

Analysis of ASX Cum Dividend Trading in the Ex Dividend Period 2003-2013

Submission to the Treasury on “Preventing Dividend Washing”

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ABSTRACT

We investigate all cum dividend (CD) trading in the ex dividend (ED) period on ASX from 2003 to May 2013 for which we have data in the Thompson Reuters Tick History (TRTH) database. Our major findings are as follows:

- The total value of trading in the CD market between 2003 and May 2013 is \$12,371 million. The trading activity in this market has jumped dramatically in the last few years. The value of the dividends paid on these CD trades is \$350 million and they carry additional franking credits of \$148 million.
- The total value of trading in the ED market for shares that have some trading in the CD market is \$125,524 million, approximately 10 times as great as the CD trading.
- The average trade size in the CD market is \$174,279 while in the ED market this is \$31,018. Thus it seems that the CD market involves trading by larger and more sophisticated investors than those who typically trade in the ED market of the underlying security.
- The dividend yield on shares that are traded in the CD market is approximately 2.3% (ignoring franking credits) or 3.1% (including franking credits). Franking credits make up about 27% of the total value of dividends received by resident Australian shareholders.
- The CD premium received by foreign investors who sell during CD trading is between -0.8 of a basis point and 33 basis points for our whole sample period. This premium has been reducing through time, and by 2012 and 2013 trading it became negative.
- The dividend drop-off ratio (ignoring franking credits) is close to unity, while it is between 0.72 and 0.78 when franking credits are included.
- We estimate that the loss to Treasury from dividend wash trading in the period 2009-2013 is approximately \$129 million.

INTRODUCTION

This submission contains a summary of all trading activity in shares that trade cum dividend (CD) in the ex dividend (ED) period from 2003 to May 2013. The ASX allows CD trading for two days after the ED date because the writer of call options on the underlying instrument that are exercised on the cum dividend day needs to be able to deliver cum dividend shares, and if that writer is uncovered, then a facility that allows CD shares to be purchased in the ED period provides the mechanism for delivery of CD shares. There are of course other legitimate reasons for investors wanting to trade CD shares in the ED period. Investors might, for example, want to buy CD shares if the ED price drop on the underlying instrument was considerably less than the amount of the dividend. Recently however the Corporate Tax Unit (CTU) of the Commonwealth of Australia Treasury has become concerned that CD trading is increasingly being used in dividend washing, a mechanism that in essence allows foreign investors (who are not entitled to imputation franking credits) to sell those franking credits to domestic investors. As explained in the CTU Discussion paper this results in domestic investors being able to “claim two sets of franking credits on what is effectively the same parcel of shares” (Commonwealth of Australia, 2013, p.1). This is achieved by domestic investors buying CD shares from foreign investors and selling shares that they held prior to the dividend payment for the required 45 days in ED trading. Thus, these “shareholders receive two sets of dividends: one set is retained during the sale of ex dividend shares; the other set is obtained during the purchase of the cum dividend shares” (Commonwealth of Australia, 2013, p.3). The sale of ex dividend shares generally results in a sale price that is approximately equal to the cum dividend price less the value of the dividend. We provide empirical evidence on this matter, which is referred to as the drop-off ratio, in this report. The basic issue is, therefore, that dividend washing provides a mechanism for investors who are not entitled to receive franking credits to sell these credits to domestic shareholders, resulting in a loss to government revenue. We estimate the value of the lost revenue in this submission.

DATA

We source our data from the Thompson Reuters Tick History (TRTH) database held by Sirca Limited. While this database contains tick-by-tick trade data, we have aggregated the intraday trades in all available CD instruments in the two days following the ex dividend date, to obtain total trading for the period. We then aggregate these data to get yearly values of CD trading. We also calculate trading in the ex dividend shares of the underlying security for these same two days, and again aggregate these to yearly values. TRTH data on CD trading exist from 1998 to May 2013. However, we understand from prior research (see Walker and Partington, 1999) that TRTH data are not a complete record of all CD trading, particularly in the earlier years, and hence we chose to start our analysis in 2003. The recovery of all CD trading from SEATS is possible, but could not be completed within the timeframe for submission of feedback and comments on the CTU Discussion paper. The authors of this submission are prepared to discuss a more complete analysis of CD trading using intraday trading records of CD trading should Treasury be so interested.

