Report prepared for the

Australian Energy Regulator

On the Estimation of Gamma

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1. INTRODUCTION

Pursuant to the National Electricity Rules, the Australian Energy Regulator (AER) is currently in the process of making: (i) distribution determinations for the Queensland and South Australian electricity distribution network service providers[1] for 2010 – 2015; and (ii) distribution determinations for the Victorian electricity distribution network service providers[2] for 2011 – 2015. Pursuant to the National Gas Rules, the AER is also currently in the process of making access arrangement decisions for the New South Wales and Australian Capital Territory gas distribution network providers[3] for 2010 – 2015.

A number of issues have arisen in the various regulatory proposals, access arrangement proposals and supporting submissions in relation to the valuation of imputation credits[4] (or equivalently, in relation to the estimation of gamma). These issues form part of the debate between the AER and the various network service providers that has been ongoing since the AER undertook its review of the weighted average cost of capital (WACC) parameters in 2008 and 2009.[5] It is in this regard that the AER has now sought further advice. In response, this report provides comment on the following matters:

- Market Practice
- Conceptual Issues
- Inferring Theta from Market Prices
- Use of Tax Statistics
- Consistency Issues
- Assumed Payout Ratio
- Miscellaneous

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[1] Energex, Ergon Energy and ETSA Utilities.
[2] Citipower, Jemena Electricity Networks, Powercor Australia, SP AusNet and United Energy Distribution.
[3] ActewAGL, Country Energy and Jemena Gas Networks.
[4] The terms "imputation credit" and "franking credit" are used interchangeably in this report.
[5] Australian Energy Regulator (2008) and Australian Energy Regulator (2009).

Each is now considered in turn – starting with a statement of the key issue for consideration, followed by a summary of my previous advice,[6] followed by a statement of the contrary view (expressed in one or more of the above mentioned various regulatory proposals, access arrangement proposals and supporting submissions) and finally a discussion of the key point(s) of difference.

A copy of my resume is attached at the end of this report.

2.   MARKET PRACTICE

The Key Issue

Do valuation experts and professionals make adjustments for gamma when performing corporate valuation exercises, and if not, why not ?

My Previous Advice

Evidence from recent surveys of experts reports – such as Lonergan (2001) and KPMG (2005) – clearly indicates that, in the majority of cases where the CAPM has been adopted for estimating the cost of equity, the expert has made no adjustment for imputation credits.

This does not, however, imply that experts generally assume imputation credits to have zero value, since the above survey evidence also documents a number of other reasons for why no adjustment was made including, uncertainties and difficulties with estimation and methodology, methodological precedent and the suggestion that acquirers do not pay extra for surplus imputation credits regardless. (In other words, whilst there is no disagreement concerning what experts do, there is disagreement concerning why they do it).

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[6]   Previous advice on the valuation of imputation credits appears in Handley (2008), Handley (2009a) and Handley (2009b).

There is another possible explanation for this market practice – (at least some) – Australian firms and independent expert valuation practitioners recognise, under the conventional approach to valuation, there is no <u>explicit</u> recognition of the value of imputation credits in either the cash flows or in the discount rate, and this approach remains valid under the imputation tax system (subject to certain implicit assumptions). In other words, imputation credits are not assumed to have zero value but rather they are simply not <u>explicitly</u> taken into account in either the cash flows or in the discount rate.

The Contrary View

SFG Consulting (SFG) expresses the following contrary view in relation to how one should interpret the evidence concerning market practice:

> *"This is entirely equivalent to "setting gamma to zero." If gamma takes a positive value, there is an adjustment to the WACC or the cash flows. If gamma is set to zero there is no adjustment ... Put another way, how is it possible that practitioners set gamma to something other than zero, but that this requires no adjustment? ... Consequently, "making no adjustment for franking credits" and "setting gamma to zero" are exactly equivalent and simply different ways of expressing the same concept."[7]*

and in relation to using the conventional approach to valuation under the imputation system:

> *"[it] is not "simpler" to implement, it is impossible to implement and has never been implemented. ... Market practitioners are not using a special alternative approach that allows them to perform valuation calculations in which franking credits have a significant impact, but which somehow does not require them to estimate gamma"[8]*

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[7]   SFG Consulting (2009 p.8).
[8]   SFG Consulting (2009 p.12-13).

<u>Discussion</u>

There are a number of serious problems with the contrary view.

First, it is incorrect on logical grounds, to conclude that the evidence supports the proposition that: (i) assuming credits have no value; and (ii) making no adjustment for franking credits, are equivalent concepts. Rather, the evidence only supports the proposition that (i) is a sufficient condition for (ii) whereas equivalence would also require (i) to be a necessary condition for (ii). [9] However, (i) is not a necessary condition for (ii) since the evidence unambiguously documents that there is more than one possible reason for why no adjustment for franking credits was made (and so given that no adjustment was made, one cannot then automatically infer that this was because credits were assumed to have no value).

Second, SFG states that if gamma is assumed to have a positive value then an adjustment must be made to the WACC or to the cash flows and therefore, there is no valuation methodology in existence which allows franking credits to have a positive value but which avoids the need to estimate what that value is. I will now show that this view is incorrect by reference to the Officer (1994) framework.

Officer (1994) examines the WACC valuation framework within the context of the Australian dividend imputation tax system and presents the following five alternative definitions (formulae) of a firm's WACC and appropriate cash flows, suitable for valuation purposes:

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[9]   One thing is said to be a "sufficient condition" for another thing if given the first, you have the second. One thing is said to be a "necessary condition" for another thing if <u>without</u> the first, you <u>cannot</u> have the second. One thing is said to be "equivalent" to another thing if the first is both a sufficient condition and a necessary condition for the second. So, in the current context, to say that (i) "assuming credits have no value" is a sufficient condition for (ii) "making no adjustment for franking credits" means given (i) you can conclude (ii) and to say that (i) "assuming credits have no value" is a necessary condition for (ii) "making no adjustment for franking credits" means given (ii) you can conclude (i).

TABLE 1

Officer's (1994) Consistent Set of WACC Valuation Formulae

	Cash flow	WACC
Before Tax Case	X_O	$r_O = \dfrac{r_E}{1 - T(1-\gamma)}\dfrac{S}{V} + r_D \dfrac{D}{V}$
After Tax Case (i)	$X_O(1-T)$	$r_i = r_E \dfrac{1-T}{1-T(1-\gamma)}\dfrac{S}{V} + r_D(1-T)\dfrac{D}{V}$
After Tax Case (ii)	$X_O(1-T(1-\gamma))$	$r_{ii} = r_E \dfrac{S}{V} + r_D(1-T(1-\gamma))\dfrac{D}{V}$
After Tax Case (iii)	$X_O - T(X_O - X_D)(1-\gamma)$	$r_{iii} = r_E \dfrac{S}{V} + r_D \dfrac{D}{V}$
After Tax Case (iv)	$X_O(1-T) + \gamma T(X_O - X_D)$	$r_{iv} = r_E \dfrac{S}{V} + r_D(1-T)\dfrac{D}{V}$

The above WACCs appear as equations (5), (7), (10), (12) and (13) in Officer (1994).

where:

X_O is the firm's operating income (or free cash flow);

T is the corporate tax rate;

γ is the value of franking credits;

D/V is the gearing ratio, with $S/V = 1 - D/V$;

r_E is the after-company-before-personal-tax cost of equity;[10]

r_D is the before-company-tax cost of debt;

r_O is the before-company-tax WACC; and

$r_i, r_{ii}, r_{iii}, r_{iv}$ are the alternative after-company-tax WACCs.

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[10]   Officer (1994 p.5).

The after-company-tax WACCs differ with respect to whether the interest tax shield and the value of imputation credits are included in or excluded from the corresponding consistent definition of after-company-tax cash flow.

The following four points are critical to interpreting the above valuation formulae:

- Officer (1994) suggests that under a classical tax system, the conventional measure of the cost of equity (i.e. where returns are based on capital gains and dividends only) is expressed on an after-company-before-personal-tax basis.[11]

- Officer (1994) suggests that under an imputation tax system, the proportion of company tax that can be fully rebated against personal tax liabilities is best viewed as personal income tax collected at the company level – in other words, the tax collected at the company level is a mixture of personal tax and company tax.[12]

  This means that under an imputation tax system, the conventional measure of the cost of equity is no longer expressed on an after-company-before-personal-tax basis but rather is expressed on an after-company-after-*some*-personal-tax basis. In comparison, it is the grossed-up cost of equity (i.e. where returns are based on capital gains, dividends and the value of imputation credits) which is expressed on an after-company-before-personal-tax basis.[13]

- The link between the grossed-up cost of equity r_E (i.e. including the value of imputation credits) and the conventional cost of equity r_E^* (i.e. excluding the value of imputation credits) is:

$$r_E^* = r_E \frac{1-T}{1-T(1-\gamma)} \tag{1}$$

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[11]   See equation (14) in Officer (1994 p.9).
[12]   Officer (1994 p.2).
[13]   See equation (15) in Officer (1994 p.9).

where γ is the value of imputation credits.[14] Importantly, this relationship holds for any value of gamma.

