

**Audit firm industry specialization, Discretionary accruals and  
Stock Price Synchronicity**

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## Attestation of Authorship

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person (except where explicitly defined in the acknowledgements), nor material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning.

Candidate's signature:

A rectangular box containing a handwritten signature in black ink. The signature is cursive and appears to read 'John Kommunuri'.

(John Kommunuri)

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# **Audit firm industry specialization, Discretionary accruals and Stock Price Synchronicity**

## **Abstract**

The study investigates the association between earnings quality and stock price synchronicity. Stock price synchronicity (here after Synchronicity) is a measure of the relative amount of firm specific information impounded into stock price. Prior literature attests that better information environments have lower synchronicity. Accounting earnings are the major source of information for investors' decision making and influence stock returns. Investors demand audited financial statements for their informed decision making (Wallace, 1984). It is proposed in this study that accounting earnings of firms audited by industry specialist auditors confirm low synchronicity as they impound better quality information into stock price.

Agency theory elucidates the significance of information in a decision-making setting. According to the theory, principals appoint agents (Management) and delegate decision-making tasks to them as they trust that the agents would act in the principals' best interests. The management of a firm plays a significant role in conveying credible signal to the shareholders and other stakeholders, in the form of disclosures, about the quality of information that is to be disclosed and incorporated into stock prices. Roll's (1988) market model suggests that the amount of information that impounds into stock price should be mirrored in stock price synchronicity ( $R^2$ ).

My study also provides reliable empirical evidence on the effectiveness of auditing which varies with the industry expertise of auditors. It provides a clear understanding of how audit quality is associated with a firm's information asymmetry and its stock returns. The monitoring role of auditor helps the principal and other decision makers in obtaining reliable information about the firm. Since auditing is regarded as one of the mechanisms both principals and agents place, if

an auditor fails to provide sufficient level of audit quality to their client firms, i.e. fails to reduce information asymmetry between the parties, then obviously there will be less or no demand for audit services.

The empirical results of this study show that in New Zealand, industry specialization of audit firms is regarded as a significant element of investor decision making. The results of industry specialization quality explicate that the market regards specialists as credible information providers and the clients of industry specialist auditors exhibit low synchronicity.

Prior research shows that discretionary accruals are priced by the market (Subramanyam, 1996). When managers employ specialists, the level of discretionary accruals signals the market about the quality of their earnings. Specialists are expected to differentiate between the opportunistic and informative nature of discretionary accruals and are able to minimize (allow) opportunistic (informative) accruals thereby improve accrual quality. If the market perceives this quality and if that quality synchronizes into stock prices, then the clients of specialists attest low synchronicity compared to the clients of non-specialists. The results show that the discretionary accruals of a firm audited by specialists are comparatively low and have a positive effect on the level of the firm's synchronicity.

**Key words:** Stock Price Synchronicity, Corporate Governance, Audit Quality, Industry specialization, Discretionary accruals, Earnings management.

## Chapter 1: Introduction

The role of external auditors in the capital markets is so imperative and in the wake of the recent extensively exposed accounting scandals, the attention of investors, security exchange commission (SEC), and the accounting professional bodies has increased on the role of auditors. External auditors play as information intermediaries or information credibility enhancers in the financial markets (Mansi, Maxwell, & Miller, 2004). The potential conflicts of interests and the events of fraudulent financial reporting have intensified investors' fears, stimulating investors to demand for high quality auditors. Audit quality helps reduce information asymmetry and resultantly reduces conflict of interests between managers and investors. Prior literature postulates that auditor industry specialization is an important element of audit quality (Craswell, Francis, & Taylor, 1995).

My current study investigates the association between earnings quality, as measured by the discretionary accruals of the firm, and stock return synchronicity<sup>1</sup> (hereafter Synchronicity), the factors associated with the demand for industry specialist auditor (hereafter Specialists), whether industry specialization enhances the quality of firm's disclosures and signals credibility to the financial market. Synchronicity is a measure of the relative amount of firm specific information impounded into stock price. Roll's (1988) market model suggests that the amount of firm specific information impounded into stock price should be mirrored in synchronicity ( $R^2$ ). A high (low) synchronicity denotes more (less) market and/or industry specific information and less (more) firm-specific information impounded into stock price.

Morck, Yeung, & Yu (2000) provide evidence that firms in better information environments have lower synchronicity. Supporting evidence is found in the study that as information environment improves over time, or information asymmetry contracts, synchronicity tends to decrease. Lev and Zarowin (1999) survey the usefulness of financial information to investors and ascertain

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<sup>1</sup> Stock return synchronicity and stock price synchronicity are used interchangeably

that the usefulness of accounting and/or financial information has been deteriorating. The survey concludes that the changes in firms' operations and economic conditions are not reflected well through the reporting systems that firms use. The major source of information for decision making for investors is accounting earnings. Audited financial statements provide useful information to the users and according to Wallace (1984) investors demand audited financial statements for their informed decision making. That means the audit process adds value to the accounting information and it is valued as a means of improving the quality of financial information. Arthur Levitt, former United States Security Exchange Commissioner, while addressing this issue indicates that "the commission has been working with similarly interested parties from around the globe to advance the causes of efficient and transparent markets (Levitt, A. 1999)."

This research is motivated on the premise that the findings so far, on the association between audit firm specialization quality and stock price synchronicity, are mainly on the US firms. Some of the studies (e.g. Gul, Kim & Qiu, 2010) use Big4 Vs Non-Big4 differentiation to measure audit quality and its relation with synchronicity. There is limited empirical evidence on the association between the specialization quality and stock price returns of firms in New Zealand. In New Zealand, the size of the listed corporate sector is relatively small with a small profile in a global sector particularly when compared with the markets in USA, UK and Australia. Fox, Walker, & Pekmezovic (2012) remark that New Zealand has a small, less developed and fewer widely held companies. When the shareholding is widely dispersed and no individual shareholder can exercise control on the direction of the company, the management will have more control on the operations of the business. This may lead the managers to participate in self-serving behavior which is not in the best interests of the shareholders. This provides a setting to investigate and draw conclusions on whether the specialization quality of audit firm has any influence on the earnings management behaviour of the management and resultantly on firms' stock returns.

According to Bhattacharya, Daouk, & Welker (2003) 'there is a variety of risks that investors may face as a result of possessing inadequate or imprecise information on which to base their investment decisions'. Inadequate information causes information risk, which may cause a high

risk of making a wrong decision and incurring losses. Prior studies show that employing high quality auditors helps reduce information asymmetry, thereby lowers information risk and helps market participants to make informed decisions. Reduced information risk benefits are in the form of reduction in the cost of equity (Francis, LaFond, Olsson, & Schipper, 2005).

A good corporate also links to investor protection. The concept of corporate governance can be defined as the procedures and processes according to which a corporation is directed and controlled (OECD, 2009). A study by Goldman Sachs JB Were finds that companies that score highly on governance issues produce a 35 percent excess return on the index (Gompers, Ishii, & Metrick, 2003). Their results show that good governance offers better share price performance. Based on agency theory one of the significant aspects of corporate governance is disclosure of financial information as a means to relieve information asymmetry by providing reports from managers to fund providers.

The origins of corporate governance can be found in the desire to improve transparency and accountability of financial reporting by listed companies to their shareholders, transparency and accountability remain fundamental elements and now embrace effective communications with a more diverse range of stakeholders, both internal and external, on a wider range of issues... and higher expectations in respect of openness and accountability in the public sector (HKSA, 2004, page 2). Several studies conclude that audit services play a momentous role in reducing information asymmetry as well as in mitigating agency problems between managers and stakeholders (For example: Beatty, 1989). Beasley and Salterio (2001) suggest that auditors are considered, from the agency perspective, as important players in the corporate governance structure because they monitor the quality of the financial reporting process.

## Corporate Governance setting in New Zealand

There are significant institutional differences between New Zealand and the US with regards to capital market setting, investor sophistication, market capitalization of listed firms, institutional ownership, and firm level corporate governance characteristics etc. All these characteristics impact on the information asymmetry and firm's stock return synchronicity. New Zealand is a small, common law jurisdiction. On the subject of corporate governance practices, New Zealand has a statutory base (Noonan & Watson, 2007) and is regarded as one of the top good governance countries (Morck et al., 2000). In a study by Chhaochharia & Laeven (2009) using a governance index of 17 variables New Zealand was rated highest over the period from 2003-2005. Yet because of significant institutional differences in New Zealand compared to other countries such as USA, UK and even Australia, the effectiveness of corporate governance practices could not be as dominant as seen in the other countries mentioned earlier. For instance, ownership concentration in New Zealand is extremely high (Hossain, Prevost, & Rao, 2001).

In New Zealand the ratio of stock market capitalization held by minority shareholders as a ratio of gross national product (GNP) is relatively low compared to the above mentioned common law countries. Differences such as these, I believe, offer a distinctive setting to study the corporate governance quality, mainly the monitoring role of industry specialist auditors in New Zealand. In cross country studies the effect of industry could not be studied because of the difficulties in classifying industries in different countries.

The World Economic Forum's annual 'Global Competitiveness Reports' define competitiveness as the set of institutions, policies and factors that determine the level of productivity of a country. According to their recent (i.e. 2012-2013) report New Zealand is ranked highly in terms of governance practices. The report pronounces that New Zealand has some of the best functioning institutions in the world. On a scale of 1 to 7 (being the best) New Zealand occupies 1<sup>st</sup> rank with 6.6 score for ethical behavior of firms, and 2<sup>nd</sup> rank for the quality of public institutions, followed by 5<sup>th</sup> rank for financial market development with 5.48 score. In regards to

the strength of investor protection on a scale of 1 to 10 (being the best) the country scores 9.7 standing in the 1<sup>st</sup> rank, followed by a 2<sup>nd</sup> rank for efficiency of corporate boards, followed by 3<sup>rd</sup> rank for the strength of auditing and reporting standards (Schwab, 2013).

The Financial Markets Authority (FMA) in New Zealand, established under the Financial Markets Authority Act 2011, enforces securities, financial reporting and company law as they apply to financial services and securities markets. The Authority investigates potential breaches of how financial markets conduct legislation and takes appropriate enforcement action (FMA, 2013). One of the main aims of the FMA is to raise the standard of corporate governance in New Zealand so that investors will have access to the information they need to make informed decisions.

As regards to the corporate governance of companies, New Zealand adopts a hybrid approach (i.e. a mix of mandatory and voluntary rules) for companies listed on the New Zealand Stock Exchange (NZX). All companies in New Zealand must comply with certain mandatory rules that are set in the Companies Act 1993 and the Financial Reporting Act 1993. These rules are more severe for listed entities because of the contractual obligations that the entities employ. In addition, some listing rules are also imposed by NZX on listed firms. These rules require listed companies to 'comply or explain' the extent of their compliance with the NZX Corporate Governance Best Practices Code (NZX, 2013). So, corporate governance has particular meaning and application for listed companies because of the contractual obligations that the firms have and also the obligations contained in the NZX listing rules. This approach enables the market to make an assessment of the quality of both mandatory and voluntary disclosures and this will be reflected in the company's share price.

As mentioned earlier, the size of the listed corporate sector is relatively small in New Zealand with a small profile, with a small, less developed and fewer widely held companies. In such a setting, no individual shareholder can exercise control on the direction of the company and thus the management will have more control on the operations of the business. This may lead to self-serving behavior of the management which is not in the best interests of the shareholders.

Fogelberg (1974) observes that 75% of the companies in New Zealand are classified as management controlled.

Fox and Walker (1993) assert that there is mixed empirical evidence on the notion that management control leads to self-serving behavior in New Zealand. Jiang and Habib (2009) suggest that firms with management-controlled ownership structures disclose significantly more than when ownership concentration is higher. However, Fox and Walker (1993) propose that the movement away from owner-controlled to management-controlled companies may increase compliance costs and provide more opportunities for managers to behave in ways that do not always serve the best interest of investors as a whole.