SUMMARY OF CD TRADING 2003-2013

Table 1 and Figures 1.1 and 1.2 provide summaries of the CD trading. Our data capture 70,984 trades in all years, with a total value of \$12.371 billion. It is very clear that CD trading has increased dramatically in recent years (see Figure 1.1). Indeed CD trading in the five months to May 31, 2013 (\$4.642 billion) already exceeds CD trading in 2012 (\$4.162 billion). There is a clear increase in the number of CD trades (see Figure 1.2). The average value of each CD trade has also increased, a point we return to in subsequent discussion. Also of interest is that the total value of dividends that accrue to the buyers of shares in CD trading across all years is \$350.147 million, and these dividends carry total franking credits of \$148.395 million dollars. The dividends are almost exclusively fully franked with an average implied corporate tax prepayment of 29.67% of the grossed-up dividend. In calculations below we estimate how much of this total amount of franking credits that are traded in the CD market represents a loss of government revenue.

Table 1 Summary of CD trading on ASX from 2003-2013

Year	CD Trading (\$millions)	Number of Trades	Average Trade Size (\$)	Total Dividends on CD Trades	Total Franking Credits on CD Trades
2003	\$78.34	1038	\$75,473	\$1,972,762	\$808,736
2004	\$126.45	1026	\$123,249	\$2,997,277	\$1,266,573
2005	\$103.02	995	\$103,541	\$2,483,279	\$1,011,640
2006	\$270.04	1730	\$156,092	\$5,840,409	\$2,434,869
2007	\$912.12	2764	\$329,999	\$19,551,338	\$7,993,225
2008	\$166.55	1887	\$88,262	\$4,261,993	\$1,798,785
2009	\$303.45	2515	\$120,658	\$7,701,574	\$3,066,035
2010	\$615.00	10916	\$56,340	\$16,877,214	\$6,596,171
2011	\$993.17	5614	\$176,910	\$33,521,256	\$14,350,407
2012	\$4,161.52	24152	\$172,305	\$134,636,142	\$57,547,160
2013	\$4,642.89	18380	\$252,606	\$120,332,900	\$51,532,143
All Years	\$12,371.04	70984	\$174,279	\$350,146,659	\$148,395,003

Figure 1.1 Total CD Trading (\$ millions) from 2003-2013

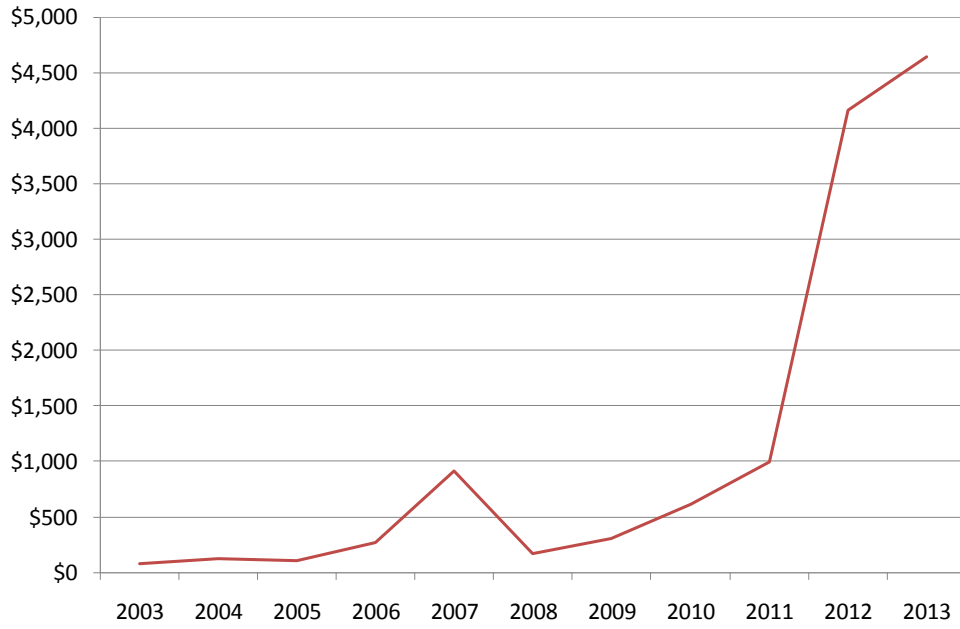
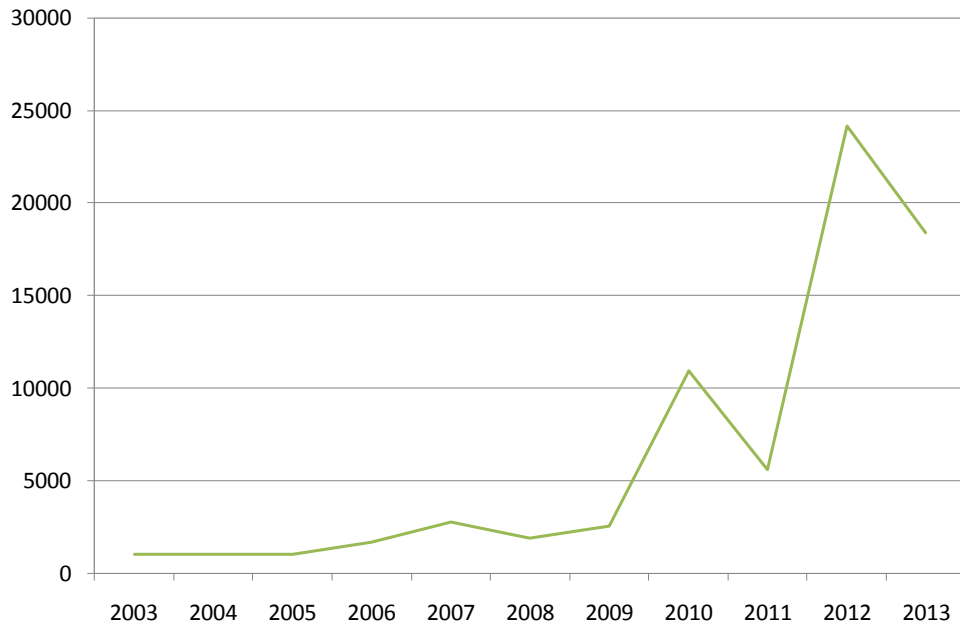


