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AUSTRALIAN ENERGY REGULATOR REVIEW OF WACC PARAMETERS FOR ELECTRICITY TRANSMISSION AND DISTRIBUTION

MELBOURNE

2.07 PM, FRIDAY, 10 OCTOBER 2008

MR S. EDWELL: Welcome to this round table on the weighted average cost of capital and particularly a big welcome to our and the industry's expert advisers because we really wanted this to be a session where we get some interaction between the advisers rather than necessarily the AER people and the sector because we have
5 another process and indeed a number of processes for that to happen. So we wanted to get some early I guess up front understanding of what has been put to us from the sector through the advisers that are acting on their behalf, so I welcome everybody and in particular I want to welcome Martin Lally in New Zealand. We can see you there on the screen, Martin, and you're probably hearing us with a bit of delay.

10 ASSOC PROF M. LALLY: Yes. Yes, I can hear you very well. Thank you, Steve.

MR EDWELL: Now, having been on the other end of some of these conferences as the only person on a number of occasions, I know it's difficult to get a word in
15 edgewise, so I will actually call you in, you know, fairly frequently so you don't get or you don't miss an opportunity to make your point, so it will be up to me. So rest assured I will do that. We do have - this session is a fairly formal session so we are proposing to have a transcript.

20 Now, I'm not sure whether we will release it or not but certainly for our own purposes we want a record of what is discussed here to inform us as we go through but just for that purpose, could I ask if people are making a comment if they could introduce who they are and where they are from, that would be pretty useful, and also I acknowledge some of the industry people here today as well. We did curtail the
25 number of industry people at the session because we wanted to keep it fairly tight but welcome to you as well.

Now, we have put aside two hours. We probably have got - we will be starting a bit late so we will probably go, we will certainly go for the two hours. We have
30 probably got a little bit of time beyond two hours but not much. Some of us, I know I have and possibly Ed and some of you other people have got planes to catch. So I am going to have to put my toughest regulator's hat on. So I say up front that the session will be pretty highly regulated in terms of the chair. We have allocated in the handout that you have been given, certain times for considering these various issues
35 so I intend to keep people to those times.

So where you have got the floor, if you could just keep within either the 10 minutes or the five minutes that we have allocated for the time, that will be greatly appreciated and will save the chairman's gong going off through the proceedings and
40 hopefully at the end of each session when the experts have had their input, we may get a bit of time for other people to ask any questions or clarification but essentially it is for expert case putting and responding. So I think I have covered off on most of the formalities. So are people happy if we kick off?

45 Now, I should probably introduce Andrew Reeves and Ed Willett. The three of us make up the AER. I think it's fair to say that we are still getting across the detail of what has been put to us in this very weighty input which we very

much welcome from the sector. Our staff has sort of been beavering away at it and what we have asked staff to do for this afternoon's session and given staff direction was to put together some questions which we think are at this point in time the sort of threshold questions or amongst the threshold questions for us, so we don't propose to be 100 per cent familiar with what has been put because we haven't gone through all the material but we have made a pretty good start. [the list of questions is attached]

So to the extent that I get stuck in terms of describing some of the issues, I'll defer to our people who have had the chance to look through it in more detail. So look, let's kick off and I guess the first issue that we wanted input on was really this issue about the weight that people are putting on the relevance of market data as distinct from other references in terms of estimating the various WACC parameters. In some cases what's put to us is that the market data is fairly reliable, for example, in the context of, you know, gamma estimation and the MRP but we are also getting the view, and this is mainly, I think, in the context of beta where some experts are saying that, certainly in the case of Australia, the beta estimates are not very reliable.

So without getting into the detail of references for specific parameters because we are going to discuss some of those later on, the question we really want you to respond to here at a sort of a high level principle sense is, what do you see as, or is it more appropriate to rely more heavily on market data for some parameters and less so for others? Is there a consistency in terms of that, and maybe if I could get Professor Gray to lead off on that issue.

PROF S. GRAY: Will do. Yes, thanks for the opportunity to present some of our views. On that first question, now, I have tried to stick to the high level aspects as you asked. It's my view that we should use the same approach for all WACC parameters and that that involves looking at all of the available and relevant empirical data, empirical market data, and then what we should do is to apply a considered approach taking all of the relevant data into account. It is my view that what we should not do is apply a mechanical and unquestioning approach in any respect; in other words, we should not just turn a handle and immediately adopt whatever comes out at the other end.

Equally, it is my view that we should not assume a value for any WACC parameters, that all WACC parameters should be considered in light of the relevant available market evidence. In the papers that I have prepared in this matter, what I have said is that: number one, we should consider all of the relevant data; number two, we should consider different econometric techniques that might be applied to the data; and, number three, we should also consider or have reference to the settled market practice in relation to each of the WACC parameters and that a considered approach, taking into account all of these things, will inevitably apply different weight to different pieces of the empirical evidence that are available.

The considerations in my papers determine how much weight we might apply to each different piece of empirical evidence include the following things: so number 1 is the statistical precision and reliability of the empirical estimates; number 2 is the

availability of data and so that has a cross-sectional dimension. So just by way of one example in relation to beta, consideration would be how many comparables do we have available, how many comparable firms are in the data set that's available.

5 We would consider the – this is under the second point of availability of data – we would also consider a time series dimension. So again, in relation to data how long a data period is available for those comparables; and in relation to theta, which was the other paper that I prepared, how long a period of, you know, whatever the data source is, futures contracts or dividend drop offs as the case may be, is available.

10 The third thing that my papers suggest would have reference to is the consistency of empirical estimates and so that point also has three dimensions, if you like, consistency over time. So if we had a parameter and there were no good economic reasons for expecting to vary widely over time, and yet an empirical approach or an econometric approach that we applied, did produce estimates that varied widely over
15 time, then that would be a case where those empirical estimates in that econometric technique would be afforded less weight. We would also look at consistency across firms.

20 Again, just by way of example in relation to beta, if we had a small number of comparable firms in our data set and we compute, use the particular empirical technique to estimate beta for each of those firms and we considered that they were all estimates of the same thing, the appropriate regressed equity beta estimate for the benchmark firm and across the small number of comparable firms that we had, again we obtained wildly different results. That would be a reason to afford less weight to
25 that evidence.

And then the third element would be consistency across empirical methods. So if we have a particular data set and there are a number of different empirical methods, that could be applied to it and they produce consistent results, they would corroborate one
30 another and be a reason for us to put more confidence and afford more weight to the results, but if different empirical methods produce again wildly different results when analysing the same data sets, that would be another reason to be cautious in affording much weight to that evidence.

35 Now, the fourth consideration in my papers is the internal consistency within an economic framework. We will come to this later. I will just note that there are two elements there – two examples, perhaps – consistency between estimates of theta in market risk premium which is not something that I address - Dr Bishop will probably have something to say about that at some point – and then consistency between the
40 estimate we might use for theta and the value that is ascribed to cash dividends, which is something that we will come to later. I won't deal with that in detail here.

45 The fifth thing that my papers had regard to is market practice. What is the settled market practice that is applied by industry participants and the thinking there being that that is probably the settled market practice for good reason. And then the sixth thing is what I have called in my papers, economic reasonableness or the plausibility

of the estimates that result from applying an econometric technique to a particular data set, that we would look at the output and consider whether it makes economic sense.

5 So some examples of that would be, you know, do the results imply that equity returns are lower than debt returns? Do the results imply that investors required dramatically different returns from comparable firms all considered to be proxies for the benchmark firm. Do the results imply that investors or a group of investors are acting irrationally. There are some economic reasonableness or plausibility
10 considerations that should also – one should also have regard to before – in determining how much weight to assign to a particular econometric result applied to a particular data set.

MR EDWELL: Thanks, Stephen. Doctor.

15 DR BISHOP: I can only just reiterate exactly that Stephen said in evaluating the parameters. We looked at the market in the first instance but often there were challenges in interpreting the market or getting the data. So that does lead to trying to find comparisons with practice, comparisons with other countries, although they
20 are often fraught with difficulty, comparison across different studies and techniques. For example, in the market risk premium area. As I'm sure you are all very well aware it's quite challenging. We need a forward looking market risk premium but we don't have a ready data source of what that market risk premium actually is, so we tend to look historically, that's one method, of course, when we look historically
25 we get very wide variation in those numbers.

So we tend to break it up into different data periods and cut it in different way to see if we can see a consistent story coming out of it, then we might compare it, as Stephen said as well, with what happens in practice, are numbers consistent with
30 what people are actually doing and if not, why not? Can we get some lead from that to help us rationalise or understand that the numbers are sensible.

Clearly we try and look at other countries. We would expect in, I guess, some international activities there would be some similarity although again there are
35 challenges across countries because of the differences in the structure and people and demands of those countries. And where we have different methods that might give us some insight, we will also look at those but naturally the weight we put on them depends on the quality of the information that goes into it and how much research there has been done on it as well around the world is of great input to thinking
40 through those issues.

MR EDWELL: Thanks, Steve. Professor Lally, would you like to have first go at making comments on those matters?

45 ASSOC PROF M. LALLY: Thank you. I think the list that Stephen has articulated is a very good one, a very comprehensive list. If I could just make a couple of comments. One of them is that some of the characteristics that Stephen is

mentioning would appear to be subsumed within others so there may not be a need to separately consider them. For example, if you're interested in statistical reliability of the estimate, which I hope we would be, and you're also concerned about the length of the data period you have got, if the length of the data period is very short or very long, that tends to affect the statistical reliability of the estimate. So if you are looking at the statistical reliability of the estimate you may not need to be too fussed about the length of the data period. Short periods will be generally to statistically unreliable estimates.

10 The second comment I would like to make is that Stephen does refer to internal consistency within the framework and I think that's a very good point to make. There is one area where there is, I think, a striking clash between this desirable property of your estimation process and what the market data seems to be saying. Now, that clash is in the area of the parameter that you are calling theta, what I will call the utilisation rate on imputation credits and the model that you are using is this Officer CAPM which assumes, amongst other things, that national equity markets are fully segregated so Australians are completely segmented from the rest of the world, that's the model, and if that's your model it seems to me that the value for this parameter theta that goes into that model should be consistent with that and that pretty well says to you that the value for theta should be one or something close to it.

However, if you look at market data you tend to get in general significantly lower estimates and why is that? Quite possibly because your market data is reflecting the existence of lots of foreign investors which is incompatible with the models you are assuming. So I am pleased that Stephen has mentioned this internal consistency question because I think it raises significant issues in respect of this parameter theta.

MR EDWELL: Thanks, Martin. John, do you want to - - -

30 ASSOC PROF HANDLEY: Yes, thanks Steve. John Handley from the University of Melbourne. I agree with Martin's comments when he referred to the list of items that Steven has taken into account in his considered approach. I think, without stating the blinding obvious, the true value of these variables to the extent that the true value exists, is not there. So all these variables require an element of estimation and therefore it also requires the exercise of judgment, professional judgment.

40 So the notion of internal consistency, I think, is very important and I think we will hear, a consistent theme throughout today's session will be consistency in the sense that if you look at any opinion, any valuation or any view that a person takes, there are two elements that you have to take into account; one is it's going to be objective aspects of that opinion and there is going to be subjective aspects and so to a large extent when an opinion, when a view is formed, the best you can do is to ensure that it's defensible and so covering all the bases, taking as many items into account as you possibly can, not arbitrarily making adjustments one way or the other I think is

very important. Regarding Martin's second comment on the theta, I think that is probably better left - - -

MR EDWELL: We have got a question like that later on.

