Tax Heterogeneity and Stock Supply Elasticity: Evidence from Australian Off-Market Repurchases*

Christine Brown[1]
Department of Finance, The University of Melbourne

and

Kevin Davis[1]
Department of Finance, The University of Melbourne
and
The Melbourne Centre for Financial Studies

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[1] Contact details: Department of Finance, The University of Melbourne, Parkville, Victoria 3010, AUSTRALIA. christine.brown@unimelb.edu.au, Phone 613 83445308, kevin.davis@unimelb.edu.au, Phone 613 83445908. Fax: 613 83446914.

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ABSTRACT

Off-market (self-tender offer) share repurchases by Australian companies provide a valuable example of corporate capital management where the effects of shareholder tax heterogeneity can be readily identified. We develop a model of the Dutch auction tender process commonly used for such repurchases which enables us to test whether the supply of stock tendered is consistent with complete tax arbitrage. We estimate an upward sloping supply curve of stock tendered, confirming results of less than perfect elasticity found in studies in other environments, and find less than complete tax arbitrage. The model is used to examine the effect of price constraints on auction price outcomes and distribution of tax benefits between shareholders in different tax positions and to assess the mispricing resulting from fixed price tenders. The results provide support for recent legislative changes which removed constraints on the allowable range of repurchase prices.

KEYWORDS: Repurchases, Taxation, Shareholder Heterogeneity

JEL Classification: G32, G35, H20

1. *Introduction*

The literature on share repurchases is extensive and examines, *inter alia*, motivation (signaling, capital management etc.), market reactions, and method (on- versus off-market[1] etc.). See Allen and Michaely (2003) for a recent survey. The focus of this paper is upon two specific issues identified in that literature. One is the argument that corporate managers make payout decisions which favor institutional investors. A second is the merits of fixed price versus Dutch auction tender mechanisms in implementing off-market share repurchases. We utilize Australian data which, because of its particular tax characteristics, provides a favorable institutional environment in which to examine these issues.

Off-market share repurchases[2], structured to achieve certain tax advantages, have been popular in Australia in recent years, but have attracted criticism from commentators in the financial press. Underpinning the criticism has been the complaint that such repurchases favor one group of shareholders to the detriment of others. The possibility of inequitable treatment of shareholders arises because of the specific tax treatment applied to Australian repurchases which also leads to the unusual outcome of repurchases occurring at a substantial discount to the prevailing market price.

While the discount pricing of repurchases reflects idiosyncratic tax factors, the Australian tax and institutional environment provides a valuable opportunity to examine whether characteristics of the supply curve of stock found in other studies of repurchases are robust to marked changes in institutional conditions. In particular tax heterogeneity of investors is well defined in the Australian case enabling us to identify key determinants of the stock supply curve, to test whether complete tax arbitrage occurs, and examine how pricing constraints affect the distribution of benefits from repurchases between participants and non-participants.

[1]The terms 'repurchase' and 'buyback' are used interchangeably in Australia. Off-market repurchases are called self-tender offers in the U.S. and on-market repurchases, where the company repurchases shares on the stock market through a broker, are called open-market repurchases in the U.S.

As Bagwell and Shoven (1989, p130) note, "[b]oth the sellers and the nonsellers can gain from a corporate program of share repurchase" due to self selection based on their tax characteristics, implying that the pricing mechanism for the repurchases is important in distributing such gains. Rau and Vermaelen (2002), Short, Zhang and Keasey (2002) (using UK data from a partial imputation tax system) and Lie and Lie (1999) (using US data from a classical tax system) find that the tax position of important shareholders, such as pension funds and other institutional shareholders, is a key factor in corporate payout policy. Thus the importance of institutional investors in firm capital management decisions appears to be independent of the specific tax environment. While we do not examine the choice between payout methods (see Brown and Norman, 2009) our analysis of the characteristics and pricing of repurchases provides evidence from a different tax environment consistent with corporate payout policy favoring institutional investors.

The full imputation tax system operating in Australia combines with somewhat unique tax rules governing the treatment of off-market repurchases to provide an ideal environment to investigate the importance of investor-level taxes in the structure of repurchases. Thus the first general contribution of the paper is an examination of how taxes affect capital management in a non-classical tax system, and in providing a different lens to previous studies through which to examine the consequences of shareholder tax heterogeneity.

Our analysis shows that Australian off-market repurchases are generally structured to provide most benefits to low tax rate participating investors (such as institutional pension (superannuation) funds) who have short term capital gains from trading activities elsewhere in their portfolios. Our empirical findings also suggest that alternative structures and pricing could provide greater benefits for non-participants, although Australian Tax Office restrictions have played an important role in this regard.

A second contribution of the paper lies in developing and estimating a model of the supply curve for stock tendered, by modeling the net benefits of participation to shareholders in different tax situations. We are also able to exploit information extracted from repurchase offer and completion documents to measure excess demand or supply due to auction price bounds. We use this information to estimate an upward sloping

supply curve for stock tendered in Dutch auctions using censored regression techniques. We are able to test whether tax arbitrage can fully explain the shape of the supply curve or whether other risk-related factors associated with tendering are also relevant.

These results enable us to assess the extent of mispricing in fixed price tenders, and also the costs to non-participating shareholders from the minimum price bounds imposed by companies (in response to Australian Tax Office rulings) on Dutch auction outcomes. Our results provide support for recent (May 2009) changes to the tax legislation affecting the treatment of off-market repurchases, which *inter alia* removed the lower bound on the price at which companies can repurchase shares.

The Australian experience is also of interest because it relates to significant capital management decisions. As we demonstrate later, many of the largest listed companies are involved (often more than once) and the average percentage of shares outstanding bought back is in the order of 5 per cent. While the number of off-market repurchases over our study period is relatively small (82), the total dollar amount involved in many years in the sample period is comparable to the very much larger number of on-market repurchases.[3] There has also been a change in the dominant method of conducting off-market repurchases, away from fixed-price tenders to (constrained) Dutch auction tenders. The data available provides an opportunity to examine the consequences of this change and compare the merits of the two methods.

The remainder of the paper is structured in the following way. Section 2 reviews the literature relevant to the development of later sections of the paper while Section 3 outlines the tax treatment of off-market repurchases in Australia. Section 4 describes how off-market repurchases have evolved in Australia and presents salient details of the characteristics of our data. Modeling of the tender process and derivation of the supply curve of stock tendered is undertaken in Section 5. Section 6 contains estimation of the supply curve and application of the results to assess the effects of price limits on auction

[3] For example, for the complete population of on-market and off-market repurchases for the period 2003-2006, there are 147 companies undertaking 247 on-market repurchases buying an (unweighted) average of 2.4% of outstanding shares and spending $7.4 billion. In contrast over the same period there were 18 companies undertaking 22 off-market repurchases returning $13.7 billion to shareholders and buying back an (unweighted) average of 7.2% of outstanding shares.

outcomes and distributional effects. Section 7 summarizes our results and concludes with some suggestions for further research and policy implications.

2. *Literature Review*

Off-market (self-tender) repurchases are generally conducted at a fixed price or via a Dutch auction, where a range of prices at which shareholders can tender is specified. Bagwell (1992) finds considerable heterogeneity across the shareholder bid information provided by 32 companies conducting Dutch auction share repurchases. She provides direct evidence that US firms repurchasing shares via a Dutch auction face upward sloping supply curves, a finding corroborated by Brown and Ryngaert (1992) for fixed-price tender repurchases. Market imperfections such as capital gains tax and asymmetric information or differences of opinion about fundamental value have been used as explanations for the presence of an upward sloping supply curve. Comment and Jarrell (1991) argue that the less than complete tendering response in the U.S. to both fixed price and Dutch auction repurchases at a premium to the market price indicates that firms face upward sloping supply curves during the offer period.

