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The Value of Imputation Tax Credits

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ABSTRACT

A large proportion (about 35%) of the tax that "masquerades" as company tax is actually personal tax collected (or withheld) at the company level. This means that the effective company tax in Australia is much closer to 19% than the statutory rate of 30%. The reason is the introduction of imputation tax in July1987 which substantially reduced the previous double tax on company earnings; company tax followed by personal tax on dividends. Shareholders now pay personal tax on the gross of dividends and imputation tax credits (i.e. company tax) and obtain credit for the company tax paid. There are three milestones in the life of franking credits; they are created when company tax is paid, they are distributed along with dividends and they are redeemed when shareholders claim them against personal tax liabilities. Two issues thus arise; how many credits are issued (*access*) and how many of these distributed credits are redeemed (*utilisation*)? We find that the access factor is 71% and about 50% of distributed credits are being redeemed. Overall, about 35% of company tax is actually pre-payment of personal tax. Over the period July 1987 to June 2002 (the latest ATO data available) about $265 billion of company tax had been paid, creating $265 billion of franking credits of which $77 billion remained within FAB accounts giving rise to an Australian-wide average access factor of 71% over these 19 years.

NOTE

The results of this paper were first presented at a Pacific Basin Finance Conference in New York in December 1991. There have also been a number of presentations at seminars in Sydney, Brisbane and Melbourne during 1992, 1993 and 1995, 1997, 1998 and 2000. The paper has benefited from comments at these seminars. The authors acknowledge the invaluable assistance of the Australian Stock Exchange (Melbourne Office) and Knight Ridder/Equinet in giving us access to the data. Funding by Esso for the extension of the study in 1993 is gratefully acknowledged. The authors are also indebted to Professor Frank Finn for insightful comments on the Study.

1. Introduction

Imputation credits are valuable but how valuable depends on dividend policy and the tax status of the recipient shareholder. (Do they pay Australian taxes?) Unfortunately, tax laws prevent the trade in imputation tax credits and therefore there is no open market to observe the value of the credits. The consequence is that an implicit value of the credits has to be estimated indirectly. This paper is a study of the value of imputation tax credits.

The introduction of the imputation tax system for companies in 1987 has partially eliminated the double taxation of the classical company tax system that prevailed before 1st July 1987. Under the classical tax system, company tax was charged on a company's profit and then personal tax was charged on dividends distributed from after-tax company profits. Under the imputation tax system, tax is first collected as "company tax" and then when shareholders receive (franked) dividends they are credited with these "company tax" payments, called imputation credits, for use against their personal tax liabilities on the grossed up (including tax credits) dividends. Hence, shareholders aggregate the cash dividends received and any accompanying credits and are liable for personal tax on this total. The imputation credits (distributed company tax collections) are credited against this personal tax liability and the shareholder pays the net liability or, in the case of an excess of imputation credits over personal tax liability, receives a net credit that can be applied against other tax liabilities in that year. Cash refund of excess credits is now allowed (introduced in 2002) but credits cannot be carried across tax years by personal investors.

Most countries have some form of imputation tax system that credits some proportion of company tax against personal tax liabilities. There are only a handful of OECD countries still applying the classical tax system, with the USA the most noteworthy. However, the USA is known to be considering introducing some form of crediting system.

Under the imputation tax system, much of the money collected as "company tax" is really a withholding of personal tax. If shareholders could access all company tax payments as imputation credits and all such credits could be redeemed as pre-payment of personal tax liabilities, then there would be no company tax. The only tax liability would be the personal tax liability. In practice, this extreme case of zero company tax is not achieved. Not all company tax payments are distributed as credits and of those credits that are distributed, not all can be utilised by the recipients. Companies rarely have a policy of 100% payout of earnings so some credits are not accessible by shareholders. In turn, some recipients are not liable for Australian tax, noticeably, foreign shareholders and so they did not have a tax liability against which they can utilize the credits. Australian tax-exempts, such as charitable funds and universities, can now redeem their credits for cash against the ATO. There has been some "trading" in tax credits between taxable and taxexempt shareholders but the Australian Tax Office (*ATO*) has actively sought to curtail this activity with considerable success.

There are three milestones in the life of imputation credits:

1. They are **created** when company tax is paid.
2. They are **distributed** when franked dividends are paid to shareholders.
3. They are **redeemed** when shareholders lodge their personal tax claims.

These three events are analysed in order to establish the value of franking credits.

We derive our results in two ways. Firstly, we examine the national tax statistics from which we derive the overall average results as imputation credits are created. We have to be very careful in using these data as there is much double counting in the flow data produced by the ATO. A company that receives a franked dividend and uses that income to pay out its own franked dividend will result in both sets of dividends and credits being recorded in the ATO statistics of dividends and credits issued. However, the Franking Account Balances (FABs) will accurately reflect the situation. Whilst the FAB account of the first company shows a debit, the FAB of the second company will show both a credit for the franking credit received and an offsetting debit for the franking credit paid out. Hence, we can use both the net tax paid data and FAB data to get accurate estimates of the credits issued by companies. This determines the Australian-wide average access factor – the credits that are distributed (2 above) as a portion of the credits that are created (1 above).

From 1988 – 2002 (the latest ATO data available) there have been net tax collections of $265 billion and $77 billion of credits were retained within FABs. Hence 29% of credits are still held in companies and 71% or $188 billion have been distributed to shareholders. Not surprisingly, this pay out ratio is very similar to the dividend payout ratio of listed Australian companies. To demonstrate the problem with double counting in ATO company statistics we need only consider franking credits distributed. The aggregate credits distributed according to ATO statistics over the period 1988-2002 was $280 billion (estimated from franked dividends paid out). This exceeded aggregate net tax paid and would be quite inconsistent with $77 billion remaining within FAB accounts.

When company tax statements are submitted (Form C) there are items which can be aggregates of other items so some tax items are not uniquely identified. Frustratingly, one of the items so reported is the redemption of franking credits by permitted entities. When companies complete their Calculation Statement (CS) of Form C they show gross taxable income including dividend income (label A of the CS), the gross tax payable on that income (label B), the offsetting franking credits redeemed (if so allowed[1]) and any

[1] For example, Life Offices operating compliant funds are allowed to redeem credits as if they are "virtual" superannuation funds.

intercompany dividend rebates (but since abolished in 2002) at label C. Companies then report net tax payable and it is the payment of this tax item which creates franking credits. Much of this tax liability is now pre-paid in instalments and these are shown as refundable credits (label R) along with non-refundable credits (label G). We have to be very careful to identify *franking* credits among these various forms of tax credits. The main ones we need to identify are those at label C but they are not uniquely identified. They have been aggregated with inter company dividend rebates in the past so we cannot get an accurate estimate of the franking credits redeemed by allowed entities. In contrast, we can get accurate data for credits redeemed by individuals and stand-alone superannuation funds.

When tax statements are lodged by taxpayers, there is no requirement to identify the source of the credits claimed, but rather just the aggregate of tax, dividends and credits. Hence we can only obtain broad results from the taxation statistics. For example, we cannot use them to distinguish between credits paid and received by resources versus industrial stocks. To overcome this problem, we analyse the ex-dividend behaviour of stock prices.

When stocks go ex-dividend, the share price typically drops because the assets, in the form of dividends and franking credits, are being distributed. The drop in the share price reflects the market's value of the cash dividend and the credit being paid out. If shareholders value the associated imputation credits, then the share price should drop further to reflect the trade-off between capital value and dividend cash plus credits. This is indeed what happens. Share prices of fully-franked dividends fall further, as shares go ex-dividend, than shares which pay out unfranked dividends. We analyse the ***extra*** drop-off in the share price that is attributable to the credits as distinct to the drop-off attributable to the dividend alone.

This method of valuing the credits has the advantage that separate valuations of tax credits can be made for market sectors and even individual companies. However, much caution should be exercised when interpreting such sub-sector valuations because there is considerable "noise" in the individual results. Consistent with our taxation statistics estimates, we find that the **average** drop-off value of the credits is about 50% of their face value.

Ex-dividend drop-off statistics can only address the *second* factor, **distribution,** associated with company tax and imputation credits. Drop-off analyses (and, indeed, any other valuation method based on dividend events) can only value the tax credit attached to a dividend when it (the franked dividend) is paid. This happens after the company makes its decision about how much of the profit, after-company tax, to distribute as a franked dividend. The value of credits derived from drop-off analyses indicates the market value of credits, not the redemption value. In theory, we would expect the drop-off valuations to be less then the redemption valuations in order to allow for the time value of money between the payment of the franked dividend and the redemption of the franking credit. In practice, the "noise" in the data may mask any such finessing of the results. Accordingly, we use the drop-off value and redemption value as substitutable values.

Before proceeding to the results, there are some issues that should be cleared away. These are issues that we find are frequently raised and represent some confusion in the minds of some people.