Figure 1.2 Number of CD Trades for 2003-2013



SUMMARY OF TRADING IN THE EX DIVIDEND SHARES ON DAYS WHEN THERE IS TRADING IN THE CD SHARES

For each stock and each day that has trading in the CD market, we also summarise the trading in the underlying ED market for those same stocks and days. Table 2, and Figures 2.1 and 2.2, provide yearly summary statistics and graphical representations of this trading. It is clear that the trading in the ED market greatly exceeds the trading in the CD market. Across all years the value of trading in the ED market in Table 2 is \$125.523 billion; this is approximately 10 times as large as the CD trading (\$12.371 billion – Table 1). The total number of trades in the ED market is 4.047 million (Table 2); this is approximately 57 times as large as the CD number of trades (70,984 – Table 1). Accordingly, the average trade size in the CD market (\$174,279 – Table 1) is 5.6 times as large as it is in the ED market in Table 2 (\$31,018), confirming that trading in the CD market is dominated by “sophisticated investors”.¹

Table 2 also reveals that CD trading as a proportion of ED trading is between 2 and 6% in the earlier years (for example 2003 to 2010), whereas in the years 2011 to 2013 this proportion jumps quite dramatically. In 2011, 2012 and 2013 CD trading as a proportion of ED trading reaches 8.89%, 23.24% and 33.47%, respectively. A structural change in this proportionate trading is evident.

Figure 2.3 provides additional evidence that the CD market is dominated by sophisticated investors. The average trade size for the CD market (in red dashed) is generally much larger than the average trade size in the ED market, particularly from 2006 and onwards. Prior to 2006 CD trade size and ED trade sizes are of similar magnitude; suggestive that prior to 2006 the traders in the CD market are similar to the traders in the ED market. If trade size can be taken as a proxy for the overall size of the market participant [i.e., large institutional investors are likely to trade in larger amounts than small institutional investors and retail investors – see Lee et al (1999) for supportive evidence] then our evidence suggests the CD and ED market is not dominated by a particular investor class prior to 2006, but after 2006 larger institutions dominate in the CD market. One other point of interest is that there is a clear trend downward in the average trade size in the ED market across our sample period; this trend could be related to the increased use of algorithmic trading on ASX.

¹ Casual observation of the underlying data indicates that there are some very small trades occurring consistent with individual investors also being present in this market. We would be able to further investigate this observation if Treasury was interested.

