

Market Behavior of Institutional Investors around Bankruptcies Announcements: Evidence from Australia

Professor Alex Frino

University of Sydney, Sydney, NSW 2006, Australia and CMCRC

Professor Stewart Jones

University of Sydney, Sydney, NSW 2006, Australia and CMCRC

Dr Andrew Lepone

University of Sydney, Sydney, NSW 2006, Australia and CMCRC

Wong, Jin Boon

University of Sydney, Sydney, NSW 2006, Australia and CMCRC

*This research was funded by the Sydney Futures Exchange under Corporations Regulation 7.5.88(2).

Abstract

This study seeks to examine and document the changes in shareholdings of institutional investors around bankruptcies announcements to provide empirical evidences and determine if institutional investors disadvantage small retail investors through information superiority. The results documented in this study found no unusual trading behavior by institutional investors in the immediate period surrounding bankruptcies announcements. Rather, we find that there is a gradual exit from these failed companies approximately 112 to 115 days prior to the event date. Further analysis shows that this exodus is caused by institutional investors reacting to the release of the bankrupt firms last financial statements. In addition, this research extends the financial distress literature by providing evidence that the lack of disclosures is the predominant cause of an exponential increase in information asymmetry prior to company failures. However, it is observed that disclosing and non-disclosing companies experience the same “sell-off” by institutional investors over the sample period. We posit that this is due to the findings that institutional investors that exit the firm have already sold off their shares after the release of the last financial reports.

1. Introduction

Over the last two decades, the roles of institutional investors within the stock markets have grown increasingly important, for example in the United States, institutional investors hold over 50 percent of the market value of common stock and trading by them constitutes about 70 percent of daily trading volume (see Lakonishok et al, 1992, Gompers and Metrick, 2001, Bennett et al., 2003). This growth in institutional presence¹ underlies the importance of understanding their trading behavior and their impact on firms and firm characteristics.

Whilst there have been numerous studies done on institutional holders and their relevant market behaviors, there have been no prior research documenting the relationship between institution investors and financially distressed firms. This topic is of particular interest to regulators, practitioners, academic and stakeholders of bankrupt firms as there are significant economic and social costs² associated with corporate failure (Altman, 1984, 2001). For instance, the study of institutional investors and their holding patterns can provide valuable insight into common social speculations that they exit financially failed firms prior to announcements of failures (leaving the average retail investor³ to bear the burden of failure).

¹ In the NYSE, it was noted by Siconolfi (1992) that institutional ownership of equity has grown rapidly and exceeds 50% of the value of outstanding equity during his sample period. Institutional ownership in other developed countries like Japan stands at around 63% (Kim and Nofsinger, 2005).

² In companies that failed financially, stakeholders of the firms are usually faced with little or no returns on their holdings (see for example, Frino, Jones and Wong, 2007).

³ In the 2004 ASX Share Ownership Study conducted by ASX, it was documented that there is an increasing number of Australians investing in share more than ever before. The study, the latest in an ASX series stretching back to 1991, showed that 55 percent of adult Australians (8 million people) now include shares in their investment portfolio, up from 51 percent in 2003 (7.4 million people). This growing number of “daddy and mummy investors” highlights the social and ethical responsibility of stock markets to protect

This line of research is consistent with the growing regulatory concern that institutional investors are trading on private information prior to price-sensitive “events” (e.g. earning announcements) and disadvantaging small retail investors. For example, in the US, prior to the adoption of SEC regulation FD in August, 2000, securities laws do not specifically prohibit selective disclosures to analysts or institutional investors. Berenbeim (1994) noted that during this period, institutional investors do indeed have superior access to information via private information release from managers. Given this shift in legislative requirements and the recent reforms (e.g. Sarbanes-Oxley Act of 2002 I the US, CLERP 9 in Australia, etc) in response to unexpected corporate collapses around the world, it is indicative that there is a growing emphasis on providing more protection to retail investors by “leveling the playing field” with access to equal information set across investment groups (see also McNichols and Trueman, 1994). This notion is consistent with the fair trading, orderly and transparent environment philosophy that most stock exchanges¹ around the world subscribe to.

Prior literature analyzing institutional behavior around events provides support for these regulatory concerns. Studies like Ali, et al (2004), Ke and Petroni, (2004) and Pinnuck (2004) have observed that institution investors are able to execute profitable trades based on private information and that there is a positive relation between changes in institutional holdings and firms’ future earning and returns. Further to this, Frino, Jones and Wong (2007) also document a significant increase in information asymmetry between market participants in the immediate period around bankruptcy announcements.

unfair trading behavior that may lead to public outcries, backlashes and deterioration in investors’ confidence.

Their results appears to suggest that there is a lack of sufficient disclosures or publicly available information to clarify the ambiguous financial status of these distress firms around a critical period which may severely impair the average investors' ability to trade on equitable grounds. This is likely to be of especial concern if institution investors are found to be in possession of private information during this period which allows them to profit at the expense of the average retailer investor.

Given these regulatory concerns, this study seeks to examine and document the changes in shareholdings of institutional investors around bankruptcies announcements to provide empirical evidences and determine if institutional investors disadvantage small retail investors through information superiority. In addition, this study extends the work of Frino, Jones and Wong (2007) by formally testing the adequacy of current disclosures requirements (in particular Listing Rule 3.1 in Australia) and investigate if the lack of public information release (in the form of announcements) is the predominant cause of the significant increase in information asymmetry in bankrupt firms. The results of this study extend the growing literature on institutional behaviors and are of potential interest to regulators and stock exchange officials for future legislative reforms and enforcement of current rules.

For these purposes, the authors elect to conduct the study based on stocks listed in the Australia Securities Exchange (ASX). There are several motivation for doing this, first of all, the availability of a unique dataset in Australia that provides institution holdings on a daily basis provides an ideal experimental setting to formally examine the issues

mentioned. This proprietary dataset provided by the Australian Securities Exchange (ASX) contains detailed shareholdings information on daily basis that allows us to pinpoint the exact trade movements of institution investors. With this dataset, it allows the authors to capture important behavior traits and more accurately study the relationship and impact between their movements, information asymmetry, share prices, volume and volatility.

Whilst the literature on institution behavior around price-sensitive announcements (except failures) has been well-researched, there are several limitations with these analyses due to their heavy reliance on noisy⁴ proxies such as trade size (see Cready, 1988 and Lee, 1992). These proxies are at best an estimation of institutional movements and are sometimes inaccurate as wealthy individual investors may be able to command similar trade sizes and distort the results. Other studies that monitor the behavior of institutional holders have generally use data gathered from sources such as Thomson Financial/CDA Spectrum (quarterly)⁵, Moody's handbook guide of common stock (quarterly), Morningstar (monthly), or Standard and Poors' Security Owners' Stock Guides (monthly). Whilst the timeliness of these data may be sufficient for explanatory research, there are some limitations when it is used for event type studies that seek to track responses to related information release in the same period. For instance, studies that seek to capture changes in institution holdings over the immediate period

⁴ See, for example, Lee (1992) as to why trade size can be a noisy proxy for trading activities.

⁵ Most recent studies (see Bushee and Goodman, 2007) use the Thomson Financial/CDA Spectrum which it is derived from institutional investors' 13f filings (all institutional investors managing more than \$100 million in equity ownership must file a quarterly report of all equity holdings greater than 10,000 shares or \$200,000 in market value to the Security and Exchange Commission (SEC) in quarterly 13f filings). Although Thomson Financial Spectrum reports the name of the institutional holder, most recent trade, and the number of shares held by each institution for all publicly traded companies, it is available only on a quarterly basis.

surrounding announcements (e.g. several days prior to and after) will be restricted by this “outdated” data.

In addition to the availability of a unique proprietary dataset, another motivation for using an Australian sample is the difference in legislation. Much of the previous literature on financially distressed firms is based on US failure samples which are governed by US bankruptcy legislation. There are major differences in Australian and US bankruptcy legislation, suggesting that US empirical studies in this area may not be generalisable to Australia. One important difference is that Australian bankruptcy law is generally less permissive than the US (see Skeel, 2003 for an overview). For example, Australian law provides that once appointed the insolvency administrator has a limited period (28 days) to recommend to the creditors whether the company should be wound up or enter into a deed of arrangement (and if the deed of arrangement is not reached, there is a provision for automatic liquidation of the firm). In contrast, Chapter 11 provides no specific statutory limit when the debtor firm has to present a reorganization plan to creditors.⁶ The potential for “strategic bankruptcy” or the opportunistic behaviour of firms to exploit the permissive provisions of Chapter 11 has been well documented in the literature (see e.g., Delayney, 1991; Skeel, 2003). While Australian voluntary administration legislation cannot guarantee that such “strategic bankruptcy” does or can not occur, the relatively more stringent provisions (particularly in terms of requirements for debtor firms to make an expeditious settlement with creditors) are likely to reduce both the incentive and

⁶However, debtor firms have 120 days in which they have an exclusive right to present a reorganization plan to the creditors, and 180 days (from the date of filing of voluntary administration) to obtain acceptance of any reorganization plan from creditors (there is no provision in Chapter 11 requiring automatic transition to liquidation).

opportunity for firms to abuse the spirit of the legislation to the same extent that has occurred in US markets.

Furthermore, the uniqueness of Australia's disclosure environment allows us to develop a more refined research design, particularly in terms of identifying the event date. Much previous literature (see e.g., Clark and Weinstein, 1983) has defined the event window according to the bankruptcy filing date. As acknowledged by Clark and Weinstein (1983), while they could determine the filing date with a high degree of accuracy, the announcement date might not necessarily coincide with the filing date. It is possible that the announcement of failure to the market can precede or even follow the filing date.⁷ Under Australia's Continuous Disclosure regime (which is regulated by the Corporations Act (2001) and Australian Stock Exchange (ASX) Listing Rules), all listed firms must disclose any material information on a timely basis to the market which can affect the value of the firm's securities. Information for release to the market must be lodged by companies with the ASX's company announcement office (CAO), which is then immediately released to the market under Signal G (see Explanatory Note, ASX Listing Rules, Chapter 3, 97,575; and Chapter 15 of the listing rules). Because all Signal G market releases are electronically dispatched in 'real time', a very accurate determination can be made of the announcement or event date for all firms in our sample.

To examine the behavior of institution investors around bankruptcies announcements in Australia, a time series analysis of changes to the institutional holdings was utilized. To

⁷While recognizing this issue as a limitation to their study, Clark and Weinsten (1983) can provide no assurance about the number of firms in their sample which announced failure to the market before, on or after the filing date.

control for broad market factors, a control group that is carefully matched to the failed sample based on industry background, firm size and institutional holdings was obtained. Regression analyses using variables like decile-adjusted returns, volume and volatility were also conducted to account for firm specific factors. The results observed in this study do not show any unusual trading behavior by institutional investors in the immediate period surrounding bankruptcies announcements. Rather, we find that there is a gradual exit from these failed companies approximately 112 to 115 days prior to the event date. Given that the institutional concentration on event day is relatively high compared to the start of the sample period, we posit that the “sell-off” may be caused by a selected category of institutional investors that exit the firm based information events prior to bankruptcies announcements. Using the release of the last financial reports as an additional event date, we document the exodus of some institutional investors following the release of the last financial statements.

In addition, this research also extends the findings of Frino, Jones and Wong (2007). Results in this paper indicates that firm with no information release in the 50 days prior to failure announcements have significantly higher information asymmetry compared to firm that provide some forms of disclosures. We further examine if non-disclosing companies experience higher institutional exodus but no significant differences in changes were documented between disclosing and non-disclosing companies. We posit that this can be attributed to the “sell-off” effects after the release of the last financial reports.

The remainder of this thesis is organized as follows. Chapter 2 discusses the relevant literature on the market behavior of financially distressed firms, the relationship between bid-ask spread and information asymmetries and the evolution of modeling techniques used in distress forecasting. Chapter 3 develops the hypotheses relating to the holding behavior of institutional investors in financially distressed firms and the possible links between the existences of significant information asymmetries around failure announcements and the lack of disclosures in this period. Chapter 4 outlines the data collection procedure along with a presentation of the descriptive statistics and Chapter 5 discusses the methodology used to evaluate hypotheses formulated in the previous chapter. The results of the institution behavior and links between disclosures and information asymmetries are presented in Chapter 6. Conclusions and suggestions for future research are provided in Chapter 7.

2. Literature Review

The first section of this Chapter describes the relatively limited prior works on the market behavior of financially distressed firms. The follow section provides an overall view of the components of bid-ask spread. In particular, there is an emphasis on the adverse selection cost of the spread and its link to information asymmetries. Key findings and limitations of the studies are also highlighted with alternative equity markets (i.e. Australian Stock Exchange) proposed as a suitable environment to obtain a better approximation of the information asymmetry components. The final section of this Chapter relates information asymmetry to disclosures

2.1. Market behavior of Financially Distressed Firms

The announcement of corporate failure usually conveys important information about the future risk profile and market value of a firm's shares, such as recovery rate risk (Altman et al., 2005). As noted by Frino, Jones and Wong (2007) and Clark and Weinstein (1983), a bankruptcy announcement can signal changes in the probabilities of alternative future share values (for instance, bankruptcy increases the possibility that the shares will become worthless⁸). Research to date indicates that corporate failure announcements are usually not complete surprises to the market – the market does impound a solvency deterioration signal into stock returns well before the event of failure. In fact, Aharony et al., (1980) report evidence that shareholders can experience abnormal losses up to a period of four to six years prior to the announcement of bankruptcy (similar results are reported in Brenner, 1981; Pettway and Sinkey, 1980 and Shick and Sherman, 1980).

Clark and Weinstein (1983) also reported similar evidences that document the existence of a bankruptcy announcement effect. By using monthly and daily data, they obtain fairly precise estimates of average shareholder losses concurrent with bankruptcy announcements. Using both raw and market adjusted returns they document substantial stock price declines on the event day itself, the day prior to announcement and the day after announcement. These findings are consistent with the view that market participants do not fully anticipate corporate failure. Consistent with previous literature, they report negative abnormal returns of up to 65% over a three year period leading up to failure. With their monthly data, they report average shareholder losses of 30% in the month

⁸ This thesis also found that all firms in our failed sample show a zero return to shareholders after the proceeds of liquidation is finalized which is consistent with Frino, Jones and Wong (2007).

leading up to failure. Over the three day period immediately prior to and following the announcement, Clark and Weinstein report a cumulative average return (CAR) of -47%, suggesting that the market does not fully anticipate bankruptcy announcements.

Frino, Jones and Wong (2007) revisited this topic recently and documented a similar trend with raw and decile-adjusted returns of -70.2% and -81.6% respectively over a 420 days period. However, while their sample of failed firms displayed greater declines in abnormal returns (total average returns of -26.15%) over the preceding ten days before event date, their results do not indicate a significant announcement effect on the day prior and on event date itself. In contrast to the findings of Clark and Weinstein (1983) their findings suggest that failure announcements are largely anticipated by the market. The authors attribute these differences in results partly to variation in methodological design considerations, in particularly refinements to the event window provided by their study, and differences in US and Australian bankruptcy legislation which can potentially affect the characteristics of firms included in failure samples reported across different studies.

More interestingly, when compared to a control group of non-failed firms, Frino, Jones and Wong (2007) found that the bid-ask spreads of failed firms widened significantly up to a year prior to failure which suggest the presence of substantial information asymmetries⁹ across investors in failed firms leading up to the event date. The study documented that the average BAS of failed firms increased by 29.3% over the entire observation period leading up to event date and that 49% of this increase occurred on the two days prior to announcement (-1 and event day itself). The actual increase in BAS for

⁹ See section 2.2 for a discussion between the relationships of bid-ask spread and information asymmetries.

failed firms on event day was 9.4% suggesting that information asymmetries across investors increase sharply in the days leading up to failure. Information asymmetry in the immediate weeks and days leading up to failure (which was also found to be coupled with significantly higher trade volume and volatility) is suggested to most likely arise from the trading behaviour of informed and less informed investors. They posit that informed traders could represent large institutional investors with superior analytical skills and knowledge of the firm, or insider traders; while less informed traders usually represent small investors. The authors highlighted one factor evident in their failure sample that could potentially aggravate (or even cause) such a high level of information asymmetry and linked it to the extreme paucity of public financial disclosure provided by many distressed firms leading up to failure. For instance, it was common in their sample to find a lead time of more than 12 months between the announcement of failure and the last financial report published by a failed company.¹⁰ For many failed firms, they found little evidence of any systematic disclosure (either through financial or non-financial sources provided by the firm) that could signal to capital markets the impending collapse of the firm or even that the firm was in any serious financial distress. On the surface of it, this finding appears to raise concerns about the effectiveness of Australia's mandatory Continuous Disclosure regulations which requires all publicly listed companies to immediately disclose to the market any material information which can affect the value of the company's shares.

¹⁰This is also confirmed by Jones and Hensher (2004) who report an average lead time of approximately 11.2 months between when a company announces failure and the publication of its last financial report.

The next section discusses the bid-ask spread of a publicly listed company, the adverse selection component of the spread, its link to information asymmetry and relationship with accounting disclosures.

2.2. Bid-Ask Spread

The bid-ask spread of a publicly-listed firm is the price at which a dealer is willing to buy or sell the underlying securities at the quoted prices. The bid price which is set signifies the price at which a dealer is willing to buy the stock and the ask price is the price which he is willing to sell it for. By serving as an inter-mediatory, the dealer makes it possible for investors to trade on demand and hence provides the service of “immediacy” (see Demsetz, 1968). By providing this service to the market, the dealer earns a premium as the bid (price which the dealer will buy the securities) is usually below the equilibrium price for the stock and the vice versa, the ask price above the market price.

The next sub-section discuss the composition of the bid-ask spread premium.

2.2.1. Bid-Ask Spread and its Composition

Prior research on bid-ask spread (see for example Amihud and Mendelson 1980; Copeland and Galai 1983; Glosten and Harris 1988; Stoll 1989) posits that this premium are set by market participants in order to recoup three different costs. These are: (1) order processing costs, (2) inventory holding costs, and (3) adverse selection costs associated with information asymmetry. The order-processing costs are the dealer's costs of arranging trades and clearing transactions. The inventory holding costs are the dealer's

costs of carrying the necessary inventory of stock to be able to trade on demand, while the adverse selection component of the spread is closely related to information flows in capital markets.

The next sub-section explains more on the adverse selection component of the bid-ask spread and the link to information asymmetries.

2.2.2. The Adverse Selection Component of the Bid-Ask Spread

Of particular interest in the context of this thesis is the adverse selection component of the bid-ask spread which it is affected by information flow and is potentially of the most interest to regulators, academic, accountants, financial analysts and investors. This branch of the spread literature was first discussed by Bagehot (1971) and subsequently by Copeland and Galai (1983), Glosten and Milgrom (1985) and Easley and O'Hara (1987) who develop theoretical models that link information flows to bid-ask spreads.

The focus of these papers theorize that a subset of “informed” traders have more knowledge about the value of the stock than the dealer and will only trade when it is beneficial for them to do so. Hence the dealer will always be disadvantage and lose money when trading with them. However the dealer also knows that not all traders are “informed” and that he will gain from dealing with these “uninformed traders” (investors who are equally or less informed than he). Therefore, to profit from these transactions, the models in this papers posits that dealers set the bid-ask spread so that the expected gains from uninformed traders cover the expected losses to informed traders. This implies

that the adverse-selection component of the spread will be larger when the dealer perceives a greater likelihood of trading with informed traders, or when he believes that the information possessed by the informed trader is more precise. In this sense, the adverse selection component of the bid-ask spread reflects the degree of "information asymmetry risk" perceived by the dealer.

The next sub-section discusses the relationship between information and accounting disclosures.

2.2.3.1. Information Asymmetry and Accounting Disclosures

Whilst finance academics have pondered over the issue of bid-ask spread over 40 years (since Stigler 1964; Demsetz 1968), the linkage to accounting information only occurred in the past 20 years. Given the adverse selection component of the spread, a number of academics have sought to better understand how firm actions and accounting disclosures affect information asymmetry in the stock market as captured by bid-ask spreads. Since the 1980s, this line of inquiry has led to a number of theoretical and empirical studies. Several theoretical studies feature formal models of how earnings information might affect information asymmetry. One of the pioneers in this area was the study by Verrecchia (1982), where under the assumption that public information is a substitute for private information, he concludes that the amount of costly private information search by traders would decrease with the increase of public information, as few investors would be willing to pay for something that is readily available. His results suggest that the

existence of earnings information leads to less information asymmetry between market participants.