Next, refer to Officer's (1994) After Tax Case (i) in which the value of the firm is equal to:

$$V = \frac{X_O(1-T)}{r_i} \tag{2}$$

Whilst gamma certainly does not appear in the cash flow:

$$X_O(1-T) \tag{3}$$

it does appear in the discount rate:

$$r_i = r_E \frac{1-T}{1-T(1-\gamma)} \frac{S}{V} + r_D(1-T)\frac{D}{V} \tag{4}$$

... or so it seems. However, substituting (1) into (4) gives:

$$r_i = r_E^* \frac{S}{V} + r_D(1-T)\frac{D}{V} \tag{5}$$

In other words, according to Officer's (1994) After Tax Case (i), the value of the firm is given by:

$$V = \frac{X_O(1-T)}{r_i}. \tag{2}$$

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[14]   This follows by noting that, under an imputation tax system, there are two different ways to express the before tax cost of equity: $\dfrac{r_E^*}{1-T}$ and $\dfrac{r_E}{1-T(1-\gamma)}$. Equating the two and rearranging gives equation (1). Note that the variables r_E and r_E^* used here correspond to the variables k_E and k_E^* which appear in my previous reports – see Handley (2008 p.18) and Handley (2009a p.23).

where

$$r_i = r_E^* \frac{S}{V} + r_D (1-T) \frac{D}{V}.$$ (5)

The critical point here is that gamma appears in neither the cash flow nor in the discount rate, since r_E^* is the conventional cost of equity which is based on dividends and capital gains only. Further, (5) was derived without making any assumption concerning the value of gamma and so it is independent of the value of gamma and in particular does not require one to assume that imputation credits have zero value.

Intuitively, in equation (4) r_E represents the cost of equity grossed-up to include the value of imputation credits, but multiplying by $\frac{1-T}{1-T(1-\gamma)}$ then has the effect of reversing that gross-up.

This means that the value of the firm is equal to the capitalised value of the conventionally measured cash flow (i.e. excluding the value of imputation credits) using a conventionally measured WACC (i.e. excluding the value of imputation credits). Importantly, this is not some "special alternative approach", as SFG would otherwise suggest, but rather is simply the standard conventional approach to valuation, commonly used by practitioners and which involves no explicit recognition of the value of imputation credits in either the cash flows or in the discount rate. In this regard, equations (2) and (5) may be described as an after-company-after-*some*-personal-tax approach to valuation. To implement this approach, the conventional measure of the cost of equity r_E^* may be estimated using the Sharpe CAPM in the normal way i.e. using returns based on dividends and capital gains only (and so does not require an estimation of gamma).

It should be noted that NERA Economic Consulting reached a similar conclusion in one of their earlier reports:

"There is no need for gamma to appear directly in the WACC ... irrespective of whether firms pass on franking credits, one can use the conventional textbook formula for the WACC to discount cash flows conventionally defined".[15]

In relation to Officer's (1994) After Tax Case (iii), which is commonly called the Vanilla WACC approach, on first impression, it looks like gamma appears in the cash flow:

$$X_O - T(X_O - X_D)(1-\gamma) \tag{6}$$

but not in the discount rate:

$$r_{iii} = r_E \frac{S}{V} + r_D \frac{D}{V} \tag{7}$$

But in fact, gamma appears in both since r_E is the grossed-up cost of equity which in turn is a function of gamma (which is used to determine the gross-up). For consistency purposes, it is then necessary to use the same value of gamma in both the cash flow and the discount rate.

Third, SFG suggest that if an adjustment is to be made to the cost of equity capital for franking credits, then that adjustment would take the following form:

$$r_e^{adjusted} = r_e \left[\frac{1-T}{1-T(1-\gamma)} \right] \tag{8}$$

where r_e is estimated cost of equity capital using the standard CAPM, $r_e^{adjusted}$ is the estimated cost of capital adjusted for franking credits and the term in square brackets is the adjustment factor.[16] However, reference back to equation (1) shows that SFG has misspecified the adjustment formula by mixing up $r_e^{adjusted}$ with r_e .

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[15]   NERA Economic Consulting (2008 p.31).
[16]   SFG Consulting (2009 p.8).

3.   CONCEPTUAL ISSUES

The Key Issue

Whether my treatment of the range of conceptual issues and assumptions that arise when using redemption rates to estimate theta are consistent with any sort of CAPM or any equilibrium model at all ?

My Previous Advice

Within the CAPM framework, the equilibrium value of an asset, including the equilibrium value of an imputation credit, is determined collectively by all investors in the market, rather than by any single investor.   The influence of all investors is operationalised by taking a complex weighted average of the level of risk aversion of all investors in the market – with weights based on individual levels of wealth.[17]

Arguably the most critical choice to be made when using the CAPM concerns the proxy for the market portfolio because once you choose the market, you define the set of assets that are relevant for pricing purposes and you define the set of investors that are relevant for pricing purposes. This means that non market assets, including any assets which may be held by any of the investors in other markets are outside the model and therefore play no role with respect to the pricing of assets within the model.

In the current context, the issue narrows down to what weight should be given to foreign investors for the purposes of estimating gamma. It is obvious that the aggregate wealth of domestic investors compared to the aggregate wealth of foreign investors is small on a global scale. But this does not automatically mean that domestic (foreign) investors should be given little (most) of the weighting. The key point is that by choosing a domestic stock index as the proxy for the market portfolio, the equilibrium value of gamma is then <u>by definition</u> equal to a weighted average over all investors in the domestic market, including foreign investors but only to the extent that they invest domestically. The holdings of foreign assets by foreign investors (and equally the

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[17]   See for example Brennan (1992) and sections 4.15-4.16 of Huang and Litzenberger (1988).

holdings of foreign assets by domestic investors) are outside the model and so should be ignored in determining the weights attributed to each investor.

The Contrary View

SFG expresses the following contrary view:

> *"Handley (2009) also sets out part of the derivation of the CAPM where there is a single market consisting of n risky assets held collectively by m investors. A crucial aspect of these models is that:*
> *a. The m investors must, between them, hold 100% of the n assets; and*
> *b. The m investors own nothing other than the n assets.*
> *That is:*
> *a. None of the m investors can hold any assets outside the model; and*
> *b. There can be no investors outside of the model who can possibly buy any of the n assets inside the model.*
> *In other words, the derivation of the CAPM and subsequent models that are based on it, require a closed system."* [18]

and further:

> *"The "model" envisaged by Associate Professor Handley violates both of these basic requirements. The Handley model does not satisfy the basic market clearing condition so any proposed equilibrium does not exist, cannot exist and cannot be derived. Consequently it cannot be used to develop a set of weights to be applied when constructing a weighted-average redemption rate estimate of theta."* [19]

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[18]   SFG Consulting (2009 p.20).
[19]   SFG Consulting (2009 p.3).

and

> *"It is impossible to derive any sort of equilibrium relationship when one considers only a sub-set of investors and a sub-set of assets."* [20]

Discussion

There are a number of serious problems with the contrary view.

First and foremost, whilst SFG is correct in suggesting that the derivation of the CAPM and subsequent models that are based on it, require a closed system, they are incorrect in suggesting that this means that no investor within the model can hold any assets outside the model. In this regard, SFG have simply failed to take account of the implicit assumption of market segmentation which automatically occurs when one chooses a proxy for the market portfolio which does not include all the assets in the economy. It is important to be clear on what is meant by segmentation in this context. Specifically, segmentation does not imply that there are no other assets outside the model and there are no other investors outside the model. Quite the contrary, segmentation means that any assets outside the model, whether they are held by investors outside the model or whether they are held by investors inside the model – and the corresponding wealth of those holdings of outside assets – are irrelevant for the purposes of pricing the assets inside the model. In other words, no other assets matter and no other investors matter and so can be ignored. In this case, despite SFG's claim to the contrary, the market clearing condition is able to be specified in terms of the assets within the model and an equilibrium can be derived. The key point is that the market is defined by assumption and although the CAPM assumes neither segmentation nor integration of capital markets, these interpretations naturally follow once the market is chosen. For example, the common approach of using say the S&P500 index as the market proxy in a domestic CAPM to price U.S. stocks implicitly assumes other international stock markets (and a whole suite of other asset classes such as corporate bonds, commodities, property, foreign currencies) are irrelevant for pricing purposes whereas using an international

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[20]   SFG Consulting (2009 p.22).

CAPM to price U.S. stocks requires one to choose a suitable international stock index as the market proxy.[21]

Second, it is noted for completeness, that the above conclusions have been based on the standard setup for CAPM based models (as referenced to Brennan (1992) and Brennan (1970))[22] and not on some other "Handley model" or "Handley asset pricing model"[23] as suggested by SFG. The model described in paragraphs 94 – 95 of SFG (2009) is therefore irrelevant to the discussion.