Table 2 Summary of ED trading on ASX from 2003-2013

Year	Total Trading in Ex Dividend Shares (\$ millions)	Number of Trades	Average Trade Size (\$)	CD Trading as a Proportion of Ex Trading
2003	\$4,127.49	47772	\$86,400	1.898%
2004	\$5,745.01	55164	\$104,144	2.201%
2005	\$7,260.51	74310	\$97,706	1.419%
2006	\$11,984.40	150552	\$79,603	2.240%
2007	\$16,308.35	272454	\$59,857	5.593%
2008	\$12,230.41	398936	\$30,658	1.362%
2009	\$10,451.62	443902	\$23,545	2.903%
2010	\$14,465.32	643070	\$22,494	4.252%
2011	\$11,167.93	568427	\$19,647	8.893%
2012	\$17,909.01	861384	\$20,791	23.237%
2013	\$13,873.62	530849	\$26,135	33.466%
All Years	\$125,523.68	4046820	\$31,018	9.856%

Figure 2.1 Total Trading in Ex Dividend Shares (\$ millions) for 2003-2013

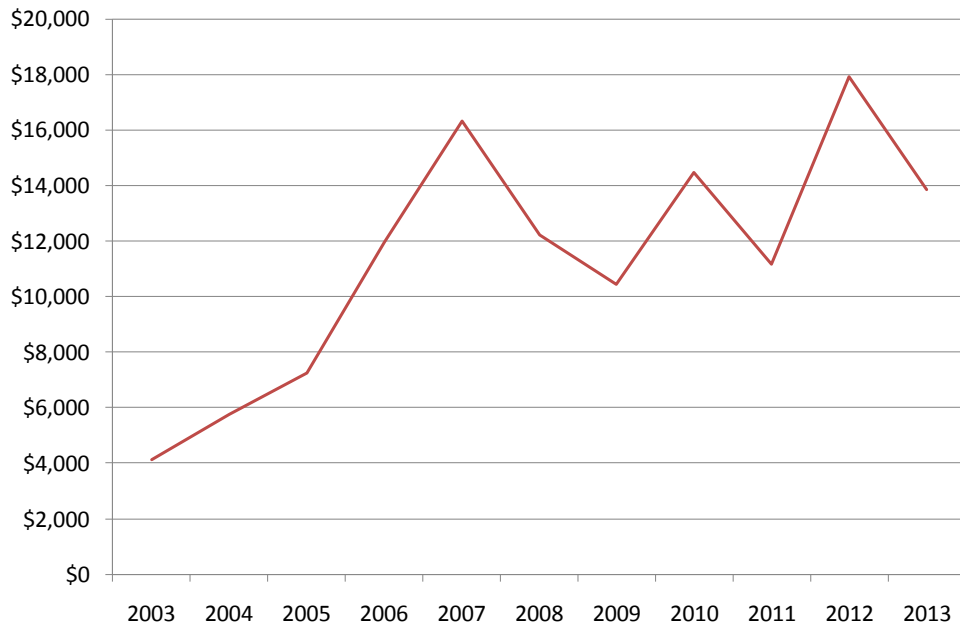


Figure 2.2 Number of Ex Dividend Trades for 2003-2013

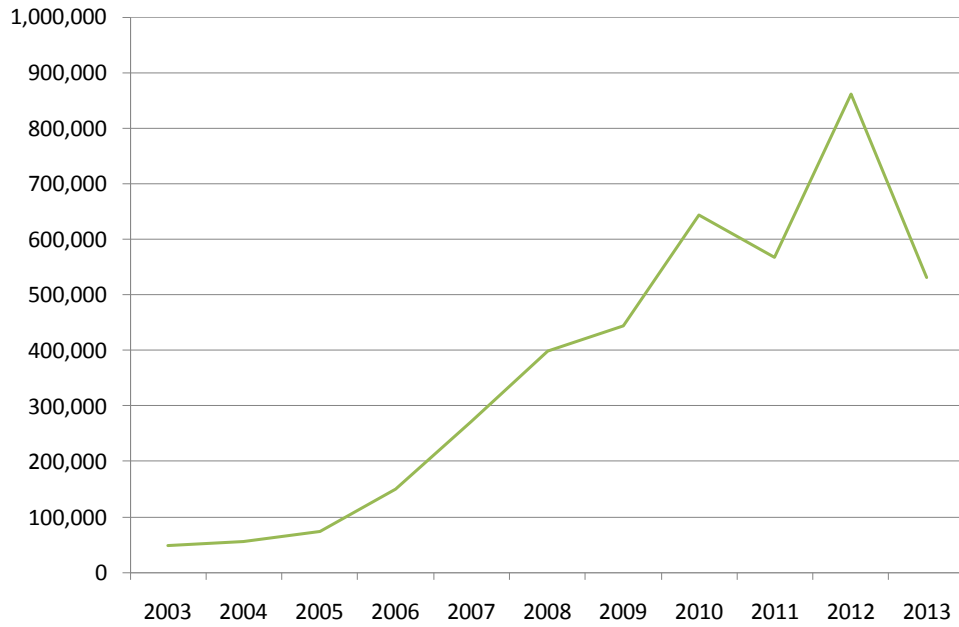
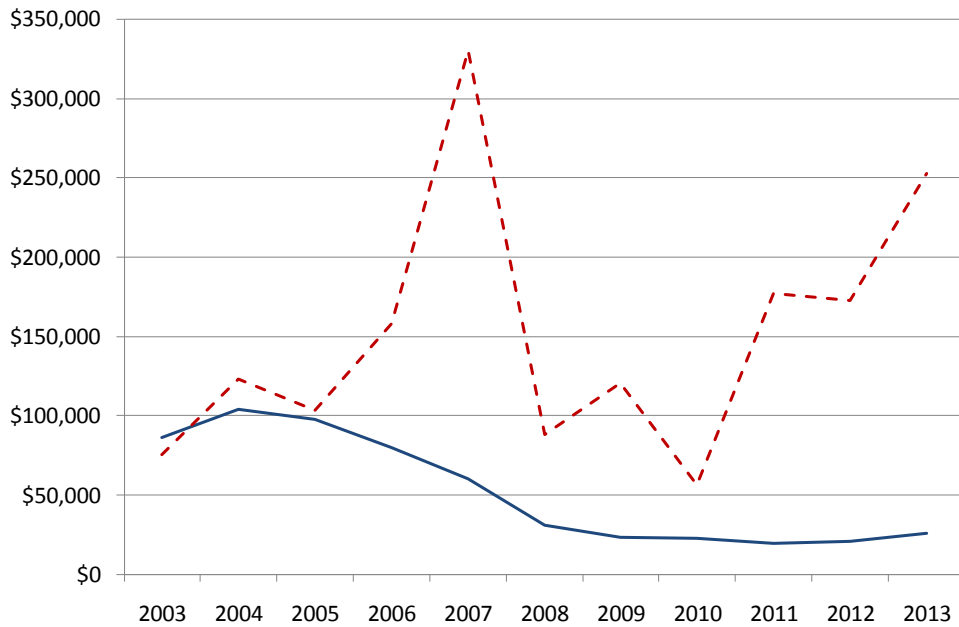


Figure 2.3 Average ED (Blue) and CD (Red Dashed) Trade Sizes from 2003-2013