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ASSOC PROF HANDLEY: That's right, when we talk about gamma. So basically on the specific high level aspect of this, I actually don't see any inconsistency in relying on market data more heavily in some items and not in others.

10 MR EDWELL: Thanks, John. We have still got about six or seven minutes on this issue so I might open it up. Now, David, I think you had one question which you're telling me is related to this. Do you want to just ask - - -

MR D. HEADBERRY: Do you want me to come up closer so I can hear you?

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MR EDWELL: Well, just sit over here.

MR D. HEADBERRY: David Headberry from the major energy users group, representing consumers. One of the issues – I was listening very carefully to what all of our professors have been telling us, and all of the data we get comes from the stock market, effectively. The stock market also tells how well companies are really doing in a real world, not in a regulated world. And to me, for consistency across the whole market, we should really be benchmarking what really is happening in the market as a whole, rather than just taking elements out of what we see, out of the market itself, and then just applying them in a mechanical way. So I would like to have some feedback on what – the value of actually looking at what is happening in the market with real companies.

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MR EDWELL: Dr Gray or Dr Bishop?

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PROF GRAY: I don't understand the question.

MR HEADBERRY: Okay. All of the data we get, the derivations of gamma, and market risk premium, all that sort of thing, comes out of the performance of the stock market, the accumulation index and the like. That is made up of the out workings of a whole raft of companies that are in the stock market, 7 or 800 of them. What we should be looking to do is to benchmark the actual performance of companies, as distinct from what we actually model out of the individual elements that we calculate.

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DR BISHOP: Yes. I am also a little bit struggling with the question. But what we are actually doing in estimating betas, trying to come up with the required rates of return, is to reflect what is actually happening in the stock market. At the end of the day, the WACC, the cost of capital, cost of debt, are meant to represent what real companies face. And of course, we can't easily observe what the cost of equity is, for example. It's not something you can go and see a ready market for, so we rely on market data to inform us what that actually is, but we need models to help us

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interpret the data. But the challenge is that there's a lot of information out there. How do we absorb it, how do we interpret it?

5 And we use our models to help us, and clearly, the models are just that, and how good they are is subject to an enormous amount of testing, trying to get the best model that is available. And we tend to use the CAPM, because it is the best model available, but it's informed by stock market information. So we're looking – and when we're trying to estimate betas, for example, we're looking to what the real betas might be of those companies. So in that sense, we do very heavily rely on
10 stock market information to help – to inform a lot of these decisions, and what these parameters are.

ASSOC PROF HANDLEY: I'm not sure whether this is correct, but is your
15 concern that we're only looking at companies which are listed on the stock exchange, as opposed to looking at the whole universe of companies and firms within this country?

MR HEADBERRY: No, it's the whole of the Australian market, because that is
20 where we derive the information from.

ASSOC PROF HANDLEY: Yes.

MR HEADBERRY: But what raised the question is that many of the members of
25 consumer organisations that actually get involved with regulatory reviews look at the rewards that have been granted by regulators - as to the regulated companies, and then compare that to their own rewards that they generate out of the operating in a competitive environment. And they see a market difference, and that's what is raising this concern, is that we can analyse and break down the detail within the whole of the – each of the various elements, and come up with an answer.
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We come up with one which is usually biased towards the regulated business, and there's valid reasons for that, but the final outcome is that the number that is calculated seems to be much more than the companies who are working in a competitive environment really do earn. And that's what their concern is, that the
35 rewards going for a low-risk business like the regulated businesses are much greater than the rewards they earn in the in competitive world. And that is for a range of companies, not just one sector of the market as a whole. And that is what raised the question.

40 MR J. DIMASI: David, Joe Dimasi. I guess I'm also trying to interpret your question, and your last clarification, I suppose, would go to a question of judgment as to whether the parameters they used are, you know, just generally too high, whether that's your concern. Or is your concern that – the model that we end up with is, if you like, a model outcome. So for example, we have a 60/40 gearing ratio, but the
45 companies are not bound by that. I mean, that's how we work, and there's a number of others that are model inputs, but the companies can then go and do what they will. So in a sense, what they might end up with is different to what the regulator says, and

that's understood. We're not regulating their actual returns, we're setting these model conditions. So is your concern that we should be regulating their actual returns?

5 MR HEADBERRY: No.

MR DIMASI: Okay.

10 MR HEADBERRY: My concern is that – an obvious example. OneSteel is a company listed on the stock market, it operates in the same investment environment as the regulated business. OneSteel looks at its return that it gets in relation to its assets, and consistently, we are seeing all of our members saying the same thing, that when each of our members looks at the returns they get, and looking on their annual reports, and their balance sheets, and that sort of thing, they are lower than the
15 regulated returns.

MR DIMASI: Well, that's a rhetorical question. At the end of the day it's the question of the judgment that we use, isn't it?

20 MR HEADBERRY: Yes, but I'm just saying, that's what it is, and that's what my question goes back to: Why can't we look at an average of the market returns, to benchmark the calculated WACC to see whether that reflects what happens to the wider companies across the stock market? Because we're using essentially the same data, and we don't seem to get the same outcome after using the same data.

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MR DIMASI: I thought that is what we do, but anyway.

30 PROF GRAY: I was concerned, I'm not sure that that's a valid comparison. I think what we need to see is the weighted average cost of capital that OneSteel uses internally when deciding whether or not to commit capital, and you would surely not have us believe that that number is dramatically lower than the weighted average cost of capital that regulators in this country have historically allowed distribution businesses.

35 MR EDWELL: Look, let's put it on the table as an issue, and we'll just put it into our process, David, and get the views on that from both sides when people have more opportunity, give it some thought. Is there a pressing issue on questions from that last item, or could we move into more detail? Let's go into the next couple of questions, and this is now zooming in on the specific risk parameters. And this next
40 element is all about the risk-free rate. Now in the issues paper that the AER put out, we canvassed the potential for the risk-free rate to be estimated on the basis of a five-year proxy, as distinct from the traditional 10-year proxy, and that's not a view that we have a settled position on, of course.

45 But I guess it is relevant in the context of, we have got five-year resets, so should there be some consistency between the period of the risk-free rate and how it's used in MRP, etcetera, and the five-year regulatory period. Now we have received some

pretty strong response back from industry, through their advisors, that there's a problem there. At least one problem, anyway. And the threshold issue is the purported illiquidity of short-term Commonwealth Government securities over five years, vis-a-vis 10 years. So I guess our – this question is really trying to get some discussion around the relative merits of:, both historically and currently, have we got an illiquid market in the five-year period?

And also in looking at that, is it not just the simple matter of saying: Well, let's just look at a five-year bond, compared to a 10-year bond, but look at the remaining years to maturity that a 10-year bond might have, because as we all know, these things get traded, so five years down the line, a 10-year bond becomes a five-year bond, so, you know, should we be considering that? So if I could just get maybe, Steven, you might want to lead off again, just your points around that issue, and in particular, I didn't see – and this is a personal view – but I didn't see in what you had provided us – I saw some pretty strong assertions, but I'm not necessarily sure I saw any evidence to support your claim that the five-year market is illiquid.

DR BISHOP: If I could start by just commenting that the consistency issue is very high on the agenda here, and we need to be consistent in the risk-free rate, and market risk premium. Again, that's where one of the tests, we agreed, was, I think, quite an important test. And where do we start with what the period should be? And that context is very, very important in all of this. And of course, the context that we have is, first, the CAPM doesn't tell us what the period should be. It's a one-period model, we don't know what it is, but the interpretation generally is that it's certainly investor horizon we should be thinking about, or that's often then translated into: Well, it should be the horizon of an investment that we're considering, what is the return that we must earn to encourage capital to be attracted to that particular investment?

And so we tend to look at the duration of the investment as the starting point to thinking about what should be the return, and so the return should reflect that duration. And so when we come to measure things like market risk premium, then that would say we want the longest term possible for that market risk premium. What is the term of the market, what is the term of the risk-free rate? We need to think through that. So we would need a series, a historical series, if we're using historical estimates of market risk premium. That is consistent with that notion, and I think the challenge has been, historically, to find a risk-free rate that has been liquid and deep. And my understanding is that the 10-year end has been a lot more liquid and more traded than has been the five-year rate.

Now one of the challenges I have discovered in, in fact, asking – answering the question that was asked when I was actually writing a paper, because I have seen the comment many times that the 10-year end is more liquid than the other ends, and so I endeavoured to try and get some data on that. And the bottom line is that it's very hard to find data on the quantity of trading that occurs in those bonds, and I certainly would welcome input on sources of that particular trading. The data source we often

use is Bloomberg, it captures a lot of data. I have tried to get the volumes of trades on the bonds from there. They actually track it on a daily basis.

5 You can look on the day and see that number of ticks, the number of trades that occurred, but you can't get it historically. And I agree with the notion that ideally, what do we want here? We want some indication of the quantity of trading to tell us how good the number is that we're seeing. It appears to be hard to get. So I at least got what information I could get in the time that I had, and the most of the information available seems to be supply-based information. It's how often are the
10 bonds issued, what quantities they're issued.

And when we look at that, it's very clear that there are substantially more 10-year or longer bonds issued than there are five. They are issued far more frequently than are the five-years. Now that's the supply side argument, but it's indicative that if they're
15 out there, they're going to trade more frequently than the shorter term. So bottom line is that that security, historically, is seen to be more liquid than the shorter term.

MR EDWELL: And that applies to the secondary market as well?

20 DR BISHOP: Well, that was my point about – I tried to get information on the secondary market through Bloomberg, you know, what is the quantity traded, where is this stored? And when we worked through the paper, I have ended up having to rely on the supply side, and also recognised that if we can get more trade information – and when I saw the question here, which I had anticipated writing the paper, I have
25 tried to track that down through the Reserve Bank website, with Reserve Bank papers, anything that gave any indication of the actual volume of trading, and I have not been able to come up with a good source, and I would certainly welcome any input that can assist us there.

30 I'm not sure whether you were able to find anything, John, when you were doing the paper with Brailsford and Maheswaran when you came out with the market risk premium there. Were you able to come up with better information?

35 ASSOC PROF HANDLEY: No, we were not actually looking for any data on the liquidity, from the point of view that we were essentially following the market convention, being that the market risk premium is, traditionally, defined relative to the long-term bond, and traditionally that has been the 10-year rate. We did add – an innovative component of our paper is that we have also presented some data based on the short end, on the basis that – and that was based on the three month treasury
40 notes, for as long as we could do it, and then we had to substitute that with the 90-day bank bills, for the reasons that we know, that at different points in time the yield curve is not flat.

45 And so we took a view that, okay, there's general acceptance that the 10-year is fairly liquid, and that the short end, the 90-day, three months, is probably the most liquid, or at least accepted as the most liquid. As far as getting data on that, as I said,

we didn't look into it, but based on what Steven has said, I would not be surprised if it could prove difficult to get that liquidity data.

MR EDWELL: Information.