Third, it is again repeated that if foreign investors were to be given a weighting commensurate with their global level of wealth then consistency considerations would require that the AER adopt an international CAPM for pricing purposes – which in turn would also require the use of an international risk free rate, an international market portfolio and stock betas measured relative to this international market portfolio.

4.   USE OF TAX STATISTICS

The Key Issue

Whether tax statistics and redemption rates have any relevance when estimating theta.

My Previous Advice

The use of redemption or utilisation rates as a means of estimating the value of franking credits is driven by conceptual considerations. Depending on tax status and domicile, franking credits are used by investors to reduce their personal taxes. It is this reduction in personal taxes, if any, which is the ultimate source of value to an investor.

Theory tells us that in equilibrium, γ represents a complex weighted average of the values of franking credits across all investors in the market. In this regard, Handley and

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[21]   Again, in this case, the other asset classes are ignored for pricing purposes.
[22]   See Handley (2009a p.13-15).
[23]   SFG Consulting (2009 p.30).

Maheswaran (2008) examine taxation statistics in order to estimate the extent to which franking credits have ex-post reduced the personal taxes of various classes of resident and non-resident equity investors in Australian companies over the seventeen years from 1988 to 2004 and report an average utilisation rate across all investors of around 70–80%.[24] Notwithstanding this represents a simple average of utilisation rates across investors rather than a (complex) weighted average and assuming the set of investors is indicative of the set of investors in the domestic market portfolio, this may be interpreted as a reasonable upper bound estimate of the value of gamma.[25]

The Contrary View

SFG suggests that weighted average redemption rates (estimated from taxation statistics) have no role to play in the estimation of theta for two reasons. First, SFG suggests the approach is based on a number of keystone propositions, the first two of which are false:

> *"The AER has based its support of weighted-average redemption rates on a number of propositions:*
> *a. Gamma does not affect the cost of capital;*
> *b. The forcible removal of foreign investment would (in reality) not affect the cost of capital of Australian firms; and*
> *c. The forcible removal of foreign investment would increase the estimate of theta under all methodologies.*
> *The first two of these propositions is false and the third is an assumption. Consequently, we conclude that there is no basis for the continued use of weighted-average redemption rates – even as an estimate of the upper bound value of theta"* [26]

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[24]   See Table 4 in Handley and Maheswaran (2008).
[25]   The term "upper bound" is used here as a (theoretical) maximum value rather than in a statistical / confidence interval sense.
[26]   SFG Consulting (2009 p.35).

Second, SFG suggests there is a better approach to estimation, regardless:

> *"The main advantage of using observed market prices of traded securities is that we don't have to assume – we can observe instead. For this reason, using market prices of traded securities (as we do for all other WACC parameters) should be preferred to the use of redemption rates weighted according to a conceptual model."* [27]

In an earlier report for Energex and Ergon Energy[28], Synergies Economic Consulting (Synergies) use publicly available statistics sourced from the ATO to estimate that the imputation credit utilisation rate averaged 35% over the period 2003 to 2007.[29] As a result, they question the validity of the Handley and Maheswaran (2008) results. In response I reported to the AER that their updated estimate of the franking credit utilisation rate should not be relied on, due to the presence a serious flaw in its estimation methodology.[30] In its most recent report for Energex, Synergies has dismissed my criticism and maintains the view that its:

> *" taxation study:*
>
> - *is robust;*
> - *does not suffer from methodological issues claimed by Handley;*
> - *has demonstrated that double counting is not a valid criticism; and*
> - *seriously calls into question the persuasiveness of evidence relied upon by the AER to raise the value for gamma based on the Handley and Maheswaran study."* [31]

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27   SFG Consulting (2009 p.4).
28   Synergies Economic Consulting (2009).
29   See Table 1 in Synergies Economic Consulting (2009).
30   Handley (2009b p.11).
31   Synergies Economic Consulting (2010 p.12).

<u>Discussion</u>

I will comment on the views of SFG and then on the views of Synergies.

The first keystone proposition suggested by SFG is the following:

> *"One of the pillars of the AER's conclusion that redemption rates are relevant to the estimation of theta is the contention that an increase in the assumed value of gamma does not result in a decrease in the allowed cost of capital. This is plainly wrong. If different values of gamma had no impact on the cost of capital, (and consequently on the revenue requirement and the value of the firm) we would not need to estimate gamma – because it would be irrelevant."* [32]

and

> *"The only issue that is of any consequence here is whether an increase in gamma increases the value of the firm. Clearly it does. There can be no debate about this point"* [33]

In other words, SFG is of the strong view that (i) changing the estimate of gamma does effect company values and (ii) the AER is suggesting the exact opposite. The problem here is that SFG has misunderstood the AER's position. The misunderstanding can be traced back to the Explanatory Statement in which it is said:

> *"Handley demonstrates that the inclusion of imputation credits in the analysis will not affect company values as long as they are consistently recognised in the cash flows as well as the discount rate"* [34]

Unfortunately, SFG continues to misinterpret this statement as a suggestion (by me) that changing the numerical value of gamma will not change the value of the firm and purportedly supports its case by reference to a worked example in Officer (1994):

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[32]   SFG Consulting (2009 p.31).
[33]   SFG Consulting (2009 p.31).
[34]   Australian Energy Regulator (2008 p.335)

"In our SFG Redemption Rate Report, we set out the relevant part of the example from the Appendix to Officer (1994) to show that gamma is relevant. Officer (1994) shows how a higher value of gamma reduces the cost of capital and increases the value of the firm."[35]

On the contrary, the purpose of the statement was (and still is) to make the point that the conventional approach to valuation, meaning there is no explicit recognition of the gamma in either the cash flows or in the discount rate, remains valid under the imputation tax system (subject to certain implicit assumptions). This is the same issue discussed in section 2 of this report. It is not necessary to estimate gamma in order to value the firm and provided a consistent set of assumptions is used then the same value will result. Specifically, for a given gamma and a given return due to dividends and capital gain, the firm can be valued on either an after-company-before-personal tax basis (where gamma is taken into account in the cash flows and the discount rate) or an after-company-after-some-personal-tax basis (where gamma is not taken into account in the cash flows and the discount rate) and the same firm value will result.

Regardless, of the misinterpretation, there is a flaw in SFG's proof that gamma effects the cost of capital. Specifically, SFG relies on an example in Officer (1994) to show that a higher value of gamma increases the value of the firm but fails to recognise that this result occurs by way of assumption:

"in the example, it has been <u>assumed </u>that the value of the imputation tax credit raises the value of the shares" [36] *[emphasis added here]*

The second keystone proposition suggested by SFG is:

"One of the pillars of the AER's conclusion that redemption rates are relevant to the estimation of theta is the contention that the forcible removal of foreign

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[35]   SFG Consulting (2009 p.31).
[36]   Officer (1994 p.11).

equity from the Australian market may have no impact on the cost of equity of Australian firms:" [37]

SFG strongly disagrees with this position on the basis of the "SFG counterfactual":

"In our counterfactual example we considered what would happen to the estimate of gamma (and consequently the firm's cost of capital) if a law were passed that forcibly reduced the amount of foreign investment allowed in Australia. We noted that simple average redemption rates must increase in this case (since a greater proportion of franking credits must go to resident investors). If simple average redemption rates were used as the basis for estimation, the estimate of theta would increase, the estimated cost of capital would fall, and the estimated value of the firm would rise. We concluded that such an outcome is illogical". [38]

Again, SFG has misinterpreted the AER's position. The fundamental issue for consideration is what impact would a change in the investor mix (and in particular, a decrease in the proportion of foreign investors) have on the cost of capital of Australian firms. SFG suggests that the cost of capital would increase (which may very well be the case) but also suggests that using weighted average redemption rates to estimate gamma implies the exact opposite. In reaching these conclusions, SFG has relied on a simple mathematical relationship in Officer (1994) which SFG claims proves that a higher value of gamma decreases the cost of equity capital. Specifically, in an earlier report,[39] SFG correctly states that, within the Officer (1994) framework, the proportion of the total grossed-up cost of equity, r_E which is attributable to franking credits is:

$$\frac{\gamma T}{1 - T(1 - \gamma)} \tag{9}$$

and so the component of the total grossed-up cost of equity which is attributable to dividends and capital gains is:

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[37]   SFG Consulting (2009 p.33).
[38]   SFG Consulting (2009 p.33).
[39]   SFG Consulting (2008 p.47).

$$r_E \frac{1-T}{1-T(1-\gamma)} \qquad (10)$$

SFG refers to (10) as "the firm's after tax cost of equity capital" and uses it to argue that the higher the gamma the lower the firm's cost of capital. As shown in equation (1) above, (10) represents the conventionally measured cost of equity capital, r_E^*.

