Report prepared for the

Australian Energy Regulator

Advice on the Value of Imputation Credits

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PREAMBLE

The Australian Energy Regulator (AER) is currently assessing regulatory proposals from the following service providers: TransGrid, Transend, Directlink, Ausgrid, Endeavour Energy, Essential Energy, ActewAGL and Jemena.

The AER seeks expert advice, in relation to the value of imputation credits[1] to inform its assessment of the rate of return for these service providers. Advice is sought on nine matters:

- Interpretation of gamma
- Interpretation of the payout ratio
- Interpretation of the 'second parameter'
- Estimation approach
- Equity ownership approach
- Tax statistics
- Dividend drop-off studies
- Valuation of imputation credits
- Plausibility of estimates

including twenty-four specific questions.

This report sets out my advice on each of these matters (and questions) in turn.

[1] The terms "imputation credit" and "franking credit" are used interchangeably in this report.

EXECUTIVE SUMMARY

The traditional approach to estimating the value of imputation credits γ (gamma) can be stated as follows

$$\gamma = F \times \theta$$

where F is the credit distribution or payout ratio – representing the proportion of imputation credits distributed to shareholders and θ (theta) is the credit utilisation or redemption rate – representing the per dollar value of a distributed imputation credit.

Based on the discussion in this report, it is my opinion, that a reasonable estimate of:

(i) the Payout Ratio F is 0.7 – 0.8 with a preferred estimate of 0.8.

(ii) the Utilisation Rate θ is 0.4 – 0.7 with a preferred range of 0.5 – 0.6.

(iii) the Value of Imputation Credits γ is 0.3 – 0.6 with a preferred range of 0.4 – 0.5.

It is clear what we want to estimate – but there are residual concerns with the available data. This means all estimates of theta and gamma should be considered to be imprecise.

1. INTERPRETATION OF GAMMA

Advise on an appropriate interpretation of gamma. In advising on this matter, take into account the following sub-questions (1 to 4):

<u>Question 1</u>

What do you consider to be the purpose of the gamma adjustment in section 6.5.3 of the National Electricity Rules (the 'rules')? In responding to this question, please have regard to the National Electricity Objective, which is 'to promote efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity with respect to:

a. price, quality, safety, reliability and security of supply of electricity; and

b. the reliability, safety and security of the national electricity system.'

The fundamental task of the regulator is to set prices which provide the regulated firm with an opportunity to earn a fair compensation for the efficient delivery of the regulated service. Specifically, the regulatory framework requires the determination of allowed revenues on a nominal, post-tax basis using a building block approach and which includes building blocks for operating costs, depreciation (a return of capital), a return on capital and the cost of corporate income tax. The return on capital is to be determined within a weighted average cost of capital ("WACC") framework such that the regulated firm is allowed a rate of return commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk. Allowed operating costs are those that a prudent operator would incur in order to achieve efficient delivery, security of supply and maintain the safety of the regulated service.

The post-tax basis of the regulatory framework can be more fully described as an after-company-before-personal-tax framework. In other words, cash flows and returns are to be measured after company taxes but before personal taxes. By definition, this means that allowed revenues should include compensation for corporate taxes incurred by the regulated firm but not for personal taxes incurred by the firm's shareholders. Similarly, allowed revenues should include compensation for prudent, efficient costs incurred by the regulated firm but not for costs (including personal transactions costs) incurred at the shareholder level. Note, this does not mean that personal taxes and costs are being ignored or assumed not to exist – rather there is no need to explicitly include them in the modelling framework.[2]

The above discussion can be used to readily explain the purpose of the gamma adjustment in section 6.5.3 of the National Electricity Rules. The cost of corporate income tax building block (for each regulatory year) is defined as:

$$ETC_t = (ETI_t \times r_t)(1 - \gamma) \quad (1)$$

where ETI_t is the estimated taxable income for that year, r_t is the expected statutory tax rate for that year and γ (gamma) is the value of imputation credits. Here, $ETI_t \times r_t$ can be interpreted as the amount of company tax paid.

It is well established that under the Australian imputation tax system, tax paid at the company level represents a mixture of corporate tax and personal tax. A distribution of imputation credits is the means by which a credit for taxes paid by the company is passed onto (or imputed) to shareholders and the question of whether shareholders can use these credits to reduce their personal taxes (or receive a tax refund) depends on their tax status and domicile. Officer (1994 p.2) discusses this point as follows:

> *"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 effect, the tax collected at the company level is a mixture of personal tax and company tax, the company tax being that proportion of the tax collected which is not credited (rebated) against personal tax."*

[2] The regulatory WACC framework is an after-company-before-personal-tax framework which requires explicit modelling of cash flows and returns after allowing for company tax but avoids most of the complications associated with having to model personal taxes - one complication which remains of course, is gamma. If one wanted to explicitly model personal taxes then an after-company-after-personal-tax WACC framework could be used instead.

The gamma adjustment in section 6.5.3 of the National Electricity Rules reflects this principle by providing that a regulated firm is compensated only for company taxes but not for personal taxes. If $ETI_t \times r_t$ is the estimated amount of company tax paid by the benchmark efficient entity and γ is the proportion that effectively represents personal tax, then the split of tax paid into the company tax and personal tax components is:

$$ETI_t \times r_t = (1-\gamma)(ETI_t \times r_t) + \gamma(ETI_t \times r_t) \tag{2}$$

or equivalently:

$$ETI_t \times r_t = ETC_t + \gamma(ETI_t \times r_t) \tag{3}$$

Rearranging (3) leads to the definition of the cost of corporate income tax building block, ETC_t in (1) above.

This approach is entirely consistent with that adopted in Officer (1994 p.4) who states:

> *"This amount, i.e. $T(X_O - X_D)$ represents the amount of tax collected from the company but not all of this is company tax. A proportion (γ) of the tax collected from the company will be rebated against personal tax and, therefore, is not really company tax but rather is a collection of personal tax at the company level. Therefore, if we wish to define the effective company tax collection, we need to reduce T by the proportion γ."*

Officer (1994 p.4) then defines the effective level of company tax paid as:

$$X_G = T(X_O - X_D)(1-\gamma) \tag{4}$$

which corresponds directly with the cost of corporate income tax building block in (1) above.

Question 2

Please describe how gamma is defined and interpreted in the relevant academic literature (including the work of Officer, Monkhouse, Lally, and any other literature you deem relevant). Is gamma defined and interpreted consistently across the relevant literature?

The seminal paper dealing with valuation under an imputation tax system is Officer (1994). In this paper, Officer makes three key contributions to the literature.

The first and most important contribution is to show that under an imputation tax system, the way we measure after-company-before-personal-tax returns needs to change. In particular, under a classical tax system, the after-company-before-personal-tax return on equity consists of two components: capital gains and dividends but under an imputation tax system, we need to add a third component – the value of distributed imputation credits. Returns calculated in this way – capital gains, dividends and the value of distributed imputation credits – are commonly referred to as grossed-up returns. Note that I have referred to the value of distributed imputation credits rather than just distributed imputation credits. I equally could have referred to the value of dividends rather than just dividends but this is not necessary for dividends are paid in cash and the (after- company-before-personal-tax) value of one dollar of dividends is one dollar. The necessity for the distinction in the case of imputation credits is due to the fact that unlike dividends, imputation credits are not cash but rather are convertible into cash depending on the tax status and domicile of the shareholder who receives them. This means that the (after-company-before-personal-tax) value of an imputation credit can be different for different investors and equally the after-company-before-personal-tax return on equity can also be different for different investors. It is important to repeat that in this context the relevant value of an imputation credit is the after-company-before-personal-tax value.

Officer's (1994) second contribution is to extend the WACC valuation framework to an imputation tax system by setting out various definitions of a firm's WACC (discount rate) and the corresponding consistent definitions of cash flow which can then be used for valuation purposes.[3] One of these definitions[4] – the vanilla WACC – forms the basis for the current regulatory framework. Under this approach, the after-company-before-personal-tax cash flow of the firm is given by:

$$X_O - T(X_O - X_D) + \gamma T(X_O - X_D) \tag{5}$$

where X_O is the firm's operating income (or free cash flow), $T(X_O - X_D)$ is the amount of tax paid at the company level and $\gamma T(X_O - X_D)$ is described by Officer (1994 p.4) as *"a proportion of the tax paid at the company level [which] is really a withholding of personal tax"*.[5] The corresponding WACC is given by:

$$r_E \frac{S}{V} + r_D \frac{D}{V} \tag{6}$$

where r_E is the firm's after-company-before-personal-tax cost of equity, r_D is the firm's before-company-before-personal-tax cost of debt, S/V is the proportion of equity financing and D/V is the proportion of debt financing. For the purposes of (6), the firm's after-company-before-personal-tax cost of equity is given by:

$$r_E = \frac{X_E' + \gamma T(X_O - X_D)}{S} \tag{7}$$

where X_E' is dividends paid to shareholders and $\gamma T(X_O - X_D)$ is described by Officer (1994 p.4) as the *"value of franking tax credits"*.

It is clear that Officer has used two different terms to describe the same thing – the amount $\gamma T(X_O - X_D)$ – but there is no ambiguity here. These terms can and have been used interchangeably. From the company's view, distributed imputation credits represent tax paid at the company level which is imputed to shareholders to reduce their personal taxes. From the shareholders' point of view, distributed imputation credits are valuable to the extent that they can be used (or utilised or redeemed) to reduce personal

[3] The regulator uses this framework in a slightly different way – rather than applying a discount rate to a cash flow to determine a value, the regulator applies a discount rate to an (asset) value to determine a cash flow.
[4] This is case B (iii) in Officer (1994).
[5] Combining the last two terms in (5) gives the effective level of company tax paid in (4).

taxes and/or have credits refunded. Similarly, Officer has described gamma in seemingly different ways. For example he refers to:

> *"A proportion (γ) of the tax collected from the company will be rebated against personal tax."*

and shortly thereafter:

> *"γ can be interpreted as the value of a dollar of tax credit to the shareholder."* [6]

But again, there is no ambiguity. These terms can and have been used interchangeably because the underlying source of value of an imputation credit to shareholders is the consequent reduction in personal taxes in recognition of taxes that were previously paid at the corporate level. In other words, within the Officer framework, it is clear that gamma represents the utilisation or redemption value of imputation credits [7] and this value corresponds to the proportion of company tax which is in effect a prepayment of personal tax by the company on behalf of its shareholders.[8] It is this identification of the personal tax component of the company tax paid which is the central idea of the paper.

