REPORT TO THE AER

RESPONSE TO QUESTIONS RELATED TO THE ESTIMATION AND THEORY OF THETA

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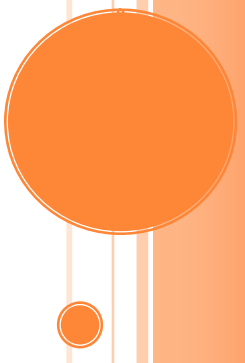

Expert Witness Compliance Declaration

We have been provided with a copy of 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 we have made all the inquiries that we believe are desirable and appropriate and that no matters of significance that we regard as relevant have, to our knowledge, been withheld from the Court.

REPORT TO THE AER

RESPONSE TO QUESTIONS RELATED TO THE ESTIMATION AND THEORY OF THETA

The Australian Competition Tribunal has directed the AER to propose an approach to estimating theta that correctly uses tax statistics and dividend drop-off studies. In response to this directive, the AER has sought expert advice in relation to developing such an approach, having regard to the theoretical and econometric basis of dividend drop-off and tax statistics studies respectively. Specifically, the AER has posed eight questions. This report has been prepared by the consultants in response to this request and will address each question in turn.

QUESTION 1

Why are estimates of theta generated from dividend drop-off studies significantly below estimates generated from tax statistics studies?

We begin our discussion by noting that dividend drop-off studies attempt to measure the market value of franking credits in ex-dividend trading. We also note that this may differ from the measurement of the market value of dividends at other times because of the abnormal trading that takes place about the ex-dividend date.

Tax studies however, attempt to estimate the utilisation of franking credits, which is a measure of the franking credits redeemed by shareholders. The franking credits redeemed as a percentage of franking credits distributed is known as the utilisation ratio, or utilisation fraction, and sometimes as theta (θ).

Theta however, is also used to refer to the market value of franking credits distributed, which is clearly a potential source of confusion.

This ambiguity in the use of theta is not easily resolved. To understand why note that gamma (γ), which is used to convert the face value of imputation credits created (tax paid) to an effective value, is often written as:[1]

$$\gamma = F(\theta) \tag{1}$$

where the imputation payout ratio F is the ratio of imputation credits distributed to imputation credits created, and is sometimes called the access fraction. To define theta, we draw on Officer's (1994, p4) seminal paper in which it was stated:

> *"A proportion (γ) of the tax collected from the company will be rebated against personal tax... Thus γ is the proportion of tax collected from the company which gives rise to the tax credit associated with a franked dividend."*

This implies that gamma depends on utilisation and hence theta should measure utilisation.

Officer however, goes on to conclude his definition by saying:

> *" ... γ can be interpreted as the value of a dollar of tax credits to the shareholder."*

and in a footnote he suggests using market prices, and particular dividend drop-off ratios, to estimate gamma for the marginal shareholder. This implies that theta should be measured as a market value.

Thus, there is a considerable ambiguity in the definition of gamma and theta. The literature subsequent to Officer has tended to view both gamma and theta as market values. When theta is measured as a market value, the implicit assumption is that the factors driving a wedge between the market and redemption (utilisation) value of distributed franking credits are not accounted for in the discount rate used in valuations. For example time discounting for delay in the receipt of franking credit and the impact of other variables, as discussed below, and/or that the marginal investor has a utilisation ratio that cannot be observed but which is embedded in the market price.

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[1] This approach to estimating gamma assumes that the value of undistributed imputation credits is zero.

Divergence between Ex-dividend Estimates and Utilisation Estimates

A reasonable presumption might be that the market value of distributed credits to the investor is simply the face value of the credits to be utilised (redeemed) discounted for the time to elapse before redemption. Since time delays would be relatively short and discounting would be at the rate on government securities, the discounting effect would be small, so there would not be much difference between the face value of credits to be redeemed and the market (discounted) value.

If, however, the franking credit value is measured in the context of an ex-dividend study, the valuation is considerably more complicated than this. Consider, for example, the model for short term dividend capture trades in Walker and Partington (1999). In their theoretical and empirical work they only consider fully franked dividends. So the face value of the franking credit is $(D/1\text{-}t_c)t_c$, where D is the dividend, and t_c is the corporate tax rate. At the time of the study the corporate tax rate was 36%, so the franking credit was $0.56 per dollar of fully franked dividends.