There are serious problems with the SFG view. First, SFG have not presented the issue within an appropriate framework. Indeed, a proper consideration of the impact of a change in the investor mix (and in particular, a decrease in the proportion of foreign investors) on the cost of capital of Australian firms requires a complete examination of the impact on both asset demand and asset prices within a formal equilibrium framework. In other words, if you change the set of investors then you change the setup for the model and so you will likely change the resulting equilibrium – including not only a possible change in the equilibrium value of imputation credits (gamma) but also a possible change in the equilibrium value of the cash flows (dividends and capital gains) generated by the firms. Such an important question cannot be answered simply by reference to equation (10) from the Officer (1994) framework which, for a given value of gamma shows nothing more than a decomposition of the total grossed-up equity return into the amount due to credits and the amount due to dividends and capital gains. This is the reasoning behind the AER's position – in short, it is a much more complicated issue than SFG otherwise suggests.

Second, there is a definitional problem with the SFG counterfactual. SFG uses the conventional cost of equity r_E^* (i.e. excluding the value of imputation credits) as the measure for drawing conclusions as to whether a change in gamma causes a change in the cost of capital. However, under an imputation tax system this is an incomplete measure unless one assumes credits have zero value. In contrast, if one allows credits to have positive value then one also needs to take into account the change in the grossed-up cost of equity r_E (i.e. including the value of imputation credits).[40] This is because a

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[40] In this regard, Handley and Maheswaran (2008 p.92) state that *"All else equal, if Australia was fully integrated into world capital markets, then following the introduction of the imputation tax system, we would expect to see little or no change in the [equity] return when imputation credits are ignored and an increase in the [equity] return when imputation credits are included."*

key contribution of the Officer (1994) paper is in pointing out the distinction that is necessary under an imputation tax system, between (equity) returns expressed on an after-company-before-personal-tax basis and (equity) returns expressed on an after-company-after-*some*-personal-tax basis.[41] To be clear, the grossed-up cost of equity r_E is measured on an after-company-before-personal-tax basis whereas the conventional cost of equity r_E^* is measured on an after-company-after-*some*-personal-tax basis but importantly, r_E and r_E^* are two different ways of describing the same thing – the first describes the cost of equity on an after-company-before-personal-tax basis whereas the second describes the (same) cost of equity but on an after-company-after-some-personal-tax basis.

Now consider the following example in which it is assumed that the current grossed-up cost of equity is $r_E = 0.17$ based on a current gamma of say, 0.5 and a corporate tax rate of 0.30. This means, using the Officer (1994) decomposition in (10), that the current conventional cost of equity (equivalently the return due to dividends and capital gains) is $r_E^* = 0.14$. Now assume there is a decrease in the proportion of foreign investors, an increase in gamma to say, 0.6 and an increase in the after-company-before-personal-tax cost of equity to $r_E = 0.20$. Again using the Officer (1994) decomposition in (10), this would mean that the conventional cost of equity (equivalently the return due to dividends and capital gains) has increased to $r_E^* = 0.171$. The key point is that r_E^* has increased rather than decreased and therefore runs counter to the argument by SFG that an increase in gamma would cause a decrease in the (conventionally measured) cost of capital.

In summary, the SFG counterfactual is a result of no substance and in particular, in no way proves that an increase in gamma associated with a reduction in the amount of foreign investment causes the cost of capital of Australian firms to fall.

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[41] This point appears to have been missed by SFG who state *"Handley (2009, pp. 23-25) sets out a complicated discussion of what he calls "after-company-before-personal-tax" returns and "after-company-after-some-personal-tax" returns and so on. In our view, this discussion is irrelevant and serves only to obfuscate the clear relationship between gamma, WACC, and the value of the firm."(SFG (2009 p.31)).*

SFG has also suggested that weighted average redemption rates from tax statistics should not be used to estimate gamma because gamma can also be estimated using the market prices of traded securities and the advantage of this second approach is that it is based on observed data. The main type of study which falls within this second approach are dividend drop-off studies. Now, SFG's statement would certainly be true if there were no limitations associated with using dividend drop-off studies to estimate gamma. However, as discussed later in the next section, this is not the case and so, in my opinion, SFG overstates the relative importance of estimates based on dividend drop-off studies compared to estimates based on tax statistics.

I now comment on the above views expressed by Synergies

In my earlier report, I identified the following problem with the Synergies tax study:

> *"In comparison, Synergies define the credit utilisation rate to be equal to the ratio of credits used to credits distributed.[42] Importantly, they infer the aggregate dollar amount of credits distributed each year from the aggregate dollar amount of franked dividends paid during that year, as disclosed in the ATO statistic ... There is, however, a fatal flaw with the Synergies approach. Specifically, they have failed to take into account the fact that the aggregate amount of franked dividends paid each year, as disclosed by the ATO, includes an unknown amount of double counting which arises as dividends are paid along chains of interposed entities within the same corporate group structure ... This means that the Synergies estimate of the amount of franked dividends paid each year and the corresponding estimate of the amount of imputation credits distributed each year are overstated by an unknown amount and accordingly, the Synergies estimate of <u>the credit utilisation rate</u> is understated by an unknown amount. In short, the Synergies estimates of <u>credit utilisation rates</u> are not reliable"[43] [emphasis added here]*

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[42]   In their Table 1, Synergies use the term "Reclaimed Credits" for credits used and "Distributed Credits" for credits used.

[43]   Handley (2009b p.9).

Unfortunately it appears that Synergies has misunderstood the nature of the problem, although it is acknowledged that this may be partly due to an incorrect reference by the AER in the Queensland draft decision that the problem also related to the estimated payout ratio.[44]

To repeat my earlier advice, the double counting problem does not affect Synergies' estimate of the payout ratio but does continue to affect their estimate of the credit utilisation rate.[45]

5.   CONSISTENCY ISSUES

The Key Issue

Where a particular parameter is used in two places in the WACC estimation exercise, whether consistency requires that the same value should be used for that parameter in each of the two places

The focus in this section concerns a suggested inconsistency in the AER's treatment of the value of cash dividends, and in particular how the coefficients from regression based dividend drop-off studies should be interpreted for the purposes of estimating theta.

My Previous Advice

An important issue concerns the interpretation of the drop-off in the price of a share on an ex-dividend date. In an ideal economy characterized by no transactions costs or differential taxes, no information asymmetries, competitive price-taking and rational behaviour, the share price is expected to drop on the ex-dividend date by the amount of the dividend.

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[44]   Australian Energy Regulator (2009a p.210).

[45]   The double counting problem exists in the aggregated company tax statistics. In estimating the credit utilisation rate, data sourced from aggregated company tax statistics is used in the denominator but in estimating the estimated payout ratio, data sourced from aggregated company tax statistics is used in both the numerator and the denominator as so the error largely cancels out.

A more complete explanation, and in my view, the most appropriate framework for analyzing dividend drop off studies is the equilibrium framework provided by Michaely and Vila (1995) and Allen and Michaely (2003), who suggest that the drop-off should reflect not just the impact of differential personal taxes but also the risk involved in trading around the ex-dividend date.

Despite some evidence to the contrary, it is my view that the weight of the empirical evidence supports the notion that differential taxes and risk effects ex-dividend day pricing. In this regard, Allen and Michaely (2003, p.376) state that *"in most periods examined, the average price drop is less than the dividend paid"*.

The key implication is that the presence of differential taxes and risk complicates the interpretation of results from dividend drop-off studies. In particular, the regression coefficients from dividend drop-off studies reflect not only the value of one dollar of franking credits (or the value of one dollar of cash dividend) but also the impact of differential personal tax rates, on dividends compared to capital gains, and risk. This means that that multiple interpretations of the value of franking credits are possible depending upon what is assumed about differential personal taxes and risk and so caution needs to be exercised in using dividend drop-off studies as a basis for estimating the value of theta.

This approach leads to what may at first appear to be an inconsistency regarding the AER's treatment of differential taxes – in using the standard CAPM to estimate the cost of equity, the AER assumes no differential taxes but in interpreting the results of dividend drop-off studies (for the purposes of estimating gamma), the AER allows for the impact of differential taxes – however, the apparent inconsistency is of no consequence.

In reaching this position, the AER has relied on two classes of empirical evidence. First, the results of U.S. dividend yield studies provide evidence that dividends are "fully valued" – equivalently, that cash dividends are valued at 100 cents in the dollar – meaning that differential taxes have no effect on prices, and so differential taxes do not need to be taken into account in estimating equity returns. Second, the results of U.S. drop-off studies provide evidence that dividends are "less than fully valued" –

equivalently, that cash dividend are valued at less than 100 cents in the dollar – (due to the impact of differential taxes), and so differential taxes do need to be taken into account in estimating gamma. In other words, the AER is relying on the appropriate evidence in the appropriate context i.e. U.S. dividend yield studies in relation to the CAPM and U.S. drop-off studies in relation to gamma. Further support for this position comes from Allen and Michaely (2003) who also are neither oblivious nor overly concerned about the apparent inconsistency between the results from U.S. dividend yield and U.S. drop-off studies which they effectively attribute to methodological issues associated with the former.