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ASSOC PROF HANDLEY: When we are looking at the yield on a five-year security, whether for the purposes of the risk-free rate or for the purposes of estimating the market risk premium, we may clearly - an approximation would be just to take a linear interpolation of the short and long end. Now I don't know whether that's - I'm not advocating that as the best method, but at least that will give you some feel for the, sort of, magnitude of what the five-year rate might be. But clearly, you know, you would want to, if you were going to use a five-year - if you did want a five-year rate, you would want to measure that directly, and then in some ways, that linear interpolation could be a cross-check on what the market data shows.

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MR EDWELL: Martin Lally, do you have a comment on this matter?

ASSOC PROF LALLY: I'll have to defer to my Australian colleagues on the question of the relative liquidity of five and 10-year bonds in Australia, and just what those liquidity measures are. But if I could just make three brief comments on the discussion I have heard so far. One is the question of what is the horizon that you're talking about in this CAPM model. I think it's very clear from the model that it's a horizon over which investors make decisions, and then wait to revise their portfolios. And of course, the investors don't behave like that in general, but the model presumes that they made a decision, they buy - sell some assets, and they sit back and wait.

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And whatever that horizon is, it's assumed to be uniform across the business. It has nothing to do with the length of a particular firm's investment project. If that horizon that the CAPM model is talking about from investors is, for example, one year, then so be it. Some firms will invest in projects that have a life of six months, and some will invest in projects that have a life of 60 years. There's no relationship between the investment project life you are looking at and the horizon that the CAPM is talking about. The second point I would make is that discussions about the relative liquidity of different length bonds rather assumes that you have the luxury of lots of different options here.

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Now I'm not well acquainted with the Australian situation, but as far as New Zealand is concerned, the only really long-term government bonds series that's available - and when I say "long-term," I mean going back several decades - the only long-term series that's available is 10-year government stock. And when you look at the results that have been presented from a wide range of countries by Dimson, Marsh and Staunton, it appears internationally that there really is only for most countries some long-term series, generally 10 years; sometimes it's a bit more, sometimes a bit less and something very short of the order of a few months.

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So they are really the only two options as far as estimating the market risk premium in most markets. It either has to be done relative to very short-term bonds or very long-term bonds. The third point I would make is that it has been mentioned by a number of people that traditionally the market risk premium as defined relative to long-term bonds. Well, that's certainly the case in New Zealand, but that is perhaps because we only have long-term bonds for the purposes of estimating the market risk premium, we don't have any other options.

But as far as other markets are concerned, I've recently been involved in a much more detailed kind of arrangement to the one you have here, with the Commerce Commission, involving a couple of other academic/consultants, one of them from the UK, Julian Franks and the other from the US, Stewart Myers, and both Stewart and Julian were very, very surprised when I referred to using the long-term bond series for estimating the market risk premium and doing cost of capital assessments on that basis. Their view in their own markets was that the Commission was to use very short-term bonds for estimating the market risk premium. So it looks as if Australian and New Zealand practice is not necessarily that which is followed in other markets around the world.

MR EDWELL: Thanks, Martin. Okay. Look, we might settle that one – not settle it, but take all that on board. I think the second question here is a bit of a side angle to that, and that is from my point of view one of the things we have to do with this risk free rate is to use it to calculate the debt risk premium. So for a given credit rating what would be the premium for a particular corporate to raise its debt. So the term of the – the term you use to calculate the risk free rate ought to align, ought it not, with the benchmark sort of corporate bond yields you are using to put what the premium ought to be. So I guess the other take on this discussion then is what are your views about the liquidity of the corporate bond markets? If we go ten or five can we get a match-up there in terms of liquidity in corporate bonds, and I'm not sure that I read – I admit I've skirted over this stuff, but I'm not sure I read much about what you – if you had anything to say about the corporate bond market, Steven, in the paper you gave us.

DR BISHOP: No, the answer is only no. We didn't really – the focus of my paper and the papers I was working on were not the debt risk premium. I mean I like your argument about consistency, that we need to be able to be consistent in degree of liquidity and are we in trouble if we have liquidity in one and not another.

MR EDWELL: Yes.

DR BISHOP: And does that create problems for measurement, and I'm very comfortable with that notion indeed, but it's not something I looked at as part of this liquidity baseline.

MR EDWELL: Any other comments on that? John, have you got a - - -

ASSOC PROF HANDLEY: I don't have any data on the liquidity of the corporate bond market. My understanding is that the corporate bond market in Australia is probably illiquid compared to the government bond market and certainly based on research that's been undertaken in the US over recent years by some high profile
5 people, they show that the liquidity of the corporate bond market – and this is prior to the sub prime problems that have occurred – the liquidity of the corporate bond market in the US is actually quite low as well, and the US corporate bond market is much, much larger than what there is here.

10 So I think the message from that is that when you're looking at debt capital markets and bond markets for estimating yields, you can have quite a high degree of reliance in taking data from government bond markets, but when you start taking data from corporate bond markets then liquidity does become an issue. On the other hand, if that's the only data that's available, then that is the only data that's available and
15 then you make a judgment call on how you're going to use it.

DR BISHOP: Which is why you might go to the primary market in that case because the secondary market is just not deep enough.

20 ASSOC PROF HANDLEY: Yes.

MR EDWELL: Martin, do you want to make a comment on that?

ASSOC PROF LALLY: Quick comment. I think it's pretty uncontroversial that
25 corporate bond markets are illiquid, relative to government bonds, and also to the equities of at least your largest firms. But, hopefully, if you obtain your estimates for the debt premiums from looking at traded bonds, whilst there is some room for error in generating those numbers because liquidity is low, hopefully the numbers do tend to be pushed upwards to reflect the fact that corporate bonds are relatively illiquid
30 and that seems to me to be an entirely proper thing to do, corporate bond yields reflecting the illiquidity of those instruments. The really interesting question here is the extent to which we should be thinking about liquidity of equities in the businesses that you're interested in regulating.

35 Traditionally the Australian regulators and all others that I'm familiar with are not making any allowances for the illiquidity of equity in the firms that you're regulating. The market risk premium estimates are reflecting the liquidity of the value weighted average asset in the market, but that tends to be a pretty large stock, so liquidity premium might very well be lowish relative to the smaller businesses that
40 you are regulating. I don't know that there is any simple answer to this because trying to make allowance for liquidity for relatively illiquid equities is a very, very controversial area, but it is one that regulators haven't tackled and maybe it's something that should be on their agenda for future discussion.

45 MR EDWELL: Yes. Any other comments on those? We might leave the risk free rate then and move on to gamma. I was watching Business Sky News last night and they had Don Stammer on there talking about the latest meltdown and he was

saying – and there were some international people as part of this panel, and he was saying what a wonderful world we live in in Australia where we've got the best imputation system – best taxation imputation system and I was thinking at the time, well, you might think it is good, but we've got to sort out whether –how the bloody thing works in the WACC formula, whether it is 0 or 1 or let's just take a punt in the middle, which is what has been happening. So we've got this vexed issue about how we derive gamma and there are polarised views, as we all know.

So I guess this – and it would be wonderful if we could – and maybe the problem would go away if we could just agree on what empirical evidence we should be using to try and estimate it. But we've got some people saying, well, let's use tax statistics and other people saying, tax statistics don't work, so dividend drop off studies is the only way to go. So the two questions here really hit on that and the first one really is all about, again, to the sector, I guess, in the first instance, your views about what the best estimate of – in terms of – both theoretical and, I guess, in empirical terms, this issue about what is the best way to estimate the value of these imputation credits. In particular, as I see it, you come out fairly strongly in sort of knocking estimation through tax statistics, if you could comment on what is behind that.

PROF GRAY: Okay. I'll just start by noting that, for reasons that I'll explain as I go, if someone is of the view that imputation is of great value to Australian investors, they're necessarily also of the view that gamma takes a very small value. I'll explain that as I go. There are four methods that have been used to get an estimate of data which is a component of the estimate of gamma. So one is the redemption rates, aggregate tax statistics. Another one is the dividend drop-off type technique looking at stock price changes around dividend ex dates. A third one is looking at prices of simultaneous trades of securities; futures contracts and stocks being one example, where one entitles you to a dividend and franking credit and the other one doesn't. Then the fourth approach that has been suggested is to ignore all of the market data and assume a value.

My view is that what we should do is examine all of the available empirical evidence consistent with the framework that I outlined earlier, and consider holistically applying the same sorts of considerations in my earlier list, and that that type of approach should be applied – or at least I've applied that same kind of framework or approach to both of the papers that I've prepared. In doing that in relation to gamma, what I've done is to look for consistency across the different empirical methods that have been applied across time, so when we break samples up into years or periods of time and across different securities markets, if you were looking at futures contracts, rights issues and stocks.

The one result that is extremely consistent across different empirical techniques, different periods of time, is that the package of a \$1 dividend and a 43 cent franking credit – 43 cents being the amount of franking credits that are attached to a \$1 dividend that is fully franked at the 30 per cent corporate tax level – that a package of a \$1 dividend and a 43 cent franking credit is valued at \$1, and that is very consistent

across a whole range of results. Where different authors of different studies have reached different conclusions is that how much of that \$1 total value should be attributed to the cash dividend and how much should be attributed to the franking credit, and for reasons I'll explain later, it's difficult to pare that out.

5

But for the moment let's be clear that the value of the package of the \$1 cash dividend and the 43 cent franking credit is valued by the market at \$1 across a number of different periods of time and a number of different econometric techniques applied by a range of different authors. So my view is that the next step is to consider whether a particular piece of empirical evidence is answering the right question. Here is where we come to the use of redemption rates. The aggregate tax statistics basically look at all of the franking credits that are distributed by firms in the Australian market to shareholders during some particular period of time. How many of them get redeemed by the recipients. Sometimes that is called a redemption rates. Sometimes people call it a utilisation.

It's my view that what we're after here is the value of franking credits to what we might call a representative investor, which in my view is a completely different question to how many of these franking credits might get used. What we're really after is how much investors – or a representative investor has paid for the franking credits that they receive via higher stock prices. So to the extent that gamma takes a positive value, that is one and the same as saying that stock prices are higher than they otherwise would be, that some of the value of franking credits has been capitalised into stock prices. So the real question is when that investor receives their 43 cent franking credit, right, how much extra did they have to pay when they bought the shares in order to receive that franking credit? How much of that 43 cent franking credit value was capitalised into the stock price and has already been paid for by the investor?

So if gamma is one, the answer to that question is all of it, in which case franking – I'll get to my earlier point, franking credits are of no benefit to Australian investors whatsoever because they had to pay an extra 43 cents when they bought the share in order to receive that 43 cent franking credit. If gamma is zero, then none of the franking credit value is capitalised into stock price and the franking credits are of benefit to investors rather than to firms, as was the original intention of the legislation. If I could use an analogy perhaps. Suppose I provided everyone here with a hamburger and then, no doubt, some people would eat the hamburger and others would not. It wouldn't tell me anything about how much the hamburger is worth to a representative investor, for me to count how many people ate it and how many didn't, right.

What I would need to do is to ask people a question like, can you give me your charge out rate with no hamburger provided and then give me your charge out rate if I do provide hamburgers and that would tell me something about how that individual valued the burger, as opposed to whether they just consumed it or not. It is the same thing here. When I look at methods like a dividend drop-off study or simultaneous prices of stock and futures contracts, I'm asking the latter question, how much are

investors across the market valuing the cash dividend, plus franking credit? Whereas if I look at aggregate tax statistics, I just see how many of them get used and it doesn't tell me anything about how much they are valued or how much investors had to pay via higher stock prices in order to receive – perhaps I'll stop there. That is, I think, the answer to the first question.

