Quantifying shareholder losses from continuous disclosure breaches: An assessment of U.S. Court methods

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Abstract

In U.S. securities fraud cases the Market Model based event study has been a required component of any calculation of damages. However, in Australia there is no authority regarding the appropriate method for estimating damages for breaches of continuous disclosure provisions, a branch of securities fraud, by publicly listed companies. This paper assesses four major methods for determining damages applied in U.S. securities fraud matters to actual Australian breaches of continuous disclosure. Given the widespread acceptance and strength of the theoretical underpinnings of the Market Model, any divergence in damages estimation by the other methods supports the deference that should be shown to the Market Model in quantifying damages in securities fraud matters. The results highlight that the Market Model estimates loss differently from the other methods to a highly significant degree thus supporting the appropriateness of the Market Model in both U.S. and Australian securities fraud matters.

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I. Introduction

Estimating shareholder losses for disclosure breaches by publicly listed companies can be calculated by different methods. The market model based event study is widely found in U.S. case law but there is an absence of Australian legal authority regarding the market model. By comparing the various methods of loss estimation with the market model using actual continuous disclosure breaches by Australian publicly listed companies, this paper will highlight that the market model generates estimates of shareholder loss that are not distinct in an econometric sense.

ASX (Australian Securities Exchange) Listing rule 3.1 imposes a continuous disclosure regime and requires that Australian listed companies immediately disclose to the market any information that a reasonable person would expect to have a material effect on price. The *Corporations Act 2001 (Australia)* provides support for the continuous disclosure regime that is contained in the *ASX Listing Rules.* Australian case law remains unclear as to the authoritative method of quantifying the loss to shareholders from a breach of continuous disclosure obligations by a company because class actions to date have been settled out of court. Similar continuous disclosure obligations fall on U.S. listed companies. For example, Section 202.06 of the *NYSE Manual* contains the immediate release policy provision requiring certain important information to be immediately released to the public. Further, U.S. securities fraud matters often refer to fact scenarios where a company has omitted to provide information to the public or misled the public and then made a corrective disclosure. In contrast to Australia, American case law provides considerable guidance as to how such a loss should be quantified as there have been numerous cases that have been determined by court action.

When quantifying the loss to shareholders in continuous disclosure breaches the purpose is to ascertain that part of the change in the stock price that is a result of the announcement concerning the fraud. The two main measures of shareholder loss are adjusted and unadjusted return measures. The former controls for general market and/or industry effects and the latter provides a raw return.

The early work of Mullaney (1977) identified that the out of pocket expenses method was the most widely used method in U.S. securities fraud cases at the time. Mullaney (1977) also highlighted the use of general market and industry indices to control for those factors. The recissory method was also described. A few years later, Fischel (1982) advocated for the use of the market model to estimate damages although at the time the market model was limited to establishing reliance.

Green v Occidental Petroleum Corp 541 F.2d (1976) was the authority for the use of the out of pocket expenses approach. That case elaborated the now irrelevant use of price and value lines of the stock involved in the fraud based on a retroactively fitted regression model. At that time measuring the level of stock price inflation was the focus of damages estimation.

Cone and Laurence (1994), Langevoort (1996), Thorsen, Kaplan, Hakala (2002), Fischer (2005), Goldman (2006) and Allen (2007) documented the acceptance of the out of pocket expenses method based on the price and value line approach that usually included the use of a market model based regression fitted retroactively.

Bhagat and Romano (2002) highlight the use of the market model based event study in the estimation of damages in terms of measuring actual loss rather than stock price inflation.

Buckberg and Dunbar (2008) further documented the widespread acceptance of market model based event studies to measure loss in securities fraud cases. Kaufman and Wunderlich (2009) highlight that the market model based event study is widely used in U.S. securities fraud cases to measure damages in terms of actual loss rather than stock price inflation in a post *Dura Pharmaceuticals, Inc. v. Broudo*, *544 U.S. 336 (2005)* environment. That case is authority for the principle that there needs to be actual loss for there to be securities fraud.

McCormick (2008) was highly relevant in identifying the other methods of quantifying loss used in U.S. courts namely the modified recissory method (average price method), market capitalisation method, simple recissory method (returning individual shareholders to their position before the fraud) and the formerly popular out of pocket expenses approach based on price and value lines.

Further, North (2010) identified all of the breaches of continuous disclosure obligations to date in Australia. Jones (2011) emphasises the importance of the U.S. sentencing guidelines in loss estimation.

This paper expands upon the previous literature in the field by actually quantifying the difference in loss estimation between market model based event studies and the other methods identified in both U.S. cases and U.S. journals, the first paper of its kind to do so.

Given the strength of the theoretical underpinnings of the market model based event study any significant difference between it's quantification of loss and the other methods supports the use of the market model in Australian breaches of continuous disclosure obligations. A significant difference also confirms the appropriateness of the widespread acceptance of the market model based event study in U.S. Securities fraud matters.

The remainder of this paper is structured as follows: Section II contains a literature review, Section III details the method, Section IV describes the data used, Section V presents the results and finally Section VI concludes.

II. Literature Review

In Mullaney (1977) the author identified that in Section 10(b) of the *Securities Exchange Act (U.S.)* and rule 10b-5 of the *Securities Exchange Commission Rules (U.S.)* that include securities fraud for non-disclosure, U.S. courts were not clear as to how damages should be measured. That is similar to Australian case law currently. The author described a simple approach to calculating damages that consisted of aggregating the amounts at which stocks were purchased and sold by individual class members. The author stated that this simplistic approach was dealt with caution in *Green v Occidental Petroleum Corp 541 F.2d (1976).* Mullaney(1977) highlighted that at the time the out of pocket expenses approach was the most accepted method of quantifying loss. It involved measuring the level of stock price inflation by comparing the difference between the price paid and the actual price at the date of purchase.

Mullaney (1977) discussed another method of calculating damages used specifically in the area of misleading statements, particularly where the plaintiff is a defrauded seller, termed the cover remedy and calculated loss based on the difference between the price a reasonable time after the corrective disclosure and a reasonable time after the corrective disclosure that would enable the affected investor to reinvest and take advantage of a falling stock price. Should the investor fail to reinvest then the investor has no recourse.

Mullaney (1977) also highlighted that comparing a particular stock with comparable indices to isolate the effect of general market conditions had also been used in U.S. courts with industry specific or broader based indices. Also U.S. Courts had selected a period of six months prior to the corrective disclosure as indicative of the true value of the stock. A recissory measure of damages has also been used by U.S. courts where there is a direct transaction of securities between the plaintiff and defendant. Under the recissory method the plaintiff is entitled to the difference between the stock price at the time of purchase and the stock price after the corrective disclosure is made. A recissory method is not appropriate in an open market where there are no face to face dealings except transactions with anonymous parties.

