Market behaviour surrounding changes in mandatory disclosure: evidence from an order-driven market

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CHAPTER 1: Introduction

This thesis contributes to the literature in several ways. Firstly, it examines the role of an increase in public disclosure of derivative financial instruments on the bid-ask spread of firms that use these instruments, relative to those that do not. It does so by examining the behaviour of spreads around the issue of AASB1033 *Presentation and Disclosure of Financial Instruments*, which came into effect for financial periods ending on or after 31 December 1997. This standard required firms to disclose whether they are using financial instruments and the purpose for using these instruments, i.e. for hedging or trading. Thus, the 1998 financial statements provide a credible means to partition firms into user and non-user categories. This avoids the problem of quantifying voluntary disclosure, which has been shown to be problematic in prior literature as well as avoiding methodological and econometrical issues associated with the construction of a voluntary disclosure index.[1] For example, in studies on the determinants of voluntary financial instruments disclosure in Australia, Chalmers and Godfrey (2000[2], 2004) have to firstly, rely on a survey that indicates whether firms use derivatives before proceeding to evaluate the extent of firm's annual report disclosures on derivatives. Conducting a study in the post-AASB 1033 period overcomes this problem, as firms have to describe their status as either user or non-user. The bid-ask spread will be compared before and after the introduction of AASB1033 to assess whether any significant changes occur between pre- and post-event periods.

The second contribution of this thesis is to evaluate the informational effects of what are purported to be *higher quality* accounting standards[3]. Australia, along with over other nations adopted International Financial Reporting Standards for financial reports prepared from 1 January 2005 onwards.

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[1]These issues primarily relate to endogeneity in the disclosure-earnings performance relation and the construction of disclosure indices. For a more extensive discussion of the limitations of studies addressing the capital market effects of voluntary disclosure see Healy and Palepu (2001).

[2] Although published in 1999, it used data from annual reports ending 30 June 1998. Although their 2004 study uses the same data, hypotheses are drawn from Institutional Theory.

[3] For example, the mission of the IASB is " *to provide higher quality accounting standards"* (www.iasb.org, accessed 12 January 2005)

Of interest to this thesis is the Australian equivalent, AASB139, which, in addition to disclosure requirements also imposes a much tougher test, that of recognition. Briefly, the standard requires that all financial assets and liabilities be shown in the financial statement at fair value and prescribes accounting rules covering the recognition of changes in fair value. Thus, under AASB139, it should be possible to observe the effect of derivative usage on financial statements. As information gathering and dissemination is not costless, firms, standard setters and regulators would benefit from the incremental change in the disclosure regime. This provides the link to information asymmetry, in that derivative use has traditionally been associated with higher risks. Indeed, anecdotal evidence suggests that derivative-using firms have experienced significant losses when the effect of their derivatives usage was recognised in their financial statements. Australian companies have not been immune from incurring losses related to their derivative activities. AWA Limited incurred large losses in 1986/1987 on foreign currency transactions; BP Australia Limited, similarly incurred losses in 1992, which were attributed to cause the company's operating loss for the year (Hancock, 1994). A more recent Australian example is that of Pasminco Limited, which, in its' 2000 Annual Report under the heading Currency Options, stated:

> *"The effect of this* (hedging) *strategy is to protect US$ 2279 million of revenue against a rise in the Australian/US dollar exchange rate above US68 cents while forgoing the benefit of a fall in the exchange rate below US65 cents"*(Pasminco Limited 2000 Annual Report, pg 9)

One 25 July 2002, approximately one month after the 30 June balance date, the Australian dollar had fallen to US51 cents. In Pasminco's case, this translated to approximately $900 million loss on the hedge. However, some empirical evidence suggests that to the extent to which derivatives are used to manage risk, the magnitude of derivative positions in relation the overall cash flows is small and this will not contribute to idiosyncratic risk. In other words, derivatives usage does not increase the level of risk (Guay and Kothari, 2003). Furthermore, Guay (1999) asks whether corporations reduce or take additional risks with derivatives by examining changes in several risk measures of new derivative users and finds that firms' interest-rate risk exposure and foreign-currency risk exposure decrease significantly after they initiate the use of derivatives and concludes that on average, firms use derivative instruments to hedge.

Whilst investigating the benefits of financial instrument disclosure, this thesis also considers measurement implications. Specifically, this thesis argues that measurement and recognition in the financial statements will have a much larger effect on the bid-ask spread because financial statement users will be a better position to observe and evaluate the direct effect using derivatives. Therefore, this thesis will provide additional evidence on the efficacy of financial statement recognition as a means of reducing information asymmetry.

A substantial body of literature that decomposes the bid-ask spread into three components, usually categorised as order-processing costs, inventory-holding costs and adverse selection costs. As information asymmetry is not directly observable, the adverse selection component of spread usually proxies for the firm's information level. This is linked to liquidity of the firm, of which spread is a measure, through the behaviour of informed and uninformed traders. Inequality in capital markets leads to adverse private and social consequences, such as decreased liquidity of securities. This adverse selection effect of inequality can be mitigated by improved disclosure by firms, whether voluntary or mandatory (Lev, 1988; Healy and Palepu, 2000). Therefore, the adverse selection component of the bid-ask spread proxies for information asymmetry. A substantial body of literature discusses bid-ask spread estimation and decomposition issues. However, most of the studies that have decomposed the spread components use the U.S. environment, where the price-setting process is quote driven by specialist traders who also provide liquidity. In this setting, using trade-indicator models of the spread, it is possible to decompose the spread into the three components. The Australian microstructure environment is different from that of the U.S. primarily because of the absence of market makers, the fact that all trading is order-driven, and trading in mainstream securities takes place on one exchange. These characteristics are posited to influence the spread components. Specifically, as will be argued, the adverse-selection component of the spread should be higher or more observable because order-processing and inventory-holding costs are likely to be lower in Australia. Consequently, this thesis will contribute to our understanding of the spread-components in an order-driven market. Another contribution of the thesis pertains to the evaluation of adopting Australian equivalents of International Financial Reporting Standards, and of the measurement standard (AASB 139) in particular.

If AASB 139 is indeed part of a "higher quality" suite of accounting standards and introduces yet more new information to the market, then the adverse selection component of spread will widen once more. Examining whether this effect is temporary or transient can be used as evidence to support the assertion of the existence of information asymmetry.

Background: Use of derivative financial instruments

A derivative is a financial instrument whose value depends on another financial instrument or security, such as stock, stock index, foreign currency, commodity or bond. Derivatives trading and usage world-wide has increased exponentially. An International Swaps and Dealers Association Market Survey indicates that from 2001 to 2005, the total notional (or contractual) amount reported by dealers in derivatives increased from US$ 70,126 billion to US$ 235,845 billion. These figures cover Interest Rate, Foreign Currency, Credit and Equity derivative instruments. Comparative yearly data for the last five years is provided in Table 1 below.

Table: 1 Global Derivative Usage: Notional Amounts in US$ billion

Year	Total IR and Currency derivatives outstanding	Total outstanding credit default swaps	Total equity derivatives outstanding	Total Notional Amounts	% Change in totals
2001	$69,207.30	$918.87	(not reported)	**$70,126.17**	
2002	$101,318.49	$2,191.57	$2,455.29	**$105,965.35**	**51.11**
2003	$142,306.92	$3,779.40	$3,444.08	**$149,530.40**	**41.11**
2004	$183,583.27	$8,422.26	$4,151.29	**$196,156.82**	**31.18**
2005	$213,194.56	$17,096.14	$5,553.97	**$235,844.67**	**20.23**
				Average for period	**28.73**

Source: Adapted from International Swaps and Dealers Association (ISDA) Market Surveys (www.isda.org)

The importance of derivatives usage (both traded and privately – negotiated) in Australia is by no means trivial. Organised derivatives trading taking place on the Sydney Futures Exchange (financial and non-financial derivatives, typically 90-day bank bill futures, three-year bond-futures, 10-year bond futures, share price index futures and futures for shares in specific listed firms) as well as on the Australian Stock Exchange, for options of several large listed firms (Deegan, 2005).

In addition, trading takes place in interest rate derivatives and cross-currency derivatives. In 2004 the Reserve Bank of Australia (RBA) conducted a survey of activity in foreign exchange and over-the-counter (OTC) derivatives markets in Australia, as part of a global survey of central banks in 52 countries, co-ordinated with the Bank of International Settlements (BIS) for the BIS's *Triennial Central Bank Survey of Foreign Exchange and Derivative Market Activity.* Total OTC derivatives trading, expressed as notional or contractual amounts, increased from an average daily turnover of US$3.8 billion in 1995 to US$17.6 billion (RBA, 2004). Turnover data provide a measure of market activity; turnover, which is defined as the absolute gross value of all new deals entered into during the month of April 2004 measured in terms of notional or contractual amounts (BIS, 2004). Table 2 provides detailed information for various instruments, as used in Australia. As indicated in the table, the use of OTC derivatives is quite fluid over the period covered by the BIS survey, with noticeable decrease in the usage of some instrument and marked increases in others.

Table: 2 Australian OTC Derivatives Activity – Average Daily Turnover (in US$ billion)

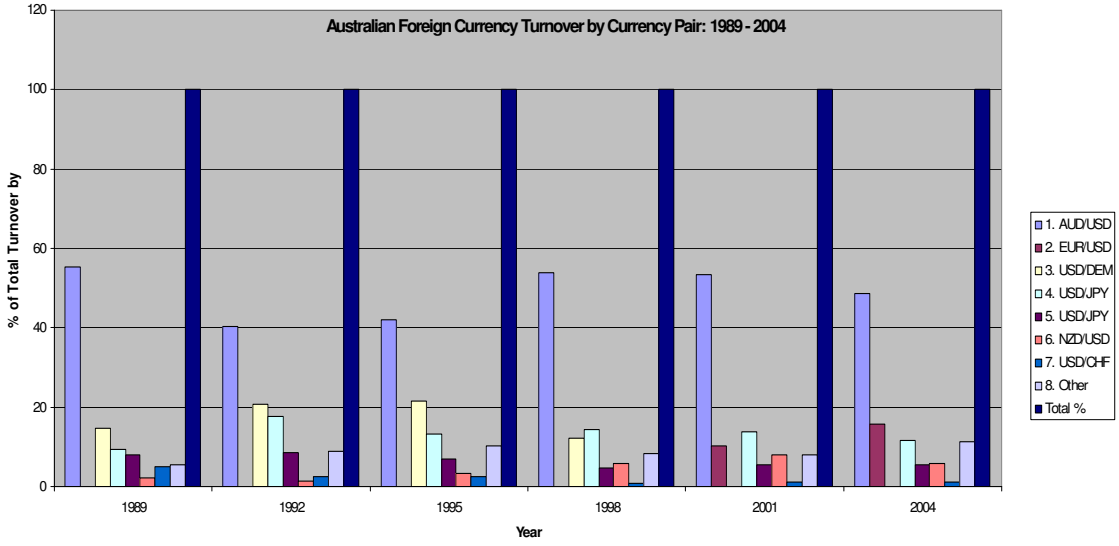
	April 1995	**April 1998**	**% change**	**April 2001**	**April 2004**	**% change**
Foreign Exchange Derivatives						
- Cross Currency Interest Rate Swaps	0.3	0.4	25.00	0.5	1.2	58.33
- Options	0.8	1.3	38.46	1.6	3.6	55.56
Total Foreign Exchange	**1.1**	**1.7**	35.29	**2.1**	**4.8**	56.25
Interest Rate Derivatives						
- Forward Rate Agreements	2	1.5	-33.33	5.5	5.6	1.79
- Swaps	0.5	1.3	61.54	4	6.7	40.30
- Options	0.3	0.1	-200.00	0.3	0.5	40.00
Total Interest Rate	**2.8**	**2.9**	3.45	**9.8**	**12.8**	23.44
TOTAL OTC DERIVATIVES	***3.9***	***4.6***	15.22	***11.9***	***17.6***	32.39

Source: Adapted from Reserve Bank of Australia (2004) Media Release #10: Survey of Foreign Exchange and Derivatives Markets

The same BIS survey indicates that some trading in financial instruments takes place on behalf of customers, thereby confirming that Australian firms employ derivatives and look at banks to cover their hedging requirements. At a global level, the BIS 2004 Survey observes (at pg 1) that trading between banks and financial customers rose markedly.