A fundamental objective of governance research in accounting is to investigate the properties of accounting systems and the surrounding institutional environment important to the effective governance of firms (Bushman & Smith, 2001). To support the contractual obligations of corporate governance, managers use financial accounting information as a key quantitative representation. Even if the agency conflicts do not exist between managers and investors, making available of quality accounting data enhances efficiency by enabling the two parties to identify value creation opportunities with less errors (Bushman & Smith, 2001). Therefore, financial accounting information plays a governance role by disciplining efficient and effective management of resources. Since the financial accounting system, by itself, is regarded as a primary source of effective, low-cost governance system, managers employ high quality auditors(e.g. BigN firms, industry specialists etc) to add credibility to their reported information.

My study develops a clear insight of how audit quality is associated with a firm's information asymmetry, earnings quality as measured by discretionary accruals, and stock returns. If an audit firm is able to provide specialist or differentiated services and reduce information asymmetry, the probability of mitigating the information asymmetry level may intensify the demand for specialist audit services. So audit firm industry specialization represents an essential monitoring device that managers use to enhance the credibility of their financial reports and to protect investors' rights. This uncovers some empirical evidence on the audit

quality effect of industry specialization and how the choice of industry specialist audit firm influences synchronicity. Gramling and Stone (2001) recommend that it is important to examine whether there are any quality differences besides BigN and Non-BigN differentiation. So far, to my knowledge, no research has been done in New Zealand on the effect of audit firm industry specialization on stock price synchronicity.

Where there is a significant separation of ownership and control there the study of good corporate governance is important to see the extent of agency problems. Such a separation is more evident in listed companies in New Zealand as well as in other countries so they matter most for corporate governance issues. Listed companies are subject to the Securities Regulation Regime, Stock Exchange listing rules and also the Companies Act 1993 as in the case of other issuers. In this study I particularly focus on companies listed on the New Zealand Stock Exchange's (NZX) main board (NZSX) and on the alternative market (NZAX).

The results, by and large, show that in New Zealand industry specialization of audit firms is regarded as significant element of investor decision making. Binary values (1, 0) are used to represent industry specialist and non-specialist auditors respectively. To test for sample selection bias I use the Heckman two-step method. Heckman (1979) model is based on the assumption that the selection model and the outcome model can be related to each other through their error terms which may hold any unobservable factor that influences self selection. The results show that audit clients in New Zealand do not self select their audit firms. Treatment effect model (2-step) is also used as a sensitivity test and the results from the treatment effect model support conclusions drawn from the Heckman model.

Hypothesis1 tests the impact of discretionary accruals on synchronicity. Consistent with prior studies the results (see table 6) show synchronicity (SYNC) values ranging from -2.89 to 2.52. The negative co-efficient of discretionary accruals indicate that investors may treat discretionary accruals of firms as informative and as a result high DISACC firms have low SYNC values

where low SYNC represents more credible firm specific information. However the results do not show statistically significant effects.

The general perception is that low levels of accruals exhibit good quality information and low synchronicity. The results of Hypothesis 2 show statistically significant evidence for such association in New Zealand (Results are in table 6). The findings provide evidence that specialists constrain opportunistic discretionary accruals but they are no better than non-specialists in differentiating between the opportunistic and the informative motive of accruals. The results are in line with prior studies that industry experienced auditors are better able to detect errors within their industry specialization than outside their specialization (Owhoso, Messier, & Lynch, 2002), reduce earnings management of their clients and increase the market's perception about the quality of their accruals (Balsam, Krishnan, & Yang, 2003), reduce discretionary accruals and treat both opportunistic and informative discretionary accruals similarly and are more concerned about the level of earnings management than the underlying motive i.e. opportunistic or informative motive for earnings management (Mascarenhas, Cahan, & Naiker, 2008). The negative effect of INDSPE on SYNC denotes that the clients of Specialists exhibit low synchronicity and significant levels show that the market treats industry specialists as credible information providers.

The remainder of the study is organized as follows. Chapter 2 provides a discussion of theoretical framework on synchronicity, earnings management and audit quality hypothesis. Chapter 3 gives a review of related literature and development of hypotheses to be tested. In Chapter 4 the research design with relevant empirical models is discussed. Chapter 5 discusses the results, and Chapter 6 concludes the thesis and discusses limitations and future research.

## Chapter 2: Theoretical Framework

In this section I present an explanation of the agency theory and Information asymmetry. I then define synchronicity and explicate how synchronicity captures the amount of firm specific information that is impounded into stock prices.

### **Agency theory**

Agency theory attempts to describe a relationship where one party (the principal) delegates work or responsibility to another (the agent). The theory states that a firm is a nexus of contracts among individuals and organizations. These may involve principals, the owners of capital, and agents or management who are the owners of expertise to perform services on the principals' behalf (Jensen & Meckling, 1976). The theory has its foundation in the information economics literature which explains the significance of information in a decision-making setting. One of the earliest studies on the agency issue was by Adam Smith. Smith (1776) proposes that "being the managers rather of other people's money than of their own, it cannot well be expected, that they should watch over it with the same anxious vigilance (as if they were owner managers). Later, Berle and Means (1932) instigate the debate on the conflict of interest that arises because of the separation of owners and managers in large corporations.

While consistent with the concept of agency traditionally advanced by legal scholars and attorneys, the economic variants of agency theory emphasize the costs and benefits of the principal-agent relationship. A beneficial agency cost is one that increases a shareholder's value and an unwanted agency cost occurs when management actions conflict with shareholder interests. Such would be the case when managers put their own interests ahead of owners' interests."

The positivist strand of the agency theory focuses on the relationship between the owner and the manager. According to the theory, principals appoint agents and delegate decision-making tasks to them as they trust that the agents would act in the principal's best interests. But often times this may not hold true and managers may obscure some information without disclosing it to the principals and other stakeholders. This causes information asymmetries between the parties because of their different and opposing motives and goals. Fama (1980) supports the positivist strand of the theory focusing on the role of efficient capital markets in controlling the opportunistic behaviour of managers. Nondisclosure of useful information may affect the decision making capability of the users. This self-serving behavior of the management may prompt the principal put some monitoring mechanisms in place. Eisenhardt (1989) states that the agency theory is about resolving the problem in a relationship with conflict of interests, and risk sharing when attitudes toward risk diverge.

On the other hand, in order to gain the Principals' trust in them and to give external parties, e.g. investors, more confidence in their decision making, the agents may position monitoring mechanisms in place. Agency theory also considers that agency costs are mostly borne by managers or agents (Jensen & Meckling, 1976). If the management feels that their signals lack credibility, i.e. high information asymmetry, then they might respond to the information needs of shareholders/stakeholders through establishing a good corporate governance structure i.e. by setting up mechanisms that would reduce information asymmetry. The initial implementation of corporate governance policies was to maintain an effective and independent board of directors. The Cadbury Commission in 1992 issued a landmark report on setting up the best practice codes by corporations in order to sustain good corporate governance.

## Information asymmetry hypothesis

Information hypothesis states that financial information is essential to investors to make rational investment decisions through determining proper market values. Fama and Laffer (1971) suggest that the information has major benefits such as reduction of risk, improvement of decision-making and earning of trading profits. The information environment, i.e. the amount and quality of firm specific, industry and market- specific information available to investors, is characterized by various accounting and other sources of information available to investors. As discussed earlier in the previous section, the agency theory perspective also advocates that the relationship between the principal and the agent may be associated with information asymmetry.

Information asymmetry, according to Arrow (1985) is hidden information. Since the agent has more involvement with the company, it is commonly assumed that the agent has more information which may not be accessible to the principal freely and therefore the agent may use this information opportunistically. Healy and Palepu (2001) argue that the need for financial reporting and disclosure arises from information asymmetry and conflict of interests between managers and outside shareholders.

The management of a firm plays a significant role in conveying decision useful information to the market. Management gives credible signal to the shareholders and other stakeholders, in the form of disclosures, about the quality of information that is disclosed and the quality of information that needs to be incorporated into stock prices. One way of reducing information asymmetry is by issuing credible information or disclosures, so that investors or potential investors will have more assurance with regard to the efficient and effective management of the firm.

## Earnings management hypothesis

Earnings are regarded as a good measure of firm performance. Accounting earnings measure firm performance over a period of time and this measurement is based on the given accounting principles and conventions. The information content of reported net income (i.e. earnings) can be measured by the extent of security price change or equivalently by the size of the abnormal market returns around the time the market earns the current net income (Scott, 2009). A firm's market returns are related to its earnings (Petra, 2007) and earnings informativeness can be proxied by its association with market returns (see Vafeas, 2000).

According to Schipper (1989) earnings management is 'a purposeful intervention in the external reporting process, with the intent of obtaining some private gain (as opposed to, say merely facilitating the neutral operation of the process)'. Schipper (1989) continues on the definition and adds that 'a minor extension of this definition would encompass "real" earnings management, accomplished by timing investing or financing decisions to alter reported earnings or some subset of it'. A general view is that earnings management occurs within the framework of financial reporting, but it may also occur through 'real activities'.

Healy and Whalen (1999) condition that " earnings management occurs when managers use judgment in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers". According to this definition earnings numbers should be reflective of the economic substance underlying the financial transactions of a firm. The opportunistic perspective is exhibited when managers use these earnings figures to mislead stakeholders. This perspective has its roots in Agency theory where it states that managers are assumed to manipulate earnings to mislead stockholders or to maximize their personal benefits at the cost of the stakeholders' interests. The investigation of earnings management often converges on management's use of discretionary accruals (Dechow, P. M., 1994).

Jackson and Pitman (2001) argue that the practice of earnings management crumbles investors' confidence in financial reporting quality and thereby blocks the efficient flow of capital into financial markets. Firms follow the generally accepted accounting standards for their accounting information preparation, but in addition to disclosing this credible information an independent actor or party can be contacted to make sure the information is reliable and whether it represents the true and fair view of the operations of the firm. Proper regulation, auditing and capital market intermediaries will help enhance the credibility of information provided by the management because accounting, auditing, and efficient capital markets are essential players in monitoring agency relationship (Healy & Palepu, 2001).

Auditing is a highly valued monitoring system among stockholders, creditors and top management (Wallace, 2004) and so the role of auditing is significant in monitoring agency costs as it is associated with both conflict of interests and information asymmetry. Becker, DeFond, Jiambalvo, & Subramanyam (1998) suggest that auditing reduces information asymmetries as it allows outsiders (i.e. external auditors) to verify the validity of financial statements. Economic theory suggests that audit firms must differentiate themselves by developing their expertise (eg. through specialization) to provide superior services to firms and enable credible information flow into the market.

Audited financial statements provide information useful to investors' decision making. Auditing, from this point of view, is a form of controlling for the monitoring mechanism. If proper examining actors are employed to check the reliability of information presented, then the chances of withholding any material information by the agents can be reduced. The monitoring role of auditor helps the principal and other decision makers in obtaining reliable information about the firm. Since auditing is regarded as one of the mechanisms that both principals and agents place, if an auditor fails to provide sufficient level of audit quality to their client firms, i.e. fails to reduce information asymmetry between the parties, then obviously there will be less or no demand for audit services. De Angelo's (1981) definition of audit quality as 'the market assessed joint probability that an auditor will both detect and report a breach in a client's accounting system' is a plain description of auditor reputation for gaining audit quality.

Investors and other outside parties assimilate the quality of audit into their decision making. As audit quality increases, firm-specific information becomes more precise, the information asymmetry is reduced, and the firm's market beta decreases in magnitude (Lambert, Leuz, & Verrecchia, 2007). Companies with high debt ratios and companies with more accounting based covenants are more likely to hire an auditor to address the agency relation of the management to creditors (Chow, 1982). Titman and Trueman (1986) put forward that when managers signal firm-specific information to the outside market through external auditors, that signal is perceived by external investors as more credible and reliable.