Writing the utilisation ratio as θ gives the value of credits redeemed as $\theta(D/1\text{-}t_c)\ t_c$.. Using this formulation, Walker and Partington (1999) model the equilibrium drop-off ratio for a short-term dividend capture trade as:

$$\frac{P_{CD} - P_{XD}}{D} = \left[\frac{\delta_1(1-t_c) - \delta_2(t_d - \theta t_c)}{(1-t_c)(1-t_g\delta_3)(1-a)}\right] - \left(\frac{2a}{1-a}\right)\frac{P_{CD}}{D} \qquad (2)$$

where:

P_{CD} is the market price of the cum-dividend share

P_{XD} is the ex-dividend price

D is the dividend to be paid

t_c is the corporate tax rate

t_d is the investor's tax rate on dividends

t_g is the gains tax rate at which the investor can obtain a benefit from the ex-div price drop

a is the transactions cost as a percentage of the price.

δ_1 = discount factor for the time until dividend receipt

δ_2 = discount factor for the time until dividend taxes are paid and the benefit from the imputation credit is obtained

δ_3 = discount factor for the time until the benefit of tax losses is obtained

It is immediately clear that there is a substantial list of variables other than utilisation that impact on the drop-off ratio and potentially the estimated market value of the franking credit. In a normal ex-dividend study there would also be some discounting for risk, but this does not apply here as the cum-dividend and ex-dividend prices were simultaneously observed in the Walker and Partington (1999) study. There could also be some market micro-structure effects to account for, such as the bid-ask spread.

Substituting the average drop-off ratio of 1.15 for the ex-dividend events, and the average values for the variables (other than θ), in equation (2), Walker and Partington (1999) back out an implied value of theta of 0.88.

Most ex-dividend studies do not isolate theta in this fashion. Instead, they partition the price drop-off between the cash dividend and the franking credit. In this process, the effects of variables (such as taxes and transaction costs) are allocated between the cash dividend and the franking credit, which tends to lower the estimates of theta. For example, using Hathaway and Officer's (2004) cash dividend valuation of about 80% of face value, the franking credit would be worth \$0.35 (i.e. \$1.15 - \$0.80) per dollar of fully franked dividends, equivalent to a theta of 0.63 at the 36% corporate tax rate. Using the assumption that the cash dividend is fully valued, the market value of the imputation credit would be estimated at \$0.15 per dollar of fully franked dividends, equivalent to a theta of 0.27.

In the foregoing example, it is mainly transactions costs and some discounting that are likely to depress the market value of franking credits relative to the utilisation ratio. Had the model considered long term investors, instead of short-term traders, it would likely be a lower tax rate on capital gains relative to income that would depress the market value relative to the utilisation ratio, with some contribution from discounting. Thus, two lessons are apparent from the example. First, the market value measurement of franking credits in an ex-dividend study can be impacted by many effects other than utilisation. Second, the allocation of these effects between the cash

dividend and franking credit can materially affect the estimated value of the franking credit.

Aggregating (Average) or Marginal Valuation

A significant question in this context is whether the equilibrium market price (and hence the cost of capital) are determined by aggregating over investors, as in an after-tax CAPM such as Lally and van Zijl (2003), or whether the equilibrium price is somehow determined by the marginal trader. Estimates of utilisation from taxation studies take an aggregate across investors and so are more in the spirit of an aggregate equilibrium for price.

In contrast, the estimation of the market value of franking credits in an ex-dividend study is in the spirit of estimating the franking credit value to the marginal trader. However, in practice these estimates are very imprecise and of questionable reliability. Furthermore, the identity of the marginal trader may well differ across dividend yield classes, also the marginal trader in ex-dividend trading may well differ from the marginal trader in the normal course of trading.

It is important to note that the utilisation ratio for the marginal trader could be above or below the average utilisation ratio observed in taxation statistics and therefore taxation statistics do not necessarily set an upper bound on the utilisation ratio if a marginal approach is taken.

QUESTION 2

What is the theoretical foundation of dividend drop-off studies? Do the various models presented in the literature such as Elton and Gruber (1970), Boyd and Jagannathan (1994) provide alternative explanations of the ex-dividend price drop-off in the Australian stock market.

The theoretical foundation of dividend drop-off studies began with Elton and Gruber (1970) and has been extended since by a number of authors. The basis of the theoretical models is that in a market with rational wealth maximising investors, the market equilibrium is characterised by an absence of arbitrage opportunities. Note, that this is not the same as saying that short-term arbitrage determines prices. Rational price setting by long–term investors can also eliminate arbitrage opportunities and this is the basis of Elton and Gruber's (1970) model.