Trading in AUD/USD foreign currency instruments (spot, outright forwards and foreign currency exchange swaps) accounted for 49 per cent of total Australian turnover in April 2004, with around 40 per cent of global trade in the AUD/USD pair taking place in the Australian market in 2004 (RBA, 2005). Foreign currency trading by pairs of currencies is presented in Figure 1 below.

Figure 1: Australian Foreign Currency Turnover by Currency Pairs: 1989 - 2004



Source: Reserve Bank of Australia *Bulletin,* June 2005: 2; BIS Survey 2004.

Total derivatives turnover in Australia increased to an average of US$ 18 billion per day in April 2004, representing a rise of 47% from the previous BIS 2004 Triennial survey (RBA, 2005). The RBA's *Bulletin* reports that similar to the increase in turnover for traditional foreign exchange instruments, the expansion in derivatives activity in Australia is attributed to the appreciating value of the Australian dollar (RBA, 2005). The interest rate derivatives market in Australia increased by 30% (compared to 97% globally); the change in the global figure can be ascribed to the significant volatility experienced in the U.S. treasury markets, while the turnover in foreign exchange derivatives more than doubled to US$ 5 billion per day (RBA, 2005). Therefore, volatility and uncertainty about interest rates, exchange rates and commodity prices continue to drive the demand for financial instruments that allow firms to manage their exposures.

As indicated in the data above, derivatives have become a key component in firm's capital structures and financial management decisions. The rapid growth of derivatives was (in the period prior to any disclosure requirement) and continues to be a major cause for concern for regulators and standard setters worldwide, primarily for two reasons. Firstly, accounting disclosures were not initially required for these instruments, meaning that essentially they were kept off-balance sheet. The second issue is a consequence of the first, and concerns the risks associated with derivatives that were neither recognised nor disclosed in annual reports. Losses linked to derivatives by corporations worldwide have added to the perceived problem and in turn generated concerns about how best to measure and disclose the risks associated with derivatives usage. Creditors, shareholders and regulators have become interested in obtaining information about the nature of firms' derivatives portfolios, the purposes for which these instruments are used and the effect on the firm, for example, on cash flows and profit, and the first place they look for this information is in the financial statements and the accompanying notes to the accounts (Duchac, 1998).

In response to these requests for more detailed and comprehensive information about derivatives, various local and international accounting standard bodies have initially developed a set of disclosure rules requiring firms using financial instruments to disclose information about the risk associated with their derivatives within footnotes. Mandatory disclosures require firms to present information about these instruments notional amounts (a measure of derivatives activity) and estimated fair values (Berkman, Bradbury, Hancock and Innes, 1997) in the footnotes. Under International Accounting Standards and their Australian equivalents, financial instruments (including derivatives) are now required to be shown on the balance sheet at fair values, with changes in fair values required to be shown in the income statement.

Derivatives are off-balance sheet financial instruments in that, although these instruments are not recorded in the financial statements, they generate gains and losses that affect the future value of the firm. However, an important point to recognise is that causal relationship between financial instrument and corporate failure is not necessarily unidirectional. Finance literature provides ample arguments as to why a firm might wish to use derivatives and the benefits flowing from derivatives' usage, particularly in the area of risk management.

Corporate risk management is an important element of the firm's overall business strategy, and therefore, the use of derivatives for this purpose should not immediately render the firm a "pariah" of the derivatives world. When debating the potential benefits to shareholders from derivatives hedging, it is important to remember that corporate hedging is not a new practice. Financial engineering and the development of various derivatives products have merely provided firms with newer and arguably less expensive means of hedging corporate-level risk (Krawiec, 1998). Stulz (1996) draws upon extant theories of risk management in a corporate setting to argue the primary goal of this is to eliminate the probability of costly, lower tail outcomes, i.e. those that would cause financial distress or render the firm unable to carry out its strategy. The challenge facing users of financial reports, who wish to evaluate entities that use or market financial instruments, is to determine the extent and characteristics of the risks and rewards resulting from derivatives use. Users need to be able to determine who bears the risks and rewards and how these will change over time, and the conditions under which these will be minimised or maximised (Hancock, 1994). Furthermore, in assessing the usefulness of accounting-related derivatives disclosures, Seow and Tam (2002) use a returns-regression framework and find that with the exception of notional outstanding amounts, all derivatives disclosures contain new information that is not incorporated in either market beta or earnings.

Development of disclosure requirements in Australia

The following quote from Brown (1994: PAGE???) is indicative of the issues leading up to the introduction of mandatory reporting standards in Australia.

> "*While progress in setting accounting standards may have been slow, the rate of discovery of new forms of derivative financial instruments has been rapid and dramatic, if not explosive. Consequently, we can safely predict many more interesting days ahead for standard setters as they grapple with the new financial order".*

Prior to the introduction of AASB 1033 *Presentation and Disclosure of Financial Instruments,* accounting for financial instruments in Australia was quite diverse. Significantly, aside from banks and other financial institutions that were subjected to the prudential regulatory framework of the Reserve Bank, there were no formal disclosure requirements for firms that fell outside the scope of such regulation.

Some organisations recognised financial instruments at cost, some distinguished between hedging and trading activities, some financial instruments were treated as off-balance sheet and some were carried at market value (Carew, 1995; Berkman, et al. 1997). The accounting issues surrounding financial instruments concerned the absence of uniform rules concerning definition and recognition, measurement and disclosure. The first Australian attempt at introducing mandatory accounting and disclosure requirements for financial instruments came in March1993 in the form of Exposure Draft 59 (ED 59), which foreshadowed a move towards market-value accounting for all financial instruments and sought to address all three aspects concurrently. The Australian approach differed from the U.S., where the issues of disclosure, recognition and measurement were addressed separately by various FASB standards or SEC regulations[4]. The Australian Exposure Draft 59 (ED59) covered all financial instruments which were defined as those giving rise to a financial asset of one entity and a financial liability/or equity instrument of another, and therefore applied to simple instruments such as cash, debtors and payables as well as more complex financial instrument (Hancock, 1994; Deegan, 2002). The measurement provisions of ED59 allowed entities to choose either a purpose-led basis of a net market value method to value financial instruments, each resulting in a different accounting treatment. The purpose-led basis required firms to classify instruments as either acquired for trading, held-to-maturity or designated as hedges. Net market value of assets was defined as the expected future cash flows from disposal in an orderly market, after adjusting for costs and the market value of liabilities was defined as the expected cash outflows required to extinguish the liability. With the purpose-led basis, the measure of financial assets and liabilities depended on the purpose for which these instruments were intended to be held (AASB - ED 59, 1993).

The simultaneous disclosure and recognition requirements outlined in ED 59 proved to be quite controversial, and the Australian Accounting Standards Board received 120 comment letters in response to ED59.

[4] Between 1990 to 1998, 4 accounting standards issued by the FASB concerning the recognition and disclosure of derivatives in the U.S. The reporting regime was further enhanced in 1997 through the issue of U.S. Securities and Exchange Commission Financial Reporting Release # 48: *Disclosure of Accounting Policies for Derivative Financial Instruments and Derivative Commodity Instruments and Disclosure of Quantitative and Qualitative Information about Market Risk in Derivative Financial Instruments, Other Financial Instruments and Derivative Commodity Instruments.*

The main objection of respondents being the volatility in earnings that would arise from the net market value method, where all financial instruments would be measured at net market value, with gains and losses recognised immediately in the Income Statement (Hancock, 1994). Chalmers and Godfrey (2004) note that extensive lobbying activity resulted in the AASB withdrawing ED 59 and in June 1995 replacing it with a disclosure-only exposure draft, *ED65:Presentation and Disclosure of Financial Instruments.* The abandonment of measurement and disclosure together saw ED65 move from exposure draft status to a full accounting standard, AASB1033 *Presentation and Disclosure of Financial Instruments*, issued in December 1996 and applicable to reporting periods ending on or after 31 December 1998. The issue of recognition and measurement of financial instruments was finally addressed with the move towards International Accounting Standards, and their Australian equivalents. From 1 January 2005, in addition to maintaining disclosure requirements, AASB139 *Financial Instruments: Recognition and Measurement* requires all financial instruments to be recognised in the financial statements and prescribes accounting methods for financial instruments. Developments in regulation of derivatives reporting in Australia are addressed in more detail in the hypothesis development section.

CHAPTER 2: LITERATURE REVIEW

Use of derivatives and the demand for corporate hedging

Corporate risk management literature has developed along a number of streams. One stream focuses on the optimal hedge positions adopted by risk-averse managers whose stake in the firm is not fully diversified (Stulz, 1984; DeMarzo and Duffie, 1995).The focus is on the choice of optimal hedging policies that firms adopt on behalf of their risk-averse shareholders. Managers are posited to be undiversified, whereas shareholders are assumed to be risk neutral, because of their ability to liquidate their positions little or no costs (Raposo 1997).

A review of the economic theory underlying the demand for corporate hedging activities is presented below.[5] According to the efficient markets hypothesis, a firm's future price represents the capital market's assessment of the expected future earnings (conditional on all available information) discounted to its present value by a discount rate that reflects the riskiness of the income stream (Brealey et al., 2002). Therefore, consistent with the economic objective of the firm to maximise the value of the firm, management must either maximise the firm's future earnings stream or minimise the risk reflected in the discount rate. Modern financial theory, through the capital asset pricing model (CAPM) indicates that only "systematic risks" determine the appropriate discount rate.[6] According to CAPM theory are assumed to be risk-averse, and will demand a risk premium as compensation for bearing higher risk. Because sophisticated investors are assumed to be well-diversified, the risk premium demanded reflects only the un-diversifiable (or systematic) risk that remains in their portfolio after diversification. Therefore, management actions and decisions that alter the firm-level amount diversifiable (or unsystematic) risk will thus have no effect on the discount rate on the denominator of the net present value calculation. Investors neither receive nor claim to receive a premium for bearing such risks because these risks can be diversified away by the investors through adjustment of their portfolio of holdings.

