Voluntary Disclosures and the Stock Price Synchronicity

- Evidence from New Zealand

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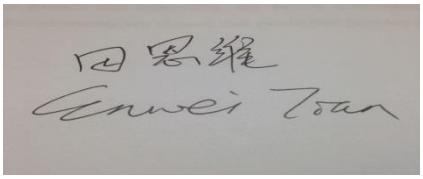
Author's Signature: 

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ABSTRACT

This paper investigates if there is a significant association between the informational opacity of the firm which is measured by voluntary disclosure levels, and the extent of firm-specific information incorporated into the share price as measured by synchronicity in New Zealand stock market. I apply three panel data regression analyses to a sample of 297 listed companies' fiscal year observations over the 2001 to 2005 period. These three regressions are based on three different measurements of dependent variables but the same set of control and independent variables. The three dependent observations include one synchronicity risk measure and two idiosyncratic measures. My variable of interest in this study is a disclosure score which is a measurement of voluntary disclosures of firm specific information. I regress synchronicity on disclosure level to inspect whether the amount of disclosed firm information impounded on the share price is mirrored in stock price synchronous movement. The results imply that the level of firm's voluntary disclosures reflects on the stock price synchronicity with the market and industry index. The paper finds that in New Zealand, firm disclosure levels are negatively associated with stock price synchronicity and positively related to idiosyncratic risk.

This study also runs additional three regressions by controlling systematic risk in the original three models due to the limitation of synchronicity or idiosyncratic risk measurement according to Li et al. (2013). The new result also gives the same correlations among my test variables, and it further confirms that more voluntary disclosures of firm specific information will lighten the stock price co-movement. Moreover, I also test the validity of synchronicity measurement via earnings response coefficient model following Gul et al. (2010) study, and this new result verifies that my synchronicity measure is effective. Based on all regressions analyses, the results suggest that a high disclosure score (SDSCORE) is usually associated with a high idiosyncratic risk (ISR1 or ISR2) but a lower stock price synchronicity (SYNCH). The findings highlight the importance of voluntary disclosures which will promote transparency in the share market to decrease the share price synchronicity.

CHAPTER 1: INTRODUCTION

This study investigates whether firms' voluntary disclosure level in their annual reports is associated with stock price synchronicity in the New Zealand capital market. Although this research question has already been addressed by other researchers, but it is worth of investigating this issue in New Zealand as New Zealand institutional level and market environment are significantly different from other big countries such as US where the voluntary disclosures and stock price synchronicity study has been conducted. Firms in those countries with more stringent legal environment and with a capital market oriented financing system may have more incentives to be transparent, which leads to greater level of voluntary disclosures and low stock price synchronicity. However, regardless of New Zealand relatively transparent and efficient market (Smellie, 2012), New Zealand has its own characteristics of the corporate governance, firm size and ownership structures (Hossain et al., 2001; Pekmezovic, 2007). All this specific characteristics affect firms' levels of disclosures and stock price synchronicity. So it is necessary to investigate the relationship between disclosures level and stock price co-movement in New Zealand market.

The role of voluntary disclosures for firm specific information in the modern capital markets becomes more imperative because of the increased pace of entrepreneurship and economic change. According to agency theory, there is always a potential conflict of interest between the principal known as stakeholder and the agent known as self-interested entrepreneur. The lack of transparency of firm specific information gives rise to information asymmetry. Healy and Palepu (2001) summarize several incentives of managerial voluntary disclosures, and assert that a high level of voluntary disclosures is one of the best solutions to information asymmetry.

In this study, I provide empirical evidence on the capital market effects of disclosures. Healy and Palepu (2001) point out that the level of voluntary disclosures serve as an important mechanism in the functioning of an efficient stock market. First, high levels of disclosures will increase liquidity in a firm's stock (Diamond & Verrecchia, 1991). Secondly, prior studies conclude that high levels of disclosures will reduce the cost of capital for a firm (Barry & Brown 1984; Barry & Brown 1985; Botosan, 1997; Botosan, & Plumlee, 2002). Last, when the accounting regulation and auditing are imperfect,

voluntary disclosures will lower the cost of information acquisition for analysts (Lang & Lundholm, 1996). In other words, voluntary information can increase information intermediation which can create more valuable new information for investors.

Stock synchronicity happens in the situation when stock prices for each individual firm are highly correlated and thus bring out a synchronous movement of their stock price (Chung et al., 2011). In addition, stock prices co-movement might be a result of asymmetrical market-level information as well as the informational opacity of the firm (Roll, 1988). It is argued that the higher levels of voluntary disclosures reduce opacity and improve a firm's transparency, which can indeed reduce the synchronicity issue (Haggard et al., 2008). Thus, my study intends to verify if this relationship between voluntary disclosures and stock price co-movement exists in the New Zealand capital market.

There are three models in my current research to test the above discussed association. One model uses synchronicity risk as the first dependent variable, and the second and third models use alternative idiosyncratic risk measures as my other two dependent variables. There is a growing group of research examining the association between disclosure levels of firm specific information and stock price synchronicity. According to the prior literature, synchronicity as a dependent variable can be a measurement of the extent of the firm specific information impounded into the share price, and it is usually computed by R squared which is estimated from the capital assets pricing model (CAPM) according to several empirical studies (Roll, 1988; Morck et al., 2000; Durnev et al., 2003; Piotroski & Roulstone, 2004). They argue that under the CAPM model, stock co-movement might be driven down by better disclosures of firm specific information which should be mirrored in a lower R squared.

However, recent research contends that using idiosyncratic risk as the measure of the firm specific return is more accurate rather than using R squared (Rajgopal, & Venkatachalam, 2011; Li et al., 2013). Therefore, I am not only using synchronicity as a dependent variable, but also adding two idiosyncratic risk measurements. Specifically, this study employs three models with the same control variables but different dependent variables to test if the associations among those variables are the same as I predict. So,

it first uses synchronicity as the dependent variable based on R squared calculation in model one, and then, it also selects two different methods to measure the idiosyncratic volatility and takes them as dependent variables in model two and three. Overall, this paper sets up three models (one synchronicity model and another two idiosyncratic models) to test the relationship between voluntary disclosures and stock price co-movement.

All these models use self-constructed disclosure index as my interest of variable developed by Jiang and Habib (2009). This measurement is reliable as the previous study provides a marking system based on different categories of construction to estimate each New Zealand firm's disclosure score. However, this index only measures quantity of disclosure (the level or extent of disclosures). It does not address the issue of voluntary disclosure quality as it is difficult, if not impossible, to measure the quality of voluntary disclosure. This is why most of research on voluntary disclosures focuses on disclosure quantity instead of quality. I will explain the detail of this self-constructed measurement in chapter 4.

The results show that firms with high levels of voluntary disclosures decrease stock price synchronicity, and also increase the idiosyncratic risk based on a sample of the 297 listed companies in New Zealand Stock Exchange from 2001 to 2005. These results are exactly the same as I suggest my main and sub-hypotheses tests would generate. The findings are also consistent with prior research arguments which are based on US and Australian data (Haggard, Martin & Pereira, 2008; Bissessur & Hodgson, 2012).

As a robustness test, I re-test the three original regressions controlling for systematic risk, and then I also measure earnings informativeness to make sure of the effectiveness of my synchronicity risk measurement. Li et al. (2013) summarize that the correlation between systematic risk and the variable of interest might have an impact on final statistic results when researchers choose to use alternative measures of synchronicity or idiosyncratic risk. So I add systematic risk control on original regressions as an additional test to see if my new results are in accordance with my hypotheses. Furthermore, following the Gul et al. (2010) paper, this study also runs the earnings

response coefficient test to verify the validity of synchronicity risk which is based on R squared measurement.

Based on additional tests, the new results, after being controlled the systematic risk, reveal the same significant relationship as the results from original regression analyses, and the validity of synchronicity measure is also supported by the earnings response coefficient model. These additional tests further confirm the negative (positive) relationship between voluntary disclosures and the stock price synchronicity risk (idiosyncratic risk) that I have found using three original models. Overall, this study shows high levels of voluntary discourses reduce synchronicity risk. This finding strengthens the necessity of voluntarily disclosing firm specific information to reap the benefit of reducing the stock price synchronicity. However, disclosures are not a costless exercise. Managers will need to weigh the cost and benefit of voluntary disclosures (Elliott & Jacobson, 1994).

My dissertation proceeds as follows: Chapter 2 presents the relevant theories and literature on voluntary disclosures, stock price synchronicity and idiosyncratic risk. Chapter 3 develops hypotheses. Chapter 4 explains the sampling method and presents the research design. Chapter 5 presents empirical results on descriptive, correlation and multivariate analyses. Chapter 6 conducts additional tests by controlling systematic risk and verifying the validity of synchronicity measure by measuring Earning Response Coefficients (ERC). Chapter 7 discusses the potential limitation and concludes.

CHAPTER 2: LITERATURE REVIEW

2.1 Literature survey on voluntary disclosures

This section first presents an explanation of agency problem and information asymmetry with some relevant theories. After discussing these two subsections, it reviews literature on incentives of voluntary disclosures and the capital market effects of voluntary disclosures.

2.11 Agency theory

Agency theory represents a relationship between two parties: the principal (stakeholders/ shareholders) and the agent (the entrepreneur/ managers). This theory of principal-agent relationship happens because of the separation of ownership and control in most firms. The former chooses the latter to act on its behalf in a business perspective, or rather, the principal will usually delegate implementation or even decision making rights to the agents who are paid for their service (Jensen & Meckling, 1976). However, when the shareholders/ stakeholders invest in a business venture with a less active role in its management, managers may have more information than the shareholders/stakeholders thus creating a barrier to control of information dissemination. Also this barrier may prove more costly when replacing a manager as information may be hidden or removed from the company that hadn't been recorded.

The agency problem arises from conflicting interests and information differences (Jensen & Meckling, 1976). When stakeholders delegate decision making rights to agents, the agents do not always act in the best interest of investors due to the differentiation of personal interest. In the earlier literature, Smith and Skinner (1999) explains that the consequence of the self-interested party watching over a saver's money is harmful to the interests of outside investors when the entrepreneur has an incentive to expropriate savers' funds (Jensen & Meckling, 1976). Additionally, some unreasonable agency costs are borne by the agent party. For example, managers may use the principal's funds to pay themselves excessive compensation; they also can hide or

manipulate information that is inconvenient to themselves. The manipulated information may influence inappropriately shareholders/stakeholders' decision making.

Another result of agency problem is information opacity. It is always assumed that managers have superior information to outside investor (Healy & Palepu, 2001). Regarding the theory of "unraveling result" (Grossman & Hart, 1980; Grossman, 1981; Milgrom, 1981; Milgrom & Roberts, 1986), managers may choose to disclose or to hide firm-specific information to distinguish themselves from those stakeholders who have access to less favorable information. Normally, there are always two choices for managers utilizing the strategy of voluntary disclosures (Lurie & Pastena, 1975; Kross & Schroeder, 1984). First, they may hide adverse information. Secondly, when the information gives benefit, it is more likely for them to make more disclosures (Milgrom, 1981). So, this self-serving and opportunistic behavior of managers will lead to information asymmetry and increase the agency costs (Jensen & Meckling, 1976). Therefore, shareholders/stakeholders, especially outside shareholders, may not be able to make a sensible decision due to the agency problem.

2.12 Information asymmetries and relevant theories

Fama and Laffer' (1971) information hypothesis states that most firms' specific information will be included in its financial reports, and it is essential for investors reducing investment risk, making right investment decisions and earning more trading profits. The useful information, including firm level, industry level and market level information, is always characterized by various sources of financial statements or accounting reports, and it is assumed that more useful information gives more benefit to investors (Fama & Laffer, 1971). Healy and Palepu (2001) argue that there are increasing demands for accounting reporting and voluntary disclosures to reduce information asymmetry.

However, based on the previous literature review in section 2.11, agency theory is strongly associated with credible information as the agency problem causes information asymmetries. Asymmetry is referred to as one of the information problems where the agents obscure some private information without disclosing it to the outside

shareholders or other stakeholders (Healy & Palepu, 2001). It is commonly known that the entrepreneur can access more private information which is not freely available in the public domain. Then, because of self-interest behaviour, it is more likely for managers to use that private information opportunistically. Thus, the hidden activity of managers will go undetected and lead to information asymmetries (Arrow, 1985).

According to the above discussions, the agency problem makes the information asymmetries issue worse, and it is not fair for the investors. There are two systems-oriented theories – legitimacy theory and stakeholder theory, focusing on the role of information and disclosure in the relationships between the principal, agent and government. Suchman (1995) concludes the theory of legitimacy:

"*Legitimacy is a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions"* (Suchman, 1995, p. 574)

Rather than legitimacy theory which considers the whole society level, stakeholder theory is specifically focused on different stakeholder groups within the social and accounting area (Freeman, 2010). Similar to legitimacy theory, the ethical branch of stakeholder theory argues that the organization has the responsibility to treat all stakeholders fairly (Freeman, 2010). More generally speaking, each group of stakeholders such as shareholders, creditors, employees, government and communities have the rights to be given the same information, even if the information does not have any benefits for those stakeholders (Freeman, 2010). Therefore, these two theories point out that the role of public disclosures like the accounting report is to implement that responsibility of firm (Freeman, 2010).

2.1.3 Incentive of voluntary disclosures

As the agency issue and information asymmetries may potentially bring out a breakdown in the functioning of the stock market, voluntary disclosures play a significant role to solve those information problems. There are some forces affecting

managers' disclosures decisions. The most important factor that makes managers extend voluntary disclosures is due to its benefit on reduction of the capital cost (Barry & Brown, 1985). According to capital markets transactions hypothesis, it is more costly for existing shareholders to make public equity or debt when a firm has a high information asymmetry level (Healy & Palepu, 1993 & 1995; Myers & Majluf 1984). Therefore, when managers anticipate issuing public debt or equity, they have incentives to disclose voluntarily in order to minimize the information asymmetry, and as a result, they can lower the firm's cost of external financing when they make those capital market transactions (Barry & Brown 1984 &1985).

Another factor that may impact on managers' decisions of information disclosures is associated with litigation cost (Healy & Palepu, 2001). The threat of firm litigation makes a two-sided impact. On the one hand, managers, in order to reduce the cost of litigation, may choose to do a pre-disclosure of poor performance (Skinner, 1994). Litigants focus on whether there are delays in bad news announcements, and the delaying bad news is prima facie evidence that managers do not voluntarily disclose those pieces of news in a timely manner (Skinner, 1994; Healy & Palepu, 2001). So, to reduce the risk of litigation, managers believe that it is better to pre-disclose poor performance. On the other hand, litigation can reduce managers' motivation of voluntary disclosures because they think forecasting good news can increase litigation risk (Healy & Palepu, 2001). In other words, managers think that a penalty made by the legal system is more likely to be imposed on the firm who always forecasts information in good faith (Healy & Palepu, 2001). The empirical evidence suggests a firm with a high level of positive information on future earnings is followed by a high level risk of litigation (Healy & Palepu, 2001). So, based on this point, litigation potentially discourages managers to disclose forward-looking information.

