Key words: dividends; franking credits; cum-dividend market; valuation

The valuation of franking credits to investors

With an increasing focus by fund managers on post-tax return and tax-efficiency, including the benefits arising from franking credits, this paper investigates the extent to which the value of franking credits is reflected in the market price of stocks. A particular emphasis is placed on evidence from recent years to determine whether there has been any change in behaviour from that previously exhibited or whether the franking credit is fully valued by the market.

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SINCE THE INTRODUCTION OF the dividend imputation system in Australia in 1987, many studies have considered the valuation of franking credits in stock prices. Early studies tended to conclude that franking credits were not fully valued, if they were valued at all. The null hypothesis had been to test that the valuation is not zero, (namely: H_0: $\gamma = 0$; H1: $\gamma <> 0$, where γ is the proportion of the credit valued by the market). The question for investors is really whether or not they are fully valued by the market. The hypothesis tests for this are: H_0: $\gamma = 1$; H_1: $\gamma < 1$. Answering this question will enable investors to determine if there is some value in franking credits that can be exploited for excess returns.

In recent years there have been developments in the funds management industry in Australia that may have had an impact on the valuation of franking credits. Anecdotally, most buy-side analysts now explicitly value franking credits in their company valuation and there are now several funds available to the public, both actively and passively managed, which explicitly measure the value of franking credits in their (after-tax) performance reporting. Under these conditions, it is likely that the franking credit valuation issue is evolving. It is interesting that the recently released review of the Australian tax system, (AFTS 2009) was only able to quote studies with data up until 2006 in considering the valuation of franking credits. This study will consider the most recent data.

Based on data for large cap companies over the period 1986 to 2004, Hathaway and Officer (2004) found that, on average, franking credits are valued at 50% of their theoretical face value. They also found that the market values dividends at around 80% of their face value and that the market's combined value of the dividend and the franking credit is approximately equal to the cash dividend. Beggs and Skeels (2006) came to a similar conclusion in their dividend drop-off study. Both studies used a regression model to determine how much of the drop-off in share price over the ex-dividend date was attributable to franking credits.

Bellamy and Gray (2006) highlighted problems with the methodology used in this style of regression analysis. They argued that, given the linkage between dividends and franking credits, only the combined value can be estimated reliably. They assumed that the dividends were fully valued first and then inferred a value for franking credits from the combined value estimate. They concluded that franking credits have negligible value.

Cannavan, Finn and Gray (2004) considered price differences between stocks and derivatives on large stocks on which derivatives are widely traded. They found that since the introduction of the 45-day rule (a tax law introduced in 1997 that required investors to hold a stock for at least 45 days in order to receive the attached franking credits) franking credits have had negligible value in the market.

An alternative approach was taken by Handley and Maheswaran (2008) who show that 81% of credits from 2001 to 2004 were claimed from the Australian Taxation Office. This provides a direct indication of the underlying value and how much should be paid. This also depends on the residency of the shareholder, among other factors, and does not reflect the actual price paid by all investors for the credits through the opportunity cost of price adjustment.

Methodology

This paper follows a regression approach similar to that of Bellamy and Gray (2006) to use dividend drop-off prices to estimate the valuation.

When a stock trades ex-dividend the share price is expected to fall by the amount of the dividend paid. The share price should reflect the fact that the firm has distributed a portion of its assets. After a stock goes ex-dividend in the Australian market, buyers are no longer entitled to the cash dividend and attached franking credit. It can be expected that the drop in the share price reflects the total value of the lost benefit, being the sum of the value of the dividend and the franking credit. The value that the market places on the dividend and the attached tax credit can be inferred from the size of this fall in the share price.