The first such issue is that the personal taxation rate (as distinct from the tax status) of the shareholder recipient of the dividend is irrelevant. The only fact that matters is that the shareholder has an Australian taxation liability against which the imputation credits can be applied. Whether that tax liability was incurred at a marginal tax rate of 15% or 48% is immaterial. To see the veracity of this statement, simply ask yourself the question "if they could sell their imputation credits, what would two taxpayers, one on a 15% and the other on a 48% rate, want as monetary compensation for their imputation credits paid from a company on 30% corporate rate?" To make this concrete, suppose each received a $0.70 fully franked dividend. Then each would be liable for personal tax on the grossed up amount of $1.00 ($0.70 cash dividend plus $0.30 imputation credit). The answer is that ***both*** would want $0.30 cents for their imputation credit. In this case alone, they would end up with $1.00 cash and their personal tax position would remain unaltered. The fact that they are on two separate marginal personal tax rates is immaterial. Being able to both access and utilize the credits are the important aspects of the value of imputation credits.

The second major issue of confusion is that foreign investors (indeed, anyone who cannot access the value of the credits) would not pay anything for the value of future imputation credits impounded in Australian share prices. But this would only be true if foreign shareholders always traded their shares with other foreign shareholders. In this case, none of the future credits would ever be used so they would indeed be valueless (assuming some mechanism is not invoked to trade credits with taxpayers). However this is very unrealistic. The Australian Stock Market turns over about 50% of its aggregate market capitalisation each year. So, on average, each share is traded approximately every two years. Even if foreign investors held their Australian shares for this average of two years, they would only lose value for the imputation credits paid out over the two year holding period. When they sell out of their shares, they are selling into a market that does place value on the credits. Our result, that distributed credits are valued at about 50% of face value reflects a market place of investors in which some place no value on the credits and some place a high value on the credits.

The third major issue is that it is quite important to recognise that the value factor of credits (the value of distributed credits) is not in itself the "gamma" factor used within the Officer WACC formulae, a point which is commonly confused or mis-represented. The gamma factor in the various Officer WACC formulae represents that part of the tax paid by companies as company tax but is in reality a pre-payment of personal tax. Because we typically estimate costs of capital after company tax but before personal tax, the portion of company tax payments captured as pre-payment of personal tax (ie gamma) is a cash flow that has to be added to shareholders' pre-personal tax cash flow. The Australia-wide average gamma over all companies and over the entire period 1988-2002 is **0.355**. That is, of the $265 billion ostensibly collected as company tax, about 50% of the distributed $188 billion, namely $94 billion, is valued in the market place as either being a pre-payment of tax liabilities or, recently for some entities, redeemable as cash. So the effective company tax collection has been about $171 billion. Gamma is not the value of distributed credits alone. It is the compounding of the two factors – the fraction of tax distributed as credits multiplied by the value of distributed credits. In this sense it is the value of all possible credits, that is, the value of all tax payments giving rise to the creation of credits.

To avoid paying for something you cannot use, we would expect that shareholders arrange their affairs to be tax efficient. Presumably, taxable investors would be attracted to shares with fully franked dividends and, insofar as these shares reflect some value in the franking credits, investors who cannot access the credits would be attracted to shares with unfranked dividends, all else being the same. There is certainly strong evidence that this clientele effect is occurring. We will present the results below. However, it is difficult to avoid franking credits when buying shares because the vast majority of dividends are franked and of the franked dividends, the vast majority are fully franked. All up, 68% (by value) of the dividends paid out have been franked dividends and that number itself has been reduced, possibly temporarily, by a burst of unfranked dividends paid out in 1999 and 2000. Prior to that, the average remained in the range 70-80% of dividends were fully franked. It has recently returned to about 80% being fully franked. So while there is a theoretical argument for market segmentation, there are practical limits on how far this segmentation can go. Nevertheless, personal taxpayers have shown very strong preferences for fully franked dividends and their personal tax returns indicate that they typically have above 90% of dividend income as franked dividends.

The sudden increase in the unfranked dividends paid out in 1999 and 2000 was a consequence of the announcement of the abolition of the inter-company dividend rebate. In the event, the change did not take place until 1 July 2001.

We now turn to presenting our empirical results. Section 2 presents the Australian Tax Office (*ATO)* data and the associated analyses. In Section 3 we present the ex-dividend drop-off events. We present only the main results and only sufficient detail to understand the analyses and the results. We make some concluding remarks in Section 4, as well as some precautionary dictates on using these results in practical valuation exercises. The authors have been involved in quite a wide range of projects that involve applying these results and have made some deductions about their practical implementation.

In summary, we find the following overall results:

1. *access* - 71% of company tax payments have been distributed as imputation credits, and

2. *utilisation* - 40-50% of the distributed credits are redeemed by taxable investors.

These are two *factors* which, when compounded, indicate that statutory company tax rate is reduced by 28-36%. Effectively, company tax is substantially less than the statutory rate, now 30%, and much closer to an effective rate of now 19-21%. It must be emphasised that these are Australia-wide **average** results and market sectors or individual companies may experience substantial variations from the average. A different payout ratio and a different shareholder tax status would be obvious reasons for a deviation from the average.

2 REDEMPTION VALUE OF CREDITS (*ATO* DATA)

We extracted a wide range of data including dividends paid, company tax payments, credits issued and credits claimed by taxable claimants. As much as possible, we aligned this data set with the various sections and labels of the Company Taxation Form (Form C) in order to understand the flows over time especially as there have been numerous and quite profound changes to the operation of the company tax system. This data set describes the *creation* of credits (i.e. company tax payments), the *distribution* of credits (i.e. franked dividend payments) and the *redemption* of credits (i.e. taxpayer claims of credits, including individuals, superannuation funds and some financial companies). The proportion of credits claimed (redeemed) and thus the dollar value of the credits to the ultimate users of the credits can be estimated from this *ATO* data.

2.1 Creating Imputation Credits (*ATO* Data)

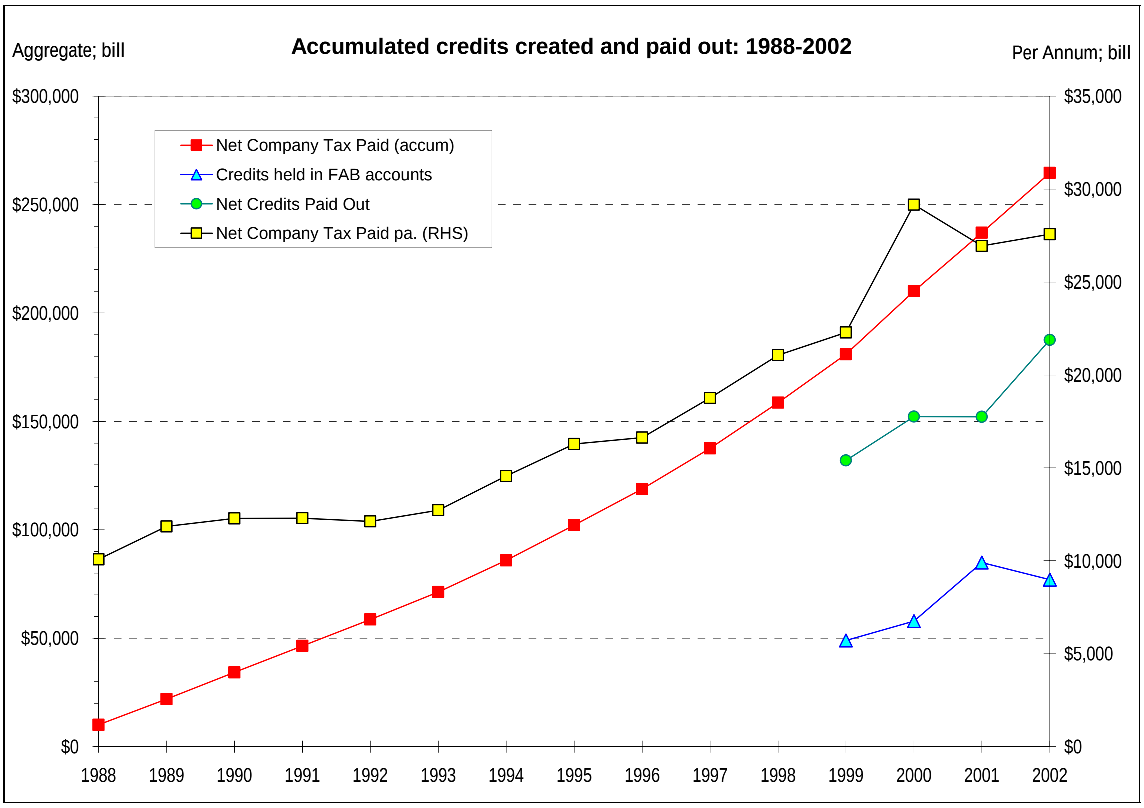
The source of credits is company tax collections. Figure 1 illustrates these data over the 19 financial years 1984 to 2002. There have clearly been some major events in company tax collections, including the hiatus from the recession in the early 1990's plus a downturn in 1995. According to the ATO[2] this is attributable to "... tax planning in response to the change in the [corporate] tax rate...". However, dividends and credits can be issued from retained earnings, within the confines of a company's Franking Account Balance (FAB), which means that the credits issued need not directly correlate with current year tax collections. The *ATO* only began to report data on credits from the 1990 financial year. They only began to report FAB account data in 1998. The published data often experience substantial revision for the last published year of company tax data.

2.2 Distributing Credits (*ATO* Data)

Credits are distributed to the ultimate users (credit redeemers, which include personal taxpayers, superannuation funds and some companies), either directly by the taxable companies which create the credits or passed through other entities such as taxable and non-taxable companies, and partnerships and trusts. In the case of trusts, the dividend is passed on as a cash distribution and the credits (and therefore their value) received by a trust can be passed on to the trust recipients. The *ATO* data distinguishes between credits received by investors in their own right (*primary credits*) and credits received via these intervening trusts (*secondary credits*) which presumably includes credits distributed from trusts of managed funds on behalf of investors. We aggregate the two to derive at the redeemed credits of personal taxpayers.