Studies such as Dann (1981), Vermaelen (1981, 1984), Lakonishok and Vermaelen (1990), Comment and Jarrell (1991) and D'Mello and Schroff (2000) that find positive abnormal returns on announcement of self-tender offers in the U.S. are taken as evidence in support of managers undertaking a repurchase to signal to the market that their shares are undervalued (the 'undervaluation hypothesis'). Extensive empirical support for the undervaluation hypothesis does not of course preclude other explanations for the observed positive announcement returns. The market may react positively if the disbursement of cash via the repurchase lowers the agency costs of free cash flows (Jensen, 1986; Bagwell and Shoven, 1989; Jagannathan, Stephens and Weisbach, 2000; Dittmar, 2000; Grullon and Michaely, 2004).

Another possible reason for the observed positive announcement response in the U.S. is that repurchases are generally tax-advantaged as a payout mechanism when compared to dividends. Bagwell (1992) and Anderson and Dyl (2004) find that the magnitude of the market response in the U.S. to the announcement of a repurchase is positively related to the premium over market price at which the offer is made, consistent with the idea that the signal sent must be credible to market participants. In fact, share

repurchases in the U.S. almost always occur at a premium to the market price at the date of tender completion because participating shareholders must be compensated for the capital gains tax which becomes due once the shares are tendered (Anderson and Dyl, 2004).

The off-market share repurchase environment in Australia is different in three important aspects to that in which US self-tender offers are conducted. First, because of the dividend imputation tax system operating in Australia the tax disadvantages of dividends are not as pronounced as in the U.S. While high marginal tax rate individuals may prefer capital gains because the payment of a dividend with attached tax credits still leaves residual personal tax to be paid, *ceteris paribus* the imputation system reduces the preference for capital gains. Second, because the proceeds of many off-market repurchases are not taxed purely as capital gains but as a mixture of dividend income and capital repayment, tax-based arguments for the choice between dividends and repurchases as preferred distribution mechanisms are not as straightforward. Third, the unique structure for off-market repurchases often means that the repurchase is completed at a discount to market price. The transfer of valuable tax benefits results in shareholders' willingness to tender at prices below the current market price, implying that off-market repurchases in Australia are less likely to send or be used as a credible signal of firm undervaluation. Survey evidence suggests that off-market repurchases are primarily undertaken by companies as an alternative to dividends (Mitchell and Robinson, 1999).

Consistent with this last argument, much lower abnormal returns on announcement are observed in Australia as compared with the U.S., with the magnitude of the response positively related to the size of the *discount* to market price at which the repurchase is completed (Brown, 2007).[4] One interpretation for the observed positive market response that is consistent with its magnitude being positively related to the offer discount, is that the disbursement of cash via an off-market share repurchase is tax-advantaged for some shareholders and induces announcement date purchases by such investors in order to participate.

[4] The abnormal returns of 2.2% for off-market repurchases in Australia are much lower than the 7.7% reported by Bagwell (1992) for self-tender offers in the U.S.

The offer discount in many Australian off-market repurchases represents a gain to non-tendering shareholders in return for the tax benefits directed to tendering shareholders. Shareholders on the lowest marginal tax rates who are active traders generating non-concessionally taxed capital gains[5] (generally charitable institutions and pension funds) will have the lowest reservation prices because (as explained in Section 5) they have larger tax benefits. Hence heterogeneity in shareholder marginal tax rates is likely to lead to upward sloping supply curves for 'discount' off-market repurchases, similar to the result for 'premium' off-market repurchases in the U.S. (Comment and Jarrell, 1991; Bagwell, 1992; Brown and Ryngaert, 1992). Whereas in the U.S. Brown and Ryngaert (1992) and Anderson and Dyl (2004) find that the premium over market price in fixed price tenders is increasing in shareholders' capital gains tax liabilities, we show (in Section 5) that in Australia a larger dividend component (with its consequent tax benefits) is likely to increase the discount to market price in Dutch auction repurchases. Participating institutional investors enjoy the greatest tax benefits suggesting that the structure of off-market repurchases in Australia will be sensitive to institutional shareholdings,[7] consistent with the empirical findings of Rau and Vermaelen (2002) and Short, Zhang and Keasey (2002) for the U.K. and Lie and Lie (1999) for the U.S.

3. Repurchases in Australia: Tax and Legal Considerations

Share repurchases were not allowed in Australia until enabling legislation was introduced in 1989. They can be undertaken on- or off-market and the focus of our study is the situation where the company invites all shareholders to tender shares into the repurchase (termed an 'equal access off-market' repurchase). In general companies are able to repurchase up to 10 percent of their ordinary shares in any 12-month period (commonly referred to as the 10/12 limit). There are a myriad of corporation laws, stock exchange listing rules, tax rulings and exemptions granted by the Australian Securities and Investment Commission, which taken together give companies undertaking such repurchases the opportunity to structure the offer price (payment for the shares tendered)

[5] Concessional tax rates for capital gains tax apply in some circumstances. See Appendix 1.
[7] Unfortunately reliable data on institutional shareholdings are not available in Australia due to the widespread use of nominee companies.

in certain tax advantageous ways. Fundamental to this is that Australia operates a full dividend imputation system. A brief overview of the Australian tax system is given in Appendix 1.

The interaction of taxation law and company law has created a somewhat unique taxation treatment for off-market repurchases in Australia.[8] The company may be able to designate a (sometimes very small) portion of the repurchase price as being debited from the company's share capital account, which is treated as a return of capital or capital component C. Thus, denoting the current share price by P and the repurchase price by wP, the remainder of the repurchase price amount is then sourced from retained profits and is a deemed dividend ($D = wP - C$) for taxation purposes.[9]

A tax ruling on the dividend and capital component breakdown is required before a repurchase involving a dividend component is announced. In the case of Dutch auction tenders, the announcement specifies a dividend amount with the capital component being subsequently determined from the auction outcome as the difference $C = wP - D$. If the company has sufficient undistributed tax (franking) credits, the deemed dividend portion can be "fully franked", with Australian resident shareholders entitled to an income tax credit representing the Australian corporate tax paid by the company in respect of the profits from which the deemed dividend is derived.[10] The tax on the cash amount of the dividend (D) directly payable, or received as a refund from the Australian Tax Office (ATO), by a resident taxpayer with a marginal tax rate of t is $D(t\text{-}t_c)/(1\text{-}t_c)$ where t_c is the company tax rate. The capital component C can be quite low, and may result in participating shareholders who sell shares into the repurchase benefitting from a capital loss for tax purposes (depending on their cost base). Investors who have short term realized capital gains on other assets, which would be taxed at their full marginal tax rate, benefit most from the tax offset. Investors whose only realized capital gains on other

[8] The tax treatment is similar to that in the U.K. for a subperiod of the Rau and Vermaelen (2002) study.

[9] The Australian Government Board of Taxation (2007) states that the rationale for allowing part of the repurchase price to consist of a dividend was to ensure consistency with the rules on returns of capital, cancellations and liquidation. The logic behind the approach appears to be based on considering the repurchase as a 'partial winding up' of the company in which total contributed capital and retained earnings (each with different tax consequences upon distribution to shareholders) are each to be shared pro-rata between liquidating and remaining shareholders.