Fama and Laffer (1971) conclude that audited financial statements present all the benefits proposed. If audited financial statements are provided by firms, then investors tend to be risk averse because the information helps them in reducing risk in their investments, or they will demand higher returns for a high risk stock, or they will pay a higher price in the form of a risk premium where they see less uncertainty of risk. This states that the information transfer between the firm and others depends on the quality of information provided by the firm and how the market perceives that information.

The information role of insiders, institutional investors, financial analysts, and the management is so significant in this perspective. There is empirical evidence that these parties differentially influence the impounding (synchronicity) of market level, industry level, and firm level information into stock prices. To the extent that these parties contribute different information into price formation process or differentially influence the dissemination and incorporation of common (i.e. industry and market) information, synchronicity should vary with the presence and absence of these parties' activities (Piotroski & Roulstone, 2004).

## Theory of Stock Price Synchronicity

Capital markets research in accounting examines the relationship between security prices and the information contained in the firm's financial statements and associated documentation (Wolk, Dodd, & Rozycki, 2007). The efficient allocation of resources by the market is made possible through the accounting information provided by firms for analysis, valuation and performance measurement etc. Under the Capital Asset Pricing Model (CAPM), a firm's returns are determined by multiple non-diversifiable factors and firm-specific characteristics. The explanatory power of market and industry indexes rationalizes the relative amount of market level, industry level, and firm level information that impounds into stock price. Many studies in accounting use the empirical form of the CAPM which is popularly known as the market model.

The Capital Asset Pricing Model developed in the early 1960s, by William Sharpe (1964) and John Lintner (1965), provides a coherent framework to answer the how of the risk of an investment should affect its expected return. The pattern builds on the model of portfolio choice developed by Markowitz in 1959. According to the CAPM, investors choose 'mean variance-efficient' portfolios and it predicts that a firm's stock returns should be correlated with market returns. Fisher and Lorie (1964) note that there have been no measurements of the rates of return on investments in common stocks that could be considered accurate and definitive.

The model is a fundamental contribution to the understanding of the determinants of asset prices and can serve as a benchmark for the perception of capital market phenomenon that causes asset prices and investor behaviour to deviate from the prescriptions of the model (Perold, 2004). It was argued in earlier studies that the CAPM is an elegant theory with insightful implications for asset pricing and investor behaviour. Though the CAPM has been extended in a variety of ways, almost all variants have a multi-beta expression for expected return. The market beta of an asset measures the sensitivity of the assets' return to variation in the market return.

Roll (1988) empirically investigates how much of an asset's return variation is explained by market factors, industry factors and firm specific factors. Roll's (1988) market model proposes

that the amount of firm specific information impounded into stock price should be mirrored in stock price synchronicity ( $R^2$ ). Stock price synchronicity is defined as 'the ratio of common return variation to the total return variation'. This is the information based interpretation of stock return synchronicity. According to Roll (1988) synchronicity depends on the relative amount of firm level and market level information impounded into stock price. He concludes that the low R-square of a firm is due to either private information or factors that are not related to information. According to Piotroski and Roulstone (2004) the comovement of a firm's stock is an approximation of the relative amount of firm-specific versus industry and market-level information influencing prices over the fiscal year. A high (low) synchronicity denotes more (less) market and/or industry wide information and less (more) firm-specific information impounded into stock price.

A growing body of research provides evidence that stocks with low synchronicity have more firm-specific information incorporated into them. But the stock return variation, i.e. price synchronicity, may not always be explained by market wide factors but by firm-specific factors or by the amount and rate of private information capitalization into stock prices. The association between accounting information and change in stock prices is empirically investigated to test the usefulness of accounting information to investors. When there is evidence that accounting information is properly incorporated into stock prices then there is a significant association between the two. In other words, when the markets are efficient then the value of new information is fully and completely demonstrated via the security's price response.

Morck, Yeung and Yu (2000) and various other studies use this model widely to capture stock price co-movements. According to this model higher (lower) R-square values represent greater levels (lower) of synchronicity and vice-versa. For instance, Jin and Myers (2006) use R-Square based measure of synchronicity and shows link between measures of corporate transparency and synchronicity. Their results show that if the information environment is more transparent, then investors will be able to obtain more firm specific information. My current study uses R-square estimate using all available firms in the New Zealand share market.

## Chapter 3: Literature Review and Hypothesis Development

This chapter provides a review of studies on synchronicity internationally and in New Zealand, and the association between audit quality and synchronicity. Also a review of discretionary accruals literature and the monitoring role of specialists in improving the quality of financial information are provided. Based on the theoretical framework and the literature review the hypothesis to be tested regarding the effect of audit firm industry specialization on audit quality and how audit quality influences synchronicity through discretionary accruals is developed.

### Stock price synchronicity

Stock price synchronicity has long been investigated in finance literature. Roll (1988) was the first to recommend and investigate  $R^2$  values across firms. He investigates whether low synchronicity is because of private information or due to other pricing errors suggesting that more firm-specific information decreases synchronicity. Following Roll (1988), Morck, Yeung and Yu (2000) examine synchronicity and find that stock price movements are more synchronous in emerging markets than in developed markets. Their results propose that the reason for high synchronicities in emerging markets is because of poor investor protection. This is consistent with prior studies where more firm specific information is associated with low synchronicity.

Other studies along these lines also presume that low synchronicity is associated with more firm specific information (Piotroski & Roulstone, 2004), more efficient corporate investments (Durnev, Morck, & Yeung, 2004), stronger capital market governance (Daouk, Lee, & Ng, 2006). Furthermore Jin and Myers (2006) attribute low synchronicity to a country's information transparency. Chan and Hameed (2006) use synchronicity ( $R^2$ ) to measure the degree to which market information is impounded into stock prices. Fernandes and Ferreira's (2008) studies portray similar conclusions. Kim and Shi (2010) observe high synchronicity levels in emerging markets.

Synchronicity measures are used to capture the tendency of stock price to move together, where it has the ability to reflect firm specific information within a market. A high disclosure quality (Haggard, Martin, & Pereira, 2008), and high audit quality (Sami & Zhou, 2004; Gul, Kim, & Qiu, 2010) enable firms to have low synchronicity. Some studies are conducted at country level and others at firm level. The studies on firm level synchronicity have alternative propositions that some support the information based interpretation of synchronicity or firm specific return variation. Other studies argue on the risk based interpretation of synchronicity or noise trade. These two propositions are explained below in more detail.

### **Country level synchronicity**

Morck, Yeung and Yu's (2000) study on 40 countries finds that stock prices move together more in emerging markets than in developed markets. According to them, in countries where investor property rights are stronger there the return synchronicity is lower. They provide cross country and cross sectional differences in  $R^2$  and observe that legal and regulatory impediments to informed trades can explain relatively high  $R^2$  in developing countries. Their reasons for the co-movement in emerging economies are more correlated fundamentals, inadequate property rights, and poor investor protection. They also state that stock prices in higher GDP economies move in a relatively unsynchronized mode and confirm that firms in better information environments have lower synchronicity. This phenomenon of stock price movements is not mainly due to market size but because of correlation of fundamentals in emerging economies. Poor and uncertain protection of property rights causes swings in market wide stock prices.

Wurgler's (2000) study on 65 countries on how financial markets improve the allocation of capital, finds more association between the development of financial markets and efficient allocation of capital. This efficiency, according to Wurgler (2000), is positively correlated with the amount of firm specific information incorporated into stock returns in the domestic market. So, as more firm specific information is impounded into the stock price there is better allocation of capital.

Durnev, Morck, and Yeung (2001) suggest that low  $R^2$  is an indicative of information efficiency in the market and show evidence of a higher association between current returns and future earnings among firms and industries that have low market model  $R^2$ . They claim that as more firm specific information is incorporated into stock prices, the return moves more synchronously with the market. Because of the informational connection of synchronicity, it is used as an inverse measure of a firm's information environment. Bushman, Chen, Engel, & Smith (2004) find greater firm specific return variation or low synchronicity in countries where there is freedom of press and more financial analysts following large firms. In countries where firms are more opaque there the synchronicity levels are higher (Jin & Myers, 2006). In other words countries with more accounting transparency have lower synchronicity levels.

### **Firm level synchronicity**

The studies on firm level synchronicity have diverse arguments with respect to synchronicity. Some argue on the information hypothesis basis, and others argue on the risk or noise basis. Synchronicity is widely used in prior literature as a proxy for information efficiency or quality of information environment. The studies based on information hypothesis support the idea that synchronicity measures the amount of firm specific information incorporated into stock prices.

Recent work (eg. Wulglar, 2000; Durnev, Morck, & Yeung, 2004; Piotroski & Rolstone, 2004; Chan & Hameed, 2006) takes on the view that synchronicity is negatively correlated with firm specific information that is incorporated into stock prices, and uses synchronicity as an inverse measure of information quality. They view the  $R^2$  of market model as gauging the information content of stock prices. For example, Durnev, Morck Yeung, and Zarowin's (2003) findings on the association between current returns and future earnings, the market model  $R^2$  is negatively related to that association. That means firms with lower synchronicity exhibit stronger association between current returns and future earnings indicating more informative stock prices. Their results confirm Roll's (1988) idea that firm specific variation reflects in stock price returns.

Another study by Durnev et al., (2004) examines the relationship between the firm's stock price informativeness and capital investments. Capital investment decisions are more efficient when stock prices are more informative. Piotroski and Roulston (2004) define synchronicity as the extent to which market and industry returns explain variation in firm level stock returns. The study shows that firms displaying low (high) synchronicity, ceteris paribus, have a relatively greater amount of firm-specific (market-level and industry-level) information synchronized into their stock prices. DeFond and Hung (2007) also present evidence supporting this interpretation of synchronicity.

Roll (1988) also proposes that there could be "occasional frenzy related to concrete information" that explains low synchronicity (low  $R^2$ ). This clarifies the point that in addition to firm specific information firm specific noise could also explain stock return variation. Following this view another stream of literature finds evidence on the firm-specific noise explaining the variations in stock returns. For example Shleifer and Vishny (1997) reveal that greater pricing errors are associated with higher firm-specific volatility. Campbell, Lettau, Malkiel, & Yexiao (2001) also show that the rise in firm-specific volatility overtime is not likely to be a result of increased firm-specific information being reflected in stock returns. Rajgopal and Venkatachalam (2011) & Li, Rajgopal and Venkatachalam (2013) document a positive association between information risk and firm-specific return volatility.

Kelly's (2005) research to study the main source of low market model  $R^2$  provides evidence that low  $R^2$  stocks have a lower likelihood of private information events and they are subject to greater asymmetric information risk. Dasgupta, Gan, and Gao (2009) suggest that as more firm specific information is disclosed the idiosyncratic volatility decreases. Their argument suggests the view that the disclosure of time varying firm-specific information increases synchronicity. Teoh, Yang and Zhang (2009) test whether low synchronicity is driven by firm-specific information or firm-specific noise in stock prices and confirm that the higher the synchronicity the more stock returns exhibit accounting based anomalies against value relevance assumptions. These results support the view of Roll (1988) that both private information and the noise contribute to the low market model  $R^2$  and so information efficiency does not essentially influence synchronicity.

Durnev, Morck, Yeung, and Zarowin's (2003) suggestion that synchronicity can be used as a negative measure of information efficiency was questioned by Skaife, Gassen, and LaFond (2005) that the results are mixed outside the U.S market. Furthermore, Pantzalis and Xu (2008) argue that Durnev et al's (2003) conclusion of positive correlation between synchronicity and information efficiency does not exist after controlling for firm size. A thorough examination of prior studies on synchronicity reveals mixed and even conflicting evidence on the use of  $R^2$  and on the relationship between synchronicity and price informativeness.