[2] (*Taxation Statistics* 1995-96, page 49 para 3)

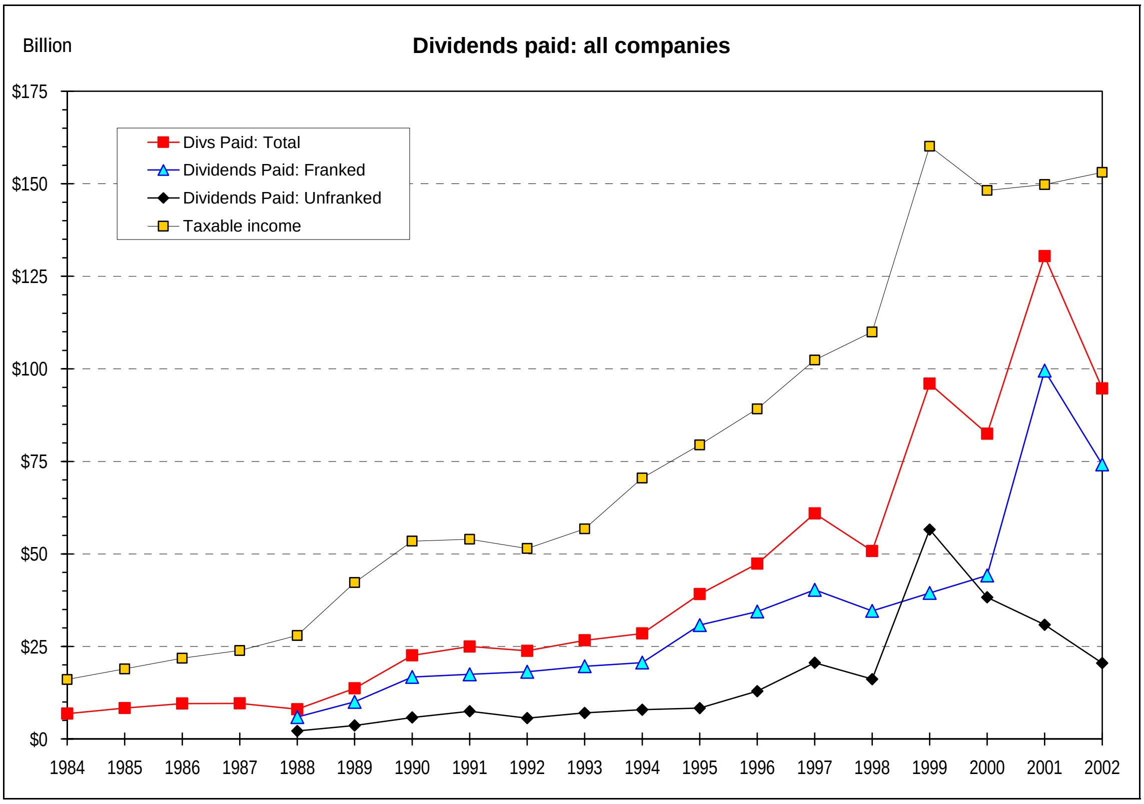
Figure 1: CREDIT CREATION



Dividends can only be fully franked or unfranked. When a shareholder receives a "part franked" dividend they are actually receiving some fully franked and some unfranked dividends, so giving an overall part franking ratio. All the taxation statistics need show is the totals of franked and unfranked dividends. Any credits issued that were created under a previous different company tax rate will automatically be corrected because the company tax rules cause the size of company FAB accounts to be adjusted whenever a company tax rate changed. This is done in a manner so that the (accounting) value of the credits is preserved. The simplified tax changes introduced in 2000 now show the FAB as the actual amount of credits that can be paid and not, as previously, the amount of fully franked dividends that could be issued.

The *ATO* have published data on the amount of dividends paid (franked and unfranked) since the 1990 financial year. For a number of years, the amount of franked of dividends averaged about 75%-80% of total dividends but this proportion dropped suddenly in 1999-2000 in response to the inter company dividend rebate announcement. It appears that this sudden increased distribution of unfranked dividends gave rise to a consequent increase in taxable income with a commensurate higher tax payment (see Figure 1) which in turn enabled subsequent higher franked dividends to be paid out. These results are seen in Figure 2: distribution of credits via companies.

Figure 2: CREDIT DISTRIBUTION



In attempting to estimate the access factor to credits, we face the problem that the data of distributed dividends and credits include much double counting. Fortunately, the ATO began publishing the aggregate amount of company FAB data for the 1998-99 tax year. We now have four years worth of FAB data. We know the total amount of net company tax paid since the inception of the imputation system so we can use the FAB data to calculate the overall access ratio as in Table 1.

Table 1: Aggregate Tax Payments ($ mill) and Access Ratio for Credits

	1988-1999	1988-2000	1988-2001	1988-2002
Accumulated net company tax since 1987-88	180 914	210 074	237 017	264 591
Credits retained in FAB accounts	48 933	57 884	84 905	76 975
Net Credits distributed	131 981	152 190	152 112	187 615
Proportion of net tax that has been distributed	73%	72%	64%	71%

To interpret these data, we see for example, that over the period 1987/88 to 1999/2002, a grand total of $264.6 billion of company tax had been collected by the ATO. This created the equivalent amount of franking credits. Of these credits, $77.0 billion remain within the FAB accounts of Australian companies so $187.6 billion had been distributed. This is a distribution ratio 71% of the total credits created. This is in broad agreement with payout ratios of listed Australian companies, the biggest component of these data.

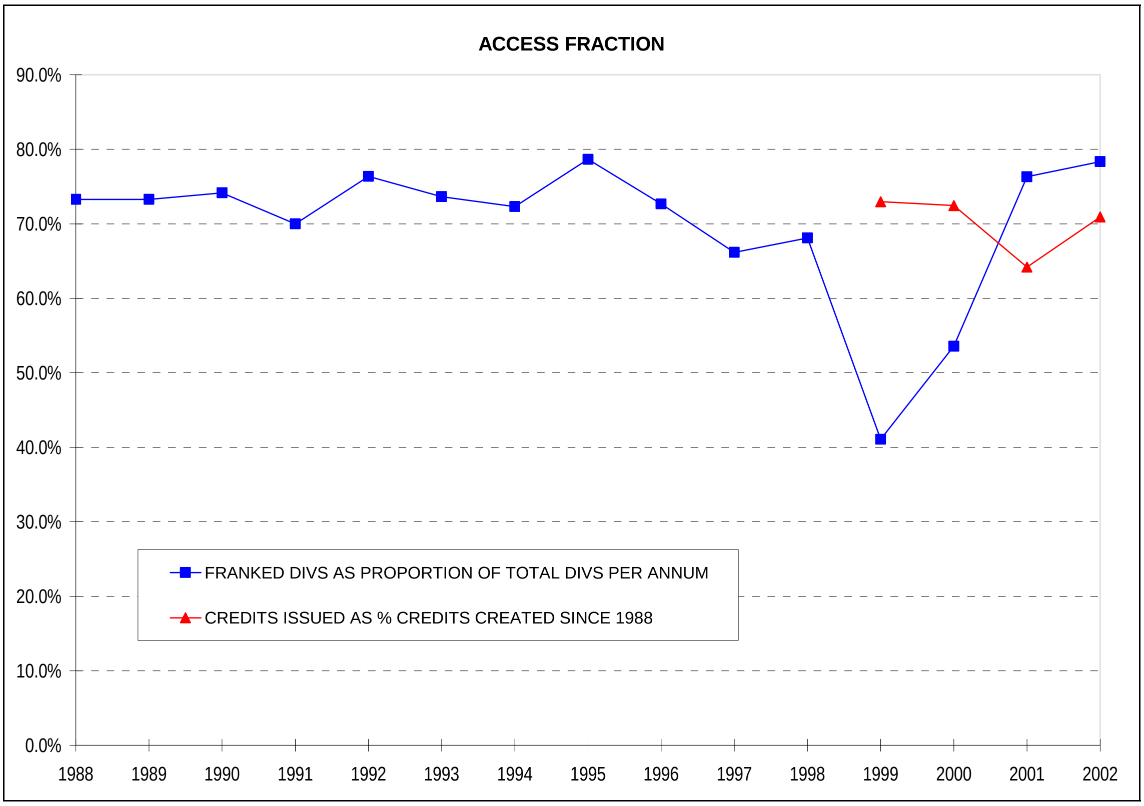
We are now in a position to estimate the first or *access* factor of imputation credits. This is the proportion of credits issued as a percentage of company tax paid. <u>From Table 1 we estimate this access ratio to be an</u>

overall ratio of 71%. This is an average over all Australian companies that submitted tax returns and over the 19 year period July 1987 to June 2002. These data are plotted in Figure 3. For individual cases one would need to use the appropriate access factor.