The theory that the release of public information reduces incentives for investors to generate private information is supported by Diamond (1985). From his findings, he concludes that public information aligns traders' beliefs and reduces the speculative positions of informed traders. Interestingly, when Lundholm (1991) relaxes the assumptions in these studies and allowed for multiple private information sources, he found that releasing public information can actually concentrate the allocation of private information. This result demonstrates that whilst the release of public information may reduce the number of traders in possession of privileged information, the degree of information asymmetry that exists may be more severe between the informed and uninformed in such an environment.

While these early theoretical models focus on situations that involve the existence and non-existence of accounting disclosures and posit that the public release of information tends to reduce information asymmetry, later research shows that information asymmetry is likely to increase (at least temporarily) in the immediate period surrounding announcements. For example, McNichols and Trueman (1994) and Demski and Feltham (1994) show that speculative investors (e.g. those with short investment horizons) tend to intensify their private information search just prior to a release of earnings announcement to exploit any potential benefits. This suggests that informed trading can increase prior to the announcements and that the anticipation of earnings announcements may increase

information asymmetry around this period. Further to this, Kim and Verrecchia (1994) hypothesize that if investors differ in their ability to process earnings information, the release of earnings will actually increase information asymmetry around the release date. More specifically, they investigated the existence of information asymmetry on the day of the earnings release and documented an increase immediately after the announcements.

Consistent with the above hypotheses, Lee et al. (1994) and Yohn (1997) reported an increase in bid-ask spreads four days before an earnings announcement, the event day itself and the day after. The widening of spreads in the pre-announcements period appear to support the McNichols and Trueman (1994) and Demski and Feltham (1994) models which predict an increase in information asymmetry in the days leading up to the announcement. Similarly, the post-announcement increase in spreads is consistent with the theories posits by Kim and Verrecchia (1994), in which information asymmetry risk increases immediately after the news release as some traders with superior information-processing ability exploit a short-term informational advantage.

Another branch of this research seeks to provide some insights into how earnings characteristics affect information asymmetry around earnings announcements. For example, Senteney (1991) noted that the dealer's bid-ask spread reaction to trading volume around earnings announcements differs depending on the earnings characteristics. He finds smaller spread increases when unexpected earnings are positive rather than negative and also finds smaller spread increases when earnings are released later rather

than earlier than expected. Affleck-Graves et al. (1996) also show that the increase in spreads around earnings announcements is inversely related to the predictability of annual earnings. Finally, Yohn (1997) shows that the spread around earnings announcements is related to the expected trading profits from obtaining private information prior to the earnings announcement.

Other studies that focus more on the microstructure details of accounting disclosures like Greenstein and Sami (1994) show that firms who implemented the SEC's recommended 10-K segment disclosure requirement (established in 1970) experienced a reduction in bid-ask spreads (*ex post* 1970). Along similar lines, Raman and Tripathy (1993) and Boone (1998) show that the disclosure of reserve-based, present-value variables in the SEC filings of firms in the extractive petroleum industry reduced bid-ask spreads. From an international perspective, Leuz and Verrecchia (2000) report that firms committing to increased levels of disclosure through an international reporting strategy (i.e German firms moving to adopt German and IAS GAAP) resulted in a decline in their bid-ask spreads. More recently, Frino and Jones (2004) also documented that the mandatory release of cash-flow statements by *AASB 1026* (in Australia) reduces the bid-ask spread of reporting firms. These findings appear to provide some support for the earlier theoretical models of Verrecchia (1982) and Diamond (1985) and suggest that when firms produce more detailed disclosures, it is likely to reduce information asymmetry. More importantly, from a supervisory viewpoint, these results shows that actions taken

by regulators can affect bid-ask spreads and the equitable¹¹ flow of information to all investors.

In addition to this, Coller and Yohn (1997) show that firms releasing management forecasts have higher spreads prior to the forecast release than a matched sample of non-forecasting firms. They also find that spreads decrease from before to after the management forecast for the forecasting firms. These findings suggest that another motivation for the release of management forecasts is to reduce information asymmetry in the stock market.

The next sub-section summarizes several key points of these studies.

2.2.3.2. Key Points in the Literature on Information Asymmetry and Accounting Disclosures

Through the review of these empirical studies that evaluate the relationship of accounting information and bid-ask spread, we identified some key points that is relevant for this thesis. First, the evidence shows that accounting disclosures can, and do, affect a firm's information risk as reflected by quoted spreads. Accounting information events, such as earnings announcements and the release of management forecasts, have a significant short-term effect on the size of the quoted spread. Lee et al. (1994) and Yohn (1997), in particular, use changes in spreads to demonstrate that information asymmetry risk

¹¹ According to Lev (1989), when a firm's financial information disclosure is more "equitable" and "broadly informative," the information asymmetry between informed and uninformed traders is lower. Therefore, a more equitable disclosure policy would result in lower bid-ask spreads. Other things being equal, information asymmetry increases as the amount or quality of public information decreases.

increases in the days immediately around the earnings news release even after controlling for contemporaneous volume increases. Similarly, Coller and Yohn (1997) use quoted spreads to show that firms are more likely to issue a management forecast when information asymmetry risk is higher, and that these voluntary forecasts are effective in lowering this risk.

A second key finding is that the availability of better accounting information can lead to a reduction in bid-ask spreads. In particular, Greenstein and Sami (1994), Raman and Tripathy (1993), Boone (1998), Leuz and Verrecchia (2000) and Frino and Jones (2004) all show that more extensive accounting disclosure can be linked directly to lower transaction costs. The implication is that by improving the quality and content of accounting information, accountants may be able to help improve the transactional efficiency of stock markets.

Finally, at least one study suggests that managers' actions may affect the transactional efficiency of stock markets. Aftleck-Graves et al. (1996) show that the increase in spreads around earnings announcements is inversely related to the long run predictability of annual earnings. They also find that the number of accounting changes and the variability of past earnings streams are positively associated with earnings predictability and inversely related to spreads. These findings suggest that managers' actions to decrease the volatility of the firms' earnings stream may enhance market liquidity.

The next sub-section discuss some of the limitations on the use of bid-ask spread as a proxy for information asymmetry.

2.2.4. Limitations of the Bid-Ask Spread as an Empirical Proxy of Information Asymmetry

Previous research examining the impact of accounting disclosure has examined bid-ask spreads for stocks listed on the New York Stock Exchange (NYSE) or quoted on NASDAQ¹². Stoll (1989) in particular, developed a technique enabling the decomposition of bid-ask spreads into its different components and estimated that 43 percent of the magnitude of the bid-ask spreads on the NYSE was attributable to adverse selection or information asymmetry. Following this, Affleck-Graves, Hedge and Miller (1994) estimated that the information asymmetry component of the spread for NASDAQ stocks was 35 percent.

These results suggest that it is relatively difficult to map a direct relationship between changes to bid-ask spread and the information asymmetry component. For example, when the spread of a firm widens prior to an earnings announcement, it could be incorrect to attribute it to an information asymmetry effect as these changes could have been distorted by relevant changes in order processing costs or inventory holding costs.

To mitigate this problem, studies like Krinsky and Lee (1996) have sought to estimate the information “asymmetry component of the spread” by computing the price sensitivity of

¹² For example, Greenstein and Sami (1994) and Coller and Yohn (1997) examine firms listed on the New York Stock Exchange, Hagerman and Healy (1992) and Raman and Tripathy (1993) examine firms listed on the over-the-counter market in the USA (NASDAQ).

a stock to order flow imbalances. They posit that firms whose stock prices are very sensitive to order imbalances have higher information asymmetry. Their results show that the information asymmetry component of the spread increases around earnings announcements, even though the order processing component of the spread does not increase.

Despite the innovation in this technique, the evidence in Neal and Wheatley (1997) suggest common information asymmetry component models may have difficulties in cross-sectional designs. Using several common techniques, Neal and Wheatley (1997) estimated the information asymmetry component for a sample of closed-end mutual funds. These funds hold a portfolio of traded securities whose net asset value is publicly available every week. It is therefore difficult to argue that market makers in these funds face substantial risk due to privately-informed trading. Yet Neal and Wheatley (1997) report a large information asymmetry component in the bid-ask spread of these funds, comparable in magnitude to those found in other “normal” equity issues. Apparently the information asymmetry component for these funds reflects the limited liquidity and order flow "persistence" in closed-end funds—that is, there is a higher likelihood that buy (sell) orders will be followed by further buy (sell) orders. This result raises questions about the usefulness of models like Krinsky and Lee (1996) in cross-sectional investigations of the relative informativeness of accounting disclosure. Specifically, it shows that even if a firm employed 100 percent "marked-to-market" accounting and highly transparent disclosure policies, it can still have a large information asymmetry component. The implication is that better models for estimating the information asymmetry component

are needed to obtain proxies that better capture differences in the information environment.

In sum, Lev (1989) makes the conceptual argument that bid-ask spreads should be related to a firm's information environment. However, empirical investigations are hindered by some limitations. Future research must consider and seek innovative ways to overcome these limitations in order to yield relevant insights into how a firm's information environment affects information asymmetry and bid-ask spreads in the stock market.

The final part of section 2 provides some arguments by prior literature on why due to the unique characteristics of Australian equity markets, the information asymmetry component of bid-ask spreads is likely to be considerably higher in Australia than for the US equity markets. Hence are more likely to provide a cleaner experimental setting for examining the impact of any disclosures on information asymmetry.

2.2.5. Bid-Ask Spread and Information Asymmetry in the Australian Equity Markets

As highlighted in the previous sub-section, there are some limitations of interpreting results attempting to map a relationship between disclosures and the information asymmetry component of the bid-ask spread particularly in the US due to their market characteristics. Although, these studies allow researchers to attribute a certain part of bid-ask spread costs to adverse selection costs, it was only recently in the unique characteristics settings of Australian equity markets that analysts were more able to

isolate this particular component and study a more direct effect of information asymmetry costs on specific disclosures.

Frino and Jones (2005) whilst examining the value-relevance of cash-flow statements in reducing information asymmetries, posit three reasons why the information asymmetry component of bid-ask spreads (Stoll, 1989) is likely to be considerably higher in Australia than for the US equity markets. First, it is well recognized that order processing costs in electronically traded markets can be lower because of lower fixed costs of running such a system (Frino et al., 2004). This can translate into lower exchange fees and order processing costs for market participants (Grunbichler, Longstaff and Schwartz, 1994). Because stocks on the NYSE are predominantly traded by ‘open outcry’ while trading on the ASX is fully electronic, the order processing cost component of the bid-ask spread for Australian equities is likely to be smaller.¹³ Second, inventory holding costs are likely to be less relevant in competitive order driven markets such as the Australian Stock Exchange relative to specialist markets such as the NYSE and dealer markets such as NASDAQ.¹⁴ Finally, Stoll (1989) describes how bid-ask spreads are set in a competitive market setting. However, previous research suggests that specialists on the NYSE wield market power which allows them to extract significant economic rents from other traders by setting wider bid-ask spreads than is warranted (see Brock and Kleidon,

¹³The great proportion of equity trading around the world has been largely electronic for a number of years (Domowitz, 1994). Even the NYSE is far from being an ‘open outcry’ market.

¹⁴Affleck-Graves, Hedge and Miller (1994) convincingly argue and provide evidence that multiple dealer markets are likely to provide lower bid-ask spreads than specialist markets because there are more dealers over which to spread inventory (share risk), and the opportunity for inter-dealer trading facilities inventory risk sharing. This in turn reduces inventory holding cost. They also recognize that multiple dealer markets are characterized by higher aggregate inventory levels, which increase in proportion to the number of market makers. Given the absence of dealers on the ASX, we argue that inventory holding costs are likely to be even lower (and perhaps irrelevant) compared to NASDAQ or NYSE.

1992). It has also been demonstrated that specialists can engage in noncompetitive activity such as hiding limit orders which allows them to maintain artificially wide bid-ask spreads (McInish and Wood, 1992). Evidence of anticompetitive behaviour has also been documented for NASDAQ by Chan, Christie and Shultz (1995) who find that NASDAQ dealers avoid odd eights-quotes thereby maintaining artificially wide bid-ask spreads. In summary, spreads on the ASX are more likely to be driven by information asymmetry (adverse selection costs) relative to previous studies based on the NYSE and NASDAQ markets. This increases the probability of detecting the impact of corporate disclosures, such as failure announcements, on information asymmetry through an examination of bid-ask spreads. Hence, Australian equity markets are likely to provide a cleaner experimental setting for examining the impact of failure announcements on information asymmetry.

This concludes the relevant literature review on bid-ask spread, information asymmetry and disclosures. The next Chapter develops Hypotheses relating to the behavior of institutional investors and the link between lack of disclosures and increase information asymmetry.

3. Hypotheses Development

This section of the thesis discusses the development and formulation of some testable hypothesis.

3.1 Information Asymmetry between Institutional and Retail Investors

Whilst theoretically, investors can be classified into several categories for different purpose in research, many studies in the literature have broadly classified investors into two main classes, namely, institutional and retail (or sophisticated and unsophisticated). These classifications are usually done due to the striking characteristic differences between their investment strategy, analytical prowess and level of informedness.

In our hypothesis development, we focus on the reasons suggested by prior researches for the structural differences that exist in the levels of information asymmetry between the two classes and formulate some testable hypothesis based on this. The first part of this section focus on previous studies that posit reasons for why institutional investors are likely to be better-informed, whilst the next part looks at the behavior of retail investors and provides some suggestions for systematic differences in the level of information awareness between the two groups.

3.1.1 Institutional Investors and their Level of Informedness

From previous works done on institutional behavior, the literature suggests several reasons for institutional investors to be better informed, for example, Lev (1988) posits that II tend to have lower marginal costs of gathering information due to their scale of operations and Wilson (1975) suggests that the cost of being informed is relatively fixed whilst the returns to trading on information increase with scale. Therefore, large scale investors, such as institutions, realize greater returns to information search and acquisitions than do individual investors and thus are more involved in such activities.

Potter (1992) suggests that institutions spend substantial resources on information research. Since they dedicate significant resources to information production, they are well-informed relative to individuals. The higher level of informedness of institutional investors also implies that on average they acquire more precise private information than individual investors. El-Gazzar (1998) also suggest that since II's actual or potential holdings of a security are so large, they have incentive to develop private information and it becomes cost-efficient for them to do so as the potential benefits are sizeable.

In addition to the lower costs of acquiring information, El-Gazzar (1998) also noted that fund managers have two other incentives to develop private information prior to disclosures events, fiduciary responsibility and higher investment performance. Fund managers are concerned about litigation repercussion as institutions have a fiduciary responsibility to their beneficiaries where they are held to a "prudent person" standard, that is to exercise the care and judgment a person of ordinary prudence and intelligence in dealing with his or her property, under the circumstances existing at the time (see O'Brien and Bhushan, 1990).

To satisfy these requirements, institutions develop a prudent/selective investment policy and continuously monitor their portfolio (Arbel et al., 1983) and this efficient selection and monitoring of investment involves large-scale development of private pre-disclosures information (Brous and Kini, 1994).

3.1.2 Retail investors, information and their investment style

The other branch of research that focuses on the behavior of individual investors also provides supporting evidence that there is a difference in the level of informedness between institutional and individual investors. For example, Shiller and Pound (1989) found that individual investors spend far less time on investment analysis and rely on different sources of information than do their institutional counterparts. Other studies by Yunker and Krehbiel (1988) and the Stanford Research Institutional International survey (1987) also documented that the majority of individual investors do no analysis of their own prior to purchasing stocks. In addition, Bartov, Radhakrishnan and Krinsky (2000) also suggest that this type of investors generally rely more on information in the financial press (e.g. Wall Street Journal) and intuition to make their investment choices rather than perform the rigorous of the financial statements. Other studies like the Committee on Corporate Disclosures (1995) and Smith (1995) also expressed concern that II and certain analyst have privileged access to information. Brennan (1995) also noted that the information possessed by individual is inferior to that of II.

This difference in investment style and decision making suggests that systematic difference should exist in the amount and precision of private information in the hands of institutional investors and individual investors. Given the structural differences in the level of information awareness between institutional and retail investors (and that institutional investors are more informed, see O'Brien and Bhushan 1990; Walther 1997), it can be expected that they will exit firms prior to any announcements of failures to avoid the adverse price effect associated with these news. This is consistent with the private information advantage theory posits by recent works in this area (see Ali, et al,

2004; Pinnuck, 2005; and Ke and Petroni, 2004) and the institutional needs (e.g. mutual funds) to fulfill their fiduciary responsibilities and justify their remunerations (O'Brien and Bhushan, 1990 and El-Gazzar, 1998) by avoiding losses. This leads to our first hypothesis that,

H1: Institutional investors exit bankrupt firms prior to announcements of failures

The next sub-section describes the importance of disclosures to reducing information asymmetry and develops hypotheses on how a possible lack of it adversely affects the shareholders of financially distressed firms.

3.2 Information Asymmetry, Disclosures and Financially Distress Firms

“Information is the lifeblood of the stock markets.” London Stock Exchange

Since the inception of the Amsterdam Stock Exchange, the world's first continuous trade stock market since the early 17th century¹⁵, information has always been essential to the creation of transparency and liquidity that have allow stock exchanges around the world to function. Wurgler (2000) also suggested that more informative stock prices lead to better resources allocation which has implication for economic growth.

¹⁵ The Amsterdam Stock Exchange is considered the oldest in the world. It was established in 1602 by the Dutch East India Company (*Verenigde Oostindische Compagnie*, or "VOC") for dealings in its printed stocks and bonds. It was subsequently renamed the Amsterdam *Bourse* and was the first to formally begin trading in securities.

Information already important in the ordinary context of the stock markets takes on a more critical role in financially distressed firms as any disclosures with regards to the potential change in status (e.g. solvent to insolvent) could have a large adverse effect on the holdings of investors in these firms (see Clark and Weinstein, 1983 and Frino, Jones and Wong, 2007).

Generally, the disclosure policy can be examined using the information asymmetry paradigm that divides investors into two categories: informed investors and uninformed investors (Bagehot, 1971). Informed investors know the fair price of a stock as a result of their access to non-public information and their skill in extracting knowledge of the fair price from this information. Informed investors profit at the expense of uninformed investors by purchasing stocks from uninformed investors when they are trading below their fair value and by selling stocks to uninformed investors when they are trading above their fair value. Because an informed investor has the option not to trade, uninformed investors will always lose when they trade with an informed investor (O'Hara, 1993).

Given the behavioral characteristic of both institutional investors and retail investors that was theorized in Section 3.1, it could be posit that institutional investors are most likely informed investors and retail investors are probably uninformed on most occasions.

Hence, there are stringent rules and regulations incorporated into disclosures practices by regulatory authorities in an attempt to mitigate the informational advantage possessed by informed investors, and the associated transfer of wealth from uninformed to informed

investors, namely, by prohibiting both the selective disclosure of material information and the non-disclosure of material information (Kim, 1993).

For example in the US, companies accessing capital markets are required to follow disclosures rules set by the Securities and Exchange Commission (SEC) and in Australia, companies listed in the Australian Stock Exchange (ASX) are required to follow the disclosures regulations outlined in the Listing Rules, for example under Chapter 4 of the rules, listed companies are required to make periodic disclosures with regards to the financial status of the firms. More importantly, in terms of the swift changes in financial conditions of financially distress firms, the continuous Disclosure regime under Listing Rule 3.1 requires that all listed firms must disclose any material information on a timely basis¹⁶ to the market which can affect the value of the firm's securities.

It is noteworthy that these requirements are enforced by the Australian Security and Investment Commission (ASIC) and have statutory backing¹⁷ under the *Corporation Act* (in particular, s674-78 is applicable for Listing rule 3.1) , making it a criminal offence for directors and managers who failed to comply. This legislative requirements conform to the *litigation cost* theory posits by Healy and Palepu (2001) where managers in possession of

¹⁶ Information for release to the market must be lodged by companies with the ASX's company announcement office (CAO), which is then immediately released to the market under Signal G (see Explanatory Note, ASX Listing Rules, Chapter 3, 97,575; and Chapter 15 of the listing rules). Because all Signal G market releases are electronically dispatched in 'real time', a very accurate determination can be made of the announcement or event date for all firms in our sample.