<u>The Contrary View</u>

SFG have expressed the following contrary view:

"Inconsistent estimates of the value of cash dividends are used in two places in the AER's reasoning:
a. The AER's empirical estimates of theta (and consequently gamma) are conditional on an estimated value of cash dividends of 75-80 cents per dollar; and
b. The AER's estimate of the required return on equity using the CAPM is conditional on cash dividends being valued at 100 cents per dollar.
In our view, the estimate of 100 cents per dollar should be used consistently throughout the WACC estimation process. This is because:
a. Dividend yield studies are consistent with an estimate of 100 cents;
b. The relevant and important dividend drop-off studies are consistent with an estimate of 100 cents; and
c. An estimate of 100 cents (and the corresponding estimate of the value of franking credits) fits the Australian data just as well as the 80 cent estimate (and its corresponding estimate of the value of franking credits) reported by Beggs and Skeels (2006)."[46]

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[46]   SFG Consulting (2009 p.43).

<u>Discussion</u>

There is no disagreement concerning the interpretation of the empirical evidence from the dividend yield studies – cash dividends are valued at 100 cents in the dollar and so differential taxes do not need to be taken into account in estimating equity returns.

There is however substantial disagreement concerning the empirical evidence from the dividend drop-off studies. SFG argues that the "relevant and important" dividend drop-off studies suggests that cash dividends are valued at 100 cents in the dollar and so differential taxes similarly do not need to be taken into account in estimating gamma. The "relevant and important" studies that SFG has relied on in reaching this conclusion are: (i) Boyd and Jagganathan (1994) and (ii) a subset of the results from Graham, Michaely and Roberts (2003).

SFG suggests that more weight should be given to the Boyd and Jagganathan (1994) study (and its conclusion that cash dividends are valued at 100 cents in the dollar) as the reason used by the AER for dismissing the study was unfounded. Specifically the AER stated that Boyd and Jagganathan (1994) is *"based primarily on an arbitrage framework"*.[47] In contrast, SFG states that Boyd and Jagganathan (1994)

> *"reports results from a perfectly standard dividend drop-off analysis that <u>has</u> <u>nothing whatsoever to do with any arbitrage framework</u> ... Section 1 of the paper is called 'An equilibrium model of ex-dividend share pricing' ... Boyd and Jagganathan (1994) clearly does 'reflect an equilibrium framework.'"*[48] *[emphasis added here]*

The AER position was based on advice in my earlier report that:

> *"The Boyd and Jagganathan (1994) is quite rightly an important study as SFG states, but it should be noted that it is <u>primarily</u> an arbitrage framework"*[49] *[emphasis added here]*

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[47]   Australian Energy Regulator (2009 p.462).
[48]   SFG Consulting (2009 p.38).
[49]   Handley (2009a p.32).

The intention here was simply to point out that the Boyd and Jagganathan (1994) model substantially relies on arbitrage arguments (in addition to equilibrium considerations). For example, in describing the setup to their model Boyd and Jagganathan (1994 p.723) state:

> *"Next, let us consider arbitrageurs ... If the expected price drop is above this line, the arbitrageur can profit by short-selling the stock cum-dividend and buying back at the ex-date."*

The role of arbitrage in the Boyd and Jagannathan (1994) framework has also been acknowledged by Cannavan, Finn and Gray (2004).[50]

As noted in my previous advice, Heath and Jarrow (1988) caution (on theoretical grounds) against the use of arbitrage considerations in dividend drop-off studies.[51] In short, the key implication of recognising the arbitrage component of the Boyd and Jagganthan (1994) study is that their results should be interpreted with caution.

Regardless of any debate concerning the relative importance played by equilibrium considerations compared to arbitrage considerations in the Boyd and Jagganthan (1994) model, the key point is that Boyd and Jagganthan (1994) is but one study out of many studies. Notwithstanding the results in Boyd and Jagganthan (1994), it is my view that the weight of the empirical evidence supports the conclusion that cash dividends are valued at less than 100 cents in the dollar. For example, Allen and Michaely (2003) represents a comprehensive survey of the literature dealing with dividend and payout

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[50]   According to Cannavan, Finn and Gray (2004 p.179), *"Boyd and Jagannathan (1994) and McDonald (2001) construct equilibrium models for ex-dividend stock pricing by considering several different classes of investors, and buyers and sellers within each class. For every class of trader, they construct an indifference curve along which the trader is indifferent between trading cum-dividend and ex-dividend. These indifference curves vary across investors ... They then eliminate any region that would admit arbitrage for any class of investors. Arguments are subsequently made about where, within the admissible range, market-clearing prices might lie"*. Cannavan, Finn and Gray (2004) refer to Boyd and Jagannathan (1994) as a costly-arbitrage equilibrium framework and note that it has been extended by McDonald (2001) to a market that includes imputation tax credits.

[51]   According to Heath and Jarrow (1998 p.97), *"Therefore the stock price drop on the ex-dividend date must necessarily reflect the equilibrium trading process involving different tax clienteles (one of which is the short-term trader) and a risk premium. The size of this risk premium is perhaps small but nonethe less positive. The extent to which this risk premium is significant needs to be considered in future empirical research."*

policy in general including dealing with the impact of taxes on security prices, and reach a very clear conclusion on the evidence concerning U.S. drop-off studies:

> *"differential taxes affect both prices (at least around the ex-dividend day) and investors' trading decisions. In most periods examined, the average price drop is less than the dividend paid, implying a negative effect on value"(p.376).*

It is noted that SFG still seeks to rely on (a subset of) the results from a second study to support its case – Graham, Michaely and Roberts (2003), who conclude that the appropriate estimate is 100 cents for cases where the dividend yield is greater than 2% (the high yield group of stocks) – on the basis that:

> *"We know that the yield for the average Australian firm is above 2%, so it would seem that the above 2% category would be appropriate".*[52]

However, in maintaining this view, SFG appears to have ignored two problems raised in one of my previous reports. First, the average dividend yield for the stocks in Graham, Michaely and Robert's (2003) high yield group is not disclosed and so we cannot say how close or otherwise it is to 2.5% (which SFG states is the approximate average dividend yield for the Australian market) – the implication is that we cannot conclude as SFG otherwise suggests that this is the most appropriate category from which conclusions should be drawn. Second, the high yield group covers less than 5% of the entire sample of stocks examined by Graham, Michaely and Roberts (2003) – and if instead, the results from the entire sample are used then the conclusion is clearly that cash dividends are valued at less than 100 cents in the dollar.[53]

In addition to its arguments based on Boyd and Jagganathan (1994) and the high yield group from Graham, Michaely and Roberts (2003), SFG suggest there is another reason

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[52]   SFG Consulting (2009 p.41).
[53]   Graham, Michaely and Roberts (2003 p.2634) summarise as follows: *"Our results are generally consistent with the tax hypothesis that the ex-day premium is caused by preferential taxation of capital gains relative to dividend income."* and in relation to the contrary finding for the high yield group of stocks *"Consistent with previous studies, within each era, we find that the premium is closest to one among stocks with the highest dividend yield and abnormal volume is also highest for these stocks. This is consistent with dividend capture or arbitrage activity forcing the premium to approach one for high-dividend yield stocks (because the reward for such activity outweighs the costs)."*

why the results of dividend drop-off studies should be interpreted on the assumption/condition that cash dividends are valued at 100 cents in the dollar (for the purposes of estimating the value of franking credits) – an estimate of 100 cents in the dollar for the value of cash dividends (and the corresponding estimate of the value of franking credits) "fits the Australian data just as well" as other estimates of less than 100 cents in the dollar (such as the 80 cent estimate and its corresponding estimate of the value of franking credits reported by Beggs and Skeels (2006)).

To support this view, SFG presents an analysis which compares the pairs of estimates (for the value of cash dividends and the value of franking credits) resulting from three different dividend drop-off studies: (i) Beggs and Skeels (2006), (ii) SFG (2009a) in which no prior constraint is placed on the value of cash dividends – referred to here as the unconstrained SFG study;[54] and (iii) SFG (2009) which is conditioned on cash dividends being valued at 100 cents in the dollar – referred to here as the constrained SFG study.[55] Based on the unconstrained SFG study, the estimated value of cash dividends and the estimated value of theta is 98 cents in the dollar and 23 cents in the dollar respectively – or using shorthand notation, (0.98, 0.23). Based on the constrained SFG study, the estimate of the value of cash dividends and the value of theta is (1.00, 0.08). Based on the Beggs and Skeels (2006) study, the post-2000 estimate of the value of cash dividends and the value of theta is (0.80, 0.57).

Of particular importance, SFG also present a joint confidence region[56] for the pair of estimates from the unconstrained SFG study,[57] and show that the estimates from both the constrained SFG study and Beggs and Skeels (2006) also fall within the joint confidence region. This leads SFG to conclude:

> *"All of these points are shown in Figure 2 and all are within the joint confidence*
> *region. That is, all of these combinations of (a) the value of cash dividends, and*

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[54]   Also see Appendix I in Skeels (2009).