2.3 Redemption of Credits

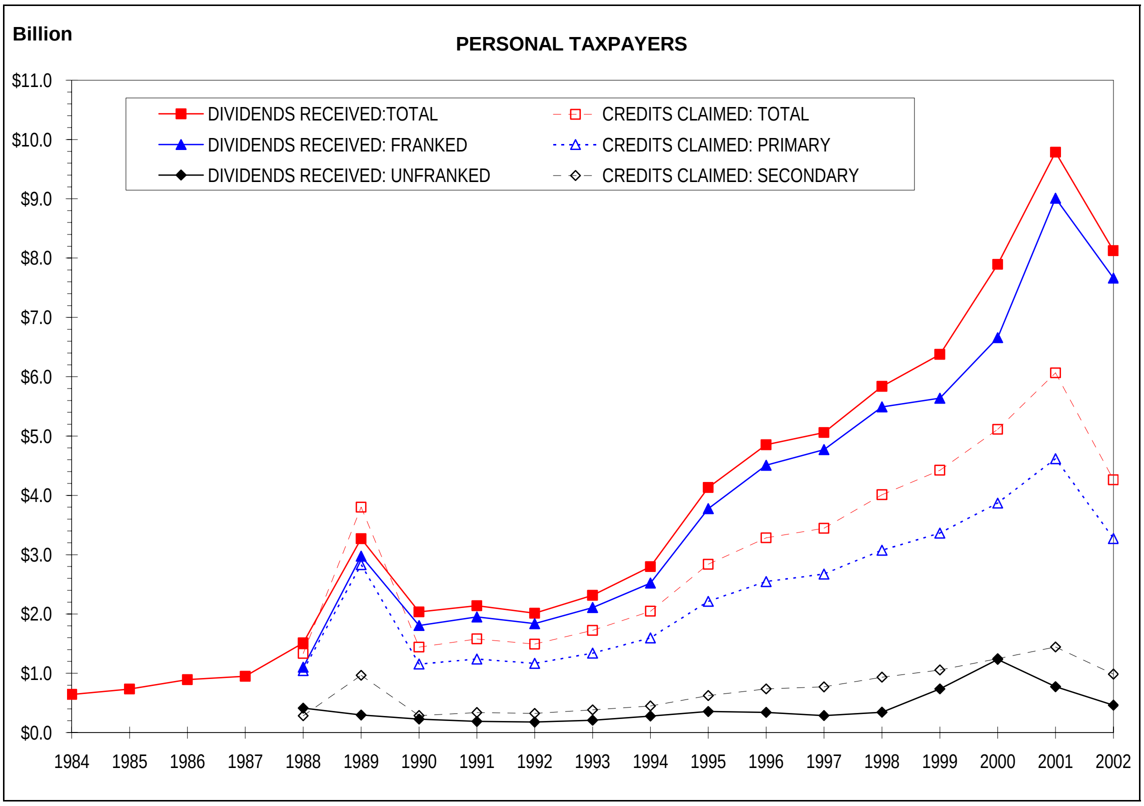
We next estimate the credits redeemed (claimed) by the ultimate consumers of the tax credits. The imputation credits are redeemed by (1) individuals (taxable and non-taxable), (2) by superannuation funds and by (3) some companies. There are special tax rules for companies such as Life Offices that have superannuation business that are "...designed, in part, to put the treatment of the superannuation businesses of life assurance companies on the same footing as superannuation funds"[3] . We include both taxable and non-taxable individuals and companies because the ATO definition of a non-taxpayer is a person or company that pays no net tax. Many of these non-taxpayers attain this status by using franking credits (and other credits and rebates) to eliminate their tax bill. Thus, many "non-taxpayers" redeem credits so they must be included in the analysis. Recent changes have allowed some non-taxpayers such as charities to redeem their unused credits for cash.

Figure 3: Access Factor



[3] "Australian Taxation Statistics 1999-2000, page 197.

Figure 4: Credits redeemed by personal taxpayers

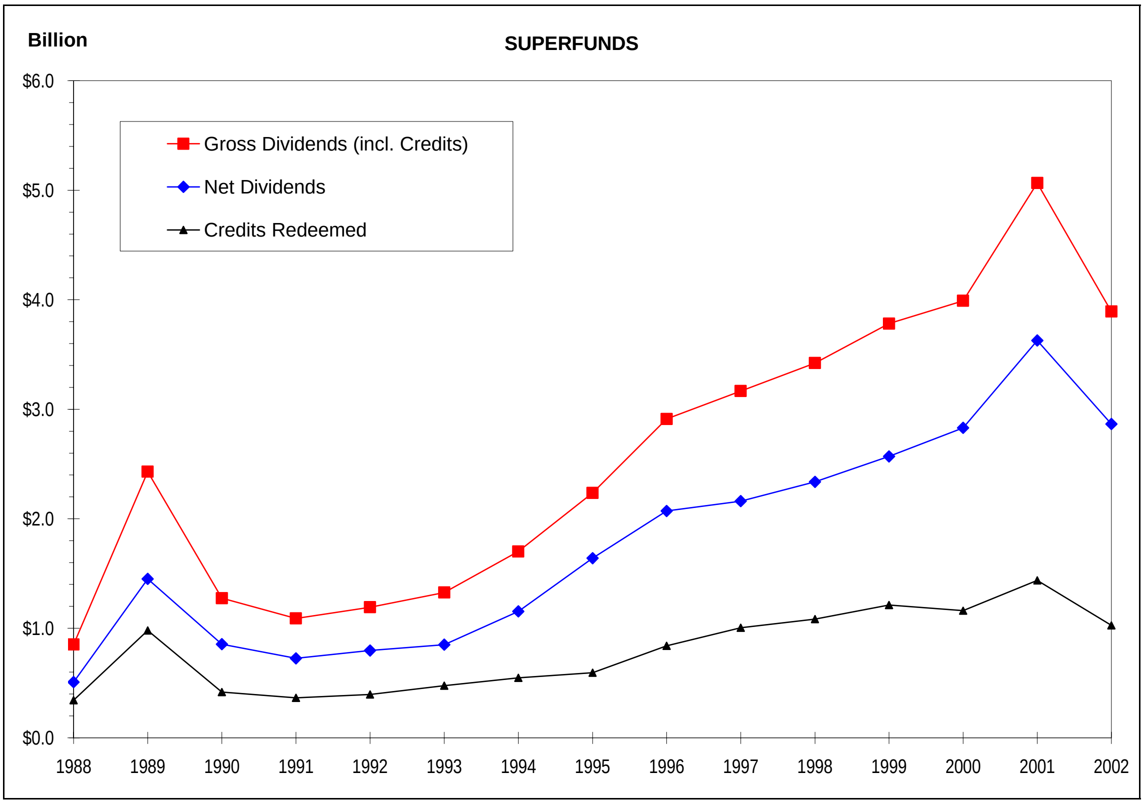


The primary credits redeemed by individuals can be checked against the current dividend and the current tax rate, e.g. the 1996 franked dividend amount of $4,289 million has a theoretical associated credit of $2,413 million = $4,289x(0.36/0.64) million. This is very close to the reported amount of $2,422 million. All the data are very close to the theoretical amounts, except for 1995; see the comment above by the ATO attributing this to effective tax planning.

Whereas the actual credit claims of superannuation funds are reported, their dividend receipts are not reported as franked or unfranked (in contrast to individuals where dividends are so disaggregated). Instead, the grossed-up dividend (credit plus cash) is reported as well as net dividends and aggregate rebates and credit claims. We cannot perform a check on the data as per the calculation above for personal taxpayers.

The ATO report that in 2002 super funds redeemed $1.03 billion worth of franking credits. This is much less than the size of the super industry in Australia would suggest. We attribute the "missing" credits to claims by "virtual" super funds run by Life Offices, who have a large share of the Australian superannuation industry.

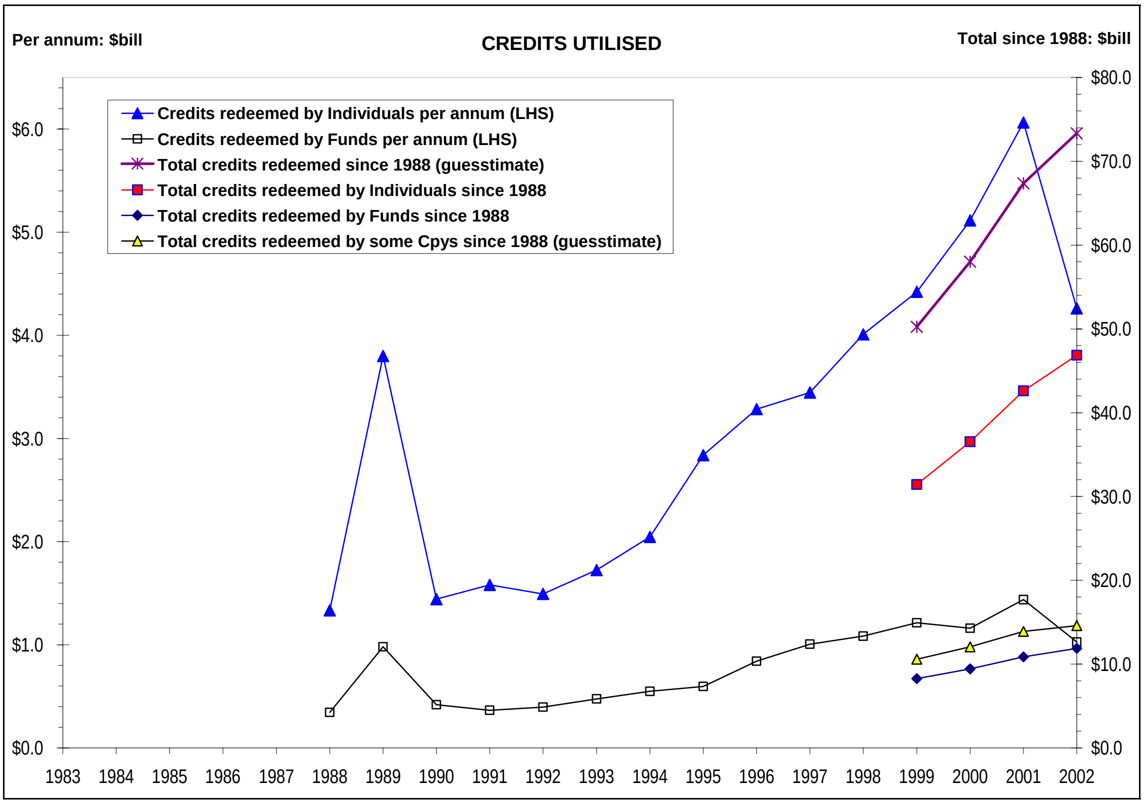
Figure 5: Credits Redeemed By Superannuation Funds