Here in this study I outline the underlying principle that prompts the  $R^2$  methodology as a measure of information quality and use this measure to see the effect of audit firm industry specialization on the earnings management behaviour of firms in New Zealand and how this prompts smooth capitalization of quality firm-specific information into firm's stock prices. For this study the sample is restricted to the New Zealand market. A single jurisdictional setting may enhance the power of the tests as it controls for any international varying and confounding factors (Holthausen, 2009). In New Zealand NZX50 index is a common benchmark against which firm and industry performances are measured. The market model is estimated using daily return stock data.

As conferred earlier, synchronicity is based on the market model regression. In this model the returns of each firm are regressed on associated industry returns (i.e. based on industry index) and market returns (i.e. based on market index). According to Roll (1988) a regression of firm's returns on market and industry returns gives a coefficient of determination ( $R^2$ ) and it is used as an inverse proxy for firm's information environment. High (low)  $R^2$  indicates that company returns are being explained more (less) by pervasive factors than firm-specific factors.

## **Earnings quality and stock price synchronicity**

The above discussion substantiates that firm specific information incorporates into stock prices. Firm performance influences a firm's stock price as it influences the decisions of investors. Earnings are viewed as primary source of information (Francis, LaFond, Olsson, & Schipper, 2004) and a superior measure of firm performance. Earnings quality is highly associated with firm's information environment and the information asymmetry is higher for firms with low earnings quality (Bhattacharya, Desai, & Venkataraman, 2013).

Capital markets measure firm performance, and stock returns capture the quality of earnings. If earnings reflect information relevant to investors and if the earnings are measured reliably enough to be reflected in stock price then the earnings are value relevant. But market returns may not measure the quality of earnings accurately because of the accounting choices firms employ, and also managers' incentives to manage earnings opportunistically or informatively. Earnings include both cash flows and accruals. Accruals are a better measure of firm performance than the operating cash flows because of the ability of the accruals in mitigating timing and mismatching problems inherent in measuring cash flows over short intervals (Dechow, 1994).

According to Subramanyam (1996) the role of accruals in measuring firm performance is an important question in accounting research. Accruals are mostly estimates into future events, so accruals may introduce estimation errors into the accounting process. Watts and Zimmerman (1986) and others state that accrual measurement is subject to managerial discretion. Managerial discretion, in some instances, could induce managers to use the flexibility provided in accounting standards to manage accruals opportunistically and provide misrepresentation of their reported earnings. There is evidence in the academic literature on the self-interested or opportunistic choices of managers.

The Earnings management literature proposes that accruals may be opportunistically manipulated by managers to conceal firm's poor performance and/or to defer a portion of unusually good current earnings to future years (DeAngelo, 1988), & (Guay, Kothari, & Watts,

1996). Discretionary accruals are used in earlier studies in the measurement of earnings management, earnings response coefficient etc. For instance, Becker, Defond, Jiambalvo, & Subramanyam (1998) use discretionary accruals through the cross-sectional variation of the Jones (1991) accruals estimation model as a direct measure of earnings management.

Gramling & Stone (2001) employ discretionary accruals to measure earnings response coefficient and the ability of earnings to predict cash flows. Francis, Schipper, & Vincent (2002) use discretionary accruals as an inverse measure of earnings quality. When earnings are manipulated these figures tend to distort a firm's real performance and lose their credibility in reflecting the economic substance of the underlying financial transactions of the firm and hence show low quality information.

However, managers may exercise discretion over accruals for informative reasons, i.e to convey their private information about future earnings (Francis et al., 2005). Subramanyam (1996) provides evidence that managers use discretionary accruals to make earnings more informative. According to Healy (1996) the informative motive assumes that managers select accruals to make reported earnings a precise signal of firm value, enhancing the value of accounting as a language for communicating with investors.

In my study Hypothesis 1 is about the relation between earnings quality, using the quality of discretionary accruals as a proxy, and stock price synchronicity. Prior literature shows that accruals are priced by the market. For the reason that accruals quality affects various aspects of a firm's information environment (Bhattacharya, Ecker, Olsson, & Schipper, 2011) and different informational aspects have different effects on price synchronicity, the relation between accruals quality and price synchronicity could be positive or negative.

Accruals quality may decrease (increase) price synchronicity when more (less) firm-specific information is incorporated into stock prices. An increase in accrual quality causes the firm-specific information more precise and the firm's market beta decreases in magnitude. A smaller market beta represents less co-movement between firm's returns and the market returns which

implies more firm-specific information and less market wide information is exhibited in stock price. Therefore, firms with higher (lower) accrual quality will have lower (higher) price synchronicity.

Assuming market efficiency, more informative accruals will be more value relevant. If managers act opportunistically then the discretionary accruals have positive effect on stock price synchronicity. On the other hand if the discretionary accruals are estimated by managers to efficiently communicate their private information about future earnings, then it is expected to exhibit negative effect on price synchronicity. Taking into consideration the above competing views I make the following hypothesis non-directional (the hypothesis is stated in null form).

*H<sub>0</sub>1: There is no association between stock price synchronicity and earnings quality*

## **Auditing and Agency Theory**

Auditing is demanded by firms to provide solution to information asymmetry problem between the contracting parties. Audits serve the purpose of promoting confidence among investors and boosting their trust in a firm's financial information, and so in accounting and financial reporting environment there is demand for audit services. The purpose of an audit is to form a view on whether the information presented in the financial report, taken as a whole, fairly reflects the financial position or reflects the economic substance underlying the financial transactions of a firm at a given date.

In the early 20th century auditor's responsibility was searching, discovering, and preventing fraud. This suggests that Auditors' role was like a policeman. Later on the focus has changed to giving reasonable assurance and verifying the truthfulness of financial information. The function of the audit was treated as adding credibility to financial statements. This credibility increases confidence among investors and other stakeholders in the operations of the firm. Beaver, Eger, Ryan, & Wolfson (1989) state that auditing, as a form of controlling, reduces the chances of managers hiding useful information from the principals. Managers, to add credibility to their financial information, signal firm-specific information to the outside market through external auditors. This is supported by Wallace (2004) where the study supports the view that auditing is a highly valued monitoring mechanism to add credibility to financial information.

The reputation an audit firm has for its quality multiplies the demand for audit services. Managers demand reputable auditors as they add additional credibility to the management's disclosures. According to Scott (1984), reputation is a major asset to an audit firm as it increases firm's returns and enhances investor's confidence in the financial information audited by auditors. In agency theory, when an agent has private information which is not available or obtainable by the principal, in other words when information asymmetry exists between the agent and the principal, then the principal may utilize an audit to reduce the information asymmetry. Also auditing alleviates information asymmetry between external and internal parties of a firm, that improves the quality of firm-specific information contained in financial statements (Balsam et al., 2003).

Jensen and Meckling (1976) propose that an audit is one type of monitoring mechanism that increases the value of the firm. Watts and Zimmerman's (1983) study explains the recognition of the need for audit since the development of business corporations in the 1200s and the gradual evolution of the mechanism. They emphasize the importance of audit for firms as a monitoring mechanism. Lee (1972) states that the most important requirement of the external audit is to increase the credibility of financial statements generated from accounting information. Audit quality signals the decision makers how well an audit detects and reports any material misstatements of financial information, reduces information asymmetry, and helps protect the interests of the stakeholders. An audit will be successful in reducing the opportunistic behavior costs (agency costs) borne by the manager only if it is expected that the auditor will report some discovered breaches of contract (Watts, R. L. & Zimmerman, 1983).

Francis and Wilson (1988) conduct a joint test of audit quality differentiation and demand for high quality audits as a function of agency costs. Much of these monitoring costs will involve accounting. For instance, the cost incurred in a financial audit is a monitoring cost. The demand for a larger audit firm, according to Francis and Wilson (1988), arises if the audit firm is technically capable (i.e. have the necessary expertise) to conduct the audit. So a firm's intention of hiring an external auditor, because external auditors are independent and technically capable (e.g. a specialist auditor because they are more competent in their audit procedures), may indicate that the firm prefers enhanced credibility in their disclosures to outside parties. Some studies on agency theory have revealed different types of management's opportunistic behaviour such as excessive perquisites, incorrect investment decisions, empire building etc. Audits serve the decision-makers' interest in strengthening accountability in financial reporting by reinforcing trust and confidence among the users of financial information.

The demand for audited financial statements grows as they provide useful information to investors in making informed judgments. Information quality is of little value if users do not perceive the information as credible. Information credibility arises only when auditors are able to influence the confidence of the users of financial statements, i.e. only when the auditors are able to detect and correct errors and give guidance to the preparers on preparing financial

statements and other related information correctly. Then only investors perceive the financial information audited by specialists as more credible (Titman & Trueman, 1986).

The IAASB's (2011) perspective on audit quality is that apart from auditing standards there are many inputs such as auditor skills and experience, ethical values and mindset, soundness of the audit methodology, effectiveness of audit tools, and the availability of adequate technical support. Schilder (1992) comments that the auditing standards be recognized and understood as only one of several components influencing audit quality. Francis, LaFond, Olsson, and Schipper (2005) specify that high quality audit increases the chances of detecting any questionable accounting practices by constraining overstated earnings and revealing misreporting.

The Financial Crisis Advisory Group (FCAG) of the Financial Accounting Standards Board (FASB), in its report (2009) highlights the need for high-quality accounting standards with a rigorous independent audit to produce high quality accounting information. In Jackson's (1926) opinion, the auditor should present the results in a more intelligent and forceful manner, provide an expression of expert opinion which is of greater worth to the client. Watts and Zimmerman (1986) contend that audit quality depends on the relevance of the auditor's report in examining contractual relationships and reporting on breaches. According to Becker, Defond, Jiambalvo, & Subramanyam (1998), high quality auditing acts as a deterrent to earnings management because management's reputation is likely to be damaged and firm value reduced if misreporting is detected and revealed. So the effectiveness of auditing, i.e. its ability to uncover and constrain the management of earnings, is dependent on the competence of the auditor.

But acquiring this competence is not instantaneous as it requires accumulation of skills, knowledge and expertise over a period of time and investment by audit firms in acquiring those skills. Audit firm's consistency in building these skills and reputation as a specialist is an important factor of audit quality. Auditor's reputation for delivering high quality audit has a significant effect on the demand for audit services. Their reputation (for example: as BigN auditor, specialist auditor etc.) for audit quality adds credibility to managers' disclosures to investors.

## **Audit quality and its proxies**

### **Audit firm size**

Several prior studies consider audit size as a proxy for audit quality. The idea was that BigN firms by default provide high quality audits. They use the size of the audit firm as an indicator of quality and suggest that BigN auditors provide more credible information compared to non BigN auditors. These studies outlined various reasons for large audit firms providing high quality audits. For example, De Angelo (1981) contends that an auditor size is a direct function of demand for audit services provided by BigN auditors, and markets are sensitive to this type of audit quality. Another example is that larger audit firms may face less client influence than smaller audit firms. According to Palmrose (1988) larger auditors have more to lose in terms of quasi-rents and reputation by providing sub-standard audits than do smaller auditors. So larger audit firms are less inclined to succumb to client pressures to 'cheat' thereby they provide high quality audits. Palmrose(1988) states that litigation is one of the few directly observable measures of audit quality and BigN audit firms are significantly less likely to be the subject of litigation than non BigN audit firms. More litigation incidences represent lower quality audits.

Francis, Mayhew, and Sparks (1999) support the idea that, firms that hire brand name auditors (BigN) experience lower levels of earnings management than firms that do not hire brand name auditors. Becker et al., (1998) use audit firm size as a determining factor and their results show that the clients of BigN audit firms report significantly lower discretionary accruals than the clients of non BigN firms. From prior research it is evident that BigN auditors are assumed to have better reputation for adding credibility to financial disclosures. Also Auditors from BigN audit firms perform higher-quality audits because they have more experience and expertise compared to non-BigN audit firm. This is stated in Dopuch and Simunic's (1982) study that stakeholders perceive brand name auditors (BigN) as providing greater credibility to financial statements as they have more observable characteristics such as specialized training associated with quality audits. But this may not be true in all circumstances and it can be challenging to determine the quality of audit based on the size of the audit firm. Examples include Arthur Anderson's audit of Enron, Ernst& Young's audit of One.tel who failed to detect and report material misstatements.