Fischel (1982) highlighted that there were some U.S. cases where the market model was openly recognised in the context of establishing reliance for rule 10b-5 matters. Fischel (1982) supported the use of the market model in estimating damages in rule 10b-5 cases that include non-disclosure matters.

At the time the out of pocket expenses method of calculating damages had been used in courts such as in *Green v Occidental Petroleum Corp 541 F.2d(1976)*. That method involved creating a price line and a value line. The price line consisted of the actual stock prices plotted on a graph. The value line consisted of retroactively plotting a regression line from about the time the disclosure was made all the way back to the time of the fraud. The difference between the price line and the value line at the time of the fraud actually occurring was a measure of stock price inflation. Further Fischel (1982) also stated that the efficient markets hypothesis that underpins the market model had also been adopted in certain U.S. cases.

Cone and Laurence (1994) state that the value line concept had been extensively covered in law literature. Further, Langevoort (1996) reported that the out of pocket expenses method was the standard measure of loss. However, later studies mentioned in this literature review highlight that methods based on stock price inflation are no longer accepted in U.S. courts.

Bhagat and Romano (2002) canvas the range of uses of the market model in securities regulation including the estimation of damages. Further Thorsen, Kaplan and Hakala (2002) report the wide use of the market model and declare it to be the standard in U.S. Courts for measuring the level of stock price inflation and deflation. However, the authors description of the use of the market model places it within the context of the price and value line approach because it measures the level of inflation due to the fraud.

Fischer (2005) document that the predominant method of calculating damages at the time was the price and value line approach but Fischer's analysis was based on an out-dated case occurring in 1981. Further the author highlighted that a market model based event study had determined the amount of damages in a U.S. case.

Goldman (2006) reiterated the widespread, particularly in the ninth circuit, use of the price and value line method that also utilises a market model to estimate the level of stock price inflation. The market model is used to control for the influence of economy wide effects . However, since *Dura Pharmaceuticals, Inc. v. Broudo*, *544 U.S. 336 (2005)* the use of the market model to estimate stock price inflation is no longer supported in U.S. courts.

Goldman (2006) also highlights the way in which the price and value lines are used to estimate the amount of damages based on *Green v Occidental Petroleum Corp 541 F.2d(1976).*

Allen (2007) supported the widespread use in U.S. courts of the market model based event study to calculate the level of stock price inflation despite the movement of U.S. courts toward measuring actual loss that is the loss that actually occurs once the corrective disclosure is made. At the time of the fraud no actual loss has been passed on to shareholders as the stock price has not factored the non-disclosed information.

Buckberg and Dunbar (2008) highlighted that market model based event studies are accepted in class action claims involving securities fraud including omitting to disclose. Further, the authors noted that the Securities and Exchange Commission (SEC) in 1994 showed their acceptance of market model based event studies although at the time in a pre-*Dura* legal environment most likely as a means of measuring stock price inflation.

McCormick (2008) elaborated some of the other methods for quantifying the loss to shareholders including the modified recissory method applied in *United States v. Bakhit, 218 F. Supp. 2d 1232 (C.D. Cal. 2002).* That method compares the average price during the fraud period with the average price after the fraud is disclosed by the company. McCormick (2008) also discussed the market capitalisation method that considers the total change in the market capitalisation of the stock after the corrective disclosure is made (see also United States v. Ebbers, 458 F.3d 110, 128 (2d Cir. 2006)). Other methods discussed in McCormick (2008) include the simple recissory method that returns an individual shareholder to their position before the fraud. Also the price and value line approach that arose from the decision in *Green v Occidental Petroleum Corp 541 F.2d(1976)* based on a regression based event study retroactively fitted was identified but has been criticised in recent U.S. court decisions that explicitly opposed quantification methods based on an attempt to measure stock price inflation.

Kaufman and Wunderlich (2009) emphasised the prevalence within U.S. case law for the use of the market model based event study to establish the elements of the offence of securities fraud including damages. The authors detail the steps involved in estimating actual loss with the market model. In a post-*Dura* environment the event is defined as when the public became aware of the fraudulent activity. An event window surrounding that announcement is a key determinant of loss to shareholders. The use of a price and value line traced back to the time of purchase is no longer the appropriate use of the market model. Fischel (1982) had previously suggested the current use of the market model based event study to make out the elements of the offence of securities fraud and so Fischel's approach was now accepted in U.S. courts.

North (2010) identified all of the breaches of continuous disclosure obligations to date in Australia.

In Jones (2011) the author stated that the U.S. sentencing guidelines (18 USCS Appx § 2B1.1) influence U.S. Courts determination of the size of the loss to shareholders in securities fraud cases. The guidelines provide key factors that a U.S. court must take into consideration when estimating the size of the loss to shareholders.

III. Method

A. Market Model based Event Study

This paper will apply the market model method to corrective disclosures/revelations of new information made because of breaches by ASX listed companies of the continuous disclosure requirements in the *ASX Listing Rules & Corporations Act 2001*. The corrective disclosures/revelations of new information are published on the ASX website. The market model based event study is based on Ball & Brown (1968). However, Fama, Fischer, Jensen & Roll (1969) also tested the market model event study soon after.

$$Abnormal\ Return = Stock\ Return - Expected\ Return$$

The expected return is the return that a stock should display given market conditions. The market model assumes that a particular stock's return is independent of company specific factors. After subtracting the expected return, estimated by the market model, from the stock's return the remainder is the abnormal return or unexpected return that is a result of the announcement alone because market effects have been accounted for by the market model.

To calculate an expected return the market model must be estimated using statistical techniques, represented by the following model (that is an accepted modification of the Ball & Brown (1968) model):

$$ER_{s,t} = \hat{\alpha} + \hat{\beta}_m R_{m,t} + \mu_t \qquad \text{(Expected Return)}$$

$$AR_{s,t} = SR_{s,t} - ER_{s,t} \qquad \text{(Abnormal Return)}$$

An OLS (Ordinary Least Squares) regression is run in order to estimate the parameters of the market model $\hat{a}$ and $\hat{\beta}$. $\hat{a}$ is the intercept term of the model. $\hat{\beta}$ or beta measures the relationship between the stock's return and the return on the market index. An OLS regression is performed using the S&P/ASX 200 Accumulation Index as the market index. The S&P/ASX 200 Accumulation Index consists of the top 200 stocks by market capitalisation listed on the ASX .

The S&P/ASX 200 Accumulation Index was selected as the market index because it is most representative of broad market movements and is widely used in the finance industry. Five years of in-sample data for all of the stocks and the S&P/ASX 200 Accumulation Index was used to estimate the market model and where five years was not available then the maximum number of data points was used. Five years was used to be consistent across all events and it is more robust than a smaller in-sample period such as one year that would be overfit to the market conditions of that year.