There are other incentives that may also force managers to change disclosure levels. For instance, management talent signaling hypothesis states that talented managers are more encouraged to make voluntary earnings forecasts (Tureman, 1986). It is also argued that more disclosures can lower the likelihood of undervaluation of stock which can avoid the negative market effect of poor earnings performance (DeAngelo, 1988). However, managers may reduce voluntary disclosures due to proprietary cost hypothesis, even though they know that lower level of disclosures makes it more costly to raise

additional equity (Verrecchia, 1983; Darrough and Stoughton, 1990, Gigler, 1994). Their studies show that voluntary disclosures can damage a firms' competitive position, in particular, when there is less threat of entry in the industry or when firms face existing competitors. Thus it is in a firm's own interest to have a lower level of disclosure as a higher level may allow an easier entry of a new competitor to the industry

Overall, one of the best solutions to agency problems and information asymmetries is making management fully disclose firm specific information. When the level of voluntary disclosures is high, it reduces the harm to stakeholders. The high level of voluntary disclosures can leave fewer opportunities for the self-interested agents to withhold private information, and hence to increase information transparency in the stock market (Healy & Palepu, 2001).

2.1.4 Capital market effects of voluntary disclosures

Different levels of voluntary disclosures show different influences for capital markets. Several empirical papers examine the economic and financial consequences of firms' voluntary disclosures. Based on the literature review of Healy and Palepu (2001), there are three major market effects discussed in this section.

The first crucial effect on market is stock liquidity. In the previous section, I discuss that voluntary disclosures can reduce information asymmetries among informed and uninformed market participants. Diamond and Verrecchia (1991) conclude that investors feel more credible and confident to invest in a firm with high levels of disclosures, and the relevant stock transactions in that firm tend to get a fairer price, thus, increasing liquidity for that firm. Following their study, a number of papers also attempt to examine the stock liquidity in relation to firm disclosures. These relevant studies provide empirical evidence that firms with an increasing rate of disclosures have higher bid-ask spreads than their industry peers prior to the rating of disclosures change (Healy et al., 1999; Welker, 1995; Leuz & Verrecchia, 2000). As a result, expanded voluntary disclosures improve the stock liquidity (Healy & Palepu, 2001).

The second type of market effect of voluntary disclosures is reducing the cost of capital. According to the discussion in section 2.1.3, information asymmetries can bring incentives for the agents to give voluntary disclosures in order to decrease the cost of capital (Myers & Majluf, 1984; Barry & Brown, 1984 & 1985; Merton, 1987). Those early empirical studies make the conclusion that investors' demands for incremental returns bear an information problem, increasing with higher information asymmetries. Consequently, firms that have higher voluntary disclosure levels imply less information risk, and lower the cost of capital. The more recent evidence shown by Botosan (1997) demonstrates this cost of capital hypothesis. She then concludes that an increased cost of equity capital might result from a lower annual reporting at voluntary disclosure level (Botosan & Plumlee, 2002).

The last major capital market consequence of voluntary disclosures is the cost of information acquisition. Lang and Lundholm (1996) argue voluntary disclosures reduce the cost of information. In addition, Veldkamp (2006) expends the framework built by Grossman and Stiglitz (1980) which shows the cost of information is more expensive for the individual investors if there is a lower level of voluntary disclosures from a firm. It also can lead a decline of demand in the stock market from those outside investors. Moreover, the high demands can lower the unit cost of gathering such information. Therefore, for those firms with high levels of disclosures, they may generate high demand in stock market which can finally decrease the information acquisition cost. For those firms with less disclosure information, they may suffer lower demands as investors must bear a high proportion of fixed cost of purchasing the specific firm information (Veldkamp, 2006). Therefore, these pieces of evidence conclude the high level of voluntary disclosures increases information intermediation as it lowers the cost of information acquisition.

2.2 Literature survey on stock price synchronicity

This section first reviews early literature on synchronicity and focusses on the accounting studies using stock price synchronicity. It then discusses the measurement of stock price synchronicity and presents previous empirical studies on the relationship between voluntary disclosure levels and stock price synchronicity.

2.2.1 Stock price synchronicity theory

The earliest idea of synchronicity popped up in psychology in the 1920s. This word explains the phenomenon that simultaneous occurrences happen within two or more events, and the moving trends of those events are observed in a meaningful manner. The reason for different events to occur together might be apparent, causal or unrelated by chance (Synchronicity, 2011). Putting synchronicity in an accounting and finance perspective, this issue has long been noticed in the capital market and called stock price synchronicity. It is a measurement which is used in share price movement, and it also can reflect the degree of firm specific information within market and industry levels (Roll, 1988). Put in simple terms, stock return synchronicity is the common return variation for each firm to the total return variation of the whole capital market (Roll, 1988).

In accounting and finance literature, stock price synchronicity can be explained by Capital Assets Pricing Model (CAPM) according to the Roll's (1988) research. The CAPM model was discussed in the early 1960s in William Sharpe (1964) and John Lintner' (1965) research papers. Then, Black (1976) extends the model. He argues that both factors of non-diversifiable and the factors of firm specific characteristics affect firms' returns. This model makes a fundamental contribution on explaining and expanding the definition of asset price, and it also serves as a benchmark for understanding the causality between asset prices and investment behavior according to explanatory variables of market, industry and firm specific information (Perold, 2004). Thus, Roll (1988) uses the CAPM model to investigate to what extent that a firm's assets return variation can be explained by information at market level, industry level and firm specific level.

Stock price synchronicity is associated with information acquisition. The earliest study provides evidence that stock price movement is mainly dependent on the information of market or industry level (King, 1966). More recently, Roll (1988) proposes that a significant portion of stock return variation is generated by the firm-specific information. He illustrates the consequence of stock price synchronicity when there is a lack of firm

specific information. Overall, more and more empirical evidence concludes that, except for market and industry information, firm specific information also impounded on the stock price, and hence those sorts of information will change the stock price synchronicity risk (Roll, 1988; Durnev et al., 2003; Piotroski & Roulstone, 2004).

2.2.2 R squared as Stock price synchronicity measurement

Basically, the figure of R squared indicates how well data points fit a statistical model. A higher R squared means a higher fit of the model controlling for relevant variables (R-squared, 2006). Under CAPM model, it represents the proportion of sample variation in the stock price explained by regression equation where variables are used as explanatory factors. Or to put it another way, R squared is equal to the squared correlation coefficient between the observed values of the share price co-movement and the values predicted by the estimation on market and industry related information.

As the stock returns can explain the market-level, industry-level and firm-level information gained by the public traders, the previous study states that those relative amounts of information will eventually capitalize into the real stock prices to determine the co-movement of stock prices measured by the statistic R square (Morck et al., 2000). Generally speaking, CAPM regression concentrates the impact of firms' share price returns in relation to the market and industry specific information. So when the R squared generated from this model is high, it means a high fit of explanatory variables without being concerned about the firm specific information (Roll, 1988). On the contrary, Roll (1983) concludes that the low R squared is the result of either more firm specific information (private information) or the factors that can disclose some pieces of relevant information about the firm. Evidence from the corporate finance literature indicates that a higher level of stock synchronicity can develop a high R squared (Jin & Myers, 2006). Thus, R squared is a measure of the extent of a firm stock returns co-movement compared with market and industry returns (Khandakera & Heaney, 2009; Du, et al., 2007).

Expanding the framework built by Myer and Jim (2006), recent study makes a similar conclusion using synchronicity operationalized by R squared from the market capital

model (Hutton et al., 2009). By transforming R squared into a synchronicity variable, they assume that the information environment via calculation on R squared will be a reflection of stock synchronicity. According to the origin of R squared, a higher synchronicity level follows a higher R squared indicating less disclosures of firm private information, and it confirms a greater chance on stock price co-movement (Piotroski & Roulstone, 2004). In other words, a lower R squared implies a lower stock price synchronicity risk, and it further reflects a higher proportion of the firm-level information (Morck et al., 2000; Myer and Jim, 2006; Haggard et al., 2008, Hutton et al, 2009). (The papers that relate return synchronicity of using R squared to information disclosure are shown in Appendix 1.)

[APPENDIX 1 ABOUT HERE]

2.2.3 Relation between voluntary disclosures and stock price synchronicity

According to the above literature reviews, different levels of voluntary disclosures change information accessibility for investors, and affect their investment decision making. Therefore, the firms' voluntary disclosures impact the firms' share price. Prior studies argue that share price co-movement is attributable to the information asymmetries and can be decreased by higher disclosures of firm-specific information (King, 1966). On the other hand, higher levels of information disclosures and precision reduce investor dependence on common information signals and lower the opacity information risk, which will eventually improve the stock price informativeness (Roll, 1988). Thus, making voluntary disclosures is one of the major factors to impact the stock price, and therefore to affect stock price synchronicity.

An earlier research conducted by Grossman and Stiglitz (1980) provides evidence on the relationship between the voluntary disclosures of firm-level information and stock price synchronicity. They argue that acquisition of information is costly and may decrease the returns when gathering the information. They also find that informed trading increases when the cost of obtaining firm-specific information declines (Grossman and Stiglitz, 1980). Within their framework, a credible disclosures policy generates more transparency on private information, which allows firms to transmit

their specific information to outside investors more effectively and at less cost, and hence reduces investors' reliance on general industry and market information (Grossman and Stiglitz, 1980). Durnev, Morck Yeung, and Zarowin (2003) further support Grossman and Stiglitz' (1980) argument, they state that expending voluntary disclosures consequentially lowers the cost of information acquisition, and therefore, decreasing the cost of obtaining firm-level information gives more healthy and informative stock prices, and finally results in a lower level of stock price synchronicity. On the contrary, if the disclosures activity rating is lower, the proportion of reliance on the market level information is greater which induces a greater stock price co-movement (Haggard et al., 2008).

Moreover, Veldkamp (2006) argues that greater level of disclosures means more sources of information, which will indeed reduce the co-movement in stock market, particularly when such disclosures of information are useful for pricing a firm's market value. From my previous discussion about market effects of voluntary disclosures in section 2.1.4, obtaining additional information may be expensive for outsider investors or individual shareholders when there is a lower level of voluntary disclosures. Thus Veldkamp (2006) concludes that investors intend to buy the same information which others are purchasing. However, if they price assets using a common subset of information such as the industry level and market level information, the general news of one asset in the same capital market, particularly in the same industry, will affect the other assets' prices, and thereby stock price synchronicity happens as asset prices co-move (Veldkamp, 2006). Overall, when the level of stock price co-movement is lower, stock prices are more informative in firm-specific return variation which results from high disclosure levels (Haggard et al., 2008).

2.3 Literature survey on idiosyncratic volatility

This section discusses the criticism of synchronicity measurement based on R squared calculation. It shows another proxy for firm-specific return variation as a dependent variable known as idiosyncratic risk. This study then explains two measurements of idiosyncratic risk.

2.3.1 Criticism of R squared measurement.

Despite the intention of using R squared to test the firm-specific information environment, some researchers are aware of the controversy related to this measure. More recently, a growing group of studies criticize the use of R squared being an unreliable statistic because of the ignorance of idiosyncratic risk (this particular risk is explained in the next sub-section) which may have a closer relationship with systematic risk (Ashbaugh-Skaife et at., 2006, Fu, 2009; Smedema, 2011).

The common interpretation in studies represented by Morck, Yeung, and Yu (2000) proposes that stock price synchronicity, defined by the R squared from asset pricing regressions, can be used as a measure of the amount of pertinent firm-specific information reflected in returns. Several empirical studies following this regression model find that the lower R squared (usually with lower synchronicity) represents the firms whose stock prices corresponds to much more firm-specific information being revealed, which may be because of capture of more information and less noise in stock market trading (Wurgler, 2000; Durnev et al., 2004; Hutton et al., 2009;). In other words, a lower R squared is good because it indicates that the more firm-level information is revealed by firms, a corresponding realistic stock price occurs.

In contrast, some researchers give different conclusions. For example, one study is inconsistent with those common interpretations, with West (1988) arguing the higher R squared is good. The West (1988) model shows that rather than being a proxy for high firm specific information, low R squared is due more to noise in price returns. This finding is confirmed by Zhu (2010), which shows that noise trading has a negative effect on R squared. When the trading has greater noise trading, the Capital Assets Pricing Model is more likely to generate low R squared. Peasnell and Alves (2010) also directly challenged Morck et al. (2000) findings. Their results demonstrate clearly the inadequacy of the R squared as a measure of the quality of the information environment at cross-country level based on collection of data on forty countries over the twenty-year period 1985-2004 (Peasnell & Alves, 2010). Furthermore, Anderson and Xing (2011) conclude that R squared may not always reflect a right relation between price synchronicity and private information the firm generated. They argue that R squared can be low in either good or bad firm specific information levels (Anderson & Xing, 2011).

Moreover, some researchers claim that there is no relationship between R squared and stock price informativeness. Ashbaugh-Skaife et al. (2006) conduct a cross-country study in six largest equity markets, including Australia, France, Germany, Japan, UK and US, and they find no evidence to support R squared as a measure of firm specific information impounded into stock prices. When they use US data to examine the effect of R squared on the coefficients of future earnings in ordinary least squares (OLS), they find results contrary to Durnev et al. (2003).

Overall, those studies' results cast further doubt on the robustness and reliability of the R squared measure. Li et al. (2013) summarize that using synchronicity measured by R squared will be affected when the trading noise is great especially in a cross country setting. R squared is not a robust statistic when the study considers annual cross sectional regressions, and the association among synchronicity and other control variables may not always capture noise (Li et al., 2013).

2.3.2 Idiosyncratic volatility and alternative measures

From the regression specification, there are two ways to control for systematic risk. Based on the literature review on section 2.2.1, Capital Asset Pricing Model developed by William Sharpe (1964) and John Lintner (1965) applies more emphasis on the value of diversification. When an investment is considered with a well-diversified portfolio, the most important factor to affect its return is systematic risks. Li et al. (2013) state that there are two common proxies for firm specific return variation measurement: one is measuring synchronous movement of a firm share price return with the market returns; another method is using idiosyncratic risk.

However, more recent studies show the use of idiosyncratic risk measure is more robust as it is strongly associated with systematic risk. Idiosyncratic volatility is defined as the best conditional volatility measure for analyzing and forecasting under the market model (Fu, 2009). He argues that returns on pricing implications of idiosyncratic volatility have to be considered when the regression includes monthly return information to share traders at different times (Fu, 2009). The previous research such as

Fama and MacBeth (1973) ignore idiosyncratic risk as they think only systematic risk can impact return and idiosyncratic has no influence on share price return. Nevertheless, more recent studies show there is a more significant correlation between idiosyncratic volatility and systematic risk (Fu, 2009; Smedema, 2011; Bartram et al., 2012; Li et al., 2013).