But the important question is: utilisation value to whom ?

Implicit in Officer's WACC framework (and the standard classical tax WACC framework) is the notion of market value and so the relevant measure of utilisation value is that value as determined by the market – in other words it is not the utilisation value of a credit to any single investor or the utilisation value to any single class of investors that we want but rather the utilisation value to the market as a whole. In contrast, much of the current debate appears to incorrectly suggest that market value and utilisation value are alternative concepts for this purpose.

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[6] Officer (1994 p.4)
[7] The terms "utilisation value" and "redemption value" are used interchangeably in this report.
[8] By definition gamma represents a proportion between zero and one and so can be more fully described as either the per dollar utilisation value of imputation credits or the value of a dollar of imputation credits.

Note also that Officer's WACC framework (and the standard classical tax WACC framework) is simply a set of definitions linking consistent sets of values, cash flows and discount rates. It acquires a market value context only if key inputs such as the cost of equity, cost of debt and in the current case, the value of imputation credits have been determined within an appropriate market value setting.

It is in this regard that Officer (1994) makes his third contribution. Officer draws on his discussion concerning grossed-up returns to suggest that if the after-company-before-personal-tax version of the Capital Asset Pricing Model ("CAPM") [9] is used to derive estimates of equity returns then it would take the following form under an imputation tax system:[10]

$$E(\hat{r}_j) = r_f + \beta_j [E(\hat{r}_m) - r_f] \tag{8}$$

where $E(\hat{r}_j)$ is the expected after-company-before-personal-tax return on firm j , $E(\hat{r}_m)$ is the expected after-company-before-personal-tax return on the market portfolio, r_f is the risk-free return, β_j is the beta of firm j and the grossed-up return each period is:

$$\hat{r}_t = \frac{\Delta P_t + d_t + \gamma C_t}{P_{t-1}} \tag{9}$$

where ΔP_t is the capital gain for the period, d_t is dividends paid during the period, C_t is imputation credits distributed during the period and P_{t-l} is the price at the start of the period. Officer (1994 p.9) simply refers to the amount $\frac{\gamma C_t}{P_{t-1}}$ as *"the value of tax credits expressed as a rate or proportion of the initial value of the share"*. This CAPM formula is discussed further under question 7.

Other important papers in the literature include Monkhouse (1996), Monkhouse (1993) and Lally and van Zijl (2003).

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[9] This corresponds to the standard Sharpe-CAPM which is also called the Sharpe-Lintner CAPM. The Sharpe-CAPM was derived without any explicit assumption concerning taxes, but is conventionally applied in a classical tax system to the determination of after-company-before-personal-tax returns. Brennan (1970) extends the Sharpe-CAPM to incorporate the effects of personal taxes on income and capital gains.

[10] See equations (17) and (18) in Officer (1994).

The Officer WACC framework is a strict perpetuity model – it assumes that 100% of the cash flow and 100% of the imputation credits generated each period are paid out as franked dividends in that period. In other words, the amount of franking credits generated each period and the amount of franking credits distributed each period are one and the same. Monkhouse (1996) extends the Officer WACC framework to a non-perpetuity setting by allowing for a less than full payout of cash flow and franking credits each period. This has the effect of creating a wedge between the amount of franking credits generated by the firm (equivalently amount of company tax paid by the firm) and the amount of franking credits distributed to shareholders. The difference is commonly referred to as retained imputation credits. In this case, the utilisation value of imputation credits can be measured in two ways – either as a proportion of the franking credits generated or created by the firm, or as a proportion of the franking credits distributed by the firm. Gamma, γ continues to be used to refer to the personal tax proportion of company tax paid – equivalently the utilisation value of generated imputation credits while theta, θ is used to refer to the utilisation value of distributed imputation credits and is commonly called the utilisation rate.[11] The relationship between gamma and theta is then: [12]

$$\gamma = F \times \theta + (1 - F) \times \psi \tag{10}$$

where F is the credit distribution or payout ratio – representing the proportion of credits generated that are distributed to shareholders and ψ (psi) is the per dollar utilisation value of a retained imputation credit, where $\psi < \theta$ due to time value loss associated with the delay in distributing the credit. Equation (10) says that gamma may be interpreted as a weighted average of the value of a distributed credit and the value of a retained credit. If one assumes a 100% payout of imputation credits each period then $F = 1$ and (10) collapses to $\gamma = \theta$ which is consistent with Officer (1994).

Monkhouse (1993) derives a CAPM under an imputation tax system which allows for personal taxes on income and capital gains and also distinguishes between distributed

[11] Theta can equivalently be described as a utilisation value (expressed as cents-in-the-dollar) or as a utilisation rate (expressed as a percentage or proportion).
[12] Monkhouse (1996) does not specifically use the term gamma but the interpretation is clear from the definition of the company's effective tax rate in his equation (2.5).

and retained imputation credits. Lally and van Zijl (2003) derive a CAPM under an imputation tax system which allows for differential personal taxes on income and capital gains and distributed imputation credits only. Both papers explicitly refer to the utilisation value of distributed imputation credits in a manner consistent with Officer (1994). These models are discussed further under question 7.

Question 3

With regard to the relevant literature, do you consider reasonable our interpretation of gamma as the expected proportion of company tax that is returned to investors through the utilisation of imputation credits?

Yes. As discussed under questions 1 and 2 above, such an interpretation is consistent with the relevant literature and the regulatory framework.

Question 4

Do you consider it reasonable to estimate gamma as the product of a:

a. payout ratio (also known as the distribution rate); and

b. 'second parameter' (which we interpret as the 'utilisation rate' and which SFG (2014) interpret as 'the value of distributed credits')?

Yes – but there is an important qualification.

This approach to estimating gamma is commonly referred to as the traditional approach and can be stated as:

$$\gamma = F \times \theta \tag{11}$$

where F is the credit distribution or payout ratio – representing the proportion of credits generated that are distributed to shareholders and θ is the credit utilisation or redemption rate – representing the per dollar value of a distributed credit.

A direct comparison of (11) with the Monkhouse (1996) definition of gamma in (10) shows that the traditional approach is based on the implicit assumption that $\psi = 0$ i.e. that retained imputation credits have zero value. I have previously argued that this assumption is unreasonable.[13]

It is well understood that the value of a retained imputation credit is less than the value of a distributed imputation credit due to the delay in distribution – but the difficult question is how much less. Unfortunately the answer is we just don't know as there is currently no empirical evidence on the value of a retained credit. Any value attributable to credits retained in a period would be reflected in the observed capital for that period but there no known method to identify that component. I continue to find the suggestion that retained imputation credits are worthless to be implausible. Recent commentary in the financial press suggests there are (at least some) market participants who are like-minded: [14]

> *"Plans to cut company tax to 28.5 per cent at the beginning of the next tax year means the value of retained franking credits will fall by about 7 per cent, say Warakirri analysts."*

and:

> *"Matthew Ryland, director of Greencape Capital, has about $5 billion under management in large cap stocks, said: "Retained franking credits are an interest-free loan to the government that we want to minimise at all costs. I would like to think corporate boards around Australia are paying attention because failure to do so would mean loss of value for their shareholders. While there is value we want to get it out to shareholders."*

[13] See section 2.3 in Handley (2010).
[14] Duncan Hughes, "Investors to lose $5b in tax credits", AFR Weekend, 7-8 June 2014, p.2.

Notwithstanding the first comment is based on the face value of credits in Franking Account Balances (FAB) in aggregate, both comments are clearly consistent with the notion that retained imputation credits have a strictly positive value.

This leads to my qualification. Retained imputation credits can be worth no less than zero but may be worth more than zero. Estimates of gamma using the traditional approach will therefore be downward biased to the extent that retained imputation credits have value.[15] Although it is not possible to reasonably estimate the magnitude of the bias, its direction is clear.

Discussion of the correct interpretation of the 'second parameter' appears under question 7.

[15] For clarity, retained credits means the balance of credits in a firm's FAB which are available to be paid out at some future point in time.

2. INTERPRETATION OF THE PAYOUT RATIO

Advise on an appropriate interpretation of payout ratio. In advising on this matter, take into account the following sub-questions (5 to 6):

<u>Question 5</u>

Please describe how the payout ratio is defined and interpreted in the relevant academic literature (including the work of Officer, Monkhouse, Lally, and any other literature you deem relevant). Is the payout ratio defined and interpreted consistently across the relevant literature?

The Officer WACC framework is a perpetuity model – it assumes that all imputation credits generated in a period are fully paid out in that period. There are no retained credits by definition.

Monkhouse (1996) allows for a less than full payout of credits (and cash flow) each period – he defines the credit payout ratio F as *"the [face] value of imputation credits obtained by shareholders divided by the amount of imputation credits generated in the period"*.[16] Equivalently, F is defined as the proportion of credits generated (or created) in a period that are paid out (or distributed) in that period. The treatment of the payout ratio in Monkhouse (1996) is consistent with that in Officer (1994) – in effect, Officer (1994) considers the special case of $F = 1$.

Monkhouse (1993) and Lally and van Zijl (2003) are single period CAPM models. Each can be interpreted as adaptions of the Brennan-CAPM to an imputation tax system and each can be used to estimate the after-company-before-personal-tax return on equity.