I guess my conclusion is that we would look at empirical data such as drop-off analysis and simultaneous stock price analysis. For the reasons I've outlined I wouldn't look at aggregate tax statistics of redemption rates, and for the reasons in my opening comments earlier, I wouldn't apply an assumed value. So I'd place weight on two of the four methods that have been proposed.

MR EDWELL: I know John and Martin might have different views on this. Do you want to lead off on this one, John.

ASSOC PROF HANDLEY: Sure, and I think our views aren't entirely consistent. They are partly consistent, but not entirely consistent. First of all, if you go back to the original question A about how much weight should you place on particular approaches, I'm of the view that you should look at all the approaches. I agree you should not be able to assume value, so that then takes it down to two parts of three. Stephen has knocked out the dividend drop-offs – certainly we should look at. The simultaneous derivative stock price studies we should look at as well. The one where we have a difference of opinion is the usefulness of estimates based on tax data and I must admit I'm an author of one of those studies, so I'll briefly provide the logic behind that particular study and my view on why I think that is – it is useful in the equation to be used to come up with a view as to what is the appropriate value of gamma.

Now, the first thing is there were a couple of the reports put forward by industry which suggested that the question concerning who is the marginal – the famous marginal versus average versus representative investor, really is not of any particular relevance. To the contrary I think it's quite relevant. The underlying principle behind the tax statistics basis for trying to estimate gamma is, there is a conceptual starting point that that conceptual starting point is to say, what does gamma represent in the Officer CAPM. Now, the difficulty that we have here is that Officer didn't define it very clearly. In fact there was just an assumption as if imputation credits capitalise in the prices, this is what the CAPM equation would look like.

Now, to make his model consistent with all the versions, all of the original standard CAPM, Blacks's CAPM, all the extensions to CAPM, what we can say is that the value of gamma in that model is the value to the representative investor. Now, the representative investor is the weighted average of all the investors in the market. So this is the key here. It's how you define the market determines how you define the pool of investors. Now, in some sense the issue about what is the value of gamma is equivalent to what extent are Australian capital markets segmented or integrated from world capital markets. That issue is not resolved. There is evidence which

suggests it's integrated, some evidence which suggests it's segmented. I think in reality the truth is probably somewhere in between.

5 The point is, once you define the market for the purposes of estimating your cost of the capital; in other words, once you define it as being the domestic market, then what you define is you define your group of investors. Now, the group of investors are the investors in that market and whether they are foreign, whether they are domestic, whether they are black, whether they are blue doesn't matter, it's the investors in the Australian market and only to the extent that they invest in the
10 Australian market. So, in other words, by defining the market for the purposes of determining expected returns as the domestic market, it is segmented from what happens in the rest of the world and that's not saying – and this is where Martin and myself differ – that's not saying that you completely ignore the foreign investors.

15 What it's saying is: this model is essentially saying, we have a group of investors, who we'll call them foreign investors for our purposes, who can't use imputation credits as well as everyone else in the market. There are other investments in other world markets are not relevant for pricing purposes. So why does that mean that this tax study that Chris and myself presented or prepared? Why does that have any
20 relevance? Well, it goes back to the definition of what gamma is supposed to represent. gamma is supposed to represent the prepayment of or the rebate of tax paid at the corporate level which is effectively personal tax.

25 So that study, the data and the results that's produced in our paper don't – well it's not intended to show the number of credits that's redeemed. What we have tried to do is a best efforts approach to estimate the amount of personal tax which is reduced by the receipt of imputation credits; in other words, how much company tax, how much tax paid at the corporate level has been used to reduced personal taxes in accordance with the original definition? And so what we come up with is – and if
30 anyone has ever used data from the tax office you will understand what I mean. It was very, very messy. So it's a best efforts approach and what we came up with is, over the entire period the number was between point 7 or point 8.

35 So how do you interpret that? Well, that's not our estimate of gamma therefore we haven't said that's our estimate of gamma. In some ways, what you could do is you could certainly say that is perhaps an upper bound for what gamma is because it's indicating that there's about 20 per cent of credits which are not being used to reduce personal taxes and that number is not inconsistent with studies over time and recent data which comes out of the ABS which essentially says, you know, somewhere
40 between 20 to 30 per cent of capital invested in the Australian market comes from foreigners. So this idea of 70 to 80 per cent upper bound on gamma is – and notwithstanding that's a simple average as opposed to a weighted average based on risk aversion and all those technical complexities, that's one message that come out of that paper.

45 So my view would be, following a conceptual approach; in other words the model, by looking at what gamma is supposed to represent in the model, then we can try

to use some data which provides us with a measure of what we are trying to estimate is true to that model and we come up with a figure of point 7 to point 8, but that is not saying that gamma should be point 7 or point 8 but the view I have is that you just can't ignore that in the sense that it does have relevance contrary to saying, well,
5 it's of no relevant. So, in other words, it's another – we've got the dividend drop off studies which – and perhaps at question time I might

We have got the dividend drop off studies, which are based on Steve's latest data, is saying, if you assume 100 per cent distribution, point 2 to point 3.5, previous studies
10 have said point 5 and this is saying perhaps an upper bound at point 7 to point 8. Again, it's just another - - -

MR EDWELL: How do you see any particular weighting in terms of, you know, how you would look at that empirical evidence to come to a view on what a number
15 ought to be?

ASSOC PROF HANDLEY: Well, I think certainly with the dividend drop off data there is that consistent message of the package of \$1 franking credits is equivalent - \$1 of cash and 43 cents of franking credits is worth a dollar. Now, there are issues
20 associated with how you interpret that as well. So there's no clear cut case. If you were to take a totally naïve approach, you might say well - - -

MR EDWELL: We might have to.

25 ASSOC PROF HANDLEY: That's right. You might say, well, the current figures – and I'm not suggesting this but the current figure is point 5. I have got some data which is suggesting that it should be higher and this is just on the flip side, suggesting that maybe it's not lower.

30 MR EDWELL: Stephen, do you want to respond to that, then it will be Martin?

PROF GRAY: Yes, I think that would be probably more efficient. I sort of agree with a number of things that John said and I guess we differ on a couple of other things. I guess the first point to make that in my paper on this, I just don't want it
35 interpreted that the marginal investor is irrelevant. I think my point – because there is a marginal representative investor in any asset pricing model, that my point there was that we don't need to make any assumption about the identity or a marginal or representative investor when we apply a dividend drop off study or a simultaneous securities price study. We do exactly the same thing with exactly the same data and
40 obtain exactly the same results regardless of whether you told me, you know, that this is what the marginal investor looks like or that's what the marginal investor looks like.

We do exactly the same exercise and you don't get any assumption about that which
45 is a little different from, like, John's opening comments in relation to the use of redemption rates. There you do need, as John outlined, some sort of upfront framework or thinking about, you know, representative investors and how you define

The market. When you talk about the definition of The market, I think it is useful to think about the two extreme cases: one is where Australia has giant walls all around it and is completely segmented in which case, you know, we know that only Australian investors can finance Australian companies and that all franking credits will be distributed to Australian investors and presumably but for people who are forgetful and disorganised at the end of the tax year they all get redeemed. That still doesn't tell us how much they value those franking credits. We would still need an estimate somehow of how much they value.

10 The other extreme is I could define the market to be the world in which case when I take my weighted average utilisation rate, the number is zero to several decimal places because of Australia's small place in the world economy. I think they are useful end points. If we go the route of assuming that Australia is completely segmented – I am sure we will talk about this more – completely segmented and my view is we are switched then to the fourth method of estimating gamma which is to just leap to an assumption, an assumed value. If we say Australia is segmented, therefore gamma is one, we have assumed the value. We haven't used empirical market data at all.

20 ASSOC PROF LALLY: theta rather than gamma surely.

PROF GRAY: Yes, well that was my next point, yes. So John said a couple of times point 7 or point 8 being an up bound for gamma, again data. I think we should make that clear.

25 ASSOC PROF HANDLEY: Yes, yes.

PROF GRAY: I don't want to put words in your mouth.

30 ASSOC PROF HANDLEY: No, well, that's another issue as well we can defer back - - -

MR EDWELL: We'll just get some comments from Martin first and I think the second question is related to – I'm sort of getting into that but Martin, if you could just comment on this issue. We're trying to hit people on a fairly high level about, you know, what the best way to value this imputation credits might be and then we can come back and drill down on a bit more detail.

40 ASSOC PROF LALLY: Well, we are talking here about theta rather than gamma. I think Stephen has noted correctly the four approaches that have been taken to this issue, the so called assumption that it has to be one which springs from the fact that Officer model, which is the model we're using, assumes that there are these giant walls around Australia. Secondly, there's the approach which John is most closely associated with, the redemption statistics; and then the last two methods, the drop off studies and the examination of these derivatives which Stephen is most closely associated with.

I think it's very useful to regulators to see the results from those different approaches and they are different and we have to ask ourselves why they are different. I think to help understand why the results from the drop off and the derivative studies are markedly less than from the first two approaches, it's useful to think of, imagine that
5 international capital markets are fully integrated. In that case, because foreigners to Australia can't utilise the credits, then we would expect that they would have no market value but nevertheless despite that we would expect that Australian investors would be strongly tilting their portfolios towards Australian securities because they wouldn't have to pay any more to buy these securities with these nice
10 additional features called imputation credits and yet they would be able to use them.

So we would expect Australian investors to be tilted in that direction and therefore the redemption rate by Australian investors to be quite high. So, I think as Stephen has argued, there is no inconsistency between a low value of gamma coming out of
15 the so called market studies and a high value coming out of the redemption analysis which John has done. The question though is which is the best approach? My view is that you are using a model, the officer model which assumes that Australia has these huge walls around them and if you're using a model which assumes that, your parameter estimates ought to be consistent with that and that points you towards a
20 theta value of one.

Now, a kind of a second best for that in my ranking order would be to say, well, okay we do have some foreign investors in the Australian market. Let's just treat them as if they were another class of Australian investor who just happened to have this
25 unusual feature that they could not utilise the imputation credits. Well, as John said, given that these unusual investors have a weighting in the Australian market of 20 to 30 per cent, you would kind of expect that the redemption rate would then be around about 70, 80 per cent and indeed you're finding that.

30 So if you're prepared to accept foreign investors simply as an additional class of investor who happens to have this unusual feature of not being able to use the credits, then, I think, John's approach is the right one. The third best option is to look at the drop off studies and the derivative assets approach and that does lead you to markedly lower estimates in many cases but that simply reflects the fact that foreign
35 investors are having such a strong impact on the pricing of Australian securities even though their representation in the market is only let us say 30 per cent.

However, there is an additional point I would like to make here that when you look at these drop off studies, I understand there is a range of results here, but if you take
40 what seems to be a widely quoted result from the Beggs and Skeels paper, they come up, they do this regression and they find that the coefficient on cash dividends is 0.8 and they find that the coefficient on imputation credits, on franking credits, is 0.57 and it appears that most people are treating the 0.57 is an estimate of theta; it's not. Surely from an econometric point of view the coefficient on imputation credits is not
45 theta, it's theta multiplied by that same coefficient on cash dividends.