[55]   As explained by SFG (2009 p.42), *"We have re-estimated theta conditional on cash dividends being valued at 100 cents in the dollar. This has been done using the same data set, same tax rates, and same methodology that was the subject of the recent review of our work by Professor Skeels. We have simply estimated theta conditional on cash dividends being valued at 100 cents, with the remainder being attributable to franking credits."*

[56]   It is noted that the level of significance is not stated..

[57]   See Figure 2 in SFG (2009 p.42).

(b) theta fit the data equally well. One can choose any of these combinations and fit the data just as well as any other combination. <u>The usual criterion of statistical significance cannot discriminate between any of these combinations</u>" [58] *[Emphasis added here]*

So which pair of estimates should be used ? For consistency reasons, SFG suggest that the results from the constrained SFG study should be used for the purposes of estimating gamma:

"We also note that an estimate of 100 cents for cash dividends and zero for franking credits fits the data just as well as any of the other combinations in the joint confidence region. That is, the market practice approach adopted by valuation professionals fits the data just as well as the Beggs and Skeels estimate or any other unconstrained estimate ...What can discriminate between them is that some of them are consistent with the standard CAPM and some are not. Those points for which the value of cash dividends is 1.00 are consistent with the CAPM (which is based on this value) and others are not" [59]

This is a particularly revealing piece of analysis for four reasons:

(i)   It clearly acknowledges the imprecision which is implicit in the estimates of the value of franking credits coming from dividend drop-off studies.

(ii)   It also has implications in assessing the relative importance of estimates coming from dividend drop-off studies relative to estimates based on taxation data. In the previous section, it was noted that SFG argues that weighted average redemption rates from tax statistics should not be used to estimate gamma because gamma can also be estimated using other approaches – such as dividend drop-off studies – which has the advantage of being based on observable market data:

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[58]   SFG Consulting (2009 p.43)
[59]   SFG Consulting (2009 p.43)

"The main advantage of using observed market prices of traded securities is that we don't have to assume – we can observe instead. For this reason, using market prices of traded securities (as we do for all other WACC parameters) should be preferred to the use of redemption rates weighted according to a conceptual model." [60]

To be clear, it is well understood that all empirical estimates are subject to error. So whilst it is true that we can observe prices, there is still uncertainty surrounding how one should interpret the coefficients from the dividend drop-off study. Specifically, depending on whether one assumes cash dividends are valued at 100 cents in the dollar or cash dividends are valued at less than 100 cents in the dollar (equivalently, what one assumes concerning the impact of differential taxes and risk), SFG's Figure 2 suggests that there is a very wide range for plausible estimates of the value of a distributed franking credit (theta). In fact, as shown in SFG's Figure 2, not only do estimates of (1.00, 0.08), (0.98, 0.23) and (0.80, 0.57), for the value of cash dividends and the value of theta respectively "fit the data equally well" but so does an estimate of approximately (0.72, 0.78).[61] In other words, the SFG analysis suggests that, if dividend drop-off studies are used, "the usual criterion of statistical significance cannot discriminate" between an estimated value of theta of 0.08 and an estimated value of theta of around 0.78.

(iii)   The interpretation of the empirical evidence from the dividend drop-off studies now takes on additional importance.

(iv)   Any suggested adjustment to the value of theta for the purposes of taking account of a less than a full payout of franking credits will likely fall within the joint confidence region for the estimate of theta and so, in my view, is not warranted. In short, any suggested adjustment of this kind is essentially looking for a level of precision which is just not there.

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[60]   SFG Consulting (2009 p.4).
[61]   These coordinates have simply been taken from Figure 2.

Both dividend drop-off studies and taxation based redemption rate studies are imperfect methodologies for estimating the valuation of imputation credits and so, in my opinion, the approach of the AER in taking account of estimates from both approaches is entirely appropriate.

6.   ASSUMED PAYOUT RATIO

The Key Issue

Whether an assumed payout rate of 100% is reasonable, sensible, or even possible ?

My Previous Advice

The Officer (1994) model assumes a perpetuity framework – this should not be interpreted as a criticism of the model but rather as a recognition of its simplicity. Since all cash flow streams, including associated imputation credits are assumed to be perpetuities then this is equivalent to assuming that 100% of the free cash flow and 100% of the associated imputation credits which are generated in each period, are fully distributed at the end of that period.

It is generally accepted that (most) firms do not in fact pay out 100% of their free cash flow and imputation credits each period – this is not in dispute. There are numerous reasons why firms may not fully distribute 100% of the free cash flow and imputation credits generated in a given period, including the case where capital expenditure exceeds depreciation.

Monkhouse (1996) extends the Officer (1994) model to a non perpetuity setting and shows that one way to take account of the time value loss associated with the periodic retention of imputation credits is to define gamma as a weighted average of the value of a distributed credit and the value of a retained credit:

$$\gamma = F \times \theta + (1 - F) \times \psi \tag{11}$$

where F is the proportion of credits generated in the period that are paid out in the period, θ is per dollar value of a distributed credit and ψ is the per dollar value of a retained imputation credit, where $\psi < \theta$ due to time value loss associated with retaining credits.[62] This weighted average formulation of the value of gamma collapses to a simpler expression if one <u>assumes</u> that retained credits have zero value, i.e.:

$$\gamma = F \times \theta \tag{12}$$

Equation (12) reflects the traditional approach to estimating gamma. An important implication is that all credits retained at the end of each and every period, and not just those credits retained at the end of the last period, are assumed to be <u>never</u> paid out and so to have zero value. However, in my opinion, an assumption that retained credits will <u>never</u> be paid out is extreme and totally unreasonable. Further, it implies that the current $150 billion in accumulated franking credits has no value.

An assumption that all credits are distributed in the period in which they are created will likely overstate the value of gamma. On the flip side, the traditional approach, by assuming all credits not distributed (in the period in which they are created) are never paid out, will likely understate the value of gamma. This suggests that if one adopts the (estimated) market average payout ratio of around 0.7, then the value of gamma, as a proportion of the value of a distributed imputation credit θ, is within the range $0.7\theta \le \gamma \le \theta$. Where exactly gamma falls within this range depends on the time value loss associated with retention of imputation credits, which in turn depends on the appropriate discount rate and the expected retention period. In my opinion, the estimation of these parameters is subject to much uncertainty.

Regardless, it is my view that seeking to adjust gamma to take account of the time value loss associated with the retention of imputation credits is seeking a level of precision which is just not there. By way of example, if one assumes that time value loss reduces the value of a retained credit by say 50% (which arguably is consistent with an average

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[62] See equations (2.3) and (2.5) in Monkhouse (1996). It is noted that under this definition, gamma need not be less than one.

retention period of around ten years)[63] then substituting this into the general definition (11) gives a value of gamma equal to 85% of the value of a distributed credit i.e. $\gamma = 0.85\theta$. Further, if one assumes the value of theta is say 0.5, then the resultant value of gamma is 0.43. In my opinion, given the inherent imprecision in the estimation process, it is not feasible to draw a distinction between an unadjusted estimate of 0.5 and an adjusted estimate of 0.43. Accordingly, in my view the best approach for estimation purposes is to follow the simpler Officer (1994) framework and define gamma as the value of a distributed imputation credit.

The Contrary View

NERA Economic Consulting (NERA) expresses the following views in relation to first, the appropriate payout ratio:

> *"We show below that statistics that the Australian Taxation Office (ATO) reports indicate that it is not reasonable for the payout ratio to be set to one. Instead, we show that the figure of 71 percent that Hathaway and Officer (2004) compute provides a more reasonable estimate of the ratio."* [64]

and second, in relation to the discount rate to be used in estimating the value of retained credits:

> *"Retained franking credits can only be distributed when they are attached to dividends. The amount and timing of future dividend payments, though, are uncertain. Since retained credits can only be distributed when attached to dividends, they should be discounted at the same rate one would use to discount dividends. The rate at which dividends should be discounted is the cost of equity."* [65]

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[63]   In relation to Table 2.3 in NERA Economic Consulting (2009), a time value loss of 50% of face value corresponds to a retention period of around 7 years assuming a discount rate equal to the cost of equity and a retention period of around 13 years assuming a discount rate equal to the risk free rate.
[64]   NERA Economic Consulting (2010 p.2).
[65]   NERA Economic Consulting (2010 p.4).

SFG also suggests that the appropriate payout rate is around 70%:

> *"In our view, an estimate of the distribution rate of franking credits is available, it appears to be uncontroversial, and it should be used. If we know that the distribution rate is 71%, we should use a distribution rate of 71%."* [66]

Discussion

The issue for consideration here is not a question of what is the appropriate payout ratio F but in accordance with equation (11) above, what is the appropriate payout ratio, F and what is the appropriate value of a retained imputation credit, ψ. The difference between the value of a distributed credit, θ and the value of a retained credit ψ represents time value loss only, which in turn depends on the appropriate discount rate and the expected retention period. It is agreed that allowing for less than a full distribution of imputation credits each period injects more realism into the modelling of imputation credits. But this comes at a substantial cost – in order to estimate gamma, one not only needs to estimate the value of a distributed credit, θ – which itself is the subject of substantial debate – but also one needs to the need to estimate a further three parameters – the payout ratio, the appropriate discount rate and the expected retention period. In comparison, Officer (1994) assumes a 100% payout of imputation credits each period and therefore that gamma is a function of one parameter i.e. $\gamma = \theta$. In my view, there is sufficient uncertainty surrounding the estimation of these additional parameters to seriously question whether the additional realism, compared to Officer's (1994) simpler approach of assuming full payout each period, actually produces a better estimate of gamma.