[16] Monkhouse (1996 p.192) uses the symbol α rather than F in his equation (2.3). The face value interpretation is clear from the definition of the company's effective tax rate in his equation (2.5).

The concept of the payout ratio in Monkhouse (1993) is consistent with that of Monkhouse (1996) and Officer (1994). Monkhouse (1993) assumes that at the end of the period, each firm distributes a known amount of dividends, distributes a known amount of imputation credits and retains a known amount of imputation credits – which he defines as the amount of Australian corporate tax paid less the imputation credits distributed.[17] He further assumes that the retained imputation credits are capitalized into the end of period value (price) of the firm at some common market utilisation rate θ_m^r.[18] Lally and van Zijl (2003) adopt a simpler framework and assume that each risky asset pays a known amount of dividends and a known amount of imputation credits at the end of the period but they do not relate the amount of credits distributed at the end of the period back to the implicit tax position of the underlying firm.

Question 6

With regard to the relevant literature, do you consider reasonable our interpretation of the payout ratio as the proportion of imputation credits generated by the benchmark entity that are distributed to investors?

Yes.

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[17] Monkhouse (1993 p.9).

[18] Monkhouse (1993 p.5). Arguably, there is a marginal benefit provided by this additional complexity since θ_m^r is assumed to be exogenous rather than being determined by the model.

3. INTERPRETATION OF THE 'SECOND PARAMETER'

Advise on an appropriate interpretation of 'second parameter'. In advising on this matter, take into account the following sub-questions (7 to 9):

Question 7

Please describe how the 'second parameter' is defined and interpreted in the relevant academic literature (including the work of Officer, Monkhouse, Lally, and any other literature you deem relevant). Is the 'second parameter' defined and interpreted consistently across the relevant literature?

It is clear from Monkhouse (1996) that the second parameter refers to the utilisation value of a distributed imputation credit. This parameter is commonly denoted and called theta θ. It is also clear from the post-tax basis of the regulatory framework (and the Officer and Monkhouse WACC frameworks) that the item of interest is more precisely described as the after-company-before-personal-tax utilisation value of a distributed imputation credit.

We know there is more than one asset paying imputation credits and there is more than one investor in the market. Since the (after-company-before-personal-tax) value of a distributed credit varies across investors then it is also clear that we require the value of imputation credits to the market as a whole rather than the value to any particular investor. But how do you estimate the value of a credit to the market given that a credit cannot be traded as a separate asset ?

One approach is to infer the value of a distributed credit from the observed market price of the underlying stock. This is the basis for using dividend drop-off studies which are discussed under question 18.

Another approach is to use an equilibrium asset pricing model like the CAPM.[19] The basic approach of the CAPM can be described as follows: given a set of assets and given a set of investors (who collectively hold those assets) and assuming each investor choses his optimal or best portfolio,[20] what is the structure of assets prices (equivalently, the structure of expected returns) if the market is in equilibrium. By definition, equilibrium means that for each asset and all assets in aggregate, demand equals supply. Importantly, in the CAPM all investors collectively determine the prices (expected returns) of all assets and so by definition all then agree on those equilibrium prices (expected returns).

To get a better understanding of the nature of the second parameter we need to dig deeper into the workings of a CAPM model under an imputation tax system. For this purpose, I choose the CAPM suggested by Officer (1994) in (8). Unfortunately, Officer conjectures rather than derives the model and so it is necessary to identify the minimum set of assumptions that would support such a model. Starting with the standard Sharpe-CAPM framework, as described in Brennan (1992), augmented for the payment of dividends and imputation credits on risky assets and the heterogeneous valuation of imputation credits across investors, it can be shown that the following assumptions:

(i) There is a single time period. At the start of the period, each investor $i = 1,..,m$ is endowed with a fraction e_{ij} of each risky asset $j = 1,..,n$;

(ii) At the end of the period, asset j pays a dividend of d_j and attached imputation credits of IC_j with certainty. The (endogenous) start-of-period price of asset j is p_{j0} and the (exogenous) uncertain ex-dividend end-of-period price is $\tilde{p}_{j1}$;[21]

(iii) Investors are risk averse and utility is defined over the mean and variance of after-company-before-personal-tax end-of-period wealth;

(iv) Investors have homogeneous beliefs about the joint probability distribution of future ex-dividend end-of-period asset prices;

(v) Investors may borrow or lend without restriction at the exogenous risk-free rate of r_f;

[19] Different CAPMs can be distinguished by different starting assumptions.

[20] The optimal portfolio for an investor is that which offers the highest expected return for a given level of risk, having regard to the investor's level of risk aversion.

[21] The purpose of the CAPM is to determine the price of the asset at the start of the period given the assumed distribution of possible prices/values of the asset at the end of the period.

(vi) Assets are perfectly divisible, there are no transactions costs, no restrictions on short sales and markets are competitive;

(vii) The after-company-before-personal-tax value of a dollar of distributed imputation credits to investor i is $0 \leq \theta_i \leq 1$ and for simplicity, it is assumed that θ_i is constant and independent of portfolio choice;

combined with the standard machinery of a pure exchange economy, where investors simultaneously and instantaneously trade at the start of the period to rebalance their portfolios of risky assets from the initial e_{ij} to the optimum z_{ij} such that markets clear, leads to the following CAPM:

$$E(r_j) + \theta c_j = r_f + \beta_j\left[E(r_m) + \theta c_m - r_f\right] \quad (12)$$

where $E(r_j)$ is the expected return on asset j due to capital gains and dividends, $c_j = \frac{IC_j}{p_{j0}}$ is the imputation credit yield on asset j, $E(r_m)$ is the expected return on the market portfolio due to capital gains and dividends, c_m is the imputation credit yield on the market portfolio, β_j is the beta of asset j and θ is the equilibrium value of a dollar of distributed imputation credits. In this case, $E(r_j) + \theta c_j$ is the expected after-company-before-personal-tax return on asset j and $E(r_m) + \theta c_m$ is the expected after-company-before-personal-tax return on the market portfolio and so (12) corresponds to the CAPM suggested by Officer in (8). Importantly, the equilibrium value of a dollar of distributed imputation credits is given by:

$$\theta = \frac{\sum \frac{\omega_i \theta_i}{\lambda_i}}{\sum \frac{\omega_i}{\lambda_i}} \quad (13)$$

where ω_i is the proportion of risky assets in the market held by investor i, λ_i is a measure of investor i's relative risk aversion and the summation is taken over all investors $i = 1, .., m$ in the market. Equation (13) states that in equilibrium, theta represents a weighted average of individual investors' utilisation rates where the weights are based on investors' levels of wealth and risk aversion.

Note that the CAPM in (12) is expressed in terms of equilibrium expected returns. It can also be expressed in terms of equilibrium asset prices as follows:

$$p_{j0} = \frac{E(\tilde{p}_{j1})+d_j+\theta c_j-Acov(\tilde{p}_{j1},\tilde{m})}{1+r_f} \tag{14}$$

where $E(\tilde{p}_{j1})$ is the expected ex-dividend end-of-period price of asset j, A is a measure of the market's absolute risk aversion and $\tilde{m}$ is the value of the market portfolio at the end of the period. The key message from (14) is that the per dollar utilisation value of imputation credits embedded in equilibrium asset prices i.e. θ is common across all assets in the market.

This interpretation of theta as a complex weighted average of investor utilisation rates is consistent with that appearing in Monkhouse (1993) and Lally and van Zijl (2003) – recall both allow for personal taxes on income and capital gains (albeit in different ways) whilst Monkhouse (1993) also distinguishes between distributed and retained imputation credits.[22] Using notation consistent with (12) and (13), the Monkhouse CAPM is:

$$E(r_j) + \theta c_j + \theta_m^r k_j = r_f + \beta_j[E(r_m)+\theta c_m+\theta_m^r k_m - r_f] \tag{15}$$

where θ_m^r is the assumed value of a dollar of retained imputation credits, k_j is the retained imputation credit yield on asset j, k_m is the retained imputation credit yield on the market portfolio and the equilibrium value of a dollar of distributed imputation credits is given by:

$$\theta = \frac{\sum\frac{\omega_i\theta_i}{\lambda_i(1-t_i)}}{\sum\frac{\omega_i}{\lambda_i(1-t_i)}} \tag{16}$$

[22] Here θ corresponds to θ^d in the Monkhouse model and U in the Lally and van Zijl model.

where t_i is investor i's tax rate on income and capital gains.[23] Similarly, using notation consistent with (12) and (13), the Lally-van Zijl CAPM is:

$$E(r_j) + \theta c_j(1 - T_2) - T_1(\delta_j - r_f)$$
$$= r_f + \beta_j\left[E(r_m) + \theta c_m(1 - T_2) - T_1(\delta_m - r_f) - r_f\right] \quad (17)$$

where δ_j is the dividend yield on asset j, δ_m is the dividend yield on the market portfolio, T_1, T_2 are complex weighted averages of investor tax rates and the equilibrium value of a dollar of distributed imputation credits is given by (13).[24]

A close comparison of the CAPM in (12) with that in (8) and (9) indicates that θ is applied to the distributed imputation credit yield in the former but γ is applied to the distributed imputation credit yield in the latter. Officer (1994) does not distinguish between theta and gamma in his WACC framework due to its perpetuity nature, but strictly it should be theta (the utilisation value of distributed imputation credits) rather than gamma (the utilisation value of generated imputation credits) which is explicitly used in the CAPM. Any value attributed by the market to retained imputation credits should be reflected in observed capital gains and so no explicit adjustment is required.

<u>Question 8</u>

We interpret the 'second parameter' as:

a. **the weighted-average, by value and risk aversion, of the utilisation rate of each investor, where**

b. **the utilisation rate of each investor is the extent to which that investor can use the imputation credits they receive to reduce their tax (or get a refund).**

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[23] See equations (6.4) and (5.1) in Monkhouse (1993) and equation (2.2) in Monkhouse (1996). In the earlier paper, Monkhouse denotes θ by θ_j but the use of the subscript j may potentially be misleading in suggesting that the equilibrium value of a distributed credit is firm rather than market specific. He drops the use of the subscript in the latter paper. Also note that in equation (5.1) of the earlier paper, the risk aversion parameter measures the investor's absolute risk aversion rather than the investor's relative risk aversion.