There are different ways to measure idiosyncratic risk, and this study applies the two most common methods - Φ and $\sigma_{i,t}^2$ to compute idiosyncratic volatility according to previous studies (Fink & Fink, 2012; Li et at., 2013). First, previous empirical papers always choose to use inverse synchronicity, and this idiosyncratic measure is known as Φ which is also based on the R squared calculation (Ferreira & Laux, 2007). The second idiosyncratic risk known as $\sigma_{i,t}^2$, usually represents the variance of residual from the regression of firm stock return on the market return, and in most cases, it is treated as the total risk minus the inverse of return synchronicity generated by R squared (Rajgopal, & Venkatachalam, 2011). (The papers that relate to idiosyncratic measurement are shown in Appendix 1.)

[APPENDIX 1 ABOUT HERE]

Nowadays, because of the argued limitation of R squared measurement, more researchers are starting to use idiosyncratic risk to measure the firm-specific information factor rather than R squared. Those arguments are addressed again by Li et al. (2013) that the use of R squared might not be robust as idiosyncratic risk in capturing firm-specific information. Specifically, they find that when $\sigma_{i,t}^2$ measurement is being used, the correlation between systematic risk and dependent variable of interest is bigger than that for the dependent variable via R squared measurements (SYNCH or Φ), and it is more likely to capture value relevant information or noise (Li, et al., 2013). So, when the study changes a dependent variable from synchronicity to idiosyncratic risk - especially for the second measurement of idiosyncratic risk shown as $\sigma_{i,t}^2$, different results can appear because that synchronicity and $\sigma_{i,t}^2$ have non-comparable dependent variables in an econometric perspective proved by Li et al. (2013).

Therefore, to give a more confident examination of the data for my research, I use one synchronicity and two idiosyncratic risks as dependent variables to check if a negative or a positive relationship exists between the voluntary disclosure level and stock price return co-movement in New Zealand stock market.

CHAPTER 3: HYPOTHESES DEVELOPMENT

3.1 Characteristics of New Zealand institution and capital market

The institutional or market differences between New Zealand and other big countries such as USA and UK are significant. New Zealand has its own characteristics with regards to firm-level of corporate governance, market efficiency environment, and capital market or firm size and ownership structures. All these different settings make an impact on the levels of information disclosure and stock return synchronicity.

New Zealand is small but with strong common law jurisdiction. Its corporate governance was rated highest during 2003 to 2005, over 2300 firms in 23 countries from the Laeven and Chhaochharia (2009) study. It is argued that New Zealand has the highest country scores based on firm-level governance norms (Laeven & Chhaochharia, 2009). Their study grades the highest score of six for New Zealand, whereas they give a zero score for Canada and one for USA (Laeven & Chhaochharia, 2009). In addition, a mixed approach of corporate governance is adopted in the New Zealand capital market including using mandatory and voluntary rules. All companies in New Zealand have to comply with mandatory rules which are described in Companies Act 1993 and the Financial Reporting Act 1993. These rules are more rigorous for those listed companies as those firms associate with higher level of contractual obligations of employment and public share issuance. All these regulations force a listed firm to comply with New Zealand Corporate Governance Best Practices Code, and require the company to provide a statement of any corporate governance policies, practice and processes adopted for that firm to be disclosed in its annual report (NZX， 2013). Overall, New Zealand has a good corporate governance level which is essential for an efficient capital market, and an efficient capital market makes a better assessment of disclosures which is reflected in firm's share prices.

Moreover, New Zealand has a relatively competitive, transparent and efficient market (Smellie, 2012). According to the World Economic Forum survey in 2012, New Zealand market's global competitiveness ranks 23rd based on 55 leader firms listed in NZX. One notable assessment criteria in this survey is that the transparent processes of

the market in New Zealand rose from third place globally to the second (Smellie, 2012). Based on the official survey, New Zealand also ranks 12th for the efficiency of business environment. These ranks show that the high honest and transparent economic environment build New Zealand a more efficient market.

The prior study also shows that New Zealand stock market has become more efficient since1990 due to regulatory changes which force a company to make more disclosures in order to reduce information asymmetry (Rayhorn et al,. 2007). Groenewold (1997) finds New Zealand a semi-strong efficient capital market by testing NSZE share price and causality of the rates of return. Narayan (2005) further concludes that New Zealand stock prices are non-linear and non-stationary for the period from 1967 to 2003, and this finding is consistent with the efficient market hypothesis. It is contended that given the supply of more public available disclosures, investors become more rational, and their more rational actions can lead to market efficiency (Holland, 1998).

An efficient stock market means that the firm's information disclosed to the public can be understood by investors, and such firm-level information can be more truly reflected in its share price (Holland, 1998). In such an efficient market, disclosed information is reliable, and it can always drive stock prices closer to fundamental value because that the maximized information disclosure benefits are subject to communication costs and minimize agency costs (Holland, 1998; Gao, 2008). Contrary to the New Zealand capital market, some countries' markets may be less efficient, for example China, and its disclosed information sometimes does not fully explain the company's financial status due to the lack of market transparency and relatively poor corporate governance, especially the negative events (e.g. disclosure on environment pollution) that have weak impact on the stock market (Xu, et al., 2012). In line with this argument, I would expect a negative effect of voluntary disclosures on stock price synchronicity.

On the other hand, the effect of firms' voluntary disclosures may not be significant in reducing information asymmetry between firms and their investors and thus does not necessarily reduce stock price synchronicity for the following reasons. In New Zealand, firm size or ownership structure can also influence voluntary disclosure levels, and thus impact stock price return. Compared with markets in other western countries like the

USA or UK, the size of a listed company in New Zealand is relatively small in the global portfolio, and the institutional ownership structures are also different in this relatively small equity market (Hossain et al., 2001). This associated institutional character is also pointed out by Pekmezovic (2007) that shareholding in the New Zealand capital market is another factor of agency problem. Because of the high level of control apportioned to management, managers can have more control on the operations of the firm (Pekmezovic, 2007). This makes it easier for the manager to hide information and make less voluntary disclosures, and it can cause an information asymmetry issue which may induce stock price synchronicity.

Specifically, Jiang and Habib (2009) conclude that New Zealand is stated to have concentrated equity ownership. They also suggest that the majority New Zealand listed companies have financial institution-controlled or management-controlled ownership structures (Jiang & Habib, 2009; Fogelberg & Laurent, 1974). The prior study shows that the firm's voluntary disclosure level is negatively related to the financial institutional ownership when the country is considered to be a concentrated ownership structure (Jiang & Habib, 2009). This argument can be more convincing with Bhabra's (2007) study that the less willingness of monitoring in New Zealand is criticized by a lack of shareholder activism compared with other western countries. Therefore, those characteristics of New Zealand institutions and market may give more opportunities for managers to make less voluntary disclosures in order to conceal misappropriation, which may have no impact on stock return synchronicity.

To sum up, the characteristics of the New Zealand institutional and capital market determine its voluntary disclosures and stock price synchronicity. On the one hand, New Zealand has a very strong corporate governance regime and provides a good functioning institutional and business environment. When the stock market is relatively efficient, it means that there are more requirements for managers to undertake more disclosure practices. It also means that investors can understand the information that is disclosed by the firm. Thus, investors in New Zealand can rely more on firm-level information rather than only using the common market or industry level information, and the firm-level information will be impounded into its stock price. As I discuss in the previous chapter 2.2.3, it will decrease the chance of stock price co-movement (Grossman & Stiglitz, 1980; Durnev, et al., 2003). On the other hand, despite the good

corporate governance and the efficient capital market environment in New Zealand, the unique firm institutional factors may increase the extent of agency problems. Information asymmetries may increase due to the highly concentrated ownership structure. So, it may lead managers in New Zealand to have greater opportunities to behave in ways which do not act in the best interest of investors. From this point of view, the voluntary disclosures and stock price synchronicity relationship may be weak.

In general, from the literature review in chapter 2, it is claimed that there is a negative relationship between disclosure level and stock synchronicity. However, New Zealand has its own characteristics in the institutional and capital market which can affect these two variables. So, considering those characteristics, the key motivation of my study is to investigate if there is still a negative association between disclosure level and stock price co-movement specifically within the New Zealand market. I argue that better disclosure practices can reduce stock price co-movement, and I also predict a negative relationship between the stock price synchronicity and disclosure scores using a sample data of firms in NZX from 2001 through 2005. As there are many articles demonstrating stock co-movement in USA companies which I review in chapter 2, this study will enrich the analysis of the relationship between disclosure level and stock synchronicity in NZ, while considering characteristics of listed companies in its particular capital market.

3.2 Main and sub-hypotheses

According to the several empirical studies reviewed in chapter 2, it is argued that stock synchronicity reflects the market level, industry level and firm level information. In this study, it analyzes if the influence on high levels of information disclosures specified within New Zealand listed firms will affect the co-movement of stock price as an increasing of firm-specific information reduces the stock synchronicity from a theatrically aspect. Assuming that financial accounting can be a major source of firm specific information, then my main hypothesis is:

- H1: The firms with higher levels of disclosures have lower stock price synchronicity than the firms with lower disclosure levels.

Specifically, I use R square to measure the level of stock synchronicity. From the statistics aspect, the higher R square results from the higher stock synchronicity. I use SYNCH to measure the R square. So, the higher SYNCH is related to the higher stock synchronicity which usually follows a higher R square. It also indicates a lower level of firm disclosures information that is represented by SDCORE. In other words, if this hypothesis is valid, the firm with less firm specific information (SDSCORE) will generate a greater co-movement of stock price (SYNCH).

As to the recent criticisms on the R square method according to the discussion in section 2.3.1, I also calculate the idiosyncratic risk to test the relationship between the level of firm disclosures information and stock price synchronicity. My sub-hypothesis is as followes:

- H2: The firms with the higher levels of disclosures have higher idiosyncratic risk than the firms with lower disclosure levels.

This sub-hypothesis uses different ways to capture the price synchronicity effect by measuring idiosyncratic risk (ISR). In the literature review 2.3.2, it is argued that using the idiosyncratic risk is a more accurate measure as this method has more consideration on systematic risk rather than using R square method (SYNCH) which posits more ambiguously the aggregate effect (Li et al., 2013). In my sub-hypothesis, it provides two common methods to measure the idiosyncratic risk (ISR) which are using the inverse measure of R square (ISR1) and the variance of the error term (ISR2) respectively. Based on previous literature review, I argue that the ISR should have a positive relationship with the disclosure level of firm information. Thus, to address the criticism on my first hypothesis test, the sub-hypothesis might be more persuasive to show the relationship between stock price and disclosure level of firm specific information.

CHAPTER 4: DATA AND RESEARCH METHOD DESIGN

4.1 Sample selection

My sample consists the listed companies in New Zealand Stock Exchange (NZSX) and New Zealand Alternative Exchange (NZAX) Markets for the fiscal periods from year 2001 to 2005. The NZSX market is the main board of the New Zealand equity market, while the NZAX is the alternative market comprising of small and medium size New Zealand companies who may have greater growth potential equity. So, selecting a sample based on both different markets can capture diverse voluntary disclosure practices in New Zealand. The sample excludes financial institutions such as insurance companies, mutual funds and investment banks. I exclude those firms following conventions of accounting and finance studies. The reason for using non-financial firms is that only in non-financial firms, high leverage indicates distress whereas it is normal in those financial firms (Fama, 1992). This study also does not take into account the overseas companies as those companies may pose different governance or disclosure requirements. This study aims to investigate to what extent the effect of firms' disclosure levels are incorporated into firms' stock price and synchronize all the firms' stock price returns.

To present the empirical tests, secondary sources have been used for data collection. First, I collect stock prices from DataStream. To get more robust data, I reconfirm the price via NZX Company Research Databases. Furthermore, the variable of interest SDSCORE which grades the levels of voluntary disclosures for listed firms in New Zealand market is provided by Jiang and Habib (2009). For other financial data which are used to calculate the final control variables such as liability, opening or end equality, total assets, book value and total capital, some of them are collected directly from DataStream or NZX Company Research Databases, some of them are obtained from companies' annual reports.

Table 1 and Table 2 give a sample selection procedure and industry composition comparison. First, I obtain the initial sample containing a total of 630 firm years comprised of 146 listed companies in New Zealand Stock Exchange. These observations are NZSX and NZAX major securities with adjusted prices and are listed

during 2001 to 2005. Then I delete 33 firms that belong to financial services, real estate investment and trust sectors, and only 113 listing company then remain in my sample. As well, I eliminate 36 firms that are not currently listed, and my sample narrows down to 77 firms. After deleting three cross-listed firms, 74 firms are remained. In addition, one listed firm's voluntary disclosure score is not available when I compare with disclosures measured from Jiang and Habib' (2009) paper, and thus I delete it also. Furthermore, three financial-year observations are deleted because of unavailable data for calculating SYNCH. Finally, 73 listed firms are remained in my sample with 297 financial-year observations (Table 1). These 73 New Zealand firms are all listed during 2001 to 2005 and still active in the New Zealand stock market with available disclosure score measurement and all control variables information.

[TABLE 1 ABOUT HERE]

Secondly, I divide those 73 firms into 12 industry sectors according to DataStream and NZX Company Research industry code (Table 2). They are 1) Healthcare, 2) Pharmaceuticals and Chemicals, 3) Travel and Leisure, 4) Support Service, 5) Industrial Transportation, 6) Industrial Engineering and Electronic Equipment, 7) Metals and Mining, 8) General Retails, 9) Food and Drinks, 10) Energy, 11) Construction and Material, and 12) Telecommunication. The industry composition in Table 2 shows the percentage of each industry included in the final sample. The industry composition table indicates that sector eight "General Retails" consisting of 12 firms with 46 observations takes the highest percentage which is 15.49%, while sector twelve "Telecommunication" only contains two firms with seven observations with the lowest proportion about 2.36%. Similarly with sector 12, sector seven "Metals and Mining" embodied only two firms takes the second lower proportion around 3.37%.

[TABLE 2 ABOUT HERE]

4.2 Empirical proxies and variable measurements

In this section, this study first explains the measurement of voluntary disclosure index obtained from Jiang and Habib (2009). It then presents the calculation of three

dependent variables: one for synchronicity risk, one for idiosyncratic risk but use the same R squared measure as in the synchronicity method, and the last one for idiosyncratic volatility using variance of returns.

4.2.1 Voluntary disclosure index

I use the disclosure score for each NZ listed firm from 2001 to 2005 as my primary variable of interest to capture each firm's disclosure level and to exam its association with the stock return synchronicity. To measure voluntary disclosures, I use the voluntary disclosure index developed by Jiang and Habib (**2009**). Jiang and Habib (2009) classify five categories in their construction of their voluntary disclosure index (SDSCORE) which include 1) background information, 2) ten or five year summary of history result, 3) key non-financial statistics, 4) projected information, and 5) management discussion and analysis. Each element contains several items to categorize and measure the disclosure score (Appendix 2). If specific information is disclosed in annual reports relating to an item of the above five categorical disclosures, this firm will get a reasonable point; otherwise, this firm is granted zero points in an item. After this process is completed for all the disclosure items among those five categories, the final points are added up to get the SDSCORE.