The other stream in the literature stems from the irrelevance proposition of Modigliani and Miller (MM) who show that under certain conditions, corporate policy has no impact on the value of the company. Essentially, if market participants can replicate the impact of corporate hedging policy for total risk by using marketable securities then the policy will add no value to the company. This irrelevance argument also applies to corporate policies regarding the use of derivatives and modern financial theory holds that a wide of range of managerial actions that reduce unsystematic risk are, at best, irrelevant to firm value. While the MM irrelevance proposition indicates

[5]The discussion of hedging activities covers hedging as a whole because it is possible for firms to hedge by means other than the use of derivatives. For example, Smith and Stulz (1985) suggest hedging can be achieved by altering real operating decisions, whereas Nance, Geczy and Minton (1993: 267) provide a different definition of corporate hedging, namely: "*the use of off-balance sheet instruments – forwards, futures, swaps and options – to reduce the volatility of firm value."* Where the discussion pertains specifically to the use of derivatives, this will be clearly indicated in the text.

[6]Systematic risk is measured by the beta statistic, which measures the sensitivity of a particular stock relative to the market as a whole.

that firm's financing decision should have no impact on the firm's cash flows, it depends on a number of limiting assumptions. Once these assumptions are relaxed, failure to hedge at firm-level can significantly and negatively impact expected future cash flows, and hence, shareholder wealth. Investment portfolio diversification at the investor-level only eliminates unsystematic risk because by holding a well-diversified portfolio an investor can reduce beta toward one (or the market beta) but can never completely eliminate it. Interest rate and foreign exchange risks are each systematic, market-wide phenomena which cannot be easily eliminated by investors. Under the MM irrelevance proposition, firms can benefit their shareholders by hedging such risks if the firms can do this more cheaply or effectively than shareholders themselves can. The MM proposition assumes no transaction costs. However, if transactions costs do exist and if these can be reduced through derivatives hedging, then hedging will increase the firm's expected cash flows and enhance shareholder wealth. Transaction costs that have been suggested by the literature include bankruptcy costs, the costs of contracting between management and risk-averse shareholders, cost associated with investment decisions (i.e. the financing of investments and distribution of cash arising from investments). Activities that reduce the firm's total risk reduce therefore increase cash flows and share price. Shareholders thus benefit from action that reduce the total risk of the firm, but not because they directly benefit from reduced total risk. This is because a reduction in unsystematic risk does not alter the discount rate. Rather, the increase increases because the cash flows included in the net present value calculation have increases, not because the discount rate applied to the calculation decreases.

Transaction cost motivators for hedging

Financial distress

One type of transaction costs are the direct and indirect costs associated with bankruptcy[7]. Smith and Stulz (1985) argue that the transaction costs of financial distress can induce firms to hedge financial price risks since the probability of incurring these costs is reduced which in turn reduces the variance in firm value. The magnitude of financial distress cost reduction is a positive function of (1) the probability the firm will encounter financial distress if it does not hedge, and (2) the

[7]Direct bankruptcy costs include the legal and administrative costs and the possibility that assets are sold below their market value or fair price. The indirect costs associated with a firm that is nearing bankruptcy are the costs of contracting with the firm's risk-averse stakeholders.

costs the firms incurs if it does encounter financial distress (Nance, Smith, Smithson, 1993).

Costs of contracting with the firm's risk-averse stakeholders

The impact of costly contracting with risk-averse stakeholders can be reduced if the firm hedges because risk-averse stakeholders will impose these costs on the firm whenever it is perceived as risky, financially unstable or prone to financial distress, even if that perception is unjustified. Hedging, including hedging with derivatives, can therefore act as a signalling device, alerting stakeholders the firm is financially solid. MM assumed that firms have unlimited access to external financing and that the firm's investment policy, therefore remains fixed. If, in fact, the firm's investment policy fluctuates with cash flows (and ability to raise finance for investment projects) then stabilising the firm's cash flows through hedging can have a positive impact on the firm's investment policies. This increased investment, can in turn, result in increased expected future cash flows. To illustrate, if a firm does not hedge, it will experience some amount of variance in is net cash flows, which will result either in a reduction in the investment or an increase in the use of externally generated funds. A reduction in investment is not normally desirable for a company with growth options. However, a decrease in net cash flow need not result in a decreased investment opportunities if the firm is willing and able to replace the lost cash flows via the capital markets.

Bessembinder (1991) presents a model of hedging with derivatives (forward contracts) and argues that since hedging reduces the probability of financial distress, it effectively shifts individual future states of default to non-default. Therefore, a hedging firm can effectively commit to meet obligations in states where it otherwise could not, reduce underinvestment and consequently negotiate better contract terms in the form of lower borrowing costs. Therefore, risk management expands the debt capacity of a hedging firm (Bessembinder, 1991).

Froot, Scharfstein and Stein (1993) present a model where hedging ensures the firm has sufficient cash available to invest in positive net present value projects, and base their prediction on the observation that firms finance most investments from internally generated. Firms also tend to reduce their capital spending if there is a cash shortfall

rather than accessing more expensive additional external debt or issue more equity. This practice can result in underinvestment when adverse interest rate, exchange rate or commodity price movements reduce cash below a certain level (Gastineau. Smith and Todd, 2001). The goal of hedging therefore is not simply to eliminate or reduce risk in general, but to align the supply of internally generated funds with capital budgeting requirements. Carter et al. (2006) observe, an important feature of the Froot et al (1993) model is that the model allows for the firm's investment opportunity set to be correlated with cash flows from the hedgeable risk. If a positive correlation exists, then less hedging is necessary because when cash flows are low, so are internally-funded investment opportunities. Carter et al. (2006) show that hedging is more valuable to firms as investment opportunities are less positively correlated with the risk factor's cash flows. Additionally, because hedging decreases variance in the firm's earnings and makes credit default less likely, it can reduce the agency costs of debt in the firm's capital structure, because hedging allows the firm to minimise the need to access outside capital when it is most expensive.

Another cost associated with raising funds is the agency cost of debt. A firm facing immediate cash flow problems is more likely to make decisions that maximise short-term cash flows, at the expense of creating long-term value. Firms that are nearing financial distress or experiencing liquidity problems are more likely to take actions that harm creditors and transfer wealth from debt holders to shareholders. Because hedging reduces the variance in the firm's earnings and the probability of default, hedging can therefore reduces the agency costs associated with different investment objectives of shareholders and creditors. Because this conflict is a greater problem for more leveraged firms and for firms with a greater number of positive net present value projects, the shareholders of these firms are going to be the primary beneficiaries of firm-level hedging (Nance et al., 1993). However, if there are benefits from leverage, for example due to the tax treatment of borrowing costs or the reduction in agency costs associated with free cash flows, then hedging provides a benefit to shareholders because the borrowing capacity of the firm increases (Froot et al. 1993). Therefore, consistent with shareholder wealth maximisation objective, higher leverage firms (may) have greater hedge incentives to hedge than relatively unleveraged firms.

The impact of taxes on hedging

The irrelevance theorem as applied to hedging with derivatives assumes a world without taxes. However, in the presence of taxes which are affected by hedging, then hedging will affect the firm's cash flows and hence its value. Smith and Stulz (1985) develop a tax-driven model to analyse the effect of hedging with derivatives on the present value of a firm's after-tax cash flow. Their model considers the shape of the corporate tax function. If marginal tax rates are an increasing function of the firm's pre-tax value, the after-tax value of the firm is a concave function of the pre-tax value (Smith and Stulz, 1985). If a firms faces a convex tax schedule (i.e. one in which the marginal tax rate exceeds the average tax rate), then hedging that reduces the volatility of expected taxable income also reduces the firm's expected tax liability (Graham and Smith, 1999). An increase in the progressivity of the tax rate and tax preference items (such as tax losses carried forward and other tax credits) lead to a more convex tax schedule (Nance et. al, 1993, Graham and Smith, 1999). Graham and Smith (1999: 2241) opine that for a firm facing some form of tax progressivity, when taxable income is low, its effective marginal tax rate will be low; however, when the income is high, the tax rate will also be high. If such a firm hedges, the tax increase in circumstances where income would have been low is much smaller than tax reductions in circumstances where income would have been high, thus lowering expected taxes.

Financial price risk

Smith and Stulz (1985) and Geczy, Minton and Schrand (1997) argue that a firm's decision to hedge also depends on the level of exposure to price risk. The Smith and Stulz (1985) model shows that firms with greater variation in cash flows or accounting earnings resulting from exposure to price risks have greater potential benefits from hedging. Furthermore, due to economies of scale the costs or hedging are likely to be smaller for firms with higher exposures to price risk, leading to the prediction that firms with higher levels of financial price exposure, c.p., are more likely to hedge and/or hedge a greater proportion of their price risk exposure.

Evidence on theoretical determinants of corporate hedging, including hedging with derivatives

From the above theoretical considerations, it is possible to compile a checklist of determinants of hedging, which can be grouped into four categories: (1) external financing costs, (2) financial distress costs, (3) tax-related costs and (4) risk exposure. Hedging theories show that relaxing the perfect capital markets assumption can lead to circumstances where firm-level hedging can add value.

In the absence of any disclosures in either annual reports, financial statements or the notes to the financial statements, early literature assessing theoretical determinants of the use of derivatives for hedging has typically relied on survey data or other sources that corroborate evidence of derivatives usage. However, as this literature does not directly pertain to the use of derivatives for hedging (rather it is assumed that derivatives play a part in the firms' overall hedging strategies) only those studies explicitly considering hedging with derivatives will be considered further[8].

Mian (1996) and Berkman and Bradbury (1996) are among the first studies that use financial reports disclosures to provide evidence on the theoretical demands for hedging, in particular hedging with derivatives. Mian's (1996) results strongly support the economies of scale argument and does not find support for the financial distress prediction and obtains inconclusive results for contracting, capital market imperfections and tax-driven hedging motivations. Berkman and Bradbury (1996) employ annual report disclosure of New Zealand firms to develop a continuous measure of hedging (the notional principal amount outstanding), which is an improvement on papers that used a binary variable for hedging. Their results show that derivatives usage increases with leverage, firm size, existence of tax losses carried forward and the proportion of managerial ownership. The underinvestment hypothesis is found to be sensitive to the variable specification, and only when fair values are used as a proxy for hedging activity providing support for the growth options.

[8] Several studies focus on the type and volume of derivatives used by corporations and the motives for their use. For U.S.-based surveys see Bodnar, Hayt, Marston and Smithson (1995); Bodnar, Marston and Hayt , (1998). Berkman, Bradbury and Magan (1997) provide survey data on New Zealand firms, and Grant and Marshall (1998) for large U.K. firms ; Bodnar, de Jong and Macrae (2003) use survey data to examine the influence of institutional differences between U.S. and Dutch firms.