Further, $SR_{s,t}$ or the return on the stock is a total return measure of stock returns because it includes the impact of dividends. On ex-dividend day the dividend amount was add to the closing price so as to factor in the impact of dividends received by shareholders. Also, since a total return has been used in this study it is suited to an accumulation index such as the S&P/ASX 200 Accumulation index because that index also includes the effect of dividends. Also as well as using closing prices the mid-point of the bid-ask spread was also calculated to estimate the market model and to calculate abnormal returns. After $\hat{a}$ & $\hat{\beta}$ have been estimated the market model will produce the expected returns ($ER_{s,t}$) necessary in order to calculate abnormal returns ($AR_{s,t}$).

The size of beta indicates the strength of the correlation between the stock and the index. Once beta has been estimated the expected return of the stock, given the contemporaneous return on the market, can be determined.

Prior to estimating $\hat{a}$ & $\hat{\beta}$ the event date must be determined. The event date occurs when the market is made aware by way of an announcement to the ASX subsequently released on the ASX website. In cases of non-disclosure, that can coincide with a misleading statement by a company. The Australian Securities and Investments Commission's (ASIC) online gazette contains details of the time of the fraud and the time of the corrective disclosure.

U.S. cases and journals highlight that the loss is measured in the period surrounding the announcement or event day – event window. The event window represents the period prior to and after the event. The market model is applied to the event window to calculate the expected return. A maximum event window of (0, 5) was selected after a review of the cases and finance literature. A (0, 5) event window includes the crucial days of the announcement and the day after the announcement and also three extra days that will ensure that all abnormal return behaviour is captured in this paper. Since the *Dura* decision a pre-event window is not necessary because a loss has not occurred during that time assuming no information leakage or insider trading.

To determine the statistical significance of the abnormal returns for each event date a t-test is performed for event dates 0 up to 5. It is expected that significant abnormal returns are observed on event dates 0 and 1 because most information is impounded in the stock price after a maximum of one day. Differences between the market model and the other models' estimation of shareholder loss are estimated with both CARs and ARs.

B. Variation of the Market Model based Event Study:

i. Market Model based Event Study with Industry adjustment

$$ER_{s,t} = \hat{\alpha} + \hat{\beta}_m R_{m,t} + \hat{\beta}_{Ind} R_{Ind,t} + \mu_t$$

$$AR_{s,t} = SR_{s,t} - ER_{s,t}$$

A modification of the market model event study is the market model with an industry adjustment. Essentially that involves including an additional variable to the standard market model namely the returns generated by an industry index ($R_{Ind,t}$) and estimating an industry beta ($\hat{\beta}_{Ind}$) using OLS regression. For each of the thirty one events the relevant securities industry codes was determined after identifying their industry code using Morningstar DatAnalysis. Following that process industry index data was obtained from Bloomberg. Table 1 Panel B contains the sample by industry. The inclusion of an industry variable not only allows market wide effects to be controlled for but also controls for industry wide effects . As a result this modification of the market model could be seen to be an improvement on the standard market model. The inclusion of an industry factor has been used in U.S. cases.

C. Unadjusted Return Models:

i. Market Capitalisation Model

$$Daily\ Return\ (Loss)_t = \left(\frac{Stock\ Price_t + Dividend_t}{Stock\ Price_{t-1}}\right) - 1$$

The market capitalisation approach is an alternative to the market model method and has been used in US courts. Essentially it involves an event window consisting of the day of the event and some days later. A maximum event window of (0,5) is used in this paper. This model does not take into account market effects on the share price like the market model does. For the purposes of this paper only the losses in percentage terms calculated by the market capitalisation model are of interest. Focussing on percentage returns enables a comparison of the losses calculated by each of the methods tested in this paper. From a finance perspective the market capitalisation model is an unadjusted return model that is essentially calculating the total stock return in the event window period.

ii. Average Price Model:

United States v.Snyder, 291 F.3d 1291 (11th Cir. 2002)

$$Daily\ Return(Loss)_{(0,t)} = \left(\frac{Average\ Price_{(0,t)} - Average\ Price_{(Cont\ disc\ breach,-1)}}{Average\ Price_{(Cont\ disc\ breach,-1)}}\right) - 1$$

The facts of the case were that after the disclosure of the fraud the stock price increased compared to the average price during the period of the fraud. Subtracting the price after the fraud by the average price during the period of the fraud would result in a gain as a result of the fraud that is a nonsensical finding. The Court introduced an approach that would overcome that finding.

The Court calculated the average price of the shares during the fraud period and subtracted it from the average price of the shares during the three days after the fraud was revealed. The result that was derived was a more realistic one but a criticism could be the arbitrary nature of the event window selected by the Court. They chose three days. The underlying rationale for a three day window was not provided by the Court. A data snooping bias is introduced into the quantification of loss if the Court simply adjusts the size of the event window until a realistic and economic solution presents itself.

Also, comparing the average price before and after does not account for that component of share returns that are a result of general market conditions. Also in the fraud period other non-fraud related events could also occur that are not addressed by taking the average. Further, for consistency a maximum event window of (0, 5) is used in this paper.

D. Comparing the Models:

CARs for event windows up to and including five days after the event are calculated using the formula:

$CAR_{(0,t)} = \sum_0^t AR_t$, where t = 0,…,5

The difference between the CAR estimated by the market model is compared to the other three methods to identify any difference in the estimation of loss. Given the acceptance of the market model in U.S. case law and its' theoretical finance background, a significant difference between the market model and the other methods supports use of the market model. The difference is calculated as follows:

$$\text{Difference in CARS}_{(0,\,t)} = Market\ Model\ CAR_{(0,t)} - Other\ Model\ CAR_{(0,t)}$$

The greater the difference between the models the more support for the proposition that the market model is distinct in its estimation of loss.

The mean difference in CARS is given by:

$$Mean\ difference\ in\ CARS_{(0,t)} = \frac{1}{31}\sum_{s=1}^{31}(Market\ Model\ CAR_{s,(0,t)} - Other\ Model\ CAR_{s,(0,t)})$$

where t = 0,..5

An upward bias is inherent in taking the difference in CARs because a CAR is an accumulation of the abnormal returns before it and so a large abnormal return on a prior event day would influence the CAR for the following day. To overcome that bias the difference in abnormal returns is calculated:

$$\text{Difference in ARS}_t = Market\ Model\ AR_t - Other\ Model\ AR_t$$

The mean difference in abnormal returns is calculated using the following formula:

$$Mean\ difference\ in\ ARS_t = \frac{1}{31}\sum_{s=1}^{31}(Market\ Model\ AR_{s,t} - Other\ Model\ AR_{s,t})$$

where t = 0,..5

To calculate the statistical significance of the differences in the estimation of loss a Wilcoxon signed rank test is used because it is non-parametric. Kolmogorov-Smirnov and Shapiro-Wilk tests of normality revealed that the distribution of differences is non-normal and not symmetric. Therefore, a t-test that is commonly used in the finance literature could not be applied in this paper. A Wilcoxon signed rank test was used to test the hypotheses that:

H_o: $Mean\ difference\ in\ CARS_t = 0$

H_A: $Market\ model's\ estimate\ is\ different$

H_o: $Mean\ difference\ in\ ARS_t = 0$

H_A: $Market\ Model's\ estimate\ is\ different$

IV. Data

To assess the various methods for quantifying total shareholder loss actual events were obtained. The important aspects of the events are in particular the day that the fraud/non-disclosure commenced and the date that an announcement was made by the concerned company regarding their involvement in the fraud.