If auditors fail to demonstrate their competence and expertise in adding credibility to the management's disclosures, then the information asymmetry remains the same. As auditors put more effort into their act of detecting and reporting any breaches in the accounting system, investors assign more credibility to the reported financial information of client firms. Employing more effort comes from auditors' willingness to invest their time and effort in developing firm specific and industry specific knowledge. So it is conventional for audit firms to develop their expertise in specific industries and gain distinct capabilities in order to show their reputation and distinguish themselves from other audit firms. They also self proclaim their specializations through their websites to alert firms of their expertise.

### **Audit firm industry specialization**

According to De Angelo (1981) audit quality is influenced by competence and independence of the auditor. DeFond, Francis and Wong (2000) maintain that the competence of the auditor or audit firm can be understood by their industry specific knowledge. Specialists provide value to clients and employ effective audit methodologies which enhance audit's communicative value (IAASB, 2010). Industry expertise is important to understanding the contributions of audit firms to the functioning of securities markets.

According to Gramling and Stone (2001) the extent to which audit firms should specialize by industries is a long standing issue. Prior studies conclude that firms that employ specialists maintain high quality audits. A thorough scrutiny of financial reports by independent specialists makes financial reporting more useful and informative so that the quality of the auditor can be the adding factor in reducing a firm's information asymmetry. Auditors must have the ability to evaluate industry conditions and the effect of those conditions on their clients. This is possible only when the auditors have sufficient industry knowledge and experience with clients in the industry. Industry expertise helps auditors to differentiate themselves from their competitors in the audit market. When planning the audit the auditor should consider the audit implications of matters affecting their client's industry including economic conditions, government regulations, and change in technology (AICPA, 1998).

Gentner and Collins (1981) show that, experts are found to be more accurate than novices when it comes to assessing their own knowledge. Expertise can be perceived as a form of know-how in their technical area. It helps them to identify client firm's control weaknesses and to properly assess audit risk. Regulated industries require specialist knowledge and so much of the audit concentration is in those industries (Danos & Eichenseher.J.W., 1982). According to Porter (1985) specialization provides the audit firms a competitive advantage. There are claims that industry specialization improves client service (e.g. Lewis & Sappington, 1989).

Owhoso, Messier, & Lynch's (2002) experimental study concludes, with relevant evidence, that specialists generate a more effective audit than non-specialists mainly because of their specific industry and task related knowledge and expertise. Their study separates errors into mechanical errors and conceptual errors and reports that audit seniors are more effective in detecting mechanical errors, and audit managers are more effective at detecting conceptual errors for firms that operate in industries of specialization. So the effectiveness of error detection improves audit quality. Furthermore Smith-Lacroix, Durocher, & Gendron (2012) consent that, 'auditing profession is a tough profession and is becoming harder and more complex. The hidden aspects of expertise in modern systems depend on a combination of lengthy training and specialization, and specialization is the key to the character of modern abstract systems'.

Mayhew and Wilkins (2003), and Casterella, Francis, Lewis, & Walker (2004) explain why auditors pursue specialization strategies. They point out the reason that specialization allows the firms to offer a unique product to a fairly homogenous group by creating more to their audit clients. Audit firms have incentives to specialize so that they can offer a differentiated or specialized product to their client firms which their non-specialist counterparts could not offer. Adding to this, Low (2004) also finds that specialists are able to make high quality changes to their audit programs in terms of procedures etc.

Evidently, to gain knowledge about the industry, audit firms make investments so they receive fee premium to match their expertise. This view is supported by Craswell, Francis, and Taylor (1995) that specialists receive a significant fee premium. But DeFond, Francis, and Wong (2000) find that specialists receive a premium only if they are part of the BigN, otherwise they receive lower fees than average. A study by Kirshnan (2003) using a sample of 4,422 clients of BigN auditors for the period from 1989 to 1998, reports that the absolute value of discretionary accruals is lower for firms audited by BigN specialists than for firms audited by non- specialists.

Cahan, Guoping, & Sun (2008) emphasize that the demand for a specialist is determined by greater levels of information asymmetry which arises from the nature and levels of industry specific investment opportunity set (IOS) within an industry. Companies with high IOS levels, according to them, have greater asymmetry and resultantly the accounting and auditing issues of those companies are more complex and so creates demand for a specialist auditor. Ettredge, Kwon, & Lim (2009) support this view that the demand for quality differentiated audits is an increasing function of proxies for firms' agency costs evolving from information asymmetry between principals and agents.

Gul, Fung, & Jaggi (2009) study the moderating effect of industry specialization on the relationship between audit tenure and earnings quality. Lim and Tan (2008 & 2010) examine whether the association between the provision of non-audit services and audit quality impairment is conditional on auditor specialization. Their results exhibit positive association between the increased level of non-audit service and the incidence of issuing going-concern for the firms audited by specialists.

Barth and Schipper (2008) note that what is understandable depends on the accounting expertise, and knowledge of the transactions being reported upon. As stated by Krishnan (2003) industry specialists constrain earnings manipulation more than non-specialists. So specialists have positive impact on the earnings quality of their clients (Balsam et al., 2003). Supporting evidence is found by Carcello and Nagy (2004) that the firms audited by specialists

report superior quality of earnings presumably because of higher quality of audits. Habib and Bhuiyan (2011) find evidence that the clients of specialists have shorter audit report lag (ARL) where the ARL gauges audit efficiency. On the basis of the evidence from prior studies on the significance of industry specialization of audit firm, it is hypothesized that the monitoring ability of the Board increases by employing an external auditor, particularly it is expected that firms improve the informativeness of their accruals when they employ specialists as the specialists' expertise limits the management's opportunity to manipulate earnings.

### **Audit firm industry specialization and audit quality**

As discussed in the previous section, audit firm industry specialization is an important dimension of audit quality (e.g. Craswell et al., 1995). Audit firm specialization is observable and that specialists are perceived to understand the client's business and any audit related risks (Ahmed, Godfrey, & Saleh, 2008). Prior research provides evidence that specialist auditors produce more accurate and efficient audit. For instance, Solomon, Shields, & Whittington (1999) show that specialists have a greater quantity and more accurate knowledge of financial statement non-error factors for their industries of specialization relative to other industries.

Dunn and Mayhew (2004) conclude that specialists gain more industry specific knowledge and have more industry expertise than non-specialist auditors. Audit firms with specific industry specialization is believed to be effective at reducing both intentional and unintentional errors, in so doing, increases the reliability of financial information provided for decision making (Behn, Choi, & Kang, 2008). Their study construes that the earnings forecasts for the clients of specialists are more accurate and less dispersed than those for the clients of non-industry specialist non BigN auditors.

Craswell et al., (1995) insist that industry expertise is a quality indicator which helps differentiate audit quality among large audit firms. Balsam et al., (2003) examine whether industry specialization is associated with measures of earnings quality and their results suggest

that the earnings response coefficients (ERCs) of clients of industry expert audit firms are higher than those of firms audited by non-experts. Kwon, S.Y, Lim, & Tan (2007) support these results by showing an association of industry specialization with higher ERCs of client firms. In 2008 a study by Ahmed et al. finds that the use of specialists significantly reduces the client firm's cost of capital by 10 to 20 basis points, but these results hold for firms with weak governance mechanism and the use of specialist is associated with lower cost of debt.

The industry specific experience, and the knowledge level of the audit firm will have an effect on their decision making process. Their knowledge about their clients and about the client's industry will help reduce the probability of audit failure. These experts have better evidence-gathering capability and their cognitive skills and expertise help in making sound professional judgment. According to Becker et al., (1998) auditors who perform high-quality audits are better at identifying problematic auditing practices and are more likely to present reservations. Balsam et al., (2003) show that specialist auditors reduce the level of earning mismanagement.

A study in Taiwan on the relationship between audit quality and customer satisfaction between firms audited by specialists and non-specialists demonstrates that the customers of specialists are more satisfied with the audit outcome than the customers of non-specialists (Chen, Lin, & Zhou, 2005). Similar study (Fan & Wong, 2005) in Taiwan supports this idea that the level of industry specialization can effectively alleviate the adverse effects of client importance on earnings quality. From the above discussion it is apparent that prior research largely presumes industry specialization is limited to BigN auditors and they provide higher quality audits than non BigN auditors. Balsam et al., (2003) results state that within BigN brand, industry specialists provide higher quality audits than non-specialists. This could imply that the quality is associated more with their specialization than with firm size.

A study by Low (2004) on the risk assessment capacities of banking industry specialist auditors finds that the banking specialists perform better in assessing the risks of their client firms than auditors who were designated as specialists in other industries. So specialization in a specific

industry is a complementary status to auditors as they are expected to be more effective in planning and administering audits of firms that operate in the industries of their own specialization. Gramling and Stone (2001) view that there is dearth of research examining whether industry specialization is associated with audit quality. My study investigates the effect of industry specialization, measured based on their market share, on audit quality.

According to DeFond and Subramanyam (1998) auditors have incentives to constrain opportunistic accrual practices of firms because of litigation risk. Auditors are concerned about accruals and their management by the firm (J. R. Francis & Krishnan, 1999). According to Low (2004) audit firm industry specialization improves audit risk assessment and influences the perceived quality of audit planning decisions. Client firms with large accruals are more likely to be targeted for their misconduct so that auditors of these clients are more likely to be sued (Dechow, P.M, Richardson, & Sloan, 2008).

On the other hand, managerial discretion could enhance earnings informativeness by allowing communication of private information. So management may use discretionary accruals for opportunistic or informative purposes. Specialists use their industry specific expertise to detect and report any opportunistic discretionary accruals and/or to promote informative discretionary accruals. Balsam et al., (2003) examine the association between auditor industry specialization and earnings quality and find that clients of specialists have lower discretionary accruals and higher earnings response coefficient (ERC) than clients of non-specialists. Their study shows negative association between industry specialization and absolute discretionary accruals and positive association with earnings response coefficients. Krishnan (2003) measures industry specialization based on portfolio shares and relative market shares and their results confirm lower absolute discretionary accrual values for firms audited by specialist BigN than non-specialist BigN auditors.

The demand for a higher quality auditor (e.g. industry specialist auditor) may arise from certain changes in client firm's agency costs (Defond, 1992). Abbott and Parker (2000) find positive relation between audit committee independence and the selection of a specialist. The study

also states that the Board of directors' independence is positively related to the selection of a brand name specialist. This demand for the selection of specialists by board of directors and audit committees is consistent with the expectation that specialists provide high quality services and likely to reduce information asymmetry.

Craswell et al., (1995) claim that auditors with higher market share (i.e. specialist auditors) provide higher quality audits. Hogan and Jeter (1999) confirm that industry market shares are associated more with industry specialization. An audit firm with larger market share within client industries potentially differentiates it from audit firms with lower market shares (Mayhew & Wilkins, 2003). These audit firms, because of their larger market share, are able to develop more industry-specific knowledge and expertise, thereby enabling themselves to provide higher quality services than audit firms with a smaller market share. Earlier studies on audit quality suggest that specialists are capable of earning higher audit fees (fee premium) which rationalizes the view that specialists could deliver higher audit quality. Supporting evidence is found in Australia that the Australian auditors who are industry specialists earn a fee premium because of their largest market share, where the market share is measured at both city and national levels (Ferguson, A., Francis, J.R., & Stokes, D.J., 2003).