Gay and Nam (1998) present results in support of the propositions raised by Froot et. al (1993). They find that firms are more inclined to use derivatives when they have greater investment opportunities and when they have relatively lower cash balances. In addition, they find a negative relationship between the correlation of the firm's internally generated funds (using five different proxies for growth opportunities) with its investment outlays, the less derivatives are used. This result implies that firms hedge less when they are already internally hedged, because cash flows are higher when investment needs are higher and vice versa. On the other hand, firms are more inclined to use derivatives when a weaker correlation exists between internal funds and investment outlays (Gay and Nam, 1998).

Graham and Rogers (2002) use annual report disclosures for a sample of firms that are expected to hedge due to tax considerations and utilise an explicit, direct measure of tax convexity. They consider simultaneously the effect of leverage and tax motivations, because hedging can increase debt capacity and reduce the probability of financial distress, if the two policies are determined simultaneously. Their findings indicate that that firms have incentives to hedge to increase debt capacity but not in response to tax considerations.

More recent studies have used derivatives disclosures in financial reports to provide evidence on the corporate demand for hedging. These studies capitalise on the fact that under the various disclosure regimes studied, firms are required to explicitly state the purpose for which derivatives are used. Judge (2006) attempts to differentiate among the theories of hedging by using voluntary derivatives disclosures in the annual reports of U.K. firms and data collected via a survey and finds strong evidence is found linking the firm's decision to hedge and the expected costs of financial distress. In an improvement on previous studies, he recognises that hedging firms may do so with or without derivatives. When the same definition as are employed as in previous U.S. (i.e. user = hedger; non-user = non-hedger), the financial distress result still holds, indicating cost and probability of financial distress is more important for the UK-sample firms than for the US, indicating the costs of bankruptcy are higher for UK firms. Larger firms, firms with more cash, firms with greater probability of financial distress, firms with exports or imports and firms with more short-term securities are more likely to hedge with derivatives and concludes that differences in

opportunities and in incentives for reducing risk and type of risk exposure (i.e. financial price risk exposure) play an important role in how (i.e. the choice of with/without derivatives) firms hedge (Judge, 2006).

Relationship between hedging with derivatives and firm value

Given the established literature on the determinants of hedging and the extent of hedging, another stream of the literature seeks to investigate whether the perceived benefits from hedging affect the hedging firms' value. A common theme in this strand of the literature is the requirement that a firm faces some kind of price risk or exposure and a consideration of the extent to which hedging is undertaken, i.e. allowing for the possibility that some or none of the exposure is hedged with derivatives.

Allayanis and Weston (2001) use a sample of 720 firms from different industries to directly test the relationship between firm value and the use of foreign currency derivatives and find that hedgers are able to extract a hedging value premium of approximately 5%, and that this premium is both statistically and economically significant. For firms that use foreign currency derivatives that have a median market value of about $4 billion, the hedging premium translates into an average added value of approximately $200 million. However, as Jin and Jorion (2006) observe, it is unclear whether hedging adds value to smaller firms, due to he large fixed costs establishing a derivatives program.

Hentschel and Kothari (2001) investigate the association between firm risk and derivatives usage. They find no differences in the risk exposures of firms that use derivatives and those that do not, and concluded that derivatives usages has no measureable impact on exposure or volatility. A similar finding is presented by Adam and Fernando's (2001) study of the impact of hedging on the firm value of gold producers. They find that derivative users generate positive cash flows that are highly significant both economically and statistically and fail to find any evidence that derivatives users exhibit increases in systematic risk. The authors conclude that their findings imply that firms' derivative transactions translate into increases in shareholder value.

Guay and Kothari (2003) study the economic effects of derivatives position for a sample of derivative-using, non-financial firms and conclude that the potential gains on derivatives are small relative to movements in equity values, and therefore, cannot have an effect of the magnitude claimed. Guay and Kothari's interpretation is that there may be other risk management activities (such as natural hedges, rather than hedging with derivatives) that lead to value increases and are positively correlated with derivatives holdings.

Jin and Jorion (2006) investigate the relationship between hedging with derivatives for a sample drawn from the same industry, oil and gas. In their first part of their analysis, the authors examine the relationship between stock return sensitivity to commodity prices and hedging and fine that sample firms' betas are negatively related to the extent of hedging. As this finding establishes the fact that the market recognises the effect of hedging, the authors than use this finding to test whether firms that hedge are rewarded with higher firm values, measured using Tobin's Q. The results indicate that hedging has no discernible effect on the value of sample firms (Jin and Jorion, 2006).

Australian evidence on derivatives usage and hedging with derivatives

Several papers have addressed the corporate demand for hedging with derivatives by Australian firms. Unlike many of the previously cited U.S. – based studies that have sourced derivatives-related data from sources other than annual reports, the Australian studies rely on annual report disclosures about derivatives. Notably, these studies have been possible due to the change in disclosure requirements in Australia, following the introduction of AASB 1032.

Berkman, Bradbury, Hancock and Innes (2002)

Nguyen and Faff – (2004) and (2005)

Heaney and Winata (2005)

Underlying economic theory: the relationship between information and the price setting process

Akerlof (1970) in his seminal paper introduces the adverse selection problem by providing an example from the used car market. He posits that sellers of used cars are better informed about their product than are buyers and that sellers of used cars that are of a bad quality ("lemons") will have the incentive to sell their cars since the average price will be attributable to the entire group of used cars, of both good and bad car dealers. In Akerlof's model, buyers will only be willing to pay a price that reflects the average quality of cars on the market, which would be below the fair market price for quality cars but above the fair price for "lemons". Owners of good quality cars would not be willing to accept the average price and as such, lemons will drive out good cars, and, in extreme cases, shut down the market. Analogous to the securities market, informed traders possess non-public information, which enables them to formulate a different estimate of the future value of a stock that is superiors to the estimate of either the dealers (market makers) or the liquidity motivated traders. Whilst the dealer and the liquidity traders have the same information about a stock, they are less informed than informed traders. Since the informed traders will never trade when it they will be disadvantages, the dealer will never gain from trading with them and will choose a bid-ask spread that will maximise their profit (Copeland and Galai, 1983). However, in setting the spread, the dealer needs to recognise that if the spread is set too wide, expected revenues from liquidity trades will decrease, but expected losses from informed trades will be reduced. Conversely, if the spread is too narrow, a dealer's expected losses from informed traders decreases, but the expected revenues from liquidity trades increases. Information asymmetry is a problem for a firm to the extent that it creates perceived "informational risk" (Callhan et. al 1997). Information risk is a form of risk for which market participants may demand compensation, thus increasing a firm's cost of capital and other high transaction costs, such as thin markets for the firm's shares, lower liquidity and decreased gains from trade (Lev, 1988). Information asymmetry, as used in the context of this thesis is a condition whereby managers (insiders) possess greater information about the firm and its activities than do outsiders. This definition is adopted partly because one of the motivations of this thesis is to investigate whether, firstly, the introduction of the disclosure-only standard AASB1033 and subsequently, the adoption of AIFRS 139 ameliorated the information inequality problem, as outlined in Lev (1988).

Specifically, whether mandatory disclosure about financial instruments was successful in reducing the information inequality problem, and whether firms that were pro-active in their disclosure policies were able to benefit, albeit, in the short-term from their disclosure policies. Verrecchia (2001: 174) addresses the rewards inherent in an examination of information asymmetry when he states:

> *"But another potential research activity will result from this documented empirical work that forges a link between disclosure and its economic consequences. While I am interested in all such links, let me suggest that the one with the greatest potential may be the link between disclosure and information asymmetry reduction."*

Notwithstanding the clear importance of research in this area, Verrecchia (2001: 174) also expresses an awareness of the difficulty of this type of research, noting:

> *"…for all my enthusiasm for the information asymmetry components of the cost of capital as a starting point for a comprehensive theory, I acknowledge the difficulty of ferreting it out in real market settings"*

Hau (2001: 1959) echoing a similar sentiment, states:

> "*Information and its assumed asymmetric distribution has become an important aspect of financial markets theory. Yet, even though information heterogeneity of agents is now a common assumption in market microstructure models, direct evidence of the scope of such asymmetry is hard to provide."*

The above discussion suggests that in order to obtain powerful and convincing evidence, care should be paid to the environment in which any proposed study will investigate, for this will determine the extent to which the existence of information asymmetry will be captured by the proxies used. Although information asymmetry is not directly observable, there are three useful surrogates that may indicate the extent of firm-level information asymmetry: the probability of informed trading, the bid-ask spread, dispersion in analyst forecasts of firm earnings, and firm-specific idiosyncratic risk. As information asymmetry is not directly observable in financial markets, prior research has instead used the bid-ask spread as an observable proxy. In this literature, a distinction is made between "insiders" and "informed traders" and the extent to which these have different beliefs about various aspects of the organisation, for example, the likely success of current research and development projects. In this context, insiders are normally defined as corporate managers, who have to balance their fiduciary duties as well as their own managerial utilities. Informed traders on the other hand (which can include managers) hope to profit from information not held by

"uninformed traders" (Madhavan, 2000). Clarke and Shastri (2001) categorise proxies for information asymmetry into four broad categories: 1) measures based on analysts forecasts; 2) investment opportunity set measures; 3) stock return measures; and 4) market microstructure measures. The first three categories of measures will be considered indirectly, as part of the literature reviewing determinants of corporate usage of derivatives, while the last category will provide the measure used for assessing information asymmetry, namely the bid-ask spread.

Information asymmetry models link information asymmetry to the bid-ask spread by differentiating between the types of traders with which market makers trade: informed traders and liquidity (or noise) traders (Copeland and Galai, 1983; Glosten and Milgrom, 1985; Easley and O'Hara, 1987). Informed traders are supposed to possess non-public information, allowing them to better estimate future security prices than the liquidity traders. Alternatively, liquidity traders are thought to either know less than the informed traders or to trade because of urgent liquidity needs. Theoretically, the asymmetry between informed traders and liquidity traders should be reduced when the quality of information available to a broader base of investors, thus reducing the number of uninformed traders. The link between the different levels of information sets available to informed and uninformed traders is made via the bid-ask spread.

The role of the bid-ask spread in information asymmetry

The bid-ask spread is set by dealers in a firm's stock and is the cost of transacting in the market. The dealer (i.e. specialist, or market maker) provides liquidity to the marked by standing ready to buy at "bid" price and selling at the "ask" price (Demsetz, 1968). As market makers are required to trade on demand, they will always lose money on trades with informed investors. This is because informed traders will not trade with market makers unless the market makers' quoted prices are favourable relative to their non-private information (Bagehot, 1971: Copeland and Galai, 1983; Lev, 1988). In other words, informed traders will only buy (sell) stock when they know that the true security value is greater (less) than the ask (bid) price quoted by the market maker. Therefore, the bid-ask spread set by the market maker compensates them for their willingness to act as provider of immediate liquidity. To remain in business the market maker must recoup these losses by gains from trades with liquidity traders, who are willing to incur a fee for immediate liquidity. The market

maker achieves these gains by increasing the quoted spread (Bagehot, 1971; Copeland and Galai, 1983; Glosten and Milgrom, 1985; Venkatesh and Chiang, 1986) such that the gains made from trades with liquidity traders are off-set by loses made on trades with informed traders.