The use of actual events provides a practical application of the various methods of quantifying loss adopted in the U.S. to an Australian context.

A. Infringement Notice data

The ASIC website contains a media release section consisting of ASIC related news including information related to the payment of infringement notices by companies. Part 9.4AA of the *Corporations Act 2001* is titled "Infringement notices for alleged contraventions of continuous disclosure provisions". Under S1317DAB the purpose of the part is to provide an alternative to civil proceedings under Part 9.4B for an alleged contravention of subsection 674(2) or 675(2). The size of the penalties increase with the market capitalisation of the fined company and are for $33 000, $66 000 and $100 000.

Thirteen infringement notices have been issued to date under Part 9.4AA. The date of the alleged fraud is identified in the notice as well as the day that the fraud-related information was published by the ASX (Event Day). Those dates will allow for the calculation of damages using the various techniques outlined in the methods section. The companies that paid the fine imposed by the infringement notices that are included in the data for this paper are:

1) Solbec Pharmaceuticals Limited, ($33 000 penalty)
2) QRSciences Holdings Limited, ($33 000 penalty)
3) SDI Ltd, ($33 000 penalty)
4) Avastra Limited, ($33 000 penalty)
5) Astron Limited ($66 000 penalty)
6) Avantogen Limited ($33 000 penalty)
7) Promina Group Limited ($100 000 penalty)
8) Raw Capital Partners Limited ($33 000 penalty)
9) Centrex Metals Limited ($33 000 penalty)
10) Rio Tinto Limited ($100 000 penalty)
11) Commonwealth Bank of Australia ($100 000 penalty)
12) Citigold Corporation ($33 000 penalty)

B. Enforceable Undertakings data

As an alternative to infringement notices S 93AA of the *Australian Securities and Investments Commission Act 2001 (Cth)* empowers ASIC to accept an enforceable undertaking [North(2010)]. An enforceable undertaking is defined in ASIC Regulatory Guide -100 (1.1):

Enforceable undertakings are one of a number of remedies available to ASIC for breaches of the legislation ASIC is responsible for enforcing. It is an administrative settlement we may accept as an alternative to court action or certain other administrative actions.

ASIC Regulatory Guide -100 (1.3) describes the purpose of enforceable undertakings:

Our power to accept enforceable undertakings enhances our ability to enforce compliance with the law. We see enforceable undertakings as an important component in our array of enforcement remedies to influence behaviour and encourage a culture of compliance for the benefit of all participants in the market we regulate.

ASIC cannot compel nor can the other party compel ASIC to accept an enforceable undertaking [North(2010)]. Four enforceable undertakings including the day of the alleged fraud and the day of the subsequent release of information to the ASX are included in the data set.

Those enforceable undertakings consist of the following companies:

13) Plexus International Ltd (2001)
14) Uecomm (2001)
15) Multiplex Group (2006)
16) TZ Ltd (2007)

C. ASIC court action data

Apart from infringement notices and enforceable undertakings, ASIC has also been successful in three court actions for breaches of the statutory continuous disclosure provisions. These cases are another source of data containing the fraud date and the date of the corrective disclosure:

17) *ASIC v Southcorp Ltd (No 2)(2003) 130 FCR 406*
18) *ASIC v Chemeq Ltd (2006) 58 ACSR 169 (1st event)*

19) *ASIC v Chemeq Ltd (2006) 58 ACSR 169 (2nd event)*

20) *ASIC v Fortescue Metals Group (No 2)[2011] FCAFC 68*

Another court case is the subject of an appeal before the High Court:

21) *ASIC v Macdonald (No 11) (2009) 230 FLR 1*

D. Shareholder class action data

A number of class action suits have been launched but none have been successful to date:

22) Andrew Taylor v Telstra Corporation Limited ACN 051 775 556; was settled out of court for $5 million.

23) Dorajay Pty Ltd v Aristocrat Leisure Ltd [2008] FCA 1311; was settled out of court for $145 million.

24) Settlement with *Downer EDI Limited*

25) Settlement with *Oz Minerals Ltd*

There are also a number of class actions that are progressing through the court system that include (not exhaustive):

26) Transpacific Industries Group

27) Allco Finance Group Ltd

28) Gunns Ltd

29) Credit Corp Group Ltd

30) Centro Retail Group (settled May 2012)

31) Centro Properties Group (settled May 2012)

The fraud and event days for class actions 26 – 31 were obtained from the IMF (Australia) Ltd website. IMF (Australia) Ltd is a litigation funder. The minimum claim size of actions that IMF (Australia) Ltd will be involved in is AUD $2 million.

Table 1: Sample Description by Year

Table 1 contains the number of corrective disclosures across different types of legal action and industry. Panel A contains four distinctive types of legal action. Panel B contains the number of corrective disclosures by industry type.

Panel A: Number of corrective disclosures by type of legal action

Year	*ASIC Infringement Notice*	*ASIC Enforceable Undertakings*	*ASIC Court Actions*	*Shareholder Class Actions*	*Total*
2000		1			1
2001		1			1
2002			1		1
2003			1	1	2
2004	1		2		3
2005	3	1	1	1	6
2006	4			1	5
2007	2	1			3
2008	1			5	6
2009	1			1	2
2010				1	1
Total	12	4	5	10	31

Table 1: Sample Description by Year

Table 1 contains the number of corrective disclosures across different types of legal action and industry. Panel A contains four distinctive types of legal action. Panel B contains the number of corrective disclosures by industry type.

Panel B: Number of corrective disclosures by industry

Year	*Metals and Mining*	*IT*	*Health Care*	*Financials*	*Materials*	*Telecomms*	*Industrials*	*Consumer Staples*	*Consumer Discretionary*	*Total*
2000					1					1
2001						1				1
2002								1		1
2003					1				1	2
2004	1		2							3
2005	1	1	2	1		1				6
2006		1	2	1			1			5
2007	2						1			3
2008	1			5						6
2009	1						1			2
2010					1					1
Total	6	2	6	7	3	2	3	1	1	31

E. Announcement Data

Actual announcement data for each stock was also sourced from the Announcements section of the ASX website. The timestamp for each announcement was obtained from Morningstar DatAnalysis. Where an announcement occurred after the close of trade then the following business day was defined as the event day.