A cross-sectional regression model was used to assess how much of the fall in the stock price over the ex-dividend date is attributable to franking credits and the cash dividend. Sector returns are also included in the model to account for movements in the stock price due to market factors. The model looks at whether the differences between the ex-dividend daily returns of a group of stocks are partially explained by the differences in the size of their franking credits. Below is the model that was used as the basis for the analysis:

$$\frac{\Delta P}{P} = \alpha + \beta_1 \cdot \frac{DIV}{P} + \beta_2 \cdot \frac{DIV}{P} \cdot f + \beta_3 \cdot Sect + \epsilon \quad (1)$$

where:

ΔP	Change in the share price over the ex-dividend date (being cum-price less the ex-price)
P	Cum-share price, the closing share price on the day prior to the stock trading ex-dividend
DIV	Dollar value of the dividend issued, $\frac{DIV}{P}$ is the 'daily dividend yield'
f	Franking level of the attached tax credit expressed as a proportion (100% franked = 1)
$Sect$	Daily return over the ex-dividend date for the sector of the dividend stock
ϵ	Represents the portion of variability in stock prices that is unexplained by the model
$\frac{DIV}{P} \cdot f$	This variable accounts for the value of the attached franking credits; grossing this value up by the corporate tax rate would give the theoretical value of the franking credit.

The overall explanatory power of the regression model is not as important as the coefficient estimates. The purpose of the model is not to forecast or predict the stock returns but to test whether franking credits explain some portion of the stock returns over the ex-dividend date.

This model simply states that the ex-dividend date daily return is explained by a linear combination of the dividend yield, the franking credit yield and a sector movement component.

Dempsey and Partington (2008) discuss the different approaches to dealing with the collinearity of the dividend and franking credit variables. They also discuss the need to consider tax, transaction and time value of money effects in any estimation. Walker and Partington (1999) also discuss the problem of the noise in market movement between end-of-day trades. While using contemporaneous trades in the cum-div and ex-div markets will reduce the noise it is unlikely to help value the franking credit. The 45-day rule (in place since 1997) prevents an arbitrageur from trading in both markets and retaining the franking credit. Hence, estimates using these trades will only capture the value of the dividend, as demonstrated by Cannavan, Finn and Gray (2004).

To address these issues some adjustments are made to the model in (1). The first is to consider stock returns in excess of the stock's own sector. Noise in the stock price that is also affecting the broader sector will be eliminated. As per Bellamy and Gray (2006) it is also assumed that the dividend is fully valued first. Dividends are unlikely to be valued in excess of their face amount.[1] If it is assumed that dividends are valued fully then the difference between the combined value and the dividend is attributable to the franking credit.

This leads to the adjusted model:

$$\frac{\Delta P + DIV}{P} - Sect = \alpha + \beta \cdot \frac{DIV}{P} \cdot f + \epsilon \quad (2)$$

The dependent variable is the daily return over the ex-dividend date plus the dividend yield less the return on the sector. This equation states that after removing the effect of dividends and the movement in the sector, daily returns are driven by the franking credit yield and an unexplained element.

The overall explanatory power of the regression model is not as important as the coefficient estimates. The purpose of the model is not to forecast or predict the stock returns but to test whether franking credits explain some portion of the stock returns over the ex-dividend date.

The regression coefficient from the model above should be adjusted for interpretation as follows:

$$\frac{\beta}{\left(\frac{t_c}{1-t_c}\right)}$$ What the market will pay to obtain a $1 franking credit where t_c is the corporate tax rate.

The regression will provide an 'average' value attributable to franking credits and also a means of determining whether the franking credits are fully valued by the market.

Tax laws were changed in 2000 so that investors are entitled to claim a refund for franking credits even when they pay no tax. Given that this study is most concerned about recent years, it is useful to constrain the estimates to periods of similar conditions. The model results were also computed for the periods 2001–2005 and 2006–2009 to provide a comparison with the results of the earlier research. The ASX 100, ASX 300 and the ASX 100–300 market segments have been separately considered in order to highlight the impact of liquidity on the market's valuation of franking credits.

In practice, the market would be expected to apply a discount to the dividends and franking credits to account for the timing between the ex-dividend date and when the dividend (usually a few days) and franking credit (generally several months) are actually received. The drop-off in the stock price reflects the discounted value of the dividend and franking credit. This time value has been ignored for computational simplicity, noting that the resultant bias would be to lower the valuation of the credit.