[10] Companies unable to pay a franked dividend are unlikely to elect to have part of the repurchase price treated as an unfranked dividend on which tax is paid at the shareholder's marginal tax rate, because of investor tax preferences for capital gains rather than unfranked dividends.

assets are from holding periods in excess of one year, and who thus face a capital gains tax rate in the current year lower than their marginal tax rate, receive less benefit. Appendix 2 provides a numerical illustration of the differential after-tax gains from participating for different classes of shareholders, and an algebraic proof is contained in Section 5.

One important consequence of this tax treatment is that the price resulting from the tender has, in most cases where a franked dividend component is involved, led to a repurchase price less than the prevailing market price. That is, $wP<P$, where P is the market share price at the close of the tender, so that $0<w<1$. This is in sharp contrast to the case of self-tender offers in the U.S. which as previously discussed are generally are conducted at a premium. In the case of fixed price offers, 14 of the 18 repurchases in our sample involving franked dividends specified a repurchase price less than or equal to the company's share price on the announcement date. In the case of Dutch auctions the indicative price range specified at the announcement of the repurchase has, since late 2004 when ATO rulings in individual cases induced a change in approach, seen companies specify an upper limit as some minimum discount (generally 8 or 5 per cent) to the volume weighted average price (VWAP) at the tender closing date.[11] Those ATO rulings prevented repurchases at a discount of more than 14 per cent of the VWAP, leading to specification of this maximum discount (ie a minimum price) being pervasive.[12]

The assignment of some part of the repurchase price as a franked dividend has made off-market repurchases in Australia contentious. Dividends are in principle to be paid pro-rata to all shareholders. However the deemed dividend component of the offer price in an off-market repurchase is distributed only to participating shareholders. This has given rise to criticism from commentators in the financial press that such repurchases create personal tax advantages for one group of shareholders (low tax rate institutional investors who participate) to the detriment of other non-participants. Whether that is so,

[11] Earlier Dutch auctions which specified price limits as dollar amounts often involved upper price limits in excess of the announcement date price.

[12] In late 2007 the Australian Tax Office (ATO) released a Practice Note (PLSA 2007/9) stating that the maximum discount allowed in an off-market repurchase is 14 percent calculated by reference to the VWAP on the 5 days leading up to and including the closing date of the repurchase. The ATO had in practice been applying this maximum discount in private rulings for some years prior to its official announcement.

depends on the extent of gains to non-participants from the company repurchasing shares at a price less than the current market price.[13] Our subsequent examination of whether price limits in the Dutch auction system (or use of a fixed price tender) prevent equilibrium outcomes helps cast light on this question.

4. *Usage and Characteristics of Off-Market Repurchases in Australia*

The regulatory environment as described in Section 3 gives access to a rich source of data from the announcements made by the companies to the stock exchange. We have collected data on all off-market equal access repurchases from the Signal G Announcements section of the Aspect Huntley Financial Database, and verified using announcements reported on the Australian Securities Exchange (ASX) web-site. Share prices are supplied by SIRCA[14] on behalf of the ASX. Information on scalebacks (when an excess of tenders at the repurchase price occurs), shortfalls (when the company is unable to purchase the desired number of shares), deemed capital amounts and franked dividends are taken from company announcements. The data have been manually checked for consistency. Our sample consists of 62 off-market equal access repurchases conducted between 1996 and December 2008 out of 82 such repurchase announcements identified by our search. Those cases omitted involved delisted companies (for which data was not available, or the repurchase was part of the delisting process), unavailability of data for some early cases, repurchases as part of a merger process, non-standard arrangements (such as associated issues or exchanges of securities) and those cancelled without completion. Appendix 3 provides a full list of the included companies in date order along with certain characteristics of the repurchases.

In the early years of the study period most companies offered to buy back shares at a fixed price but from around 2002 most large repurchases were conducted via a Dutch auction. Our sample contains 30 fixed price and 32 Dutch auction tenders. For 61% of the repurchases the final tender price is below the share price at the close of the offer, with 24

[13] This issue has been implicitly acknowledged by some companies in structuring the Dutch auction process. For example in the February 2006 off-market repurchase BHP Billiton announced that it would "…not proceed with the off-market repurchase unless the discount at which the shares can be repurchased represents at least an 8 percent discount…" and that "[a]ll shareholders …including those not participating….benefit [because of the] [p]urchase of shares at a discount of at least 8%."

[14] www.sirca.org.au

of 26 Dutch auctions involving a franked dividend component in this category (with the two exceptions early in the sample period involving a fall in the market price between announcement and closing date). A shortfall occurs in 18 cases, of which 13 are fixed price tenders, and a scaleback of successful tenders in 28 cases (of which 11 are fixed price tenders). The importance of distributing franking credits as one motive for undertaking off-market repurchases (Brown and Norman, 2009)[15] is illustrated with 71% of repurchases occurring with a franked dividend component.[16]

Table 1: Descriptive statistics for off-market repurchases

This table provides summary statistics for the sample of off-market equal access repurchases. Column 2 gives the number of repurchases each year, with the number of Dutch auctions each year in brackets. Market capitalization is measured as the number of shares outstanding at announcement date times the share price at the close of the offer. The discount ($m) is measured as number of shares bought back times the share price at the close of the offer minus the actual amount spent by the company. Franking credits represent the total tax credits distributed with the repurchase.
Panel A gives statistics by year: the number of repurchases, the mean market capitalization of repurchasing companies, the average discount to market price, the average value of franking credits distributed, the total discount to market value, the total value of franking credits distributed, the amount spent by the company and the average proportion of shares bought back.
Panel B gives the same statistics for fixed price and Dutch auction tender separately.

	No. (Dutch)	Mean Market Cap ($m)	Mean Discount ($m)	Mean Franking Credits ($m)	Sum Discount ($m)	Sum Franking Credits ($m)	Amount Spent ($m)	Mean Prop'n Bought
Panel A								
1996	1(0)	52	-1	0	-1	0	5	7.62
1997	1(0)	16444	10	165	10	165	651	4.01
1999	8(2)	6400	-44	23	-351	184	2028	9.06
2000	5(1)	3686	21	119	105	593	2413	10.11
2001	8(0)	7175	19	59	150	472	2199	12.17
2002	4(1)	1760	2	24	10	98	566	9.63
2003	4(4)	21989	74	159	298	636	2395	2.96
2004	8(7)	21141	90	179	719	1431	5051	4.09
2005	6(6)	16372	83	174	496	1043	3122	3.83
2006	4(2)	28885	144	283	575	1134	3101	3.84
2007	8(7)	18005	112	222	896	1780	4777	3.88
2008	5(2)	2964	-6	26	-29	129	639	15.04
whole sample	62 (32)	12585	46	124	2877	7664	26946	5.32
Panel B								
Dutch	32	20559	93	193	2988	6186	20006	3.83
Fixed	30	4080	-4	49	-111	1479	6940	11.86

[15] See also Mitchell, Dharmawan and Clarke (2001) and Mitchell and Robinson (1999) for information on stated motivations for share repurchases in Australia.
[16] Over 2001 to 2004 franking credits distributed via off-market repurchases were equal to 8% of total franking credits claimed by taxpayers (the remainder being from dividends paid) (Australian Government Board of Taxation, 2007, p56).