F. Stock and index data

Daily closing share price data and closing bid-ask data for each of the companies involved was obtained from Bloomberg. Dividend amounts and ex-dividend dates were sourced from Morningstar DatAnalysis. Daily market index data for the S&P/ASX 200 Accumulation Index was also obtained from Bloomberg.

V. Results

Table 2 contains the aggregate results for the ASX200 Accumulation Index with closing share price data. The average market return for each of the six event windows was close to zero. Abnormal returns were at their highest for dates 0 & 1. Returns became positive from event window two that suggest that the information was fully impounded after one day because almost all of the events are negative news. The average abnormal return for the market model based event study was -11.6% for the event day and -5.1% for the day after the event. The abnormal returns for the event day are significantly negative at the one-percent level based on a Wilcoxon signed rank test. Abnormal returns are significantly negative at the five-percent level for event day one. These results for the market model indicate that the market impounds most of the information contained in the corrective disclosure on the event day and one day after. These results lend some support for the efficient markets hypothesis because the market quickly impounds the new information into the stock price.

Using the mid-point of the bid-ask spread (table 3) the market model produced similar results for the event day but for the day after the event day the abnormal return was smaller at -3.7%. Bid-Ask unexpected returns became positive for T+2 (median) and T+3 (mean). However, unexpected returns became negative again for T+4 and T+5 but were insignificantly so. Tables 2 and 3 show that abnormal returns were statistically significant at the one-percent level for only the event day.

For the industry model like the market model table 2 highlights that abnormal returns were only statistically significant at the one-percent level for the event day. Table 2 also shows that for event date one the Wilcoxon t-stat was statistically significant at the five-percent level. Results using the midpoint of the bid-ask (Table 3) produced statistically significant results for only the event day. Those results support the finding that the market and industry require only the event day to fully impound the information contained in the truthful disclosure and probably part of the day after as well. The magnitude of the unexpected returns for the event day were almost equal; -10.8% with closing price data and -10.6% for the midpoint of the bid-ask spread. However, that gap increased on T+1 where closing price data produced a return of -5.4% and -4% taking the mid-point of the bid-ask spread.

Panel B in Table 2 shows that for the market capitalisation model on the event day the average loss was -11.5% and was statistically significant at the one-percent level. Like the market model based event study returns for event date one were significant at the five percent level. The findings support the market's impounding of information on the event day and one day after. The midpoint results in table 3 support the findings in table 2 except for event date one.

On first glance at the results in Panel D of Table 2 the average loss appears excessive in comparison to the other methods. The reported loss by the average price model is approximately twice that of the other methods. Given that the average price during the fraud is equally weighted those prices close to the time of the fraud have the same weight as more recent prices that are lower as news of the fraud is about to be released to the market. Further, the average price model factors in all events between the time of the fraud and the revelation of the truth on the event day. The average price model attempts to penalise a company not only for the subsequent drop in the stock price after the announcement but for also falsely inflating the stock price during the fraud period.

The average price model is calculated differently to the other methods and cannot be partitioned into component abnormal returns for each date in the event window. For the event day the average loss is -22.8% with closing prices and -23.7% with bid-ask data. However, there is a large discrepancy between mean and median losses.

The median loss for closing price data was -10.3% and for bid-ask data it was -12.9% on the event day. A difference from the mean return of -12.4% for closing price data and -10.78% for bid-ask data. This finding is indicative of a number of events recording very large losses based on the average price method.

Table 2 Daily Abnormal Returns by Method - Closing Prices

Panel A reports daily abnormal returns for the Market Model. Panel B reports daily returns for the Market Capitalisation Model. Panel C reports daily abnormal returns for the Industry Model. Panel D reports daily returns for the Average Price Model.

	Abnormal Returns (%)			
Event Date	**Mean**	**Median**	**Wilcoxon t-stat**	**p-value**
Panel A: Daily Abnormal Returns for the Market Model (Closing Prices)				
0	-11.638	-4.980	-185.0	<.0001
1	-5.075	-3.914	-106.0	0.036
2	1.043	0.081	8.0	0.878
3	1.694	0.247	42.0	0.419
4	-0.216	-0.016	-25.0	0.632
5	-1.478	-0.512	-69.0	0.181
Panel B: Daily Returns for the Market Capitalisation Model (Closing Prices)				
0	-11.459	-2.778	-140.0	0.001
1	-4.204	-4.146	-91.5	0.046
2	1.057	0.000	-8.0	0.859
3	1.496	0.000	22.5	0.635
4	-0.068	0.000	-13.0	0.761
5	-1.260	0.000	-24.5	0.544
Panel C: Daily Abnormal Returns for the Industry Model (Closing Prices)				
0	-10.811	-3.246	-168.0	0.000
1	-5.412	-3.553	-109.0	0.030
2	1.156	0.302	24.0	0.646
3	1.206	0.557	46.0	0.376
4	0.022	-0.216	-20.0	0.702
5	-1.337	-0.559	-66.0	0.201
Panel D: Daily Returns for the Average Price Model (Closing Prices)				
0	-22.763	-10.345	-134.5	0.002
1	-24.458	-16.029	-162.0	0.001
2	-24.803	-13.471	-161.0	0.001
3	-24.512	-10.345	-158.0	0.001
4	-24.419	-11.034	-154.0	0.001
5	-24.438	-11.739	-155.0	0.001

Table 3 Daily Abnormal Returns by Method - Bid-Ask

Panel A reports daily abnormal returns for the Market Model. Panel B reports daily returns for the Market Capitalisation Model. Panel C reports daily abnormal returns for the Industry Model. Panel D reports daily returns for the Average Price Model.

	Abnormal Returns (%)			
Event Date	**Mean**	**Median**	**Wilcoxon t-stat**	**p-value**
Panel A: Daily Abnormal Returns for the Market Model (Bid-Ask)				
0	-11.408	-5.269	-174.0	0.000
1	-3.661	-2.639	-95.0	0.061
2	-0.031	0.154	-12.0	0.819
3	0.446	0.081	7.0	0.894
4	-0.188	-0.670	-29.0	0.578
5	-1.662	-0.476	-83.0	0.105
Panel B: Daily Returns for the Market Capitalisation Model (Bid-Ask)				
0	-11.253	-4.274	-158.0	0.001
1	-2.793	-2.888	-87.5	0.071
2	-0.030	0.000	-17.5	0.682
3	0.256	-0.523	-17.5	0.725
4	-0.003	0.000	-11.0	0.807
5	-1.490	0.000	-32.0	0.372
Panel C: Daily Abnormal Returns for the Industry Model (Bid-Ask)				
0	-10.620	-4.007	-161.0	0.001
1	-3.991	-2.671	-99.0	0.051
2	0.102	0.124	-2.0	0.970
3	-0.042	0.715	23.0	0.660
4	0.067	-0.421	-22.0	0.674
5	-1.503	-0.471	-74.0	0.150
Panel D: Daily Returns for the Average Price Model (Bid-Ask)				
0	-23.699	-12.919	-152.5	0.001
1	-24.509	-13.307	-162.0	0.001
2	-24.748	-14.733	-160.0	0.001
3	-24.707	-17.001	-158.0	0.001
4	-24.760	-17.273	-156.0	0.001
5	-24.885	-17.325	-157.0	0.001

A. Difference in loss estimates (CARs)

Although theoretically superior and accepted in U.S. courts, the market model based event study based on tables 2 and 3 appears to estimate loss very closely to the market capitalisation model and industry model. However, simply comparing the average or median losses leads to artificial findings.