In Table 3 below we provide estimates of the CD premium. This premium indicates the benefit to investors of selling in the CD market vis-à-vis selling on the cum dividend day in the ordinary market. It is estimated by dividing, and then averaging, the volume weighted average price (VWAP) of trading on each stock on each CD day by the VWAP on the cum dividend day for that same stock. Our calculations

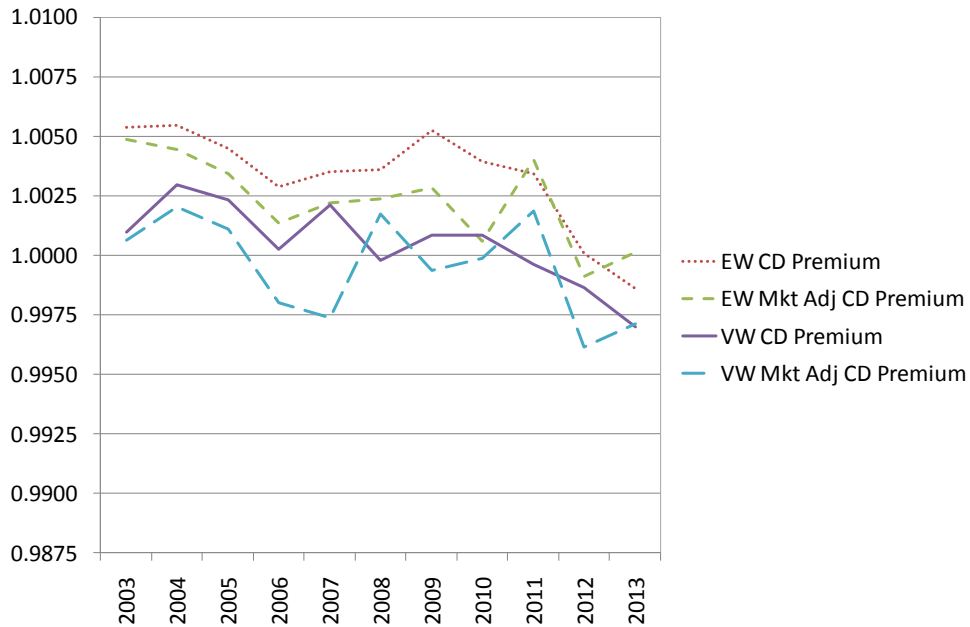
are done using both equal weights and market capitalisation value weights, and the CD VWAP is both a raw price and a price adjusted for the return on the overall market (i.e. All Ordinaries index). *Example Box 1: Dividend washing* in the Commonwealth of Australia (2013, p.4) discussion paper suggests that the CD Premium is $\$100.75/\$100 = 1.0075$ or 75 basis points. While this example in Box 1 is not meant to describe actual market pricing (it is provided to merely outline the steps in dividend washing), it turns out that empirically the CD premium is actually in the range of 0.9992 to 1.0033. Assuming that the CD market is dominated by foreign investors conducting dividend washing trades, the premium that foreign investors get for selling their franking credits is between -0.8 of a basis point and 33 basis points.