¹⁷ The Corporations Law Reform Act introduced significant statutory civil and criminal penalties for breaches of the ASX's continuous disclosure listing rules. Under the Act the penalty for contravention of Listing Rule 3(A)1 was a fine on the company of \$A100 000 if the failure to disclose was intentional or reckless. Directors, officers and advisers might also be criminally liable if they were found to have aided or abetted the contravention. Where the company's contravention was merely negligent, any investor suffering a loss could sue the company for damages under the auspices of ASIC.

adverse news will seek to provide full and truthful disclosures as the threat of litigation for inadequate or untimely disclosures and the need to protect their reputational capital outweighs the potential benefits of selective or non-disclosures (also see Skinner, 1994; 1997). This view is supported by Bamber and Cheon (1998) who also observed that firms with material adverse information may try to reduce legal liability costs by making disclosures in widely disseminated press releases.

However, despite these legislative requirements, it must also be noted that there are criticism of its usefulness and potential 'loopholes' in the system. For example, Brown *et al.* (1999) observed that investors are generally unsatisfied with the detail and timeliness of reporting by listed companies and Poskitt (2005) highlighted that since the introduction of the continuous disclosures regime in Australia, there have been strong instances of contraventions (proxied by the increasing number of price enquires) but little prosecutions. Cassidy and Chapple (2003) also queried the effectiveness of this requirement, observing that despite strong evidences of breaches in the rules, there has been little enforcement by ASIC¹⁸.

More importantly, studies that specifically look at financially distress like, Frost (1997) and Mutchler *et al.* (1997) proposed that managers of these firms have stronger incentives to be selective about their disclosures as the issuing of the adverse news may itself

¹⁸ The first ASIC prosecution for the breach of the continuous disclosure rules (since the reform in 1994) occurred only in Feb of 2003 when Southcorp (in April 2002) advised selected analysts about the likely impact of the poor vintage for premium wines on projected earnings. Southcorp's stock price fell 7 per cent within 2 days. ASX investigated and referred the alleged breach to ASIC, who initiated legal proceedings in February 2003. Under a settlement reached in November 2003, Southcorp admitted to the contravention and paid a pecuniary penalty of \$A100 000 plus ASIC's costs (ASIC, 2003).

precipitate firm failure. Moreover, the managers of such firms face greater risks of replacement, especially if financial distress triggers bankruptcy or takeover. In addition, managerial stock ownership in the distressed firm may also induce managers to be less pessimistic about going-concern uncertainties. These arguments imply that, when the firm is financially distressed, the decision to disclose is less likely to occur due to agency costs associated with the managers' wealth and career considerations.

This theory is somewhat supported by Jones and Hensher (2004) who found a lack of informative disclosures, reporting that on average, there is a lead time of approximately 11.2 months between when a company announces failure and the publication of its last financial report.

Given this potential lack of information around the critical period near the announcements of eventual failure and the recent findings by Frino, Jones and Wong (2007) that demonstrated large increases in the level of information asymmetry in the immediate period around bankruptcy, it is of importance to regulators to know the adequacy of their current disclosures requirements and any possible loopholes in their exception clause (e.g. under Listing Rules 3.1) that managers of financially distressed firms could exploit. In addition, it is also noteworthy that while there may be strong incentives to omit disclosures, it can be expected that not all managers behave in an unethical manner and it is also possible that in some cases, the potential litigation costs outweighs the benefits in some cases. This leads us to our third hypothesis,

H2: Bankrupt firms with no disclosures prior to failures have higher information asymmetry than those with disclosures.

The next two sections deal with data and methodology that will be used to test the hypothesis discussed here.

4. Definitions and Data Collection

The previous two Chapters developed hypotheses on institutional investors and their likely behavior around failures announcements. The testing of these hypotheses requires us to first define the context of failure and subsequently construct a sample of failed firms. Due to the relative small population of publicly listed companies and financially distressed firms in the Australian markets (compared to the US markets), we have utilized the entire population of 'failed' firms in our study. The first section of this Chapter defines 'failure', the next section discusses the collection process and the last section provides descriptive statistics on the financial characteristics of the 'failed' firms.

4.1. Definition of Failure

The definition of failure is important in characterizing the sample size, as different classifications could result in the exclusion (inclusion) of similar firms. Whilst traditionally, theoretical models of financial failure tend to define failure in terms of bankruptcy (i.e. legal definition of failure where the directors of an underlying firm files for bankruptcy), some studies have pointed out the limitations of this classification. For example, Scott (1981) pointed out that legal bankruptcy is only one form of insolvency.

Bladwin and Mason (1983) highlighted the need to take into account the potential bias that could be introduced if the sample size is restricted to legally bankrupt¹⁹ firms as many firms, particularly large firms, endure extended periods of distress, leading to liquidation of assets and reconstructing of debts without ever going formally bankrupt. Delaney (1991) discusses the concept of “strategic bankruptcy” where some companies have abused bankruptcy legislation as a means to “starve of creditors” (see also Skeel, 2003 for more discussion on this).

Hence it is important in the context of this study that we define failure such that it captures only firms that are in genuine financial distress to avoid the inclusion of healthy companies. To enable this classification, we evaluate the focus of our research question and compare it to the main options available to financially distressed firms listed in the Australian Stock Exchange (ASX). A summary of this is provided below,

Options available to financially distressed firms in the ASX

- 1) Takeovers²⁰
- 2) Mergers
- 3) Scheme of Arrangements
- 4) Receivership
- 5) Voluntary Administration / Winding up

¹⁹ In Australia, firms do not go legally bankrupt, they become insolvent when they fail to pay their debts as and when they fall due. When a creditor takes a court action, the firm would be placed in the hands of either a receiver and manager or provisional liquidator. Conversely the directors could appoint one if the company is insolvent as they have a duty not to trade and incur more debts while insolvent (Section 588G of the Corporation Law).

²⁰ Other forms of takeovers may include selective share capital reduction, leverage buy-outs, etc.

6) Liquidation

From these options, we first discuss takeovers and mergers. A takeover in commercial terms refers to one company (the acquirer, or bidder) purchasing another (the target). Takeovers may be “friendly” or “hostile”. In the former case, the companies cooperate in negotiations; in the latter case, the takeover target is unwilling to be bought or the target's board has no prior knowledge of the offer. Acquisition usually refers to a purchase of a smaller firm by a larger one. Sometimes, however, a smaller firm will acquire management control of a larger or longer established company and keep its name for the combined entity. This is known as a reverse takeover.

Mergers are similar in kind to takeover but involve a combination of two companies into one larger company. Such actions are commonly voluntary and involve stock swap or cash payment to the target. Stock swap is often used as it allows the shareholders of the two companies to share the risk involved in the deal. A merger can resemble a takeover but result in a new company name (often combining the names of the original companies) and in new branding; in some cases, terming the combination a "merger" rather than an acquisition is done purely for political or marketing reasons.

Some common types of mergers include, *horizontal mergers* where the two merging companies produce similar product in the same industry, *vertical mergers* where two firms, each working at different stages in the production of the same good, combine and

conglomerate mergers where the two participating firms operate in two different industries.

Takeovers and mergers can occur for various reasons with the most common being, economies of scales, increased market shares, synergy, etc. Occasionally, due to the dismay financial state of a firm, distress mergers and acquisitions may occur. To this effect, Clark and Ofek (1994) define a distressed merger/takeover according to any or all of the following factors: poor stock price performance; financial distress, such as severe deficiencies in working capital to fund continuing operations; corporate reorganizing in order to rationalize nonperforming key assets or the business as a whole; high turnover in directors and senior management.

Whilst it is possible to include distressed mergers/takeovers in our definition methodology, it poses some difficulties in the research questions that we seek to explore. For example, this study is interested in the behavior of institutional holders, in particular their holding patterns, however when any mergers or acquisitions occur, the bidder tends to consolidate holdings and eventually dominate the shares of the target firm (see, quote someone). Hence this noted behavioral tendency will likely distort our results if we include the takeovers and mergers into our failure classifications.

The next available option to any financially distressed firms is the creditors' scheme of arrangements. This particular action is a court approved compromise or arrangement, entered into between a company and its creditors, or any class of them. Generally, a

scheme of arrangement is seen as a way of maximizing the value of a company's property by allowing the debtor company to continue trading. A scheme may simply maximize the return to creditors, or it may enable companies to be restored to financial health and generate profits which can in turn be passed on to creditors²¹.

Whilst generally, most schemes of arrangements occur when a firm is financially distressed, entering this state still allows the underlying company to continue trading which may lead to a revival of the firm. Hence, it is difficult to include this set of firms into our sample as we cannot be confident that eventual "failure" has occurred.

The next three principal forms of bankruptcy proceeding available under the legislative provisions of the *Australian Corporations Act* (2001) are (i) voluntary administration (first introduced in Australia in June 1993 under the *Corporate Law Reform Act* [1992]); (ii) liquidation; and (iii) receivership. Voluntary administration has similarities with Chapter 11 provisions in the U.S.²², where the company is effectively given a period of

²¹ In Australia, the relevant statutory provision is s411 of the Corporation Act. The power of a scheme of arrangement comes as a result of the wide definition of the term "arrangement"; that it can incorporate compromises as well as offers; that it is effected merely by the stroke of the Court issuing its order (thereby reducing what would otherwise be an impossible amount of paperwork with separate agreements being entered into between the company and the relevant scheme participants); and that it is binding on dissentients and non-voters, provided that the requisite majorities approved the scheme and the Court exercises its discretion in favor of the scheme.

²² At this point, it is important to highlight that there are major differences in Australian and US bankruptcy legislation. One important difference is that Australian bankruptcy law is generally less permissive than the US (see Skeel, 2003 for an overview). For example, Australian law provides that once appointed the insolvency administrator has a limited period (28 days) to recommend to the creditors whether the company should be wound up or enter into a deed of arrangement (and if the deed of arrangement is not reached, there is a provision for automatic liquidation of the firm). In contrast, Chapter 11 provides no specific statutory limit when the debtor firm has to present a reorganization plan to creditors. However, debtor firms have 120 days in which they have an exclusive right to present a reorganization plan to the creditors, and 180 days (from the date of filing of voluntary administration) to obtain acceptance of any reorganization plan from creditors (there is no provision in Chapter 11 requiring automatic transition to liquidation).

time or "breathing space" to reorganize and/or reconstruct. Under Australian voluntary administration laws, once appointed the insolvency administrator has a limited period (28 days) to assess the company and recommend to the creditors whether the company should be wound up or enter into a deed of arrangement (this is a contract that binds the company and creditors and includes such issues as the order by which creditor claims are to be settled from sale of assets). If deed of arrangement stage is not reached, then the legislation provides for an automatic transition to liquidation. With respect to (ii) liquidation, there are essentially two types of the winding-up procedure available: a creditors' voluntary winding up (decided by special resolution of the company) and a court winding up. In the case of (iii) receiverships, the *Corporations Act* (2001) provides that a secured creditor, in the event of a firm's insolvency can appoint a receiver (or a receiver and manager) to recover outstanding claims against the company.

With regards to these factors, for the purpose of this thesis, we define failures (i.e. failed firms) as companies that have been officially placed in the hands of receivers, administrators or liquidators as shareholders of these firms have very little or no chance in the recovery of their capital and are unlikely to include any financially sound firms.

4.2. Sample Constructions

For the purpose of this thesis, our population of failed firms is derived from the period 1995-2006. This is due mainly to the availability of daily stockholding data which is captured from 1995 onwards. The initial list of delisted firms were obtained from 3 major sources, (1) Aspect Financial Pty Ltd's Financial Analysis Database and DatAnalysis

Database (two leading Australian financial database sources that contain up to 15 years of historical data on all listed companies in Australia); (2) Huntley's Delisted Company Database (1993-1999), which contains all delisted firms in Australia up until 1999; (3) a customized data feed provided commercially to the authors by AspectHuntley Pty Ltd²³. Through these databases, we obtained an initial population of 656 delisted firms for the period 1995-2006.

In the context of this study, following the definition proposed in 5.1, a stringent check was carried out in identifying firms that fit the classification of failed firms as defined above. The process of eliminating non-relevant firms that were delisted for the period from 1995 to 2006 is described.

The filtering procedure started with an examination of insolvency announcements made by all 654 firms that were delisted from the period 1995 to 2006.

Following the definition methodology, during the first round of data filtering, all firms that are involved in takeovers, mergers and scheme of arrangements were removed as these firms are not relevant in our studies with results shown below:

- (i) 332 firms were removed due to Takeovers,
- (ii) 15 removed due Mergers
- (iii) 46 removed due to Scheme of Arrangements

²³ AspectHuntley was created in 2003 from a merger of two leading data providers in Australia—Aspect Financial Pty Ltd and Huntley's Financial Services

Then, all other non-financial distress related delisting were filtered out,

(iv) 63 removed due to Other non-delisted reasons

Included in this “Other” reasons list were firms who were privatized, Trust/Fund termination at their due date, insufficient operating activities, lack of shareholders spread, etc.

Then all firms that had appointed receivers, liquidations or administrators were each individually examined for announcement relating to the appointments and the suspension date.

A thorough check through the financial statements of the remaining 198 firms yield that some of the delisted companies that opted for voluntary administration shows signs of positive profit and net assets with surplus to distribute to share owners. Upon closer examinations via www.delisted.com.au, it was noted that the proceeds from sales actually exceeded the share prices listed at that time (net book value is higher than market prices).

Arguably this voluntary type liquidation was done to avoid any unwanted takeovers and to maximize shareholder value. Thus these types of firms were eliminated from the sample following the definition set out.

(v) 5 firms that voluntarily voted to wind up due to non-distress reasons were removed

This leaves us with a usable population of 193 firms that conforms to our definition of failures. The financial statements of these companies were once again thoroughly checked to ensure financial distress.

Table 4.1 below shows a descriptive statistics of the Net Profit and ending Share Prices of the failed firms.

Table 4.1: Descriptive Statistics of Net Profit and Ending Share Prices after Tax for Failed Firms		
This table provides descriptive statistics on the net profit (after tax) and ending share prices of failed firms in the sample		
	Net Profit (After Tax)	Ending Share Prices
Mean	-\$23,858,019	0.21
Standard Error	\$7,529,603	0.04
Median	-\$3,910,788	0.11
Standard Deviation	\$73,774,738	0.32

These 193 firms were finalized and checked with www.delisted.com.au to ensure integrity and their intra-day data were requested from SIRCA.

4.3. SIRCA Request

The transactions data used in this study are secured from the Securities Industry Research Centre of Asia-Pacific (SIRCA) which possesses intra-day data from ASX since its

automation in 1990. All trading activities of publicly listed stocks are captured from Stock Exchange Automated Trading System (SEATS). This automated trading system receives and records limit and market orders and amendments to orders which are entered through terminals located in offices of member organizations. It then automatically executes the limit and market orders which overlap in the order of price and time.

The ASX shareholding data is derived from CHESS. When someone buy or sell financial products such as shares in a listed company, there will be an exchange of the title or legal ownership of those financial products for money. This exchange is called settlement. For financial products traded on the Australian Stock Exchange, settlement is effected by a computer system called CHESS, which stands for the Clearing House Electronic Subregister System. CHESS is operated by the ASX Settlement and Transfer Corporation (ASTC), a wholly owned subsidiary of the ASX. ASTC authorizes participants such as brokers, custodians, institutional investors, settlement agents and so on to access CHESS and settle trades made by themselves or on behalf of their clients. Usually, three business days after a buyer and seller agree to a trade, CHESS effects the settlement of that trade. It does this by transferring the title or legal ownership of the shares while simultaneously facilitating the transfer of money for those shares between participants via their respective banks. This type of settlement is called Delivery versus Payment (DvP) and is irrevocable.

Since the ASX shareholding data is only available after 1995, we requested the entire period from 01/01/1995 to 31/12/2006 to maximize the data set.

The first part of the request involves intra-day information specifically bid-ask spread, volume and volatility and the following was requested from SIRCA to that effect and include:

- 1) Daily share prices each individual firm as at 3.59 pm of each day
- 2) Daily Bid price for each individual firm on each day as at 3.59 pm for the requested period
- 3) Daily Ask price for each individual firm on each day as at 3.59 pm for the requested period
- 4) The high price for each individual firm on each day for the requested period
- 5) The low price for each individual firm on each day for the requested period
- 6) The volume of trade for each individual firm on each day for the requested period
- 7) The number of trade for each individual firm on each day for the requested period

From this procedure, we are able to obtain the intra-day data for the 193 firms. The next step in our sample collection involves calculating the number of usable trading day data by these firms. As this study is a predominant time-series type, we require our remaining firms to possess at least 300 trading days to ensure some meaningful behavioral interpretation.

This study chooses the cut-off point of 300 trading days mainly due to the findings by Frino, Jones and Wong (2007). In their study, they documented that the adjusted returns

of financially distressed firms starts to deviate significantly from a control group approximately 200 days prior to failure announcements. As this study is concerned about the reaction of institutional investors to failures, we seek to analyze the specific period in which there are significant negative abnormal returns. Any prior movements of institutional investors prior to this period could be highly unrelated to distress signals and possibly bias the results.

The second part of the SIRCA request involves the ASX shareholding data. As the CHES data is confidential, it can only be released in an extremely restricted form where the information of any investor or other participant in the market is not revealed in any manner. In certain approved circumstances, Australian Stock Exchange (ASX) will allow analytical routines to be run on the PC housed at ASX and then only highly aggregated results will be released by ASX to SIRCA. The aggregate data will be vetted by ASX before release to ensure the confidentiality of all investors, institutions and other participants in the market is strictly preserved.

The first requirement to obtaining this data is the aggregation of holders' group. Since we are interested in the behavior of institutional investors and retail (individual) investors, we have opted to group them according to this definition.

Under CHES, for Holder Types the sub categories are given below.

- 1) Domestic Bank
- 2) Domestic Other Deposit Taking Institution

- 3) Domestic Nominees
- 4) Domestic Insurance
- 5) Domestic Superannuation Funds
- 6) Domestic Trusts
- 7) Domestic Government
- 8) Domestic Incorporated Companies
- 9) Domestic Individual
- 10) Foreign Bank
- 11) Foreign Other Deposit Taking Institution
- 12) Foreign Nominees
- 13) Foreign Insurance
- 14) Foreign Superannuation Funds
- 15) Foreign Trusts
- 16) Foreign Government
- 17) Foreign Incorporated Companies
- 18) Foreign Individual

For the purpose of our study, we have group (9) and (18) as individual investors and the remaining as institutional investors.

In addition to aggregating the holding groups, to successfully obtain the shareholding information, ASX requires that 3 additional tests be passed. They are as follows,

- 1) Threshold test: That there be a minimum of 10 observations within each point for each data category.
- 2) Dominance test: That no observation accounts for more than 50% of the value for each data point for each data category, that no 2 observations combined account for more than 75% of the value of each data point for each data category, and that no 3 observations account for more than 90% of the value of each data point for a data category.
- 3) Activity test: Where time series data are provided that, no single observation accounts for more than 50% of the absolute value of aggregate changes for the data category from the data point for that category for the previous period, and that no 2 observations combined account for more than 75% of the absolute value of aggregate changes for the data category from the data point for that category for the previous period.

If any of the test fails, the data is suppressed and the information on which test has been failed is not revealed. Where a test is failed and the data for a data point suppressed, the results for all other data points for that security for that time period is also suppressed.

After satisfying all the criteria, the data was cleared by ASX and released for our study. Similar to the intra-day data, the next step in our sample collection involves calculating the number of usable holding data by these firms. Firms with less than 514 trading days of data were filtered out.

Finally, in addition to the requirements of 300 trading days, we thoroughly checked the existence of daily intra-day and holding data for all remaining firms. Firms with more than 20 continuous holding data break were also filtered out as this period is considered too long²⁴ to pinpoint the exact movement within the underlying firms.

Through these processes, a total of 114 were removed from the original sample size of 193, leaving 79 firms our final usable population. A summary of the sample selection process is provided in Table 4.2 below.