Table 1 provides summary statistics additional to the information in Appendix 3. Panel A illustrates the increasing frequency of off-market repurchases from 1999 onwards. Reinforcing the fact that 61% of repurchases are conducted at a discount, there are few years where repurchases are on average conducted at a premium. The total number of shares bought back as a proportion of the total shares outstanding (at the time of the repurchase) for all companies over the period is 5.32%. The equally weighted average across firms of the proportion bought back is 11.58%. As shown in Panel B companies undertaking the 32 Dutch auction tenders are larger, spend around three times as much buying back shares and distribute around four times the dollar value of franking credits (on average) as compared to those using a fixed price tender. Within the fixed price sample there are several small companies that bought back a large proportion of shares.

5. The tender process

In this section we analyze the determinants of the equilibrium relationship between a stock's repurchase price and its market price arising from a tender process in which tax differences involved in selling into the repurchase versus selling on-market create a form of clientele effect.[17] The resulting supply (offer) curve, in conjunction with the demand for shares specified by the company in the repurchase, enables identification of an equilibrium repurchase price and of the determinants of net gains from participation to different clienteles. In section 6 we use data available from Dutch auction tenders (including measures of excess demand and supply where the equilibrium price is constrained by company imposed price limits) to estimate the supply curve.[18] This also enables us to estimate how the price set in fixed price tender offers differs from the equilibrium price, and the consequences thereof.

[17] The clienteles can arise after the announcement of the repurchase as 'tax arbitrageurs' purchase stock in order to participate. This corresponds to a dynamic form of the clientele model (see Allen and Michaely (2003)) where through the trading process stocks end up just prior to the ex-dividend date in the hands of those investors most tax advantaged by the payment of the dividend.

[18] Our approach differs from Bagwell (1992) who uses actual shareholder tendering data supplied by 32 companies buying back shares through a Dutch auction. She finds upward sloping supply curves.

We first compare the after tax-cash flows of selling into the repurchase, where the repurchase price comprises a capital component and a franked dividend component, with selling on-market (such as is illustrated in Appendix 2). The notation used is given in Table 2. For convenience, the term αt (where $0<\alpha<1$) is referred to as the capital gains tax rate.[19]

Table 2: Notation

Variable	*Notation*
Investor's Original Purchase Price	P_B
Current Market Share Price	P
Marginal Tax Rate	t
Capital Gains Tax Rate	αt
Capital Component of Repurchase Price	C
Ratio of Repurchase Price to Current Market Price	W
Franked Dividend Component of Repurchase	$D = wP\text{-}C$

The after-tax cash flow from selling on the market[20] is:

$$S_M = P(1-\alpha t) + P_B\alpha t \qquad (5)$$

If the share is sold into the repurchase, the capital component is taxed at a rate αt and the franked dividend component at rate $(t-t_c)/(1-t_c)$, such that the after tax cash flow is:

$$S_B = wP - (C-P_B)\alpha t - (wP-C)(t-t_c)/(1-t_c) \qquad (6)$$

Comparing these after-tax amounts, the repurchase sale proceeds exceed the on-market sale proceeds if

$$Gain = S_B - S_M > 0$$

Substituting and simplifying,

$$Gain = P[w(1-(t-t_c)/(1-t_c)] - (1-\alpha t) - C[\alpha t - (t-t_c)/(1-t_c)] \qquad (7)$$

[19] In practice, α% of any gain is subject to tax at the marginal tax rate of t, where α=1 if the asset has been held for less than one year, or is 0.5 for individuals and 0.67 for superannuation funds for assets held for more than one year (see Appendix 1).

[20] The relevant market price is immediately prior to the close of tenders., because most shares will be tendered just prior to expiration of the offer (see Bagwell 1992).

The shareholder's original purchase price P_B is not relevant to the decision since it is the cost base used in calculating capital gains tax in both cases. As expected, the benefit from participating increases as the repurchase price increases (ie as w increases):

$$\frac{\partial Gain}{\partial w} = P\left(\frac{1-t}{1-t_c}\right) > 0 \tag{8}$$

The repurchase/market price ratio which makes the investor indifferent is:

$$\hat{w} = \frac{(1-t_c) - \alpha t(1-t_c)(1-\frac{C}{P}) - \frac{C}{P}(t-t_c)}{(1-t)} \tag{9}$$

Thus, for repurchase/market price ratios above $\hat{w}$ the investor will prefer to participate in the repurchase. Note that $\hat{w}$ depends upon α ($\frac{\partial \hat{w}}{\partial \alpha} < 0$) so that the participation indifference price is lower for investors with $\alpha = 1$. (This is the case where they have capital gains to offset which would not receive concessional tax treatment due to the assets having been sold within one year of purchase).

For $\alpha = 1$, equation 9 simplifies to

$$\hat{w} = (1-t_c) + t_c\frac{C}{P} = 1 - \frac{t_c}{(1-t_c)}\frac{D}{P} \tag{10}$$

where D is the dividend component of the repurchase price. In this case $\hat{w}$ is independent of the taxpayer's marginal tax rate t. All investors with non-concessionally taxed capital gains will find it advantageous to participate if

$$\hat{w} > (1-t_c) + t_c\frac{C}{P}, \tag{11}$$

although the increase in the gain as w increases is inversely related to the investor's marginal tax rate t, which can be seen from equation 8 by noting that $\frac{\partial^2 Gain}{\partial w \partial t} < 0$.

For investors with concessionally-taxed capital gains, such that $\alpha<1$,

$$\frac{\partial \hat{w}}{\partial t} = \frac{(1-\alpha)(1-t_c)(1-\frac{C}{P})}{(1-t)^2} > 0. \tag{12}$$

Thus the repurchase/market price ratio which makes investors with concessionally-taxed capital gains indifferent between participating or not, is higher (ie the required discount is lower). The gains from participating for a higher tax rate investor (when $w > \hat{w}$) are less than those for a lower tax rate investor.

These results are summarized in Figure 1. It can be seen that investors with concessionally taxed capital gains (α<1) to offset will not participate at lower repurchase prices at which investors with non-concessionally (α=1) taxed capital gains are still reaping benefits from participation.

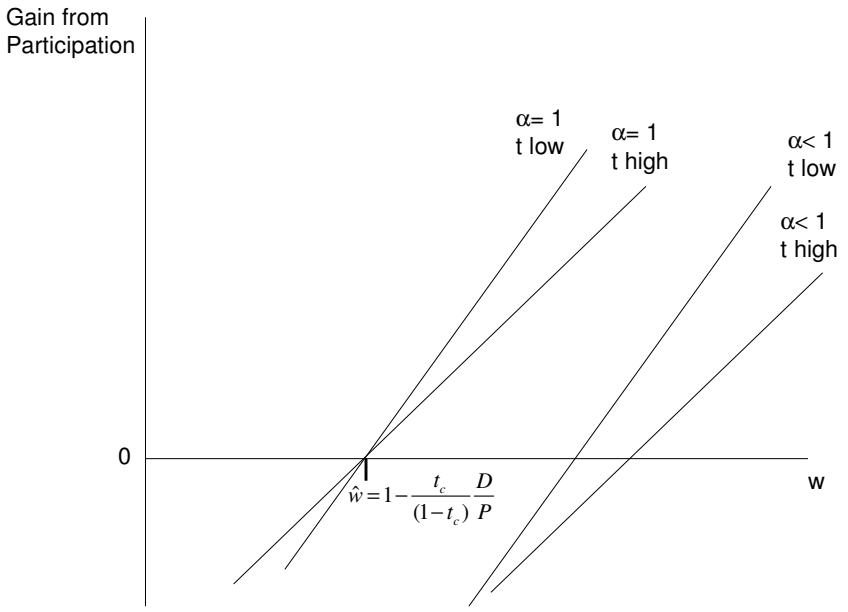

Figure 1: Investor gains from participation in an Australian off-market repurchase
In this figure, w is the ratio of repurchase price to market price, D/P is the ratio of the dividend component of the repurchase price to the market price and t_c is the corporate tax rate. After tax gains from participating in the repurchase (relative to selling on-market) are shown for investors with different tax rates t and existing capital gains which are fully taxed (α=1) and concessionally taxed (α<1).