For example, in 2002 the super industry had an aggregate size of about $525 billion of which about $200 billion was in Australian equities (they held about 36% of the ASX market). With a then dividend yield of 3.5% and a tax rate of 30% we would expect to observe a credit distribution of $2.34 billion to super funds (using the then 78% proportion of dividends being franked). Hence we are "missing" about $1.31 billion (or 56%) of credits claimed via super funds. We attribute this to the claims by Life Offices which are reported at Label C of the Calculation Statement. We "guesstimate" the historical claims by Life Offices by applying this ratio to reported claims by super funds. (We recognise that this is a very unreliable estimate of the redemption amounts but then we only use this factor as a background average of our more carefully estimated drop-off value).

Our overall results are summarised in Figure 6. This shows both per annum and aggregate estimates of credits redeemed. From this we can estimate the overall proportion of credits redeemed. We observe that in the range of 38%-44% of the credits have been redeemed by all parties - recognising that this estimate is based on some data that we cannot observe and must infer.

Figure 6: Credit Redemption Estimates

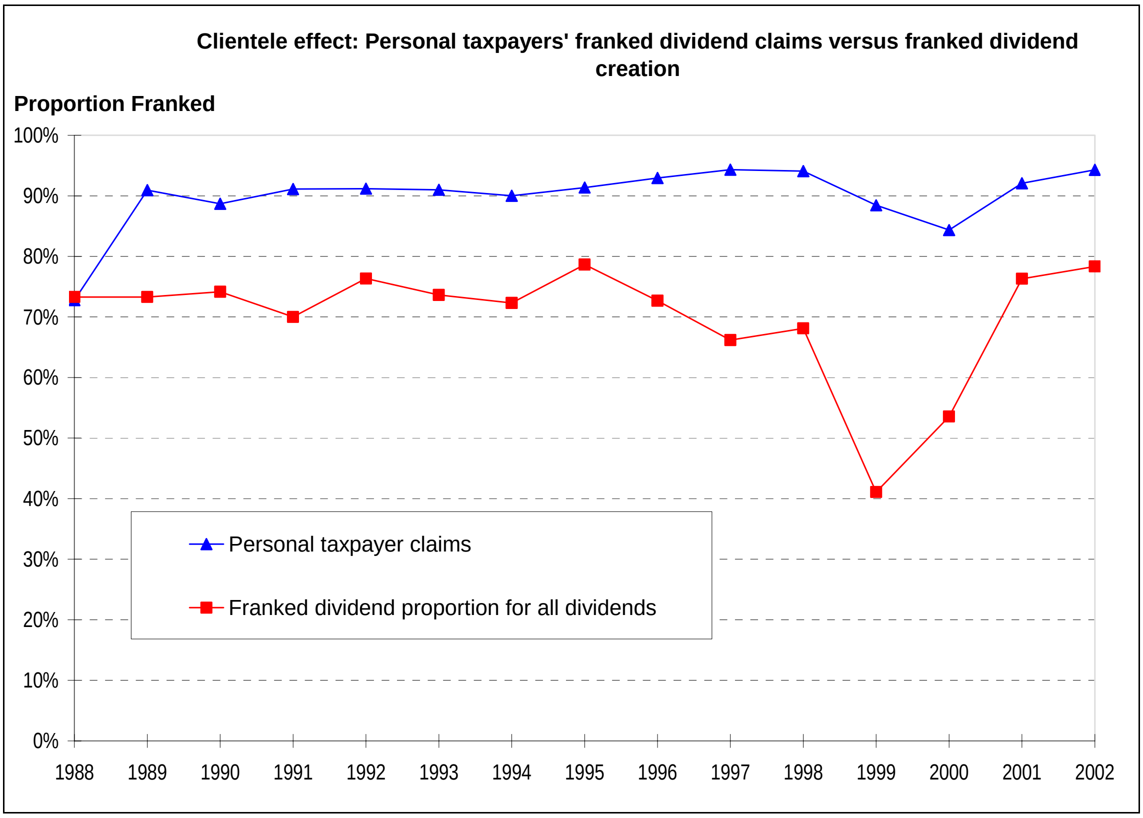


We have now established estimates for the two important factors for imputation tax credit valuation. These are an access to credits (now standing at 71%) and a redemption factor of about 40% for distributed credits. The access factor is estimated with some confidence whereas the utilisation factor is poorly estimated. The lack of ATO data for Life Office utilisation of credits makes it impossible to reliably estimate the utilisation factor.

2.4 Clientele Effects

In the above analysis, it is observed that franked dividends are pervasive but in recent years there have been some major shifts in the proportion of franked dividends. This does not mean however that all investors hold equal weightings of shares paying franked versus unfranked dividends. There is the opportunity for clientele effects which we observe in the data. Figure 7 plots a strong clientele effect among individual investors. We observe that individual investors show an overwhelming appetite for stocks with franked dividends. They hold approximately 90% of their stocks as ones with franked dividends whereas the supply of franked dividends remained about 70%-80% but substantially declined to about 41% in 1999/2000. At that time, individual shareholders were still receiving no less than 84% of their dividends as franked. We must bear in mind that individuals only hold, as direct investments, about 25% of the Australian market so this skewness in their holdings is possible.

Figure 7: CLIENTELE EFFECT



We also observe that companies have catered to this appetite for credits by smoothing the supply of credits to shareholders. The proportion of credits distributed to personal taxpaying shareholders as franked dividends is much smoother than the proportion created as franked dividends.

3. VALUING IMPUTATION CREDITS BY DIVIDEND DROP-OFFS (Listed Companies)

We now turn to the measurement of the value of imputation tax credits by examining dividend drop-offs which are the change in value of a share price when stocks go ex-dividend. Only the overall results and a brief outline of the method will be presented here.

If a stock pays a dividend of $0.70 that is fully franked at the rate of 30% (i.e. a franking credit of $0.30) then one might think that the stock price will fall by $1.00, thus full impact of the cash and the credit. To establish the amount of the franking credit, the dividend is first grossed-up to a pre-tax amount (divided by 0.70) and then the tax component of this gross amount is calculated (multiplied by the tax rate, 0.30). This establishes the amount of a fully franked dividend. If the dividend is not fully franked then the tax credit component is scaled down by the franking percent factor.

$$\Delta P = Div + FC + error$$

A more general statement of this is as follows;

$$\Delta P = Div + Div.[t/(1-t)]f + error \qquad \ldots(1)$$

where ΔP = share price change over the dividend event, FC = franking credit amount, Div = cash dividend amount, t = company tax rate, and f = franking proportion of the imputation tax credit (f =1 for a fully franked dividend). If we eliminate the scale effect of the cash dividend, then equation (1) becomes simply

$$\Delta P/ Div = 1 + [t/(1-t)]f + error \qquad \ldots(2)$$

We estimate (2) by running the regression equation

$$\Delta P/ Div = a + b.f + error \qquad \ldots(3)$$

The interpretation of ***a*** is the drop-off proportion due to the cash component of the dividend and the interpretation of ***b*** is the *extra* drop-off proportion due to the franking component. We are particularly interested in this imputation factor.

The data set analysed consisted of all dividend events for stocks listed within the ASX/S&P 500 index between August 1986 and August 2004. The data includes among many other items, security names, ASX and GICS codes and capitalisation weight within the index at August 2004, dividend amounts, ex-dates, franking and type of dividend, closing share prices cum and ex-dividend, any restructuring of capital structure of shares issued across the cum and ex-dates, and the market return across the cum and ex-dates. This data set contained 6870 dividend events and associated stock drop-offs. There were enough data points to enable sub groups to be analysed. Only the broad results will be presented here.

A drop-off calculated from non-consecutive closing price data is at risk of being influenced by extraneous information. We introduced a control for this but it only increases the explanatory power of the model for an otherwise missing variable but without altering our estimate of the value of the credits. We found no significant differences in the results with or without the control for market moves. We divided the data into low yield and high yield dividend events (an explanation is given below) and we divided the data by market capitalisation along the typical segments of Top 50 ("Big Cap"), Mid 50 ("Mid Cap") and the Ex-Top 100 ("Small Cap"). The data numbers are presented in Table 2. There were 101 events where a special dividend was paid along with a standard dividend. In these cases, the two dividends were aggregated and a weighted franking credit calculated. Presumably, the market move by the stock on the ex-date was a response to the stock going ex the combined dividend entitlement. In any event, we found our results were quite robust to the inclusion or exclusion of these combined dividends.