Though the entire spread has been used as proxy for information asymmetry a number of researchers propose that the quoted bid-ask spread can be decomposed into three cost components based on the theoretical notion a market maker faces (1) order processing costs; (2) inventory holding costs; and (3) adverse selection costs (Amihud and Mendelson, 1980; Copeland and Galai, 1983; Glosten and Harris, 1988; Krinsky and Lee, 1996). The order processing cost component is equivalent to a fee charged by the market makers for standing ready to match buy and sell orders (Demsetz, 1968; Tinic, 1972). The dealer has to have the appropriate level of inventory to meet immediate trade demands of traders, and as such, incurs an inventory holding cost. In addition to having inventory available, a market maker also charges a premium to compensate for the order processing costs. In addition, order costs are incurred by dealers in arranging trades in serving as a clearing house for unequal trades. Unequal trades occur when equal and opposite trades are not executed simultaneously (Demsetz, 1968; Stoll, 1978). The inventory holding cost component (as modelled in Stoll, 1978 and Ho and Stoll and Ho 1981) compensates market makers for holding less than diversified portfolios. The price risk and the opportunity cost of the funds dedicated to holding inventory for trading therefore gives rise to this inventory holding cost (Venkatesh and Chiang, 1986).

The final cost component of the bid-ask spread is the adverse selection component and reflects the degree of "information asymmetry risk" (as perceived by the dealer Callahan et.al. 1997). The risk to the dealers is that they will be locked into carrying excessive inventories (at rapidly declining prices) in the event that there are many successive buy transactions, or that the market makers will face a shortage when they are asked to rapidly sell as prices rise. Adverse selection occurs when two unequally informed parties trade. The better informed party will take advantage of the other's informational disadvantage to trade at a gain. The uninformed or less informed party will demand a higher price to cover their loss or some other kind of protection against purchasing an inferior product. The adverse selection component of the bid-ask spread

represents information risk, the probability that the next trader with whom the dealer interacts will be an informed trader (Copeland and Galai, 1983). Therefore, "trade-indicator" models that sought to decomposed the spread into its three components considered who initiated the trade and the probability of the next trade being made at the same price. The greater the risk of losing to informed traders, the larger the spread (Callahan et. al, 1997).

This information risk component of the bid-ask spread seems to represent an unambiguous proxy for information asymmetry, and, holding all other components constant, a higher level of information asymmetry leads to a larger total bid-ask spread. The cost that is important to accounting research is the adverse selection component because it most closely reflects information asymmetry and allows for an investigation of an improvement in accounting disclosure (or a reduction in the information inequality, as per Lev 1988) regulations on the level of information asymmetry as proxied by the adverse selection component of the bid-ask spread.

Empirical evidence linking financial disclosure and bid-ask spreads

There is a significant body of both analytical and empirical literature using bid-ask spreads to measure the effect of disclosure levels on several capital market factors. Copeland and Galai (1983) develop a model to illustrate the effect of information asymmetry on the bid-ask spread. They find that if the dealer perceives a greater probability of transacting with an informed trader he will widen the spread. The dealer expected costs depend on the probability of trading with an informed trader, which represent information asymmetry between the dealer and the informed trader. Copeland and Galai's results, consistent with prior studies, indicate a negative relationship between the bid-ask spread and each of the following variables: volume, competition between market makers and risk, and a positive relationship with price and stock variance.

Analytical models estimating the components of the spread indicate that there is a positive relationship between the adverse selection component and information asymmetry. Glosten and Milgrom (1995) develop a model showing that there will be a bid-ask spread even if all other costs (inventory holding costs and order processing costs) are zero. The bid-ask spread can be a purely informational phenomenon.

Glosten and Harris (1988) develop a two-component () asymmetric information model, transient and adverse selection. They show that the permanent price change is related to the adverse selection component (information asymmetry) while the temporary price change relates to the transitory component of the spread, i.e. inventory holding and order processing costs and conclude that to some extent, the bid-ask spread is determined by information asymmetry.

Morse and Ushman (1983) investigated the whether daily bid-ask spreads change around quarterly announcement but found no significant change around these announcements. However, they do document an increase in the average daily spreads on days of significant stick price changes.

Venkatesh and Chiang (1986) examine the effect of earnings announcements and dividend payments on information asymmetry as measured by the bid-ask spread. Their study investigates the proposition that there is a greater information asymmetry prior to firm-specific events that have the potential for revealing important information and the predictability of the date of occurrence. The study examines three groups of announcements: (1) joint earnings and dividend announcements on the same day; (2) initial (first) announcement, either of earnings or dividend announcements that were not preceded by another announcement in the prior thirty days; (3) second announcements which follow the first by at least ten days but no more than thirty days. The results reveal that bid-ask spreads were larger before second announcements and smaller before first and joint announcements. The results provide support for the proposition that dealers anticipate non-routine announcements whenever a second announcement is delayed from the first by at least ten days and dealers react by widening bid-ask spreads. Howe and Lin (1992) investigate the effect of dividends on information asymmetry as measured by the bid-ask spread. Their results suggest that on average, firms that do not pay dividends have wider bid-ask spreads than dividend-paying firms. In addition, spreads are found to decline as the dividend yield increases.

Lee, Mucklow and Ready (1993) use the bid-ask spread and depth to measure the information asymmetry around earnings announcements. Depth is measured as the number of shares available at each bid-ask price. Lee et al. (1993) posit a relationship between bid-ask spread and depth: wide spreads are found to be accompanies by low

depths, and narrow spreads by higher depths. Their study is an improvement on previous studies that only use bid-ask spreads to infer market liquidity, since market liquidity has a price dimension (spread) and a quantity dimension (depth). Their study provides evidence supporting the conclusion that dealers protect themselves immediately after earnings announcements (i.e. spreads widen) because market makers believe they could be trading with investors or investors with higher than average expertise in analysing the information content of earnings.

Another stream in the literature directly examines whether accounting disclosures contribute to enhancing the level of information about a firm. Greenstein and Sami (1994) advance the idea that disclosure of more valued information should indirectly affect the size of the bid-ask spread through resulting decreases in information asymmetry. They investigate the effects of accounting disclosures on the relative bid-ask spread by examining the effect of SEC's segment disclosure requirements. The authors observes that the relative bid-ask spread decreased significantly for firms reporting segment disclosures for the first time in 1970 while firms reporting segment disclosure prior to 1970 did not exhibit a decrease in bid-ask spread.

Krinsky and Lee (1996) investigate the behaviour of the three components of the quoted bid-ask spread surrounding earning announcements. Their results suggest an increase in information asymmetry among market participants during the event period. This is perhaps because the dealer assumes that there are information processors who have superior ability in assessing firm's performance from the announcements. The results also show a decrease in both inventory holding costs for the event and pre-disclosure periods suggesting that the risk of holding excessive inventory is decreased because of increased trading activity, as supported by theoretical models.

Another branch of the literature investigates whether the detail of information disclosed has and impact on the spreads. Raman and Tripahty (1993) document the decline in the spread of firms following routine disclosure of changes in the value of their oil and gas reserves. Boone (1988) examined the permanent effects (i.e. the adverse selection component) of SEC Accounting Series Release # 253, which affected firms in the oil and gas sector. Using a long event window of one year, he

finds evidence of a significant and permanent decline in reporting firms' bid-ask spreads.

Relationship between firm disclosure policy, information asymmetry and the bid-ask spread

Financial reporting quality, especially quality and quantity of disclosure is expected to be negatively associated with information asymmetry. Welker's (1995) study shows an inverse relationship exists between a firm's disclosure policy and its bid-as spread, such that firms with low disclosure practices have spreads that are 50 percent higher than firms with higher disclosure. The impact of disclosure on information asymmetry however is not straightforward. Kim and Verrcchia (1994) analytically show that an increase in the level of public information can have unintended consequences such as n increase in the degree of information asymmetry if investors have possess differential skills in analysing public information. Sophisticated are posited to be better able to analyse the public information to generate their own, private information. The authors then demonstrate that market-makers increase bid-ask spreads in response to the generation of private information by sophisticated investors.

Empirically, the commitment to increased disclosure and whether this impacts on the overall level of information about the firm is investigated by Leuz (2003). The basic premise of his study is that US-GAAP is more informationally efficient and should exhibit less information asymmetry. They also include trading volume and share price volatility as proxies for information asymmetry component of cost of capital. They compare two groups of German firms – one group electing to use International Accounting Standards (IAS) or U.S. GAAP for their domestic reports and the other group using domestic German GAAP, which were perceived to be of "lesser quality". Results indicate that firms electing either IAS or U.S. GAAP exhibited lower bid-ask spreads and higher trading volumes than the firms electing to use German GAAP, but there was no difference in the share price volatility among firms. Theory suggests that higher financial reporting quality reduces the dispersion of information between managers and outsiders. Coller and Yohn (1997) investigate whether the decision to issue management earnings forecasts is related to information asymmetry, and whether issuing such forecasts reduces information asymmetry. Their study is based

on the premise of signalling and predicts that if management forecasts reduce information asymmetry then issuing firms will exhibit lower spreads than firms that do not issue such forecasts. As managers can form part of informed traders, the forecasts provide information held by a subset of investors, and therefore reduce information asymmetry when they are released. Results indicate that firms issuing forecasts have smaller spreads than firms that do not and the authors conclude that management issue forecasts in order to reduce information asymmetry.

Frino and Jones (2005) investigate whether the introduction of mandatory disclosure of direct cash flows from operations is associated with a reduction in information asymmetry. Prior to the change in disclosure regulations, this item was not disclosed and could, at best, be estimated with noise, reduces the general level of information asymmetry about firms. Their results indicate that that firms that provided this information for the first time experienced a reduction in the relative bid-ask spread. In addition to testing the direct effect of regulation, they also test whether the correlation between operating cash flow disclosures and operating cash flow estimation changes as a result of mandatory disclosure.

Mohd (2005) investigates whether the introduction of an accounting standard allowing capitalisation of research and development costs of software development reduces information asymmetry, and uses bid-ask spread and share turnover as proxies for information asymmetry. He argues that although such a standard represents a departure from the U.S. GAAP (of expensing all internally generated intangibles) , expensing creates ambiguity among investors about the value of the research and development, thus increasing the information asymmetry between management and investors. He finds that information asymmetry is significantly lower for firms who capitalise than for those that expense these costs, and concludes that the standard was effective in reducing information asymmetry.