The minimum possible repurchase price/market price ratio ($\hat{w} = 1 - \frac{t_c}{(1-t_c)} \frac{D}{P}$) is where investors with non-concessionally taxed capital gains available to offset receive zero net benefit. If there are sufficient such investors, then a competitive outcome should lead to gains being competed away through the tender process and the repurchase/market price being set at $\hat{w}$. Note that potential tender participants include investor "arbitrageurs" who

have or wish to realize non-concessionally taxed capital gains on other assets and who purchase the stock after the repurchase announcement (and before the ex-date) in order to participate in the tender. Our approach is consistent with dynamic dividend clientele models where dividend-paying stocks are bought temporarily just before the ex-date by investors who value them most (e.g. Miller and Scholes (1978), Kalay (1982) and Michaely and Vila (1995)). In keeping with dynamic tax-related trading on or before the ex-day, Brown (2007) finds significant abnormal trading volumes around the announcement date for a sample of Australian off-market repurchases.[21] Thus the assumption that tender participants with non-concessionally taxed capital gains will dominate the repurchase price determination is *a priori* reasonable.[22]

In practice, however, other factors are relevant. First, all Dutch auction tenders have involved announcement of a tender price range within which the repurchase price will be set. Not only does this constrain the repurchase price, it also introduces the risk for "arbitrageurs" that the amounts purchased at the final repurchase price might involve scaling back relative to amounts tendered. Because repurchases typically involve 40-60 days between announcement and completion, the market price of the stock can vary significantly introducing price risk for unsuccessful tenders. Second, even in the absence of scaling back, "arbitrageurs" face price risk (and quantity risk from "underbidding") arising from uncertainty about the final repurchase price determined by the auction process.[23] The existence of such risks suggests that completion of the repurchase may require a higher price to elicit supply of stock from less tax-preferred investors or from those inframarginal investors who would otherwise prefer to continue to hold the stock.[24]

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[21] Lakonishok and Vermaelen (1986) and Michaely and Vila (1996) also find significant abnormal volumes on and around dividend ex-dates in the U.S.

[22] This requires that there is at least 45 days between purchase and the tender closing date in order that purchaser/participants meet the legal requirement to be able to use the franking (tax) credits. While some repurchases did not have 45 days between announcement and closing date, in many cases a forthcoming repurchase was foreshadowed in earlier corporate announcements. In our empirical work we test whether possibility of post-announcement purchase and participation is a significant determinant of the repurchase price, by inclusion of a variable measuring the number of days between announcement and close, but find that it is not.

[23] Koski and Michaely (2000) find that abnormal trading volumes around announcements are negatively related to risk exposure, consistent with risk being a relevant determinant of such "arbitrage" activities.

[24] As noted earlier, the market price is a lower bound on the value these investors place on the stock, and the zero net gain repurchase price derived in the text is thus only a lower bound for these investors.

These arguments suggest that the supply curve of stock tendered will not be infinitely elastic at the price ratio $\hat{w}$ (which reflects the minimum price at which any supply will be forthcoming) but upward sloping to reflect the risks discussed above and the need to induce less tax-preferred and inframarginal investors to participate to meet the required quantity demanded by the company.

Hence, assuming linearity, the supply curve of stock for tender *i* takes the form:

$$w_i = \beta_0 + \underset{(<0)}{\beta_1} \frac{D_i}{P_i} + \underset{(>0)}{\beta_2} Q_i^S , \qquad (13)$$

where Q^s is the amount supplied by investors into the tender. A test of whether "arbitrageurs" determine the repurchase price (as in equation 10) is given by the null hypothesis that $\beta_0 = 1$ and $\beta_1 = - t_c/(1-t_c) = -3/7$. In the following section we test this hypothesis by estimating the supply curve for stock using data from the 32 Dutch auctions conducted over the period of our study. We also use this information to examine the pricing consequences of the 30 fixed price tenders conducted.

6. *Estimation of the Supply Curve of Stock*

In this section we use censored regression techniques to estimate the supply curve of stock tendered in Dutch auctions used for repurchases. In these auctions, the company announces a quantity of stock which it wishes to repurchase (either as a number or dollar amount of shares) and, in all cases, announces a range of tender prices (either as dollar amounts or as percentage discounts to the closing market stock price). Consequently, the auction outcome may be constrained by the minimum price specified and involve an excess supply of shares tendered at that price, leading to scaling back of amounts tendered. Alternatively, if the maximum price specified constrains the outcome, there is excess demand and the company will fail to repurchase the number of shares desired.

Company documents reporting the outcome of repurchases to the ASX provide information which enables the calculation of excess demand (shortfall) and excess supply (scaleback). Thus denoting the quantity of shares demanded (as a proportion of shares on issue) by *bbsize,* and equating supply and demand gives the equilibrium repurchase price

(as a ratio to market price) as the latent variable w_i^*, which is only observed when the auction outcome is not constrained by price limits:

$$w_i^* = \beta_0 + \underset{(<0)}{\beta_1} \frac{D_i}{P_i} + \underset{(>0)}{\beta_2} bbsize_i \qquad (14)$$

The coefficient on *bbsize* is expected to be positive, because if the supply curve for shares is not perfectly elastic, then acquiring a greater proportion of shares requires paying a higher price to attract shareholders who would otherwise not tender. When a shortfall occurs, the observed price $w_i = p_{max} < w^*_i$ and quantity supplied is less than *bbsize,* with the difference (excess demand) proxied by *ED* which is calculated as the percentage difference between shares sought and shares bought.[25] When a scaleback occurs, the observed price $w_i = p_{min} > w^*_i$ and quantity supplied is greater than *bbsize,* with the difference (excess supply) proxied by *ES* which is calculated as the amount of scaleback as a percentage of shares sought. While our calculated *ED* measure could arguably be an exact measure of the excess quantity demanded, that is not so for the *ES* measure which would reflect inflation of tender amounts in expectation of possible scalebacks. Hence, we include both variables separately, rather than combining with *bbsize*.

The resulting censored regression model is:

$$pmax_i = \beta_0 + \underset{(<0)}{\beta_1} \frac{D_i}{P_i} + \underset{(>0)}{\beta_2} bbsize_i + \underset{(>0)}{\beta_3} ED_i + u_i \quad \text{for } w_i^* > pmax_i$$

$$w_i = \beta_0 + \underset{(<0)}{\beta_1} \frac{D_i}{P_i} + \underset{(>0)}{\beta_2} bbsize_i + u_i \quad \text{for } pmin_i < w_i^* < pmax_i$$

$$pmin_i = \beta_0 + \underset{(<0)}{\beta_1} \frac{D_i}{P_i} + \underset{(>0)}{\beta_2} bbsize_i + \underset{(<0)}{\beta_4} ES_i + u_i \quad \text{for } w_i^* < pmin_i$$

Estimation of the model involves inclusion of both *ED* and *ES* as regressors for all observations, with, in principle, $ED = 0$ for $w_i^* < pmax_i$ and $ES = 0$ for $w_i^* > pmin_i$. In practice there are a small number of cases where repurchase prices within the price limits

[25] Where a range of shares sought was indicated, the excess supply was calculated using the minimum of that range.

have been accompanied by either shortfall or scaleback due to unexplained decisions of the company in deciding upon a final price.