If cash dividends have a coefficient on them less than one, then surely cash dividends have not been valued as highly as capital gains, that same phenomena must extrapolate to imputation credits. So the right statistic to pull out of a Beggs and Skeels type study, the theta is not 0.57 but 0.57 divided by the 0.8, giving us a figure of 0.72. So I think I'll stop there.

MR EDWELL: Well, I think that gets us into the next little take on this and that is if you accept that the coefficient of a cash dividend is less than one, then how do we adjust to account for that and what I see, I think if I understand it correctly, you're saying that you need to gross up the market risk premium by a factor to account for that. Can you explain what you – if you accept dividend drop off studies as the reference, how do you see that tracking through to not only theta now but how gamma should apply in the CAPM?

PROF GRAY: Maybe I'll start with some general comments then. Steve will talk about the particular question of gamma and market risk premium and the link between those two.

MR EDWELL: Yes.

PROF GRAY: Just picking up on a couple of things that Martin said, the first point I would like to make is just to reiterate something I said earlier that across a reasonably long period of time and across a number of different econometric techniques and a number of different authors, we have this very consistent result from two of the methods that I outlined that a dollar of cash dividends and plus 43 cents of franking credits is valued by the market at a dollar. The other two approaches, the theoretical assumption and the redemption rates, produce different results from that as Martin outlined. My view is that the reason that they produce different results is that they are measuring different things. That is the first point.

The second point is that in relation to something that Martin said, is about Australian investors having home bias and investing more in Australian stocks than they would without imputation. I think that's absolutely true. There's a – conceptually that that would be the case. What we're talking about in relation to gamma is the weight that we should apply - in a theoretical sense if we need to go down that track – is the weight that we should apply to Australian investors and how much they would gain or lose from investing in Australia versus offshore versus the same thing for foreign investors.

So Australian investors stand to gain a lot from going overseas because there are diversification benefits. So an Australian investor who invests only in Australian stocks is not well-diversified and perhaps they would give up some free franking credits if they were on offer in order to reduce the risk of their portfolio by investing internationally.

But now think about a US investor thinking about whether to invest in Australia. If it is the case that gamma is greater than zero – it's not beta here - gamma is

greater than zero, so that the value of franking credits or some value of franking credits is capitalised into Australian stock prices. And what we're saying is that US investors will have to pay something for franking credits that we know they can't utilise. Now, they may do that because investing into Australia provides them with some diversification benefits. But here it's a quite different thing that we're considering.

We're now considering a US investor who has the opportunity of investing in any market throughout the world and we need to ask the question of how much extra diversification benefits do they get by adding Australia as the 47th world stock market rather than having their choice of only the other 46 and the answer is nothing. Like, the other 46 countries span Australia completely. So the diversification benefits from a US investor who has their choice of the other 46 markets investing into Australia is minimal whereas diversification benefits of an Australian investor going offshore is quite substantial. And so you would have quite different weights applied to that. So even if we were going to use utilisation, or redemption rates, I think that's a consideration that we'd have to be taking into account.

In terms of, like, the theoretical assumption about we're using an Officer CAPM that assumes markets are segmented so we have to impose that assumption on the estimates of each and every WACC parameter. I disagree that that's the correct way to apply an economic model. My view on that is that all economic models are based on a set of assumptions and every one of those assumptions is unrealistic which is why they're called assumptions, they're not descriptions of reality. The CAPM is based on a bunch of assumptions. Like any economic model all of those assumptions are unrealistic. So what we don't do in economics is to test the model by the validity or realism of its assumptions but by how well it works and how useful it is to us.

So the CAPM, based on a bunch of unrealistic assumptions, produces a pricing formula that we can use in this setting to estimate the expected return on equity, or the required return on equity that investors would require before committing capital to the firm. And so that's based on a set of assumptions. We get a pricing relation out of that and that model has stood the test of time and it's useful for our purpose. Now, it's a matter of estimating parameter inputs. We have to populate the parameter inputs into the model and there's two approaches that we can follow in order to do that. One is we can use values from market data, basically adopting the procedure and the considerations that I've outlined earlier. And I'd refer to that as inputting parameters into the model which are estimated as is, right, as they are in the market.

The alternative is to plug in values as they would be if all of the underlying assumptions were imposed, right. So we could say that, well, gamma, or theta, would be one if we impose the assumption that there are no foreign investors. Is that sort of clear? That one approach is to say, well, let's estimate gamma as it is. Another approach is to say, let's estimate gamma as it would be if that particular assumption underlying the CAPM were imposed on us. Obviously, it's my view that we should pursue the first approach rather than the second. If we are to pursue the

second approach, then we must do that for all CAPM assumptions. If we're going to exclude foreign investors when we estimate gamma we must also exclude them when we estimate the risk-free rate, market risk premium and so on.

5 And if we're going to exclude foreign investors, because they're inconsistent with an assumption of the CAPM, we must also exclude all investors who are unable to borrow and lend infinite amounts at the risk-free rates because that would be inconsistent with one of the assumptions of the CAPM. It's my view that that approach is something that's not useful and not appropriate. And then the final
10 thing, picking up on Martin's interpretation of the Beggs and Skeels results that you need to gross up the 0.57 estimate of data to account for – by the other parameter in that model. It's my view that that's not correct but that's a complex issue and we'd welcome the opportunity to perhaps explain in another submission, another short submission, why that's the case and I think that's probably the forum for that here. I
15 need a white board in half an hour.

MR EDWELL: I'm sure we'll give you the opportunity, yes. Martin, is there anything in response that you quickly want to make to what Stephen said?

20 ASSOC PROF LALLY: I think the econometric issue that Stephen has just referred to about the Beggs and Skeels paper, I doubt if we can resolve that here. So perhaps it would be better left to a submission from Stephen. On the more general question that he's raised let me make two comments. The CAPM does, as Stephen says, like any model, make lots of assumptions and those assumptions are, generally speaking,
25 unrealistic. And, therefore, why should we be too concerned about them? Well, let me give a concrete example. One of the assumptions that the CAPM makes is that investors are risk averse. Probably one of the few assumptions in the model which is descriptively accurate but that's neither here nor there.

30 So we've got an assumption in the model that investors are risk averse and it follows from that that the market risk premium, the true market risk premium, must be positive. Now, supposing we went out and did some sort of analysis on the market risk premium and we came up with a negative estimate for the market risk premium. Well, I would say such an estimate is inconsistent with the model and therefore
35 should be rejected. I don't know what Stephen would say but one interpretation of what he's doing so far is to say, well, that's the market evidence, Martin, and even if it is inconsistent with the model too bad. Okay. That's the first point.

The second point is, again, on this question of results that are inconsistent with
40 models. It's certainly true that if you're going to exclude foreign investors from any assessment of gamma that you ought to be consistent and exclude them from all other parameters. I think that's a fair point to make. But it's not obvious that the result of doing that, even if we could determine it which we can't, is that the risk-free rate would change. Australian investors would now have to stay home and
45 foreigners would have to stay home. It's not obvious that the risk-free rate would change. It is obvious, though, that if you can't have foreign investors, that the

market risk premium is going to change. If you can't have foreign investors, then the market risk premium is going to go up.

5 However, that's not a serious concern in the work which has been done for
Australian regulators because most regulators appear to be using the long-run
historical average returns from Ibbotson technology to estimate the market risk
premium. That appears to be the technology that's been given the greatest weight.
And that kind of technology is giving you an estimate of the market risk premium
that's probably unbiased with respect to a segmented CAPM. If markets are
10 integrated, it hasn't been the case for the last hundred years, it can only have
happened in the last few decades. So generating an estimate of the MRP from these
long-run historical studies is pretty consistent with generating an estimate of the
MRP that you need in an Officer type model.

15 So that's the MRP. I don't see a big issue there. The risk-free rate, it's not obvious
that segmentation changes that. beta - again, it's not obvious that beta would be
changed by - if we could wave a magic wand and exclude foreign investors. So the
only parameter in the model that obviously changes quite dramatically according to
whether you admit foreign investors is this parameter theta. That's why it's such a
20 big concern. If you were having these problems with all the other parameters I'd say,
well, okay, fair enough.

But the problem does seem to be so strongly focused in that area and the result is, in
the submission that I put in on behalf of the Electricity Users Association of
25 Australia, the result seems to be - I grant that people here might challenge certain
aspects of that - but the result seems to be that by using a value for theta that is 0.5,
0.6, 0.6 the typical result, you wind up with a cost of equity for Australian-regulated
business that lies outside the bounds of that arising from pure segmentation to pure
integration. And there's something surely wrong if you're generating results that lie
30 outside the plausible

MR EDWELL: Okay. Well - - -

35 PROF GRAY: Can I just say one quick thing?

MR EDWELL: Sure.

PROF GRAY: Just in relation to that - or two quick things, two very quick things.
In relation to that, the first point about there being a negative market risk premium if
40 you use a particular subset of data and get a negative estimate of the market risk
premium, it is not my view that you would put that into the - you would use a
handle-turning approach and immediately plug that into the CAPM to get the
positive

45 And the reason for that is that that would fail, like a number of the
considerations that I've outlined earlier in terms of economic reasonableness and
really just common sense. So that's that point.

The second point is that imagine what would happen if the Australian Government passed a law that prevented any corporation, state or the Commonwealth treasury itself from raising any funds from any offshore entity. And the question is, whether that would increase the funding costs for those Australian organisations or would it have little effect? My view is that the funding cost would increase. Did you want me to talk a little bit about the – and increase dramatically. Do you want me to talk a little bit about consistency between the two components of the dividend drop-off result, the cash dividends you mentioned earlier, being 80 per cent?

10 MR EDWELL: That's what I was coming to, yes, that might be useful. If you can do it, you know, no more than 5 minutes.

PROF GRAY: I can be quicker than that. And just really reiterating what's in my paper on this, because it's spelt out in some detail there, is that there's this very consistent result from all of the bits of – what I consider to be market evidence on this issue, that cash dividends are valued at 80 cents in the dollar and that franking credits are valued at 50 per cent in the dollar. That's what comes out of these drop-off studies, if you will. There's sort of two things to consider here. One is, in my view, it would be wrong to take that result when estimating gamma but to ignore that result when estimating the cost of equity.

So what we typically do is use – or regulators typically do is to use these drop-off studies as the primary basis, or estimates, of gamma – estimates of theta and say, well, point 5, in rough terms, is what's in those results. That estimate of point 5 is conditional on cash dividends being worth 80 cents in the dollar. What we then do is go to the capital asset pricing model to estimate the required return on equity and we plug into that CAPM formula. That CAPM formula, the framework, the economic framework, that's used for that CAPM formula, is based on cash dividends and capital gains being equally valued.

So what I'm saying in my paper is that it's wrong in one step of the reasoning process to use a framework where cash dividends are valued at 80 cents in the dollar and in another step, or the very next step in the reasoning process, to use a framework where cash dividends and capital gains are equally valued and that's an inconsistency. And that there are two ways of restoring that inconsistency. One way, which is my favourite approach and by far and away the simplest approach, is to say that we're operating in a CAPM world. That's an economic framework in which capital gains and dividends are equally valued. And so when we turn to estimating gamma we must apply the same economic framework.