Elton and Gruber (1970) model the no arbitrage equilibrium for long term investors who are considering buying, or selling, about the ex-dividend date. In their no arbitrage equilibrium, the investor is indifferent between trading cum-dividend or ex-dividend because the cash flows under each alternative are equal.

In Elton and Gruber (1970), the equilibrium drop-off ratio is given by $(1-t_d)/(1-t_g)$. Under imputation this equilibrium becomes $(1-t_d)/[(1-t_g)(1-t_c)]$. However, the Elton and Gruber model ignores discounting for time, and also discounting for uncertainty about the ex-dividend price on the cum-dividend date. Transaction costs are not relevant in their model since the long-term investor incurs such costs irrespective of whether they trade cum-dividend or ex-dividend. Transactions costs are, however, critical to short-term traders engaging in dividend arbitrage, since these costs erode their profits. Short-term trading was ignored in Elton and Gruber's model.

Boyd and Jagannathan (1994), extend Elton and Gruber's (1970) model to allow for both long-term and short-term trades, transactions costs, and ex-dividend price risk. Boyd and Jagannathan also allow for some market participants to have tax advantages in the receipt of dividends. Thus, rather than being an alternative model to Elton and Gruber's, the Boyd and Jagannathan model encompasses and extends the Elton and Gruber model. The equilibrium that results varies according to the dividend yield of the share in a way that is "non-linear and rather messy" (Boyd and Jagannathan, 1994, p. 723). However, one clear implication of their model is that short-term traders will tend to concentrate on higher dividend yield classes.

The Boyd and Jagannathan (1994) model can be extended to the imputation system. McDonald (2001) does this for the German imputation system and Ainsworth, Fong, Gallagher and Partington (2008b, 2010) extend the model to the Australian imputation system. The Australian equilibrium is rather complex, but Ainsworth et. al. conclude that only long term investors will trade at lower levels of dividend yield. Short-term traders engaged in dividend avoidance and in dividend capture, will trade at higher levels of dividend yield, but mostly with long-term investors. Short-term traders are also more likely to be active in low spread stocks as this reduces transactions costs.

Thus, the theoretical modeling suggests that a mix of both long-term investors and short-term traders will be active about the ex-dividend date

under an imputation system. Further there will be different types of long-term and short-term investor in the market. There is empirical evidence to support this. Norway has both an imputation system and detailed investor level trading data, which Rantapuska (2008) uses to show that several classes of trader are active in the market about the ex-date and that there is both long-term and short-term trading. Also, as we discuss in our answer to question four, there is direct evidence of long-term and short-term trading in the Australian stock market.

QUESTION 3

Is an arbitrage equilibrium model appropriate in estimating the value of distributed imputation credits to the representative investor in the Australian market[2] given that the imputation credit is unable to be used unless the share is held for 45 days?

As explained in the answer to question two, the arbitrage equilibrium model does not imply that the equilibrium price is necessarily determined by short-term arbitrage trades. So, the existence of the 45 day rule does not invalidate such models, even if it does affect the level of short-term trading. However, the abnormal trading about the ex-dividend date, as evidenced for example by the cum-dividend price run-up, does provide a basis for questioning whether the trading observed reflects the valuation of a representative investor.

Most empirical ex-dividend studies do not rely on a particular arbitrage model of equilibrium to determine the value of imputation tax credits.[3] The estimates they generate are a matter of empirics and whether such studies capture the valuation of a representative investor is an open question. In this context it is worth noting that not only are there abnormal trades arising from ex-dividend arbitrage, but also that trading by long term investors is abnormal about the ex-dividend date.

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[2] In defining the representative investor the AER adopts a conceptual framework of a domestic market of assets with foreign investors recognised to the extent they invest domestically. This is consistent with the estimation of the other WACC parameters determined by the AER. See AER, *WACC review final decision,* 1 May 2009, p. xix and *AER, WACC review explanatory statement,* December 2008, p. 13.

[3] Walker and Partington (1999) is an exception in this regard.

It should also be noted that not all shareholders have to comply with the 45 day rule. Shareholder's receiving franking credits up to $5,000 a year are exempt from the 45 day rule requirement, as are investment funds that elect to be taxed on the basis that they are tracking the market index and do not exceed the level of index franking credits by more than 20%. There have also been schemes to circumvent the 45 day rule, but naturally their details do not circulate widely. Traders have also been allowed to hedge up to 70% of the price risk over the 45 day period, so the barriers imposed by the 45 day rule are not as great as they seem at first sight.