As each event actually happened it is more accurate to calculate the differences within each event and then report the average and mean difference. Therefore, to compare estimates of loss amongst the models the difference for each event was calculated. Table 4 contains the average difference between the Market model cumulative abnormal returns and the cumulative abnormal returns for the other methods. The CAR figure is also a measure of shareholder loss that sums the event date returns for the event window period (except for the average price model). Therefore, the means reported in Table 4 provide an average per event difference. A Wilcoxon signed rank test of the null hypothesis that the mean difference is equal to zero is reported.

i. Market model based event study and the market capitalisation method

The crucial comparison occurs for event windows (0, 0) and (0, 1). For a window of (0, 0) the average difference is -0.179%. For a window of (0, 1) the average difference per event rises to -1.049%. A maximum difference of -1.23% is reached for event window (0, 5). Although the difference between the market model and market capitalisation methods is not statistically significant on the event day. The difference between the models is statistically significant at the five-percent level for window (0, 1). That window also coincides with the window most often used in Courts and also shown by Table 2 to contain the entire effect of an event. The significance of the difference for event window (0, 1) provides support for the market model's distinct estimation of loss compared to the market capitalisation method.

Losses were also estimated using the mid-point of the bid-ask and is contained in Table 5. For a window of (0, 0) the average difference is -0.154% and -1.022% for a window of (0, 1). The magnitude of the difference reaches a maximum like that for the closing price estimates at event window (0, 5) of -1.19%. Like that for closing price data, the difference at window (0, 1) was statistically significant at the five-percent level. The results in Table 5 confirm those for Table 4 and provide evidence to support the difference in estimation between the market model and the market capitalisation method.

The loss estimates generated by the market capitalisation approach tend to be smaller than that for the market model because the latter includes the effect of market wide movements. The results show that deference should be shown for the theoretically superior market model because compared to the market capitalisation approach for the crucial event window (0, 1) the market model's estimate of shareholder loss was found to be significantly different statistically.

ii. Market model based event study without and with an industry adjustment

The mean difference between the market model's estimate of loss (CAR) and the industry model's estimate of loss (CAR) is shown in Panel B of Table 4. For a window of (0, 0) the average difference is -0.827% which is greater than for the market capitalisation model. For a window of (0, 1) the difference decreases to -0.49%. The differences at event windows (0, 0) and (0, 2) are statistically significant at the five percent level. The p-value at event window (0, 1) is 0.051 and so is narrowly insignificant at the five percent level. The results in Table 4 for closing price data clearly show that the market model estimates shareholder loss significantly different from the industry model.

When the mid-point of the bid ask is used the differences in loss estimates decline in magnitude (Table 5). For a window of (0, 0) the average difference is -0.787% and with a window of (0, 1) declines to -0.457%. Like the results in Table 4, the results in Table 5 contain differences at event windows (0, 0) and (0, 2) that are statistically significant at the five percent level. However, the difference at event window (0, 1) is only significant at the ten percent level.

The results in Tables 4 and 5 highlight that the market model estimates shareholder loss differently to the industry model but more so on the event day.

iii. Market Model based event study and the average price method

The greatest discrepancy in the estimation of loss occurred between the market model and the average price model (Table 4, Panel C). For an event window of (0, 0) the average difference was 11.125%. For window (0, 1) the average difference was 7.745%. The median results report much narrower discrepancies than mean losses. Overall these results show that the average price method is inaccurate given the theoretical strength of the market model. With bid-ask data (Table 5, Panel C) the differences remained high: 12.291% (0, 0) and 9.441% (0, 1). Differences were narrowly insignificant at the five percent level for event window (0, 0) reporting a p-value of 0.051 with closing price data. Table 5 highlights that the difference on the event day was statistically significant for bid-ask data at the one percent level. Tables 4 and 5 reveal that the market model estimates loss differently to the average price model for the crucial event day.

Summary

Overall tables 4 and 5 provide evidence in support of the Market Model given its theoretical underpinnings and distinct method of estimation of loss. However, the results also highlight that one cannot make this assertion unreservedly because none of the panels contained a statistically significant difference for both event windows (0, 0) and (0, 1).

Table 4 Differences in CARs - Closing Prices

Panel A reports the difference in CARS between the Market Model and Market Capitalisation Model. Panel B reports the difference in CARs between the Market Model and and the Industry Model. Panel C reports the difference in CARs between the Market Model and Average Price Model.

	Difference in CARS (%)				
Event Window	**Mean**	**Median**	**Wilcoxon t-stat**	**p-value**	**No. of Obs.**
Panel A: Difference in CARs between the Market Model and Market Capitalisation model					
(0, 0)	-0.179	-0.194	-4.0	0.939	31
(0, 1)	-1.049	-0.402	-117.0	0.019	31
(0, 2)	-1.063	-0.709	-93.0	0.067	31
(0, 3)	-0.864	-0.402	-66.0	0.201	31
(0, 4)	-1.013	-0.625	-65.0	0.208	31
(0, 5)	-1.230	-0.850	-94.0	0.064	31
Panel B: Difference in CARs between the Market Model and Industry Model					
(0, 0)	-0.827	-0.070	-109.0	0.030	31
(0, 1)	-0.490	-0.091	-99.0	0.051	31
(0, 2)	-0.603	-0.190	-107.0	0.034	31
(0, 3)	-0.115	-0.157	-84.0	0.100	31
(0, 4)	-0.353	-0.204	-98.0	0.053	31
(0, 5)	-0.494	-0.192	-90.0	0.077	31
Panel C: Difference in CARs between the Market Model and Average Price Model					
(0, 0)	11.125	5.164	99.0	0.051	31
(0, 1)	7.745	1.264	58.0	0.262	31
(0, 2)	9.134	2.217	89.0	0.081	31
(0, 3)	10.536	3.745	88.0	0.085	31
(0, 4)	10.227	0.292	67.0	0.194	31
(0, 5)	8.768	0.182	45.0	0.387	31

Table 5 Differences in CARs - Bid-Ask

Panel A reports the difference in CARS between the Market Model and Market Capitalisation Model. Panel B reports the difference in CARs between the Market Model and and the Industry Model. Panel C reports the difference in CARs between the Market Model and Average Price Model.