Five of the repurchases did not involve a franked dividend component, and this would be expected to lead to a higher repurchase price. Hence a dummy variable equal to 1 when the repurchase did not include a franked dividend component is included, with the coefficient expected to be positive, giving

$$w_i = \beta_0 + \underset{(<0)}{\beta_1} \frac{D_i}{P_i} + \underset{(>0)}{\beta_2} bbsize_i + \underset{(>0)}{\beta_3} ED_i + \underset{(<0)}{\beta_4} ES_i + \underset{(>0)}{\beta_5} FDIVDUM_i + u_i \qquad (15)$$

as the estimating equation. [26]

We estimate equation 15 as a censored regression, assuming normally distributed residuals for the 32 Dutch auctions held over our period of study. Upper and lower censoring points were specified for each repurchase as the maximum and minimum prices specified in the offer document as a proportion of the stock's market price at the closing date of the auction.[27] The dividend/price ratio uses the closing price (consistent with the scaling of the repurchase price).[28]

Table 4 presents the results. The adjusted R^2 for the regression is 97.3% with all coefficients significant and having their expected sign. The hypothesis that competition between "arbitrageurs" dictates the repurchase price determination (which implies that β_0 = 1 and β_1 = - 3/7) is clearly rejected. Consistent with that, the significant positive coefficient (β_2) for *bbsize* indicates that larger size offerings lead to a higher repurchase price, as would be expected if non tax-preferred shareholders must be induced to participate and because of risks to "arbitrageurs". Our finding of an upward sloping supply curve is consistent with the results of Bagwell (1992) and Kadapakkam and Seth (1997) for Dutch auction tenders and Brown and Ryngaert (1992) for fixed-price tenders.

[26] Because repurchases by smaller companies may be of less interest to large institutional investors we also considered company size as a possible explanatory variable but found it to be insignificant.

[27] In later dated auctions, the price bounds were generally expressed as a percentage discount to the value weighted average price (VWAP) over the five days prior to the closing date (and this was used in those cases). For earlier auctions, dollar prices were specified, and the share price on the closing date was used to scale the repurchase price.

[28] Using announcement day prices leads to similar results. The dividend component is used because the dividend amount is exogenously given, whereas the capital component is determined endogenously as the difference between the repurchase price and the dividend amount.

Repurchases without a franked dividend component have a higher repurchase price (β_5>0) as expected. Both the excess demand and excess supply proxies have significant coefficients with expected signs, with the smaller absolute value for the coefficient of the excess demand proxy consistent with inflation of tender bid sizes in anticipation of a scaleback.

Table 4: Censored regression results for the repurchase price

This table provides the results of estimating equation (15) using Eviews. The dependent variable is *w*, the repurchase price divided by the market price at close of repurchase (closing price). *D/P* is the dividend component of the repurchase price divided by the closing price. *Bbsize* measures shares sought (demanded by the company) as a proportion of shares outstanding. *ED* is excess demand and *ES* excess supply as reported by the company to the ASX. *FDIVDUM* is a dummy variable equal to 1 when the repurchase does not have a franked dividend component. Standard errors and covariances are estimated using QML (Huber/White).

	Coefficient & Expected sign	Coefficient Value	Std. Error	z-Statistic	Prob.
Constant	β_0	0.890	0.029	30.652	0.000
D/P (dividend/closing price)	$\beta_1 < 0$	-0.111	0.043	-2.581	0.010
bbsize	$\beta_2 > 0$	0.746	0.131	5.692	0.000
ED (excess demand)	$\beta_3 > 0$	0.253	0.031	8.216	0.000
ES (excess supply)	$\beta_4 < 0$	-0.031	0.012	-2.543	0.011
FDIVDUM	$\beta_5 > 0$	0.067	0.027	2.524	0.012
R-squared	0.973	Mean dependent var			0.906
Adjusted R-squared	0.967	S.D. dependent var			0.075
S.E. of regression	0.014	Akaike info criterion			-1.166
Sum squared resid	0.005	Schwarz criterion			-0.845
Log likelihood	25.651	Hannan-Quinn criter.			-1.059
Avg. log likelihood	0.802				
Left censored obs	18	Right censored obs			2
Uncensored obs	12	Total obs			32

It is also apparent that the minimum price constraint plays a significant role in determining tender outcomes, with 18 of the 32 tenders involving left censoring (and only two right censored cases). Of those, 16 involved a franked dividend component.[29] The extent of overpricing *OP* induced by the minimum price constraint can be estimated as:

$$OP_i = w_i - \hat{w}_i^*$$

[29] The other two cases were completed at a premium to market price with the repurchase price having no dividend component.

where $\hat{w}_i^*$ is the forecast latent variable.[30] The mean (median) value of overpricing for these left censored observations is 6.8 (4.9) percentage points, indicating that the ATO specified minimum of 14 per cent is a significant constraint in many cases, with the equilibrium average discount for these cases thus being around 50 per cent higher than that allowed. The maximum overpricing is 21.7 percentage points, which occurred when the minimum price set by the company was only $0.10 (2 per cent) below the share price at announcement date.

These results suggest that minimum price constraints imposed on the auction process substantially reduce the potential benefits to non-participating shareholders to the benefit of those participants whose tenders are accepted.

It is also possible to estimate the mispricing involved in fixed price tenders, by out-of-sample forecasting of the latent variable for fixed price tenders, using equation (15). In these cases, both over and underpricing can be observed and calculated by estimating the mispricing using $MP_i = w_i - \hat{w}_i^*$. For the 17 fixed price tenders involving a franked dividend component, for which complete data is available, the mean (median) mispricing is 8.8 (8.1) percentage points. However, because both under and overpricing occurs, these figures understate the degree of mispricing. For the 12 cases of overpricing, the mean (median) is 18.4 (15.5) percentage points. For the five cases of underpricing, the mean (median) is 14.4 (3.0) percentage points

If fixed price tenders for which there is no dividend component are considered, the mispricing is even worse. For the 8 cases of overpricing, the mean (median) is 33.4 (25.5) percentage points with a maximum of 78.9 percentage points. However, these eight cases were all either very small companies and/or small listed fund managers seeking to buy back a large proportion of stock on issue. For the 3 cases of underpricing, the mean (median) is 6.3 (1.6) percentage points with a maximum of 16.6 percentage points.

Comparing these results, it is apparent that the Dutch auction tender process, even when subject to price limits performs better than the fixed price tenders in reducing the degree of overpricing. And while there are too few cases (two only) of underpricing in

[30] The overpricing for the two left censored observations involving no dividend component were both small (2.5 and 1.2 percentage points).

the Dutch auctions to enable a meaningful comparison, the fact that 12 of 32 cases did not involve censoring suggests that this system is better at avoiding underpricing also (as would be expected).

Focusing on the repurchases involving a franked dividend component, where tax benefits are distributed to successful tenders, in return for those shareholders accepting a lower price than the current market price, it is apparent that companies have generally "left money on the table". This has occurred in the case of Dutch auctions because price limits imposed due to ATO rulings prevent an equilibrium outcome, or because the price specified in fixed price tenders is above the equilibrium. Successful tendering shareholders would have paid more (by way of accepting a lower price) for the tax benefits distributed, which would have benefitted non-participants. The implications of this finding for policy are considered in the conclusion.