First, dealing with the payout ratio F. Both NERA and SFG (amongst others) suggest that the assumed payout ratio should be 70% based on observed payout ratios of Australian firms. For example, NERA presents an analysis which:

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[66]   SFG Consulting (2009 p.15).

"shows that the AER assumption that 71 per cent of franking credits are distributed immediately while the remaining 29 per cent are distributed within five years is not consistent with the evidence that the ATO provides." [67]

and SFG presents a numerical example which shows the build-up in credits over time assuming a 70% payout each year, from which they conclude:

" it is simply impossible that stored credits can be routinely distributed the year after they are created." [68]

The intention here is to counter the suggestion by the AER that the appropriate retention period for estimating the value of a retained credit is 1 – 5 years.[69]

To be clear, it is well understood that firms do not in practice routinely distribute in each period, 100% of the franking credits generated in that period. This is clear from ATO tax statistics which show that the aggregate balance of retained imputation credits at the end of June 2007 totalled almost $150 billion, and is not in dispute. The suggested actual payout ratio of 70% based on ATO is also not in dispute. In other words, the assumption that the payout ratio F is around 70% for the purposes of using equation (11) in estimating gamma as a weighted average of the value of a distributed credit and the value of a retained credit is reasonable.

What is in dispute, however, is the suggested conclusion that this evidence supports the view that around 30% of credits are retained forever and so have zero value – (which then is used to justify using equation (12) to estimate gamma as theta multiplied by the payout ratio). As I have previously stated, it is my view that an assumption that retained credits will never be paid out is extreme.

It is critically important to be clear on what the evidence does and does not support. The evidence shows that the historical payout ratio is 70%. <u>The evidence does not show that the remaining 30% of credits will never be paid out</u>. In other words, the evidence

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[67]   NERA Economic Consulting (2009 p.4).
[68]   See Table 1 in SFG (2009 p.17).
[69]   See Table 10.6 in Australian Energy Regulator (2009 p.419)

suggests that a reasonable estimate of the payout ratio is $F = 0.7$ but does not suggest that a reasonable estimate of the value of a retained credit is $\psi = 0$.

So what is the value of a retained credit ?

As mentioned above, the difference between the value of a distributed credit, θ and the value of a retained credit ψ represents time value loss only, which in turn depends on the appropriate discount rate and the expected retention period. For a given value of theta, one must estimate these two additional parameters which in my view, is not an easy exercise. In relation to the discount rate, the AER has previously argued that the appropriate discount rate to be used for determining the value of a retained credit will lie somewhere between the risk-free rate and the cost of equity.[70] In contrast, NERA suggests the latter is the appropriate rate on the basis that retained credits can only be distributed when attached to dividends and so should be discounted at the same rate one would use to discount dividends. Whilst it is well understood that expected future cash flows to equity investors (such as dividends) should be discounted at the cost of equity, this is not necessarily the case in relation to the future payout of retained credits. Such a view fails to recognise that a retained credit (and the underlying cash flow) has already been earned and is <u>in reality</u> available for immediate distribution from a firm's franking account balance, whereas (expected) future imputation credits need to be generated from (expected) future cash flows which are by definition uncertain. In relation to the expected retention period, it is not currently clear on what basis this can be reasonably estimated, but in any event, involves deeper considerations than simply extrapolating historic payout ratios indefinitely into the future.[71] In other words, the valuation of a retained credit (relative to the value of a distributed credit) is more akin to an assumption rather than an estimate since both the appropriate discount rate and the expected retention period can in essence only be assumed.

So for the purposes of using equation (11) to estimate gamma, one extreme is to assume that retained credits have no value i.e. $\psi = 0$. The other extreme is to assume that

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[70]   Australian Energy Regulator (2009 p.419).

[71]   In this regard, I have previously expressed the view that it is unreasonable to assume that a stock of potentially valuable imputation credits accumulates over time within the firm, <u>never to be released</u> and is equally unreasonable to assume that such a build up of credits would not (eventually) attract the attention of investors, investment bankers and or potential corporate raiders.

retained credits have full value (relative to the value of a distributed credit) i.e. $\psi = \theta$ which is equivalent to assuming $F = 1$. Neither is really satisfactory since the truth likely lay somewhere in between.[72] Substituting both approaches into (11) leads to the following estimate of gamma:

$$0.7\theta \leq \gamma \leq \theta \tag{13}$$

where θ is the value of a distributed imputation credit.

In my opinion, equation (13) puts in context this whole debate concerning the appropriate payout rate. The argument ultimately boils down to the question of whether, given the estimate of theta, one should then make an adjustment of between 0 – 30% in order to arrive at the final estimate of gamma.

It is my view, <u>given the inherent imprecision in the estimate</u> of θ, that seeking to make an adjustment of this magnitude is not warranted. Accordingly, I remain of the view that the best approach is to follow the simpler Officer (1994) framework and simply define gamma as the value of a distributed imputation credit.

7. MISCELLANEOUS

In this section I refer to a number of other statements which appear in the various regulatory proposals, access arrangement proposals and supporting submissions which require a brief comment.

(i) *"The AER/Handley view appears to be that "setting gamma to zero" is equivalent to suggesting that they "have no value" to investors. This is not the*

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[72]   In this regard, ETSA (2010 p.193) states: *"The empirical evidence and practical reality support a lower payout ratio than that advanced by the AER. However, ETSA Utilities recognises that retained credits will have some value and agrees with Handley and the AER that it is extreme to assume they have no value. It is just as extreme to assume that they are fully valued ... ETSA Utilities believes the true value for the payout ratio on average lies between approximately 0.7 and 1. ETSA Utilities considers that since the empirical evidence suggests a payout ratio of greater than five years, and after taking into account the discounted value of retained credits and significant practical restraints, the true payout ratio is likely to be closer to 0.7 than 1. This must be taken into account by the AER in its overall assessment and estimate of gamma."*

case. We noted above that the key issue here is not about whether some investors might value or benefit from franking credits. Unquestionably, some investors do value the franking credits they receive and some do not. Rather, the key issue is whether dividend imputation affects the equilibrium cost of capital of Australian companies. These are quite different issues. It is entirely possible that some (or many) investors do value franking credits, yet this does not affect the equilibrium cost of capital of Australian companies". [73]

The discussion in section 2 of this report should make clear what the "AER/Handley view" is in relation to the statement "setting gamma to zero". Further, it is agreed that the underlying key issue is whether dividend imputation affects the equilibrium cost of capital of Australian companies – which in turn is essentially a question of whether or not the Australian equity market is integrated with world equity markets for the asset pricing purposes.

(ii) *"The AER is wrong to conclude that "any assumed value for imputation credits (i.e. between zero and one) should not affect company values provided it is incorporated consistently in the firm's cash flows as well as the discount rate." This proposition is false and all conclusions based on it are unsupported"* [74]

This issue has been addressed in section 2 of this report.

(iii) *"In his seminal paper on this issue, Officer (1994) includes a worked example in an appendix to the paper. In that worked example, the firm creates 13.58 franking credits and distributes 10.38 of them – a distribution rate of 76%. It is clear that Officer, in developing this framework, is of the view that the distribution rate will be substantially less than 100%. This runs counter to the AER's conclusion that adopting an assumed payout ratio of 1.0: ...is consistent with the Officer (1994) WACC framework which assumes a full distribution of free cash flows."* [75]

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[73] SFG Consulting (2009 p.9).
[74] SFG Consulting (2009 p.14).
[75] SFG Consulting (2009 p.15-16).

and again,

"We note that Officer (1994) includes a detailed worked example in which clearly does not assume a full distribution of free cash flows. When Officer (1994) implements the framework of Officer (1994), he does not assume a payout ratio of 1.0." [76]

The Officer (1994) model assumes a perpetuity framework. This is clear from definitions (a), (b), (c), (d), (e), (f) and (g) used in the derivation of the various cost of capital formula set out in the paper.[77] Since all cash flow streams, including associated imputation credits are assumed to be perpetuities then this is equivalent to assuming that 100% of the free cash flow and 100% of the associated imputation credits which are generated in each period, are fully distributed at the end of that period. This means that the "McKelly Corporation" example in the Appendix to Officer (1994) is actually internally inconsistent with the Officer framework in so far as assuming that $5 million of free cash flow is transferred to general reserves rather than being paid out.