Event Window	Difference in CARS (%) Mean	Median	Wilcoxon t-stat	p-value	No. of Obs.
Panel A: Difference in CARs between the Market Model and Market Capitalisation model					
(0, 0)	-0.154	-0.139	-6.0	0.909	31
(0, 1)	-1.022	-0.335	-118.0	0.018	31
(0, 2)	-1.023	-0.669	-92.0	0.071	31
(0, 3)	-0.832	-0.372	-69.0	0.181	31
(0, 4)	-1.018	-0.584	-72.0	0.162	31
(0, 5)	-1.190	-0.775	-98.0	0.053	31
Panel B: Difference in CARs between the Market Model and Industry Model					
(0, 0)	-0.787	-0.058	-126.0	0.011	31
(0, 1)	-0.457	-0.133	-89.0	0.081	31
(0, 2)	-0.590	-0.232	-110.0	0.029	31
(0, 3)	-0.102	-0.121	-78.0	0.128	31
(0, 4)	-0.357	-0.166	-94.0	0.064	31
(0, 5)	-0.516	-0.276	-98.0	0.053	31
Panel C: Difference in CARs between the Market Model and Average Price Model					
(0, 0)	12.291	4.530	130.0	0.009	31
(0, 1)	9.441	2.679	85.0	0.096	31
(0, 2)	9.649	2.176	81.0	0.114	31
(0, 3)	10.053	1.708	80.0	0.119	31
(0, 4)	9.919	0.560	67.0	0.194	31
(0, 5)	8.382	0.414	39.0	0.454	31

B. Difference in abnormal returns

To remove the upward bias inherent in CARs, the difference for each event date rather than event window was estimated. This robustness check provided further evidence in support of the findings in Tables 4 and 5.

i. Market model based event study and the market capitalisation method

Panel A of Table 6 highlights that the average difference in abnormal returns on the event day is -0.179% and is not statistically significant. The mean difference reaches a peak of -0.87% at t=1 and then reaches a low of -0.014% at t=2. The difference at t =1 is statistically significant at the five percent level. As the results of tables 2 and 3 highlighted most of the abnormal behaviour surrounding events is contained on the event day and one day after (t=1). The significance of the difference at t = 1 provides support for the proposition that the market model based event study estimates loss differently to the market capitalisation method.

Panel A of Table 7 supports the findings for closing price data in Table 6. In fact the significance of the difference at t=1 improves to the one percent level. However, the market model estimates loss similarly to the market capitalisation method on the event day. The mean difference on the event day is -0.154% and reaches a maximum of -0.868% at event date t=1. The market model has a greater capacity to account for market wide factors after the event is initially announced. These results reinforce the finding that the market model based event study estimates shareholder loss differently to the market capitalisation method and given the strength of the market model's theoretical underpinnings deference should be shown to it instead of the market capitalisation approach that is unable to isolate market wide factors one day after the event when that distinction is more apparent to a market adjusted model like the market model.

ii. Market model based event study without and with an industry adjustment

Both models estimate loss to a similar level. The mean difference between the abnormal returns for the market model based event study and the market model with an industry adjustment is -0.827% on the event day and 0.338% at t=1. Notably at t=1 the median difference is only -0.007%. After removing the effects of accumulation by comparing abnormal returns table 6 reveals that the mean differences are statistically significant at the five percent level for the event day alone. However, the event day is a crucial day and given that the theoretical underpinnings of the market model are strongest, deference to the market model should be shown because it estimates loss differently to the industry model.

Panel B of Table 7 supports the findings in Table 6 using the midpoint of the bid-ask spread. The mean difference on the event day is -0.787% and is 0.330% at t=1. The results for bid ask data in Table 7 supports the findings in Table 6 and highlight that for the event day the difference is statistically significant at the five percent level.

iii. Market Model based event study and the average price method

The largest differences between the estimates of loss occur between the market model based event study and the average price method. The average price method compares the average price during the post event window with the average price during the period of the fraud and is an unadjusted measure of loss. The average price model cannot be partitioned into component event dates like the other methods of loss estimation and correspondingly the percentage losses for each event date cannot be add. Hence, the results for Panel C for tables 6 and 7 are identical to those for the CARs in Panel C of tables 4 and 5. Therefore, the findings for the CARs in the previous section apply here. Tables 4 and 5 reported that the market model estimates loss differently to the average price model for the crucial event day.

Summary

The results in tables 6 and 7 (ARs) support the findings in tables 4 and 5 that focussed upon the difference in CARs. The market model estimates loss to shareholders differently from each of the other estimation methods tested in the paper to a statistically significant level. Given the strength of the theoretical underpinnings of the Market Model, it should be used in shareholder loss estimation.

Table 6 Differences in ARs - Closing Prices

Panel A reports the difference in ARs between the Market Model and Market Capitalisation Model. Panel B reports the difference in ARs between the Market Model and and the Industry Model. Panel C reports the difference in ARs between the Market Model and Average Price Model.

Event Date	Abnormal Returns (%) Mean	Median	Wilcoxon t-stat	p-value	No. of Obs.
Panel A: Difference in ARs between the Market Model and Market Capitalisation model					
0	-0.179	-0.194	-4.0	0.939	31
1	-0.870	-0.213	-115.0	0.022	31
2	-0.014	-0.197	-40.0	0.442	31
3	0.198	-0.005	13.0	0.804	31
4	-0.148	-0.203	-52.0	0.316	31
5	-0.218	-0.326	-103.0	0.041	31
Panel B: Difference in ARs between the Market Model and Industry Model					
0	-0.827	-0.070	-109.0	0.030	31
1	0.338	-0.007	18.0	0.731	31
2	-0.113	-0.070	-82.0	0.109	31
3	0.488	-0.055	-56.0	0.280	31
4	-0.238	-0.017	-59.0	0.254	31
5	-0.141	-0.011	-39.0	0.454	31
Panel C: Difference in ARs between the Market Model and Average Price Model					
0	11.125	5.164	99.0	0.051	31
1	7.745	1.264	58.0	0.262	31
2	9.134	2.217	89.0	0.081	31
3	10.536	3.745	88.0	0.085	31
4	10.227	0.292	67.0	0.194	31
5	8.768	0.182	45.0	0.387	31

Table 7 Differences in ARs - Bid-Ask

Panel A reports the absolute difference in ARs between the Market Model and Market Capitalisation Model. Panel B reports the absolute difference in ARs between the Market Model and and the Industry Model. Panel C reports the absolute difference in ARs between the Market Model and Average Price Model.