Some studies test whether auditor industry specialization increases the overall client disclosure quality and reduces the frequency of fraudulent financial reporting quality. In some studies there is a negative relationship between auditor industry specialization and financial fraud. According to Carcello and Nagy (2004) such negative relationship is weaker for larger clients because larger clients have more bargaining power and also the complexities involved in the operation of more than one industry. For instance, Dunn and Mayhew (2004) examine whether auditor industry specialization affects clients disclosure quality and they provide evidence that a positive relation exists between specialist audit firm and analyst rankings of disclosure quality. But this result is limited to unregulated industries as their study finds no such relation in regulated industries.

## **Audit firm industry specialization research in New Zealand**

The audit market in New Zealand is relatively small compared to the markets in the US, UK and Australia, but there are similarities in many respects. The recent Auditor Regulation Act 2011 provides a framework for the regulation and oversight of auditors and audit firms undertaking audits of listed firms in New Zealand. The Financial Markets Authority focuses on the quality reviews of audit firms and audits in New Zealand. In their recent report issued in June 2013 the FMA states that investor confidence is fundamental to financial markets. It depends on investor access to credible and reliable information on which to base decisions.

Audits of an issuer's financial statements are designed to build up investors' comfort that the statements comply with the expected financial reporting standards and give a true and fair view of the financial position of the issuer. Audit firms must have systems, policies and procedures which are necessary to comply with the auditing standards, Professional and Ethical Standards, Assurance Standards and other conduct requirements under legislation 6' (FMA, 2013). The FMA also acknowledges that the quality reviews of these systems, policies and procedures is the direct responsibility of the Authority and will carry out at least every four years for New Zealand registered audit firms.

Prior studies state that the audit market in New Zealand is similar in terms of legal requirements and auditing standards to that of other countries mentioned above in auditor specialization research (Baskerville & Hay, 2010; Hay & Jeter, 2011). It is also evident that BigN audit firms dominate the market in New Zealand too as in other countries. Most studies on audit firm industry specialization are restricted to the US market, so the conclusions may not hold confirmed for a smaller market such as New Zealand where there is a relatively new setting for industry specialization related auditing. So in that respect New Zealand provides a unique environment for auditor specialization research. Another advantage of this study is that both BigN and Non BigN audit firms and the client firms listed in the alternative market are included in the sample which has not been done in some prior New Zealand studies. This allows to me examine the differences in specialization choices of firms across the market and their effect on clients' discretionary accruals.

Using a sample of both listed and unlisted firms Hay and Jeter's (2011) study on the pricing of industry specialization in New Zealand reports that clients of specialist pay a fee premium and it was more evident in the case of city level specialization than in national level specialization. Their study also concludes that the majority of the fee premium is paid by larger firms and firms that had lower risk. Kwong and Hay (2012) suggest that industry specialization exists in audit firms in New Zealand but no significant evidence is testified on the association between specialization and audit fees. Habib and Bhuiyan (2011) find that the clients of specialists have shorter audit report lag (ARL) compared to clients of non specialists. The study also reports that after the adoption of the International Financial Reporting Standards (IFRS) in New Zealand the ARL of firms audited by non specialists increased. These results support that idea that audit firms have incentives to specialize so that they can offer a differentiated or specialized product to their client firms which their non specialist counterparts could not offer (see Mayhew & Wilkins, 2003; Casterella et al, 2004).

The above studies insinuate that audit firms in New Zealand have industry expertise but their specialization effect is not noticeable in their audit fees (eg. Kwong & Hay, 2012; Hay & Jeter, 2011). Similar studies in other markets confirm different results. For instance Craswell, Francis, and Taylor (1995) demonstrate that specialists receive a significant fee premium. DeFond, Francis, and Wong (2000) also support this but observes that specialists receive a premium only if they are part of the BigN, otherwise they receive lower fees than average. Kirshnan (2003) using a sample of 4,422 clients of BigN auditors for the period from 1989 to 1998, reports that the absolute value of discretionary accruals is lower for firms audited by BigN specialists than for firms audited by non specialists.

These mixed results as well as a significant gap in auditor industry specialization research in New Zealand prompt me to study the significance of industry specialization of auditors in New Zealand particularly their competence in detecting and reporting their client's discretionary accruals. Furthermore, I test the relevance of discretionary accruals in explaining stock returns. Derived from the evidence provided in previous studies it is expected that the specialists add credibility to the information provided by their client firms. As a result, synchronicity of firms that

employ specialists (high quality) is expected to be lower than for firms that employ non-specialists (low quality). New Zealand market though a small market, it is transparent and I presume that it has the ability to capture firm specific information audited by specialists accurately.

### **Correction for Self selection Bias**

This is based on the idea that individuals have some control over what they do, their associations with other firms, organizations etc and their attitudes towards their associated organizations. Clients may self select their audit firms for various reasons. Prior studies show that firms self-select specialist auditors based on their firm specific characteristics. For example firms with high earnings may employ a specialist auditor, or firms with high leverage may appoint a specialist auditor to signal the market that their financial information is reliable. Large firms have complex transactions, so they may self select specialist auditors because of the complexity of their tasks. Furthermore, I cannot rule out the possibility that large firms with higher financial reporting quality may self select into specialist audit firms. In this study I address this issue of self selection bias using Heckman's (1979) self selection model to detect and correct for any self selection bias in my results. In addition, as a sensitivity test I use 'the Treatment effect model' and the results are provided in Table 4.

## **Discretionary accruals, Audit firm industry specialization and Stock price synchronicity**

The capital asset pricing model (CAPM) links a firm's stock returns to the returns of the market where a firm's returns are regressed on a common factor or a set of common factors. A firm in observation is traded with the market, which means its share price aligns with the prices of other firms in the same market. Through this alignment the share price movements are synchronous with the other share prices or with the average market movements. Roll's (1988) market model suggests that the amount of firm specific information impounded into stock price should be mirrored in stock price synchronicity ( $R^2$ ).

The first component or common component in the market model is related to common factors (market wide and/or industry wide factors) and the other component is related to firm-specific factors. The ratio of common (i.e. market and/or industry) return variation to total return variation is conveyed as synchronicity. A high (low) synchronicity denotes more (less) market and/or industry specific information and less (more) firm-specific information is impounded into stock price. The quality of a firm's information environment reduces, or is inversely related to, the  $R^2$ .

Prior research shows that discretionary accruals are priced by the market. When managers employ industry specialist auditors, the level of discretionary accruals signals the market about the quality of earnings. Subramanyam (1996) identifies cash flow from operations (CFO), non-discretionary accruals and discretionary accruals as the main components of net income and regress stock returns on net income. Francis, Reichelt, and Wang (2005) examine the association between BigN auditors' industry specialization and the level of discretionary accruals reported in the US market and they conclude that the absolute discretionary accruals reported by BigN specialists are significantly lower than the accruals reported by non-specialists.

The clients of industry specialist auditors have lower levels of discretionary accruals than clients of non-specialist auditors (Balsam et al., 2003). Mascarenhas, Cahan, & Naiker (2008) consider that specialists by lowering absolute discretionary accruals may reduce opportunism but at the same time, they may constrain the manager's ability to use accruals to reveal their private information. Prior empirical evidence, based on the opportunistic behaviour, shows that audit firm industry specialization is positively associated with client disclosure quality, and negatively associated with firm's discretionary accruals levels. However, it can be argued that specialists, by employing their industry specific knowledge of a better understanding of the earnings distribution in an industry, would be able to distinguish between opportunistic and informative discretionary accruals.

If the auditors are convinced that the financial information contains errors, they may force their clients to disclose correct and detailed information thereby reduce information asymmetry. DeAngelo's (1981) definition on audit quality is worth observing here. The definition says 'the audit quality is the market- assessed joint probability that a given auditor will both detect material misstatements in the client's financial statements and report the material misstatements'. Fan and Wong (2002) state that auditors play corporate governance, i.e. monitoring, role. High quality auditors (e.g. specialists) compared to low quality auditors (i.e. non specialists) are likely to augment the integrity of firm-specific information contained in financial statements, and thus facilitate synchronization of firm-specific information into stock prices. Synchronicity for firms that employ specialists is expected to be lower than for firms that employ non-specialists.

Though the separation of opportunistic and informative (or efficient) discretionary accruals is not easy, it is expected that specialist auditors, compared to their non specialist counterparts, have the ability to discriminate between the two, and then, as De Angelo (1981) defined, are able to constrain the opportunistic and allow the informative. Clients have economic reason for demanding an auditor that allows informative discretionary accruals seeing as prior research demonstrates that both opportunistic and informative accruals are priced by the market (Subramanyam, 1996).

Following Hypothesis1, where the effect of discretionary accruals (either opportunistic or informative) and stock price synchronicity is tested, I further intend to test whether this effect is more efficiently pronounced for firms audited by industry specialists. This may provide empirical evidence on whether the specialists are able to distinguish between the opportunistic and informative nature of accruals and, by using their industry specific knowledge, are able to constrain (allow) opportunistic (informative) accruals. It also tests whether the market perceives the quality of specialists and whether that quality is reflected in stock returns.

So far, to my knowledge, no research has been done in New Zealand on the role of audit quality, by employing specialists, in capitalizing more firm-specific quality information into firm's stock price. In order to provide empirical evidence on this the following hypothesis is stated in a null form.

*H<sub>0</sub>2: There is no association between stock price synchronicity and earnings quality for clients audited by industry specialists.*

## Chapter 4: Sample selection and Research Design

### Sample selection:

The sample is selected from the firms listed on the New Zealand Stock Exchange (NZX) for the fiscal periods from 2001 to 2011. The observations comprise of firms listed on both the Main board (NZSX) and the alternative market (NZAX). The idea is to investigate the incremental effect of audit firms' industry specialization on the earnings management of these firms and how this effect synchronizes firm specific accrual information into stock returns. To test the empirical models, data is collected from various secondary sources. Stock price data is collected from Data Stream and NZX Company Research databases. To measure other variables for industry specialization, discretionary accruals, and stock return synchronicity models the data is collected manually from NZX Company Research and company's annual reports.

Table 2 Panel A provides the sample selection procedure. The initial sample contains a total of 1140 firm years that comprises 123 firms. Firms in finance, investment, and property related industries are excluded as these firms have different regulatory requirements, unique capital structure, and different income measurement rules. Klein (2002) suggests that inclusion of these firms may result in a different accrual process which is not captured by the Modified Jones model I use in this study to estimate discretionary accruals. Since I use cross sectional data I impose no restrictions on the minimum number of firm years for a firm. Firms belong to thirteen different industries are included in the final sample. The final sample consists of 621 firm year observations for the financial periods from 2001 to 2011.

Table 2 Panel B gives an overview of industry wise classification of firms. This classification is done using the NZX descriptors. Using the market share approach, audit firms are ranked as Rank1 and Rank2 firms according to their specialization. Out of a total of 13 industries,

consumer industry has the largest number of firms with 15 firms and a total of 150 firm years. PWC is the specialist auditor ranked first for the industry and GT is placed in the second rank. Next to the consumer industry, Intermediate and durables industry sector has a total of 10 firms with 97 firm years for observation. PWC ranks first in this industry with Deloitte in second rank. To test the hypotheses stated in chapter 3, I design the following models to measure Synchronicity, Discretionary accruals and Industry Specialization.