QUESTION 4

(a) In relation to dividend drop-off studies, who are the marginal traders that set the price? Do arbitrageurs or long term investors have the largest influence on price movements of a share around the ex-dividend date?

It is not known who the marginal traders that set the price are. Indeed, the search for the marginal trader is akin to the search for the Holy Grail: the journey has been long and a successful outcome has proven elusive. Neither is it known whether arbitrageurs or long term investors have the largest influence on price movements around the ex-dividend date. As discussed under Question 2 and 3, the theory suggests that a mix of arbitrageurs/investors of different types are determining prices about the ex-dividend date with short-term traders (arbitrageurs) more likely to be present, but not necessarily dominating, at higher levels of dividend yield and where transaction costs are lower.

(b) Is there any empirical evidence that demonstrates the level of the presence of short-term traders in cum-and/or ex-dividend trading activities in the Australian stock market?

There is direct evidence of the presence of short term trading about the ex-dividend date in Australia, but there is no clear evidence on how much of the trading that occurs is short-term. Direct evidence comes from Ainsworth, Fong, Gallagher and Partington (2008b) who study trades about the ex-dividend date using trade and holdings data date for a sample of institutional equity funds. They find that these funds engage in both long-term and short-term trades about the ex-dividend date.

Further evidence comes from Bellamy (2002) and Ainsworth, Fong, Gallagher and Partington (2008a). The results of this research suggest that short term traders appear to be arbitraging higher yield franked dividends and low spread stocks. Ainsworth *et. al.* study order imbalance and find buying pressure cum dividend, selling pressure ex-dividend, and an abnormal volume of trades. Note however, that these price pressure effects are not just from short–term trading.

The buying pressure is associated with a run-up in cum-dividend prices. The results also suggest that for higher spread stocks, the price adjustment is not complete on the ex-dividend day and that the price of these stocks continues to decline for one to three days after the ex-dividend date.

In interpreting these results it should be noted that the Ainsworth *et. al.* (2008a) sample is restricted to shares that are constituents of the S&P/ASX300 in order to mitigate the effects of thin trading.

(c) What sort of trading behaviour occurs around ex-dividend date for a share and what effect does this have on the share price?

The results of Bellamy (2002), Ainsworth, Fong, Gallagher and Partington (2008a) and Ainsworth, Fong, Gallagher and Partington (2008b), suggest that both long-term and short-term traders are actively trading about the ex-dividend date. The long term investors trade cum-dividend to capture dividends and they trade in most stocks, irrespective of dividend yield, franking, or transactions costs. Since they have accelerated their trades to the cum-dividend period, these long term investors are less likely to buy stocks ex-dividend. In part, because of the extra demand for cum-dividend stock, the cum-dividend price gets bid up. The implication of this extra demand is that the investors expect that the ex-dividend price drop is likely to be less than their valuation of the dividend, otherwise they would not be favouring cum-dividend purchases of the stock.

It is also clear that there is short-term dividend arbitrage about the ex-dividend date. Arbitrageurs can be engaged in both dividend avoidance (eg. foreign investors with lower franking credit values) and dividend capture (eg. domestic investors with higher franking credit values). It is to be expected that the arbitrageur's activities will be concentrated in high yielding and high capitalisation and low transaction cost stocks, and the evidence is consistent with this as discussed in 4 (b) above. Such stocks also tend to have the highest drop-off ratios, but whether this is due to price setting by short-

term traders, or to other factors is not known. Such other factors might include more rapid and complete ex-dividend price adjustment due to greater liquidity as reflected in lower spreads. This is discussed further in answer to question 4 (d) below.

(d) How long does it take for the loss of a dividend entitlement to be incorporated into the share price? What effect does this have on the results of ex-dividend studies?

There are two issues to consider here. The first issue relates to the stocks that simply do not trade on the ex-dividend date. These stocks are reflected in the abnormally high level of zero price changes observed in ex-dividend data. Naturally, this tends to have the effect of depressing the ex-dividend drop-off ratio, although this effect appears to be less evident in regression estimates.