Table 2: Sample Sizes

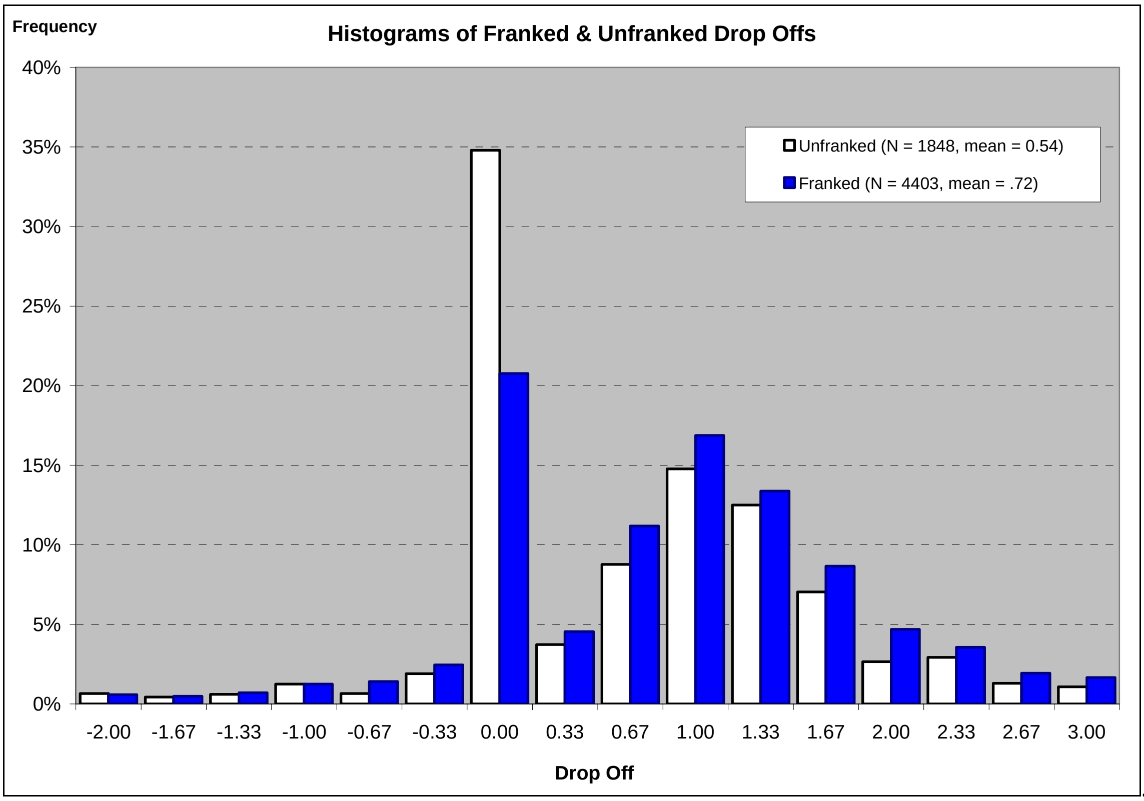
	Small Cap			Mid Cap			Big Cap			*Total*
	High Yield	Low Yield		High Yield	Low Yield		High Yield	Low Yield		
Fully Franked	1976	1119	3095	305	297	602	385	321	706	4403
Partly Franked	149	56	205	72	36	108	159	147	306	619
Unfranked	670	282	952	365	164	529	155	212	367	1848
Total	2795	1457	4252	742	497	1239	699	680	1379	6870

Number of security codes = 392
Big cap = Top 50 by market capitalisation
Mid cap = Mid 50 by market capitalisation
Small cap = others; Ex-100 by market capitalisation

Data covers ex-dividend days from 21-Aug-86 to 31-August-04
High yield events = dividend yield (wrt ex-date share price) greater than 2.00%

These drop-off data were plotted as histograms and then subjected to statistical analysis. Only the histogram for the entire set of 6870 drop-offs is presented in Figure 8. This histogram demonstrates a clear move to the right for 100% franked stocks compared to unfranked stocks, that is, fully franked stocks drop-off more than the unfranked stocks.

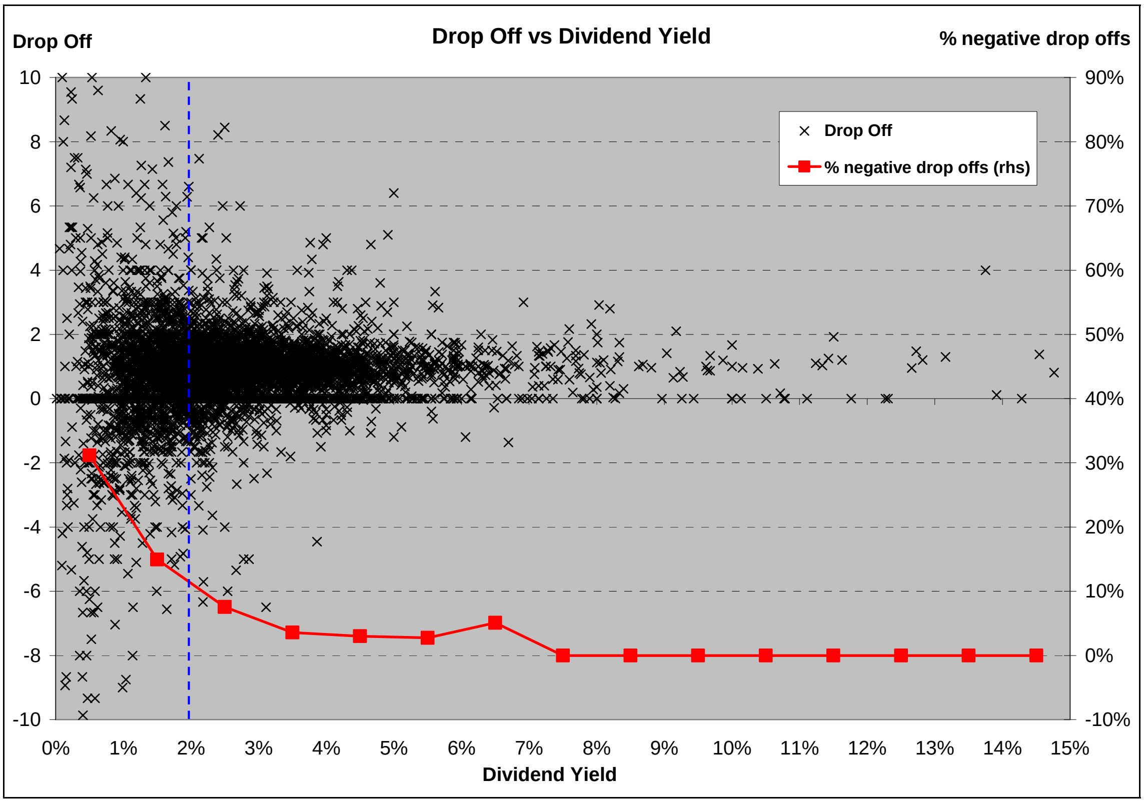
Figure 8: Drop-Off over Ex-dividend dates



We observe an excessive number of zero drop-offs but we do see that fully franked stocks on average drop further than unfranked stocks. In order to investigate this we examined the drop-off and dividend yields. Figure 9 demonstrates the interaction between drop-off dispersion and dividend yield.

This plot indicates that the error term in equation 3 will not behave as classic regression theory assumes. We approach this in two ways. One simple way is to only use data with dividend yields above 2%. This eliminates most of the noise in the data and many of the zero drop-offs are eliminated. The typical daily volatility of the Australian stock market is 0.9% per day so outside two standard deviations represents significant events. For small dividend yield events, the movement in the stock price due to going ex-dividend is swamped by the daily noise caused by market volatility. For example, movements in the price of NewsCorp (ASX code NCP) on ex-dividend days will mainly reflect news and other events pertinent to NCP and not the price of its dividend as the dividend yield of NCP is so low - typically around 0.1%. People do not buy NCP for dividends. Two standard deviations is a price move of 1.8%. We rounded this up to 2% as a filter.

Figure 9: Drop-off and Dividend Yield



A second approach was to model the fact that the error term was inversely proportional to the dividend yield and to recast the regression to allow for this heteroskedasticity. After multiplying equation (1) by the dividend yield, the revised model then becomes

$$\Delta P/P \quad = \quad a.\ Div/P \ + \ b.\ Div/P.\ f \ + \ err \qquad \text{....(4)}$$

and if we allow for market moves to be included in the error term (just in case it biases the estimates and is not noise as we suppose) then a further revised equation becomes

$$\Delta P/P \quad = \quad a.Div/P \ + \ b.Div/P.f \ + \ c.\ Mkt\ Rtn + \ err \qquad \text{....(5)}$$

The interpretation of equation (5) is simple: the return on a stock across the ex-date will be the combination of the cash yield, the franking yield and the market move (ie assuming a common beta for every stock and recognising that the stock moves will typically be negative so the "c" parameter should estimate as a negative value. The interpretation of "a" is the value per $1 of cash and the "b" term is the estimate of the value per $1 of the credits. Note that there is no allowance in this equation for any changing of the tax rate. Whilst the change in the tax rate will alter the *quantum* of the credit per fully franked dividend, it is not obvious that this will change the value per dollar of credit. We return to this point below.