7. Conclusion

This paper makes a number of contributions to the literature on corporate capital management. First, it illustrates how tax distortions generate problems for corporate managers in making decisions involving equitable treatment of all shareholders. Second, it provides a valuable case study of how large and significant off-market repurchases are conducted in response to tax distortions in a well developed capital market, in which shareholder tax heterogeneity is more clearly identifiable than in previous studies. Third, it uses a novel data set to estimate the supply curve for stock in Dutch auction tenders. The results show that auctions result in less mispricing than fixed price tenders, even when they are constrained by maximum and minimum price limits,. Supply curves for Dutch auction tenders are upward sloping, consistent with the results documented by Bagwell (1992) and others for different tax environments such as the U.S. We show that the supply curve shape is not determined solely by tax arbitrage, but that factors such as risks arising in the tender process are also relevant.

Fourth, the results are suggestive of corporate financial policy decisions, at least in some cases in our sample, being structured to favor low tax rate institutional investors who participate in the repurchase, to the detriment of other (high tax rate, long term) investors. High tax rate investors and those (such as foreign investors who cannot utilize

the tax credits) for whom it is not optimal to participate in the repurchase, do not reap as much of the benefit from the pay-out decision as they would if, for example, the repurchase price were set, or permitted by tax authorities to be, lower. Abstracting from the announcement effects of a higher share price, high tax rate investors can be worse off, even if the repurchase is done at a discount to the market price. This can occur because tenderers would have accepted less for their shares in the absence of price limits, and also if the previously undistributed tax credits were impounded in the share price, which would thus be depressed by their distribution.

Moreover, most recent repurchases have been announced with a sufficiently long lead time to the actual repurchase date to enable low tax rate investors such as institutional pension funds and fund managers, who may not be current shareholders, to purchase shares after the announcement and participate in the tax benefits. While that participation-induced demand for shares may cause a temporary spike in the share price, and the increased resulting competition in the tender process may lead to a larger final discount, our results suggest that price limits prevent non-participants achieving the full benefits associated with an equilibrium outcome.

This raises questions about the merits of tender price limits imposed as a result of ATO rulings. Following a report in May 2009 by the Australian Government Board of Taxation (2009) the Australian Government has announced changes to the tax arrangements for off-market repurchases, with two important consequences for listed companies. First, the cap on the level of discount to the market price has been removed, which our analysis shows should result in a lower repurchase price and be of benefit to non-participating shareholders. However the second major change, that capital losses are to be denied to participating shareholders, reduces the tax benefits to participating shareholders and will *ceteris paribus* increase the equilibrium repurchase price. The overall effect of these changes on the market for repurchases in Australia is a subject for future research.

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Appendix 1: The Australian Dividend Imputation Tax System

Australia introduced a dividend imputation tax system in 1987 under which resident companies generate imputation or 'franking credits' for company tax paid. The company's franking account keeps track of these income tax credits (plus distributions carrying franking credits received from other companies) that can be passed on to shareholders. If the franking account balance is positive, dividends paid are "franked" with a tax credit to recipients, but dividends paid when the balance is zero are "unfranked".

Franked dividends carry tax credits equal to the company tax paid on the profits from which the dividend has been distributed. Resident shareholders declare the dividend (grossed up to equal the pre-company-tax profit from which the dividend was paid) as income, and then the tax credit is used to offset personal income tax obligations.[31] Thus if D is the cash dividend paid, the resulting taxable personal income is $D/(1-t_c)$ where t_c is the corporate tax rate. Personal tax is levied at the investor's marginal tax rate of t, which progresses to a maximum rate of 45 per cent, while superannuation (pension) funds face a flat tax rate of 15 per cent. The tax levied on the investor is thus $tD/(1-t_c)$, but the investor also receives a tax credit of $t_cD/(1-t_c)$ such that the tax payable (or rebateable) is $(t-t_c)D/(1-t_c)$. Overseas investors cannot use the franking credits, nor can investors who have not held the stock for at least 45 days around the dividend entitlement date or who have hedged the price risk over the period.

Australia's capital gains tax (CGT) provisions treat realized capital gains as assessable income in the year of disposal of the asset. Prior to September 1999 the inflation adjusted capital gain was included in ordinary income. For assets acquired after September 1999 (and at the taxpayer' option for assets acquired prior to that date) proceeds are concessionally taxed for assets held longer than one year. For individuals, half, and for superannuation funds, two thirds, of the nominal capital gain accrued on assets held for longer than one year is included as income. Capital losses are offset against capital gains in the year of calculation or carried forward.

[31] Australian resident individuals, complying superannuation funds, registered organizations and life assurance companies may use distributed franking credits to offset their tax liabilities. If all the franking credits are distributed, and all recipients are able to fully utilize them, then the imputation system effectively eliminates the double taxation of dividends (Officer, 1994).

Appendix 2: Investor tax-treatment in Australian off-market repurchases

We illustrate the structuring of Australian off-market repurchases and the tax considerations for a superannuation (pension) fund with a tax rate of 15% and an individual paying tax at the top marginal rate of 45%. ABC announces an off-market Dutch auction repurchase for which the final price would comprise a franked dividend component of $18.00 with the remainder being a capital component. At the close of the tender the final price is $26.00 at a discount of 13.3% to the current share price of $30.00. The $26.00 repurchase price thus comprises a fully franked dividend component of $18.00 with the remaining $8 defined as a capital repayment.

Table A1: The Repurchase Participation Decision

The calculations assume that the share has been held for more than one year such that the shareholder is eligible for a concessionary rate on the capital gains when sold on market. Superannuation funds are taxed at the rate $t_p = 0.15$ on income and at the rate $(2/3)t_p = 0.10$ on long term capital gains. For individual shareholders on the top marginal tax rate, the rates are respectively $t_p = 0.45$ and $(1/2)t_p = 0.225$. Capital losses from participating are assumed to be used to offset other short term capital gains. A franked dividend of $D generates a net tax payment (rebate) of D(t_p-t_c)/(1-t_c)$, where $t_c = 0.30$ is the corporate tax rate.

	15 % tax rate (superfund)		**45 % tax rate**	
	On-market sale at $30.00	Buyback participation at $26.00	On-market sale at $30.00	Buyback participation at $26.00
Repurchase price (1)		26.00		26.00
Market price (2)	30.00	30.00	30.00	30.00
Purchase Price (3)	20.00	20.00	20.00	20.00
Capital Component (4)	na	8.00	na	8.00
Capital Gain (5) = (2)-(3) or (4)-(3)	10.00	-12.00	10.00	-12.00
Tax on gain (6) =0.10 (5) or 0.225 (5)	1.00	-1.20	2.25	-2.70
Cash amount of Dividend (7) = (1)-(4)		18.00		18.00
Tax payable/redeemable on dividend (8)		-3.86		3.86
Net After Tax Cash Flow (9) = (2) -(6)-(8) or (1) -(6)-(8)	29.00	31.06	27.75	24.84

Consider first a superannuation fund which, several years earlier, had purchased an ABC share for $20. As shown in Table A1, sale of that share on the market at a market price of $30 would generate a net after tax cash flow of $29.00, once tax at 15 per cent had been paid on two-thirds of the $10.00 capital gain. (For investors holding the stock

for less than one year the entire capital gain would be taxable and the calculations in Table A1 would be amended accordingly).