When we do that we've got our first result which says that a dollar of cash dividends plus 43 cents of franking credits is valued by the market at a dollar. If it's the case that we're operating within a framework where the cash dividends and capital gains are equally valued, then the whole of that one dollar package value must be assigned, or ascribed, to the cash dividend leaving nothing left over for the franking fee. So that's what I call in my paper a CAPM consistent estimate.

The other approach that might be adopted to restore consistency between the two sides of that one estimate from drop-off analysis is to adopt an approach that allows the cash dividends and franking credits to be differently valued so we can retain our estimate of theta, being point 5 conditional on cash dividends being worth 80 cents in the dollar but then we must apply the same economic framework in the next step of the reasoning process which is where we come to estimating the cost of equity. So we must use, not a CAPM approach but a more complex approach that allows the cash dividends to be differently valued from franking credits.

It's my view that that approach is much more complex and opens up a whole sort of Pandora's box of other issues to be considered. It's not something that's used in practice and, you know, is likely not the framework that we're going to operate within here. That leads us back to the first approach which is to get consistency within a CAPM economic framework which has capital gains and dividends equally valued, if we apply that economic framework to the data that we've got, the market data for estimating theta, the conclusion from all of the market-based studies is a negligibly small value.

MR EDWELL: Okay. Well, I think it's something we need to give a lot more – it's a threshold – there are some threshold issues around that whole matter for us. We might leave that one there, thanks, Stephen.

ASSOC PROF LALLY: Can I just - - -

MR EDWELL: Yes, Martin.

ASSOC PROF LALLY: Can I comment on something?

MR EDWELL: Sure.

ASSOC PROF LALLY: Can I just comment on something there. I think what Stephen has raised is a very important issue, but at some risk of misinterpreting Stephen, what I think he's saying is we've got a model, the Officer CAPM. Amongst other things that model assumes that cash dividends and capital gains are equally valued, there's no differential tax treatment across those two sources of income and that's true, that's what the model assumes. He then goes out and looks at some empirical studies and we'll take Beggs & Skeels where you get this 80 cent figure instead of one dollar. But the empirical evidence is telling Stephen something different to what his model is telling him. So what does he do? Does he accept the empirical evidence or does he say, I have to reinterpret the empirical evidence in light of the assumptions in my model.

While Stephen appears to be reinterpreting the empirical evidence so that it fits his model it seems to me that that's exactly what I'm doing when it comes to gamma. I've got a model which says there are no foreign investors and therefore I interpret the results of dividend drop-off studies to be consistent with that model. That is, I say theta has to be one to be consistent with the model. So I think what Stephen is doing in this area of 80 cents is exactly what I'm doing with theta. And if he were consistent he would be saying, in respect of the theta issue, the model says that there

are no foreigners. I must be consistent with the model and therefore I must choose a theta to the value of one.

PROF GRAY: I have to respond to that briefly.

5

MR EDWELL: I knew this would happen. The Chairman has lost control.

PROF GRAY: Well, obviously, my views are quite different. I'm not imposing anything. All I'm saying is that we have some view about the relative value of cash dividends and capital gains, in two parts of the reasoning process that the regulator must go through. One is the estimation of gamma, and one is the estimation of the cost of equity, the CAPM. I'm really not concerned what value gets plugged in at all. My point here is that you have to have the same value, my view that it's correct to have the same value in both places.

15

Whether that be mechanically based on market evidence, whether it's based on theoretical assumption at the other extreme is not the issue here. The issue is consistency, that you can't be – it's incorrect to be using one approach, one economic framework to answer one question, and something that is clearly inconsistent with it in the very next step of the reasoning process. I think that's the issue here.

20

ASSOC PROF LALLY: I mean, the same sort of argument applies to the use of the risk-free rate in both – in the equation, in CAPM, in the equation where it appears twice. You need to be consistent with the evaluation.

25

PROF GRAY: Exactly. That's exactly what the issue is. It's a issue.

ASSOC PROF LALLY: Yes.

30

MR EDWELL: Okay. Well, let's – we're not going too badly, but we just need to move through probably a bit more quickly. Can we just go to the market risk premium. I guess the questions there, again, are most focused on the empirics, and Dr Bishop, I think the first question is really related to what we got from you, and that was, I think, a pretty simple question. And that is, you have used, sort of, post-1980 data series, which goes up to the end of '07. Is there any reason why you sort of cut it off at '07? Because I guess one could form the view, particularly in the light of recent events, if you updated it, then you might get a different number. Could you comment on that?

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DR BISHOP: I can answer that very quickly, we could probably save some time. The market risk premium that I calculated was done on an annual basis. We were using historical data, historical data runs from 1 January to 31 December. So to be consistent all the way through, that's the profile that I used, and December 2007 was the last full calendar of data that we had. So I think at the time that I did this, I might

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have had something up to May, may have been June, I can't remember now exactly, but it might have been May. But how do I use five months of data when I'm dealing with years on everything else? I didn't want to interpolate from five months to a year, because I haven't done that anywhere else.

5

MR EDWELL: All right.

DR BISHOP: I did signal in the paper that we had monthly data from 1980, but that was not used as monthly data per se, it was used as annual data for the market risk premium calculation. The only place that I think that I used the monthly data explicitly was not in the market risk premium estimate per se, but in updating some work that had been done by Hancock on using a Hodrick-Prescott filter to see how the market risk premium might have changed over time. But again, I was looking at monthly versus annual, so I kept the data sets the same.

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MR EDWELL: Okay.

DR BISHOP: Very happy to update that to more recent times, if that's useful.

MR EDWELL: Okay. John, I think that's a pretty straight response. Any question on that?

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ASSOC PROF HANDLEY: No, the data that Steven is talking about, it's annual data, that's right, and so it's – you know, it would be – I guess if you included it you would be criticised. If you don't include it, you know, why have you left it out? When we get to December 2008 – well, actually, it will probably be January or February by the time the data comes in, when you have the most recent data, but it's just data availability.

25

MR EDWELL: Yes. Okay, that's good. So this next question – and again, it's this sort of issue about the appropriateness of looking at the data series in terms of arithmetic average, as distinct from geometric, which is not – I think I read something from – maybe something you wrote recently, John, where you actually had an argument about the pros and cons of both. It might have been your paper on MRP, the recent one you did.

35

ASSOC PROF HANDLEY: Yes.

MR EDWELL: So guess what we're really – and look, we haven't got a view about whether we should move away from the arithmetic average. Probably not, but just to sort of get a bit of discussion around the point. Do people see that adopting, sort of, you know, one approach as against the other has got some inherent biases one way or another, or is there strong sort of reasons why you would use arithmetic as distinct from – in a theoretical sense?

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ASSOC PROF HANDLEY: Yes, yes. Two points. The only reason why it's an issue is that there is a material difference between an arithmetic average and a

geometric average, particularly over such a long period of time. My colleagues didn't grasp it, and himself concluded when we put together that market risk premium paper, was the particular estimate that you want depends on the purpose of how you're going to use it, and it's pretty well established statistically that – and
5 subject to certain assumptions, being you're making random draws from the same distribution – that an arithmetic average provides you with an unbiased estimate of going forward.

In other words, provided you think that the past is a reasonably good predictor of
10 what is going to happen in the future, and there's no regime shifts or anything along those lines, then the arithmetic average is more valid than the geometric average. And that's the basic approach that we adopted. There are a number of adjusted methods that – there's arguments for each. Some people have suggested that you should use a weighted average, and the arithmetic average, and the geometric
15 average, but then the issue becomes, what should the weight be?

Dimson, Marsh and Staunton, interestingly, in their very important study, they make – I can't recall off the top of my head what the adjustment is, but they use an
20 arithmetic average, but they make some adjustments, taking into account changes in volatility looking forward, as opposed to volatility looking back. So there are a number of different versions that can be used, but convention and that unbiased argument suggest arithmetic average is the most appropriate way to go.

MR EDWELL: All right. And am I right in saying the arithmetic average approach
25 launches off the sort of – even if a proposition that, you know, your returns – you look at your returns in any one year, and - not in the context of what has happened previously, so you could actually carve it up into one year independent, which adds some credibility to using the arithmetic approach. So if that's the case – I mean, does that theoretically stack up?
30

ASSOC PROF HANDLEY: Well, if there is a weakness in using the arithmetic average, that is the assumption of independence, in the sense that you are assuming that each one of your observations is independent of the other.

35 MR EDWELL: Yes.

ASSOC PROF HANDLEY: And we know that there are some patterns. Steve would be much more across this than I am, about patterns in stock price series. But that's a limitation of using – certainly, that's the limitation of using the arithmetic
40 average, but I wouldn't see it as being something that would kill it off in favour of the geometric average.

MR EDWELL: Steven, have you got a comment on that?

45 DR BISHOP: Yes, I would comment. This was obviously an essential issue that – by looking historically, we are assuming that each of the observations are independent drawings from a stable distribution.

MR EDWELL: Yes.

DR BISHOP: And clearly, under those circumstances, it is definite that the arithmetic average is the right way to go. But given the importance of that
5 assumption, there was some work done by Ian Cooper many years ago, who looked at whether if we relax some of those assumptions, would it lead to geometric being better than the arithmetic or not.

MR EDWELL: All right.

10 DR BISHOP: And in that work, he did both conceptual analysis as well as some modelling, using the US statistics, to see, theoretically, what was the correct answer, and did using the geometric mean or the arithmetic mean gets closer to the correct answer or not. And the answer was that the arithmetic was definitely the closest to
15 the true underlying mean in the modelling. There was some bias in both, but the bias in the arithmetic was very small, and if you corrected for the bias, then it actually made the geometric mean even worse. So that analysis there, which (a) relaxed the assumption that the observed mean – that we didn't know exactly what the mean is.

20 And let me put that in context. When we talk about the distribution of possible market risk premiums, our assumption is that it's stable. And in the pure sense, we also assume we know what the mean is. But of course in practice, we don't, we have to estimate it. And how do we estimate it? We estimate it using arithmetic averages, we estimate it using geometric averages. So he said in circumstances where we don't
25 know what it is, does it matter? Which one gives us the better answer? The response was, arithmetic still did. And he said: Well, let's introduce serial correlation. Did that make a big difference or not? Answer: Given the sorts of numbers that we're used to dealing with, the arithmetic was still far better than the geometric. So that gives us some comfort, that we should stick with the arithmetic.

30 MR EDWELL: That might be an easy one. Okay. Well, I think the last question that we had - - -

ASSOC PROF LALLY: If I - - -

35 MR EDWELL: Sorry, Martin.

ASSOC PROF LALLY: If I might make a comment about that.

40 MR EDWELL: Yes.

ASSOC PROF LALLY: I think the Cooper paper to which Steven referred you is from the European Financial Management in the mid-90s. My understanding of the paper is that the point that is being made is that even that you are dealing with a
45 series of annual returns that are drawn from the same distribution, and you're trying to estimate the expected rate of return on an asset per year, then the arithmetic mean of the data series is unbiased. The geometric mean is biased, but the context in which one's dealing can be quite different, and typically, is quite different to that.

For example, if you're interested in valuing something, you're trying to estimate a discount rate for valuation purposes, and supposing you have got some cash flow 20 years into the future, and you want to choose a discount rate to discount that cash flow back to the present day. The point that Cooper is making is that you should not
5 be choosing an estimator which is unbiased with respect to the expected return per year, i.e. the discount rate. You should be choosing a discount rate estimate which is unbiased with respect to the value you get out of the whole process.