Figure 3.1 plots the behavior of the CD premium over time. Our early estimates, which are based on smaller samples, are quite noisy, but there is a clear trend downward in the CD premium in each of our four measures in the later years of CD trading. This suggests that the market for foreign investor dividend wash trades has become much more competitive. In fact our 2012 and 2013 estimates suggest that the CD premium has essentially evaporated, and is estimated to be negative in both years. If foreign investors can no longer capture a premium on CD wash trades, it is quite likely that they will withdraw from this market. Domestic investors still have an incentive to capture two lots of franking credits, but if the supply side of the market dries up because of competitive pricing, it is somewhat moot as to whether this market would be able to continue to expand. It is of course quite clear that the proposed Treasury changes to the regulations in relation to CD trading will, to the extent that CD trading is associated with foreign investors washing their franking credits to domestic investors, cause a substantial dampening of CD trading activity.

Table 3 Equal Weighted (EW) and Value Weighed (VW) CD Premiums, with and without Market Return Adjustments, 2003-2013

Year	EW CD Premium	EW Mkt Adjusted CD Premium	VW CD Premium	VW Mkt Adjusted Premium	Number of CD Events
2003	1.0054	1.0049	1.0010	1.0006	25
2004	1.0054	1.0044	1.0029	1.0021	46
2005	1.0045	1.0034	1.0023	1.0011	28
2006	1.0029	1.0014	1.0002	0.9980	67
2007	1.0035	1.0022	1.0021	0.9974	71
2008	1.0036	1.0024	0.9998	1.0017	57
2009	1.0052	1.0029	1.0008	0.9994	52
2010	1.0039	1.0006	1.0009	0.9999	73
2011	1.0034	1.0040	0.9996	1.0019	44
2012	1.0001	0.9991	0.9986	0.9962	58
2013	0.9986	1.0001	0.9970	0.9971	28
All Years	1.0033	1.0021	1.0003	0.9992	549

Figure 3.1 The CD Premium 2003-2013



DIVIDEND YIELDS OF STOCKS THAT HAVE CD TRADING, 2003-2013

In *Example Box 1: Dividend washing* in the Commonwealth of Australia (2013, p.4) discussion paper the dividend yield assumed is 7% (without franking credits) or 10% (with franking credits). While this example is provided for illustrative purposes only, we examine empirically whether this dividend yield is descriptively valid. Table 4 and Figure 4.1 provide our results. We calculate both equal weighted (EW) yields and value weighted (VW) yields, with and without franking credits. When averaged across all years we find:

- An EW dividend yield ignoring franking credits of 2.325%
- An EW dividend yield including franking credits of 3.160%
- A VW dividend yield ignoring franking credits of 2.222%
- A VW dividend yield including franking credits of 3.079%.