[APPENDIX 2 ABOUT HERE]

To answer my research question, I use data for NZ listed firms from 2001 to 2005 due to the availability of voluntary disclosure index. As stated above, Jiang and Habib (2009) is the most recent voluntary disclosure research in New Zealand. Their voluntary disclosure index are manually collected over a period of one year from reading and coding New Zealand listed companies' annual reports. To extend their SDSCORE index to recent years, it may require a considerable amount of time which exceeds the timeframe of my current dissertation. Therefore, in this study, I only focus on these five years to test my research questions. In future study, it would be worthwhile extending this disclosure index for investigating disclosure-related research issues in New Zealand.

4.2.2 Stock return synchronicity

The first step of this study is to measure the stock synchronicity. I followed the previous studies to take R squared as the coefficient of determination to explain the variation of weekly returns of stock price (Piotroski & Roulstone, 2004). I draw my initial sample of NZX firms' reporting accounting data during 2001 to 2005 from DataStream. For each firm, weekly stock price, weekly industry stock price and weekly market index are needed to calculate stock returns.

I estimate the firm specific return to measure the level of synchronicity using the linear regression firstly development by Morck et al. (2000). For each calendar year, we need to calculate R square for each firm in my sample through a regression of normal weekly return (RETi,t) on the market-wide return (MARETi,t) and an additional industry-level return factor (INDRETi,t). Additionally, all the returns include lagged values in my asset pricing model regressions. Overall, for each financial year of one firm, I calculate its R squared using the following regression model:

$$RETi,t = \alpha + \beta_1 MARET_{i,t} + \beta_2 MARETi,_{t-1} + \beta_3 INDRET_{i,t} + \beta_4 INDRET_{i,t-1} + \varepsilon_{it}\ , \quad (1)$$

Specifically, the industry return (INDRETi,t) for a specific week t is measured by the product of each firm's industry returns and weighted percentage value. The product sum is added among those firms with the same industry code. In more detail, for example, in the Healthcare industry, the industry includes six companies. For a special time t, I first use each firm's capital value divided by the total six companies' capital values to get the percentage value of each firm in this industry. Then, I use each firm's percentage value times each firm's own industry return, and finally I add up the six products to get INDRET for time t. Therefore, INDRETi is the value-weighted average of these firms' weekly returns. I also include lag return metrics $INDRET_{i,t-1}$ as the presence of informed parties can impact on the timing of the market and industry information's incorporation into prices (Piotroski & Roulstone, 2004). The MARETi use the same New Zealand capital market index. So for all the firms, they will have the same MARET in a particular time t as they all share the same market code. I also provide the lag estimate $MARETi,_{t-1}$ for each firm-year with a minimum of 45 weekly observations, where a weekly return is defined as the compounded return over five consecutive trading days.

Following Piotroski and Roulstone (2004), I also log transform R squared from first

regression to SYNCH in the equation 2 below:

SYNCH = log (R SQUARED/ (1 − R SQUARED), (2)

SYNCH is measured for each firm-year in the sample. Where R squared is the coefficient of determination from the estimation of Equation (1), the log transformation of R squared creates an unbounded continuous variable out of a variable originally bounded by 0 and 1, yielding a dependent variable with a more normal distribution (Piotroski and Roulstone (2004). Based on this construction, high values of SYNCH indicate firms' stock returns are closely tied to market and industry returns, and are assumed to reflect relatively less firm-specific information.

4.2.3 Idiosyncratic stock risk

Previous literature criticizes the R squared as a measurement of firm-specific information. Several recent papers use idiosyncratic risk as a proxy for firm-specific information or noise captured by firm specific return variation (Li, 2013). According to the literature review in Chapter 2, they doubt the use of R squared to explain the stock price synchronicity issue as this method ignores the idiosyncratic risk which may give more robust statistics results. Two representative papers are provided in Appendix 1. Specifically, Li (2013) posits two proxies used in prior literatures as idiosyncratic risk measurements. The first representative class of study (Durnev et al., 2004; Ferreira & Laux, 2007) uses the inverse synchronicity measure (Φ) as idiosyncratic risk to reveal firm specific return variation. Thus, in this study, I use ISR1 which equals to Φ shown in equation 3 as the first method to measure idiosyncratic volatility. The second representative class of study (Rajgopal & Venkatachalam, 2011; Li et al., 2013) calculates the idiosyncratic stock risk (ISR2) which is computed by average weekly variance of excess returns ($\sigma_{i,t}^2$) to capture the firm-specific information variation. They conjecture recently that using $\sigma_{i,t}^2$ might be more robust due to the degree of correlation between systematic risk and dependent variable of interest. Because of the recent criticism on the R squared measurement, I calculate ISR1 and ISR2 as my second and third dependent variables to run additional regressions as additional tests to see whether the latter two regressions bring the same or conflicting results compared with the first SYNCH measure.

To examine my sub-hypotheses (H2), my regression analyses for idiosyncratic risk will be conducted using two measurements. The first one is to measure the stock return synchronicity using the inverse synchronicity measure based on R squared. Then alternatively, I capture the idiosyncratic risk using the variance of errors (The definition of these two idiosyncratic is in Appendix 3).

$ISR\ 1 = \Phi = In\ [(1\text{-}R\ SQUARED)/R\ SQUARED]$, (3)

$ISR\ 2 = \sigma_{i,t}^{2}$, (4)

The final step shown in the following section is to estimate three regressions to first examine the relationship between the stock synchronicity and disclosure level by SYNCH (calculation shown in equation 2), and then to examine the relationship between the stock idiosyncratic risk and disclosure level using another two measurements by ISR1 & ISR2 (calculation shown in equation 3 & 4).

4.3 Model specification

This study estimates three models to examine the relationship between stock price co-movement and the disclosure level. The three models include other nine common control variables which are 1) the correlation between firm years return on assets and a value-weighted index of return on assets (NINDCORR), 2) earnings volatility (STDROA), 3) marketl value of equity (MVE), 4) the correlation between annual returns and returns on firms assets (CORR), 5) the average number of firms used to calculate industry return index (NIND), 6) firm size (SIZE), 7) leverage (LEV), 8) market to book ratio (MB) and 9) industry size (INDSIZE). Those independent variables which are used by prior synchronicity research might affect synchronicity or idiosyncratic risk (Piotroski & Roulstone, 2004; Haggard et al., 2008; Gul et al., 2010).

To test the main hypothesis (H1), I use the following equation (5). In this equation, the dependent variable synchronicity (SYNCH) is computed by R squared from equation (2), and R squared is estimated using equation (1). Then, I regress the dependent variable SYNCH on independent variable SDSCORE as well as other related control variables.

$$SYNCHi,t = a_0 + \beta_1 SDSCOREi,t + \beta_2 NINDDCORRi,t + \beta_3 STDROAi,t + \beta_4 log(MVEi,t) + \beta_5 CORR + \beta_6 Log(NIND) + \beta_7 SIZE + \beta_8 LEV + \beta_9 MB + \beta_{10} INDSIZE + \sum_{n=1}^{12}(Industry\ Dummies) + \sum_{2001}^{2005}(Year\ Dummies) + \varepsilon_{i,t}, \quad (5)$$

Following Haggard, Martin, and Pereira (2008)'s study, I use NIINDCORR as the first control variable. It is a correlation between firm annual assets returns (ROA) and value weighted index of ROA over the preceding three years with 12 observations calculating via quarterly data. NINDCORR's calculation is based on each firm's ROA and the average industry ROA. The former is computed by net income divided by the firm's total assets. The latter is measured by the product of average weekly industry return percentage based on the INDRET calculation and ROA of those firms with the same industry code. It concentrates on a firm's assets in generating revenue by comparing competing companies in the same industry. The standard deviation of return on assets (STDROA) again using the most recent three year observation from DataStream applied on a quarterly data basis. It shows the amount of variation from the average of firms' earnings that they derive from each dollar of assets controlled. The market value of equity (MVE) is proxied by (LOGMVL). It is measured by firms' logarithmic market value. This factor shows the firms market capitalization that indicate the cost for an investor to buy firm outright. The fourth factors CORR is the correlation between firm's annual returns and return on total assets (ROA). Rather than NINDCORR, CORR focuses more on a firm's own capital intensity depending on different industries. LOGNIND is the logarithmic of average number of firms within the same industry. It reflects the industry composition effect shown in Table 2. In my sample, some industries have a bigger range, (i.e. General Retails industry is comprised of 12 companies) while some industries only include two listed firms such as industry 7 and 12. The SIZE and INDSIZE both capture the firm specific growth level and the extent to the whole industry scale. The SIZE is computed as the log of total assets for a firm, and INDSIZE is the log of all firms' total assets which have the same industry code. The prior financial studies concludes that size effect makes a contribution in explaining stock returns (Wong, 1989; Kim, 2003). Market to book ratio (MB) is a way using total firm's market stock value to divide by the book value of its equity. It directly makes a quick comparison with other competitors as it can give a judgment if the firm's share price is over or undervalued. This factor is obviously associated with stock price, and it is also related to the scale or the size effect. For example, it is always argued that the

share price of growing firms or industries is worth more than their book value, and the size effect can impact the firm's ability to generate new stock sales. The last control variable is leverage risk (LEV) that is measured by total liabilities divided by total assets. These risk factors can lead to an improvement or a reduction in firm's profits, and thus impact earning quality.

I present the above nine control variables which are closed to earning quality or risk factors, and those variables are associated with firm and industry stock price return. On the one hand, it is claimed that firms' earnings are closely correlated with industry earnings, and the industry returns have a large probability to affect firm returns which will intuitively affect the stock price of the firm (Piotroski & Roulstone, 2004; Haggard et, al., 2009). As earnings quality of a firm is treated as a crucial source of information to estimate the firm's market performance, it is highly related to a firms' information environment (Francis et al., 2004). Desai and Bhattacharya (2013) also state that firms with lower earning quality usually have higher information asymmetries. On the other hand, the market risk factors is directly said to have impact on the stock price, and it also explains the inside earnings quality of the firm as these earnings or risk factors are basically associated with each other (Rezee, et al., 2012; Shu & Chiang, 2014). So, I argue these nine factors are important components of the stock synchronicity measure (SYNCH, ISR1 &ISR2), and it is also closely associated with my interest control variable of disclosure levels (SDSCORE). Overall, I use the given analysts' disclosures rankings (SDSCORE) and those nine influential control variables to run my regressions and to test my hypotheses (H1 & H2). The description of all variables is shown in Appendix 3.

[APPENDIX 3 ABOUT HERE]

According to the previous literature review, the main hypothesis (H1) will be supported if the β_1 is negative in equation 5. It means that the relationship between synchronicity risk of stock price and the extent of disclosure is expected to be negative. For the sub-hypothesis (H2), the relationship between idiosyncratic risk and voluntary disclosures will be supported if β_1 is positive in equations 6 and 7. The positive coefficient of my interest variable shows that high levels of disclosures generate high idiosyncratic risk.

Similarly, the second regression uses idiosyncratic risk, measured as Φ as the dependent variable to examine its relationship with SDSCORE to test my hypothesis 2 shown as below:

$$\Phi = ISR1 = a_0 + \beta_1 SDSCOREi,t + \beta_2 NINDDCORRi,t + \beta_3 STDROAi,t + \beta_4 log(MVEi,t) + \beta_5 CORR + \beta_6 Log(NIND) + \beta_7 SIZE + \beta_8 LEV + \beta_9 MB + \beta_{10} INDSIZE + \sum_{n=1}^{12}(Industry\ Dummies) + \sum_{2001}^{2005}(Year\ Dummies) + \varepsilon_{i,t}, \quad (6)$$

In the second model, ISR1 is one of the measurements of idiosyncratic risk based on R squared method. The dependent variable is changing from SYNCH to ISR1, and it is actually the inverse of synchronicity as I show the calculation via equation 3. In addition, other control variables remain the same.

To test sub-hypothesis 2, I use another idiosyncratic measurement in equation 7. The basic regression model examining the relation between idiosyncratic risk, measured as $\sigma i_{i,t}^2$ and disclosure level is specified as follows:

$$\sigma i_{i,t}^2 = ISR2 = a_0 + \beta_1 SDSCOREi,t + \beta_2 NINDDCORRi,t + \beta_3 STDROAi,t + \beta_4 log(MVEi,t) + \beta_5 CORR + \beta_6 Log(NIND) + \beta_7 SIZE + \beta_8 LEV + \beta_9 MB + \beta_{10} INDSIZE + \sum_{n=1}^{12}(Industry\ Dummies) + \sum_{2001}^{2005}(Year\ Dummies) + \varepsilon_{i,t}, \quad (7)$$

The only difference between equation 6 and equation 7 is the distinct estimation of idiosyncratic volatility. Rather than simply using the inverse of SYNCH, ISR2 is computed by average weekly variance of excess returns adjusted for expected return of equation 1. Both two equations are built to test my sub hypothesis 2.

Overall, these three models are all set up to examine if there are positive or negative relationships between stock price and firm specific information disclosures in the New Zealand capital market. The following section five provides descriptive analysis. Then, I conduct univariate tests to examine the correlations among variables. Finally, I present multivariate analysis results.

CHAPTER 5: EMPIRICAL RESULTS

5.1 Descriptive statistics

Descriptive statistics of synchronicity are reported in Table 3 panel A. It is a yearly basis synchronicity comparison. It means that panel A choose all firms' SYNCH but a separate synchronicity figure year by year to calculate the mean, median or standard deviation. So there are five sets of SYNCH descriptive statistics. The mean synchronicity (SYNCH) is -0.93 using 297 firm-year observations from 2001 to 2005. The lowest synchronicity measure is in year 2002 with the value around -1.17, and the highest synchronicity value is about -0.65 in 2001. From 2003 to 2005, the synchronicity values have a slightly increasing trend from -1.02 to -0.73. However, the value around -0.73 in 2005 is still lower than the value of synchronicity about -0.65 in 2001. Moreover, the SYNCH has an average mean of -0.93 with median of -1.46 and standard deviation of 2.21 from the maximum 10.23 to minimum -4.83 in the total 297 observations. Overall, there is no obvious trend in synchronicity over my sample period. However, there is a significantly high variation in synchronicity from its average value.

[TABLE 3 PANEL A ABOUT HERE]

Table 3 panel B shows descriptive statistics of mean, median, maximum, minimum and standard deviation for all variables in the three regressions (model 5 to 7). In order to remove the noise from influential outliers, all the variables are winsorized at the 1% and 99% levels. ISR1 and ISR2 are measures of the idiosyncratic risk which are both positive with mean 0.93 and 0.92 respectively. These two idiosyncratic risk measures are similar and have an opposite sign with SYNCH. Within 297 observations, the disclosures ranking of firm specific information (SDSCORE) has a mean of 0.30 with a maximum and minimum value 0.70 and 0 respectively, suggesting a considerable disparity of the SOSCORE. In other words, in a particular year, some NZX firms have high voluntary levels of disclosures, whereas some have no voluntary disclosures.