Analysis was also undertaken using a volatility filter to see if there was any impact on the results from highly volatile markets. Data points were excluded if they coincided with a day where market volatility was in excess of two standard deviations above the 40-day rolling average. The results indicated that the volatility points had no impact on the overall estimate.[2]

Data

The data set covered all dividend events in the ASX 300 over the period from 1 July 2000 to 30 June 2009. In total, the study covered 3,901 dividend events, both for normal and special dividends. Excluded from the study were a total of 88 dividend events. These included 54 events that coincided with a capital adjustment due to dilution from a bonus issue, rights issue or return of capital; 34 events did not have sectoral return for the appropriate day, and six did not trade on or after the ex date.

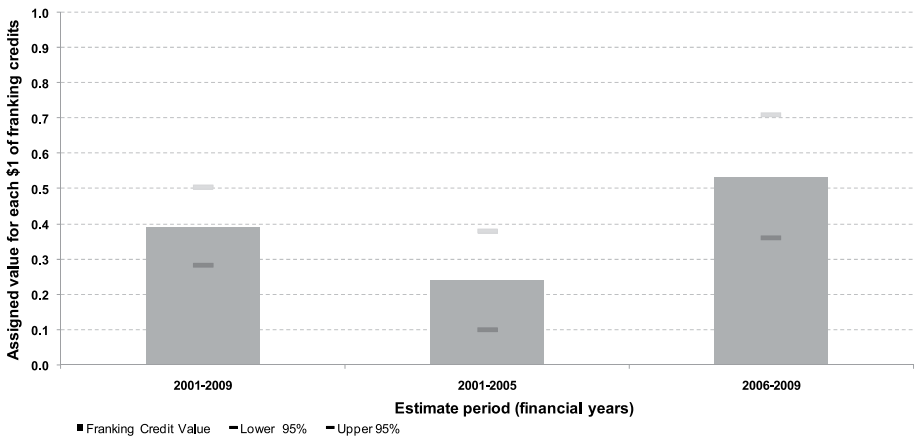
The historical membership of each stock in the ASX 100 and ASX 300 was tracked over the study period. Monthly membership data was obtained and it was assumed that a stock's membership status remained unchanged between observation points.

The closing price level for each stock was recorded for the ex-dividend date and the day prior (when the stock was still trading cum-dividend). The daily percentage return was calculated based on these closing prices. The corresponding closing index level for each stock's sector was also collected.[3] While the move in price from close to open has the shortest gap in terms of other influences, the

TABLE 1: **Key regression results for equation (2) over the ASX 300 universe**

Period	Constant		Franking Credit		Overall Fit	
	α	t-stat	β	t-stat	Adjusted R^2	Standard Error
2001–2005	0.003	5.3	-0.107	-3.3	0.005	0.0197
2006–2009	0.007	7.7	-0.240	-6.0	0.019	0.0256
2001–2009	0.005	9.5	-0.177	-6.9	0.012	0.0226

FIGURE 1: **Value per $1 of franking credit for ASX 300 stocks 2001–2009**



fact that the open is not a market clearing price and that a large portion of any daily move occurs prior to the open (i.e. overnight), the closing prices were preferred.

The type and dollar value of the dividends and the attached franking credit levels were also obtained. If a final or interim dividend occurred on the same day as a special dividend, the total dividend on that day was considered. The corporate tax rate and any changes in the tax rate were also recorded.

Market data from the ASX was sourced through IRESS and Bloomberg.

Results

The key results from the regression from (2) are provided in Table 1. The overall fit is quite poor reflecting the fact that the volatility of stock prices is not well described by one known event. However, the coefficient on the franking credit is statistically significant and would generally lead to the conclusion that there is some valuation on the franking credit.

Figure 1 demonstrates that there has been an increase in the value assigned to franking credits over recent years for stocks in the ASX 300. For the period covering 2006–2009, franking credits were valued at 53% of their theoretical face value. For the period 2001–2005, the value of franking credits was much lower at only 24% of their theoretical value. The results prior to 2005 are consistent with the earlier studies.

The increasing assigned value of franking credits may well be the result of an increasing focus among investors on actively capturing franking credits. If the marginal investor is actively pursuing franking credits as a source of revenue, this should be reflected in the share price as they are valuing the credits.