Components of spread and market microstructure

Whilst the above literature has demonstrated a link between spread and information asymmetry and in some cases the link between spread and disclosure of accounting information. Though the entire spread has been used as a proxy for divergent beliefs (and hence information asymmetry) a number of researchers propose the quoted can

be decomposed into order processing costs, inventory holding costs and adverse selection costs. This intuition is supported by analytical models. However, before reviewing these, a discussion of market microstructure is necessary because different trading mechanisms could affect the price formation process in different ways, and hence, produce different estimates of the three cost components of spread.

On quote driven markets (such as the NASDAQ), investors trade based on dealers' posted prices to either buy (bid) or sell (ask) and offers to buy and sell from other investors. Thus, in these markets, investors often provide liquidity when the quantity of bids or ask from investors is insufficient to meet demand (Handa, Schwarz and Tiwari, 1998). Within limit-order driven markets traders use quotes in the (typically electronic) order book as investors themselves provide liquidity to the markets. While trade execution costs and total trading costs have been researched extensively, the majority of this research has been done in the context of a specialist (or quote driven) market rather than in an automated (order-driven) limit-order market. A limit order is a request to either buy or sell with the condition that a price ceiling (for a bid to buy) or a price floor (for an ask to sell) is specified; trade requests are not executed if the price is above ceiling price or below the floor price. Brockman and Chung (1999a) is one of the few papers that investigate the price-formation behaviour in an order-driven market. Brockman and Chung (1999a) and Handa et.al. (1998) point out that both quote and order-driven markets are similar in that the spread on both markets represents the cost of supplying immediate liquidity. Furthermore, Brockman and Chung (1999a) note that the effective bid-ask spread in an order-driven market is the difference between the price of the lowest sell (offer) limit order and the price of the highest buy (bid) limit order. Handa et.al (1998:48) echo Brockman and Chung's arguments and note that the bid-ask spread is a "natural property" of an order-driven market, and this persists in the presence of a large number of limit orders. Furthermore, they justify the study of spread in an order-driven market by using 1995 Paris Bourse data to show that as their proxy for divergent opinions in limit orders increases, the spread widens.

Spread decomposition models: empirical estimates of bid-ask spread

As information asymmetry is not directly observable, the adverse selection component of the bid-ask spread has been the most prevalent proxy used in the literature. This has been possible due to spread decomposition models, which have followed two main approaches. The first approach, advanced by Roll (1984), relies on the serial covariance properties of observed prices. The second approach, advanced by Glosten and Harris (1988) is a trade indicator model based on the direction of trade, i.e. whether incoming orders are followed purchase or sales.

Empirical attempts to decompose the bid-ask spread into its three components (adverse selection, inventory-holding costs and order-processing costs) are impeded by the fact that distinguishing between adverse selection and inventory-holding costs is difficult due to the tendency of quoted prices to react to trades in the same manner (Kumar, 2004). As discussed in Huang and Stoll (1991), inventory-driven quote price adjustments are transient reverse over time, whereas adverse-selection price adjustments are permanent. On the other hand, the transient feature of inventory-driven adjustment allows for an estimation of the order-processing component (Huang and Stoll, 1991).

Affleck-Graves, Hedge, and Miller (1994) argue that auction-based trading (specialist market) promotes greater interaction of public orders, thus reducing the order-processing component of the quoted bid-ask spread, as compared to a competitive dealer market. On the other hand, the specialist bears a larger component of the cost of absorbing an imbalance in the flow of orders received, whereas multiple dealers can share the inventory costs, thus reducing the average inventory-holding costs among dealers.

Other studies have shown that the adverse selection component is related to a number of financial variables. For example, informed traders are assumed to engage in large trader (Lin, Sanger, and Booth, 1995). The volume of insider trading, an indicator of asymmetric information, results in widening of spread (Chung and Charoenwong, 1998; Kini and Mian, 1995). Also, analyst following of a security can reduce the information asymmetry (Roulstone, 2003; Frankel and Li, 2004) and hence, studies

have shown that market-makers' spreads are inversely related to the number of analysts following a stock (Chung, McInish, Woods, Wyshowksi, 1995).

Madhavan, Richardson and Roomans (1997) examine the impact of trading costs and public information shocks on intraday variations in price volatility. Although they do not separate the inventory-holding and order-processing components of the bid-ask spread, they conclude that the adverse selection component declines through the day, with increases in other components of the spread. However, it is only the adverse selection component of the spread that is directly affected by information asymmetry, and therefore, changes in the information asymmetry are most likely to manifest in changes in the adverse selection component of spread.

Market microstructure issues: quote versus order driven markets

Prior literature has outlined the behaviour of spreads in relation to accounting and other announcements. However, for the most part those studies are confined to U.S. markets and show the adverse selection component of the spread to vary quite diverse, raging from a low of four percent to high of eighty-two percent of total spread. Furthermore, attention should be paid to the idiosyncrasies inherent in order-driven markets (such as the ASX) versus quote-driven markets, such as those addressed by the U.S. literature. On quote-driven markets, investors trade on dealers' posted prices to either buy (at bid) or sell (at ask) a stock and offers to buy and sell from other investors. Thus, in quote-driven markets the dealers (or market makers) often provide liquidity when the quantity of bid or asks from investors is insufficient to meet demand (Handa, Scwartz and Tiwari, 1998). Conversely, in order-driven markets traders use quotes in an electronic limit-order book as investors themselves provide liquidity to the market.[9] Limit-orders involve a request to either buy or sell a stock, with the condition that a price ceiling (for a bid order to buy) or a price floor (for an ask order to sell) is specified; all requests remain unexecuted if a price is above the ceiling or below the floor. In reality, most exchanges are not pure forms of either quote-driven or order-driven models, but hybrids involving various degrees of dealer market-making and electronic trading (Chatham, 2004; Leuz, 2003; Gajewski and

[9] Apart from the ASX, order-driven markets exist for other large, liquid, and well developed markets such as the Paris Bourse, The London Stock Exchange, The Securities Exchange of Hong Kong, Singapore Securities Exchange.

Greese, 2003; Chung et. al, 1999). While the order execution costs and the components of trading costs have been researched extensively, the majority of this research has addressed the context of specialised or dealer markets rather than in quote driven markets. However, Brockman and Chung (1999 Journal of Financial Research paper) and Handa, Scwartz and Tiwari (1998) point out that the bid-ask spread in an order driven market is similar to that of dealer markets, in that both represent that costs of supplying immediate liquidity. Brockman and Chung (1999) note that the effective spread in an order driven market is the difference between the price of the lowest sell limit order and the price of the highest buy limit order. The effective spread is used when there is a concern about trades being executed within the spread. It is two-times the difference between the execution price and the most recent midpoint of the bid and ask prices. Similarly, Handa et. al (1998:48) note that the bid-ask spread is a "natural property" of an order-driven market, that persists even in the presence of a large number of limit orders. They further justify the study of the bid-ask spread in an order-driven market by using 1995 data for the Paris Bourse to show that as their proxy for divergence of opinion among limit order traders increases, the spread widens in response to the increase.

Therefore, it is clear that the extent to which markets differs in relation to the transparency of the trading process will help determine the levels of bid-ask spread. In developing an alternative methodology, based on the probability of an informed trade, some authors have argued that the trading process itself reveals information to market participants. O'Hara (1995: 252) states that the information available in the trading process can affect the strategies of market participants. However, the same cannot be said for electronic, quote-driven markets (Chatham, 2004). Pagano and Roell (1996) analytically demonstrate that greater transparency within the trading mechanism will decrease the costs for uninformed traders. McInish, Van Ness and Van Ness (1998) apply the Pagano and Roell (1996) empirical model to NASDAQ data to show that a change requiring market makers to display investors' limit orders reduces the spread. Madhavan (1996) argues that increased transparency about order flow could cause a widening of spread as the market maker's ability to share risk with outside investors reduces. The issue of structural differences between quote and order driven markets is further analysed by Heidle and Huang (2002) using probability of informed trading methodology to explain differences in the degree that information traders are exposed

to other traders, thus allowing for differential bid-ask spread, conditional on the level of information held. They find that informed traders are more difficult to distinguish in a competing dealer market, suggesting that one would expect to find relatively larger adverse selection components of the spread on the NASDAQ.

Wang (1999) uses data from the Sydney Futures Exchange in his examination, finding that electronic traders face higher adverse selection costs, but smaller order processing costs than floor traders. He concludes that floor traders in an open outcry system are better able to identify adverse selection risks than are electronic screen traders.

Institutional setting: the bid-ask spread on the Australian Securities Exchange

Aitken and Frino (1996: 53) observe "although some evidence is available from other fully automated markets, such as Canada, there is no comprehensive evidence from a fully automated order matching market". The adverse selection component of the bid-ask spread is likely to be significantly larger on the ASX, primarily for two reasons. While most U.S. studies have focused on dealers spreads, there is evidence that dealer spreads are not necessarily equivalent to market spreads and consequently, that the determinants of market spreads are not identical to those of dealer spreads (Aitken and Frino, 1996). Therefore, the adverse selection component of the bid-ask spread on the ASX is likely to be larger, if not to account for the majority of the spread.

Firstly, as identified above, market microstructure could affect the size of the spread. The ASX is a fully automated, order-driven market. Past research has shown that order processing costs in electronically traded markets are lower than those in open outcry/physical trades (Frino et. al 2004; Grunbichler et al. 1994). As a result, the order-processing component of the bid-ask spread on ASX-traded stocks will be reduced (Power, 2002; Frino and Jones 2005). The second reason pertains to the structure of trading and to liquidity being provided by (all) traders themselves. As the ASX has no designated market makers for equities trading, all traders are theoretically able to fully diversify their portfolios of inventory of stocks, and hence inventory-holding cost component of the bid-ask spread is likely to be reduced, if not negligible. In addition, prior research has also suggested that market makers are exert significant market power, and consequently, are able to extract higher rents from other traders by

intentionally setting the spreads to be wider than would otherwise occur in a perfectly competitive market (Brock and Kleindon, 1992; Chan, Christie, and Schulz, 1994).

In summary, since both order processing costs and inventory-holding costs form a smaller percentage components of bid-ask spreads on the ASX, a larger portion of the spread will be related to information asymmetry. This increases the probability of detecting the impact of public disclosure on information asymmetry through examination of bid-ask spreads. As a result, and assuming proper econometric controls and model specification, it is likely that tests undertaken using ASX data will be more robust.

CHAPTER 3: Hypothesis development

Early analytical research in discretionary disclosure predicted that where disclosures were verifiable and costless, market forces would induce managers to disclose fully private information. Milgrom (1981) showed that under such conditions, outsiders would interpret non-disclosure as implying bad news, and price the firm as if non-disclosed news were the worst possible. As a result, outsiders would "price protect" themselves and managers seeking to maximise the value of their firms would be induced to disclose fully (but costlessly) both good and bad news. Empirical studies however have reported findings to the contrary. Dye (1985 and 1986) and Verrecchia (1983 and 1990) deal with the possibility of less than full disclosure. Verrecchia (1983) has shown that if disclosure is costly, then less than full disclosure may appear in equilibrium where traders have rational expectations. Dye (1985) has analysed reasons for management's failure to disclose private information, including investor's uncertainty about the nature and existence of the manager's information, mutual benefits for agents and shareholders from non-disclosure and hidden action considerations. In subsequent work, Dye (1986) adds the possibility of externalities between (non-proprietary) information disclosed and (proprietary) information not disclosed, such that investors are able to infer the undisclosed information from the disclosed information. Both Dye and Verrecchia obtained the prediction that revelation of private information constitutes "good news".