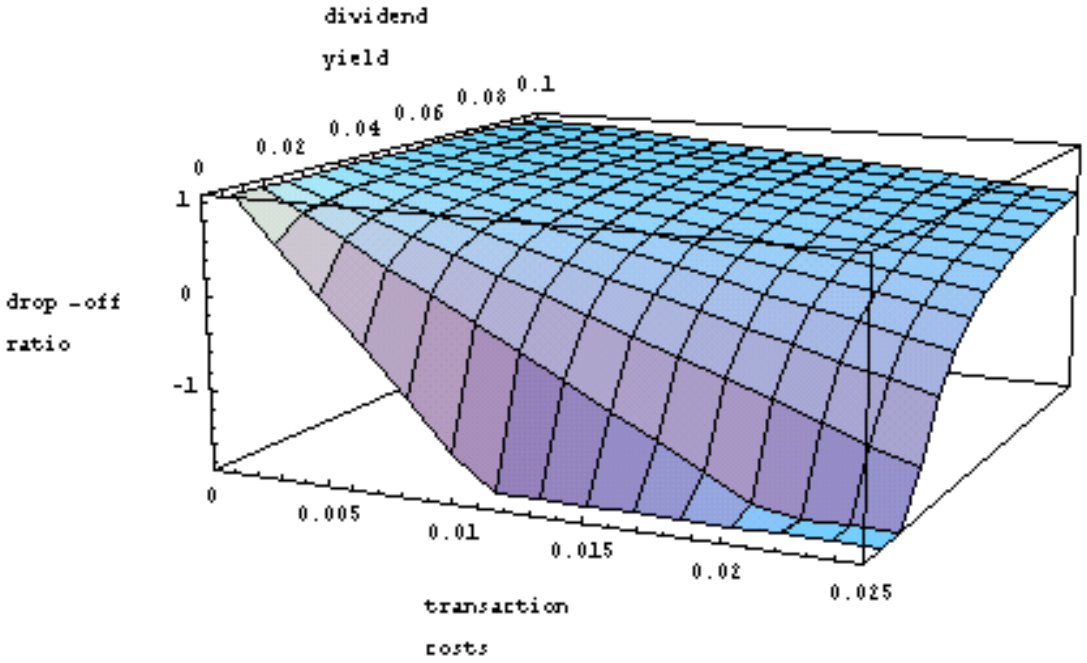
The second issue relates to the stocks that do trade on the ex-dividend date, but for which the price adjustment is incomplete on the ex-dividend day. The work of Ainsworth, Fong, Gallagher and Partington (2008a) shows that particularly for stocks with a higher bid-ask spread it can take up to three days for the ex-dividend price adjustment to be completed. Thus the price drop on the ex-dividend date, for such stocks, will not reflect the full value of the dividend. As a consequence, it is likely that the ex-dividend price drop will understate the value of the dividend.

(e) What are the effects that short-term traders have on the results of dividend drop-off studies? If short-term traders are the marginal traders that set the price, then is their valuation relevant and appropriate to the shareholders of the regulated firm?

The impact of short-term traders on the results of ex-dividend drop-off studies is not known. However, if short-term traders did determine prices, then the observed price drop would underestimate the value of dividends and franking credits to those traders. This is because the price drop would then represent the value of dividends and credits net of transaction costs. This effect is not trivial as the transactions costs for short-term trades can consume a substantial proportion of the dividend. An illustration of this is given in Figure 1, which is taken from Partington and Walker (2001). Assuming that a dollar of dividends is valued at a dollar in the absence of transaction costs, the curved plane illustrates the short-term trader's equilibrium drop-off ratio. The equilibrium drop off is shown as a function of

the dividend yield and transaction costs expressed as a percentage of the dividend.

Figure 1: An example of the relation between the drop-off ratio, dividend yield and transaction costs for a short term trader.



Source: Partington and Walker (2001)

If short term traders were setting prices about the ex-dividend date, those short term traders might, or might not, be long-term shareholders in the regulated firm. If they were long-term shareholders in the regulated firm than the ex-dividend valuation observed would, for the reasons discussed immediately above, understate the value of the dividend and franking credits to long term shareholders. If the short-term traders were not long-term shareholders in the regulated firm, then it would be a matter of chance whether their valuation was appropriate to the long term shareholders of the regulated firm.

QUESTION 5

(f) In light of the answers to questions 3 and 4, and any other matters you consider relevant, do estimates from dividend drop-off studies reflect the value to the representative investor in the

Australian market or are these estimates subject to either upward or downward bias?