[24] See equations (9), (6) and (7) in Lally and van Zijl (2003).

With regard to the relevant literature and paragraphs 342 to 358 of SFG (2014), do you consider that our interpretation is reasonable? Do you consider it reasonable only in the context of a 'closed system'?

Yes – the interpretation is reasonable based on the discussion in the previous question.

SFG's concerns about a closed system[25] are addressed below.

The starting point for a CAPM is a given set of n assets and a given set of m investors who hold them. It is then assumed that this set of investors will trade this set of assets among themselves in order to form their optimal portfolios – with the decision criteria of each investor being to maximize his utility of end-of-period wealth, which in turn is defined over the set of n assets.

The CAPM makes no explicit assumption about any other assets or any other investors but if there are other assets or investors then it is implicitly assumed that these do not matter for the purposes of determining the prices of the n assets under consideration (otherwise they should be in the model). This means that other assets held by other investors do not matter. It also means that other assets held by the m investors do not matter. This is just a form of market segmentation. By definition the system is closed because what matters for pricing purposes – the n assets and m investors – are in the model and any other assets or investors being outside the model are ignored.

This is precisely the assumption that one implicitly makes when using the CAPM in practice. Once you choose a benchmark market then you define the set of assets and investors that are relevant for pricing purposes – in other words, by choosing a particular proxy for the market, one is saying that this is the best model for estimating expected returns on assets within this market. The model is closed in the sense that it is implicitly assumed to be segmented. If one disagrees with this assumption then the solution is to bring the other assets and investors into the model.

[25] SFG (2014) (incorrectly) asserts there is a problem with the AER's modelling of the equilibrium value of imputation credits – in particular, that the model is not a closed system and so no equilibrium is possible and so weighted-average utilisation rates cannot be used as an estimate of theta.

SFG's comments are based on a faulty premise – that the m investors can own no other assets. This is an assumption of SFG but is not an assumption of the CAPM. In the current context, it is not assumed that investors in the domestic market hold no other assets but rather it is assumed that investors in the domestic market price domestic assets in isolation of any other assets they may or may not hold. For this purpose, investors in the domestic market consist of domestic investors to the extent that they hold domestic assets and foreign investors to the extent that they hold domestic assets – this is the set of n assets and the set of m investors who hold those n assets. Foreign assets held by these domestic investors, foreign assets held by these foreign investors and foreign assets held by other foreign investors are outside the model. If one disagrees with this notion of segmentation, then the solution is to bring other assets and investors into the model – for example, use an international CAPM which prices domestic assets relative to an international benchmark rather than relative to a domestic benchmark. SFG's conclusion that no equilibrium can exist is therefore invalid.

Lally (2013) adopts an unnecessarily narrow interpretation of segmentation in suggesting that foreign investors should be excluded completely. But once you choose a proxy for the market portfolio you define not only the set of assets that are relevant for pricing purposes but you also define the set of investors that are relevant for pricing purposes – in other words, it is a joint assumption. Lally's suggestion that we include the full set of n assets but only a subset of the of m investors not only contradicts the starting point of the CAPM but also does not accord with the reality that foreign investors are present in and influence the pricing of assets in the domestic market. This notion of (complete) segmentation – that only domestic assets are held by domestic investors – is an assumption of Lally but is not an assumption of the CAPM.

<u>Question 9</u>

Do you consider that our benchmark market, which is an Australian domestic market that recognises the presence of foreign investors to the extent they invest in the Australian market, is a 'closed system'?

Yes.

4. ESTIMATION APPROACH

<u>**Question 10**</u>

With regard to your answers to the questions above on the 'second parameter', do you consider it reasonable to have regard to the domestic ownership share of Australian equity when estimating the 'second parameter'?

Yes – but there is a condition on how domestic ownership share is defined.

The equity ownership approach has strong conceptual support from the CAPM class of equilibrium asset pricing models. As discussed earlier and repeated here for convenience, the equilibrium value of a dollar of distributed imputation credits is equal to a (complex) weighted average of individual investors' utilisation rates where the weights are based on investors' levels of wealth and risk aversion:

$$\theta = \frac{\sum \frac{\omega_i \theta_i}{\lambda_i}}{\sum \frac{\omega_i}{\lambda_i}} \tag{13}$$

where θ_i is investor i's utilisation rate of distributed imputation credits, ω_i is the proportion of risky assets in the market held by investor i, λ_i is a measure of investor i's relative risk aversion and the summation is taken over all investors $i = 1, .., m$ in the market.

For simplicity assume there are two classes of investor in the market. Class 1 investors hold a combined ω_1 proportion of the risky assets in the market, have an average relative risk aversion of λ_1 and can fully utilise distributed imputation credits $\theta_1 = 1$. Class 2 investors hold a combined ω_2 proportion of the risky assets in the market, have an average relative risk aversion of λ_2 but cannot utilise distributed imputation credits $\theta_2 = 0$. Substituting into (13) gives:

$$\theta = \frac{\sum \frac{\omega_i \theta_i}{\lambda_i}}{\sum \frac{\omega_i}{\lambda_i}} = \frac{\frac{\omega_1 \theta_1}{\lambda_1} + \frac{\omega_2 \theta_2}{\lambda_2}}{\frac{\omega_1}{\lambda_1} + \frac{\omega_2}{\lambda_2}} = \frac{\frac{\omega_1}{\lambda_1}}{\frac{\omega_1}{\lambda_1} + \frac{\omega_2}{\lambda_2}} \tag{18}$$

If one assumes that the average relative risk aversion of each class is the same $\lambda_1 = \lambda_2$ then the equilibrium value of a dollar of distributed imputation credits is equivalent to the proportion of the market held by class 1 investors i.e. $\theta = \omega_1$.[26]

Class 1 does not simply refer to domestic investors and class 2 does not simply refer to foreign investors. Class 1 investors are assumed to extract full value from distributed imputation credits whereas class 2 investors extract no value. Accordingly class 1 more precisely refers to those domestic investors in the domestic market with a $\theta_i = 1$ and class 2 refers to all other investors in the domestic market.

Question 11

In determining a point estimate for gamma, do you consider that estimation of the 'second parameter' depends on how the payout ratio is estimated? In answering, please have regard to the fact that the widely-accepted method for estimating the payout ratio does not consider credits paid by companies to other companies as 'paid out'. (This is because there should be no net change in the aggregate company franking account balances when an imputation credit is paid from one company to another company.)

This traditional approach to estimating gamma is to multiply a payout ratio by the utilisation value of a distributed imputation credit:

$$\gamma = F \times \theta \tag{11}$$

[26] Since 1 July 2001, a large class of resident investors have been entitled to claim a refund for any excess imputation credits. Prior to this, the franking rebate allowed to a taxpayer could not exceed its tax liability and any unused rebate (excess credit) was lost – in other words, for these investors theta would have been somewhere between zero and one.

where F represents the proportion of credits generated that are distributed to shareholders and θ is the per dollar value of a distributed credit. The resulting estimate of γ represents the personal tax proportion of company tax paid or equivalently the utilisation value of generated imputation credits. The central idea of the Officer and Monkhouse WACC frameworks is to identify the personal tax component of tax paid at the company level. Ultimately this means we are interested in knowing what proportion of credits generated or created at the company level (by the payment of company tax) is distributed to shareholders and then redeemed against personal tax liabilities. The presence of entities such as trusts, partnerships and other companies which are interposed between the companies that created the (original) credits and the personal investors that use the credits to redeem their personal taxes creates two difficulties. First there is the potential for double counting of credits as they pass through the system and second, how one should treat a credit which has not fully passed through the system, for example, it has been paid out by the original company but still resides with an interposed company. This complication has been mitigated but not eliminated by the consolidation regime introduced by the Australian Tax Office (ATO) on 1 July 2002.[27]

Ideally, estimates of both the payout ratio and theta should be based on data which is free of double counted credits and credits in the process of being paid out.

The best source of historical data currently available for this purpose appears to be aggregate FAB data from the ATO. The FAB is the account used by a company[28] to keep track of its franking credits. The account is credited with franking credits (including when it pays tax or receives a franked distribution) and is debited with franking debits (including when it receives a refund of tax or makes a franked distribution).

For any given period, the difference between the aggregate amount of corporate tax paid and the change in the aggregate FAB represents the aggregate net franking debit for that period. If the net franking debit is primarily attributable to franked distributions then this amount can be interpreted as an estimate of the amount of franking credits

[27] The consolidation regime provides for the taxing of groups of wholly owned eligible companies, partnerships and trusts as single entities. The choice to consolidate is optional but irrevocable.

[28] Strictly the FAB is used by corporate tax entities which consist of companies, corporate unit trusts, public trading trusts and corporate limited partnerships.

distributed to shareholders during the period.[29] Dividing this amount by the aggregate corporate tax paid gives an estimate of the historic aggregate payout ratio.

This approach is referred to as the cumulative payout approach and has been used by NERA (2013) and Hathaway (2013) and is reasonably uncontroversial. SFG (2014 p.57) also supports this estimation methodology. Using data from the start of the imputation tax system on 1 July 1987 and covering the twenty-four tax years from 1988 to 2011, NERA estimates the cumulative payout ratio to be 0.69. Hathaway (2013) provides an estimate of 0.71 based on the eight year period from 2004 to 2011.

<u>Question 12</u>

Do you consider that there is a reasonable alternative to using ATO statistics to estimate the payout ratio? If so, please elaborate on this alternative approach and identify the point estimate yielded.