[TABLE 3 PANEL B ABOUT HERE]

STDROA is standard deviation of earnings which measures the earnings volatility. STDROA showing a positive mean of 0.27 for standard deviation of ROA, and the minimum and maximum value are 0.3 and 0.02 respectively. In addition, all other variables that control for firm or industry earning, growth, risk and return factors have positive descriptive mean and median. The mean of SIZE is 11.28 with maximum value of 15.91 and a minimum value of 4.19, suggesting that my sample companies include both big and small companies listed in NZSX and NZAX. There is also a large variation in LOGMVE with a standard deviation of 1.94, a maximum value of 9.37 and a minimum value of -0.30. LEV has an average value of 0.44. The minimum level of leverage is 0.0045 (close to 0), but the highest leverage value is about the 13.86 that suggests these firms might have very high debt levels. The mean of market to book ratio is 1.48 (more than 1) which may indicate the average stock price might be slightly overvalued in the market. The industry size has the highest level of 16.25 and the lowest value of 10.45, and this considerable size gap also can reflect the different industry scales across the 12 industry sectors.

5.2 Correlation analyses

After winsorizing all variables at the bottom and top 1% levels, Table 4 reports the matrix of Pearson correlations among all variables used in the regression analysis. The result shows the negative relationship between the first synchronicity measure (SYNCH) and another two idiosyncratic measures (ISR1 and ISR2) at 0.05 significant level. These findings are consistent with relevant theories and my expectation. SYNCH has perfect negative correlation with ISR1 ($r = -1$). It is because ISR1 is the measure of inverse synchronicity used to represent the idiosyncratic volatility. However, SYNCH and ISR2 are not that perfectly correlated ($r = -0.780$), and ISR1 is also not perfectly positively correlated with ISR2 ($r = 0.89$). These results are understandable because ISR2 is computed by average weekly variance of excess return rather than simply using inverse synchronicity, although both ISR1 and ISR2 measure the idiosyncratic risk.

[TABLE 4 ABOUT HERE]

SDSCORE however, is neither negatively correlated with SYNCH nor positively correlated with ISR1. This result is not expected as we suppose in our hypotheses that the high disclosure level will decrease synchronicity. However, SDSCORE is significant positively correlated with idiosyncratic risk ISR2 (r= 0.347), which is consistent with my sub-hypothesis that higher level of disclosures will increase idiosyncratic volatility. Because of this inconsistence in the correlation analysis about the relation between SDSCORE and firm-specific information, regression analysis is required to draw definite conclusion.

For all the independent variables, there is no data to present a very strong multi-collinearity in Table 4. The SDSCORE, SIZE and LOGMVE are significantly correlated with each other with r = 0.763 (SDSCORE & LOGMVE), r = 0.771 (SDSCORE & SIZE) and r = 0.896 (SIZE & LOGMVE). Although those correlation coefficients are notably high, it is simply due to the variables construction procedure. Because multi-collinearity biases the t-statistics downwards (Gujarati, 2006), significant correlation coefficients are not much of a concern when the t-statistics in the regression test is large enough to reject the null hypothesis. These results show that the high growth firms might have a higher disclosure level, and large firm tend to have higher voluntary disclosure scores as well. The SIZE and LEV are significantly positively correlated with r = 0.135, and this implies the large firm may have higher leverage risk. MB and INSIZE are significant negatively (r = -0.173) and positively correlated (r = 0.331) with SDSCORE, and these results may suggest industry size is related to specific firm information and thus will affect disclosure measures. The large industry size seems to disclose more firm specific information. The other control variables such as NINDCORR, LOGMVE, CORR and LOGNIND regarding firm's earning or returns are also significant positively or negatively related to SYNCH or ISR. So, it means those factors are necessary to control in our regressions.

5.3 Multivariate analyses

The results of three regressions for the synchronicity model (equation 5) and two idiosyncratic models (equation 6 and 7) are reported in Table 5. In this table, the synchronicity model shows a significantly negative relation to the main variable of

interest SDSCORE (coefficient -2.451, 0.05 significance level). Analysis using ISR1 as a dependent variable (Equation 6) generates all coefficients with the same figures but with reversed signs. Compared with ISR1, as the second method to measure idiosyncratic risk, the third model using ISR2 (equation 7) also gives supportive results that SDSCORE is significantly related to ISR2 with positive coefficient (coefficient 2.454, 0.05 significance level). All those results are consistent with my hypotheses that higher level of disclosures of firm specific information will decrease the stock synchronicity or increase the idiosyncratic volatility. Although the correlation matrix shows a contradictory result of relation between SDSCORE and SYNCH/ISR1, it is more reliable in regression as all other factors that do have indirect effect on our dependent variables are taken into account. The multiple regressions' results reveal the true relationship between all those factors (Cvetković & Marković, 2011). In short, it is clearer to say that disclosure level is negatively related to synchronicity, and lower disclosure level of firm specific information will generate a lower idiosyncratic risk too.

[TABLE 5 ABOUT HERE]

Table 5 also reports other control variables show significant relationships to our dependent variables SYNCH or ISR. Haggard et al. (2008) and Piotroski & Poulstone (2004) represent a negative correlation between SYNCH and STDROA, and a positive correlation with firm ROA and value weighted index of ROA (NINDCORR). My results are consistent with the previous study showing that NINDCORR and STDROA have significant positive/negative coefficient 0.343/-0.050 respectively in synchronicity risk model. The results indicate that the correlation between firm ROA and industry value weighted ROA decreases when there is a lower risk of stock price synchronicity. It also suggests that a decrease of variation on a firm's total assets return accompanies a greater chance for stock price co-movement. LOGMVE is significantly positively related to SYNCH (coefficient 0.977, 0.01 significance level) while it is negatively related with ISR1 (coefficient -0.977, 0.01 significance level) or ISR2 (coefficient -0.976, 0.01 significance level) which indicates the more capital concentration will generate more synchronicity risk in New Zealand stock market. Leverage also has a significant positive relationship with SYNCH (coefficient 0.322, 0.01 significance level), and it implies the leverage risk goes up with synchronicity risk. Additionally, all those significant coefficients have the opposite signs between synchronicity risk model

(SYNCH) and idiosyncratic risk models (ISR1 and ISR 2), and all the signs are the same as I predict.

Overall, multivariate tests show that the disclosure level of firm specific information is significant and negatively related to synchronicity but positively correlated with idiosyncratic risk, and all these three multi-regressions models give consistent results with my main and sub hypotheses.

CHAPTER 6: ADDITIONAL ANALYSES

6.1 Controlling for systematic volatility

Bin Li et al., (2013) illustrate the limitation on the results when researchers only rely on the inverse synchronicity Φ as this measure does not appear to be robust in their latest dissertation. The Φ in this study is ISR1 which is similar to SYNCH measuring. They claim the differing periods of return volatility will lead to questionable inferences. However, the final data that only use the inverse synchronicity will not capture those effects (Li et al., 2013). Prior study was encouraged to use the R square metric at the country level to specify the relation between the differing periods of return volatility and quality of corporate governance (Morck et al. 2000). Bin Li et al. (2013) pointed out that there are two solutions which drives the data to be more robust: first, the Φ or idiosyncratic volatility need to control for systematic risk; or second, use alternative tests about firms 'information environment measurement to corroborate the analysis results using synchronicity (Li et al., 2013). Thus, in this research, I have conducted two additional tests to support my final results on synchronicity and idiosyncratic risks.

Firstly, I control for systematic risk in those three models (Equation5, 6, 7). I re-estimate the regressions and present the new regressions in Table 7 for my main and sub hypotheses by adding an additional control variable SYSRISK which is the same as $In[\sigma_s^2]$ in professor Bin Li's (2013) research. SYSRISK is measured by the average weekly variance of expected returns of the Fama and French (1993) model. Thus, the following three new regressions add SYSRISK as an additional control variable to test if the relationship between disclosure level and return volatility measure is affected after controlling for systematic risk.

$$SYNCH_{i,t}\ (new) = a_0 + \beta_1 SDSCORE_{i,t} + \beta_2 NINDDCORR_{i,t} + \beta_3 STDROA_{i,t} + \beta_4 log(MVE_{i,t}) + \beta_5 CORR + \beta_6 Log(NIND) + \beta_7 SIZE + \beta_8 LEV + \beta_9 MB + \beta_{10} INDSIZE + \beta_{11} SYSRISK + \sum_{n=1}^{12}(Industry\ Dummies) + \sum_{2001}^{2005}(Year\ Dummies) + \varepsilon_{i,t}, \quad (8)$$

$$ISR1_{i,t}\ (new) = \Phi = a_0 + \beta_1 SDSCORE_{i,t} + \beta_2 NINDDCORR_{i,t} + \beta_3 STDROA_{i,t} + \beta_4 log(MVE_{i,t}) + \beta_5 CORR + \beta_6 Log(NIND) + \beta_7 SIZE + \beta_8 LEV + \beta_9 MB + \beta_{10} INDSIZE + \beta_{11} SYSRISK + \sum_{n=1}^{12}(Industry\ Dummies) + \sum_{2001}^{2005}(Year\ Dummies) + \varepsilon_{i,t}, \quad (9)$$

$$ISR2i,t\ (new) = \sigma i_{i,t}^{2} = a_0 + \beta_1 SDSCOREi,t + \beta_2 NINDDCORRi,t + \beta_3 STDROAi,t + \beta_4 log(MVEi,t) + \beta_5 CORR + \beta_6 Log(NIND) + \beta_7 SIZE + \beta_8 LEV + \beta_9 MB + \beta_{10} INDSIZE + \beta_{11} SYSRISK + \sum_{n=1}^{12}(Industry\ Dummies) + \sum_{2001}^{2005}(Year\ Dummies) + \varepsilon_{i,t}\ , \quad (10)$$

Before running the final regressions, I illustrate the correlation matrix for the three dependent variables and systematic risk in Table 6. Bin Li (2013) suggests a stronger correlation between systematic risk and idiosyncratic risk than association between systematic and synchronicity. In my sample data, SYNCH, ISR1 ISR2 all show the significant relationship with SYSRISK.

[TABLE 6 ABOUT HERE]

The results reported in Table 7 show the unchanged relationships between disclosure score and synchronicity risk or idiosyncratic risk when systematic risk is controlled in the new regressions. In new SYNCH regression (8), SDSCORE is inversely related to SYNCH (coefficient -2.316, 0.05 significance level), and it also has a positive relationship with systematic risk (coefficient 4.047, 0.05 significance level), whereas ISR1 regression (9) has a positive relationship between disclosure level and idiosyncratic risk (coefficient 2.316, 0.05 significance level) but is negatively related to systematic volatility (coefficient -4.047, 0.05 significance level). Despite the different sign of coefficient, all the coefficients are the same figures in SYNCH and ISR1 regression. In the new ISR2 regression (10), the SDSCORE and SYSRISK are significantly positively and negatively related to idiosyncratic volatility at the 0.05 level with coefficient 2.318 and -4.416 respectively. Thus both ISR1 and ISR2 give the same conclusion which is consistent for my hypotheses that higher disclosure level of firm specific information is positively related to idiosyncratic risk. The other four control variables (NINDCORR, STDROA, LOGMVE and LEV) are significantly related to my dependent variable SYNCH and ISR, and it gives the same results in my previous original tests. Moreover, although MB is still insignificant in new regressions for these three models, it changes the sign when I compare the original three models which is now consistent with what I predicted sign to be.

[TABLE 7 ABOUT HERE]

From the above tests, the new results give the same relationship between the disclosure quality and stock price synchronicity. All those relationships among disclosure scores, systematic risk control, and different stock return volatility measures are statistically significant. These better tests may solve the problem brought by the differing periods of return risk especially extended to a cross country framework. Even within a particular country such as New Zealand, adding systemic volatility as a control viable still works to examine my main and sub hypotheses. The good results are again supportive that the more voluntary disclosures, the less stock prices co-variation.

6.2 Testing earnings informativeness

Summarizing the literature review in Chapter 2, there are some doubts on the validity of stock price synchronicity as a proxy of disclosure level reflected into stock prices movement. As firm specific information is a large part of the contents, the question to researchers is to what extent of firm disclosure level of information can be incorporated into stock prices when we use stock price synchronicity as the measure (Gul, et al., 2010). Overall, recent criticism is focused on the method of using SYNCH (method one) or using the Φ (method two) because they argue R squared related measurements report an insignificant association between earning quality and R squared (Fernandes & Ferreira, 2008; Gul & Srinidhi, 2011). To check the validity of the SYNCH or Φ measurement, this study shows a supplementary test following Gul et al. (2010) approach to investigate whether my synchronicity measure includes the amount of firm specific information represented by disclosure scores applied to New Zealand stock prices.

From the previous literature discussion, the firm specific information is theoretically incorporated into stock price return. If this is the case, the earnings cannot be ignored as it is the primary factor making up the firm information (Francis et al., 2004). Theoretically, capital markets rely on firms' financial and accounting information especially corporate earnings (Gaio & Raposo, 2011). So, if the researcher's question is yes, that synchronicity does measure firm specific information incorporated into share prices, we would expect return-earning association being lower for firms with a high

level of synchronicity. In other words, a high market adjusted return and earning relationship is associated with low synchronicity. Thus, the earning response coefficient α_2 is predicted to be negative. Following Gul et al. (2010) study, the equation used to test this expectation is presented as follows.

$$MAR_{i,t} = \alpha_0 + \alpha_1 NIit + \alpha_2 NIit*SYNit + \sum_k (\alpha_k NI_{it}) * CONTROL_{i,t}^{k} + \sum_{n=1}^{12}(Industry\ Dummies) + \sum_{2001}^{2005}(Year\ Dummies) + \varepsilon_{i,t}, \quad (11)$$

In this test, for a particular firm i in a fiscal year t, MAR is calculated as the difference between actual return and market return in each month, and the measuring method follows Gul et al. (2010) who calculate this market adjusted return over the 12-month period ending the fourth month after a firm's fiscal year end. For example, TURNERS & GROWERS financial year ending data are always at the end of December every year, thus, for a 12-months period observation in 2005 of this firm, I first use January, February, March and April returns in year 2006, and then add the last eight months in year 2005. NI is defined as net profit divided by the market value of equity at the beginning of the fiscal year. NISYN is the product term of NI and SYNCH. NI*CONTROL is the product sum of NI and three control variables which are MCAP, LEV and MB in this paper according to Kothari (2001) and Gul et al. (2010) studies. MCAP is the market capitalization and it denotes the firm size using natural log of total market value of equity. LEV equals to financial leverage giving by total liabilities divided by total assets to measure the potential growth and risk of a firm. MB is market to book ratio computed as the total market capital divided by the total equity at the end of fiscal year. These three control variables show the most important strength of the association to measure the returns-earning Kothari (2001).