It should be clear from our discussion above that there is abnormal trading that takes place around the ex-dividend date and there is plenty of scope for biased estimates of dividend and franking credit value relative to the normal course of trading. The answer to Question 1 also shows how ex-dividend studies might give rise to downward biased estimates of the utilisation ratio.

There is a presumption in some of the ex-dividend literature that ex-dividend estimates are downward biased. The work of Kalay (1982), Frank and Jagannathan (1998) and Bali and Hite (1998), for example, is based on explaining the effects that make the measured value of dividends in ex-dividend studies less than the underlying value of the dividend to investors.

There is also empirical evidence that ex-dividend estimates of dividend and franking credit value may be downward biased. For the UK, Armitage Hodgkinson and Partington (2006) estimate dividend values from rights issues, where the new shares trade without entitlement to the next dividend that the old shares enjoy. The estimates of dividend value from this study are larger and much more precise than ex-dividend estimates. Armitage *et. al.* conclude that ex-dividend studies give downward biased estimates of dividend and franking credit value. A similar result was found for Australia by Chu and Partington (2001). The advantage of these studies is that they study prices in the normal course of trading over periods that span up to several months. However, sample sizes are not large and it is not certain that these results can be generalised.

Walker and Partington (1999) study cum-dividend trading in the ex-dividend period, which allows simultaneous observation of cum-dividend and ex-dividend prices. They obtain drop off ratios that are more precise and significantly larger than those obtained from the usual ex-dividend data, where the prices are separated by one day. So, in different settings, there is consistent evidence that ex-dividend estimates are too low, but the question of generalisability of these results to other settings remains.

QUESTION 6

How should estimates from tax statistics studies be used in estimating theta for the representative investor in the Australian

market? Is there any way to use these estimates other than just as an upper bound theta estimate?

First, it is important to determine which theta is to be estimated: theta as a measure of utilisation of the credits, or theta as a measure of the market value of the credits.

If it is a direct measure of the utilisation that is required, then the tax statistics give a direct measure of the aggregate franking credit utilisation by investors. The resulting utilisation ratio represents a weighted average of utilisation across investors according to the fraction of total franking credits in the market that they receive. If it is assumed that the shareholders in the regulated firm mirror the market, then the market average utilisation is also the utilisation for the firm. The question then is whether it is utilisation for the firm that is required or utilisation of the marginal investor which takes us back to the discussion of this issue in the answer to Question 1.

Where the utilisation ratio of the marginal investor is required, this might be above or below the average utilisation ratio. It is clear that the estimates from taxation statistics do not put an upper bound on the marginal utilisation ratio. The upper bound is one hundred percent, since full utilisation of credits may be possible for the marginal investor.

If it is a market value estimate of theta that is required, this might be because of one or both of the following. First, a belief that the market value will capture the utilisation ratio for the marginal investor. Second, a belief that more than utilisation goes into the market value of credits and these other factors are not captured in the discount rate used in the valuation. If these factors, such as time discounting, are clearly identified then adjustments might be possible.

However, in ex-dividend studies these other factors are not made explicit. The franking credits are valued with reference to a benchmark of unfranked dividends. As explained in the answer to Question 1 the result can be widely varying estimates of the value of the value of franking credits. The problem is compounded by the many estimation issues that we discussed in our previous report, McKenzie and Partington (2010).

In summary, if the average utilisation ratio is required, taxation statistics give this directly. However, if the utilisation ratio of the marginal investor, or the market value of franking credits is required, then taxation statistics can

be used to give comfort as to the reasonableness of the estimate. Taxation statistics do not give an upper bound on either the market value of franking credits, or the utilisation rate of the marginal investor. Since the utilisation rate of the marginal investor might lie above the average utilisation ratio, it is therefore possible for the market value of franking credits, determined by the marginal investor, to lie above the average utilisation ratio that the taxation statistics provide.

QUESTION 7

Can any adjustment be made to the estimate derived from a tax statistics to appropriately derive a point estimate of theta from tax statistics. If so, how could such an adjustment be made?

If we take theta to be the utilisation ratio and if we take the average investor in the market to be the representative investor, then the taxation statistics will give an approximation to this value. The quality of the approximation depends on what weighting scheme that should be applied in determining the average that provides the characteristics of the representative investor. The taxation statistics weight by the fraction of franking credits that the investor receives, an alternative weighting would be fraction of the market the investor holds, which would correlate positively but not perfectly with franking credits received.