It is clear that within the Monkhouse WACC framework the payout ratio F is strictly a firm specific parameter.[30] This complication does not arise in the simpler Officer WACC framework because in this case generated imputation credits and distributed imputation credits are one and the same and hence $\gamma = \theta$. It also doesn't arise in using the CAPM in (8) and (12) to estimate expected returns since an explicit adjustment using θ is required only in relation to distributed imputations credits – any value attributed by the market to retained imputation credits should be reflected in observed capital gains.[31]

[29] Strictly, the recipients are non-corporate tax entities which includes individuals, funds, charities and non-residents.
[30] See equations (2.3) and 4.2) in Monkhouse (1996).
[31] Monkhouse (1993 p.15) makes a similar point: *"As an aside, the Australian Stock Exchange ("ASX") All Ordinaries Accumulation Index, which is the usual method of measuring [the market return] in Australia, is defined in terms of cash, or net, dividend yield and capital gains, and ignores the value associated with imputation credits distributed with dividends. Capital gains will, however, occur from retained cash and retained imputation credits. Hence, while the market return measured by the ASX All Ordinaries Accumulation Index will capture the effect of retained imputation credits, it ignores the effect of distributed imputation credits."*

This means that the standard cumulative payout approach uses market wide data to estimate a firm specific parameter.[32] Of itself this is not a concern since the objective is to estimate the payout ratio for a benchmark efficient entity rather than for any specific service provider.

So whilst the standard estimation methodology is considered reasonable, a question remains as to whether the data used by NERA (2013) is the most appropriate for this purpose. Specifically, the NERA estimate is based on aggregate FAB data for all companies – including public companies and private companies. In contrast, one can reasonably argue that the estimate should be based on public companies only since this is more likely to reflect the composition of the Australian domestic market for equity funds – private companies by definition are financed in entirely different ways – and so be a more relevant proxy for a benchmark efficient entity.

I now provide an estimate of the cumulative payout ratio based on data for public companies sourced from the ATO and using a methodology as close as possible to that used by NERA.

NERA's estimate is based on data contained in Table 1: Company Tax of the 2010-11 edition of the ATO Taxation Statistics (the "2011 Edition") – which shows the aggregate net company tax paid for each tax year end from 1988 to 2011 and the aggregate FAB at the end of the 2011 tax year. This is not broken down into separate components attributable to private companies and public companies. However, Table 3E: Company Tax of the 2011 Edition shows the split of net tax for the 2011 tax year end – of the total $61.7 billion in net tax, $21.3 billion was due to private companies and $39.1 billion was due to public companies.[33] Similarly, Tables 3D and 8: Company Tax of the 2011 Edition shows the split of the FAB at the end of the 2011 tax year – of the total $222.5 billion in FAB, $128.0 billion relates to private companies and $83.5 billion relates to public companies.[34]

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[32] This issue is also discussed by Lally (2013 p.50-51).
[33] The balance is due to non-resident and other resident companies.
[34] Of the balance, $9.2 billion is due to non-membership period returns lodged by subsidiary companies that have consolidated during the year and the rest is due to non-resident and other resident companies.

For each of the other twenty-three tax years from 1988 to 2010, the split of net tax paid into the private company and public company components for that year is sourced from the relevant table of that year's edition of the ATO Taxation Statistics.[35]

The annual net tax paid data appearing in the 2011 Edition does not match the corresponding data reported in the previous editions of the ATO Taxation Statistics due to updates over time. For example, net tax paid in 2001 was $27.6 billion according to Table 1: Company Tax of the 2011 Edition compared to $26.3 billion according to Table 1: Company Tax of the 2001 Edition.[36] I therefore use the percentages of net tax paid by private companies and net tax paid by public companies based on the earlier editions of the ATO Taxation Statistics to estimate the split of the annual net tax paid data appearing in the 2011 Edition. For example, Table 8E of the 2001 Edition indicates that of the $26.3 billion in net tax paid, $9.1 billion (35%) was paid by private companies and $16.6 billion (63%) was paid by public companies. Applying these percentages to the $27.6 billion in net tax paid in 2001 according to the 2011 Edition, I estimate 35% or $9.6 billion was paid by private companies and 63% or $17.4 billion was paid by public companies.

Based on the above, the total net tax paid by public companies for the twenty-four year period from the start of the imputation tax system in 1987 to 2011 is estimated to be $429.8 billion. The FAB relating to public companies at the end of the 2011 tax year is $83.5 billion. This suggests a cumulative payout ratio, based on public companies only, of 0.8. (In comparison, the total net tax paid by private companies for the twenty-four year period from the start of the imputation tax system in 1987 to 2011 is estimated to be $267.8 billion. The FAB relating to private companies at the end of the 2011 tax year is $128.0 billion. This suggests a cumulative payout ratio, based on private companies only, of 0.5).

Another possible approach is to use data disclosed in the financial statements of an appropriate set of listed companies.

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[35] Data was not available for the 1988 tax year and so the 1989 split was used for both 1988 and 1989.

[36] Net tax paid from 1988 to 2011 was $720.1 billion according to Table 1: Company Tax of the 2011 Edition compared to $695.4 billion according to summing over the previous editions of ATO Taxation Statistics – a difference of 3%.

Based on the above, in my opinion a reasonable estimate of the payout ratio is within the range 0.7 – 0.8.

Question 13

If you consider that our interpretation of the 'second parameter' is reasonable, please critically evaluate our approach to determining a value for this parameter. In doing so, take into account:

a. the evidence to which we have regard, namely:

i. The equity ownership approach

ii. Tax statistics

iii. Implied market value studies (including dividend drop off studies)

iv. The conceptual goalposts approach

b. our assessment of the strengths and limitations of each class of evidence

c. the range of estimates that we adopt for each class of evidence

d. our final point estimate for the 'second parameter'

In the Rate of Return Guideline[37], the AER has proposed to adopt an estimate of 0.5 for the value of imputation credits γ which is the product of an estimate of 0.7 for the payout ratio F – based on the NERA (2013) study – and an estimate of 0.7 for the utilisation rate θ.

The estimate of $\theta = 0.7$ was reached after the AER considered four main approaches to estimation:

- the equity ownership approach based on aggregate foreign ownership data from the Australian Bureau of Statistics (ABS);

- the historic credit utilisation rate approach based on aggregate taxation statistics from the ATO;

[37] Australian Energy Regulator (2013).

- implied market value studies including dividend drop-off studies; and

- the conceptual goalposts approach.

According to the AER, the equity ownership approach suggests a utilisation rate of 0.7 to 0.8, the historic credit utilisation rate approach (also referred to as tax statistics studies) suggests a utilisation rate of 0.4 to 0.8, implied market value studies suggest a utilisation rate of 0 to 0.5 and the conceptual goalposts approach suggests a utilisation rate of 0.8 to 1.0. Most regard was given to the equity ownership approach, some regard was given to the tax statistics studies and less regard was given to the implied market value studies and the conceptual goalposts approach. Higher regard was given to the first two approaches as they were perceived to be consistent with the conceptual framework of Officer and Monkhouse.

The implied market value studies fall into two classes: dividend drop-off studies and other studies involving hybrid securities, futures contracts and simultaneous share trades. The two dividend drop-off studies considered by the AER to be the most relevant – SFG (2013) and Vo, Gellard and Mero (2013) – suggests a utilisation rate of 0.35 to 0.55

With an eye on the questions that follow, I provide here a summary of my comments on the AER's approach to estimating theta and the resultant point estimate.

I consider the most important approaches to estimation in order of importance to be the equity ownership approach, the historic credit utilisation rate approach and dividend drop-off studies (being the most relevant within the class of implied market value studies).

I do not consider the conceptual goalpost approach to be a reasonable approach to estimation as first, it is motivated by a faulty premise – that the CAPM suggested by Officer implicitly assumes that national markets for risky assets are completely segmented in the sense that all domestic assets are held by domestic investors only and all foreign assets are held by foreign investors only – and second, that it seeks to sure up one uncertain estimate by reference to two other estimates (the “goalposts”) which themselves are subject to substantial uncertainty.

There is no ambiguity concerning what we want to measure – the after-company-before-personal tax utilisation value of a dollar of imputation credits.

All approaches are subject to substantial uncertainty and so estimation of theta is imprecise.

Notwithstanding the ABS represents a very high quality source of data, there are residual definitional issues with the data used in the equity ownership approach (see the discussion under question 16).

Notwithstanding the ATO represents a very high quality source of data, there are residual concerns with the data used in tax statistics studies (see the discussion under question 17).

Notwithstanding the econometric setting of dividend drop-off studies suggests resultant estimates of theta are relatively precise, there is residual uncertainty concerning the interpretation of the regression coefficients which introduces additional non-trivial imprecision into the estimate (see the discussion under question 18).

Based on the above, in my opinion a reasonable estimate of theta is within the range 0.4 – 0.7

Question 14

If you do not consider that our interpretation of the 'second parameter' is reasonable, then please identify:

a. how you consider the 'second parameter' should be interpreted

b. the evidence to which you would have regard

c. the strengths and limitations of each class of evidence to which you would have regard

d. the point estimate or range of estimates produced by each class of evidence to which you would have regard

e. a final point estimate.

Not applicable.

5. EQUITY OWNERSHIP APPROACH

Question 15

The widely-accepted method for estimating the payout ratio does not consider credits paid by companies to companies as paid out. If we were to combine an estimate of the payout ratio from this method with an estimate of the 'second parameter' based on the equity ownership approach, do you consider that estimate of the 'second parameter' should reflect only 'non-company' investors?

Yes – as this would be consistent with the conceptual framework of Officer and Monkhouse.

Question 16

The equity ownership approach assumes that domestic (i.e. resident) investors can fully redeem imputation credits and therefore each have a utilisation rate of one. It assumes also that foreign investors, which are ineligible to redeem imputation credits, each have a utilisation rate of zero. It follows under these assumptions that the domestic ownership share of Australian equity is an estimate of the market-wide utilisation rate, where the market-wide utilisation rate is defined as the value weighted average of investors' utilisation rates.