10 And the valuation you get out of the whole process is related to the discount rate that you use through both the inverse transformation, because the discount rate appears in the denominator, and also through the power transformation, because you're discounting back over many years. And what Cooper shows is that because of those power and inverse transformations, an estimator which is unbiased with respect to the discount rate might be quite biased with respect to the valuation that you get out
15 of the exercise. And Blume, in his '74 paper, demonstrates a similar point, when you're interested in trying to do a compounding exercise.

So what is fundamental here is, what are you trying to do with the estimator? What is the purpose of the whole exercise? It seems to me, in this regulatory environment,
20 you're trying to choose an estimate of the discount rate in order to generate some revenues, and discounting them back should equal the initial investment. And in that kind of environment, the estimator should have the property that it is unbiased with respect to the parameter you're trying to estimate. And that tells you that arithmetic mean is exactly right. Not approximately right, as in the Cooper analysis with
25 discounting but it's exactly the right thing to do. So I think we've got a lot more comfort here than Cooper would be indicating, because he is looking at a slightly different problem.

MR EDWELL: Thanks, Martin. Okay. Well, let's just move on to the last take on
30 this, and that – I guess it was just a bit of a throwaway question in terms of whether we could, at least in terms of the market risk premium and the beta, have some regard to dividend growth model. We're pretty caught by CAPM as a methodology in terms of transmission that is hard-wired into the rules. It's pretty close to that in terms of distribution for electricity, but can we be informed if there are views that
35 CAPM, in its pure sense, undervalues or overvalues rates of return? Are there other models we can turn to, to at least inform us in respect of some of these market indicators? Maybe either one of the Stevens could comment on that.

DR BISHOP: Yes, let me comment on the use of the dividend valuation model for
40 market risk premium in particular, but I think out of the comments will come some indication of its potential use for other factors. In general, the simplest version of the dividend valuation model is one that has got $D1$ divided by $P0$ plus G is equal to the required rate of return. The required rate of return is made up of a required return of dividend yield, plus, if you like, a growth, or capital gain component. And there

have been studies that try and estimate both of those components. That's one general approach to using the model.

5 Another general approach has been to say: Well, let me try and be more specific about what those Ds are over time, and try and project the series of Ds, which allows me a more flexible profile and the possible dividends from now until the end of the period, before I have to make some perpetuity-based assumption, albeit constant or whatever. So a second series of studies tend to try and get an estimate of what those dividends might be for particular companies. And if you're building up a market risk
10 premium, then they would tend to get an estimate of those dividends, probably from analysts or from some external source for a particular company.

Build up that profile, make some assumption at the end of the period as to what happens beyond the period for which you have got forecasts, and then sold for the
15 discount rate that equates those forecasts with the price. So if we find the discount rate that equates to the present value of the cash flow series to price, that is an indication of what the required return is that is implicit in the pricing that we observe, given those cash flow estimates, so that gives an estimate of the required rate of return. And there are a number of studies that actually work hard on that,
20 including some information that comes out of Bloomberg. Bloomberg provide an estimate of a cost of capital for the market, based on analysts' forecasts going forward.

So that's a more detailed view of the simpler one that I mentioned first, where we
25 just take one dividend yield. And just comments on each of those, first of all. The first approach, which takes a dividend yield and then adds a growth rate, has an interesting challenge in its application. Let us take, as a starting point, an assumption that six per cent is the market risk premium, just for the sake of argument, and the recent average market risk premium is of that order, and ignoring the franking tax
30 credits. So if that was the case, then if we look at what the required rate of return would be on the market, say, for a risk-free rate of six per cent, then the market return would have to be 12 per cent, to get us a result that said a market risk premium six per cent.

35 So if we look at then the current dividend yield, the current dividend yield on average since 1980 is about four and a half per cent. So that says the growth rate – the G in that formula - has to be 7.5 to support 6%. A lot of people would be uncomfortable with using 7.5%. So as a general rule that simple model, in my view, will always give you a much lower estimate of the market risk premiums, than would
40 say the historical average. And I think that's a result of it being quite a simple model, where we have all sorts of different stocks out there. Some that have high dividend yields, some that have low dividend yields. We have some stocks that have high growth options built into them and low growth options.

45 When we have stocks with high growth options, then the G in there is likely to be quite a large number, because the G is not representative of what's going to happen. So there's a whole raft of different Gs that we need under different circumstances for different stocks and we're going to aggregate that and say, "Well, let's just use GDP

on average” which, when we do that, we tend to get a low market with this premium number. I just feel that that’s quite crude and generally we will get an underestimate through that sort of model. I would prefer to go to a model that says, “Let’s try and look at the cash flows from companies over time.” We are trying to get an analyst’s
5 consensus forecasts and back out of that – what, the underlying discount rate would be for a particular stock, aggregate that up across all stocks and try and get a market return. To me that’s a better approach.

10 And it avoids the sort of problems that, I think, Neville Hathaway had when he tried to use the simple approach and found some negative market risk premiums, which Martin would, I think, disagree with as something that should be an outcome.

ASSOC PROF HANDLEY: We might have lost Martin. Martin, are you still there?
15 Looks like we have dropped out at - - -

ASSOC PROF LALLY: Hello.

ASSOC PROF HANDLEY: He’s still there. We thought we may have lost you,
20 Martin.

ASSOC PROF LALLY: Yes. It sounds like the technician at this end pre-set the technology, to turn off at the scheduled time of 6 o'clock and somehow, despite being utterly hopeless in the area, I have managed to use his control to get you back.

25 MR EDWELL: Well done. Okay. So you probably missed a bit of that, but Steven, just keep on going.

DR BISHOP: I think the point that I was alluding to that was that the studies that tend to use more careful forecasting of possible outcomes for individual companies
30 in my view, tends to give a better answer.

ASSOC PROF LALLY: Yes.

DR BISHOP: An answer that I’m more comfortable with, than using the simple
35 dividend yield plus G approach because it’s so sensitive to G in what G you use, and doesn’t deal with company’s individual circumstances as well, because clearly there are companies out there that have very low dividends early and then they grow over time as the business develops, have high growth options. For those you would want to try and forecast out earnings as far as you possibly could. You wouldn’t want to
40 make a simple assumption about G early on.

So those studies are the ones that I would feel more comfortable with, using a dividend valuation model. And the studies that I have read of those, and I don’t pretend to have read them all, but the ones that I have read, tend to give you market
45 risk premiums that are much closer to the historical averages than the ones that tend to use the very simple approach. So, you know, the dividend valuation model has the challenges, you know, you have got to rely on peoples’ forecasts not market data, per

se, so it's the quality of the forecasts. There's a question that the timeframe that you work out, what assumptions you make beyond the timeframe and they're fairly horrendous assumptions often to make. But it is another source of error.

5 It is forward looking. It is trying to use numbers that analysts and so forth use, so it's not something I would ignore, but I intend to look at the – I would put more reliance on those where you have good forecasts, than those where you don't.

10 MR EDWELL: What do you regard as a good forecast? Given we have got so much problem interpreting historic data, let alone forecast data.

DR BISHOP: Where it's easier – yes. Well, in a sense if you're dealing with utilities, I feel a lot more comfortable forecasting the cash flows for them than I would be for a pharmaceutical company that is dealing with, you know, developing
15 new products, which have very uncertain outcomes in the future. That's primary growth options. So firms with growth options are a lot harder to assess the forecast for, than firms that, you know, have a relatively stable environment. So it's not the model that I have a problem with, it's the quality of the input and data that you put into it. It's the challenge in using it.

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MR EDWELL: Okay.

ASSOC PROF LALLY: Excuse me. Can you still hear me?

25 MR EDWELL: We can.

ASSOC PROF LALLY: I have lost the picture, but if you can hear me I can hear you, so carry on.

30 ASSOC PROF HANDLEY: I must admit, I'm not a very big fan of the dividend growth model at all, for two reasons. One is it is very sensitive to the inputs.

MR EDWELL: You might want to just speak up, I think Martin is having trouble hearing you, so – is this coming through, Martin, to you?

35

ASSOC PROF HANDLEY: Are you there?

ASSOC PROF LALLY: Yes, brilliant.

40 ASSOC PROF HANDLEY: Okay. The dividend growth model, whether you apply it for the market as a whole, whether you apply it for individual stocks, is very sensitive, to the inputs. And you can get some absolutely crazy figures pop out, particularly if your growth rates are close to your cost of equity. But more importantly, we know that the fundamental approach to valuation is to value firms on
45 the basis of free cash flow, and so, really if you're using a dividend discount model, implicitly what you're doing is that you're assuming that your dividends are equal to

your free cash flow, at least on average over time. And if that assumption doesn't hold, then you come up with some crazy figures. So I'm not a big fan of them at all.

5 I think you have always got to get back to fundamental free cash flow, and that's just not, you know, the academic approach, but that's the approach in practice. Even with the simplification that's used in the markets with the PE approach, or the price EBIT approach, effectively that earnings or that EBIT figure that they use, is acting as a proxy for free cash flow.

10 MR EDWELL: Martin, do you have a take on this that you want to comment on?

ASSOC PROF LALLY: Yes. I think all methods for estimating market risk premiums that are available to us have serious limitations. The long run historical averaging approach which seems to be given the most weight by Australian
15 regulators, that's subject to the fact that the standard errors on the estimates are very large. And also to the possibility of these numbers being upwardly biased, possibly because over time the market risk premium for this premium has come down. So in the face of serious limitations from that methodology, I think it is useful to look at the results of other methods, even though those other methods do have significant
20 limitations. And to me, the significant limitation in the discounted dividend approach is that the parameters that are going in there, particularly of G, are so subjective.

25 However, I think there is an area in which you can protect yourself from crazy estimates. If you have growth rates or earnings over the next few years of, let us say, 7 per cent per year, some of these dividend growth models will just extrapolate that out to infinity. And that doesn't make sense. So Cornell's work on this, as reflected in his book from the late '90s, he recommends forcing the long run growth rate on earnings to tie in to the long run growth rate in the gross domestic product, because
30 the market as a whole or even an individual firm cannot grow at a higher rate than the economy forever. And that some more recent work suggests that because the growth rate in the economy is picking up, not just the growth in existing firms, but also the introduction of new firms into the market, that the growth rate for existing firms, the long run growth rate for existing firms, should be even below that for the
35 long run growth rate for GDP.

40 So when you put in those kind of restrictions, I think you do tend to get not crazy answers coming out of the discounted dividend approach. But accepting that there is a good deal of subjectivity in the method, I would still favour looking at it in a range of other methods, simply because the method that you seem to be favouring so much at the moment, has got these serious drawbacks. And if you look at, take gamma for example, as Stephen has noted, there's a whole range of estimation methods for gamma, and Stev has said, "Well, you should look at all of them." I think the same point applies here, that you should look at a wide range of estimation methods, it's
45 better than simply looking at one of them.

MR EDWELL: Yes. Thanks, Martin. Okay, let's go finally to the equity beta and the reason – I know businesses are finally interested in the equity beta – the

reason it's on here last is that's the bit I haven't quite got to reading about yet, so it's not an order of priority. But could I suggest we talk about the two questions here together. And really, I guess what we're trying to do here is to focus on again, the methodology and, you know, what's the appropriate time series of data, what data
5 should we use, how many observations should we take, etcetera? So this is all about, I guess in the first instance, as well all, the longer the time series that can be good but it can be made because you have got data reliability problems. Should you use seven years or should you use a window of data longer than that?