We make the general point that where multiple measurements of the parameter of interest are made, measurement theory shows that provided the observations are unbiased and independent, then an average across measurements is likely to reduce measurement error. Similarly, the forecasting literature shows that combining estimates often provides better forecasts and that simple linear combinations of estimates often do as well, or better, than more complex weighting schemes.

QUESTION 8

In the light of the 45 day trading rule, is the assumption from July 2000 that every resident investor would (consistent with investor rationality) fully redeem an imputation credit arising on the shares held by the taxpayer a correct assumption for the purpose of tax statistics studies. Does the 45 day rule have a material effect on the estimate from a tax statistic study?

Wastage of credits could occur for resident long term investors who changed their mind and liquidated their position early, thus falling foul of the 45 day rule. The size of this group is unknown, but is probably not large. Wastage of credits could also occur for resident short-term traders who did not meet and could not avoid the 45 day rule. This does not seem very likely as short-term trading strategies would be designed to maximise returns by capturing the credits. Thus, we do not think that the wastage of credits would be large. Further, as we explained in our answer to Question 3, not all resident investors have to comply with the 45 day rule. Based on our experience, we would be surprised if the wastage of credits by resident individuals was more than about five or six percent.

References

Ainsworth, A.B., Fong, K., Gallagher, D.R. and Partington, G. (2008a) "Taxes, Price Pressure and Order Imbalance around the Ex-Dividend Day", Working Paper, University of Sydney, available at ssrn.com/abstract=1314087.

Ainsworth, A.B., Fong, K., Gallagher, D.R. and Partington, G. (2008b) "Institutional Trading around the Ex-Dividend Day", 21st Australasian Finance and Banking Conference, available at ssrn.com/abstract=1253282. (Working paper draft updated 2010).

Armitage, S., Hodgkinson, L. and Partington, G. (2006) "The market value of UK dividends from shares with differing entitlements", *Journal of Business Finance and Accounting*, 33, 150-174.

Bali, R. and. Hite G., (1998), Ex-Dividend Day Stock Price Behaviour: Discreteness or Tax-induced Clienteles?, *Journal of Financial Economics*, 47, 117–59.

Bellamy, D.E., (2002), *An analysis of ex-dividend abnormal trading volumes and share price changes in the Australian equity market*, PhD thesis, University of Queensland.

Boyd, J.H. and Jagannathan, R. (1994) "Ex-dividend price behaviour of common stocks", *Review of Financial Studies*, 7, 711-41.

Chu H. and Partington, G. (2001) "The value of dividends: evidence from a new method", Paper presented at the Accounting Association of Australia and New Zealand Annual Conference, Wellington.

Elton, E. and Gruber, M. (1970) "Marginal stockholder tax rates and the clientele effect", *Review of Economics and Statistics*, 52, 68-74.

Frank, M. and Jagannathan R., (1998), Why do Stock Prices Drop by Less Than the Value of the Dividend? Evidence from a Country without Taxes, *Journal of Financial Economics*, 47, 161–88.

Hathaway, N. and Officer R. (2004) "The value of imputation tax credits", Working Paper, University of Melbourne.

Kalay, A. (1982), The Ex-dividend Day Behavior of Stock Prices: A Re-examination of the Clientele Effect, *Journal of Finance*, 37, 1059-70

Lally, M. and van Zijl, T. (2003) "Capital Gains and the Capital Asset Pricing Model", *Accounting and Finance*, 43, 187-210.

McDonald, R.L. (2001) "Cross-border investing with tax arbitrage: the case of German dividend tax credits", *Review of Financial Studies*, 14, 617–657.

McKenzie, M.D. and Partington, G. (2010) "Report to AER: Evidence and Submissions on Gamma", AER Report, March 25.

Officer, R. (1994) "The cost of capital of a company under an imputation tax system", *Accounting and Finance*, 31, 1-17.

Partington, G. and Walker, S. (2001) "'A Note on transactions costs and the interpretation of dividend drop-off ratios", *Accounting and Finance*, 41, 229-241.

Rantapuska, E. (2008) "Ex-dividend day trading: Who, how, and why?: Evidence from the Finnish market", *Journal of Financial Economics*, 88, 355-374.

Walker, S. and Partington, G. (1999) "The value of dividends: Evidence from cum-dividend trading in the ex-dividend period", *Accounting and Finance*, 39, 275-296.