Table 4.2: Summary of Sample Filtering Procedure		
This table summarize the process of identifying failed firms in our sample		
Criteria	Firms Eliminated	Firms in sample
Delisted firms in ASX from 1995 to 2006	-	654
<i>Failure to Meet Definition of Failure</i>	-	-
(i) Takeovers	332	322
(ii) Mergers	15	307
(iii) Scheme of Arrangements	46	261
(iv) Others	63	198
(v) Voluntary Liquidation	5	193
<i>Sub-Total</i>	<i>461</i>	<i>193</i>

²⁴ Studies in the US have the capacity to monitor changes in monthly shareholdings via Standard and Poors' Security Owners' Stock Guides or Morningstar. As this study seek to extend the literature with our unique dataset, firms with one month break in data (approximately 20 trading days) is deem inadequate.

Lack of Data		
Less than 2 years (514 trading days) of intraday data	83	110
More than 1 month (20 trading days) of consecutive break in holding data	31	79
<i>Sub-Total</i>	114	79
<i>Total Firms Removed</i>	575	-
<i>Total Firms in Sample</i>	-	79

5. Research Methodology

In Chapter 3, hypotheses were developed that relate to institutional investment tactics, their behavioral tendency and likely holding patterns. Hypothesis 1 and 2 states that given their sophistication and informedness, institutional investors are likely to exit financially distressed firms prior to the announcements of failures with a lead time and are generally better analysts of financial statements. The next 2 hypothesis discusses the level of information asymmetry around failure announcements and their relation to disclosures. In our study, we theorized that the lacks of disclosures are the primary reason for the high level of information asymmetry between market participants and firms with low disclosures levels tend to have higher bid-ask spread and more institutional exodus. The models and methodology used to test these hypotheses are presented in this Chapter.

5.1. Institutional Holding Patterns

Whilst many studies have investigated the behavior of institutional investors in financially variable firms, none thus far, have attempt to document their link with failed

firms. In addition, most studies up to date have utilized at best a monthly shareholding data that is limited in any event specific studies.

However, previous studies have given us indications on some firm characteristics that institutional investors prefer. For example, studies like Potter (1992) have suggested that institutional investors tend to invest in larger size firms as these companies are more likely to have timely, alternative information prior to an announcement event (suggesting preference for an information rich environment, see also Aggarwal and Rao (1990). Consistent with this finding, Cready (1994) and Hessel and Norman (1992) also observed that institutional investors have a greater preference for large firms relative to individual investors.

These prior findings suggest that the concentrations of institutional investors are unlikely to be equal amongst firms in our sample. Larger firms with a richer information environment are likely to have higher institutional ownership (and bid-ask spread), vice versa. Earlier in Chapter 3, we hypothesize that institutional investors are likely to exit firms prior to distress. However if there are no institutional presence within a company in the pre-determined time frame, they will be no exodus. For example, if the institutional holding in a failed firm is equal to 0%, we cannot expect to observe any selling of shares as there will be none to speak of²⁵. To provide a more detailed analysis on the change in institutional holdings of bankrupted firms, we segregated our population of failed firms into 2 percentiles based on institutional concentration at the beginning period. Firms with

²⁵ Vice versa, if the firm is a 100% owned by institutional investors, there can only be exodus. However this situation is of less consequence in our study as we can only analyze the behavior of institutional holdings if it exists within a firm.

50% or more institutional holdings are placed into the *High* quartile and firms with less than 50% are classified as the *Low* quartile.

The High quartile is observed to have 16 firms and the Low quartile consists of 63 firms.

Descriptive Statistics of the firm characteristics for the 2 quartiles are provided in Table 5.1 and 5.2.

Table 5.1: Descriptive Statistics of Firm Characteristics for the High Quartile					
This table provides descriptive statistics of firm characteristics for the High quartile					
	Market Capitalization (Initial)	Market Capitalization (Average)	Daily Trading Volume (Average)	Institutional Holdings (Initial)	Institutional Holdings (Average)
Mean	194,450,542	148,429,205	1,261,959	63.94	58.15
Median	56,846,579	47,734,917	534,641	61.38	60.21
Standard Deviation	286,528,084	194,947,329	2,201,519	11.98	4.94
Minimum	5,150,631	5,220,026	25,583	50.09	48.77
Maximum	995,764,829	659,548,866	9,769,571	94.65	64.57
Count	16	16	16	16	16
Table 3.2: Descriptive Statistics of Firm Characteristics for the Low Quartile					
	Market Capitalization (Initial)	Market Capitalization (Average)	Daily Trading Volume (Average)	Institutional Holdings (Initial)	Institutional Holdings (Average)
Mean	38,153,915	29,671,807	320,381	23.96	23.55
Median	17,907,915	13,759,972	101,668	20.78	0.67
Standard	44,872,850	37,463,263	629,906	15.09	23.79

Deviation					
Minimum	2,191,378	94,791	1,489	0.76	22.16
Maximum	294,494,087	263,454,126	3,549,807	49.85	24.62
Count	63	63	63	63	63

These results appear to be consistent with prior findings that institutional investors generally prefer large (market capitalization) firms that are frequently traded.

5.2. Event Date: Failure Announcements

To test *hypothesis 1*, we define the event day (0) as the first instance the announcements of failure is released to the general public. Under Australia's Continuous Disclosure regime (which is regulated by the *Corporations Act* (2001) and Australian Stock Exchange (ASX) Listing Rules), all listed firms must disclose any material information on a timely basis to the market, which can affect the value of the firm's securities. Information for release to the market must be lodged by companies with the ASX's company announcement office, which is then immediately released to the market under Signal G (see Explanatory Note, ASX Listing Rules, Chapter 3, 97 575; and Chapter 15 of the listing rules). Because all Signal G market releases are electronically dispatched in 'real time', a very accurate determination can be made of the announcement or event date for all firms in our sample.

From the event date, we utilize a time-series analysis of institutional investors' movement approximately 300 trading days prior to document any possible exodus.

5.3. Definition of Variables

5.3.1. Institutional Holdings

Institutional investors are usually investors, such as banks, insurance companies, retirement funds, hedge funds, or mutual funds that are financially sophisticated, make large investments and often hold very large portfolios of investments. For the purpose of our study, we have classified institutional investors as either domestic or foreign banks, other deposit taking institutions, nominees, insurance firms, superannuation funds, trusts, government and incorporated companies (refer to Chapter 4 for a more detailed explanation).

To measure the institutional holdings within a publicly listed firm, we measured the total amount of ordinary shares owned by these class of investors and expressed it as a fraction (in percentage terms) of a firm's outstanding ordinary shares on a daily basis.

$$\text{Institutional Holdings (\%)} = \frac{\text{Total Institutional Holdings of Ordinary Shares of Firm } i}{\text{Total Outstanding Ordinary Shares of Firm } i}$$

5.3.2. Bid-Ask Spread (BAS)

Bid-ask spreads are a widely used proxy for information-asymmetry and adverse selection costs. For the purpose of this study, BAS is measured using the percentage bid-ask spread of a stock at the end of the day.

The percentage bid-ask spread is defined as the average of the difference between the best limit bid and ask price for the stock divided by the price of the stock, which is estimated by the mid-point of the bid-ask spread as follows:

$$BAS_i = \sum_{i=1}^n \left[\frac{P_{at} - P_{bt}}{(P_{at} + P_{bt})/2} \right] / n$$

where: P_{at} and P_{bt} are the 3.59 pm ask and bid prices, n is the number of firm observations on that particular day and i represent the i th firm in the sample.

5.3.3. Volume

The trading volume of a publicly listed firm can be defined as the number of shares, bond, or contracts traded during a given period. For the purpose of our study, we classify trading volume as the number of ordinary shares traded for a firm during a trading day. Following Cohen, Maier, Schwartz and Whitcomb (1978), this study employs the use of total market capitalization of stocks as a proxy for the level of trading (thin) in stocks.

The volume of trade in this case was thus obtained by dividing the daily trade volume for the i th firm on day K by the firm's total outstanding shares in the market²⁶ (capitalization). Mathematically it can be described as:

$$\text{Percentage Volume}_t = \text{Volume}_t / \text{Total Outstanding Shares}$$

5.3.4. Volatility

Volatility in the financial markets refers to the standard deviation of the change in value of a financial instrument within a specific time horizon. It is often used to quantify the risk of the instrument over that time period. Following the definition in Pinches and

²⁶ Does not include preference shares and in circumstances where shares are not fully paid, a pro-rata basis is used.

Kinney (1977), this research defines stock price volatility as the variance of returns. Due to the expected extreme fluctuation (in percentage term) involved in this research, we choose to adopt the methodology in Wiggins (1992) to compute the return variances as it supports the use of an extreme value estimator. Mathematically, this method involves using the daily high and low prices of firms and is derived as the natural logarithm of the daily high minus daily low and can be presented as follow,

$$\text{Percentage Volatility} = \text{Ln} (\text{Daily High} / \text{Daily Low})$$

The variance of a period of trading days was chosen over the intra-day hourly return of a stock as this study was more focus on a time series analysis of the volatility leading to an insolvency announcement as compared to the cross-sectional analysis of the stock's volatility^{27,28}.

5.4. Control Group

In order to properly document and analyze the behavior of institutional investors in failed firms, controls for factors unrelated to the event are necessary. In particular, factors such as industry, broad economic conditions and size need to be controlled. For example, changes in macroeconomic factors (e.g. interest rates, inflation, etc.) can affect the holding patterns of institutional investors by providing a better (or worse) return on other options. In other circumstances, industry specific factors (e.g. decline in demand) may

²⁷This excludes preference shares. In circumstances where shares are not fully paid, a pro-rata basis is used.

²⁸Finally, because the failed firm portfolio in this study is typically dominated by smaller firms, non-trading days (which occurred quite frequently in our sample) could create a potential source of bias in our results. To avoid this problem, we have removed non-trading days from the daily sample for both the failed and control group firms.

result in an exodus of institutional holdings within a sector that may distort our analysis. Finally, size²⁹ is also of concern as smaller firms in contrast to larger firms tend to have higher BAS and exhibit unique market microstructure behavior (see Aitken and Frino, 1996). Controlling adequately for these factors will strengthen the internal validity of our results.

To control for such factors, a matched sample of non-failed firms was generated from the population of non-failed listed firms. These firms are carefully matched on the basis of comparable institutional holdings, industry background and market capitalization³⁰. Matching firms by these criteria (specifically, institutional holdings within the same industry) will allow us to analyze any unusual movements of institutional investors due to firm (or industry specific) factors and market capitalization is a common proxy for size.

The procedure to derive the control portfolio is outlined below.

Step 1: The institutional holdings (IH) and total market capitalization (TMC) data for *all* firms listed in the Australian Stock Exchange (ASX) were extracted for the period 1995 to 2005.

²⁹The previous segregation of firms into quartiles predominately focuses on the concentration of institutional holdings within the failed group. Although, on average, the top quartiles (with the highest institutional holdings) consists of larger sized (market capitalization*share prices) firms with lower bid-ask spread and higher trade volume, this is insufficient to serve adequately as a control.

³⁰For each failed firm, we selected a non-failed firm in the same industry group that most closely matched the market capitalization and total revenue of the failed firm. This was achieved by a simple matching procedure that searched for all non-failed companies that were within a 10% variance (plus or minus) of the market capitalization and total revenue of the failed firm in question. The sample period of the control group firms also needed to be matched to the sample period of the failed firms. This procedure typically produced a very small number of non-failed firms to be matched against each failed firm (typically less than 5 non-failed firms for every failed firm). The final selection of the non-failed firm was based on the closest possible match of the market capitalization and total revenues with the failed firm.

Step 2: Firms in the failed sample were then removed from the population sample and the remaining companies (non-failed firms) were then segregated into their industries based on their ASX listing code.

Step 3: Since this study focus on the behavior of institutional investors in failed firms within a time frame of approximately 3 years, we strive to match a control portfolio closely based on the *opening* IH and *average* TMC for a 3-year period (e.g. 3 year average). We choose *opening* IH as the matching criteria instead of average as any downwards changes in the IH of financially distressed firms would result in an average smaller than the opening IH. If there are no changes in the control firm, this would re The average of TMC was utilized as previous studies (see Frino, Jones and Wong, 2007) have documented that failed firms experienced declining share prices as it move towards failures. This fall in share prices would result in a shrinking market capitalization and conversely if we match it based on the opening TMC

At this point in time, it is important to note that the failure announcement dates of failed firms are randomly dispersed across the 10 year time frame, e.g. 5/6/01, 7/4/03, etc. To properly match and control for the related variables due to this factor, we first obtain the IH for all non-failed firms calculate the 3-years TMC prior to failure for each failed firm and the corresponding matched 3-years data were calculated for each firm within the industry. For instance, if Firm A failed in 2002, then the years 2000, 2001 and 2002 were

utilized for Firm A and all the 3-years average for all firms within the industry in the *same time frame* (e.g. 2000, 2001 and 2002) were calculated.

Step 4: The TMC for all firms in the industry were then divided against the failed firms' figures individually resulting in a ratio. For example, if failed firm X has an average market capitalization of \$1,000,000 over the 3 years and a non-failed firm within the same industry has \$1,100,000 in the *same 3 years period*, then the corresponding ratio would be 1.1. Hence, the closer the ratio is to 1, the better the match (with 1 being identical). This procedure was not attempted for IH since the figures are already expressed in percentage terms.

Step 5: The TMC ratios were then compiled and *all* firms in the industry with ratios within a 15%³¹ range (e.g. $0.8 < X < 1.2$) were included into a control portfolio for the failed firm.

Step 6: To avoid the problem of overlapping, we strive not to use the same firms twice and also attempt to allocate the closest possible match (e.g. lowest deviation from 1) to a failed firm. In addition, we also try to evenly distribute the number of firms (which was within the range for two failed firms) amongst the failed firms.

Step 7: As some failed firms have more matches as compared to others, there exists the possibility of a particular portfolio dominating the control group. To minimize

³¹The lower the percentage, the more closely matched the control firms are likely to be. We strive to utilize the lowest percentage possible whilst keeping the portfolio of firms to at least 3. A 30% margin allows us to fulfill this condition.

this, each failed firm will only contribute a control market data that is derived by the average of the portfolio.

Step 8: Further, the market data for each corresponding control firm were individually matched to the exact day of bankruptcy announcements of failed firms. For example, if Firm A failed on any given day, say 3/7/1992 and has 425 days of market data prior to the announcement, we extracted the market data 425 days up to and ending on 3/7/1992 for the corresponding control group firm. This procedure was applied to all firms in the control portfolio.

Table 1 below provides descriptive statistics and *t*-statistics (as well as a non-parametric equivalent measure) for the matching variables (institutional holdings and market capitalization) for the experimental and control groups. It suggests that a reasonable match has been achieved across the two groups.

5.5. Regression Analysis

In order to determine if there are any systematic differences in the institutional holdings of failed and non-failed firms, we need to control for broad market and firm specific factors that may affect institutional holdings which are not related to bankruptcies. Given the findings of prior literatures that have suggested that institutional investors tend to invest in large liquid stocks with low spreads and substantial analyst coverage, we include the deciles-adjusted returns, bid-ask spreads, volatility and volume as control

variables in our regression. The following equation is estimated using an OLS regression:³²

$$IH_{it} = \alpha + \phi BNB_{it} + \beta_1 BAS_{it} + \beta_2 Volume_{it} + \beta_3 Volatility_{it} + \varepsilon_{it} \quad (1)$$

where IH_{it} = Institutional holdings (in percentage terms) of i , where i is either (a) the entire portfolio of companies, (b) firms with high institutional concentration (50% or more) and (c) firms with low institutional concentration (less than 50%) in time period t . BNB_t = a dummy variable taking on the value 0 if the firm failed and 1 otherwise; BAS_t = bid-ask spreads in time period t ; AR_t = deciles adjusted returns in time period t ; $Volume_t$ = Daily traded volume / Total shares outstanding in time period t and; $Volatility_t = \ln(\text{High/Low of the day})$ in time period t , where High is the highest price during the day; Low is the lowest price during the day.

As noted by Frino and Jones (2005), the volatility calculation is an extreme value estimator and is more efficient than measures based on closing prices (see Wiggins, 1992). For the volume variable, we follow the approach of Cohen et al., (1978) who utilize the total market capitalization of stocks as a proxy for the level of trading (thin) in stocks. Volume is obtained by dividing the daily trade volume for the I -th firm on day K by the firm's total shares outstanding^{33 34}. The decile-adjusted returns approach is

³²Following an approach suggested in Frino and Jones (2005), we estimate a pooled OLS regression model using the Newey-West robust estimator (1987). The Newey-West estimator presents a consistent covariance matrix in the presence of both autocorrelation and heteroscedasticity.

³³This excludes preference shares. In circumstances where shares are not fully paid, a pro-rata basis is used.

³⁴Finally, because the failed firm portfolio in this study is typically dominated by smaller firms, non-trading days (which occurred quite frequently in our sample) could create a potential source of bias in our results.

consistent with those used in Frino, Jones and Wong (2007) to account for firm's abnormal return that is not related to broad market changes.

The regression is then applied to the entire portfolio of bankrupt companies, firms with 50% or more institutional holdings (high) and firms with less than 50% institutional investors (low).

5.5 Disclosures and Information Asymmetry

To test hypothesis 2, we first segregate the bankrupt firms into two groups, disclosing and non-disclosing. As these failed firms were observed to experience large increases in information asymmetry approximately 50 trading days prior to bankruptcies announcements (see Frino, Jones and Wong, 2007³⁵), we classify companies with at least one announcement during this period as a disclosing firm. Companies that made no announcements at all during this period were classified as non-disclosing firms.

Further to this, the authors read all announcements made by the firms within the entire sample period and sub-classify these announcements into *informative* and *non-informative*. For the purpose of this study, we classify disclosures as *informative* if they provide some insights into changes of a company's financial status (e.g. the firm is re-negotiating debts obligation, conducting capital raising, etc³⁶). Any announcement that

To avoid this problem, we have removed non-trading days from the daily sample for both the failed and control group firms.

³⁵ Comparing a portfolio of bankrupt firms to a control group, Frino, Jones and Wong (2007) documents that information asymmetry for the failed firms start to be increasingly large (and statistically significant) around 50 trading days prior to announcements of failures.

³⁶ Announcements which provide an indirect indication of financial distress like resignation of key managements staffs (see Clark and Ofek, 1994) are also included as part of informative disclosures.

does not relate to potential changes in the firms financial status (e.g. change of company address, etc) is identified as *non-informative*³⁷.

Perhaps unsurprisingly, the authors observed that not all disclosures made by bankrupt during this period indicate signs of financial weakness, others “positive” information release are also documented (e.g. rights issue to raise more capital, companies in potential takeover talks, capital restructuring, etc). These observations appear to suggest that the managers of these companies are actively seeking ways to avoid bankruptcies. As the predominant purpose of hypothesis, H3, is to examine if a lack of information creates information asymmetry, we include this form of “positive” announcements as part of informative disclosures³⁸.

Firms with non-informative announcements are classified as non-disclosing firms. After applying this filter, it is observed that 32 firms provide informative announcements 50 days prior to announcements of bankruptcy and 47 companies do not disclose at all within this period. Analysis were then conducted to test hypothesis, H3, to determine if firms that disclose information regarding the financially distressed status of their firms experienced lower information asymmetry.

The following section provides the results of these analyses.

³⁷ Trading halts are not classified as a disclosure.

³⁸ As additional robustness tests, the authors also attempted to segregate the failed firms into disclosing by recognizing only “bad” news as informative disclosures from the companies. However, it is observed that only 2 companies in the entire bankrupt portfolio satisfy this requirement.

6. Results

6.1. Change in Institutional Holdings around Bankruptcies Announcements

Figure 6.1 provides a graphical representation of the daily institutional holdings for the entire portfolio of failed and control groups in the days leading to bankruptcies announcements. Table 6.1 provides the daily institutional holdings and the Mann–Whitney U -statistics for both groups. Results indicate that, on average, institutional holdings decrease by 1.63% during the 300 days sample period and the decline originates around 113 days prior to bankruptcies announcements. While, we observe a decline in the institutional concentration of bankrupt companies, these changes are not found to be statistically significant when compared to the control group. As previously discussed, these results can be diluted by the lack of change in companies with low institution holdings.