10 And then within that, I think, what we have been given is, sort of, talking about monthly observations, you know, what's your view about whether we could break that down and use weekly observations, and if so, how many observations each week should we be using? I mean, it's all about, you know, beefing up the integrity of the data, I guess. And then I think the first question was, sort of, another take, and that
15 is, if we're saying that certain data is unreliable, on the basis, you know, some sort of R-squared measure, is that an appropriate, you know, can the reliability of data be knocked off the table, just on the basis of an R-squared measure alone or are there other factors in there that really should be considered?

20 So it's really all about the data set that we're using here, I think. That's what we would like to concentrate on just in the next 10 minutes or so. So, Stephen, did you want to lead off on that?

25 PROF GRAY: Yes, sure. I think I could be fairly brief with this. If I just, like, tackle each of those in turn?

MR EDWELL: Sure.

30 PROF GRAY: I think in terms of the first one listed, the use of an R-squared statistic as the measure of data reliability, that's one thing that you would look at. I'm certainly not in favour of prescribing and, sort of, cut-off, and if it's above that cut-off, it's in and if it's below that, you ignore it.

35 MR EDWELL: Right.

PROF GRAY: There's nothing like that whatsoever. R-squared is one of the considerations that you would have regard to. Essentially, you know, my view is that you would go through the, kind of, list of considerations that I outlined right at the start. But one of those is the statistical reliability of the data and one element of the
40 statistical reliability of the data, is the R-squared statistic. So it's just one of, you know, there's a holistic consideration that would be applied to all of the data. So it certainly is not the case that, you know, a number above a certain threshold is in, and below it is out. It's one thing that you would look at.

45 Having said that, the paper does go into quite some detail in articulating the fact that for those estimates that do have very low R-squareds, there are many reasons to

question the reliability of that. And so that's explained in some detail in the paper, and I'll perhaps leave that there.

MR EDWELL: Yes.

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PROF GRAY: Whether we use seven years or the longest possible window of data, in relation to the Australian data, in some respects is a mute point, because for the vast majority of the comparable firms that we have got, the total amount of data that's available is less than half of seven years already. So there's really only two
10 listed comparables that currently exist, that have even seven years of available data. And in my view, that in itself, is a reason to question placing a lot of reliance on the available Australian data. If we were looking at a different set of data and posed the same questionnaire, my view would be to use the longest window of data that's available, subject to, you know, obvious economic considerations.

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So an example would be AGL and Alinta at the time of the asset swap, became fundamentally different firms. And so to include in one data set, data from prior to the asset swap and after, and just run a regression without any further consideration, in my view would be wrong and likely to mislead. But unless there was some reason
20 like that where the firm had changed, you know, via an acquisition or a divestiture, or dramatically changed its financing structure, in the absent of that, longer is better, because we are facing this trade-off between statistical reliability and precision versus relevance. And if we can do those sorts of, you know, sort of first stage checks to make sure that the period we have got is a similar firm over the entire
25 period, and I would say we do have relevance for the entire period, then we would want to have as long a period as possible to maximise the statistical reliability.

In terms of weekly observations and so on, I have looked monthly data because that's effectively the settled practice among data service providers and people in the
30 industry. Chopping up the available data into finer slices to run the regression using weekly or daily data, is done from time to time, but I haven't looked at that here. It's quite different from that, from the settled practice.

MR EDWELL: Thanks, Stephen. John, have you got any comment on - - -
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ASSOC PROF HANDLEY: No, I agree with Steve. The R-squared is just one measure. There was an issue which I might just shoot you an email later, rather than chewing up time here, just a technical issue in one of his reports, which I didn't quite understand.

40

MR EDWELL: Yes.

ASSOC PROF HANDLEY: But, yes, it's very similar to when they're estimating the market risk premium. What we want is, we want the beta for the next five years
45 and we going to base it on past data and you have got that trade-off between relevance and, you know, ideally the longer the sample the period, the better. But unfortunately some times you might not have that data there.

MR EDWELL: Reliability.

ASSOC PROF HANDLEY: So that again is where some judgment has to come in.

5 MR EDWELL: It's a matter of judgment. Martin, have you got a comment on this?

ASSOC PROF LALLY: A few brief comments. And firstly I was surprised by the Stephen's references to R-squared. If you look at a regression and you get a very tight – you get a low standard error on the beta estimate, that's good. That's great.
10 And looking at an R-squared that's low, for example point one, it doesn't subtract anything from that. If the standard error on the beta estimate is really low, then you should be happy and having an R-squared that's low, shouldn't subtract anything from your happiness. I think the negative relationship that Stephen is showing between R-squared and standard error, is I think just an artefact of the way the
15 simulation is done.

That's probably something that we could privately talk about. On the broader issues here, I agree that you do need a long data series. But the data series must be for the relevant – well, it must encompass the relevant regulatory regime. My understanding
20 is that regulation of energy utilities in Australia started in the late 1990s. Is that correct?

MR EDWELL: Yes, that's correct.

25 ASSOC PROF LALLY: Okay. So why on earth are people like ACG using data to generate estimates from 1990 onwards? That doesn't seem to me to make a lot of sense. Regulation matters to beta. So if you are estimating betas for regulated businesses, the data set that you are using has got to be the data set that encompassing the relevant regulatory regime. A third point I would make here is
30 that I agree very much with Stephen that the Australian data is very unsatisfactory and therefore I think it's very important to have a look at foreign data.

But the foreign data has to be from a comparable regulatory regime. The fourth
35 point I'd make is a general point that has been made before, that looking at the data is great, but you must also have some theoretical priors, and if I could just take an example of this. I think I have a very strong theoretical prior that a price cap regulatory regime over a five year period will give rise to more risk to a business than a revenue cap over five years, and yet, when I look at recent reports from ACG,
40 they are giving a beta of .7 for a price cap regime for gas distribution businesses regulated by the ESC, and they are giving an equity beta of 1 for electricity transmission businesses that are subject to a revenue cap regime.

So they have got empirical estimates that are the complete opposite of what my
45 theoretical priors would suggest, and that says to me that when you're looking at the empirical data, if you get a result that is grossly at variance with your theoretical

prior, and there is enough possibility that the data choice could, in fact, generate a biased result, you should be very cautious in interpreting those sort of results.

5 MR EDWELL: Thanks, Martin. Could we leave that one there. I agree with all of that. Yes. Okay. Look, we started at quarter past, and we're 10 minutes over. Let's agree to finish in five minutes. But, David, you have one question. I think we sort of might wrap up some of the things.

10 MR HEADBERRY: Yes.

MR EDWELL: Do you want to ask that?

15 MR HEADBERRY: Yes. One of the things that our consumers have seen is that in the build up of the WACC out of the – using the CAPM and all of the various inputs, is that regulators have tended to be conservative in each of the elements that go into that numbering, and so what you end up with was – whilst you have got a conservative beta estimate, or you have got a conservative MRP or a conservative risk-free rate or whatever, by the time you add up all of the bias to being conservative in each of those areas, you end up with a very large multiple of bias in the final outcome, and this is one of the things that – again, I come back to what our members have been identifying, is that the WACC that comes out is not reflective of what they see in their businesses, and they are querying – asking the question on a regular basis, why are we giving such a high return to the regulated businesses? Is it because of the fact that these – there's this cumulative bias that's been built into the actual number that comes back?

25 And I guess, to a degree, that comes back to the question I first started off with. We should be benchmarking the calculated WACC with what is really seen, or as best we can interpret from what's available in the marketplace. So that's my concern, is that we're actually multiplying up and making a cumulative error, bias error, in favour of the businesses.

30 MR EDWELL: Martin, to the extent that we're doing some work with the users on this, do you want to sort of put an academic spin on that question?

35 ASSOC PROF LALLY: I think it is wrong to introduce upward biases or individual parameters in order to protect against estimation error. I think the right place to make the adjustment for estimation error is right at the end, because if you make upward adjustments at the individual parameter level, you have really got no idea what it's actually doing to the overall WACC. So I think you should try to use parameter estimates that are unbiased, but once you come up with a WACC, using those parameter estimates, then I think there is a place for making an upward adjustment to WACC, in recognition of the fact that estimation error that leads to a WACC that's too low is a much more serious problem than estimation on the upside, and in my advice to the Commerce Commission, it's always been of that kind, and the commission does, in fact, make an adjustment for estimation error at the WACC level, rather than at the individual parameter level.

PROF GRAY: I agree. It's not just because it's nearly out of time, but I agree 100 per cent with all that. Just one thing I would comment on though is the premise of the question, that each of the individual parameters has been set in a conservative or biased manner. I think that's something that would need to be shown.

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MR EDWELL: Well, it's how you define bias, I guess. Yes.

DR BISHOP: Bias is one direction.

10 MR EDWELL: Yes.

DR BISHOP: But I'd also just reiterate the point that Steve made earlier, which is a very important one. The appropriate comparison is the WACC that is used for regulatory purposes with what would be used in industry, and is that WACC
15 different? It's not the realised returns, it's the WACC, and how we make decisions, and are they significantly different or not, and that's a useful cross-check. I think, as Steve mentioned right at the outset, if we can cross-check against what practice is, then that's another very useful input.

20 MR EDWELL: Thanks Steven. Okay. Look, let's wrap it up there. I think we're getting all brain dead, but that's been very useful for us. Now, I think we have got something planned, Chris, with the secretary in terms of another forum at some stage.

25 MR PATTAS: Yes. The plan is that after we release the position, the AERs position, that we would hold a public forum, and that would be open to the industry and to users and to other stakeholders.

MR EDWELL: Okay. So, look - - -

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MR PATTAS: Sorry.

MR EDWELL: Vicky. Yes?

35 MS BROWN: Can we finish with just one thing. As you are working through our submission and our expert reports, if any particular questions or issues come up, please feel free to get in contact with us and we can respond to them in writing. Because we can't have another one of these meetings, so very happy to do that. And also, just one other question, are there any other papers that have been developed by
40 your experts that we should go through as well? Is that appropriate?

MR EDWELL: Well, I think the process we're going through – correct me if I'm wrong, Chris – is we're – I mean, everything is in the mix, in terms of what we're getting from our consultants and what we get from you guys and your experts, and
45 then we make the call, and to the extent we have relied on our own papers or your papers in making our draft determination, that will all become public. So I think it's

not like a transparency. It's just that – well, we don't want to have the debate before we have actually got there ourselves.

MS BROWN: Yes.

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MR EDWELL: So to the extent we're drawing on – and we are – information been given to us from other sources, we'll certainly make that very apparent, and we'll release that at the time, and that will be, I guess, an issue for our public forum and we'll explain all that.

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MR PATTAS: Yes. So that material will be available at that time. Yes.

MS BROWN: Thank you.

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MR PATTAS: Yes.

MR EDWELL: Well, could I particularly thank Stephen Gray, Steven Bishop, Martin Lally, and John Handley for their expert contributions, and it's been very valuable to us. So thanks for your time, and thanks, everybody, for listening.

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MATTER ADJOURNED at 4.30 pm INDEFINITELY