As shown in Table 8, the NI has a positive coefficient related to the MAR with a significant statistic which suggests that a high stock return is significantly associated with good earnings. However, NISYN has a negative coefficient at 5% significance level. This result means a higher scale of synchronicity of firms will lead a lower rate of earning return. This negative relationship is important in answering the question that corporate earning information might have less effect on stock prices when disclosure level is low with a high SYNCH. Furthermore, NIMCAP and NIMB both have significant positive coefficients, where NILEV has a negative but insignificant coefficient. This observation is consistent with Kothari (2001) findings within US firms

as well as Gul et al. (2010) findings in Chinese stock market.

[TABLE 8 ABOUT HERE]

Taken together, the above regression measuring earnings response coefficient (using three control variables) shows a significant return earnings association, and the results are generally consistent with prior study (Kothari, 2001., Gul et al., 2010), suggesting that large or high growth firms usually generate higher return earnings. According to the new finding, the significantly negative $\alpha 2$ implies the measure of synchronicity or Φ in this paper is valid and effective to capture the amount of firm specific information incorporated into stock prices of New Zealand listed companies.

CHAPTER 7: CONCLUSION AND IMPLICATIONS

There is no universal common law to specify the requirements of disclosures measurement because some elements are very difficult to disclose as they are difficult to measure. For instance, the cost of environment definitely needs be disclosed in the accounting statement. However, it is hard to trace that cost as the cost may be accounted for differently if applied with different accounting methods such as standard cost, activity based cost and time driven method (Blacconiere, & Patten, 1994). So, measuring voluntary disclosures is difficult because the market cannot unify the standard of accounting measurements. Thus, it is hard to set up a benchmark of voluntary disclosure level for different industries when we generate the disclosure score.

Furthermore, although this study does not control for mandatory disclosures as companies vary in the extent of compliance with mandatory disclosures, the variation in the level of mandatory disclosures in New Zealand is small. In our sample, we focus on companies listed on The New Zealand market and all those firms have to have disclosures by and large of similar content.

Recently, there are some criticisms that state that the R squared may not always reflect the influence of firm specific information (Chen et al., 2007). Because the stock price has already incorporated both private and public information, high level of disclosures of firm specific information is the result of an increasing effectiveness of private or public information. In other words, stock synchronicity may happen in either high or low disclosures at firm specific information level (Xing & Anderson, 2011). Therefore, in this study, the first and second models all use the R square methods to measure dependent variables but might not be that accurate compared with using model three (Li et al., 2010). However, model three might be a solution for this limitation, and I also check the validity of synchronicity measures via Earning Response Coefficient test which gives good support for our first two models. Furthermore, it is worth considering that the systematic risk in the additional test generates more robust statistic results.

Last but not the least, the sample is limited by the availability of disclosure scores provided by Jiang and Habib (2009). Because of the self-designed marking system of SDSCORE, the voluntary disclosure measurement might be subject to criticism. Prior study criticizes the accuracy of some voluntary disclosure measures such as self-

constructed disclosure index or the disclosure scores developed by some rating agencies (Peasnell & Alves, (2010). Despite the stickiness of voluntary disclosures, the data may not be very representative of current disclosure practices of listed companies. So there is a demand for future study opportunities measuring disclosure levels in recent years.

Overall, my study is to examine the relationship between voluntary disclosures and the stock price synchronicity in New Zealand stock market. To measure voluntary disclosures, I adopted the voluntary disclosure score developed by recent New Zealand study. I measure the stock price co-movement (SYNCH) via logarithmic transformation of R squared and two idiosyncratic volatility models (ISR1 & ISR2). Based on multivariate analysis, I find that there is a significant negative relationship between the stock price synchronicity and firm disclosure levels after controlling for nine variables that are found to affect synchronicity by early synchronicity studies. Based on this finding, it is clear to say that more voluntary disclosures reduce the information gap between investors and companies.

In the previous discussion in chapter 3, I address New Zealand reporting environment is transparent and encourages more disclosures. Assuming that disclosures are credible this should have the desirable consequence of reducing synchronicity. On the other hand, this may not happen as New Zealand is a small economy and corporate ownership is rather concentrated. According to prior studies, majority firms in NZ are small and medium in size and have concentrated ownership. Firms tend to have low willingness of disclosure and poor tradition of disclosures. However, my research findings suggest that voluntary disclosures New Zealand improve corporate transparency and information environment. This is evidence by the negative association between firms' voluntary disclosures and stock price synchronicity. So, despite of the poor tradition of disclosure in NZ market, it still gives a negative mean of SYNCH and a negative relation between synchronicity and disclosures. Again, the specific factors address the importance of replicating this study in NZ.

Therefore, this study using the New Zealand capital market, demonstrates above points, and the findings strengthen the necessity of voluntarily disclosing firm specific information as well. However, the measurement of discourse levels is challenging because that there are no universal standards of accounting methods or disclosure regulations across different industries or countries. As there are also some doubts about

the estimation of stock synchronicity by R squared as well as the limitation of using old disclosures data, further study might be required.

REFERENCES

Anderson, R., & Xing, X. (2011). Stock price synchronicity and public firm-specific information. *Journal of Financial Markets*, 14(2), 259-276. doi:10.1016/j.finmar.2010.10.001

Arrow, K. J. (1985). Informational structure of the firm. *The American Economic Review*, 75(2), 303-307.

Ashbaugh-Skaife, H., Gassen, J., & Lafond, R. (2006). *Does stock price synchronicity represent firm specific information? The intenational evidence.* Working paper. University of Wisconsin, Madison.

Barry, C. B., & Brown, S. J. (1984). Differential information and the small firm effect. *Journal of Financial Economics*, 13(2), 283-294. doi:10.1016/0304-405X(84)90026-6

Barry, C. B., & Brown, S. J. (1985). Differential information and security market equilibrium. *The Journal of Financial and Quantitative Analysis*, 20(4), 407-422. doi:10.2307/2330758

Bartram, S. M., Brown, G., & Stulz, R. M. (2012). Why are U.S. stocks more volatile? *The Journal of Finance*, 67(4), 1329-1370. doi:10.1111/j.1540-6261.2012.01749.x

Bhabra, G. S. (2007). Insider ownership and firm value in New Zealand. *Journal of Multinational Financial Management*, 17(2), 142-154. doi:10.1016/j.mulfin.2006.08.001

Bissessur, S., & Hodgson, A. (2012). Stock market synchronicity - an alternative approach to assessing the information impact of Australian IFRS. *Accounting and Finance*, 52(1), 187-212. doi:10.1111/j.1467-629X.2010.00388.x

Black, F. (1976). "Studies of Stock Price Volatility Changes," Proceedings of the Business and Economic Statistics Association, *American Statistical Association*, 177-181

Blacconiere, W. G., & Patten, D. M. (1994). Environmental disclosures, regulatory costs, and changes in firm value. *Journal of Accounting and Economics*, 18(3), 357-377. doi:10.1016/0165-4101(94)90026-4

Botosan, C. A. (1997). Disclosure level and the cost of equity capital. *The Accounting Review*, 72(3), 323-349. Retried from http://www.jstor.org.ezproxy.aut.ac.nz/stable/248475?__redirected

Botosan, C. A., & Plumlee, M. A. (2002). A re-examination of disclosure level and the expected cost of equity capital. *Journal of Accounting Research*, 40(1), 21-40. doi:10.1111/1475-679X.00037

Chen, C., Huang, A. G., & Jha, R. (2012). Idiosyncratic return volatility and the information quality underlying managerial discretion. *Journal of Financial and Quantitative Analysis*, 47(4), 1-45. doi:10.1017/S002210901200018X

Chen, Q., Goldstein, I., & Jiang, W. (2007). Price informativeness and investment sensitivity to stock price. *The Review of Financial Studies*, 20(3), 619-650.

Chung, R., Fung, S., Shilling, J. D., & Simmons-Mosley, T. X. (2011). What determines stock price synchronicity in REITs? *The Journal of Real Estate Finance and Economics,* 43(1), 73-98. doi:10.1007/s11146-010-9254-3

Cvetković, D., & Marković, D. (2011). Beta-carotene suppression of benzophenone-sensitized lipid peroxidation in hexane through additional chain-breaking activities. *Radiation Physics and Chemistry*, 80(1), 76-84. doi:10.1016/j.radphyschem.2010.08.009

Darrough, M. N., & Stoughton, N. M. (1990). Financial disclosure policy in an entry game. *Journal of Accounting and Economics*, 12(1), 219-243. doi:10.1016/0165-4101(90)90048-9

DeAngelo, L. E. (1988). Managerial competition, information costs, and corporate governance: The use of accounting performance measures in proxy contests. *Journal of Accounting & Economics*, 10(1), 3-36.

Desai, H., & Bhattacharya, N. (2013). Does earnings quality affect information asymmetry?: Evidence from trading costs. *Contemporary Accounting Research*, 30(2), 482-516. doi:10.1111/j.1911-3846.2012.01161.x

Diamond D. W., & Verrecchia, R. E. (1991). Disclosures, liquidity, and the cost of capital. *The Journal of Finance*, 46(4), 1325-1359. doi:10.1111/j.1540-6261.1991.tb04620.x

Du, J., Hao, H., & Xu, C. (2007). *What Determines the Synchronicity of Stock Price Movements in the Shanghai and Shenzhen Stock Exchanges*? Shanghai-Hong Kong Development Institute.

Durnev, A., Morck, R., Yeung, B., & Zarowin, P. (2003). Does greater firm-specific return variation mean more or less informed stock pricing? *Journal of Accounting Research, 41*(5), 797-836. doi:10.1046/j.1475-679X.2003.00124.x

Durnev, A., Morck, R., & Yeung, B. (2004). Value-Enhancing capital budgeting and Firm-specific stock return variation. *The Journal of Finance*, 59(1), 65-105. doi:10.1111/j.1540-6261.2004.00627.x

Elliott, R. K., & Jacobson, P. D. (1994). *Costs and benefits of business information disclosure*. Accounting Horizons, 8(4), 80.

Fama, E. F. (1992). The cross-section of expected stock returns. *The Journal of Finance*, 47(2), 427-465. doi:10.1111/j.1540-6261.1992.tb04398.x

Fama, E. F., & MacBeth, J. D. (1973). Risk, return, and equilibrium: Empirical tests. *Journal of Political Economy*, 81(3), 607-636. doi:10.1086/260061

Fama, E. F., & French, K. R. (1993). Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics*, 33(1), 3-56. doi:10.1016/0304-405X(93)90023-5

Fama, E. F., & Laffer, A. B. (1971). Information and capital markets. *Journal of Business*, 44(3), 289-298. doi:10.1086/295379

Ferreira, M. A., & Fernandes, N. (2008). Does international cross-listing improve the information environment. *Journal of Financial Economics*, 88(2), 216-244. doi:10.1016/j.jfineco.2007.06.002

Ferreira, M. A., & Laux, P. A. (2007). Corporate governance, idiosyncratic risk, and information flow. *The Journal of Finance*, 62(2), 951-989. doi:10.1111/j.1540-6261.2007.01228.x

Fink, K. E., & Fink, J. D. (2012). Expected idiosyncratic volatility measures and expected returns. *Financial Management*, 41(3), 519-553. doi:10.1111/j.1755-053X.2012.01209.x

Fogelberg, G., & Laurent, C. R. (1974). *Boards of directors in New Zealand companies:* Department of Business Administration VictoriaUniversity of Wellington.

Francis, J., LaFond, R., Olsson, M, P., & Schipper, K. (2004). Costs of equity and earnings attributes. *The Accounting Review*, 79(4), 967-1010. doi:10.2308/accr.2004.79.4.967

Freeman, R. E. (2010). *Strategic management: A stakeholder approach*. Cambridge: Cambridge University Press.

Fu, F. (2009). Idiosyncratic risk and the cross-section of expected stock returns. *Journal of Financial Economics*, 91(1), 24-37. doi:10.1016/j.jfineco.2008.02.003

Gaio, C., & Raposo, C. (2011). Earnings quality and firm valuation: International evidence. *Accounting & Finance*, 51(2), 467-499. doi:10.1111/j.1467-629X.2010.00362.x

Gao, P. (2008). Keynesian beauty contest, accounting disclosure, and market efficiency. *Journal of Accounting Research*, 46(4), 785-807. doi:10.1111/j.1475-679X.2008.00295.x

Gigler, F. (1994). Self-enforcing voluntary disclosures. *Journal of Accounting Research*, 32(2), 224-240. doi: 10.2307/2491283

Groenewold, N. (1997). Share market efficiency: Tests using daily data for Australia and New Zealand. *Applied Financial Economics*, 7(6), 645-657. doi:10.1080/758533856

Grossman, S. J. (1981). The informational role of warranties and private disclosures about product quality. *Journal of Law and Economics*, 24(3), 461-483. doi:10.1086/466995

Grossman, S. J., & Hart, O. D. (1980). Disclosures laws and takeover bids. *The Journal of Finance*, 35(2), 323-334. doi:10.1111/j.1540-6261.1980.tb02161.x

Grossman, S. J., & Stiglitz, J. E. (1980). On the impossibility of informationally efficient markets. *The American Economic Review*, 70(3), 393-408.

Gujarati, D. N. (2006). *Essentials of econometrics*. 3rd ed., Gary Burke, New York, NY.

Gul, F. A., Kim, J., & Qiu, A. A. (2010). Ownership concentration, foreign shareholding, audit quality, and stock price synchronicity: Evidence from China. *Journal of Financial Economics*, 95(3), 425-442. doi:10.1016/j.jfineco.2009.11.005

Gul, F. A., & Srinidhi, B. (2011). Does board gender diversity improve the informativeness of stock prices? *Journal of Accounting & Economics*, 51(3), 314-338. doi:10.1016/j.jacceco.2011.01.005

Haggard, K. S., Martin, X., & Pereira, R. (2008). Does voluntary disclosure improve stock price informativeness? *Financial Management, 37*(4), 747-768. doi:10.1111/j.1755-053X.2008.00033.x

Healy, P. M., Hutton, A. P., & Palepu, K. G. (1999). Stock performance and intermediation changes surrounding sustained increases in disclosures. *Contemporary Accounting Research*, 16(3), 485-520. doi:10.1111/j.1911-3846.1999.tb00592.x

Healy, P. M., & Palepu, K. G. (1993). The effect of firms' financial disclosures strategies on stock prices. *Accounting Horizons*, 7(1), 1.

Healy, P. M., & Palepu, K. G. (1995). The challenges of investor communication: The case of CUC international, inc. *Journal of Financial Economics*, 38(2), 111-140. doi:10.1016/0304-405X(94)00814-H

Healy, P. M., & Palepu, K. G. (2001). Information asymmetry, corporate disclosures, and the capital markets: A review of the empirical disclosures literature. *Journal of Accounting and Economics*, 31(1), 405-440. doi:10.1016/S0165-4101(01)00018-0

Holland, J. (1998). Private voluntary disclosure, financial intermediation and market efficiency. *Journal of Business Finance Accounting*, 25(1&2), 29-68. doi:10.1111/1468-5957.00177

Hutton, A. P., Marcus, A. J., & Tehranian, H. (2009). Opaque financial reports, R 2, and crash risk. *Journal of Financial Economics*, 94(1), 67-86. doi:10.1016/j.jfineco.2008.10.003

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, 3(4), 305-360. doi:10.1016/0304-405X(76)90026-X

Jiang, H. & Habib, A. (2009). The impact of different types of ownership concentration on annual report voluntary disclosures in New Zealand. *Accounting Research Journal, 22*(3), 275-304. doi:10.1108/10309610911005590

Jin, L., & Myers, S. C. (2006). R 2 around the world: New theory and new tests. *Journal of Financial Economics*, 79(2), 257-292. doi:10.1016/j.jfineco.2004.11.003

Khandakera, S., & Heaney, R. (2009). Do Emerging Markets Have Higher Stock Synchronicity? The International Evidence. *Journal of Business and Policy Research*, 4(1), 79-98.