In the Guideline, we proposed that the domestic ownership share could be estimated as one minus the foreign ownership share. Moreover, we followed a methodology proposed by the ABS for estimating the foreign ownership share as the share of Australian-issued equity held by 'Rest of world' from the Australian National Accounts: Financial Accounts (cat. no. 5232.0).

Do you agree with this approach to estimating the domestic ownership share for the purposes of estimating the utilisation rate? In answering this question, please have regard to:

- **a. our definition of the utilisation rate**
- **b. our definition of the benchmark market**
- **c. the 'issued by' and 'held by' breakdowns provided in Tables 32 and 33 of Australian National Accounts: Financial Accounts (cat. no. 5232.0).**

If you consider that there is a more appropriate approach to estimating the domestic ownership share for the purposes of estimating the utilisation rate, please explain your methodology and provide a point estimate.

In the Rate of Return Guideline the AER's conclusion that the equity ownership approach suggests a utilisation rate of 0.7 to 0.8 appears to be based on two studies. The first, a feature article from the ABS on foreign ownership of Australian equity using data largely drawn from the Australian National Accounts, provides an estimate that domestic investors held 71% of Australian equity.[38] The second is Hathaway (2013) who estimates that domestic investors held between 75% and 81% of Australian equity between 1988 and 2012.

Conceptually, the approach is well founded. However, there are two related definitional issues which are likely to make this an imprecise estimate. The first concerns the market – specifically, is the ABS definition of Australian equity representative of the domestic market in which expected rates of return are determined i.e. is there a similar composition of investors? The second concerns the investors – in order to use the equity ownership approach to estimate theta, we require the domestic ownership proportion not of domestic investors but rather of investors who fully value imputation credits. In other words we require data on the proportion of the market which is owned by a subset of domestic investors being individuals, funds (including those super funds run by life offices) and charities.

[38] Australian Bureau of Statistics (2007).

Depending on which definitions are used, one can arrive at different estimates of theta.

A close examination of the ABS data reveals that if the ABS definition of equity is adjusted to exclude "equity" issued by the public sector and the ABS definition of domestic investors is adjusted to include only end users of imputation credits – taken here to be "Households", "Pension Funds" and "Life Insurance Corporations" – then the domestic investors ownership proportion (of the total equity held by "Households", "Pension Funds", "Life Insurance Corporations", "State and Local General Government", "National General Government" and "Rest of World") falls to 62% as at March 2014.[39] If instead just listed equity is used, then this proportion falls further to around 50% as at March 2014.

SFG (2014, p.83-84) also suggests more recent estimates, based on listed equity only, are around 55%. Black and Kirkwood (2010 p.27) suggests the share of the market owned by foreign investors is around 40%.

The estimation task is difficult. In this regard, Handley and Maheswaran (2008 p.88) note:

> *"the limitation expressed by the Australian Bureau of Statistics, that it is inherently difficult to estimate the precise nature of non-resident equity investment in Australia because 'where nominees are involved, the issuer generally does not know who holds the share'."*

Based on the above, I conclude that the equity ownership approach suggests a utilisation rate of 0.5 to 0.7.

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[39] See Tables 32 and 33 in the ABS National Accounts 5232.0 for the March quarter, 2014.

6. TAX STATISTICS

<u>**Question 17**</u>

In having regard to ATO statistics when determining a value for gamma, do you consider that there are types of companies that are likely reflected in the statistics that should be excluded from the analysis because this exclusion would likely lead to a more appropriate estimate of gamma? In considering an appropriate estimate, please have regard to:

a. your advice on interpretation of gamma;

b. the AER's definition of the 'benchmark efficient entity' (set out in chapter 3 of the rate of return guideline explanatory statement). In addition to this definition, assume that the benchmark efficient entity is a company, and

c. the AER's definition of the relevant market, as an Australian domestic market that recognises the presence of foreign investors to the extent they invest in the Australian market.

The AER's conclusion from tax statistics studies that the utilisation rate is 0.4 to 0.8 is based on three estimates using post-2000 data sourced from the ATO – the estimate of 0.81 from the Handley and Maheswaran (2008) study and estimates of 0.44 and 0.62 from the Hathaway (2013) study.

Similar to the equity ownership approach, the approach has strong conceptual foundations. However, there are residual data concerns which are likely to also make this an imprecise estimate.

Hathaway (2013) identifies an apparent inconsistency between a number of specific items reported in the aggregate data for companies – franked dividends paid, net tax paid, the change in the FAB and franking credits received – and consequently urges caution in the use of ATO tax statistics until an explanation becomes available.[40] This

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[40] Hathaway (2013 p.5) describes the problem as: *"The two sets of taxation data and financial data do not reconcile with each other"*. But it is noted that these data items are taken from the one company tax

explains the basis for his two estimates 0.44 and 0.62. It is noted that the second of these is consistent with Handley and Maheswaran's (2008) estimate of 0.67 for the period 1990 to 2000 – although this is not strictly comparable due to the introduction of the 45-day rule in 1997 and the refund of excess credits provision in 2001.[41] In regards to the Hathaway (2013) study, SFG (2014 p.86) state that:

> *"the best estimate that can be obtained from the ATO data is in the range of 44% to 62% from Hathaway (2013)".*

It is noted that the ATO data represents a summary of income tax returns for a given year and so by definition will not include credits refunded to those taxpayers who do not need to lodge a tax return – this will contribute a (likely small) downward bias on the estimate of theta.

SFG (2014 p.87) also makes the observation that ATO data can in principle be used to estimate gamma directly without having to separately estimate the payout ratio and theta. This follows from the interpretation of gamma as the expected proportion of company tax that is returned to investors through the utilisation of imputation credits. In other words, for any given period, if we obtain a reasonable estimate of the amount of credits redeemed and a reasonable estimate of the amount of credits generated by the payment of company tax then the ratio of the first to the second provides a first approximation of the historic proportion of the personal tax component of tax paid at the company level – an explicit assumption being that retained credits have zero value. Hathaway (2013 p.38) estimates the total amount of imputation credits redeemed during the period 2004 – 2011 was $127.6 billion and the total amount of net company tax paid during the same period was $421.5 billion. This suggests a value of gamma of 0.3. However, this is based on ATO data for all companies – both public and private. The relevance of public companies (vs all companies) in estimating the payout ratio F has been discussed under question 12. One could argue along similar lines that the utilisation rate θ should be based on public companies only. Whilst one would expect the utilisation rate based on public companies would be higher than the utilisation rate

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return submitted by each company each tax year and so arguably this is better described as an apparent inconsistency within the one data set.

[41] See Table 4 in Handley and Maheswaran (2008).

based on private companies,[42] data on credits redeemed by shareholders in public companies vs credits redeemed by shareholders in private companies is unfortunately not available from the ATO Tax Statistics.

I wish to make one point for clarification in relation to the use of taxation statistics. I have previously suggested that estimates of utilisation rates from taxation statistics can be interpreted as a reasonable upper bound estimate of the value of theta.[43] The purpose for including the "upper bound" part was simply to convey the fact that the ultimate source of value of a distributed franking credit is the amount of personal tax saved as a result of redeeming the credit – something which is given by taxation statistics data. In other words, value can only be realized by "redeeming" the credit at the ATO. Unfortunately the "upper bound" part has inadvertently been misinterpreted as suggesting that taxation statistic estimates of theta cannot be used as point estimates of theta. For example, according to the Australian Competition Tribunal:

> *"The applicants submit that the AER was in error in a number of ways. The most important can be summarised as follows:*
>
> > *the AER averaged 'apples and oranges'; that is, the AER was in error to average an upper bound for theta derived from a tax statistics study with a point estimate provided by a dividend drop-off study;*
> >
> > *…".*[44]

The above apples and oranges distinction is not correct. To be clear, taxation statistics (like other methodologies) can be used to derive reasonable albeit imprecise point estimates of theta. The previously used "upper bound" terminology in no way invalidates its interpretation or use as a point estimate.

Based on the above, I conclude that the tax statistics studies approach suggests a utilisation rate of 0.4 to 0.6.

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[42] One possible reason for the materially lower payout ratio for private companies compared to public companies is that imputation credits are less valuable to shareholders in private companies and hence there is less incentive to pay them out.
[43] See section 4 of Handley (2010).
[44] Australian Competition Tribunal (2010 para.83).

7. DIVIDEND DROP-OFF STUDIES

Question 18

Provide your assessment of whether dividend drop off studies provide an appropriate estimate of the 'second parameter'. In considering an appropriate estimate, please have regard to:

a. your advice on interpretation of the 'second parameter';

b. the AER's definition of the 'benchmark efficient entity' (set out in chapter 3 of the rate of return guideline explanatory statement). In addition to this definition, assume that the benchmark efficient entity is a company; and

c. the AER's definition of the relevant market, as an Australian domestic market that recognises the presence of foreign investors to the extent they invest in the Australian market.

In the Rate of Return Guideline the AER concluded that the most relevant dividend drop-off studies – SFG (2013) and Vo, Gellard and Mero (2013) – suggest a utilisation rate of 0.35 to 0.55.

The SFG (2013) study is an update (incorporating more recent data) of the SFG "state-of-the-art" dividend drop-off study considered by the Australian Competition Tribunal in 2011.[45] SFG's conclusion from both studies is that:

> *"the appropriate estimate of theta from the dividend drop-off analysis that we have performed is 0.35 and that this estimate is paired with an estimate of the value of cash dividends in the range of 0.85 to 0.90"*[46]

The Vo, Gellard and Mero (2013) study essentially follows the methodology of the SFG studies but includes additional analysis including alternative regression forms and sensitivity analysis. They conclude:

[45] Australian Competition Tribunal (2010) and Australian Competition Tribunal (2011).
[46] SFG (2013 p.1).