Figure 6.1: Change in Institutional Holdings around Bankruptcies Announcements
(All firms)

Change in Institutional Holdings Around Bankruptcies Announcements (All Firms)

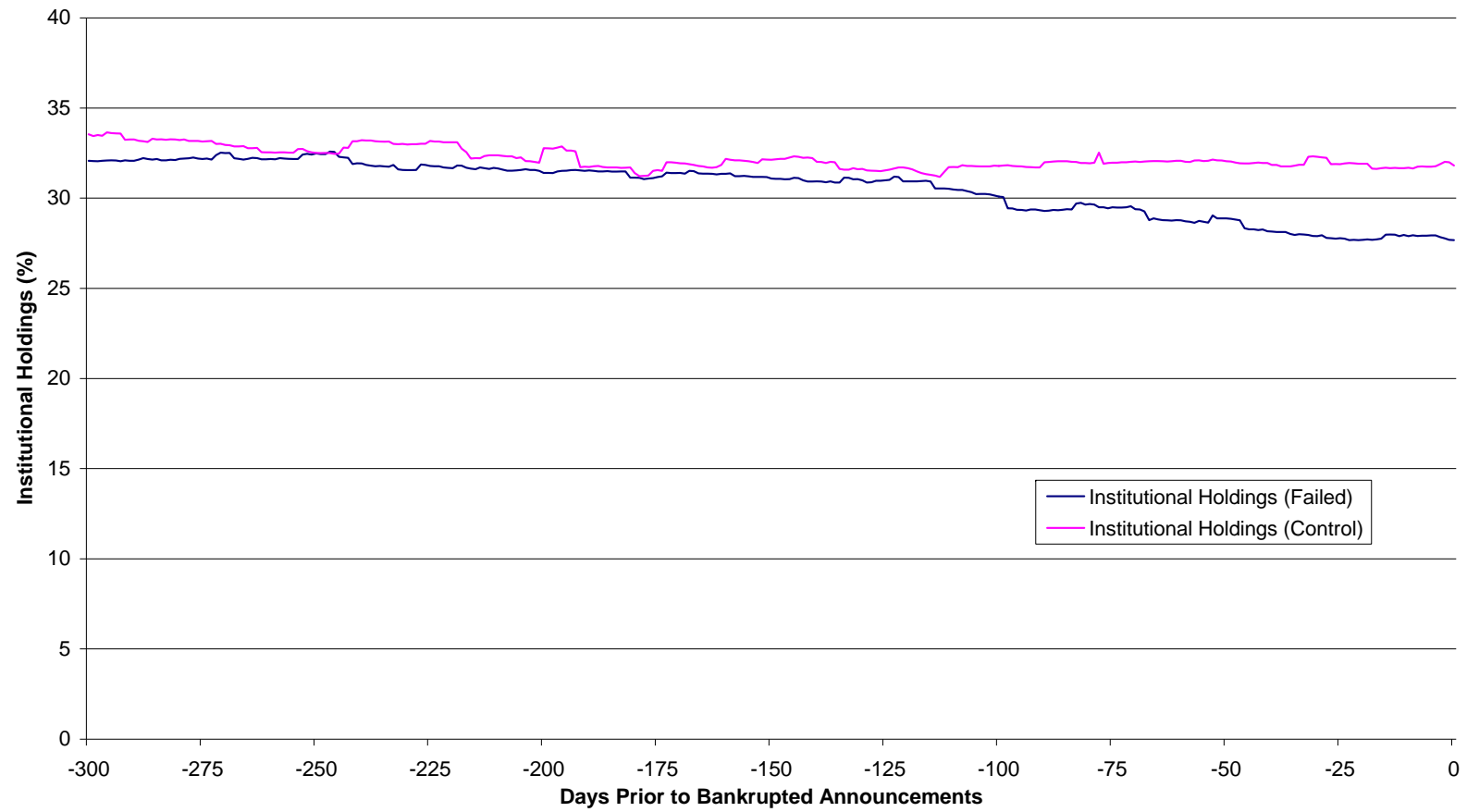


Table 6.1. Institutional Holdings around Bankruptcies Announcements (All Firms)

Table 6.1. provides daily institutional holdings for the entire portfolio of failed and control firms leading up to bankruptcies announcements

Days Prior to Bankruptcies Announcements	Institutional Holdings (Failed)	Institutional Holdings (Control)	Difference In Institutional Holdings Between Failed and Control Firms	T-stats
-300	32.06	33.44	-1.39	-0.40
-250	32.49	32.52	-0.03	-0.01
-200	31.40	32.77	-1.37	-0.42
-150	31.09	32.13	-1.04	-0.33
-100	30.09	31.79	-1.70	-0.55
-50	28.88	32.04	-3.16	-1.06
-40	28.15	31.84	-3.69	-1.35
-30	27.89	32.29	-4.40	-1.59
-20	27.69	31.91	-4.22	-1.52
-10	27.90	31.68	-3.79	-1.37
-9	27.95	31.66	-3.71	-1.34
-8	27.90	31.75	-3.85	-1.39
-7	27.91	31.75	-3.84	-1.39
-6	27.92	31.75	-3.83	-1.39
-5	27.94	31.74	-3.80	-1.38
-4	27.93	31.77	-3.84	-1.39
-3	27.84	31.89	-4.05	-1.47
-2	27.77	32.01	-4.25	-1.55
-1	27.69	31.99	-4.30	-1.57
0	27.67	31.81	-4.14	-1.51

To provide a more detailed analysis, Figure 6.2 provides a graphical representation of the changes in institutional holdings for the firms with 50% or more institutional holdings and the equivalent control group in the days leading to bankruptcies announcements. Table 6.2 provides the daily institutional holdings and the Mann–Whitney U -statistics. Similar to the results for the entire portfolio of firms in Figure 6.1 and Table 6.1, we observe that firms with 50% or more institutional concentration experience a decline of 15.08% holdings over the sample period. The bulk of this decline also starts around 115 days prior to failure announcements and these reductions in institutional concentration were found to be statistically significant approximately 40 days prior to bankruptcies announcements when compared to the control group.

Figure 6.2: Change in Institutional Holdings around Bankruptcies Announcements
(Firms with 50% or more Institutional Holdings)

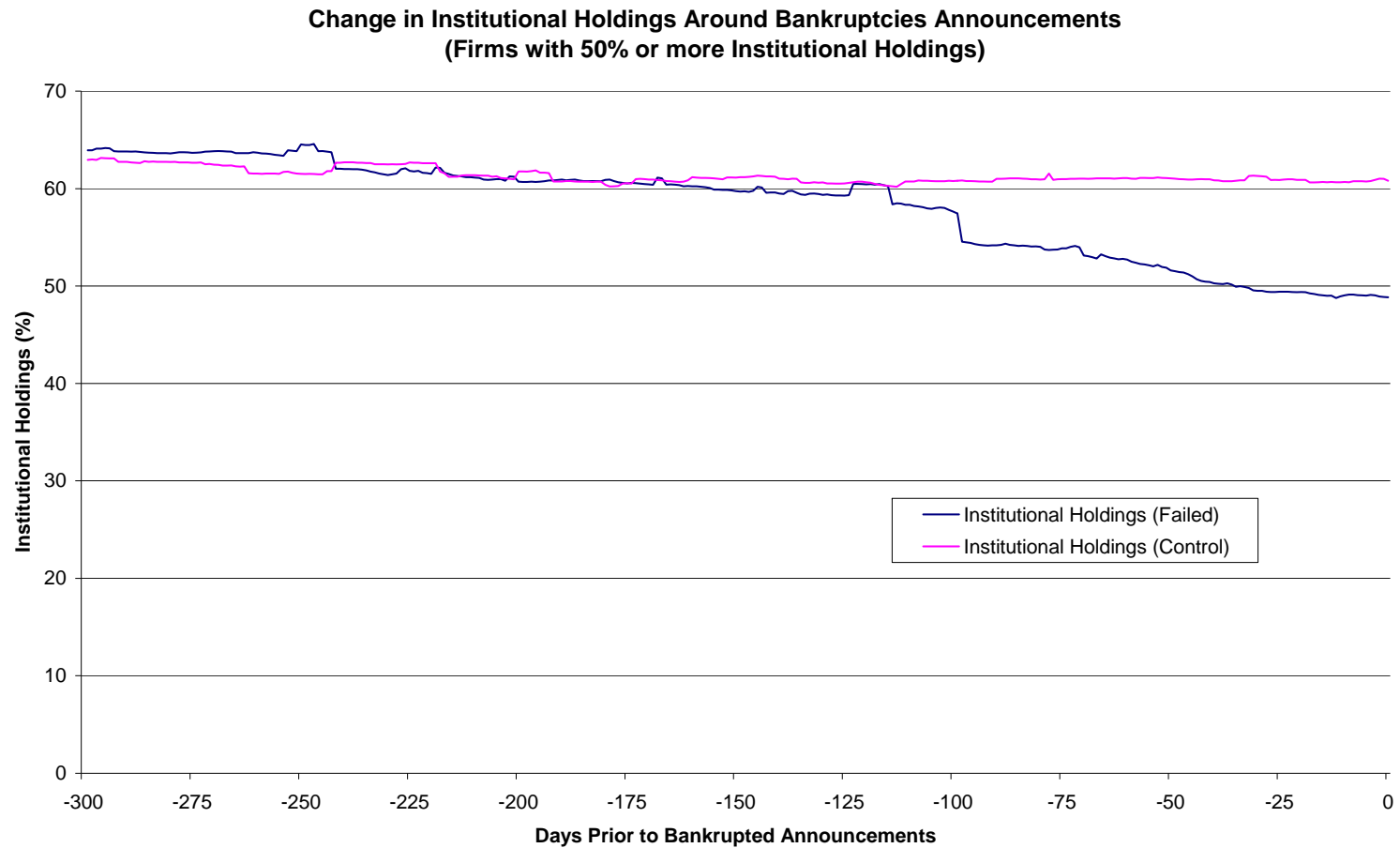


Table 6.2. Institutional Holdings around Bankruptcies Announcements
(Firms with 50% or more Institutional Holdings)

Table 6.2. provides daily institutional holdings for failed and control firms with high institutional concentration (50% or more) in the period leading up to bankruptcies announcements				
Days Prior to Bankruptcies Announcements	Institutional Holdings (Failed)	Institutional Holdings (Control)	Difference In Institutional Holdings Between Failed and Control Firms	T-stats
-300	63.94	62.94	1.00	0.24
-250	64.53	61.52	3.01	0.74
-200	60.70	61.77	-1.07	-0.26
-150	59.74	61.13	-1.39	-0.32
-100	57.65	60.79	-3.14	-0.69
-50	53.60	61.04	-7.44	-1.43
-40	50.27	60.84	-10.57	-2.41*
-30	49.52	61.29	-11.77	-2.59*
-20	49.40	60.91	-11.51	-2.55*
-10	49.04	60.68	-11.65	-2.65*
-9	49.11	60.66	-11.54	-2.63*
-8	49.13	60.75	-11.62	-2.65*
-7	49.07	60.75	-11.69	-2.66*
-6	49.03	60.75	-11.71	-2.67*
-5	49.02	60.74	-11.72	-2.68*
-4	49.10	60.77	-11.67	-2.66*
-3	49.05	60.89	-11.84	-2.72*
-2	48.93	61.01	-12.08	-2.79*
-1	48.87	60.99	-12.12	-2.80*
0	48.86	60.81	-11.95	-2.69*
* Significance at the 5% level				

Figure 6.3 provides a graphical representation of the changes in institutional holdings for the firms with less than 50% institutional holdings and the equivalent control group in the days leading to bankruptcies announcements. Table 6.3 provides the daily institutional holdings and the Mann–Whitney U -statistics. Similar to the results documented above, we observe that firms with less than 50% institutional concentration experience a decline around 112 days prior to failure announcements. However the decrease during the sample period is observed to be small (approximately 1.4%) and the changes in institutional holdings not statistically different from the control group.

Figure 6.3: Change in Institutional Holdings around Bankruptcies Announcements
(Firms with less than 50% Institutional Holdings)

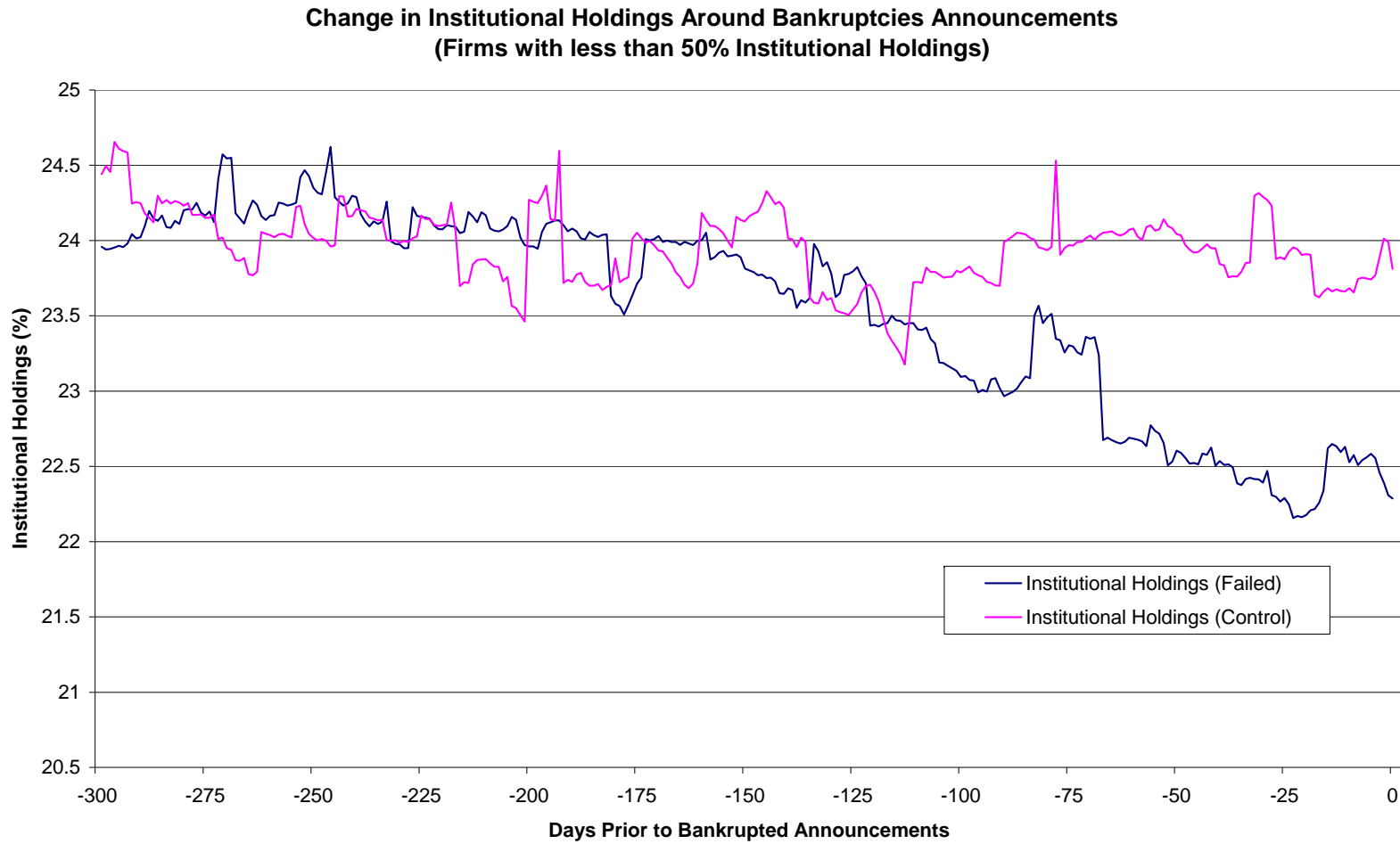


Table 6.3. Institutional Holdings around Bankruptcies Announcements
(Firms with less than 50% Institutional Holdings)

Table 6.3. provides daily institutional holdings for failed and control firms with low institutional concentration (less than 50%) in the period leading up to bankruptcies announcements				
Days Prior to Bankruptcies Announcements	Institutional Holdings (Failed)	Institutional Holdings (Control)	Difference In Institutional Holdings Between Failed and Control Firms	T-stats
-300	23.96	25.44	-1.48	-0.55
-250	24.35	25.02	-0.67	-0.24
-200	23.96	25.27	-1.31	-0.51
-150	23.81	25.13	-1.31	-0.52
-100	23.09	24.79	-1.69	-0.70
-50	22.97	24.99	-2.03	-0.84
-40	23.49	24.94	-1.45	-0.59
-30	23.35	25.03	-1.69	-0.70
-20	22.68	25.08	-2.39	-0.99
-10	22.60	25.04	-2.44	-1.02
-9	22.54	24.84	-2.31	-0.96
-8	22.39	25.29	-2.90	-1.18
-7	22.18	24.91	-2.73	-1.11
-6	22.53	24.68	-2.16	-0.86
-5	22.58	24.66	-2.08	-0.82
-4	22.51	24.75	-2.24	-0.89
-3	22.54	24.75	-2.21	-0.89
-2	22.56	24.75	-2.19	-0.88
-1	22.58	24.74	-2.16	-0.86
0	22.56	24.77	-2.21	-0.89

To control for non-bankruptcies related factors that may affect changes to institutional holdings, we run the regression proposed in Section 5.5. Table 6.4 provides the results from the regression. Panel A presents the figures for the entire portfolio, Panel B demonstrates the results for failed sample with high institutional concentration and Panel C yields the analysis for failed companies with low institutional concentration. It is observed that there is a statistically significant positive coefficient for the bankruptcy dummy (indicating that lower institutional holdings are associated with failed firms) across all 3 analyses (Panel A, B and C) after controlling for bid-ask spreads, decile-adjusted returns, price volatility and volume.

Table 6.4: Regression Estimates for Changes in Institutional Holdings Around the Release of the Last financial Reports		
<p><i>The table presents results from the following regression model:</i></p> $IH_{it} = \alpha + \phi BNB_{it} + \beta_1 BAS_{it} + \beta_2 Volume_{it} + \beta_3 Volatility_{it} + \varepsilon_{it}$ <p><i>The dependant variable is the average institutional holdings (in percentage terms) in time period t for portfolio i, where i represents either the (a) entire portfolio, (b) high institution holdings, or (c) low institution holdings. BNB_t represents a dummy variable taking on the value 0 if the firm failed and 1 otherwise. BAS_t is the bid-ask spreads in time period t, AR_t is the deciles adjusted return in time period t. $Volume_t =$ Daily traded volume divided by Total shares outstanding in time period t and $Volatility_t$ is calculated by the Ln (High/Low of the day) in time period t, where High is the highest price during the day; Low is the lowest price during the day.</i></p> <p><i>Panel A presents the results for the entire portfolio, Panel B the High concentration and Panel C the low concentration groups, respectively.</i></p>		
Panel A: Entire Portfolio		
Intercept	32.91	161.65**
Dummy	1.11	11.29**
Bid-Ask Spreads	-10.81	-8.63**

Average Returns	-0.16	-3.80**
Volatility	-6.75	-6.26**
Volume	-96.65	-3.33**
Adj. R-Sq.	0.48	
F-Statistic	111.74	
* Significance at the 5% level		
** Significance at the 1% level		
Panel B: High Concentration (50% or more Institutional Holdings)		
	OLS Estimates	T-stats
Intercept	62.43	116.90**
Dummy	1.92	6.40**
Bid-Ask Spreads	-40.00	-5.76**
Average Returns	-1.52	-2.25*
Volatility	-31.17	-8.69**
Volume	-116.04	-1.02
Adj. R-Sq.	0.31	
F-Statistic	54.54	
* Significance at the 5% level		
** Significance at the 1% level		
Panel C: Low Concentration (Less than 50% Institutional Holdings)		
	OLS Estimates	T-stats
Intercept	24.13	266.40**
Dummy	0.29	6.27**
Bid-Ask Spreads	-8.79	-10.58**
Average Returns	-0.08	-3.92**
Volatility	1.71	1.07
Volume	-58.35	-2.58*
Adj. R-Sq.	0.28	
F-Statistic	46.21	
* Significance at the 5% level		
** Significance at the 1% level		

Overall the results provide empirical evidences to suggest that some institutional investors that exit bankrupt firms prior to failure. However, we did not observe any unusually large sell-off by institutional holders in the immediate period prior to announcements in any of the above analysis. Rather the exodus documented is gradual and appear to have started approximately 112 to 115 days prior to any bankruptcies announcements. It is also observed that the reduction in institutional holdings is small (1.4%) and not statistically significant for firms with low institutional concentration (less than 50%). The exit by institutional investors is observed to be more prevalent (15.08%) in failed companies with higher levels of institutional concentration (50% or more) and it becomes statistically significant around 40 days prior to the event date.