Kim, Y., Liu, C., & Rhee, S. G. (2003). The effect of firm size on earnings management. The University of Hawaii. Retrieved from:
http://www2.hawaii.edu/~fima/PDF/Finance_Seminar/EarningsMgmt.pdf

King, B. F. (1966). Market and industry factors in stock price behavior. *The Journal of Business, 39*(1), 139-190. doi:10.1086/294847

Kothari, S. P. (2001). Capital markets research in accounting. *Journal of Accounting and Economics*, 31(1), 105-231. doi:10.1016/S0165-4101(01)00030-1

Kross, W., & Schroeder, D. A. (1984). An empirical investigation of the effect of quarterly earnings announcement timing on stock returns. *Journal of Accounting Research*, 22(1), 153-176.

Lang, M. H., & Lundholm, R. J. (1996). Corporate disclosures policy and analyst behavior. *The Accounting Review*, 71(4), 467-492.

Laeven, L., &Chhaochharia, V. (2009). Corporate governance norms and practices. J*ournal of Financial Intermediation*,18(3), 405-431. doi:10.1016/j.jfi.2008.10.001

Leuz, C., & Verrecchia, R. E. (2000). The economic consequences of increased disclosures. *Journal of Accounting Research*, 38, 91-124.

Li, B., Rajgopal, S., & Venkatachalam, M. (2013). *R SQUARED and Idiosyncratic Risk are not interchangeable.*
Retrieved from http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2269203

Lintner, J. (1965). Security prices, risk, and maximal gains from diversification. *The Journal of Finance*, 20(4), 587-615. doi:10.1111/j.1540-6261.1965.tb02930.x

Lurie, A. J., & Pastena, V. S. (1975). How promptly do corporations disclose their problems? *Financial Analysts Journal*, 31(5), 55-61. doi:10.2469/faj.v31.n5.55

Merton, R. C. (1987). A simple model of capital market equilibrium with incomplete information. *The Journal of Finance,* 42(3), 483-510. doi:10.1111/j.1540-6261.1987.tb04565.x

Milgrom, P. R. (1981). Good news and bad news: Representation theorems and applications. *The Bell Journal of Economics,* 12(2), 380-391.

Milgrom, P. R., & Roberts, J. (1986). Relying on the information of interested parties. *The Rand Journal of Economics*, 17(1), 18-32. doi:10.2307/2555625

Morck, R., Yeung, B., & Yu, W. (2000). The information content of stock markets: Why do emerging markets have synchronous stock price movements? *Journal of Financial Economics, 58*(1), 215-260. doi:10.1016/S0304-405X(00)00071-4

Myers, S. C., & Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics*, 13(2), 187-221. doi:10.1016/0304-405X(84)90023-0

Narayan, P. K. (2005). Are the Australian and New Zealand stock prices nonlinear with a unit root? *Applied Economics,* 37(18), 2161-2166. doi: 10.1080/00036840500217887

NZX. (2013). Corporate Governance Best practice code, retrieved from https://nzx.com/files/assets/arc_sxdx_app16.pdf

Peasnell, K., & Alves, P. (2010). The use of the R2 as a measure of firm-specific information: A cross-country critique. Journal of Business Finance & Accounting, 37(1/2), 1-26. doi: 10.1111/j.1468-5957.2009.02181.x

Perold, A. F. (2004). The capital asset pricing model. *The Journal of Economic Perspectives*, 18(3), 3-24. doi:10.1257/0895330042162340

Pekmezovic, A. (2007). Empirical studies on corporate ownership. *New Zealand Law Journal*, 275.

Piotroski, J. D., & Roulstone, D.T., (2004). The influence of analysts, institutional investors, and insiders on the incorporation of market, industry, and Firm-Specific information into stock prices. *The Accounting Review, 79*(4), 1119-1151. doi:10.2308/accr.2004.79.4.1119

Rajgopal, S., & Venkatachalam, M. (2011). Financial reporting quality and idiosyncratic return volatility. *Journal of Accounting & Economics*, 51(1/2), 1-20. doi:10.1016/j.jacceco.2010.06.001

Rayhorn, C., Hassan, M. K., Yu, J., & Janson, K. R. (2007). Emerging market efficiencies: New Zealand's maturation experience in the presence of Non-Linearity, thin trading and asymmetric information. International Review of Finance, 7(1-2), 21-34. doi:10.1111/j.1468-2443.2007.00066.x

Roll, R. (1988). R 2. *The Journal of Finance, 43*(3), 541-566. Retrieved from http://www.jstor.org.ezproxy.aut.ac.nz/stable/pdfplus/2328183.pdf?acceptTC=true

R-squared (2006). In Dictionary of finance and investment terms. Retrieved from http://ezproxy.aut.ac.nz/login?qurl=http%3A%2F%2Fsearch.credoreference.com.ezproxy.aut.ac.nz%2Fcontent%2Fentry%2Fbarronsfin%2Fr_squared%2F0

Rezee, Z., Espahbodi, R., Espahbodi, P., & Espahbodi, H. (2012). Firm characteristics and stock price. *Abacus*, 48(4), 473-501. doi:10.1111/j.1467-6281.2012.00377.x

Sharpe, W. F. (1964). Capital asset prices: A theory of market equilibrium under conditions of risk. *The Journal of Finance*, 19(3), 425-442. doi:10.1111/j.1540-6261.1964.tb02865.x

Shu, P., & Chiang, S. (2014). Firm size, timing, and earnings management of seasoned equity offerings. *International Review of Economics & Finance*, 29, 177-194. doi:10.1016/j.iref.2013.05.011

Skinner, D. J. (1994). Why firms voluntarily disclose bad news. J*ournal of Accounting Research*, 32(1), 38-60.

Smedema, A. (2011). Two essays on idiosyncratic volatility. (Order No. 3483610, The Florida State University). *ProQuest Dissertations and Theses*, 80-n/a. Retrieved from http://ezproxy.aut.ac.nz/login?url=http://search.proquest.com/docview/902631664?accountid=8440. (902631664).

Smellie, P. (2012, Sep 07). NZ lifts its global competitiveness. *The Northern Advocate.* Retrieved from http://ezproxy.aut.ac.nz/login?url=http://search.proquest.com/docview/1038123563?accountid=8440

Smith, A., & Skinner, A. S. (1999). *The wealth of nations*. New York: Penguin.

Suchman, M. C. (1995). Managing legitimacy: Strategic and institutional approaches. *The Academy of Management Review*, 20(3), 571-610. Retrieved from http://www.jstor.org.ezproxy.aut.ac.nz/stable/258788?__redirected

Synchronicity. (2011). Chatham: Newstex. Retrieved from http://ezproxy.aut.ac.nz/login?url=http://search.proquest.com/docview/868951807?accounti =8440

Trueman, B. (1986). Why do managers voluntarily release earnings forecasts? *Journal of Accounting and Economics,* 8(1), 53-71. doi:10.1016/0165-4101(86)90010-8

Veldkamp, L. L. (2006). Information markets and the comovement of asset prices. *Review of Economic Studies*, 73(3), 823-845. doi:10.1111/j.1467-937X.2006.00397.x

Verrecchia, R. E. (1983). Discretionary disclosure. *Journal of Accounting and Economics*, 5(1), 179-194. doi:10.1016/0165-4101(83)90011-3

Welker, M. (1995). Disclosures policy, information asymmetry, and liquidity in equity markets. *Contemporary Accounting Research,* 11(2), 801-827. doi:10.1111/j.1911-3846.1995.tb00467.x

West, K. D. (1988). Dividend innovations and stock price volatility. *Econometrica*, 56(1), 37-61. doi: 10.2307/1911841

Wong, K. A. (1989). The firm size effect on stock returns in a developing stock market. *Economics Letters*, 30(1), 61-65. doi:10.1016/0165-1765(89)90157-2

Wurgler, J. (2000). Financial markets and the allocation of capital. *Journal of Financial Economics*, 58(1/2), 187-214. doi:10.1016/S0304-405X(00)00070-2

Xing, X., & Anderson, R. (2011). Stock price synchronicity and public firm-specificinformation. Journal of Financial Markets, 14(2), 259-276. doi:10.1016/j.finmar.2010.10.001

Xu, X. D., Zeng, S. X., & Tam, C. M. (2012). Stock Market's reaction to disclosure of environmental violations: Evidence from China. *Journal of Business Ethics*, 107(2), 227-237. doi:10.1007/s10551-011-1035-2

Zhu, W. (2010). Corporate governance and insider trading regulation efficiency. *Frontiers of Business Research in China*, 4(2), 306-324. doi:10.1007/s11782-010-0014-2

Appendix 1
List of published papers that rely on SYNCH or ISR measurement

There are a large amount of studies use either Synchronicity (SYNCH) or Idiosyncratic risk (ISR) as a proxy for the level of firm-specific information being incorporated in stock price. In addition, idiosyncratic risk can be measured in two ways. (First, ISR1 is calculated similarly with SYNCH using R squared method. Second, ISR2 use average variance of excess returns.) I restrict this list of some representative published papers with their main argument.

1) Using SYNCH (R squared)
   a) Morck, Yeung and Yu (2000) conclude a country with less developed financial systems or poor corporate governance will have higher R squared.
   b) Durnev, Morck, Yeung and Zarowin (2003) observe that low R squared illustrates more information about firms' current returns and future earnings
   c) Piotroski and Roulstone (2004) examine the extent to which trading by informed market participants will affect stock co-movement.
   d) Jin and Myers (2006) document that the value of R squared affected by different level of information transparency and control rights.
   e) Hutton, Marcus and Tehranian (2009) find that higher R squared is related to opacity or less firm specific information.

   Etc…..(there are many papers using R squared to calculate SYNCH to show that return synchronicity is related to disclosure levels, audit quality (IFRS adoption) and corporate investments. Those relevant studies are also shown in the reference list.)

2) Using ISR1 (Φ)to measure idiosyncratic risk (inverse synchronicity by In [(1-R squared)/R squared]
   a) Durnev, Morck, and Yeung (2004) use inverse synchronicity to investigate the association between idiosyncratic volatility and the efficiency of capital allocation.
   b) Ferreira and Laux (2007) illustrate that a firm with fewer antitakeover provisions display higher levels of idiosyncratic risk, trading activity, private information flow, and information about future earnings in stock prices.

3) Using ISR2 (variance of σ) to measure idiosyncratic risk
   a) Rajgopal and Venkatachalam (2010) use idiosyncratic risk rather than the R squared measure to show whether the upward trend in idiosyncratic volatility is related to financial reporting quality.
   b) Chen, Huang and Jha (2012) investigate that poor financial reporting, in particular poor earnings quality is correlated with a greater idiosyncratic volatility.
   c) Li, Rajgopal and Venkatachlam (2013) compare the two proxies of using R squared (SYNCH) or inverse measure of R squared (ISR1) and using a variance of σ, and they argue the ISR2 measure is more robust.

Appendix 2
Check-list of the Major Elements of DSCORE

1. Background information:
Statement of corporate goals or objectives;
General statement of corporate strategy is provided;
Competitive environment;
Description of organizational structure
Principle products;
Principle markets; and
Actions taken during the year to achieve the corporate goal discussed.

Note: one point for each item and one additional point for quantitative data.

2. Ten-or five-year summary of historical results:
Return-on-asset or sufficient information to compute return-on-asset (i.e. net income, tax rate, interest expense and total assets);
Net profit margin or sufficient information to compute net profit margin (i.e. net income, tax rate, interest expense and sales);
Asset turnover or sufficient information to compute asset turnover (i.e. sales and total assets);
Return-on-equity or sufficient information to compute return-on-equity (i.e.net income and stockholders' equity);
Summary of sales and net income for most recent eight quarters; and
Comparison of main financial performance indicators with budget or prospectus.

Note: one point for each item and two points for ten or more years.

3. Key non-financial statistics:
Number of employees;
Percentage of sales in products in last five years;
Market share
Units sold
Production volume (through-put);
Unit selling price;
Growth in units sold;
Customer satisfaction; and
Regulation compliance.

Note: two points for each item

4. Projected information:
Growth opportunity;
Cash flow forecast;
Capital expenditures and/ or R&D expenditure forecast;
Profit forecast;
Sales forecast; and
Share price estimation.

Note: two points for each directional prediction and three points for a point estimate

5. Management discussion and analysis:
Change in revenue;
Change in operating income;
Change in cost of goods sold;
Change in earnings before income tax, depreciation and amortisation (EBITDA);
Change in selling and administrative expenses;
Change in interest expense or interest income;
Change in net income;
Change in inventory;
Change in accounts receivable;
Change in capital expenditures or R&D; and
Change in market share.

Note: one point for each item with detailed explanation, and one additional point for explanation with quantitative data.