"We have estimated a market value of franking credits that across different robust regression procedures, averages to be approximately $0.45 per $1 of face value. Implementing the market returns correction, the estimated market value falls to $0.34 per $1 of face value … The appropriate range suggested by this study is a value of theta between 0.35 to 0.55 based on the range of estimates encountered in the sensitivity analysis. If, however, a point estimate of theta is required, then the estimated value of theta should be that based on an average across the robust regression models, which is 0.45." [47]

SFG comment on these results as follows:

"In fact, there is very little evidence to support the Vo et al mid-point estimate of 0.45 at all. The Vo et al estimates of theta, with and without the market adjustment, are summarised in Figure 5 below. The figure shows that the vast majority of estimates fall below the ERA's mid-point estimate (marked as a line). Moreover, whereas a material number of estimates fall below the bottom of the range (less than 0.35) there are no estimates above the top end of the range (0.55)." [48]

It is not my intention to argue the merits or otherwise of one econometric technique over another – this is best done by others, but I do wish to highlight that this once again illustrates how the recent debate concerning dividend drop-off studies has become focused on econometric minutia.

It is my view that the most important question concerns whether estimates from dividend drop-off studies actually measure what we are looking for – the (after-company-before-personal-tax) value of a distributed imputation credit suitable for determining a fair rate of return (compensation) for those investors who supply capital to the benchmark efficient entity. In this regard, there are two additional issues with introduce imprecision into the estimates coming out of dividend drop-off studies.

[47] Vo, Gellard and Mero (2013 p.31-32)
[48] SFG (2013 p.30).

The first issue concerns the correct interpretation of the regression coefficient.

It is well understood that the drop-off in the stock price on the ex-dividend date reflects the value of the thing being distributed – in this case, the value of the dividend and the value of the attached imputation credit. There is, however, a substantial literature (theoretical and empirical) which suggests the drop-off may also reflect a number of other factors including differential personal taxes and risk. For example, in their survey article, Allen and Michaely (2003 p.363) discuss the relatively simple ex-dividend model of Elton and Gruber (1970) who show that in a world with no transactions costs and where investors are risk neutral, the expected drop-off (as a proportion of the dividend) reflects the differential tax rates of investors trading around the ex-dividend date:

$$\frac{E(\Delta P)}{D} = \frac{1-t_d}{1-t_g} \tag{19}$$

where $E(\Delta P)$ is the expected drop in the stock price, D is the dividend, t_d is the personal tax rate on dividends and t_g is the personal tax rate on capital gains. In the absence of differential personal taxes (19) suggests the expected drop-off should be equal to one or equivalently, the stock price is expected to drop by the amount of the dividend.[49] Allen and Michaely (2003 p.370) also discuss the relatively complicated ex-dividend model of Michaely and Vila (1995) who show that in equilibrium, the expected drop-off (as a proportion of the dividend) is given by:

$$\frac{E(\Delta P)}{D} = \bar{\alpha} - \frac{X\left(\sigma_e^2/K\right)}{D} \tag{20}$$

where $E(\Delta P)$ is the expected drop in the stock price, D is the dividend, $\alpha_i = \frac{1-t_{di}}{1-t_{gi}}$ is the relative tax preference of dividends vs capital gains for investor i, $\bar{\alpha}$ is a risk tolerance weighted average of the individual α_i, K is an after-tax weighted average of individual investors' risk tolerances and σ_e^2 is the variance of the ex-dividend stock price. According to Michaely and Vila (1995 p.171):

[49] Note the model is set within a classical tax framework.

> *"The model shows that an ex-day equilibrium price exists, and that this price is a function of several factors: aggregate risk tolerance, risk of the individual stock around the ex-day, and the relative importance of trading groups that differ in terms of the tax treatment of their capital gains and dividend income."*

The key message here is that other stuff (such as taxes and risk) may need to be taken into account in interpreting dividend drop-off studies.

Now consider the basic regression framework of the SFG studies:[50]

$$\frac{\Delta P}{D} = \delta + \theta \frac{FC}{D} + \varepsilon \tag{21}$$

where δ is the value of cash dividends (as a proportion of their face value) and θ is the value of distributed franking credits (as a proportion of their face value).

Importantly, the regression coefficients δ and θ can be interpreted in this way only if there are no other factors such as differential personal taxes and risk reflected in the estimates. But the results of SFG clearly tell us that this is not the case. SFG estimate the value of cash dividends δ to be in the range of 0.85 to 0.90 but one would expect a coefficient of $\delta = 1$ in the absence of differential personal taxes and risk, since by definition the (after-company-before-personal-tax) value of one dollar of dividends is one dollar. This means that the coefficient of $\theta = 0.35$ does not represent the (after-company-before-personal-tax) value of one dollar of imputation credits but rather it represents the (after-company-before-personal-tax) value of one dollar of imputation credits and the impact of other factors, such as differential personal taxes and risk. We don't really need to concern ourselves with precisely identifying what these other factors are – it is sufficient to know that collectively they have reduced the estimates of the (after-company-before-personal-tax) values of one dollar of dividends and one dollar of imputation credits by 10 – 15% . Accordingly, we need to gross-up the SFG estimates of θ by 10 – 15% to correctly interpret the results of the study. In other words, the SFG studies suggest a utilisation rate of 0.39 – 0.41 rather than the 0.35 as

[50] SFG (2011 p.19).

claimed. This approach is equivalent to the "Lally Adjustment" discussed in the Rate of Return Guideline.[51]

The second issue also concerns the correct interpretation of the regression coefficient – but at a more fundamental level. Adjusting the coefficient to remove the impact of differential personal taxes and risk gives us the (after-company-before-personal-tax) value of a dollar of imputation credits but the question is value to whom? In other words, there remains a residual concern as to whether the composition of investors around the ex-dividend date is reflective of the composition of (long term) investors in the benchmark market who supply capital to firms (including to the benchmark efficient entity) and therefore whether the implied value of imputation credits around ex-dividend dates is representative of the value of imputation credits to the market as a whole.

It is not entirely clear what adjustment factor should be applied to the Vo, Gellard and Mero (2013) theta estimate of 0.45 but their table 5 suggests it should be in the order of 0.85. In this case, the Vo, Gellard and Mero study suggests a utilisation rate of 0.53 rather than the 0.45 as claimed.

Based on the above, I conclude that the dividend drop-off studies suggest a utilisation rate of 0.4 to 0.5.

<u>Question 19</u>

Do you consider reasonable our assessment of the strengths and limitations of dividend drop off studies, as set out on pages 175 to 177 and in appendix H.6 of the rate of return guideline explanatory statement? In responding to this question, please have regard to:

a. pages 115 to 132 of appendix B of ENA (2013a); and

b. paragraphs 121 to 185 and appendix 9 of SFG (2014).

Yes – as per the discussion under the previous question.

[51] See p.175-177 of Appendix H of the Explanatory Statement to the guideline.

<u>Question 20</u>

Do you consider that Vo et al (2013) raises any material concerns about the methodology and results of SFG (2011) and SFG (2013) that are not allayed by ENA (2013a) and SFG (2014)?

As discussed under question 18, I have not dug into the detail of the econometric debate.

8. VALUATION OF IMPUTATION CREDITS

<u>**Question 21**</u>

Paragraphs 65 to 70 of SFG (2014) identify a number of factors as to why 'the value of distributed imputation credits that is reflected in share prices may be less than the face value of those credits'.

a. Do you consider reasonable each of the factors identified?

b. Can you identify any other such factors?

c. Do you consider that such factors are relevant to estimating the 'second parameter'?

d. Do you consider that the individual or joint effect of such factors can be estimated with confidence using available empirical evidence?

SFG correctly identifies a number of factors which may influence the value of imputation credits reflected in stock prices – less than full redemption (including the impact of the 45 day rule), time delay, administrative costs, personal taxes and diversification costs.

The last three factors are particularly relevant to implied market value studies. Since the objective is to estimate the after-company-before-personal-tax value of a distributed imputation credit and also to avoid compensating the regulated firm for transactions costs incurred at the shareholder level then the particular estimation methodology should allow for these factors – in other words, ideally we want the value of credits before administrative costs, personal taxes and diversification costs. Such an adjustment is in the spirit of the discussion under question 18 concerning how to interpret regression coefficients from dividend drop-off studies.

The second factor – time delay – is relevant to implied market value studies and tax statistics studies but should be immaterial in most cases and therefore require no adjustment. The possible long delay suggested by SFG in the case of dividends paid through interposed entities should already be taken into account in tax statistics studies if credits are considered to be paid out only when they are passed on to the ultimate end users (such as individuals, funds, charities and non-residents).

The first factor – less than full redemption including from the impact of the 45 day rule – is important because this goes to the heart of what we are trying to measure – the utilisation value of distributed imputation credits. It is reasonable to expect that this value would automatically be built into estimates coming from implied market value studies and tax statistic studies and so no adjustment would be required in these cases.

Recall, the equity ownership approach assumes for simplicity that there are two classes of investor in the market – class 1 investors are assumed to extract full value from distributed imputation credits whereas class 2 investors are assumed to extract no value. The impact of the 45 day rule could in principle be taken into account by reducing the set of class 1 investors and increasing the set of class 2 investors by some proportion to reflect those investors who have their entitlement to credits disqualified by virtue of the 45 day rule, however it is not obvious how to identify such investors nor to estimate the appropriate proportion and in my opinion this is looking for a level of precision which is just not there anyway. Handley and Maheswaran (2008) note that some non-residents are able to extract some value from imputation credits whereas the equity ownership approach assumes all non-residents extract no value from credits. Again, seeking to adjust the estimate for this level of detail is in my opinion not warranted.[52]

Question 22

SFG (2011) and SFG (2013) suggest that investors value a dollar of imputation credits at \$0.35, and a dollar of dividends at \$0.85 to \$0.9. Do you consider that an inconsistency could arise were this valuation of imputation credits used in estimating gamma, but this valuation of dividends not used in estimating the market risk premium?