It is noteworthy that at the time of failure announcements, institutional holdings are still relatively high compared to the start of the sample period. For example, the institutional concentration remains at 86.3% of the original level in the sample of all failed firms, 76.4% in the high portfolio and 94.2% in the low sample³⁹. These results may indicate that the institutional holders that remained in the bankrupt firms may be "dedicated" and/or "quasi-indexers" and the exodus is caused predominately by "transient" institutional holders⁴⁰ who are reacting to news events (e.g. earnings announcements, financial statements, etc).

³⁹ The remaining institutional percentage is calculated by taking the holdings on event day divided by the initial level, multiply by 100%, e.g. $(27.67 / 32.06) * 100$ for the entire sample.

⁴⁰ Bushee (1998, 2001) posit that institutional investors can be classified into different categories, (i) *transient*, (ii) *dedicated*, and (iii) *quasi-indexer*. "Transient" institutions are characterized as having high portfolio turnover and highly diversified portfolio holdings. These traits reflect the fact that transient institutions tend to be short-term-focused investors whose interest in the firm's stock is based on the likelihood of short-term trading profits (Porter 1992). In addition, the short investment horizons of these institutions create little incentive for them to gather information relevant to long-run value, allowing managers the opportunity to make myopic investment decisions (Porter 1992). The other two types of

To examine if the exodus by institutional investors is indeed related to news events, we further analyze the change in institution holdings around information releases. Results of this analysis are provided below.

6.1.2. Behavior of Institutional Investors around the Release of Financial Statements

This sub-section seeks to examine if the exodus by institutional investors is related to news releases that are publicly available. To test this, an announcement event that provides information on any potential changes to a firm's valuation and is common to all companies in the failed portfolio must be utilized. For this purpose, the financial statements which all companies are required to provide⁴¹ is selected. In addition, given that a bankrupt firm may have lodge more than one financial report⁴² during the sample period, a uniform and consistent choice must be made across the entire portfolio. To provide consistency, we utilized the day where information regarding the last financial report is first released⁴³ as the event date for this analysis.

institutions classified by Bushee 1998, "dedicated" and "quasi-indexers," provide long-term, stable ownership to firms because they are geared toward longer-term dividend income or capital appreciation. Dedicated institutions are characterized by large average investments in portfolio firms and extremely low turnover, consistent with a "relationship investing" role and a commitment to provide long-term patient capital (Porter 1992; Dobrzynski 1993). Quasi-indexers are also characterized by low turnover, but they tend to have diversified holdings, consistent with a passive, buy-and-hold strategy of investing portfolio funds in a broad set of firms (Porter 1992). Because of the longer investment horizons of these two types of institutions, they should be less focused on near-term earnings and be more likely to have preferences that are insensitive to the distribution of future value.

⁴¹ Section 292 of the *Corporations Act 2001* (Corporations Act) requires all public companies to prepare and lodge financial reports

⁴² Section 319 of the Corporations Act requires a disclosing entity or registered scheme to lodge the financial reports within three months of the end of the financial year. All other companies must lodge their financial reports within four months of the end of the financial year. Depending on the timing of failure, a company may have lodge more than one financial report during the sample period. For example, if a firm failed just after the release of their last financial statement, it is likely that they would have provided another report for the last financial year.

⁴³ As both the half-yearly and full-year financial reports provide essentially the same information effects, they are both classified and utilized as financial reports for the purpose of this study. As there are instances where an earnings announcement is released to the public prior to the financial reports, we identify the

Figure 6.4 provides a graphical representation of the changes in institutional holdings for the portfolio of failed and control groups with 50% or more institution holdings 100 days prior to the release of the last publicly available financial reports and 40 days after⁴⁴. Table 6.5 provides the daily institutional holdings and the Mann–Whitney *U*-statistics for both groups. Results indicate that, on average, institutional holdings starts to decline around 1 day prior to the event date and exodus persist for approximately 23 days after the release of financial reports. The difference in means between the failed and control group becomes statistically significant approximately 23 days after the event.

event date as the first point in time where this type of information (financial report related which is likely to affect stock valuation) is available.

⁴⁴ We are only able to provide a 40 days post period analysis as some companies announced bankruptcies after this time.

Figure 6.4: Change in Institutional Holdings around the Last Financial Reports
(Firms 50% or more Institutional Holdings)

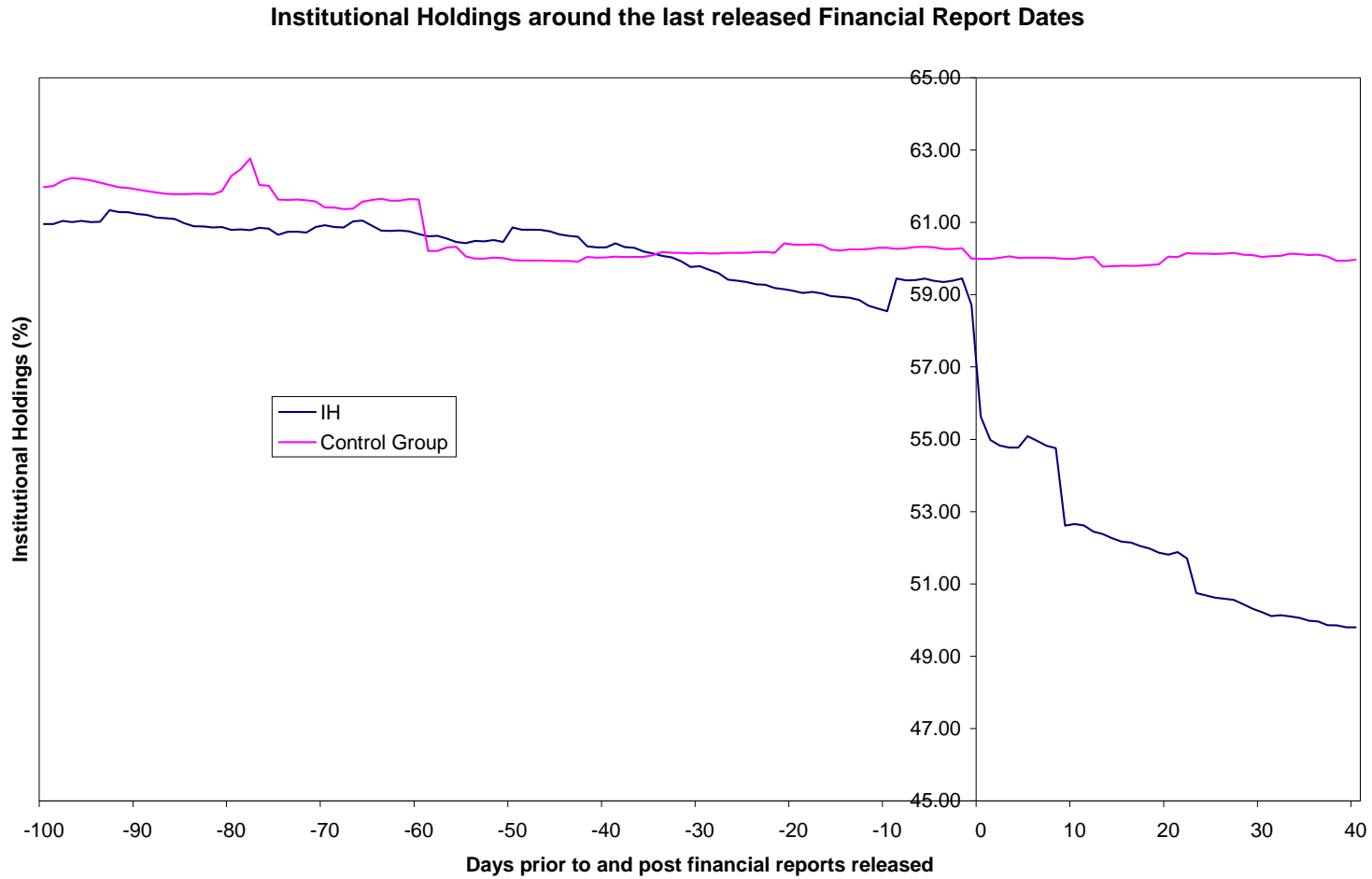


Table 6.5. Change in Institutional Holdings around the Last Financial Reports
(Firms with 50% or more Institutional Holdings)

Table 6.5. provides daily institutional holdings for failed and control firms with high institutional concentration (50% or more) in the period around the first instance the last financial reports are release publicly via Signal G announcements				
Days Prior to Bankruptcies Announcements	Institutional Holdings (Failed)	Institutional Holdings (Control)	Difference In Institutional Holdings Between Failed and Control Firms	T-stats
-100	60.95	61.98	-1.03	-0.23
-75	60.66	61.63	-0.98	-0.20
-50	60.86	59.96	0.90	0.27
-25	59.34	60.16	-0.81	-0.21
-10	58.54	60.29	-1.75	-0.30
-5	59.38	60.31	-0.93	-0.23
-4	59.35	60.26	-0.91	-0.22
-3	59.39	60.26	-0.87	-0.21
-2	59.45	60.29	-0.84	-0.20
-1	58.71	60.00	-1.29	-0.31
0	55.63	59.99	-4.37	-1.05
1	54.99	59.99	-5.01	-1.21
2	54.83	60.02	-5.19	-1.25
3	54.77	60.06	-5.29	-1.27
4	54.77	60.02	-5.25	-1.29
5	55.09	60.03	-4.94	-1.19
10	52.66	59.99	-7.33	-1.66
20	51.81	60.05	-8.24	-1.89
30	50.22	60.04	-9.83	-2.31*
40	49.80	59.97	-10.17	-2.42*
* Significance at the 5% level				

These results appear to provide some evidence to support the previous proposition that the exodus of institutional investors is related to news events, specifically, financial statements type announcements. It is also noteworthy that some institutional investors begin to exit these bankrupt firms 1 day prior to the “official” announcement via Signal G, however, we caution against interpreting this as the existence of private information

and exploitation by institutional holders. While the authors have taken steps to ensure that the event date is the earliest possible moment where financial report type information is first release to the public, it may be possible that there is “leakage” of this news in other media which is not captured via the “official” channel.

As broad market and firm specific market variables can affect institutional holdings, we run the following regressions to control for these factors. To control for any broad market movements that may affect changes to institutional holdings, we run the following regression,

$$IH_{Top_t} = \alpha + \beta_1 Control_{Top_t} + \beta_2 Event_t + \varepsilon \quad (2)$$

where IH_{Top} = Average Institutional holdings (in percentage terms) for stocks with 50% or more institutional concentration in the failed portfolio at time t ; $Control_{Top}$ = Average Institutional holdings (in percentage terms) for stocks less than 50% institutional concentration in the control portfolio at time t ; $Event$ = a dummy variable taking on the value 0 if it is on or before the event date and 1 otherwise.

Table 6.6 provides the results from this regression. It is observed that there is a statistically significant negative coefficient for the event dummy, indicating that failed firms with high institutional concentration are associated with lower holdings after controlling for broad market movements.

Table 6.6: Regression Estimates for Changes in Institutional Holdings
Around the Release of the Last financial Reports

The table presents results from the following regression models:

$$IH_{T_{opt}} = \alpha + \beta_1 Control_{T_{opt}} + \beta_2 Event_t + \varepsilon$$

The dependant variable is the average institutional holdings (in percentage terms) for stocks with 50% or more institutional concentration in the failed portfolio at time t, Control_{T_{opt}} represents the average institutional holdings (in percentage terms) for stocks with 50% or more institutional concentration in the control portfolio at time t and Event is a dummy variable taking on the value 0 if it is on or before the event date and 1 otherwise.

High Concentration (50% or more Institutional Holdings)

	OLS Estimates	T-stats
Intercept	24.05	2.99**
Control _{Top}	0.59	4.49**
Event	-7.90	-32.91**
Adj. R-Sq.	0.92	
F-Statistic	780.14	
** Significance at the 1% level		

To control for any broad market movements and firm specific market variables that may affect changes to institutional holdings, we run the following regression,

$$IH_{T_{opt}} = \alpha + \beta_1 Control_{T_{opt}} + \beta_2 Event + \varepsilon \beta_3 BAS_{T_{opt}} + \beta_4 AR_{T_{opt}} + \beta_4 Volume_{T_{opt}} + \beta_5 Volatility_{T_{opt}} + \varepsilon_{T_{opt}}$$

where $IH_{T_{opt}}$ = Average Institutional holdings (in percentage terms) for stocks with 50% or more institutional concentration in the failed portfolio at time t; $Control_{T_{opt}}$ = Average Institutional holdings (in percentage terms) for stocks less than 50% institutional

concentration in the control portfolio at time t ; Event = a dummy variable taking on the value 0 if it is on or before the event date and 1 otherwise. BAS_t = bid-ask spreads in time period t ; AR_t = deciles adjusted returns in time period t ; $Volume_t$ = Daily traded volume / Total shares outstanding in time period t and; $Volatility_t = \text{Ln}(\text{High/Low of the day})$ in time period t , where High is the highest price during the day; Low is the lowest price during the day.

Table 6.7: Regression Estimates for Changes in Institutional Holdings Around the Release of the Last financial Reports

The table presents results from the following regression model:

$$IH_{Top_t} = \alpha + \beta_1 Control_{Top_t} + \beta_2 Event + \varepsilon + \beta_3 BAS_{Top_t} + \beta_4 AR_{Top_t} + \beta_5 Volume_{Top_t} + \beta_6 Volatility_{Top_t} + \varepsilon_{Top_t}$$

The dependant variable is the average institutional holdings (in percentage terms) stocks with 50% or more institutional concentration in the failed portfolio at time t . $Control_{Top}$ represents the average institutional holdings (in percentage terms) for stocks with 50% or more institutional concentration in the control portfolio at time t and Event is a dummy variable taking on the value 0 if it is on or before the event date and 1 otherwise. BAS_t is the bid-ask spreads in time period t , AR_t is the deciles adjusted return in time period t . $Volume_t$ = Daily traded volume divided by Total shares outstanding in time period t and $Volatility_t$ is calculated by the Ln (High/Low of the day) in time period t , where High is the highest price during the day; Low is the lowest price during the day.

High Concentration (less than 50% Institutional Holdings)

Intercept	27.82	3.38**
Control _{Top}	0.54	3.96**
Event	-7.88	-31.63**
Bid-Ask Spreads	-7.39	-2.14*
Average Returns	7.20	1.18
Volatility	-1.73	-0.83
Volume	99.40	1.05
Adj. R-Sq.	0.92	
F-Statistic	272.07	

* Significance at the 5% level
** Significance at the 1% level

Similar to the results documented above, it is observed that there is a statistically significant negative coefficient for the event dummy indicating that failed firms with high institutional concentration are associated with lower holdings after controlling for broad market movements. These results confirm that institutional holdings are indeed lower after the release of the last financial reports.

Figure 6.5 provides a graphical representation of the changes in institutional holdings for the portfolio of failed and control groups with less than 50% institution holdings around the release of the last publicly available financial reports. Table 6.8 provides the daily institutional holdings and the Mann–Whitney *U*-statistics for both groups. Similar to the results for the portfolio of high institutional concentration, we observed a decline in holdings around 1 day prior to the release of the financial statements to 19 days after the announcements. Difference in means between the failed and control group are not observed to be statistically significant throughout this sample period. Consistent with the findings of the portfolio of high institution holdings, these results provide evidence to support the proposition that the sell-off by institution investors is related to financial reports related news event.

Figure 6.5: Change in Institutional Holdings around the last Financial Reports
(Firms with less than 50% Institutional Holdings)

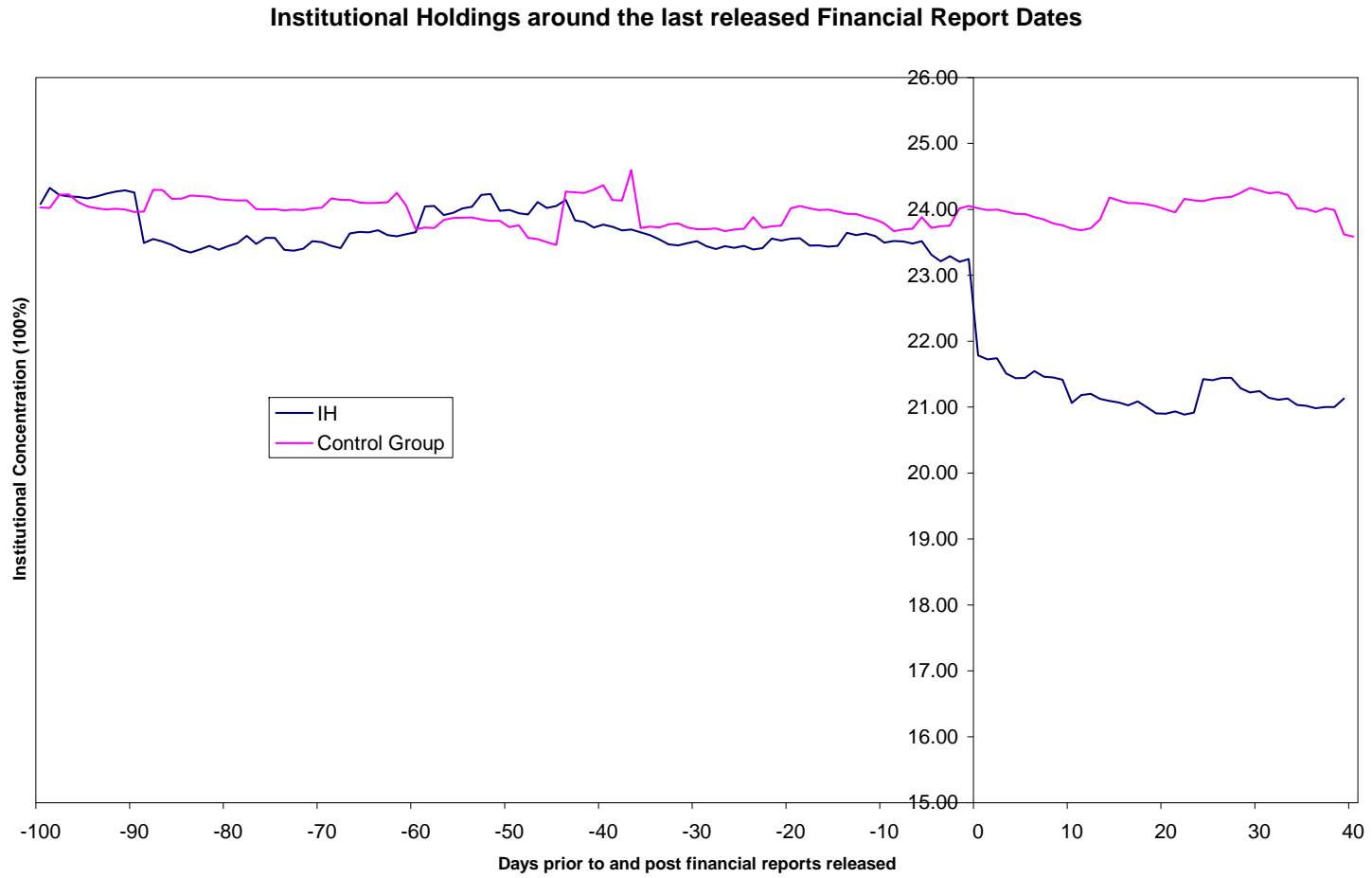


Table 6.8. Change in Institutional Holdings around Bankruptcies Announcements
(Firms with less than 50% Institutional Holdings)

Table 6.8. provides daily institutional holdings for failed and control firms with low institutional concentration (less than 50%) in the period around the first instance the last financial reports are release publicly via Signal G announcements				
Days Prior to Bankruptcies Announcements	Institutional Holdings (Failed)	Institutional Holdings (Control)	Difference In Institutional Holdings Between Failed and Control Firms	T-stats
-100	24.08	24.03	0.05	0.02
-75	23.57	24.00	-0.44	-0.18
-50	23.99	23.73	0.26	0.11
-25	23.45	23.71	-0.26	-0.11
-10	23.50	23.79	-0.29	-0.12
-5	23.31	23.72	-0.41	-0.18
-4	23.21	23.74	-0.53	-0.22
-3	23.29	23.76	-0.46	-0.20
-2	23.20	24.01	-0.81	-0.35
-1	23.25	24.05	-0.81	-0.35
0	21.79	24.02	-2.23	-0.97
1	21.73	23.99	-2.26	-0.96
2	21.74	24.00	-2.25	-0.95
3	21.51	23.97	-2.46	-1.04
4	21.44	23.93	-2.49	-1.04
5	21.44	23.93	-2.48	-1.01
10	21.07	23.71	-2.64	-1.11
20	20.90	24.00	-3.10	-1.26
30	21.24	24.29	-3.04	-1.23
40	21.13	23.59	-2.46	-1.01

Similar to the analysis of the failed companies with high institutional concentration, we run the following regression to control for changes in broad market movements,

$$IH_{Bottomt} = \alpha + \beta_1 Control_{Bottomt} + \beta_2 Event_t + \varepsilon \quad (3)$$

where $IH_{Bottomt}$ = Average Institutional holdings (in percentage terms) for stocks with 50% or more institutional concentration in the failed portfolio at time t ; $Control_{Bottom}$ = Average Institutional holdings (in percentage terms) for stocks less than 50% institutional concentration in the control portfolio at time t ; $Event_t$ = a dummy variable taking on the value 0 if it is on or before the event date and 1 otherwise.