The traditional disclosure models of Grossman (1981), Milgrom (1981), Verrecchia (1983) and McNichols (1984) predict a negative average information transfer between firms in an industry that are all potential recipients of news since only inferior firms withhold information. In other words, firms that do not disclose are subject to downward revision in their stock prices when a competitor firm makes a disclosure. Foster (1981) and Clinch and Sinclair (1987) find a positive information transfer within industry when firms made forecasts of earnings, whereas Lev and Penman (1990) find no significant information transfer within the industry.

Firms anticipating periods with not significant inflows of information will have an incentive to maintain their current disclosure levels precisely to signal this and to distinguish themselves from firms receiving adverse news. The "no news" firms are exactly in the same position as the "good news" firms in that they must provide sufficient guarantees to the market (in the form of signals, e.g. earnings forecast) that they have received no news or no bad news (see Dye, 1985, 1986 for analytical examples where this holds). Firms with bad news have no recourse. They cannot match the guarantees of the "good news" or "no news" firms hence they will be evaluated as having received bad news. In general, there is a hierarchy of firms from best to worst, based on the relative change in value that would occur if their inside information were made public (Ross, 1979). The incentive-signalling mechanism provides a structure that managers use to disclose their information in such a way that outsiders in the market believe it. Those with the best news distinguish their firms from those with the next best, and so on down the line. At the bottom of the hierarchy are those with the worst news, who would like to suppress it, but since it is not in their interest to offer the kinds of guarantees provided by those with better news (see Dye 1985, 1986 for operationalisation of these "guarantees" which refer to whether a firm has indeed observed or chose not to observe some news) the worst news will also be effectively signalled.

Teoh and Hwang (1991) develop a model in which firms voluntarily make announcements that lead to a downward revision in their stock prices, i.e. firms signal their bad news. McNichols (1989) finds that the majority of management forecasts in the 1973-1983 period are bad news and that the average announcement effect is statistically negative. Skinner (1994) provides evidence suggesting managers

voluntarily disclose earnings information for two mutually exclusive reasons. First, when firms are doing relatively well managers make good news disclosures to distinguish their firms from those doing less well (e.g. see Lev and Penman, 1990). Second, consistent with legal liability and reputation effects arguments, managers make pre-emptive bad news disclosures. Kasznik and Lev (1995) examine management's discretionary disclosure prior to a large earnings surprise, the way in which managers signal this surprise to investors and investors' reaction to such signalling. They find that less than ten percent of their large-surprise firms issued quantitative signals, while half of the firms kept silent. Firms with greater earnings disappointments (or bad news) were more likely to make a disclosure, and larger disappointments were preceded more often by quantitative disclosures.

To the extent that a regulatory act required previously undisclosed information be made public, the adverse selection component of the bid-ask spread should decrease (Greenstein and Sami, 1994: Power, 2002). Of course, this is contingent on the news content of the disclosures. Berkman, Bradbury, Hancock and Innes (1997) find that overall, disclosures about derivatives by Australian companies are relatively poor compared to their New Zealand counterparts and attribute this finding to the regulatory regime in place at the time, specifically the absence mandatory accounting standards dealing with disclosure or measurement of derivative financial instruments. A similar opinion is proffered by Chalmers and Godfrey (2004), who show that the amount of derivatives-related disclosures by Australian firms exhibit clear spikes, in terms of the amount of information being disclosed, especially in the period preceding the introduction of AASB1033.

In order for spreads to be affected by derivatives disclosures, the news content of such disclosures needs to be considered. The following discussion outlines some of the reasons why such disclosures are expected to impact on spreads. Firstly, prior to the introduction of AASB 1033 and AASB 139, many derivatives were neither disclosed nor recognised as a result of using historical cost accounting, since derivatives have no value at the inception of a contract. Since these have no cost, if no recognition is given to changes in their fair values, these instruments are effectively off balance sheet and "invisible". Depending on underlying price movements, such derivatives can have substantial values (assets and liabilities) and can represent significant risk

positions that could transform a firm's overall risk profile. Lack of recognition therefore results in financial statements that are potentially incomplete. Secondly, as outlined in Tables XX and XX, firms recognised the need to actively manage financial risks to avoid being exposed to a loss resulting from a sudden price changes (for example, in interest and exchange rates and commodities) causing the volume of derivatives transactions to increase. The historical cost of financial assets and liabilities has little relevance to financial risk management decisions. Reporting the historical cost of these assets and liabilities in published financial statements lacks relevance and information value for investors attempting to evaluate firm performance, cash flows and financial risk exposures (Hancock, 1994).

To understand the "news content" of derivatives disclosures, consider the development of derivatives disclosures in the U.S., a regime which is characterised as "informationally rich" (Verrecchia, 2001). The first step towards more transparency about firm's derivatives usage was provided by SFAS 105 *Disclosure of Information about Financial Instruments with Off-Balance Sheet Risk and Financial Instruments with Concentrations of Credit Risk* which required firms to disclosure information about financial instruments, not just derivatives, which created off-balance sheet risk as well as credit risk for reporting periods ending beginning June 1990. Among other disclosures, firms were requires to report information about the face, contract, or notional amount of these instruments as well as information about their credit risks. In late 1991, the disclosure regime changed, with the introduction of SFAS 107 *Disclosures about Fair Values of Financial Instruments*, which in addition to notional amounts, now required fair values to be disclosed. As derivatives contract is a zero-sum game, the fair value is an indication of the position held in such a contract at a point in time. A positive fair value represents a movement against the underlying asset and therefore is a gain on a derivative contract, whereas the negative market value represents a positive movement in the value of the underlying asset, resulting in a payable position. To the extent that hedge accounting is applied (as prescribed by the various recommendations/U.S. GAAP), this would result in a cash inflow and outflow respectively (which can be equated as an asset or liability). Fair value disclosures in annual report play a particularly important role, in that they provide the market with an opportunity to assess what side of the contract a firm is on at a point in time.

This is particularly applicable in the institutional setting of this study, where derivatives information was not communicated to the market prior to the adoption of AASB1033, other than voluntarily by firms in their annual reports. Furthermore, the financial press has highlighted the potential losses associated with derivatives usage. Therefore investors are expected to value such disclosures when they are made, because such disclosures are the only means of ascertaining a firm's involvement (and the extent of involvement) in derivatives.

In 1994, the FASB issued SFAS119 *Disclosures about Derivative Financial Instruments and Fair Values of Financial Instruments*, which improved the quality of data on corporate hedging that was available in annual reports. SFAS 119 required firms to disclose information about the nature and terms of their financial instruments, and more importantly, the purpose for which financial instruments (including derivatives) were held. Another improvement in the disclosure requirements consisted the prescription that firms disaggregate information about financial instruments with off-balance sheet risk by class, business activity, risk or other category that was consistent with management of those instruments. Although the date of adoption of SFAS 119 was a function of firm size and large firms, i.e. those with assets in excess of US$150 million were required to adopt SFAS 119 beginning with December 1994, all firms were required to comply with SFAS 119 for reporting periods ending December 1995.

The information content of derivatives disclosures therefore relates to the management's ability to identify, measure and control any additional risks that arise as a result of the firm's derivative usage. Because fair values embody all available information in an efficient market, they may be expected to provide a better basis for predictions (along with the knowledge of economic conditions and risk attributes of financial instruments)(REFERENCE????). Incentive signaling theory would suggest that firms would want to signal what side of the game their derivatives position was at balance date and that this incentive is more pronounced for "winners", i.e. for contracts with positive fair values. However, there are a number of reasons why firms would also want to disclose negative fair values, which *prima facie* would seem to be "bad news". Losses on instruments held for trading purposes would be reflected in the income statement when incurred. For instruments held for asset-liability management

(which are accounted for on an accrual basis, in the same manner as the underlying instrument) disclosing negative fair value could signal management's beliefs that the position will improve in the future, either by closing out the contract or being able to roll-over into an alternative contract. This is akin to holding an option presently out of the money, in the hope that the situation will turn around. Secondly, an "industry-wide disclosure dynamic" as proposed by Dye and Sridhar (1995) could influence firms to disclose negative fair values. They assume that one firm's receipt of information is positively correlated with the receipt of information by other firms in the industry. If investors know when the individual firms receive information, firms will disclose all their information to distinguish themselves from other firms with even worse information. If investors do not know when firms receive information, however, one firm's disclosure causes investors to update their assessments that other firms (who have not disclosed) have received information. Dye and Sridhar (1995) show that as long as there is a positive correlation among firms' receipt of information, this revision in investors' perceptions causes disclosure by sufficient number of firms to increase the probability that other firms will disclose their information. In other words, negative fair values disclosures would be made as long as there are other firms making fair value disclosures.

Finally, the introduction of mandatory derivatives disclosure requirements was predicated on the notion that financial statement users would require information about the purpose for which an entity uses derivatives and the associated risk (Chalmers, 1999; Chalmers and Godfrey, 2004). The relevant accounting standard, AASB 1033 *Presentation and Disclosure of Financial Instruments,* contains extensive disclosures concerning all financial instruments. Such disclosures were deemed necessary to help users assess the financial position, performance and cash flows of an entity. In particular, the disclosures were intended to help users ascertain the level of risk associated with financial instruments, irrespective of recognition (Hancock, 1999). Paragraph 5.3 of AASB1033 (which was a disclosure only standard) required firms to disclose various details about their objectives for holding or issuing derivatives, so as to enable users to understand the reasons for using derivatives. Disclosed information should have provided an overview of the financial risks faced by the firm, and how these risks were managed through the use of derivatives. In addition, both notional contractual amounts and fair values should be disclosed.

Existing literature documents the value-relevance of mandatory derivatives disclosures made according to US GAAP. In addition, there is empirical support for the conjecture that International Accounting Standards (on which AASB 1033 is based) and US GAAP provide superior information to investors (Alford et. al, 1993, Amir et al., 1993, Ball, 1998). International accounting standards' disclosure requirements are more stringent than of most countries' national accounting standards (The Economist 1996, p76). Because IAS and US GAAP disclosures were in place before their Australian equivalents, a firm could voluntarily disclose the information required under either IAS or US GAAP in the notes of their domestic financial statements (such as the case of Australian firms listed on the NYSE) without explicit reference to international standards.