The results for estimating equations (3), (4) and (5) are presented in Table 3. We also include the estimate of the associated value of the credit assuming a 36% tax rate (the rate prevailing through much of the data period).

Table 3: DROP-OFF RESULTS

Tax Rate	36%
Theoretical Credit	0.563

Standard Equation

All Data	Cash	Credit	Credit @ 36%
The Lot	0.56	0.15	0.27
Big Cap	0.50	0.50	0.89
Mid Cap	0.75	0.21	0.38
Small Cap	0.47	0.12	0.22

Revised Equation excl. Mkt Moves

All Data	Cash	Credit	Credit @ 36%
The Lot	0.83	-0.02	-0.04
Big Cap	0.80	0.29	0.52
Mid Cap	0.78	0.33	0.58
Small Cap	0.84	-0.06	-0.11

Standard Equation: High Yield Data Only

High yield data	Cash	Credit	Credit @ 36%
The Lot	0.68	0.12	0.22
Big Cap	0.81	0.29	0.52
Mid Cap	0.77	0.24	0.42
Small Cap	0.59	0.12	0.22

Revised Equation incl. Mkt Moves

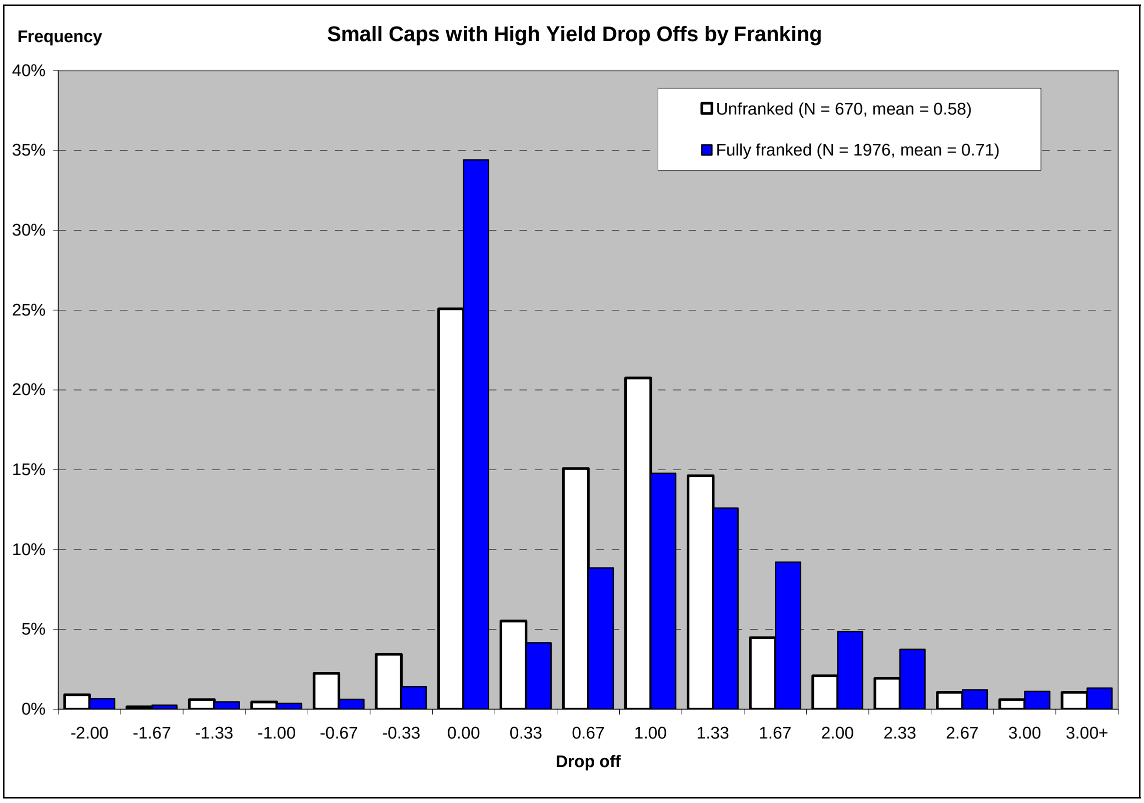
All Data	Cash	Credit	Credit @ 36%	Mkt
The Lot	0.83	-0.02	-0.04	-0.49
Big Cap	0.80	0.27	0.49	-0.84
Mid Cap	0.77	0.35	0.61	-0.46
Small Cap	0.84	-0.06	-0.10	-0.40

Interpretation

The theoretical value for the drop-off fraction due to the credit component of a fully franked dividend is $t_C/(1-t_C)$. As most of the data covers the 36% tax regime, we take this ratio to be 0.36/0.64 = 0.563. Then, for example, a drop-off fraction for the credit of 0.29 (big cap, high yield stock) means that those credits are being priced at 52% of their face value i.e. they are being priced at 52 cents per $1 of credit. Table 3 describes the full set of these results. We see that $1 of cash is typically valued between $0.80 - $0.81 for big cap stocks.

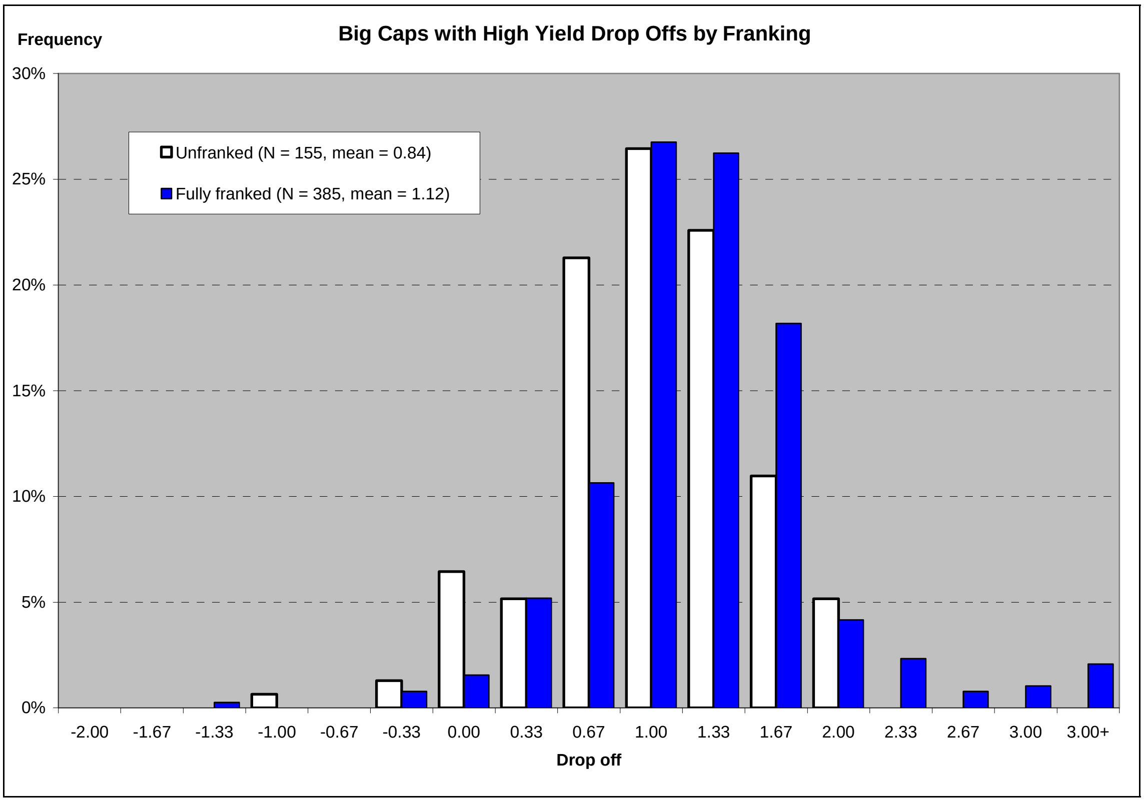
We have no faith in the Standard Equation model for all data (the greyed out panel) because, as described above, there are a lot of zero drop-offs and too much confounding noise (unexplained data) for this data set. It is hard to believe, as these results would imply, that cash would be valued at only 50 cents in the dollar but a credit, which is not as readily realisable as a cash dividend, would be valued higher at 89 cents in the dollar. In addition, the results for small and mid cap stocks are erratic but this is not surprising. There is no obvious reason why the cash dividend for Big Cap, Mid Cap and Small Cap stocks should vary. That the results do is testament to the difficulty of estimation among these smaller stock events. Implicit in our experimental design is that stocks trade over the ex-date period but many stocks, particularly small cap stocks, are rather illiquid. We see this in the following two plots, Figures 10 and 11, which contrasts small cap and big cap drop-off distributions with high yield data.

Figure 10: Small Cap Drop-offs with High Yield Data



Whereas for the big cap distribution the relative high number of zero drop-offs has disappeared (and nearly all drop-offs are down, ie positive) the small cap distribution still shows a large proportion of zero drops. This non-trading effect biases low the value of cash and credits for small cap stocks. We would expect credits of small cap stocks to be valued at no less or even higher than those of big cap stocks, reflecting the relative higher domestic ownership of small cap versus large cap stocks. We use the large cap stocks to estimate the value of the credits. We do so because the data are more reliable.