(iv)   *"In its Final Decision, the AER's estimate of the market risk premium is based primarily on empirical evidence relating to historical excess market returns as set out in a series of tables prepared by Associate Professor Handley. In that analysis, Associate Professor Handley takes the excess return of a stock market index over and above the yield on government bonds each year. He then "grosses up" these estimates for various assumed values of franking credits. This grossing up procedure is based on the actual payout ratio of Australian firms, not on an assumed payout ratio of 100%.*

In our view, consistency demands that the same payout ratio must be used throughout the WACC estimation process." [78]

There is no inconsistency here. The purpose of calculating historical excess returns is to determine the actual ex-post grossed up return – which by definition

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[76]   SFG Consulting (2009 p.18).
[77]   See pages 5 – 8 of Officer (1994).
[78]   SFG Consulting (2009 p.17-18).

requires we use the actual/observed payout rate. The market value of any credits which are generated in the period but not paid out would be reflected in the observed capital gain which is used in calculating the ex-post return.

(v)   *"We note that this discussion fails to recognise the well-known typographical error in Officer, 1994, Eq. 14, which is repeated as Handley, 2009, Eq. 4, whereby gamma should be replaced by theta – theta is related to "tax credits per share distributed" and gamma is not."*[79]

Questions concerning delays in the payout of credits and the time value loss associated with retained imputation credits do not arise in the Officer (1994) model. In particular, there is no distinction in the Officer (1994) model between the value of a credit created and the value of a credit distributed, since all credits created in a period (by the payment of corporate tax) are assumed to be fully distributed at the end of that same period. In other words, there is no distinction between theta and gamma in the Officer (1994) framework, as the full distribution of credits implies a payout ratio of 1 (therefore gamma equals theta in the Officer (1994) framework)

(vi)   *"Associate Professor Handley concludes that*

A reasonable estimate of gamma is within the range 0.3 to 0.7.

Logically, then, it follows that Associate Professor Handley considers any estimates from outside this range to be unreasonable. The AER's final estimate of 0.65 is obtained by applying 50% weight to its "lower bound estimate" of 0.57 and its "upper bound estimate" of 0.74. That is, 50% of the AER's final conclusion is based on an estimate (0.74) that Associate Professor Handley considers to be unreasonable." [80]

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[79]   SFG Consulting (2009 p.31).
[80]   SFG Consulting (2009 p.44).

In my opinion, it is not feasible to draw a distinction between an estimate of 0.7 and an estimate of 0.74. Further it is noted that the AER's current estimate of gamma is 0.65 which does indeed fall within my suggested range of 0.3 – 0.7.

(vii)   *"Of course, foreign investors obtain no benefit from franking credits. Yet, to the extent that gamma is greater than zero they are assumed to pay for franking credits. In our view, it is incumbent upon anyone proposing to assume that gamma is greater than zero to explain why foreign investors would pay for franking credits that they cannot use."* [81]

From a theoretical point of view, this reflects nothing more than a standard result of equilibrium asset pricing models when investors are heterogeneous – in the current case, the heterogeneity arises due to imputation credits having different values to different investors – an so is of no particular concern. Whilst all investors collectively determine and agree on the equilibrium asset price, different investors will hold different portfolios of risky assets – in the current case, each investor's portfolio will be tilted according to the value that the investor places on imputation credits relative to the equilibrium (weighted average) value of imputation credits.[82]

From an empirical point of view, this is exactly the result found by McDonald (2001 p.618) in relation to German imputation tax system:

"This implies that a foreign investor incurs a cost of 26% of the value of the dividend from holding a German stock across the ex-dividend date. In the long run, a foreign investor following a buy-and-hold strategy in a company which makes payouts exclusively as dividends loses 26% of the value of the investment"

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[81]   SFG Consulting (2009 p.44).
[82]   The concept of tilted portfolios within a CAPM framework has previously been examined by Black (1974) and Elton and Gruber (1978) amongst others.

8. CONCLUSION

Based on the discussion in this and my earlier reports, it remains my opinion that a reasonable estimate of gamma is within the range 0.3 – 0.7.

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Curriculum Vitae

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QUALIFICATIONS

BCom, BMath *Newcastle*, MCom (Hons) *Melbourne*, PhD *Melbourne*

EMPLOYMENT HISTORY

Period	*Organisation*	*Position*
Jul 1993 to date	University of Melbourne Melbourne	Associate Professor of Finance (since July 2005)
Sep 2009 to Jan 2010	Stern School of Business New York University New York	Visiting Associate Professor of Finance (Fall Semester 2009)
May 2008 to Sep 2008	Stern School of Business New York University New York	Visiting Associate Professor of Finance (Summer Semester 2008)
Aug 1988 to Jul 1993	SBC Australia *(Now UBS)* Sydney and Melbourne	Corporate Finance Executive
Nov 1985 to Aug 1988	Coopers & Lybrand *(Now Pricewaterhousecoopers)* Newcastle	Audit Senior

RESEARCH

Research Focus: Corporate finance, derivative security pricing, corporate finance applications of derivative security pricing

Scholarly Publications (since 2000)

- Handley, J.C., 2008. "Dividend Policy: Reconciling DD with MM". Journal of Financial Economics, 87, 528-531.

- Handley, J.C. and K. Maheswaran, 2008. "A Measure of the Efficacy of the Australian Imputation Tax System". Economic Record, 84, 82-94.

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- Brown, C.A., J.C. Handley and K. Palmer. "A Closer Look at Barrier Exchange Options".

- Brown, C.A., J.C. Handley and K. Palmer. "Partial Differential Equations for Asian Option Prices".

- Handley, J.C. and C. Sobfeldt-Hansen. "Floating Priced Convertibles – A Direct Test of the Faulty Contract Design and the Last Resort Financing Hypotheses"

- Brown, C.A., J.C. Handley and A. Lamba. "Share Buybacks and Information Asymmetry – Winners and Losers"

- Handley, J.C. and M. Pinnuck. "Testing for Capital Structure Persistence Using a Flow Rather than a Stock Measure".

TEACHING

Teaching Focus: Financial Management, Corporate Finance, Derivatives, Investments

Awards

- 2008 Dean's Certificate for Excellence in Graduate Teaching.

- 2007 Dean's Certificate for Excellence in Undergraduate and Postgraduate Teaching.

- 2006 Dean's Certificate of Excellent Undergraduate and Postgraduate Teaching.

- 2005 Dean's Certificate of Excellent Undergraduate and Postgraduate Teaching.

- 2004 Dean's Certificate of Excellent Undergraduate Teaching for 2004.

- 2003 Dean's Individual Award for Excellence in Teaching in the Faculty of Economics and Commerce.[83]

  In the citation to the award, the Dean of the Faculty of Economics, Professor M.A. Abernethy wrote: *The Award is based on your outstanding contribution to curriculum development in finance at both the undergraduate and postgraduate level and your excellent teaching evaluations over a lengthy period of time"*

ADMINISTRATION AND LEADERSHIP

- Deputy Head, Department of Finance, 2009—.

- Coordinator, PhD Program in Finance, 2009.

- Academic Director, Master of Applied Finance Program, 2006—2008.

- Coordinator, Honours Program in Finance, 2001—2003.

- Chair, 2003 Review Committee of the Honours Program in Finance at the University of Melbourne

- Chair, 2002 Review Committee of the Undergraduate Program in Finance at the University of Melbourne

KNOWLEDGE TRANSFER AND CONTRIBUTION TO THE PROFESSION

I have provided expert advice on various financial matters to the Australian Accounting Standards Board, Australian Competition and Consumer Commission, Australian Energy Regulator, KPMG Corporate Finance and the New Zealand Commerce Commission, including the following recent engagements:

- 2010, Consultant to the Australian Energy Regulator on matters dealing with the AER Electricity Distribution Determinations for Queensland and South Australia for 2010-2015, Victoria for 2011-2015 and Gas Distribution Decisions for New South Wales and the Australian Capital territory for 2010-2015, March–.

- 2009, Consultant to the Australian Energy Regulator on matters dealing with the AER Electricity Distribution Determinations for Queensland and South Australia for 2010-2015, October.

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[83]   This is awarded for the best performance in the entire Faculty of Economics and Commerce which covers four departments: Department of Accounting and Business Information Systems, Department of Economics, Department of Finance, Department of Management.

- 2009, Consultant to the Australian Energy Regulator on matters dealing with The AER Review of Proposed Debt and Equity Raising Costs and the Weighted Average Cost of Capital for the 2009–14 Regulatory Control Period, April.

- 2009, Consultant to the Australian Energy Regulator on matters dealing with The AER Review of the Weighted Average Cost of Capital for Electricity Distribution and Transmission, March/April.

- 2009, Consultant to the New Zealand Commerce Commission on matters dealing with the Telecommunications Service Obligations (TSO) Determination for the years ending 30 June 2005 and 2006, June.

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- 2007, Consultant to the New Zealand Commerce Commission on matters dealing with the Telecommunications Service Obligations (TSO) Determination for the year ending 30 June 2004, March.

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- 2003, Consultant to the New Zealand Commerce Commission on matters dealing with the Telecommunications Service Obligations (TSO) Determination for the period ending 30 June 2002, June.

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