If the superannuation fund participates in the repurchase at a price of $26.00 then $8.00 is the sale price for tax purposes and $18.00 is a dividend franked at a 30 per cent tax rate (the corporate tax rate). The superannuation fund makes a capital loss of $12.00 which when offset against other realized capital gains in its portfolio reduces tax payable by $1.20. The franked dividend receipt implies assessable income of $18.00/0.7 = $25.71, tax credits received of $7.71 and tax assessed of $3.86, giving a tax refund of $3.86. The net cash flow is thus $31.06 so that participating at a repurchase price of $26.00 is preferable to selling on market for $30.00. In contrast, the individual shareholder with a marginal tax rate of 45 per cent would be worse off from participating in the repurchase (because even though the tax benefit of capital loss is greater due to the higher marginal tax rate, that higher rate also means additional tax must be paid on the dividend).

In practice the tax authorities assign a deemed sale price equal to a volume weighted market price around the close of the tender offer, which also affects the deemed capital component. [32] These complexities make the calculations somewhat more complex, but the outcome is essentially similar.

[32] In January 2004, the ATO issued a draft determination (TD2004/D1) which complicated the determination of the capital component. A "deemed" sale price for tax purposes would be determined by adjusting the pre-announcement company share price by the percentage change in the market index (the S&P/ASX 200) between the announcement date and the tender closing date, and using this figure to calculate the capital component for tax purposes. In our empirical work, inclusion of a variable measuring the market index increase over the relevant period, to test whether this change had any significant effect on tender outcomes did not produce significant results.

Appendix 3: Australian Off-Market Repurchases: 1996 - 2008

ASX Code	Date announced	Offer Price/ Price at Close	ED[a]	ES[b]	Franked dividend component/ Price at Close	Capital Component / Offer Price	Dutch v Fixed
GYM	28/10/1996	1.310	0.162	0.000	0.000	1.000	Fixed
CBA	12/11/1997	0.986	0.000	0.422	0.582	0.410	Fixed
CBA	10/02/1999	0.909	0.000	0.639	0.565	0.378	Fixed
SEV	11/03/1999	1.085	0.000	1.584	0.000	1.000	Dutch
AOR	17/03/1999	1.667	0.014	0.000	0.000	1.000	Fixed
WYL	17/05/1999	1.048	0.000	0.672	0.609	0.419	Fixed
TIG	19/07/1999	1.222	0.000	0.000	0.000	1.000	Fixed
CIN	30/09/1999	1.190	0.304	0.000	0.714	0.400	Fixed
CBA	30/09/1999	1.018	0.262	0.000	0.000	1.000	Dutch
GOW	7/10/1999	1.026	0.000	0.000	0.632	0.385	Fixed
WOW	14/02/2000	0.927	0.000	0.842	0.465	0.498	Fixed
GUD	8/08/2000	1.142	0.768	0.000	0.000	1.000	Fixed
LLC	18/08/2000	0.962	0.000	1.353	0.623	0.352	Fixed
ANN	2/10/2000	1.013	0.000	0.965	0.000	1.000	Dutch
PDR	23/10/2000	1.800	0.077	0.000	0.000	1.000	Fixed
CAA	13/02/2001	0.956	0.156	0.000	0.301	0.685	Fixed
CBA	13/02/2001	0.973	0.000	17.868	0.624	0.359	Fixed
IBC	14/02/2001	1.103	0.106	0.000	0.195	0.000	Fixed
IAG	2/03/2001	0.875	0.000	6.246	0.302	0.654	Fixed
BOQ	6/04/2001	0.994	0.000	2.425	0.508	0.488	Fixed
WOW	30/04/2001	0.827	0.000	0.736	0.553	0.331	Fixed
EPI	11/09/2001	1.778	0.000	0.000	0.000	0.000	Fixed
STO	17/10/2001	0.978	0.000	2.077	0.561	0.426	Fixed
TAB	21/03/2002	0.965	0.185	0.000	0.137	0.858	Fixed
IAG	6/05/2002	0.968	0.301	0.000	0.403	0.584	Fixed
SEV	27/08/2002	1.033	0.000	2.448	0.671	0.350	Dutch
SOF	15/10/2002	1.250	0.375	0.000	0.000	1.000	Fixed
WOW	24/02/2003	0.921	0.324	0.000	0.688	0.253	Dutch
TLS	3/10/2003	0.850	0.000	1.907	0.547	0.357	Dutch
SEV	24/10/2003	1.032	0.295	0.000	0.413	0.600	Dutch
FGL	6/11/2003	0.891	0.045	0.000	0.488	0.453	Dutch
MAY	30/01/2004	1.044	0.000	0.000	0.000	1.000	Dutch
CBA	11/02/2004	0.828	0.000	0.000	0.497	0.506	Dutch
LMC	24/02/2004	1.115	0.420	0.000	0.447	0.599	Fixed
IAG	30/04/2004	0.878	0.000	0.000	0.523	0.491	Dutch
WBC	6/05/2004	0.839	0.000	0.000	0.608	0.497	Dutch
TLS	27/09/2004	0.860	0.000	0.127	0.541	0.556	Dutch
BHP	5/10/2004	0.870	0.000	0.000	0.725	0.321	Dutch
ANN	12/10/2004	1.011	0.000	0.869	0.000	1.000	Dutch
BSL	23/02/2005	0.890	0.000	0.000	0.537	0.618	Dutch
CXP	1/03/2005	0.889	0.294	0.000	0.841	0.079	Dutch
RIO	11/03/2005	0.844	0.000	0.000	0.752	0.175	Dutch
CML	17/03/2005	0.908	0.000	0.000	0.580	0.463	Dutch
WBC	2/11/2005	0.854	0.000	0.040	0.675	0.271	Dutch

SGB	16/12/2005	0.855	0.000	2.425	0.637	0.412	Dutch
BHP	15/02/2006	0.838	0.000	1.740	0.763	0.254	Dutch
CML	23/05/2006	0.860	0.000	0.000	0.608	0.410	Dutch
NHH	29/09/2006	0.848	0.123	0.000	0.364	0.571	Fixed
GFL	30/11/2006	1.026	0.000	0.000	0.000	0.000	Fixed
BHP	7/02/2007	0.827	0.000	1.662	0.743	0.298	Dutch
CXP	8/02/2007	0.866	0.000	1.561	0.817	0.132	Dutch
FGL	20/02/2007	0.865	0.000	0.724	0.600	0.495	Dutch
AWC	5/03/2007	0.888	0.000	3.938	0.838	0.210	Dutch
JST	7/03/2007	0.857	0.000	1.488	0.835	0.038	Dutch
STO	14/05/2007	0.950	0.000	1.556	0.732	0.317	Dutch
GFL	23/11/2007	1.256	0.000	0.000	0.000	0.000	Fixed
CCL	5/12/2007	0.858	0.000	1.524	0.566	0.500	Dutch
BLD	13/02/2008	0.850	0.000	0.000	0.423	0.632	Dutch
STO	21/08/2008	0.920	0.000	1.449	0.751	0.195	Dutch
LST	25/09/2008	1.632	0.000	1.994	0.000	1.000	Fixed
MMA	30/09/2008	1.289	0.000	0.000	0.000	1.000	Fixed
GFL	28/11/2008	1.259	0.000	0.000	0.000	0.000	Fixed

[a] Shortfall as a percentage of shares sought
[b] Scaleback of tenders as a percentage of shares sought