## Measurement of Stock price synchronicity

Following Ross (1988) and Morck et al., (2000), I state that synchronicity is based on market model regressions for each firm in the sample observations of daily stock returns on the returns of related industry index and the market index (NZX50). Based on the synchronicity model, I examine the correlation between discretionary accruals and the information content of stock price by using data for the period from 2001 to 2011 for the firms listed on the New Zealand stock market.  $R^2$  estimations are calculated from the two factor model displayed below, where the individual daily stock returns are regressed on the equally-weighted industry daily returns and equally weighted market daily returns.

$$R_{i,t} = \alpha + \beta_1 R_{m,t} + \beta_2 R_{j,t} + \varepsilon_{i,t} \dots \dots \dots (1)$$

For each firm and each period (year), on an average 250 observations are used to estimate the  $R^2$  of the model.  $R^2$  is calculated by regressing daily stock returns on the market returns and industry returns. The regression statistic ( $R^2$ ), measures the percentage of variation in daily stock returns of firm  $i$  as explained by industry and market returns. Then following Morck et al., (2000) and Piotroski and Roulstone (2004) I use the following formulae to calculate the logistic transformation of  $R^2$ . This generates a continuous variable that is more normally distributed than the value bounded variable within the intervals of 0 and 1. This logistic transformation provides synchronicity (SYNC) value for firm  $i$  in period  $t$ .

$$SYNC_{i,t} = R^2 = \log \left[ \frac{R^2}{1-R^2} \right] \dots \dots \dots (2)$$

The synchronicity value (SYNC) from the above equation is considered as dependent variable and regressed on the discretionary accruals (DISACC) of the firm. Furthermore, an interaction variable is created for the discretionary accruals audited by industry specialists (DISACC\*INDSPE) and is used as an explanatory variable along with other firm specific variables that influence the synchronicity of the firm.

## Measurement of Discretionary accruals

I split total accruals into non discretionary and discretionary accruals. Following Jones (1991), Dechow et al, (1995) I first calculate total accruals, then estimate non discretionary accruals using Jones (1991) model as modified by Dechow et al (1995), where total accruals, the difference in changes in revenue and changes in accounts receivables, and changes in property, plant and equipment are scaled by lagged total assets of the firm. In addition to these, the return on assets is included as an explanatory variable. DeFond and Jiambalvo (1994) use the Modified version of the Jones model to estimate the parameters for their cross sectional data. There is further evidence that the Modified Jones model performs better for cross sectional data than for time series data (see Bartov, Gul, & Tsui, 2000). Besides, in examining the relationship between earnings management and audit quality issues, prior studies such as Becker et al., (1998), and Krishnan (2003) employ the Modified Jones model and provide empirical results. It was also presumed that this model provides the most powerful tests of earnings management (Dechow, Sloan, & Sweeney, 1995). Considering this substantiation, I apply the Modified Jones model for the calculation of discretionary accruals.

### Modified Jones Model

#### Step 1: Calculates discretionary accruals.

$$TACC_{i,t} = \frac{TACC_{i,t}}{TA_{i,t-1}} = \alpha_{i,t} \left[ \frac{1}{TA_{i,t-1}} \right] + \beta_1 \left[ \frac{(\Delta REV - \Delta AR)_{i,t}}{TA_{i,t-1}} \right] + \beta_2 \left[ \frac{PPE_{i,t}}{TA_{i,t-1}} \right] + \beta_3 ROA_{i,t} + \varepsilon_{i,t}$$

.....(3)

The residuals ( $\varepsilon_{i,t}$ ) from the above model represent discretionary accruals (DISACC) for firm  $i$  in year  $t$ .

## Step 2: Discretionary accruals and Stock Price Synchronicity model

To test Hypothesis 1 on the association between earnings quality (using DISACC as proxy) and stock return synchronicity the following model is used.

$$SYNC_{i,t} = \alpha + \beta_1 CFO_{i,t} + \beta_2 NDA_{i,t} + \beta_3 DISACC_{i,t} + \beta_4 Size_{i,t} + \beta_5 Leverage_{i,t} + \beta_6 Growth_{i,t} + \sum_{n=1}^9 Ind\ Dummies + \sum_{2001}^{2011} Year\ Dummies + \varepsilon_{i,t} \dots \dots \dots (4)$$

In this model the variable of interest is DISACC.  $B_3$  is expected to be significantly positive (negative) when the management's estimations of discretionary accruals are opportunistic (informative). Prior studies show evidence that CFO, NDA, Size, Leverage, and Growth of a firm have influence on the performance and stock returns of a firm, so these variables are used to control for their effects. Explanation on measurement of the variables is given in Table 1.

## Measurement of Industry specialization

### Market share approach:

According to Palmrose (1986) the rationale for defining specialists on the basis of market share is that audit firms spend large amounts on acquiring industry specialist knowledge so they tend to have large market shares because they can split the knowledge –developing costs and achieve economies of scales. Some studies state that audit firms focus on the relative distribution of audit services across various industries for each audit firm.

Audit firm market share is most likely to produce fee premiums, especially in regulated industries. Audit firms seek recognition as industry specialists (Hogan & Jeter, 1999; Casterella et al., 2004), and it allows them to earn audit premiums for their specialization (Porter, 1985; Mayhew and Wilkins, 2003; Ferguson et al., 2003; Francis et al., 2005). Ward, Elder, & Kattelus (1994) examine the effect of audit market share on the fee premiums and find positive association between audit firm industry expertise and fees. Their study tests a model of municipal audit fees using the audits of 171 Michigan municipalities. In the same year another

study in the US, O’Keefe, Simunic, & Stein (1994) examine the relation between audit firm industry market share and audit fees and the results show that audit firms with high market share receive higher fees. If the market share is high, then the clients perceive that the audit firm is an expert and are willing to pay a higher audit fees as an incentive to audit firm’s expertise.

Though Palmrose (1986), O’Keefe et al., (1994) find positive relation, some other studies such as Pearson and Trompeter (1994) find negative relation between industry market share and audit fees. So there are mixed results on the relation between auditor market share and audit fees they charge. According to Danos and Eichenseher (1982) the effects of audit firm industry expertise on fees are industry dependent, time dependent or both. Some suggest that the nature of pricing (i.e. whether it is cost based or market based) in the audit services market and perceived differences in the industry expertise will jointly determine the relation between audit firm industry market share and audit fees (e.g. Cullinan,1999). I use the audit market share approach to measure the industry specialization of auditors. In line with previous studies (Mayhew & Wilkins, 2003; Carcello & Nagy, 2004; Chen et al., 2005) I use the market share as a proxy for industry specialization and apply 20% market share threshold across all industries. For market share calculations the following model (Model 5) is used.

**Audit market share calculation for firm *i* in year *t*:**

$$\frac{\text{Sum of sales revenue of the firms in an industry audited by the audit firm}}{\text{Total industry sales}}$$

$$AUD\ MRKTSHR_{i,k} = \frac{\sum_{j=1}^J \sqrt{REV_{ijk}}}{\sum_{i=1}^I \sum_{j=1}^J \sqrt{REV_{ijk}}} \dots\dots\dots(5)$$

Francis and Schipper (1999), Chaney, Jeter, and Shivakumar (2004), and Ettredge, Kwon and Lim (2009) establish that the demand for higher quality audit is based on certain firm specific characteristics such as size, growth opportunities, capital intensity, member of a regulated industry, investment opportunity set etc. In the following industry specialization model (Model 6) I use these variables to test whether these firm specific factors influence the demand for a specialist auditor. Mascarenhas, Cahan, and Naiker (2008) adopt the above mentioned explanatory variables in their measure of industry specialist auditor. The number of firms differs

from industry to industry. The greatest proportion of the sample is in the consumer industry (23.1%) followed by intermediate and durables with a proportion of 15.4%. A detailed summary of the sample classification showing firm classification according to the industry, 1<sup>st</sup> ranked and 2<sup>nd</sup> ranked audit firms based on the market share approach, number of firms and number of firm year observations are provided in Table 2, Panel B.

### ***Industry specialization model:***

$$\begin{aligned}
 INDSPE_{i,t} = & \alpha + \beta_1 SIZE_{i,t} + \beta_2 CAPINT_{i,t} + \beta_3 LEV_{i,t} + \beta_4 ISSUE_{i,t} + \beta_5 LOSS_{i,t} + \beta_6 OPCYCLE_{i,t} \\
 & + \beta_7 \frac{P}{E}_{i,t} + \beta_8 ATO_{i,t} + \beta_9 CURR_{i,t} + \beta_{10} QUICKR_{i,t} + \beta_{11} REGU_{i,t} + \varepsilon_{i,t} \dots \dots (6)
 \end{aligned}$$

### **Other approaches:**

#### ***Portfolio approach***

Specialist audit firms presumably devote most of their resources into developing their industry-specific knowledge, so they focus on the industries that could generate most revenues for them. This approach considers each audit firm individually by considering the distribution of services that each audit firm spreads among industries. According to Neal and Riley (2004) this approach takes specialists in industries where they generate the most revenue and so are likely to devote the maximum amount of their resources. To calculate the portfolio share, an auditor's revenue in each industry is divided by the auditor's total revenue.

#### ***Weighted market share approach***

Neal and Riley (2004) develop this approach by combining the first two (i.e. market share and portfolio) approaches. Gramling and Stone (2001) state that the market shares of audit firm  $i$  in the industry  $k$  is measured as the total audit fees earned by audit firm  $i$  in industry  $k$  deflated by the total audit fees generated by all the clients in the industry  $k$ .

#### ***Self proclaimed approach***

Audit firms promote their specialist knowledge and expertise (by self proclaiming) through their websites and other sources. Hogan and Jeter (1999) refer to these self proclaimed firms. Some examples from websites are provided in Table 7.

## Discretionary accruals, Audit firm industry specialization and Stock price synchronicity

Based on the evidence provided in previous studies it is expected that the industry specialist auditors add credibility to the information provided by their client firms. As a result, synchronicity of firms that employ industry specialist (high quality) auditor is expected to be lower than for firms that employ non-specialist (low quality) auditor.

Specialists use their industry specific expertise to detect and report any opportunistic discretionary accruals and/or to promote informative discretionary accruals. Balsam et al., (2003) examine the association between auditor industry specialization and earnings quality and find that clients of specialists have lower discretionary accruals compared to clients of non-specialists. I apply the following model to test whether specialists are able to detect the misstatements and/or approve informative discretionary accruals of a firm. Also to observe the influence of specialists on nondiscretionary accruals and cash flows from operations, I have included three additional explanatory interaction variables in the model.

Conclusively to test hypothesis 2 and provide empirical evidence on whether the market recognizes the quality of a specialist auditor and the discretionary accruals audited by specialists and whether that quality is capitalized into stock returns, I run the following model.

$$\begin{aligned}
 SYNC_{i,t} = & \alpha + \beta_1 CFO_{i,t} + \beta_2 NDA_{i,t} + \beta_3 DISACC_{i,t} + \beta_4 Size_{i,t} + \beta_5 Leverage_{i,t} + \beta_6 Growth_{i,t} \\
 & + \beta_7 INDSPE_{i,t} + \beta_8 CFO_{i,t} \times INDSPE_{i,t} + \beta_9 NDA_{i,t} \times INDSPE_{i,t} \\
 & + \beta_{10} DISACC_{i,t} \times INDSPE_{i,t} + \sum_{n=1}^9 Ind\ Dummies + \sum_{2001}^{2011} Year\ Dummies + \varepsilon_{i,t} \\
 & \dots\dots\dots (7)
 \end{aligned}$$

In the above equation the variables of interest are INDSPE, and DISACC\*INDSPE.

## Chapter 5: Empirical results

This section presents the results of empirical tests on the relation between audit firm industry specialization and discretionary accruals, and on the effect discretionary accruals of firms audited by specialists on the synchronicity levels of firm's stock prices.

### Probit regression results:

The first stage Probit regression results on the effect on INDSPE of independent variables specified in the industry specialization model explain that, except Current ratio, Quick ratio and REGU, other variables do not have statistically significant effects. Table 4, Panel A shows the effect of independent variables on INDSPE. Current ratio is statistically significant with a z-value of -2.73 significant at 1% level and Quick and REGU with z-values of 2.08 and -2.34 respectively, significant at 5% level in explaining their effect on Industry specialization. The rest of the variables do not show any significant results.