Both IAS 32 and US GAAP[10] require disclosure of firm's objectives of derivatives usage, accounting treatment of derivatives, segregation between trading and hedging instruments, and disclosure of notional and fair values of derivatives contracts, and the same requirements are present in AASB1033. By adopting either standard or the recommendations of various international bodies, a firm is effectively committing to certain disclosures irrespective of future results. That is, a firm commits to provide this information even in those situations where non-disclosure could be the preferred strategy, and as such, switching to more informative reporting represents an increase in a firm's commitment to disclosure in its domestic accounts. Within the context of capital market pressures, the primary motivation seems to be a desire to lower the firm's cost of capital. Additional information reduces the investors' uncertainty about the quality of the firm and the expected return from its stock. Empirical evidence is provided by Leuz (2001) and Leuz and Verrecchia (2003).

By reducing "information risk" through non-mandatory disclosure, a firm can expect investors to accept a lower rate of return, thereby reducing the firm's cost of capital. Recent studies have examined the link between increased non-mandatory disclosure

[10]Derivatives disclosures became mandatory in the US for the first time with the introduction of SFAS 105 in 1991. Since then, the issue has been addressed by several other standards, the latest being SFAS 133, dealing with the disclosure and recognition of financial instruments.

and the firm's cost of capital. Botosan (1997) finds a significant relationship between her disclosure index and the firm's cost of capital for firms with low analyst following. Using a similar index for foreign firms trading in the U.S. equity markets, Botosan and Frost (1998) show a significant association between liquidity and the timeliness of disclosure but not between level of disclosure and liquidity, which is posited to affect the cost of capital. **ALSO HERE: Sengupta (1998 on the link between disclosure and cost of debt)**

Welker (1995) used analyst ratings of the firm's overall disclosure policy and demonstrate that firms with higher disclosure ratings have, on average, lower bid-ask spreads and a relationship between public disclosure and the bid-ask spread was shown to exist during periods in which no specific disclosures were made (i.e. firm's general disclosure policy). He measured the magnitude of disclosure in terms of the amount of information and showed than an inverse relationships exists between its disclosure policy and its bid ask spread, such that the bid-ask spread of firms with "low" disclosure practices are 50 per cent higher than the top third of their sample firms, with high disclosure practices (Welker, 1995).

Based on the above discussion and review of the literature assessing the link between disclosure and information asymmetry, and given the fact that there has been tremendous growth in the use of derivatives coupled with their initial off-balance sheet accounting treatment which could detract from the usefulness of financial reports and the importance ascribed by regulators to disclosure, voluntary disclosure of financial-instrument related information will reduce information asymmetry, particularly when the effects of derivatives use are not directly observable in accounting numbers (Hancock, 1994; Chalmers and Godfrey, 2004). This relationship is formally investigated by the following disclosure-related hypothesis:

H1: Firms that did not publicly disclose derivative financial information prior to ASCT Industry Statement or AASB1033 will experience a reduction in relative bid-ask spread following the disclosure of such information, c.p

Methodology

The fundamental question addressed in this thesis is whether disclosures about firm's derivatives activities reduces the level of information asymmetry. Specifically, the benefit of more informative disclosure is operationalised as a narrowing in the bid-ask spread. To determine whether more disclosure is associated with relatively lower levels of information asymmetry, multiple regression (Ordinary Least Squares) will be used, the principal independent variable will be the bid-ask spread. The primary model used is based on the work of Frino and Jones (2005). Their model uses Australian data, and has shown that an improvement in accounting disclosures does reduce information asymmetry, as measured by a narrowing in the bid-ask spread of firms that disclose information for the first time. Therefore, this model provides a good benchmark for comparing results. In order to test the first hypothesis, that the bid-ask spread is narrower for firms that disclose information about their derivatives activities for the first time, a variable measuring the amount of disclosure will be constructed. This continuous variable is assessed via a disclosure index constructed from the disclosures prescribed by the ASCT Industry Statement. Chalmers and Godfrey (2004) note that the ASCT Industry Statement is more thorough than the requirements of AASB1033. Furthermore, using content analysis applied to a sample of annual reports, Dunne et.al (2004) document that implementation of mandatory disclosures about derivatives is associated with an increase in the amount of information available within an annual report for listed firms in the U.K. Therefore, a negative coefficient is predicted for the disclosure variable *DISCORE*, indicating that higher disclosure is associated with a decrease in spread. The index is not weighted, so as not to prejudice the importance of a disclosure item. Each disclosure will be allocated a score of 1 if present and a score of zero if absent, and a total score is calculated for each firm's annual report for each period. The calculation of *DISCORE* is presented in Appendix XX. The final score is then converted into a percentage of the maximum score available, according to the following formula:

$DISCORE_i = FirmScore_i / Max * 100$

Control variables

In addition to a continuous measure for disclosure, another two variables are included. Firstly, previous research indicates that the relationship between spread and price is mechanical, and that largely, the higher-priced stocks exhibit larger spreads. Furthermore, the Australian Stock Exchange has minimum price variations (i.e. minimum spreads) according to the stock price, in effect stipulating the price at which an order can be placed relative to another order at a different price, thus determining the minimum spread (Aitken and Frino, 1996). Aitken and Frino (1996) find this to be associated with bid-ask spreads on the ASX. Therefore, a dummy variable capturing the minimum tick size in included.

Another variable is included to account for the disclosure regime in place at the time from which the observation is drawn. This is necessary to account for the three distinct disclosure regimes that existed in Australia between 1993 and 1998, culminating with the introduction of the first disclosure standard, AASB1033 *Presentation and Disclosure of Financial Instruments*. This standard (introduced in December 1996) became effective for reporting periods ending on or after 31 December 1997, making January 1, 1998 the beginning of the first mandatory reporting period. The variable *DiscReg3* captures whether disclosure is made in the mandatory period. There is another event that could affect the quantity and quality of disclosures (and hence the bid-ask spread) - the issue of an Industry Statement by the Australian Society of Corporate Treasurers in March 1995. The statement sought to "fill the void that exists in respect of the existing (at the time) accounting standards not providing clear direction in many aspects" (ASCT 1995: 3). The Industry Statement was composed of two parts. Recommended minimum disclosures were contained in *Part A* while best practices interim disclosure guidelines (presumably until AASB1033 became operative) were prescribed in *Part B* of the Industry Statement. The issue of the Industry Statement is a significant event in the disclosure environment because the Australian Securities and Investments Commission (ASIC) endorsed the statement in a media release dated 30 March 1995. In a subsequent media release dated 20 June 1995, ASIC conveyed its expectation that firms comply with the requirements of the Industry Statement, specifying that it would be difficult

for firms to meet the Corporations Law statutory requirement that their financial statements present a true and fair view without adopting the minimum requirements (*Part A*) of the Industry Statement (Chalmers and Godfrey, 2004). Aside from this remark, ASIC did not provide any other guidance or information about failure to comply. Therefore, whilst not mandatory, the Industry Statement could have contributed to the amount of derivatives disclosures made by firms in their annual reports and a disclosure index derived from the ASCT Industry Statement requirements has the added benefit of conveying information that is identified as being relevant to decision makers. Therefore, 1995 and 1996 are referred to as quasi-mandatory reporting. This feature of the reporting environment is captured by the *DiscReg2* variable.

Prior to the issue of the Industry Statement, the Australian Accounting Standards Board issued two Exposure Drafts relating to derivatives. ED59 was issued in March 1993 and represented the first attempt at regulating derivatives disclosure in Australia. The exposure draft sought addressed both measurement and disclosure issues in one document and was met with strong opposition from financial statement preparers who argued that the proposed rules (particularly for hedge accounting) would induce undue volatility in earnings, which will detract from earnings figure as a measure of firm performance (Hancock, 1999; Chalmers, 2001). The AASB withdrew ED59 in October 1995, after issuing its replacement, ED65 in June 1995. With some minor variations, ED65 was later was introduced as AASB1033. Whilst exposure drafts could have contributed to firms choosing to disclose information about derivatives, exposure drafts are not mandatory and firms are not required to comply with their requirements. The period 1993 to 1994 is referred to as the purely voluntary disclosure regime, characterised by an absence of any domestic regulatory guidance and is captured by the variable *DiscReg1*. Chalmers and Godfrey (2001; 2004) report an increased in derivatives disclosure (even if incomplete) in 1995 and in 1998, following the issue of the Industry Statement and the introduction of AASB1033.
A negative coefficient for all *DiscReg* variables is expected. In addition, given the potential for firms to adopt AASB 1033 requirements early, the magnitude of the coefficient is expected to decline as mandatory disclosure become imminent (i.e. $\beta 4 > \beta 5 > \beta 6$). The formal specification of the model used to test the first hypothesis is as follows:

$$SPREAD_t = \alpha + \varphi DISCORE_t + \beta_1 Volt + \beta_2 Volat + \beta_3 Tick + \beta_4 DiscReg1 + \beta_5 DiscReg2 + \beta_6 DiscReg3 + \varepsilon_t \quad \textbf{(1)}$$

Where:

SPREADt	=
DISCOREt	= derivatives disclosure score
Volt	= Natural Log of daily volume of trade
Volat	= Natural Log of (High/Low of the day)
Tick	= Dummy Taking the value of 1 to 4, depending on stock price bracket
DiscReg	= Dummy, taking the value of 0/1 indicating purely voluntary, quasi-mandatory and mandatory disclosure regime, where 1993 to 1994 is the purely voluntary disclosure regime; 1995 to 1997 is the quasi mandatory regime; 1998 is the mandatory regime as per AASB1033.

In progress:

- **formal hypothesis on the impact of IFRS adoption**
- **methodology to assess impact of IFRS → leaning towards evaluating the value relevance of IFRS; also possible to continue with event study methodology from 2006 onwards so that the effect of firs-time adoption of IFRS does not swamp the results**

Components of DISCORE – Voluntary and Quasi-mandatory disclosure regimes
(based on Chalmers 1999, Chalmers and Godfrey 2004, Hancock and Howieson 1993, ASCT 1995)

A score of 1 is allocated for each of the following disclosures and 0 for non-disclosure

Item	Reference ED 65 (paragraph #)	**ASCT Industry Statement**
Policy information:		
Specification of hedging policy	- other standards	
Specification of objective for holding or issuing derivatives	52	**Part A**
Specification of accounting policies adopted for derivative instruments (other than foreign currency hedges)	43a	**Part A**
Specification of policies concerning collateral, security and credit arrangements	66b	**Part A**
Specification of policy used to assess, monitor and control derivatives-related risks		**Part A**
Specification of controls in place to monitor risks		**Part A**
Risk information:		
Segregation of information by risk category (e.g. Int. rate, Credit Risk)		**Part B**
Provision of following specific information about derivatives:		
- Principal, stated value, face value, notional value, notional amount or other similar information	43 bi	**Part B**
- Date to maturity	43 biii	**Part B**
- Weighted average/effective interest rate	43 bii, 55b	**Part B**
Specification of whom it has credit risk exposure	66ci	**Part B**
Specification/commentary on estimated credit risk at reporting date	66a	**Part B**
Net market (Fair Value) Information:		
Specification of net market or fair value of derivative instruments	78a	**Part B**
Specification of methods adopted in determining net market or fair value	78b, 78c	**Part B (only for trading activities)**