	Abnormal Returns (%)				
Event Date	Mean	Median	Wilcoxon t-stat	p-value	No. of Obs.
Panel A: Difference in ARs between the Market Model and Market Capitalisation model					
0	-0.154	-0.139	-6.0	0.909	31
1	-0.868	-0.346	-131.0	0.008	31
2	0.000	-0.141	-28.0	0.592	31
3	0.190	-0.009	7.0	0.894	31
4	-0.186	-0.164	-53.0	0.307	31
5	-0.172	-0.293	-95.0	0.061	31
Panel B: Difference in ARs between the Market Model and Industry Model					
0	-0.787	-0.058	-126.0	0.011	31
1	0.330	0.001	48.0	0.355	31
2	-0.133	-0.083	-95.0	0.061	31
3	0.488	-0.050	-43.0	0.408	31
4	-0.256	-0.011	-65.0	0.208	31
5	-0.159	-0.028	-76.0	0.139	31
Panel C: Difference in ARs between the Market Model and Average Price Model					
0	12.291	4.530	130.0	0.009	31
1	9.441	2.679	85.0	0.096	31
2	9.649	2.176	81.0	0.114	31
3	10.053	1.708	80.0	0.119	31
4	9.919	0.560	67.0	0.194	31
5	8.382	0.414	39.0	0.454	31

C. Non-Synchronous Trading

To overcome the problem of non-synchronous stock returns found in daily closing price data a Scholes-Williams market model was estimated. Errors in variables would be more likely to be found in highly traded and lowly traded stock. Both highly traded and less frequently traded stocks are found in the sample of stocks used in this paper.

The effect of non-synchronous measurements of daily stock returns using closing price/bid-ask data is that the estimators of beta could be biased without a Scholes-Williams adjustment.

The losses calculated with a market model using an OLS beta were compared with those calculated using a Scholes-Williams adjusted beta. Losses in court using the market beta are based on cumulative abnormal returns particularly event windows (0, 0) and (0, 1).

Table 8 reveals that the losses calculated using a Scholes-Williams beta are different to those using an OLS beta at the one-percent level of significance for the event day. However, for an event window of (0, 1) the difference is only significant at the ten percent level. Given the importance of the event day in loss estimation, where a Scholes-Williams beta is justified because of the stock being a lowly or highly traded stock then it would appear to estimate losses differently to a standard OLS estimate of beta and so should be used in place of an OLS beta.

To identify whether the market model based on an OLS beta is significantly different in its estimation of loss to the Scholes-Williams beta, differences of abnormal returns for each event date are calculated removing the bias induced by accumulating the abnormal returns inherent in a CAR measurement.

Table 9 highlights that a clear difference in estimation is evident for each event date at the one percent level of significance. As the AR results do not include an accumulation effect inherent in CAR results, Table 9 provides a more accurate measurement of the differences in loss estimation by both an OLS and Scholes-Williams beta estimation. Table 9 provides further support for the use of a Scholes-Williams beta where the stock is highly or lowly traded.

Table 8 Differences in CARs between the Market Model and Market Model (Scholes Williams)

Panel A reports the results with closing prices. Panel B reports results with the midpoint of the bid-ask.

	Difference in CARS (%)				
Event Window	**Mean**	**Median**	**Wilcoxon t-stat**	**p-value**	**No. of Obs.**
Panel A: Closing Prices					
(0, 0)	-0.004	-0.001	-157.0	0.001	31
(0, 1)	-0.004	-0.003	-90.0	0.077	31
(0, 2)	-0.007	-0.004	-159.0	0.001	31
(0, 3)	-0.007	-0.005	-53.0	0.307	31
(0, 4)	-0.010	-0.006	-116.0	0.020	31
(0, 5)	-0.010	-0.008	-87.0	0.088	31
Panel B: Bid-Ask					
(0, 0)	-0.004	-0.001	-150.0	0.002	31
(0, 1)	-0.003	-0.002	-97.0	0.056	31
(0, 2)	-0.006	-0.003	-152.0	0.002	31
(0, 3)	-0.006	-0.004	-41.0	0.431	31
(0, 4)	-0.010	-0.006	-107.0	0.034	31
(0, 5)	-0.010	-0.007	-77.0	0.134	31

Table 9 Differences in ARs between the Market Model and Market Model (Scholes Williams)

Panel A reports the results with closing prices. Panel B reports results with the midpoint of the bid-ask.

	Difference in ARS (%)				
Event Window	Mean	Median	Wilcoxon t-stat	p-value	No. of Obs.
Panel A: Closing Prices					
0	-0.004	-0.001	-157.0	0.001	31
1	0.000	-0.001	-178.0	0.000	31
2	-0.003	-0.001	-175.0	0.000	31
3	0.000	-0.001	-211.0	<.0001	31
4	-0.003	-0.001	-220.0	<.0001	31
5	0.000	0.000	-223.0	<.0001	31
Panel B: Bid-Ask					
0	-0.004	-0.001	-150.0	0.002	31
1	0.000	-0.001	-167.0	0.000	31
2	-0.003	-0.001	-167.0	0.000	31
3	0.000	-0.001	-208.0	<.0001	31
4	-0.003	-0.001	-208.0	<.0001	31
5	0.000	0.000	-211.0	<.0001	31

VI. Conclusion

This paper has quantitatively assessed four key methods used in U.S. securities fraud matters: the market model based event study, market model based event study with an industry adjustment, market capitalisation approach and the modified recissory (average price) method. The first three methods have been used most widely and the modified recissory method to a lesser extent because it has been argued to require privity of contract between the buyer and seller. In a post- *Dura* legal environment the use of price and value lines using retroactively fitted regression analysis is no longer in favour in U.S courts. Attention has turned to actual loss rather than stock price inflation. Recent literature and U.S case law has revealed that the market model based event study is the standard in damages estimation in U.S. securities fraud matters. This paper has extended the work of previous authors that identified the methods used in U.S. courts by providing a quantitative assessment of the variation of the other models from the market model based event study in an Australian context using actual breaches of Australian continuous disclosure obligations.

The market model based event study does quantify loss in a significantly different way to the market capitalisation method. The industry model estimates loss in a statistically different way to the market model based event study. The modified recissory method estimates loss differently to the market model. The market model is unique in its estimation of loss. However, the results highlight that the market model was significantly different from the other methods for either (0, 0) or (0, 1) for CARs and the event date or t = 1 for ARs. Given the importance of either of those windows/dates any difference in estimation provides a sufficient reason for the adoption of the market model given its superior theoretical underpinnings. The market model is more accurate because it adjusts for market conditions.

The implications of this paper are that in future continuous disclosure cases Australian Courts should support the use of a market model given its superior theoretical underpinnings and unique method of estimation. Research has shown that the simple market model is just as effective as more complicated models such as the industry model that also accounts for industry movements. Market adjusted models such as the market model account for market wide movements. Further, the market model has been accepted in U.S. courts in securities fraud matters.

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