Figure 11: Big Cap Drop-off with High Yield Data

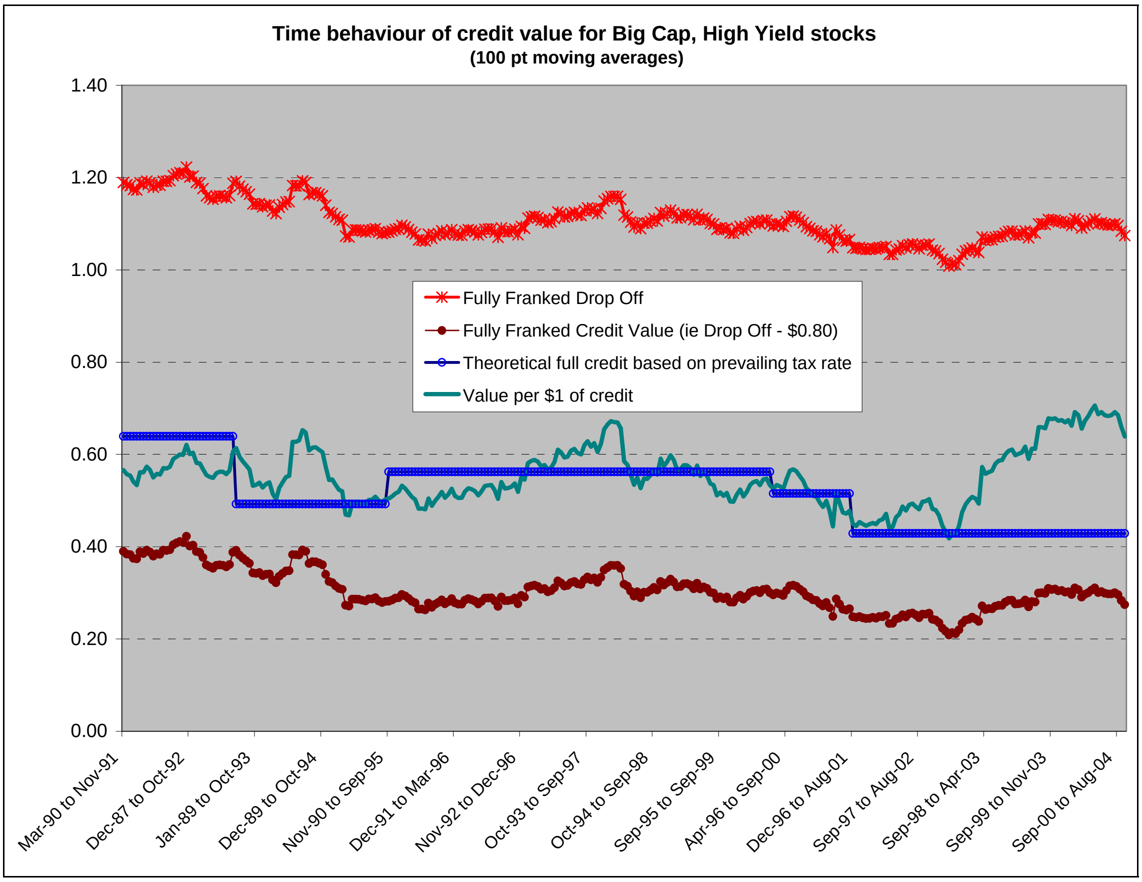


Time and Tax Changes

There have been some significant changes in tax rates over the 19 years under examination so there is the prospect that our estimates have undergone significant changes. Obviously, the change in the tax rate will alter the quantum of credit per fully franked dividend. We could find no indication that the value of cash had changed throughout this period so we used \$0.80[4] as our estimate of the cash value throughout. However, declining tax rates meant that there was on average less credit per \$1 of dividend in the later period than in the early period. This meant that the fully franked dividends dropped less towards the recent past (2001/02) compared to the earlier years (1987/88). To investigate whether the value of \$1 of credit had changed over time, we examined fully franked big cap stocks and subtracted 0.80 from each drop-off in order to examine the credit-only value through time. The theoretical value of this credit-only value is $t_C/(1-t_C)$ where t_C is the tax rate prevailing on the ex-date and this value has undergone significant changes. We calculate the ratio of the credit-only drop-off to the theoretical credit drop-off, namely (Drop-off - \$0.80)/$[t_C/(1-t_C)]$, which is our estimate of the value per \$1 of credit and examine this data over time. Figure 12 contains the results.

[4] Deducting a constant amount from the fully franked dividend drop-off to allow for the value of cash, whether we use \$0.80 or \$0.84 makes no difference to the *pattern* of the time variation of the residual, the value of the drop-off due to the credit.

Figure 12: Time behaviour of credit value



Whilst there has been a decline in drop-offs for fully franked stocks over time, so has there been a general decline in the prevailing tax rate so the theoretical amount of the credit (the face value) per fully franked dividend has also declined. The ratio of the actual credit drop to the theoretical drop varied around 50% of the face value but in recent years has shown an increase to above 60% of face value. The overall average ratio is about 51% of face value. These changes have been too recent to enable any detailed analysis and the ATO data only cover the period up to 2002 so while the results are intriguing we have no means of exploring them in any depth. They might just be an artefact of the inherent noise in the estimation process.

All Big Stocks have their credits priced at about 50 cents per $1 of credit. The tax redemption value across all companies gives a value of about 40 cents per $1 of credit. Theoretically this redemption value should *exceed* the market-derived values because the market value must be a time discounted value of the redemption value. In addition, the redemption value is necessarily a capitalisation weighted average over all companies (tax data only show the aggregate amounts collected), both listed (big and small) and private companies. Presumably the private company derived credits are more highly valued than credits from listed companies because the latter have non-Australian taxpayers as shareholders whereas the private companies would be dominated by Australian taxpaying shareholders. Alas, the redemption data estimates are too unreliable to facilitate any such comparisons between market values and tax redemption values.

In summary, we find broadly consistent values for imputation credits from two quite different analyses: one based on taxation statistics and one based on market values from dividend drop-offs. Both strongly indicate that credits are indeed valued in the market place but nowhere near their theoretical full face value.

4. Observations

Clearly our analyses demonstrate that imputation credits have a significant value. However, a word of caution is in order. Both measures of credit value are taken *after* the company has announced the payment of the dividend and the credits. This means there is no uncertainty about the timing and the amount of the credit within the measures we obtain for the value of credits. Credits cannot be redeemed until distributed with accompanying dividends and stocks cannot be traded cum-dividend until dividends are declared. Hence both methods of valuing the credits give conditional valuations: the value of the credits conditioned on the company deciding to pay a franked dividend. Neither method accurately values the credits which remain locked inside the company. Typically there is uncertainty about when such credits will be paid out and the amount of the credits to be issued. At June 2002 there was approximately $77 billion of credits still held within companies. To allow for this uncertainty in distribution, we would have to apply a discount rate to allow for the uncertainty in accessing the credits. The exact discount rate remains obscure. One could argue that this is the same issue faced with any shareholder in which the future payout rate is uncertain. However, if a cash dividend is not paid and instead the retained capital earns its keep, then shareholders will achieve capital gains in place of cash dividends. But franking credits are different. Until paid out as franked dividends, imputation credits are company tax that has been paid to the government and while being held there it surely does not earn its opportunity cost for shareholders. It is a wasting asset from the point of view of a shareholder so the risk in not receiving franking credits is different to the risk of not receiving a cash dividend. We cannot determine an appropriate risk premium for this event.

From the experience of applying the above measures in many discounted cash flow valuation exercises, we much prefer keeping imputation effects quarantined in the cash flow values instead of adjusting the discount rate to allow for imputation credits. Certainly any combination of discount rate and cash flow can be derived to give consistent valuation results. However, allowing for franking credits in the discount rate poses practical issues that can be very difficult to solve. Valuations are usually done after company tax but before personal tax. As shareholders pay personal tax on the aggregate of dividends and imputation credits, an allowance for the value of imputation credits has to be added back to the cash flow received by shareholders. It is easier to add back into the cash flows than adjust the discount rate.

Imagine a project with a cash flow stream that has a large lumpy capital expenditure that causes temporary large deductions before tax, maybe even sufficient to eliminate all tax payments for a number of years (e.g.

Pay TV and its cabling expenditure). This reduces or eliminates company tax payments and hence reduces or eliminates the creation of credits. Adding back a proportion (e.g. 50%) of any company tax payments each year as a stream of credits automatically accommodates these lumpy events. Trying to apply franking credits by modifying the cost of capital requires forming some geometric average of the annual franking credit value which is very difficult, if not impossible, without first knowing the project value. There is an academic "cottage industry" in deriving new models of the costs of capital that incorporates the value of franking credits. It leads to some complicated models which we think are entirely unnecessary and indeed unduly complicate the issues.

We would be the first to admit that the value of imputation credits is not measured with any precision, but neither are many attributes of investment decisions which, by definition, must depend on future outcomes. Notwithstanding this lack of precision, ignoring them is tantamount to assuming a zero value for credits and this certainly is a gross error.

Neville Hathaway
Bob Officer
November 2004