The estimated franking credit values should be interpreted with caution given the large standard errors. While not precise, the results indicate that franking credits are assigned a significant value in stock prices. Considering annual estimates there is a trend for an increase in average value which is evident in Figure 2. These estimates are volatile and need to be considered with caution as indicated by the width of the 95% confidence intervals. It is also evident that, in the early periods, the confidence interval included the zero point whereas this does not occur in later years and, indeed, in three of the past four years, the intervals include the 1.0 level. Statistically the results are not able to reject the second null hypothesis (H_0: $\gamma = 1$) for these years.

It should be noted that the results were unaffected by the introduction of the further assumption that sector returns are fully factored into the share price. Completely removing sector returns produced similar results, suggesting a slightly higher valuation of franking credits. These similar results have not been reported here.

The depth of the market and liquidity is likely to affect the extent to which dividends and franking credits are factored into share prices. In order to consider this, the results have been run on two subsamples representing the ASX 100 and the ASX 300 less the ASX 100, often referred to as *small caps*.

FIGURE 2: **Annual estimates of the assigned value of $1 of franking credits for the ASX 300**

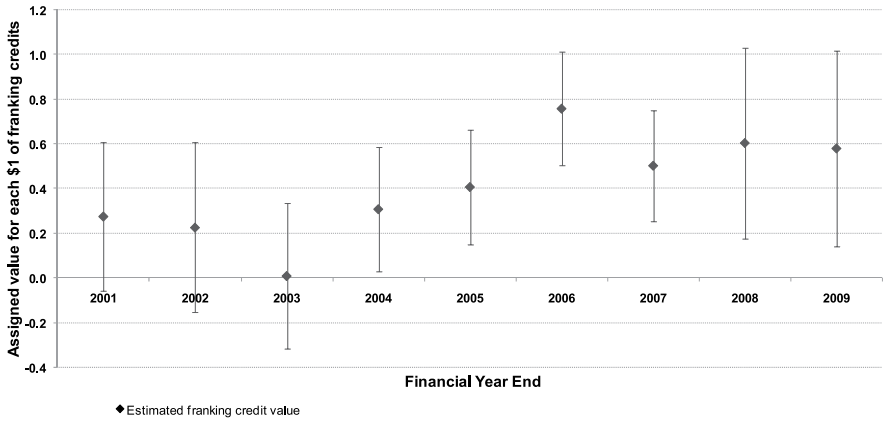


TABLE 2: **Key regression results for equation (2) over the ASX 100 universe**

Period	Constant		Franking Credit		Overall Fit	
	α	t-stat	β	t-stat	Adjusted R^2	Standard Error
2001–2005	0.003	4.4	-0.157	-4.0	0.015	0.0139
2006–2009	0.007	6.0	-0.379	-5.7	0.039	0.0224
2001–2009	0.005	7.5	-0.257	-7.0	0.026	0.0182