Table 6.9 provides the results from this regression.

Table 6.9: Regression Estimates for Changes in Institutional Holdings Around the Release of the Last financial Reports		
<i>The table presents results from the following regression models:</i>		
$IH_{Bottomt} = \alpha + \beta_1 Control_{Bottomt} + \beta_2 Event_t + \varepsilon$		
<i>The dependant variable is the average institutional holdings (in percentage terms) for stocks with less than 50% institutional concentration in the failed portfolio at time t, $Control_{Bottom}$ represents the average institutional holdings (in percentage terms) for stocks with less than 50% institutional concentration in the control portfolio at time t and $Event$ is a dummy variable taking on the value 0 if it is on or before the event date and 1 otherwise.</i>		
Low Concentration (less than 50% Institutional Holdings)		
	OLS Estimates	T-stats
Intercept	24.98	7.92**
$Control_{Bottom}$	-0.06	-0.42
Event	-2.45	-40.37**
Adj. R-Sq.	0.92	
F-Statistic	829.11	
** Significance at the 1% level		

Results for the firms with low institutional demonstrates a statistically significant negative coefficient for the event dummy, indicating that these companies are associated with lower holdings after controlling for broad market movements.

To control for both broad market and firm specific market variables, the following regression was utilized,

$$IH_{Bottomt} = \alpha + \beta_1 Control_{Bottomt} + \beta_2 Event + \varepsilon \beta_3 BAS_{Bottomt} + \beta_4 AR_{Bottomt} + \beta_4 Volume_{Bottomt} + \beta_5 Volatility_{Bottomt} + \varepsilon_{Bottomt} \quad (4)$$

where $IH_{Bottomt}$ = Average Institutional holdings (in percentage terms) for stocks with 50% or more institutional concentration in the failed portfolio at time t ; $Control_{Bottomt}$ = Average Institutional holdings (in percentage terms) for stocks less than 50% institutional concentration in the control portfolio at time t ; $Event$ = a dummy variable taking on the value 0 if it is on or before the event date and 1 otherwise. BAS_t = bid-ask spreads in time period t ; AR_t = deciles adjusted returns in time period t ; $Volume_t$ = Daily traded volume / Total shares outstanding in time period t and; $Volatility_t$ = $\ln(\text{High/Low of the day})$ in time period t , where High is the highest price during the day; Low is the lowest price during the day.

Table 6.10: Regression Estimates for Changes in Institutional Holdings Around the Release of the Last financial Reports

The table presents results from the following regression model:

$$IH_{Bottomt} = \alpha + \beta_1 Control_{Bottomt} + \beta_2 Event + \varepsilon \beta_3 BAS_{Bottomt} + \beta_4 AR_{Bottomt} + \beta_5 Volume_{Bottomt} + \beta_6 Volatility_{Bottomt} + \varepsilon_{Bottomt}$$

The dependant variable is the average institutional holdings (in percentage terms) stocks with less than 50% institutional concentration in the failed portfolio at time t .

$Control_{Bottomt}$ represents the average institutional holdings (in percentage terms) for stocks less than 50% institutional concentration in the control portfolio at time t and $Event$ is a dummy variable taking on the value 0 if it is on or before the event date and 1 otherwise. BAS_t is the bid-ask spreads in time period t , AR_t is the deciles adjusted return in time period t . $Volume_t = \text{Daily traded volume} / \text{Total shares outstanding}$ in time period t and $Volatility_t$ is calculated by the $\text{Ln}(\text{High}/\text{Low})$ of the day in time period t , where $High$ is the highest price during the day; Low is the lowest price during the day.

Low Concentration (less than 50% Institutional Holdings)

Intercept	24.27	7.29**
Control	-0.02	-0.18
Event	-2.48	-32.72**
Bid-Ask Spreads	1.10	0.93
Average Returns	0.79	0.41
Volatility	-1.60	-0.78
Volume	-69.47	-1.07
Adj. R-Sq.	0.92	
F-Statistic	274.23	

* Significance at the 5% level

** Significance at the 1% level

Consistent with the previous results, it is observed that the event dummy variable is statistically significant negative. These results confirm the findings that companies low institutional holdings experience lower institutional concentration after controlling for broad market and firm specific movements.

Overall, our results indicate that both firms with low and high institutional holdings experience low holdings after the release of the last financial reports.

6.2. Information Asymmetry and Disclosures

Figure 6.6 provides a graphical representation of the bid-ask spreads of disclosing and non-disclosing firms around bankruptcies announcements. Table 6.11 provides the daily institutional holdings and the Mann–Whitney *U*-statistics for these groups. Results indicate that, on average, the bid-ask spreads for disclosing firms are lower than non-disclosing and that the differences becomes statistically significant around 50 days prior to bankruptcies announcements. Similar to the results documented in Frino, Jones and Wong (2007), we observed that the bid-ask spreads for failed firms exhibit large increase 1 day prior to and on the event day itself. Comparing the change in bid-ask spreads to the start of the period for the disclosing firms, we noted that the bid-ask spread increase by 111.1% in the day prior to announcements and 155.6% on the event day itself⁴⁵. For non-disclosing firms, we observed that the increases were 300% one day before the event and 400% on the announcement day itself. The differences between the disclosing and non-disclosing firms are documented to be statistically significant at the 1% level approximately 9 days prior to bankruptcies announcements.

These results suggest that while bankrupt firms experience increase in bid-ask spreads in the immediate period prior to failure announcements (consistent with Frino, Jones and

⁴⁵ Change in bid-ask spreads are computed by take the $((\text{Bid-Ask Spread}_t - \text{Bid-Ask Spread}_{start}) / \text{Bid-Ask Spread}_{start}) * 100$, where $t =$ days prior to bankruptcies announcements.

Wong, 2007), companies that strive to keep market participants informed by releasing some form of disclosures (false positive or negative) experience lower increases in information asymmetry. These findings are consistent with the prior findings of Yohn (1998) and hypothesis, H2, that firms with no disclosures experience greater increases in information asymmetry around periods of uncertainty.

Figure 6.6: Bid-Ask Spreads of Disclosing and Non-Disclosing Firms around Bankruptcies Announcements

Bid-Ask Spreads of Disclosing and Non-Disclosing Firms Around Bankruptcies Announcements

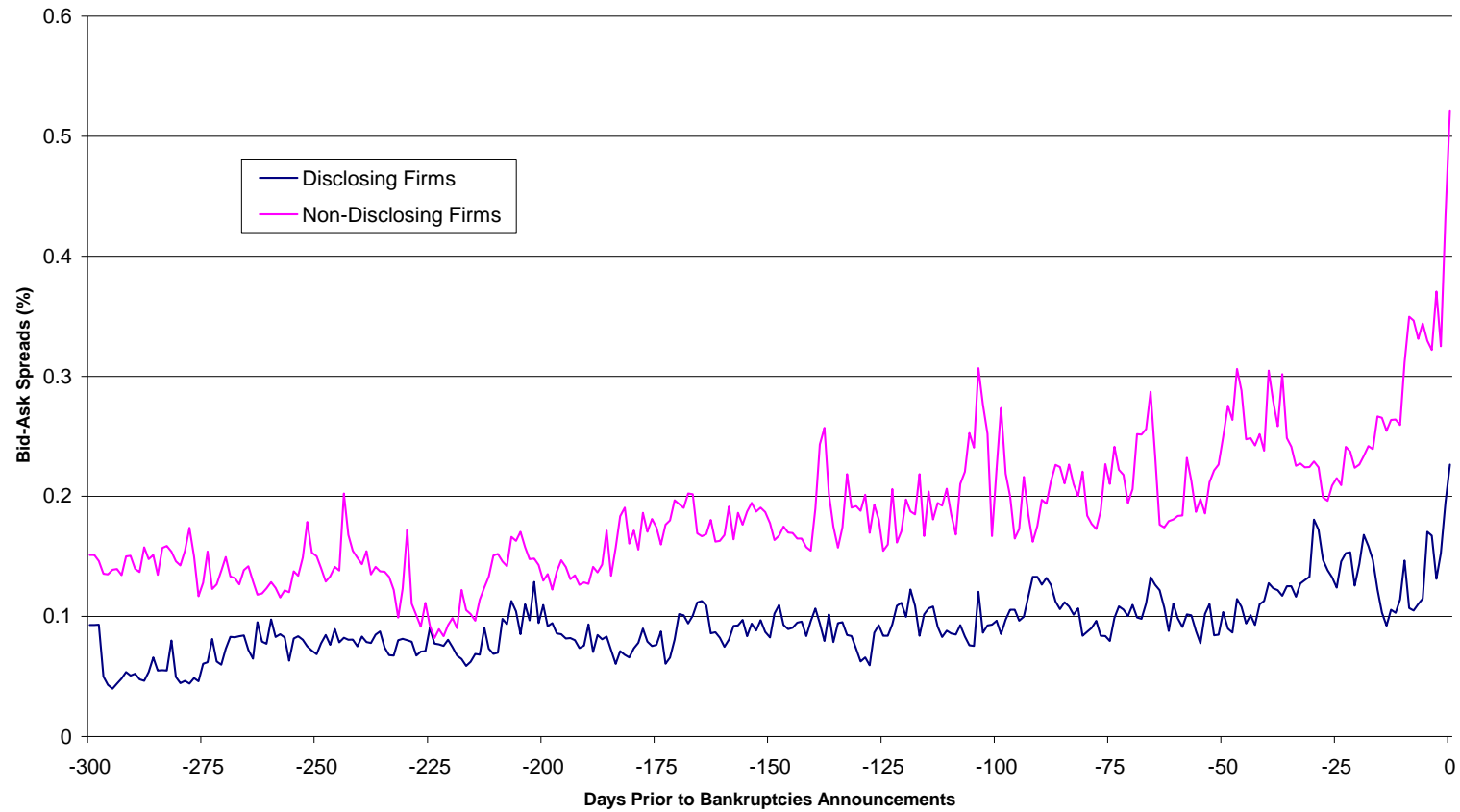


Table 6.11. Bid-Ask Spreads of Disclosing and Non-Disclosing Firms around Bankruptcies Announcements

Table 6.11. provides the daily bid-ask spreads for firms that provides some forms of disclosures 50 days prior to bankruptcies announcements (disclosing firms) and those that do not (non-disclosing firms)				
Days Prior to Bankruptcies Announcements	Disclosing Firms	Non-Disclosing Firms	Difference In Bid-Ask Spreads Between Disclosing and Non-Disclosing Firms	T-stats
-300	0.09	0.15	-0.06	-1.08
-250	0.07	0.15	-0.08	-1.33
-200	0.11	0.13	-0.02	-0.68
-150	0.08	0.18	-0.10	-1.66
-100	0.10	0.22	-0.13	-1.79
-50	0.10	0.25	-0.15	-4.72*
-40	0.13	0.30	-0.18	-4.74*
-30	0.18	0.23	-0.05	-0.85
-20	0.14	0.23	-0.08	-2.73*
-10	0.15	0.31	-0.16	-3.91*
-9	0.11	0.35	-0.24	-6.97**
-8	0.10	0.35	-0.24	-6.58**
-7	0.11	0.33	-0.22	-5.86**
-6	0.11	0.34	-0.23	-6.71**
-5	0.17	0.33	-0.16	-4.18**
-4	0.17	0.32	-0.15	-4.40**
-3	0.13	0.37	-0.24	-6.90**
-2	0.15	0.33	-0.17	-4.25**
-1	0.19	0.43	-0.24	-6.22**
0	0.23	0.52	-0.30	-15.83**
*Significance at 5% level				
**Significance at 1% level				

6.2.1 Institutional Behavior in Non-Disclosing Firms

The results in the previous sections demonstrate that institutional investors exit bankrupt firms prior to failure announcements. There are also evidences that this exodus occurs around the release of the last financial reports. In addition, it is also observed that companies which provide no disclosures have the highest levels of information asymmetry.

This sub-section seeks to provide some further analysis and examine if firms with the highest level of information asymmetry also experience the most institutional exodus prior to bankruptcies announcements. Figure 6.7 provides a graphical representation of the institutional holdings of disclosing and non-disclosing firms around bankruptcies announcements. Table 6.12 provides the daily institutional holdings and the Mann–Whitney *U*-statistics for these groups.

Figure 6.7: Institutional Behavior in Disclosing and Non-Disclosing Firms around Bankruptcies Announcements

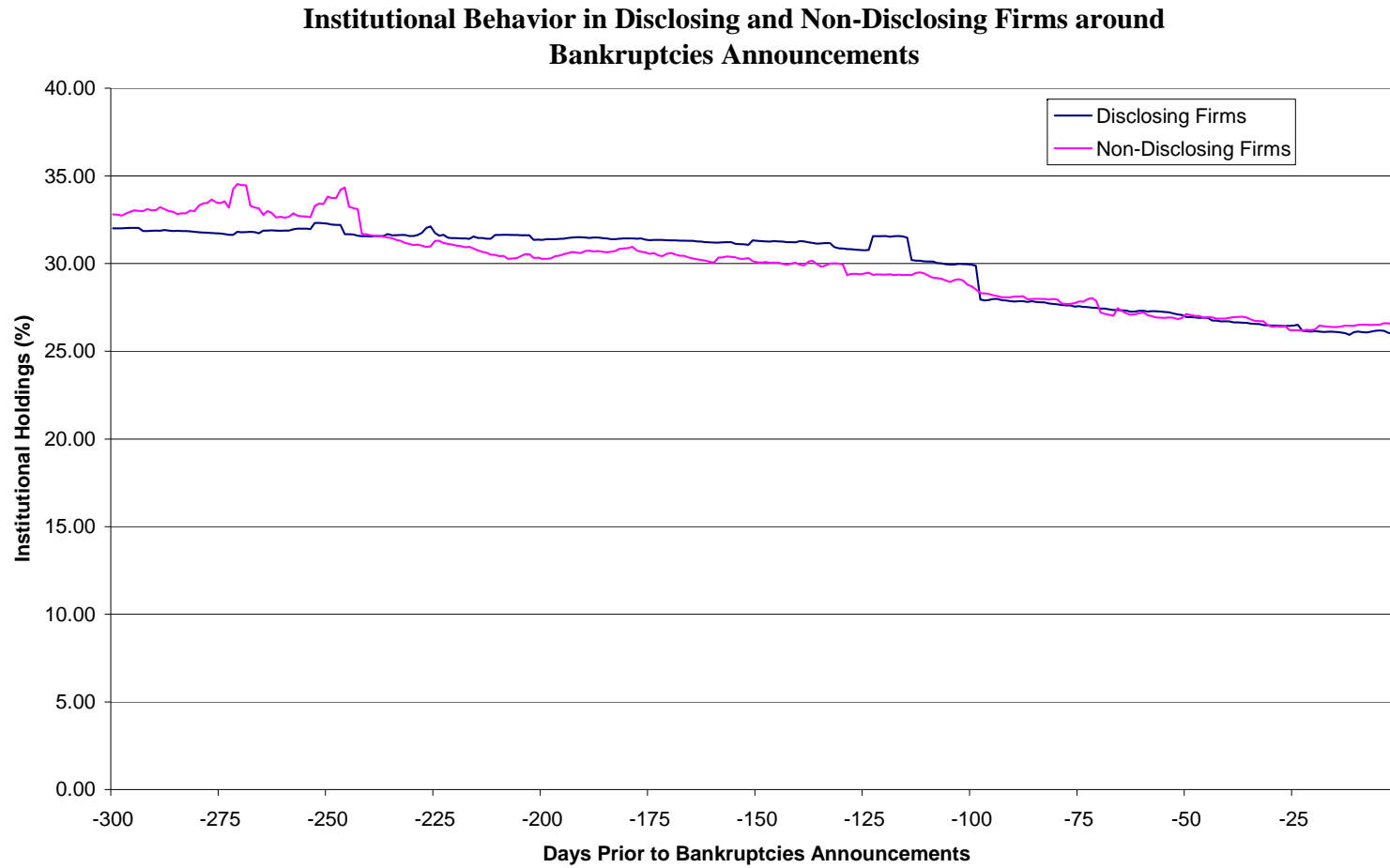


Table 6.12. Institutional Holdings in Disclosing and Non-Disclosing Firms around Bankruptcies Announcements

Table 6.12. provides the daily institutional holdings for firms that provides some forms of disclosures 50 days prior to bankruptcies announcements (disclosing firms) and those that do not (non-disclosing firms) around bankruptcies announcements				
Days Prior to Bankruptcies Announcements	Disclosing Firms	Non-Disclosing Firms	Difference In Institutional Holdings Between Disclosing and Non-Disclosing Firms	T-stats
-300	32.01	32.80	-0.79	-0.11
-250	32.27	33.83	-1.55	-0.20
-200	31.36	30.27	1.09	0.16
-150	31.30	30.07	1.23	0.19
-100	29.93	28.69	1.24	0.20
-50	26.96	27.13	-0.17	-0.03
-40	26.70	26.90	-0.20	-0.04
-30	26.46	26.39	0.07	0.01
-20	26.14	26.24	-0.10	-0.02
-10	26.12	26.50	-0.38	-0.07
-9	26.09	26.52	-0.43	-0.09
-8	26.08	26.52	-0.45	-0.09
-7	26.12	26.50	-0.38	-0.08
-6	26.16	26.52	-0.36	-0.07
-5	26.18	26.51	-0.33	-0.07
-4	26.18	26.59	-0.41	-0.08
-3	26.06	26.59	-0.53	-0.11
-2	25.99	26.54	-0.55	-0.11
-1	25.87	26.48	-0.61	-0.12
0	25.87	26.46	-0.60	-0.12

Results indicate that the amount of institutional holdings do not defer much between companies that provides some form of disclosures 50 days prior to bankruptcies announcements and those that do not. This indifference is observed to persist through the sample period. Similar to the results documented in Section 6.1, we observed a gradual decline in institutional holdings approximately 112 days prior to failure announcements

for both disclosing and non-disclosing firms. These results suggest that institutional investors that exit bankrupt firms do not differentiate between disclosing and non-disclosing companies.

This is consistent with the prior findings that institutional holders that exit the firms tend to leave after the release of the last financial report. Any further disclosures (or lack of it) prior to bankruptcies announcements do not appear to affect the remaining institutional investors who are most likely dedicated or quasi-indexer.

Conclusion

This paper seeks to examine the behavior of institutional investors around bankruptcies announcements. While results indicate that some institutional holders do indeed exit financially distressed firms that eventually fail, we did not observe any unusual activities in the immediate period prior to bankruptcies announcements. Rather we noted a gradual decline in institutional holdings that originates approximately 112 to 115 days prior to the event date. In addition, it is observed that over the sample period, firms with higher institutional concentration (50% or more) tend to experience a higher and statistically significant decrease that is approximately 15.08% of initial holdings leading to failure announcements. Although a similar decrease in holdings exist for failed companies with lower institutional investors (less than 50%), the decline is observed to be small (around 1.4%) and statistically insignificant when compared to a matched control group.