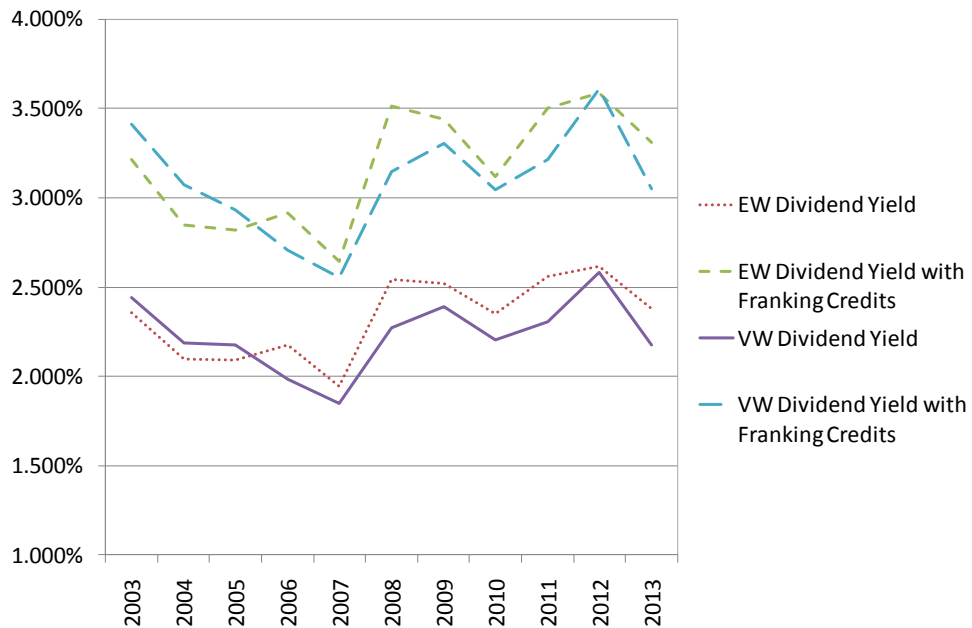
These statistics highlight the importance of franking credits to Australian residents. They represent about 26% and 28% of the EW and VW dividend yield (including franking credits). It is also clear that the Treasury example uses dividend yields that are much greater (for illustration only) than the actual yields for shares that have CD trading on ASX.

Figure 4.1 makes it quite clear that the dividend yields (both EW and VW, and with and without franking credits) have been quite stable across the years for which we have data.

Table 4 Equally Weighted (EW) and Value Weighted (VW) Dividend Yields with and without their Associated Franking Credits, 2003-2013

Year	EW Dividend Yield	EW Dividend Yield with Franking Credits	VW Dividend Yield	VW Dividend Yield with Franking Credits	Number of Events
2003	2.358%	3.213%	2.444%	3.414%	25
2004	2.095%	2.849%	2.189%	3.070%	46
2005	2.094%	2.821%	2.175%	2.931%	28
2006	2.174%	2.913%	1.982%	2.709%	67
2007	1.943%	2.647%	1.846%	2.556%	71
2008	2.545%	3.514%	2.273%	3.144%	57
2009	2.522%	3.438%	2.389%	3.304%	52
2010	2.352%	3.117%	2.206%	3.042%	73
2011	2.558%	3.500%	2.307%	3.214%	44
2012	2.617%	3.587%	2.582%	3.610%	58
2013	2.379%	3.309%	2.174%	3.049%	28
All years	2.325%	3.160%	2.222%	3.079%	549

Figure 4.1 Equally Weighted (EW) and Value Weighted (VW) Dividend Yields with and without their Associated Franking Credits, 2003-2013



EX DIVIDEND DAY DROP-OFF RATIOS, 2003-2013

One other assumption in *Example Box 1: Dividend washing* in the Commonwealth of Australia (2013, p.4) discussion paper is that the ex dividend day drop ratio is unity. The ex dividend drop ratio is defined to be $(\text{cum dividend price} - \text{ex dividend price}) / \text{the dividend amount}$. In the example a stock that has a cum dividend price of \$100 and a \$7 dividend is assumed to trade ex dividend at \$93. This implicitly assumes no value to the franking credits associated with the dividend.

We examine these issues empirically and provide estimates of the drop-off ratio in Table 5. We do our calculations for both EW and VW, with and without a market adjustment for the ex dividend price and with and without franking credits. One problem with dividend drop ratios is that the denominator in this calculation is quite often small (the dividend yield is around 2% or 3%) and this can cause drop ratios to have large variance. Accordingly, any drop ratio greater than two is winsorized to a value of two, and any negative drop-off ratio is set to zero. Table 5 contains our results.