FIGURE 3: **Value per $1 of franking credit for ASX 100 stocks 2001–2009**

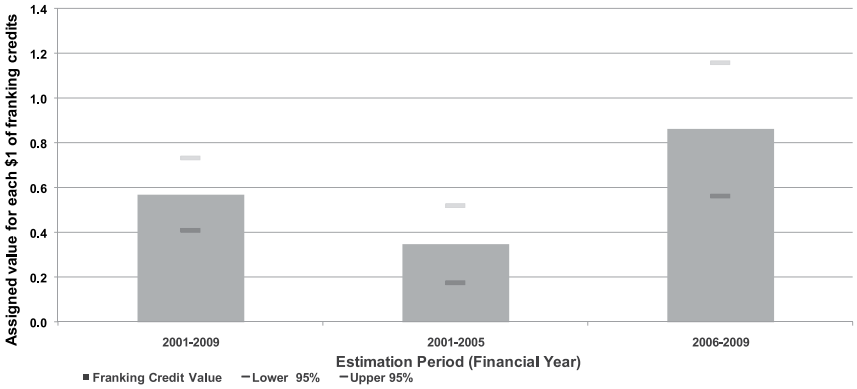
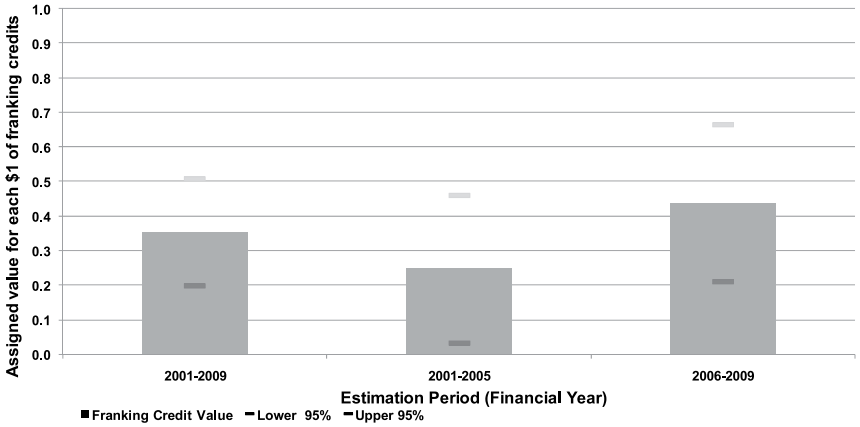


FIGURE 4: **Value per $1 of franking credit for ASX 100–300 stocks 2001–2009**



The regression results are reported in Table 2. Figure 3 indicates the estimated valuation of franking credits for the ASX 100 over the whole and two subsample periods. It is evident that, in the more liquid stocks, the market has placed a great valuation on the franking credits.

Over the total period, franking credits have a market implied value of 57% of their theoretical face amount. Considering the sub periods, the 2001–2005 period suggested that $1.00 of franking credit was assigned a value of only $0.35 in stock prices, while this has risen to $0.86 in the latter period. Again, given that the confidence bands include $1.00 for the 2006–2009 period, it would not be possible to statistically reject the hypothesis that the franking credits are fully valued.

Franking credits have been more highly valued for ASX 100 stocks than the remainder of the ASX 300 market. Importantly, in both markets, franking credits have discernable values, which have been increasing in recent years.

Consider now a set of stocks that, on average, are more illiquid than the average stock in the ASX 300. Those are the stocks that are in the ASX 300 but are not constituents of the ASX 100. Figure 4 reproduces the information from Figure 3 for small cap stocks.

Over the period from 2001 to 2009, franking credits were valued at only 35% of their theoretical value. With a 95% confidence band, this value could be as low as 20% or as high as 51%.

Once again it is observed that the value attributable to franking credits has increased over time from 25% to 44%. The methodology has produced similar results to the earlier studies, with the assigned value of franking credits being barely statistically significant.

Conclusion

Franking credits do not represent a free ticket for Australian investors. The market price now tends to incorporate a relatively large component of any franking credit into stock prices. The situation has evolved over time with markets gradually moving to factor the benefits into stock prices.

The increased significance of franking credits since 2006 is likely to be the result of marginal investors, including superannuation funds, actively seeking these credits. Franking credits are particularly valuable to superannuation funds. Since tax law changes in 2000, investors without a tax liability can redeem franking credits for a cash refund. With more investors, including

specific funds, targeting franking credits, the potential increase in the valuation of franking credits is supported by the market data.

It is clear that the market does assign some value to franking credits, although it is generally below their theoretical value across the market. For larger, more liquid stocks, this discount is getting smaller and approaching a level that may not be statistically significant. Some of this discount will reflect the time value of the delay. Other markets, such as cum-dividend markets, do not place as much value on franking credits, with other factors dominating their valuation.

The increased significance of franking credits since 2006 is likely to be the result of marginal investors, including superannuation funds, actively seeking these credits. Franking credits are particularly valuable to superannuation funds.

Notes

1 Studies have generally indicated that dividends are not valued fully both in Australian and other countries. For example, see Elton, Gruber and Blake (2005) or Cannavan, Finn and Gray (2004).

2 The coefficient difference of 0.0092 for the full sample period, was insignificant (P=72.9%).

3 It would have been more accurate to estimate the return for the sector excluding the particular stock but computational simplicity has been preferred.

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