Given that the residual institutional holdings remain considerably high on event day, we posit that this exodus may be caused pre-dominantly by transient institutional investors that are reacting to news events (e.g. earnings announcements, financial reports, etc). To test this, we examine the changes in institutional holdings around the release of the last financial report type disclosures released via Signal G for all failed companies. Results indicate that, on average, institutional holdings starts to decline around 1 day prior to the event date and exodus persist for approximately 19-23 days after the release of financial reports and that the changes are statistically significant. While we observed that institutional holdings begin to decrease 1 day prior to financial reports announcements, we caution against interpreting this as sign of private information due to potential information “leak” that are not officially released via Signal G.

This study also extends the findings of Frino, Jones and Wong (2007) by examining the cause of the significant increase in information asymmetry near bankruptcies announcements. Results indicate that firms with some form of disclosures 50 days prior to bankruptcies announcements tend to have lower bid-ask spreads throughout the sample period and experience statistically significant lower increases when compared to companies that does not release any information in this period. These findings appear to suggest that the continuous disclosures rules may not have been strictly followed by 59.5%⁴⁶ of bankrupt companies which creates a higher level of information asymmetry. Furthermore, consistent with Frino, Jones and Wong (2007), we observed a significant increase in information asymmetry one day prior to failure announcements and on the

⁴⁶ 47 out of 79 firms did not provide any form of disclosures in the 50 days leading to bankruptcies announcements.

event day itself. It is noted that no companies in the entire bankrupt portfolio provided any information release in these two days.

The final part of this paper examines if the lack of disclosures and increase information asymmetry of non-disclosing firms affects the exodus of institutional investors. Results indicate that institutional investors do not differentiate between disclosing and non-disclosing firms as they have similar institutional concentration throughout the sample period and experience similar declines that originate around 112-115 days prior to bankruptcies announcements. These results that suggest institutional investors are not affected by the lack of disclosures in some bankrupt firms can possibly be explained by our findings that institutional investors that exit bankrupt firms have already sold-off their shares after the release of the last financial statements.

References

A. Arbel, S. Carvell, P. Strebel, 1983, Giraffes, institutions, and neglected firms, *Financial Analysts Journal* 39, pg 57 - 63.

Affleck-Graves, J., C. M. Callahan, N. Chipalkatti, 2002, Earnings predictability, information asymmetry, and market liquidity, *Journal of Accounting Research* 40, pg 561-583.

Affleck-Graves, J., Hedge, S., Miller, R., Trading mechanisms and the components of the bid-ask spread, *Journal of Finance* 49, pg 1471-1488.

Aggarwal, Raj; Rao, Ramesh P.; Hiraki, Takato, 1990, Regularities in the Tokyo Stock Exchange Security Returns: P/E, Size, and Seasonal Influences, *Journal of Financial Research* 13, pg 249–264.

Aharony, J., and I. Swary, 1988, A note on corporate bankruptcy and the market model risk measures, *Journal of Business Finance and Accounting* 15, pg 275–283.

Aharony, J., C. P. Jones, and I. Swary, 1980, An analysis of risk and return characteristics of corporate bankruptcy using capital market data, *Journal of Finance* 35, pg 1001–1016.
Aitken, M. J., and A. Frino, 1996, The determinants of market bid-ask spread on the Australian Stock Exchange, *Pacific-Basin Finance Journal* 6, pg 51–63.

Ali, A., Durtschi, C., Lev, B., Trombley, M., 2004, Changes in Institutional Ownership and Subsequent Earnings Announcement Abnormal Returns, *Journal of Accounting, Auditing & Finance* 19, pg 221–48.

Altman, E. I., 1968, Financial ratios, discriminant analysis and the prediction of corporate bankruptcy, *Journal of Finance* 23, pg 589–609.

Altman, E. I., 1984, A further empirical investigation of the bankruptcy cost question, *Journal of Finance* 39, pg 1067–1089.

Altman, E. I., 2001, *Bankruptcy, Credit Risk and High Yield Junk Bonds*, (Blackwell Publishers, New York).

Altman, E. I., A. Resti, and A. Sironi, 2005, *Recovery Risk: The Next Challenge in Credit Risk Management* (Riskbooks, London). Australian Stock Exchange, 2003, Australian Stock Exchange Listing Rules (ASX, Sydney, NSW) [online; cited January 2007]. Available: www.asx.com.au/supervision/rules-guidance/listing-rules1.htm.

Altman, E. I., and M. Brenner, 1981, Information effects and stock market response to signs of firm deterioration, *Journal of Financial and Quantitative Analysis* 16, pg 35–51.

- Altman, E. I., R. G. Haldeman, and P. Narayanan, 1977, ZETA analysis: a new model to identify bankruptcy risk of corporations, *Journal of Banking and Finance* 1, pg 29–54.
- Amihud, Y. and M. Mendelson (1980), ‘Dealership Market: Market Making with Inventory’, *Journal of Financial Economics* 8, pg 31–53.
- Bagehot, W, 1971, The Only Game in Town, *Financial Analysts Journal* 27, pg12-22.
- Baldwin, C.Y., Mason, S.P, 1983, The resolution of claims in financial distress the case of Massey Ferguson, *Journal of Finance* 38, pg 505-16.
- Bamber, Linda Smith; Cheon, Youngsoon Susan., 1995, Differential Price and Volume Reactions to Accounting Earnings Announcements, *Accounting Review* 70, pg 417-441.
- Bartov, Eli; Radhakrishnan, Suresh; Krinsky, Itzhak., 2000, Investor Sophistication and Patterns in Stock Returns after Earnings Announcements, *Accounting Review* 75, pg 43-64.
- Bennett, J., R. Sias, and L. Starks, 2003, Greener Pastures and the Impact of Dynamic Institutional Preferences, *Review of Financial Studies* 16, pg 1203-1238.
- Bennett, J., Sias, R. and Starks, L., Greener Pastures and the Impact of Dynamic Institutional Preferences, *Review of Financial Studies* 16, pg 1203-1238.
- Berenbeim, R. (1994), Company Relations with Institutional Investors, Conference Board Research Report.
- Bharath, S. T., and T. Shumway, 2006, Forecasting Default with the KMV-Merton Model (December 17, 2004). AFA Boston Meetings Paper. [online; cited January 2007] Available: <http://ssrn.com/abstract=637342>.
- Bhushan, R, Collection of Information about Publicly Traded Firms; Theory and Evidence, *Journal of Accounting and Economics* 11, pg 183-208.
- Boone, J.P., Luther, R.G., and Raman, K.K., Market microstructure effects of U.S.-Canada differences relating to reserve-based accounting disclosures, *Journal of International Accounting, Auditing & Taxation* 7, pg 195-215.
- Brock, W. and A. Kleidon (1992), Periodic Market Closure and Trading Volume, *Journal of Economic Dynamics and Control* 16, pg 451–89.
- Brous, Peter A.; Kini, Omesh. FM, 1994, The Valuation Effects of Equity Issues and the Level of Institutional Ownership: Evidence from Analysts' Earnings Forecasts, *The Journal of the Financial Management Association* 23, pg 33-46.

Brown, P., Taylor, S.L., Walter, T.S., 1999, The impact of statutory sanctions on the level and information content of voluntary corporate disclosure, *Abacus* 35, pg 138-162.

Bushee, B., 1998, The influence of institutional investors on myopic R&D investment behaviour, *The Accounting Review* 73, pg 305–333.

Bushee, B., 2001, Do institutional investors prefer near-term earnings over long-run value?, *Contemporary Accounting Research* 18, pg 207–246.

Bushee, Brian J.; Goodman, Theodore H., Which Institutional Investors Trade Based on Private Information About Earnings and Returns, *Journal of Accounting Research* 45, pg 289-321.

Cassidy, A. and Chapple, L. J., 2003, Australia's corporate disclosure regime: Lessons from the US model, *Australian Journal of Corporate Law* 15, pg 1-24.

Chan, K., W. Christie and P. Schultz, 1995, 'Market Structure and the Intraday Patterns of Bid-Ask Spreads for NASDAQ Securities', *Journal of Business* 68, pg 35–60.

Clark, K., and E. Ofek, 1994, Mergers as a means of restructuring distressed firms: An empirical investigation, *Journal of Financial and Quantitative Analysis* 29, pg 541-565.

Clark, T. A., and M. I. Weinstein, 1983, The behaviour of the common stock of bankrupt firms, *Journal of Finance* 38, 489–504.

Cohen, K., S. Maier, R. Schwartz, and D. Whitcomb, 1978, The returns generation process, returns variance, and the effect of thinness in securities market, *Journal of Finance* 33, pg 149–167.

Coller, M., and T. L. Yohn, 1997, Management forecasts and information asymmetry: An examination of bid-ask spreads, *Journal of Accounting Research* 35, 181–191.

Copeland, T. and D. Galai, 1983, Information effects on the bid-ask spread, *Journal of Finance* 38, pg 1457-69.

Cready, William M., 1988, Information Value and Investor Wealth: The Case of Earnings Announcements, *Journal of Accounting Research* 26, pg 1-27.

Cready, William M., 1994, Determinants of Relative Investor Demand for Common Stocks, *Journal of Accounting, Auditing & Finance* 9, pg 487-507.

Delaney, K., 1991, Strategic Bankruptcy: How Corporations and Creditors Use Chapter 11 to Their Advantage, *University of California Press, Berkeley, CA*.

Demsetz, H., 1968, The Cost of Transacting, *Quarterly Journal of Economics* 82, pg 33-53.

- Demski, J., and G. Feltham, 1994, Market response to financial reports, *Journal of Accounting and Economics* 17, 3–41.
- Diamond, D, 1985, Optimal release of information by firms, *Journal of Finance* 40, pg 1071-1094.
- Dichev, I. D., 1998, Is the risk of bankruptcy a systematic risk? *Journal of Finance* 53, pg 1131–1148.
- Dobrzynski, J., 1993, Relationship investing: A new shareholder is emerging – patient and involved, *Business Week* 3309 (March 15), pg 68–75.
- Duffie, D., and K. Singleton, 2003, Credit Risk: Pricing, Measurement and Management, *Princeton University Press, Princeton, NJ*.
- Easley, D., and M. O'Hara, 1987, Price, trade size and information in securities markets, *Journal of Financial Economics* 19, pg 69-90.
- El-Gazzar, S., 1998, Pre-disclosure information and institutional ownership: a cross-sectional examination of market revaluations during earnings announcement periods, *The Accounting Review* 73, pg 119-29.
- Frino, A., and S. Jones, 2005, The impact of mandated cash flow disclosure on bid ask spreads, *Journal of Business Finance and Accounting* 32, pg 1373–1396.
- Frino, A., F. Harris, T. McInish, and M. Thompson, 2004, Price discovery in the pits: the role of market makers on the CBOT and the Sydney Futures Exchange, *Journal of Futures Markets* 24, pg 785–805.
- Frino, A., S. Jones, 2005 and J. Wong, 2007, Market Behaviour Around Bankruptcies Announcements, *Accounting and Finance* 47, pg 713–730.
- Frost, Carol A., 1997, Disclosure policy choices of UK firms receiving modified audit reports, *Journal of Accounting & Economics* 23, pg 163-187,
- Glosten, L., and P. Milgram, 1985, Bid, ask and transaction prices in a specialist market with heterogeneously informed traders, *Journal of Financial Economics* 14, 71–100.
- Greenstein, M., and H. Sami, 1994, The impact of SEC's segment disclosure requirements on bid-ask spreads, *Accounting Review* 69, pg 179–200.
- Grunbichler, A., I. Longstaff and E. Schwartz, 1994, Electronic Screen Trading and the Transmission of Information: An Empirical Examination, *Journal of Financial Intermediation* 3, pg 166–87.

Hagerman, R.L., Healy, J. P., The Impact of SEC-Required Disclosure and Insider-Trading Regulations on the Bid/Ask Spreads in the Over-the-Counter Market, *Journal of Accounting & Public Policy* 92, pg 233-243.

Healy, Paul M.; Palepu, Krishna G., 1993, The Effect of Firms' Financial Disclosure Strategies on Stock Prices, *Accounting Horizons* 7, pg 1-11.

Hessel, C. A, and M. Norman, 1992, Financial characteristics of neglected and institutionally held stocks, *Journal of Accounting, Auditing and Finance* 7, pg 313-330.

Huntley's Delisted Company Database 1990–99, *Huntely's Financial Services, Sydney*.

Jones, F. L., 1987, Current techniques in bankruptcy prediction, *Journal of Accounting Literature* 6, 131–164.

Jones, S., and D. A. Hensher, 2004, Predicting firm financial distress: a mixed logit model, *Accounting Review* 79, 1011–1039.

Ke B., Huddart S., Petroni K., 2003, What insiders know about future earnings and how they use it: Evidence from insider trades, *Journal of Accounting and Economics* 35, pg 315-346.

Ke B., Petroni K., 2004, How Informed Are Actively Trading Institutional Investors? Evidence from Their Trading Behavior before a Break in a String of Consecutive Earnings Increases, *Journal of Accounting Research* 42, pg 895-927.

Kim, KA, and JR Nofsinger, 2005, Institutional Herding, Business Groups, and Economic Regimes: Evidence from Japan, *Journal of Business* 78, pg 213-242.

Kim, O. and Verrecchia, R. E., 1994, Market liquidity and volume around earnings announcements, *Journal of Accounting & Economics* 17, pg 41-67.

Kim, O., 1993, Disagreement among shareholders over a firm's disclosure policy, *The Journal of Finance* 48, pg 747-760.

Krinsky, I., and J. Lee, 1996, Earnings announcements and the components of the bid-ask spread, *Journal of Finance* 51, pg 1523–1536.

Lakonishok, J., A. Shleifer, and R. Vishny, 1992, The Impact of Institutional Trading on Stock Prices, *Journal of Financial Economics* 32, pg 23-43.

Lakonishok, J., A. Shleifer, and R. W. Vishny, 1992, The Impact of Institutional Trading on Stock Prices, *Journal of Financial Economics* 32, pg 23-43.

Lee, C, B. Mucklow, and M. Ready, 1994, Spreads depths and the impact of earnings information: An intraday analysis, *The Review of Financial Studies* 6, pg 345-374.

- Lee, C.M.C., 1992, Earnings News and Small Traders: An Intraday Analysis, *Journal of Accounting and Economics* 15, pg 265-302.
- Leuz, C. and Verrecchia, R., 2000, The economic consequences of increased disclosure, *Journal of Accounting Research* 38, pg 91-124.
- Lev, B., 1988, Toward a theory of equitable and efficient accounting policy, *Accounting Review* 63, 1–22.
- Lev, T, 1989, On the usefulness of earnings and earnings research: Lessons and directions from two decades of empirical research, *Journal of Accounting Research* 27, pg 153 -191.
- Lundholm, R., 1991, Public signals and the equilibrium allocation of private information. *Journal of Accounting Research* 29, pg 322-349.
- M. Brennan, A. Subrahmanyam, 1995, Investment analysis and price formation in securities markets, *Journal of Financial Economics* 38, pg 361 - 381.
- McInish, T. H., and R. A. Wood, 1992, An Analysis of intraday patterns in bid-ask spread for NYSE stocks, *Journal of Finance* 47, pg 753–763.
- McNichols, M. and Trueman, B., 1994, Public disclosure, private information collection, and short-term trading, *Journal of Accounting & Economics* 17, pg 69-94.
- Mutchler, J., Hopwood, W. and McKeown, J., 1997, The Influence of Contrary Information and Mitigating Factors on Audit Opinion Decisions on Bankrupt Companies, *Journal of Accounting Research* 35, pg 295-310.
- Neal, R. and S. M. Wheatley, 1998, Adverse selection and bid-ask spreads: Evidence from closed-end funds, *Journal of Financial Markets* 1, pg 121-149.
- Newey, W. K., and K. D. West, 1987, A simple, positive semi-definite, heteroskedasticity and autocorrelation consistent covariance matrix, *Econometrica* 55, pg 703–708.
- O'Brien, P. and R. Bhushan, 1990, Analysts following and institutional ownership, *Journal of Accounting Research* 28, pg 55–76.
- Ohlson, J. A., 1980, Financial ratios and the probabilistic prediction of bankruptcy, *Journal of Accounting Research* 18, pg 109–138.
- Pettway, R. H., and J. F. Sinkey, 1980, Establishing on-site bank examination priorities: an early-warning system using accounting and market information, *Journal of Finance* 35, pg 137–150.
- Pinnuck, M, 2004, Stock preferences and derivative activities of Australian fund managers, *Accounting & Finance* 44, pg 97-120.

Porter, M.E., 1992, Capital choices: Changing the way America invests in industry. *Journal of Applied Corporate Finance* 5, pg 4–16.

Poskitt, R., 2005, Disclosure Regulation and Information Risk, *Accounting and Finance* 45, pg 457-477.

R. Vishny, 1997, Good news for value stocks: further evidence on market efficiency, *Journal of Finance* 52, 859–874.

Raman, K, and N. Tripathy, 1993, The effect of supplemental reserve-based accounting data on the market microstructure, *Journal of Accounting and Public Policy* 12, pg 113-133.

Scott, J., 1981, The probability of bankruptcy: a comparison of empirical prediction and theoretical models, *Journal of Banking and Finance* 5, pg 317–344.

Senteney, D. 1991, Characteristics of earnings news and operational efficiency in the NASDAQ securities market, *Review of Financial Economics* 1, pg 49-61.

Shick, R. A., and L. F. Sherman, 1980, Bank stock prices as an early warning system for changes in condition, *Journal of Bank Research* 11, 136–146.

Shiller, R. J., and J. Pound, 1989, Survey evidence on diffusion of interest and information among investors, *Journal of Economic Behavior and Organizations* 12, pg 44-66.

Shumway, T., 2001, Forecasting bankruptcy more accurately: a simple hazard model, *Journal of Business* 74, 101–125.

Siconolfi, M., 1992, Shearson Research Analysts Finish First on `All -America Team` for Third Year, *The Wall Street Journal*, October 13, C18.

Skeel, D. A., 2003, Debt's Dominion: A History of Bankruptcy Law in America, *Princeton University Press, Princeton, NJ*.

Skinner, Douglas J., 1994, Why Firms Voluntarily Disclose Bad News, *Journal of Accounting Research* 32, pg 38-60.

Skinner, Douglas J., 1997, Earnings disclosures and stockholder lawsuits, *Journal of Accounting & Economics* 23, pg 249-282.

Smith, CW and RL Watts, 1992, The Investment Opportunity Set and Corporate Financing, Dividend and Compensation Policies, *Journal of Financial Economics* 32, pg 263-292.

Stigler, C. J., 1964, The economics of information, *Journal of Political Economy* 69, pg 213-235.

Stoll, H., 1989, Inferring the components of the bid-ask spread: theory and empirical tests, *Journal of Finance* 44, pg 115–134.

Verrecchia, R., 1982, The use of mathematical models in financial accounting, *Journal of Accounting Research* 20, pg 1-42.

Walther, B., 1997, Investor sophistication and market earnings expectations, *Journal of Accounting Research* 35, pg 157-192.

Wiggins, J. B., 1992, Estimating the volatility of S&P 500 futures prices using the extreme value method, *Journal of Futures Markets* 12, pg 265–273.

Wilson, G.P., 1987, The Incremental Information Content of the Accruals and Funds Components of Earnings After Controlling Earnings, *The Accounting Review* 62, pg 293–322.

Wurgler, Jeffrey, 2000, Financial markets and the allocation of capital, *Journal of Financial Economics* 58, pg 187-214.

Yohn, T., 1997, Information asymmetry around earnings announcements, *Review of Quantitative Finance and Accounting* 11, pg 165-82.

Yunker, J. A., and T. L. Krehbiel., 1988, Investment analysis by the individual investor, *Quarterly Review of Economics and Business* 28, pg 90-101.

Zmijewski, M. E., 1984, Methodological issues related to the estimation of financial distress prediction models, *Journal of Accounting Research* 22, pg 59–82.