[52] See Table 2 in Handley and Maheswaran (2008).

There is no inconsistency in ignoring personal taxes in estimating equity returns say, by using the CAPM suggested by Officer (which is based on the Sharpe-CAPM) rather the Monkhouse CAPM or Lally and van Zijl CAPM (which is based on the Brennan-CAPM) , whilst at the same time adjusting (raw) estimates of theta from dividend drop-off studies for the impact of personal taxes.

On the contrary, if one ignores personal taxes when using dividend drop-off studies then this would be inconsistent with the Officer and Monkhouse WACC frameworks and the CAPM suggested by Officer. These models require an estimate of the after-company-before-personal-tax value of a distributed imputation credit and it is only if there are no differential taxes and no risk involved in trading around the ex-dividend date, or one assumes them away, that the regression coefficients can validly be interpreted in this way – otherwise an adjustment is necessary along the lines discussed under question 18.

9. PLAUSIBILITY OF ESTIMATES

Question 23

Do you agree with paragraph 58 of SFG (2014) which states that the parameter values proposed in the guideline produce an estimate of the share of the Australian market capitalisation that can be attributed to imputation credits 'which is too high to be considered plausible'? Please explain the approach you have used to assess 'plausibility'. Further, are you able to identify a range for estimates of the 'second parameter' that produce plausible results in this regard? If yes, please explain your methodology.

No.

SFG correctly state that within the Officer WACC framework, the proportion of the (after-company-before-personal-tax) return on equity due to dividends is:

$$\frac{1-T}{1-T(1-\gamma)} \tag{22}$$

and the proportion of the (after-company-before-personal-tax) return on equity due to imputation credits is:

$$\frac{\gamma T}{1-T(1-\gamma)} \tag{23}$$

where T is the corporate tax rate and γ is the value of imputation credits. Combined with (7) and assuming a corporate tax rate of 30%, this means the implied proportion of the equity value of a firm that is attributable to the expected future stream of imputation credits, for different values of gamma is:

Value of Imputation Credits γ	**Implied Proportion of Equity Value Due to Imputation Credits** $\frac{\gamma T}{1 - T(1-\gamma)}$
0.0	0.000
0.5	0.176
0.7	0.231
1.0	0.300

SFG then consider the case where a firm has a payout ratio of $F = 0.70$ and shareholders value distributed imputation credits at $\theta = 0.7$ and show that the proportion of the (after-company-before-personal-tax) return on equity and equivalently the proportion of the equity value due to imputation credits is:

$$\frac{\theta T}{1-T(1-\theta)} \tag{24}$$

from which they conclude:

> *"the parameter values proposed in the Guideline suggest that approximately one quarter of the value of the entire Australian market (more than $300 billion of the $1.5 trillion total market capitalisation) is attributable to imputation credits which is too high to be considered plausible"*[53]

But contrary to SFG's suggestion, the "high" implied value attributable to imputation credits does not indicate there is a problem with the set of parameter values for F and θ. Rather it results directly from the perpetuity assumption which holds in Officer's model but which we know does not hold in practice – Officer's model assumes a 100% payout of a firm's free cash flow and a 100% payout of the (associated) imputation credits and therefore the implied dividend yield and the implied imputation credit yield are assumed to be (unnaturally) high.

[53] SFG (2014 p.11-12).

SFG's growing perpetuity framework is essentially no different to Officer's (constant) perpetuity framework. This should be evident by simply comparing their proportion in (24) with Officer's proportion in (23) – these are the same formula when one recognises that $\gamma = \theta$ in the Officer framework. Like Officer, SFG assumes a 100% payout of a firm's free cash flow and a 100% payout of the (associated) imputation credits which results in the high implied imputation credit yield. Whilst SFG assumes 70% of the firm's post-tax profit is distributed each period this is equivalent to assuming 100% of the firm's free cash flow is distributed each period since in this setting post-tax profit and free cash flow are not the same thing.

Question 24

Do you consider it reasonable to have regard to the 'conceptual goalposts' approach (based on the 'reasonableness test' in Lally (2013a) in coming to a point estimate of the 'second parameter'? In responding to this question, please have regard to paragraphs 115-118 and 43l-454 of SFG(20l4c).

With regard to the attached Excel workbook, do you consider reasonable our application of the conceptual goalposts approach and our conclusions?

As discussed under question 13, I do not consider the conceptual goalpost approach to be a reasonable approach to estimation.

CONCLUSION

Based on the discussion in this report, it is my opinion, that a reasonable estimate of:

(i) the Payout Ratio F is 0.7 – 0.8 with a preferred estimate of 0.8.

(ii) the Utilisation Rate θ is 0.4 – 0.7 with a preferred range of 0.5 – 0.6.

(iii) the Value of Imputation Credits γ is 0.3 – 0.6 with a preferred range of 0.4 – 0.5.

It is clear what we want to estimate – but there are residual concerns with the available data. This means all estimates of theta and gamma should be considered to be imprecise.

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Expert Witness Compliance Declaration

I have read the Guidelines for Expert Witnesses in proceedings in the Federal Court of Australia and this report has been prepared in accordance with those guidelines. As required by the guidelines I have made all the inquiries that I believe are desirable and appropriate. No matters of significance that I regard as relevant have, to my knowledge, been withheld.

Signed

John Handley

29 September 2014

Dr John C. Handley

May 2014

1. 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)
May 2008 to Aug 2012	Stern School of Business NYU New York	Visiting Associate Professor of Finance (Summer 2008, Fall 2009, Summer and Fall 2011, Summer 2012)
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

2. RESEARCH

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

Recent Scholarly Publications

- Brown, C.A., J.C. Handley and K. Palmer, 2013. "A Closer Look at Barrier Exchange Options". Journal of Futures Markets, 33, 1, 23-43.
- Brailsford, T.J., J.C. Handley and K. Maheswaran, 2012. "The Historical Equity Risk Premium in Australia: Post-GFC and 128 Years of Data". Accounting and Finance, 52, 237-247.
- 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.
- Brailsford, T.J., J.C. Handley and K. Maheswaran, 2008. "Re-examination of the Historical Equity Risk Premium in Australia". Accounting and Finance, 48, 73-97.

Harvard Case Studies

- Tufano, P. and J.C. Handley, 1999. "General Property Trust". Harvard Business School case study 299-098, HBS Publishing.

Work in Progress

- Brown, S.J., J.C. Handley and P. Lajbcygier. “Choice Among Alternative Benchmarks: An Asset Pricing Approach"
- Handley, J.C. and J. Dark. “Investment Waiting Times"
- Brown, C.A., J.C. Handley and A. Lamba. “A Direct Test of Market Timing"
- Brown, C.A., J.C. Handley and A. Lamba. “Share Buybacks and Information Asymmetry – Winners and Losers"
- Brown, C.A., J.C. Handley and K. Palmer. "Partial Differential Equations for Asian Option Prices".
- B. Esty and J.C. Handley. "The Victorian Desalination Project”. Case Study.

Recent PhD Supervisions

- Vicky Chow, “An Examination of Alternative Option Hedging Strategies” (joint with C. Murawski) – in progress.
- Michelle Low, “Option Implied Risk Neutral Density Functions” (joint with J. Dark) – completed May 2014.
- Mohd Edil Abd Sukor, “The holiday effect in Asian stock markets: Spending holidays, non-spending holidays and firm size” (joint with R. Brown) – completed January 2014
- Chang Liu, “Credit portfolio tranche pricing: credit risks and non-credit risks” (joint with G. Schwann) – completed February 2013
- Wei Zhang, “Dynamic Currency Hedging for International Stock Portfolios” (joint with C. Brown and J.Dark) – completed June 2012.

3. TEACHING

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

Awards

- 2013 Dean's Certificate of Excellent Graduate Teaching.
- 2012 Dean's Certificate of Excellent Graduate Teaching.
- 2011 Dean's Certificate of Excellent Graduate and Postgraduate Teaching.
- 2010 Dean's Certificate of Excellent Graduate/Postgraduate Teaching.
- 2009 Dean's Certificate of Excellent Undergraduate and Postgraduate Teaching.
- 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.
- 2003 Dean's Individual Award for Excellence in Teaching in the Faculty of Economics and Commerce.

4. ADMINISTRATION AND LEADERSHIP

- Head, Department of Finance, Aug2012—.
- Academic Director, Master of Applied Finance Program, 2012—.
- Deputy Head (Academic Programs), Department of Finance, 2009—Aug2012.
- 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 Uni Melbourne
- Chair, 2002 Review Committee of the Undergraduate Program in Finance at the University of Melbourne

5. ENGAGEMENT

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

- 2012, Consultant to the Australian Energy Regulator in relation to the Estimation of the historical market risk premium to inform the AER's assessment of the rate of return for gas and electricity regulatory processes in 2012

- 2011, Consultant to the Australian Energy Regulator in relation to certain proceedings before the Australian Competition Tribunal, February.

- 2011, Consultant to the Australian Energy Regulator on matters dealing with the gas access arrangements of APT Allgas and Envestra in Queensland and South Australia for the period 2011 to 2016, January.

- 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–May, September-October

- 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.

- 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.

- 2008, 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, November.

- 2008, Consultant to the New Zealand Commerce Commission on matters dealing with the Telecommunications Service Obligations (TSO) Determination for the years ending 30 June 2004 and 2005, April.

- 2008, Presentation to the ACCC / AER on the Weighted Average Cost of Capital of Regulated Firms, February.

- 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.

- 2006, Consultant to the New Zealand Commerce Commission on matters dealing with the Telecommunications Service Obligations (TSO) Determination for the year ending 30 June 2004, May.

- 2005, Consultant to the New Zealand Commerce Commission on matters dealing with the Telecommunications Service Obligations (TSO) Determination for the year ending 30 June 2003, February.

- 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.

6. CONTACT DETAILS

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