It turns out that the Treasury assumption of a dividend drop-off of unity is quite close to the empirical estimate, at least if franking credits are ignored. Our four estimates of the drop-off ratio (excluding franking credits) are:

- 0.949 for equally weighted returns without market adjustment
- 0.998 for equally weighted returns with market adjustment
- 1.021 for value weighted returns without market adjustment
- 1.073 for value weighted returns with market adjustment

When (valuable) franking credits are included in the denominator of the calculation of the drop-off ratios, the following results emerge:

- 0.720 for equally weighted returns without market adjustment, with franking credits
- 0.748 for equally weighted returns with market adjustment, with franking credits
- 0.772 for value weighted returns without market adjustment, with franking credits
- 0.785 for value weighted returns with market adjustment, with franking credits

Table 5 Dividend Drop-Off Ratios, Equally Weighted (EW) and Value Weighted (VW) with and without Franking Credits (FC) and with and without Market Adjustment (Mkt Adj) 2003-2013

Year	EW Div Drop	EW Div Drop with FC	EW Div Drop Mkt Adj	EW Div Drop Mkt Adj with FC	VW Div Drop	VW Div Drop with FC	VW Div Drop Mkt Adj	VW Div Drop Mkt Adj with FC	No of Events
2003	0.881	0.652	0.896	0.658	0.999	0.720	1.016	0.729	25
2004	0.872	0.640	0.908	0.667	0.963	0.688	0.995	0.710	46
2005	0.857	0.648	0.943	0.708	0.891	0.671	0.981	0.735	28
2006	0.941	0.710	1.005	0.750	0.949	0.710	1.103	0.808	67
2007	0.964	0.750	0.988	0.746	0.921	0.730	1.105	0.824	71
2008	0.990	0.754	0.991	0.718	1.051	0.808	1.016	0.730	57
2009	0.870	0.656	0.957	0.721	1.011	0.739	1.048	0.761	52
2010	0.910	0.717	1.089	0.836	0.929	0.742	1.095	0.806	73
2011	1.007	0.758	0.936	0.695	1.240	0.941	1.000	0.725	44
2012	1.042	0.786	1.079	0.821	1.061	0.778	1.143	0.840	58
2013	1.094	0.790	1.082	0.809	1.187	0.846	1.179	0.864	28
All years	0.949	0.720	0.998	0.748	1.021	0.772	1.073	0.785	549

ESTIMATED LOSS TO TREASURY OF DIVIDEND WASH TRADING IN THE CD PERIOD

In order to estimate the revenue loss to the government associated with dividend wash trading we need to be able to separate CD trading into trading for “legitimate” market making and trading into “dividend washing”. There is no easy way to do this within a short time-frame, and hence we can only rely on estimates.

We assume that in the early years of our dataset (i.e., 2003 to 2008) that almost all CD trading is for legitimate purposes. Accordingly, we estimate that the legitimate amount of CD trading is 2.87% of ED trading (the average actual proportion from 2003 to 2008). We deduct this legitimate trading from CD trading and calculate the ratio of wash trading to total CD trading. We then apply this percentage figure to the dollar value of franking credits to determine the loss to revenue. Using this approach, the loss to revenue is \$129.3 million.²

CONCLUSION

We investigate all cum dividend (CD) trading in the ex dividend (ED) period on ASX from 2003 to 2013 for which we have data in the Thompson Reuters Tick History (TRTH) database. Our major findings are as follows:

² It should be noted that better estimates of the part of CD trading that is legitimate could be obtained if we had a longer time series. While these data are recoverable from ASX SEATS trading records, we were not able to extract these data in time to comply with the submission deadline.

- The total value of trading in the CD market between 2003 and 2013 is \$12,371 million. The trading activity in this market has jumped dramatically in the last few years. The value of the dividends paid on these CD trades is \$350 million and they carry additional franking credits of \$148 million.
- The total value of trading in the ED market for shares that have some trading in the CD market is \$125,524 million, approximately 10 times as great as the CD trading.
- The average trade size in the CD market is \$174,279 while in the ED market this is \$31,018. Thus it seems that the CD market involves trading by larger and more sophisticated investors than those who typically trade in the ED market of the underlying security.
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- The dividend drop-off ratio (ignoring franking credits) is close to unity, while it is between 0.72 and 0.78 when franking credits are included.
- We estimate that the loss to Treasury from dividend wash trading in the period 2009-2013 is approximately \$129 million.

Our analysis has been conducted using daily VWAP for trading activity in the cum dividend market and the corresponding ex dividend market. A much more complete and thorough analysis of this issue using intraday trade information could be conducted, though time pressures associated with this submission have not allowed this to be completed. The authors are keen to extend our empirical investigations to these more granular data, and indeed to extend the time series coverage of CD trading.

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