Appendix 3

Abbreviations and Variable Measurement

Abbreviations	**Glossary of terms description**
CAPM	Capital Assets Pricing Model, also known as market model
OLS	Ordinary Least Squares (OLS) or Linear Least Squares
NXZ	New Zealand Stock Exchange Limited
NZSX	New Zealand Stock Market (the same as NZX Main Board)
NZAX	NZX Alternative Market for small and medium size companies in NZ
ERC	Earnings response coefficient witch is the same as earnings informativeness
Variables	**Measurement description**
Dependent variables	
R squared	R SQUARED is the coefficient of determination from the estimation of equation(1)
SYNCH	Logistic transformation of R square equation 2)
ISR 1 or Φ	Inverse synchronicity Φ measured by In(1-R SQUARED)/R SQUARED refers to equation (3), R SQUARED is the mean of weekly R SQUARED from equation (1)
ISR 2 or $\sigma i_{i,t}^{2}$	Idiosyncratic volatility σ^2 is computed by average weekly variance of excess returns adjusted for the expected returns from equation (4)
MAR	The difference between actual return and market return for each month. Calculated by 12 month market adjusted monthly return for the 12 month period ending at the fourth month after a firm's fiscal year end.
Variable of Interest	
SDSCORE	Disclosures variables measures obtained from five elements measurement which are: 1. Background information; 2. Ten or five year summary of historical results; 3. Key non-financial statistics; 4. Projected information; 5. Management discussion and analysis
Control Variables	
MARET	MARET is the value-weighted market return for week t All firms with the same code and previous week t-1

INDRET	INDRET is the industry value-weighted return for week t All firms with the same code and previous week t-1
ROA	Return on total assets estimated annually
NINDCORR	Correlation between firm years ROA and a value-weighted index of ROA. NINDCORR is calculated each year using following three years for 12 observations using quarterly data
STDROA	The standard deviation of ROA measured over three years for 12 observations using quarterly data
LOGMVE	The logarithmic of market value of annually equity using shares outstanding and share price from database
CORR	Correlation between annual returns and ROA computed over the following three years for 12 observations using quarterly data
LOGNIND	The logarithmic of average number of firms in the same industry
SIZE	Firm size computed as the log of total assets at the end of fiscal year
LEV	Leverage measured as total liabilities divided by total assets
MB	100% percentage of market-to-book ratio using total market value of firm divided by market value of equity for each firm
INDSIZE	Industry size measured as the log of year-end total assets of all sample firms in the industry to which a firm belongs
SYSRISK	Systematic volatility measures average weekly variance of expected returns
NI	Total liability divided by total assets
NISYN	Product sum of NI and SYNCH
CONTROL	Three control variables :MCAP, LEV and MB
MCAP	Market adjusted monthly return for 12 month refers to the difference between the actual return and market return. Each MACP need use the fourth month after a firm's fiscal year end plus the last eight months in that fiscal year

LIST OF TABLES

Table 1

Sample Selection Procedure

	Firms	observations
Base sample (NZX provided data, Fiscal 2001-2005)	146	630
Eliminations		
1. Financials	33	132
2.Not listing now	36	179
3. Overseas	3	15
4. Unavailable voluntary disclosures information	1	4
5. Unavailable control variables information	0	3
Final usable sample	73	297

Table 2

Industry Composition

Industrial groups	No. of firms	Observations	Percentage
1. Healthcare	6	30	10.10%
2. Pharmaceuticals and Chemicals	4	13	4.38%
3. Travel and Leisure	8	39	13.13%
4. Support Service	6	21	7.07%
5. Industrial Transportation	8	37	12.46%
6. Industrial Engineering and Electronic Equipment	5	23	7.74%
7. Metals and Mining	2	10	3.37%
8.General Retails	12	46	15.49%
9. Food and Drinks	9	27	9.09%
10. Energy	7	28	9.43%
11. Construction and Material	4	16	5.39%
12. Telecommunication	2	7	2.36%
Total	73	297	1

Table 3

Descriptive Statistics

Panel A: Descriptive statistics for SYNCH across sample years

SYNCH	2001	2002	2003	2004	2005	Total average
Mean	-0.65	-1.17	-1.02	-1.07	-0.73	-0.93
Median	-1.19	-1.90	-1.62	-1.51	-1.07	-1.46
Maximum	4.92	4.97	6.16	10.12	10.23	10.23
Minimum	-4.15	-4.05	-3.85	-4.54	-4.83	-4.83
Std. Dev.	2.19	2.19	2.16	2.24	2.28	2.21
Observations	48	52	54	70	73	297

Note:
Descriptive statistics of SYNCH is obtained from regression two.
R SQUARED and SYNCH refer to the R SQUARED statistic and the stock price synchronicity measures respectively, and R SQUARED is estimated using equation one. All other variables are as defined in the Appendix 3.

Panel B: Descriptive statistics for all variables

Variables	Mean	Median	Maximum	Minimum	Std. Dev.	Observations
ISR1	0.93	1.49	4.83	-10.23	2.21	297
ISR2	0.92	1.48	4.83	-10.23	2.21	297
SDSCORE	0.30	0.29	0.70	0.00	0.13	297
NINDCORR	0.24	0.32	1.00	-0.97	0.59	297
STDROA	0.27	0.23	0.30	0.02	0.09	297
LOGMVE	4.52	4.67	9.37	-0.30	1.94	297
CORR	0.14	0.13	0.63	-0.39	0.30	297
LOGNIND	1.76	1.82	2.48	0.36	0.46	297
SIZE	11.28	11.49	15.91	4.19	2.17	297
LEV	0.44	0.35	13.86	0.00	0.83	297
MB	1.48	1.98	5.14	0.16	0.00	297
INDSIZE	14.21	14.38	16.25	10.45	1.31	297

Note:

Descriptive statistics of the variables use all dependent and independent variables from regressions five to seven. All variables are winsorized at the bottom and top 1% levels. All variables are as defied in the Appendix 3.

Table 4

Correlation Matrix

Correlations

	SYNCH	ISR1	ISR2	SDSCORE	NINDCORR	STDROA	LOGMVE	CORR	LOGNIND	SIZE	LEV	MB	INDSIZE
SYNCH	1												
ISR1	-1.000**	1											
ISR2	-.780**	.890**	1										
SDSCORE	.362**	-.362**	.347**	1									
NINDCOR R	.407**	-.407**	-.407**	.286**	1								
STDROA	.073	-.073	-.071	.472**	.047	1							
LOGMVE	.611**	-.611**	-.610**	.763**	.385**	.441**	1						
CORR	.119*	-.119*	-.119*	.060	.081	.018	.141*	1					
LOGNIND	-.329**	.329**	.330**	.161**	-.178**	.246**	.029	-.063	1				
SIZE	.510**	-.510**	-.509**	.771**	.337**	.530**	.896**	.087	.029	1			
LEV	.021	-.021	-.022	-.016	-.067	-.147*	-.098	-.132*	.038	.135*	1		
MB	.044	-.044	-.045	-.173**	.005	-.330**	-.104	-.002	-.046	.380**	.208**	1	
INDSIZE	-.072	.072	.072	.331**	.019	.061	.367**	-.075	.332**	.402**	.069	-.167**	1
	297	297	297	297	297	297	297	297	297	297	297	297	297

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 5

Ordinary Least Squares (OLS) Regression Results

Parameter Estimates									
	Synchronicity Risk Model (Hypothesis 1)			Idiosyncratic Risk Model (Hypothesis 2)					
Variable	Predicted Sign	(1) Using SYNCH		Predicted Sign	(2) Using ISR 1		Predicted Sign	(3) Using ISR 2	
		Coefficient	t-Statistic		Coefficient	t-Statistic		Coefficient	t-Statistic
Intercept	?	2.586	0.61	?	-2.586	-0.61	?	-2.602	-0.62
SDSCORE	-	-2.451 **	-2.39	+	2.451 **	2.39	+	2.454 **	2.39
NINDCORR	+	0.343 **	2.32	-	-0.343 **	-2.32	-	-0.342 **	-2.32
STDROA	-	-0.050 **	-2.44	+	0.050 **	2.44	+	0.051 **	2.46
LOGMVE	+	0.977 ***	8.06	-	-0.977 ***	-8.06	-	-0.976 ***	-8.06
CORR	?	0.062	0.23	?	-0.062	-0.23	?	-0.059	-0.21
LOGNIND	?	-0.768	-1.37	?	0.768	1.37	?	0.767	1.36
SIZE	+	0.073	0.62	-	-0.073	-0.62	-	-0.073	-0.62
LEV	+	0.322 ***	3.31	-	-0.322 ***	-3.31	-	-0.323 ***	-3.32
MB	+	7.953	0.31	+	-7.953	-0.31	+	-8.116	-0.32
INDSIZE	?	-0.303	-1.04	?	0.303	1.04	?	0.303	1.04
Year Dummies		Included			Included			Included	
Industry Dummies		Included			Included			Included	
R-squared		0.689429			0.689429			0.688985	
N		297			297			297	
***	significant at the 0.01 level								
**	significant at the 0.05 level								
*	significant at the 0.10 level								

Note:
All variables are as defined in Appendix 3. The first dependent variable is SYNCH witch shows results in the table as synchronicity risk model. The second and third dependent variables are ISR1 and ISR2 shown in idiosyncratic risk models. All three models use regressions five, six and seven as following:

H1 (Main Hypothesis):

$$SYNCHi,t = \alpha_0 + \beta_1 SDSCOREi,t + \beta_2 NINDDCORRi,t + \beta_3 STDROAi,t + \beta_4 log(MVEi,t) + \beta_5 CORR + \beta_6 Log(NIND) + \beta_7 SIZE + \beta_8 LEV + \beta_9 MB + \beta_{10} INDSIZE + \sum_{n=1}^{12}(Industry\ Dummies) + \sum_{2001}^{2005}(Year\ Dummies) + \varepsilon_{i,t}\ , \quad (5)$$

H2 (Sub-hypothese):

$$ISR1\ i,t = \Phi = \alpha_0 + \beta_1 SDSCOREi,t + \beta_2 NINDDCORRi,t + \beta_3 STDROAi,t + \beta_4 log(MVEi,t) + \beta_5 CORR + \beta_6 Log(NIND) + \beta_7 SIZE + \beta_8 LEV + \beta_9 MB + \beta_{10} INDSIZE + \sum_{n=1}^{12}(Industry\ Dummies) + \sum_{2001}^{2005}(Year\ Dummies) + \varepsilon_{i,t}\ , (6)$$

&

$$ISR2\ i,t = \sigma i_{i,t}^{\ 2} = \alpha_0 + \beta_1 SDSCOREi,t + \beta_2 NINDDCORRi,t + \beta_3 STDROAi,t + \beta_4 log(MVEi,t) + \beta_5 CORR + \beta_6 Log(NIND) + \beta_7 SIZE + \beta_8 LEV + \beta_9 MB + \beta_{10} INDSIZE + \sum_{n=1}^{12}(Industry\ Dummies) + \sum_{2001}^{2005}(Year\ Dummies) + \varepsilon_{i,t}\ , (7)$$

Table 6

Correlation Matrix between SYNCH and ISR

Correlations

	SYNCH	ISR1	ISR2	SYSRISK
SYNCH	1			
ISR1	-1.000**	1		
ISR2	-.780**	.890**	1	
SYSRISK	.077**	-.077**	.790**	1
Total observations	297	297	297	297

**. Correlation is significant at the 0.01 level (2-tailed).

Table 7

Regression Results for Additional Test 1

New Regression Results after Controlling Systemic Risk

Parameter Estimates									
	New Synchronicity Risk Model (Hypothesis 1)			New Idiosyncratic Risk Model (Hypothesis 2)					
Variable	Predicted Sign	(1) Using SYNCH		Predicted Sign	(2) Using ISR 1		Predicted Sign	(3) Using ISR 2	
		Coefficient	t-Statistic		Coefficient	t-Statistic		Coefficient	t-Statistic
Intercept	?	2.613	0.62	?	-2.613	-0.62	?	-2.629	-0.63
SDSCORE	-	-2.316 **	-2.27	+	2.316 **	2.27	+	2.318 **	2.28
NINDCORR	+	0.313 **	2.13	-	-0.313 **	-2.13	-	-0.313 **	-2.13
STDROA	-	-0.042 **	-2.01	+	0.042 **	2.01	+	0.042 **	2.02
LOGMVE	+	1.004 ***	8.32	-	-1.004 ***	-8.32	-	-1.004 ***	-8.32
CORR	?	0.118	0.43	?	-0.118	-0.43	?	-0.115	-0.42
LOGNIND	?	-0.786	-1.41	?	0.786	1.41	?	0.785	1.41
SIZE	+	0.041	0.34	-	-0.041	-0.34	-	-0.040	-0.34
LEV	+	0.308 **	3.19	-	-0.308 **	-3.19	-	-0.309 **	-3.20
MB	-	-11.023	-0.42	+	11.023	0.42	+	10.989	0.42
INDSIZE	?	-0.289	-1.00	?	0.289	1.00	?	0.290	1.00
SYSRISK	?	4.047 **	2.35	?	-4.047 **	-2.35	?	-4.416 **	-2.36
Year Dummies		Included			Included			Included	
Industry Dummies		Included			Included			Included	
R-squared		0.695698			0.695698			0.69535	
N		297			297			297	
***	significant at the 0.01 level								
**	significant at the 0.05 level								
*	significant at the 0.10 level								

Note:
This table presents coefficients from the regressions eight, nine and ten. The new regressions have the same three dependent variables (SYNCH, ISR1 and ISR2. SYSRISK is systematic risk measure which is added into the ordinal three methods in regression five, six and seven (All variables are as defined in the Appendix 3.)

$$SYNCHi,t\ (new) = a_0 + \beta_1 SDSCOREi,t + \beta_2 NINDDCORRi,t + \beta_3 STDROAi,t + \beta_4 log(MVEi,t) + \beta_5 CORR + \beta_6 Log(NIND) + \beta_7 SIZE + \beta_8 LEV + \beta_9 MB + \beta_{10} INDSIZE + \beta_{11} SYSRISK + \sum_{n=1}^{12}(Industry\ Dummies) + \sum_{2001}^{2005}(Year\ Dummies) + \varepsilon_{i,t,}, \quad (8)$$

$$ISR1\ i,t\ (new) = \Phi = a_0 + \beta_1 SDSCOREi,t + \beta_2 NINDDCORRi,t + \beta_3 STDROAi,t + \beta_4 log(MVEi,t) + \beta_5 CORR + \beta_6 Log(NIND) + \beta_7 SIZE + \beta_8 LEV + \beta_9 MB + \beta_{10} INDSIZE + \beta_{11} SYSRISK + \sum_{n=1}^{12}(Industry\ Dummies) + \sum_{2001}^{2005}(Year\ Dummies) + \varepsilon_{i,t,}, \quad (9)$$

$$ISR2\ i,t\ (new) = \sigma i_{i,t}^{\ 2} = a_0 + \beta_1 SDSCOREi,t + \beta_2 NINDDCORRi,t + \beta_3 STDROAi,t + \beta_4 log(MVEi,t) + \beta_5 CORR + \beta_6 Log(NIND) + \beta_7 SIZE + \beta_8 LEV + \beta_9 MB + \beta_{10} INDSIZE + \beta_{11} SYSRISK + \sum_{n=1}^{12}(Industry\ Dummies) + \sum_{2001}^{2005}(Year\ Dummies) + \varepsilon_{i,t}, \quad (10)$$

Table 8

Regression Results for Additional Test 2

The Effect of Stock Price Synchronicity on Return Earnings Associations

Table	Predicted Sign	Coefficient		T-statistics
NI	+	0.0001	**	-3.0538
NISYN	-	-0.0003	**	-2.4206
NIMCAP	+	8.37E-07	**	1.1006
NILEV	-	-5.44E-07		-0.087
NIMB	+	0.08	**	0.6304
CONSTANT	?	0.9278	***	5.9607
Year Dummies		Included		
Industry Dummies		Included		
Adj. R SQUARED		0.2058		
N		297		

***	significant at the 0.01 level
**	significant at the 0.10 level
*	significant at the 0.10 level

Note:

This table presents coefficients from following model: (All variables are as defined in the Appendix 3.)

$$MAR_{it} = \alpha_0 + \alpha_1 NI_{it} + \alpha_2 NI_{it} * SYN_{it} + \sum_k (\alpha_k NI_{it}) * CONTROL_{it}^{k} + Industry\text{-}Dummies + Year\text{-}Dummies + \varepsilon_{i,t},$$

I obtain SYNCH from equation 2