### Descriptive analysis

The descriptive statistics for the variables in Industry specialization equation are reported in Table-3. The results show the mean, median, standard deviation and minimum and maximum values of each variable in the model. Binary values (1, 0) are used to represent specialist and non-specialist auditors respectively. The mean value of specialization in the overall sample of 621 observations is 0.52 with a standard deviation of 0.50. These figures do not explain much about the effect of specialization on any dependent variable. The mean value of the size of firms is 11.97 and firm sizes by their log values range 7.34 to 16.01 with a standard deviation of 1.83. The reason for this standard deviation could be that the sample consists of small firms and big firms ranging from firms listed in NZX10 to firms listed on NZAX which is a small market.

The New Zealand market is relatively smaller in size, so I have included firms from the NZAX in the sample. Accordingly the capital intensity levels range from 0.44 for small firms to 312.94 for larger firms with mean value and standard deviation of 3.48 and 23.48 respectively. Obviously the range in firm size explains the range in capital intensity. The average leverage value of all firms is 0.43 showing a standard deviation of 0.20, with minimum and maximum values of 0.00 and 1.10 respectively. High leverage ratios could indicate that these firms may have high debt levels. Issue and Loss are binary variables that represent 0 and 1.

The operating cycle of a firm depends on the accounts receivable and inventory levels. For large firms it is expected that they comparatively deal with large amounts of accounts receivable and inventory so their OPCYCLE is relatively larger 937 days and for small firms 46.83 days with an average of 128 days. The ATO levels range from 0.14 times to 24.83 times for the average sample period with a significant standard deviation of 1.85. These figures do not necessarily depend on the size but on the firm's turnover levels. Current and quick ratios scales vary from small firms to large firms ranging from 0.15 to 29.1 with average standard deviation of approximately 2.7, mean value of 2.1741 and 1.59 for current and quick ratios respectively. Firms with high current and quick ratios are relatively in a better liquidity position. Firms attest both negative and positive discretionary accruals. The minimum value of DISACC is -0.50 and maximum is 0.65 showing both negative and positive discretionary accruals. The mean value of DISACC is -0.01 and a standard deviation of 0.10. The synchronicity values ranges from -2.89 to 2.52 with a standard deviation of 1.12 and a mean value of -1.04.

## **Correlation analysis**

Table 5 exhibits the correlation coefficients of the variables in model 1 and model 2. The main sample includes 621 firm year observations during the period from 2001 to 2011. All variables are winsorized at the top and bottom 5%. To measure the strength and direction of the linear relationship between the independent variables identified in the model a correlation matrix is presented. Based on the correlation results it is confirmed that there is no perfect and strong multi-collinearity between the independent variables.

Pearson correlations show that SYNC is positively related to Size, leverage, PE, NDA and CFO and negatively related to CapInt, Loss, Opcycle, ATO, Current and quick ratios, growth, and discretionary accruals (-0.040). Correlations are consistent with the hypothesis and with prior studies that discretionary accruals are negatively related to synchronicity. A positive correlation exists between industry specialization and discretionary accruals but do not show significant results.

## **Correction for sample selection bias**

### **Heckman two-step method**

To test for sample selection bias in this model I use the Heckman two-step method. In this method there are two models. One is a 'Selection model' which is a Probit model used for industry specialization (INDSPE), and the other is 'Outcome model' used to test the discretionary accruals (DISACC) of the firm. The Probit equation is the selection equation to check the factors that would make the client firms self select a specialist auditor. In the second equation the effects of independent variables on DISACC are tested. Heckman method is based on the assumption that the selection model and the outcome model can be related to each other through their error terms which may hold any unobservable factor that influences self selection. The likelihood ratio indicating the relation between the error terms of each model is indicated by the 'rho' value. A negative (positive) rho ( $\rho$ ) value shows there is negative (positive) relation between the error terms. A negative relation indicates no self selection bias. The results (in Table 4: Panel A) show that the rho value is -0.930 as there is high negative correlation between the two error terms. The coefficient of the Lambda is -0.126 with a p-value of 0.085 this is statistically significant at 10%. The results show that client firms in New Zealand do not self select their audit firms meaning.

### **Sensitivity test: Treatment effect model**

As a sensitivity test I use the 2 step treatment effect model. The results (in Table 4: Panel B) support the conclusions drawn from the Heckman model. The results show a rho ( $\rho$ ) value of -0.826 with a coefficient of -0.093 and statistically significant at 10% level. Because I did not find any evidence of self selection bias I did not include the Inverse mills ratio (IMR) as an independent variable in the discretionary accruals model.

## Analysis of Regression results

The primary interest of this research is to study the effect of industry specialization on stock return synchronicity when the specialization attribute of an audit firm influences the discretionary accruals estimated by the management of a firm. Synchronicity is regressed on both discretionary and non discretionary accruals. The interest is on the interaction between discretionary accruals and industry specialization (DISACC\*INDSPE) i.e. whether the discretionary accruals of clients audited by specialist are more informative in explaining their impact on stock returns, where informativeness is measured by synchronicity level. So I examine the association between earnings quality and synchronicity. As explained in chapter 4 the discretionary accruals are used as a proxy for earnings quality. Accrual quality, given its significance in measuring firm performance, could affect industry-specific and firm-specific information. More credible firm specific information reduces synchronicity.

As specialists are expected to constrain (allow) any opportunistic (informative) discretionary accruals, if the quality of these accruals is synchronized into stock prices, then it (DISACC\*INDSPE) will have low synchronicity effect compared to DISACC audited by non specialists. Other explanatory variables such as Size, Leverage, and Growth are included as control variables as prior studies verify that they have influence on stock returns. To capture the fixed effects of time and industry, year dummies and industry dummies are included in the model. The model includes data for 13 different industries and 11 years of time series data, so 12 indicator variables to capture industry effects and 10 year indicators to capture time effects are included in the model.

Table 6, **Panel A** shows regression results of SYNC base model i.e. for firms audited by both specialists and non specialists where a specialist auditor is determined based on the market share approach. The model has a  $R^2$  of 57.3% with an F-statistic of 30.10. Size and Leverage, Growth and CFO are positively related to SYNC with co-efficient values of 0.434 (t=22.77), 0.254 (t=1.26), 0.011(t=1.15), and 0.206 (t=0.83) respectively. Whereas accruals, both discretionary and non discretionary, are negatively associated with SYNC. The co-efficient (t-statistics) values of DISACC and NDA are -0.296 (-0.40) and -0.020 (-0.06) respectively. The

negative co-efficient values may indicate that managers use discretionary accruals to convey their private information to the market and investors treat DISACC as more informative than opportunistic. However there is no strong evidence to support this proposition as the results are not statistically significant ( $p > 0.1$ ). Industry specialists, as the theory suggests, are expected to improve the quality of information, so specialists testify negative effect on synchronicity, i.e. they are associated with lower synchronicity as more informative or quality information is allowed by specialist auditor. In Table 6, Panel B the industry specialization coefficient is significantly negative (0.172,  $t = -1.96$  and  $p = 0.05$ ). This supports the argument that industry specialists are able to convey more credible information to investors. This allows more firm-specific information being incorporated into stock prices and exhibit low synchronicity.

**Panel B** also shows regression results where the effect of discretionary accruals of firms audited by both specialists and non specialists on SYNC is tested. DISACC\*INDSPE (DISACC) represents discretionary accruals of firms audited by specialists (non specialists). The model has a  $R^2$  of 57.9% with F-statistic of 26.83. The explanatory variables NDA, Size, Leverage and Growth are positively associated with SYNC. The coefficient (t-statistic) values of these variables are 0.722 (0.94), 0.436 (22.84), 0.296 (1.46), 0.012 (1.31) respectively. CFO, DISACC, and INDSPE are negatively associated and have coefficients (t-statistics) of -0.091 (-0.24), -0.852 (-1.94), -0.172 (-1.96) respectively. The interaction of industry specialization with CFO, NDA, DISACC shows coefficients (t-statistic) of 0.554 (1.22), -3.035 (-2.24), and 1.584 (2.82) respectively. The association between size and SYNC is statistically significant at 1%, whereas INDSPE, NDA\*INDSPE, and DISACC\*INDSPE are significant at the 5% level, and the discretionary accruals of clients of non specialist firms is significantly associated at 10%.

The nondiscretionary accruals of firms audited by non specialists present high synchronicity (co-efficient = 0.72;  $t = 0.94$ ). However the results are not statistically significant ( $p = 0.347$ ). Nondiscretionary accruals are based on economic fundamentals and their quality is related to firm's innate characteristics i.e. business model and operating environment etc (Francis et al., 2005). Firms that belong to the same industry have similar innate characteristics, so the industry specific knowledge of auditors helps in enhancing the quality of nondiscretionary accruals. The NDA of firms audited by specialists (NDA\*INDSPE), as expected, exhibit

negative effect on SYNC and significant ( $p= 0.026$ ). Interestingly the DISACC of firms audited by NONSPE are negatively related to SYNC with a co-efficient of -0.852 and t-statistic of -1.94 but significant at the 10% level.

The negative coefficient of DISACC in Panel A suggests that the market may have priced the accruals as informative, though not significant, and lowered synchronicity. Auditors have more control over discretionary accruals as discretionary accruals involve more subjectivity, the way the auditor interprets and enforces GAAP will be important in determining the informativeness of the discretionary accruals that ultimately are reported by the client (Mascarenhas et al., 2008). The coefficient of the interaction variable DISACC\*INDSPE explains the incremental effect of a specialist auditor on the association between discretionary accruals and price synchronicity. From the results in Panel B it is evident that DISACC\*INDSPE is positive and significant ( $p= 0.005$ ) indicating that, rather showing any incremental negative effect, the DISACC\*INDSPE is positively related to price synchronicity.

The general perception is that low levels of accruals exhibit good quality information and low synchronicity, the results from my regressions show statistically significant evidence for such association in New Zealand. The findings may imply that specialists constrain opportunistic discretionary accruals but they are no better than non specialists in differentiating between the opportunistic and the informative nature of discretionary accruals. In addition they may treat a large part of discretionary accruals as opportunistic and minimize them. Supporting evidence is found in prior studies. For instance, specialists may reduce discretionary accruals and they treat both opportunistic and informative discretionary accruals similarly, they are more concerned about the level of earnings management than the underlying motive i.e. opportunistic or informative motive for earnings management (Mascarenhas et al., 2008).

Industry experienced auditors are better able to detect errors within their industry specialization than outside of their specialization (Owhoso et al., 2002), reduce earnings management of their clients and increase the market's perception of the quality of their accruals (Balsam et al., 2003). On the other hand, firms' accruals may be of opportunistic (informative) nature to a

larger (smaller) extent, so specialists detect and minimize (allow) opportunistic (informative) accruals. Consistent with Balsam et al. (2003) the significant results of  $DISACC*INDSPE$  indicate that specialists increase the value relevance of earnings by improving accruals. I do not find support for the argument that industry specialists are more likely to allow informative accruals. One reason for specialists not able to differentiate between opportunistic and informative accruals may be because discretionary accruals are more firm specific or idiosyncratic rather than industry specific. Therefore auditors' industry knowledge is less useful in this differentiation and in enhancing the informativeness of discretionary accruals.

Alternatively, specialist auditors, with their superior industry specific knowledge, are better at addressing the risks, accounting practices, and other issues associated with the industry. According to Krishnan (2003) specialist auditors are likely to concentrate on industry specific best practices, industry specific risks and errors, unusual transactions etc. This allows them to evaluate management's strategic and operating initiatives against the industry standards, and industry and market trends. This may improve client's industry specific, rather than firm specific information, and thus increases  $R^2$  showing positive association between  $DISACC*INDSPE$  and Synchronicity. It is presumed that the market does appear to regard the quality of discretionary accruals audited by specialists as credible in approximating the stock returns so they are generously capitalized into stock returns. Hypothesis 2 states that there is no association between SYNC and  $DISACC*INDSPE$  and since there is no statistically significant evidence to support this I reject the null hypothesis.

The other control variables, cash flow from operations (CFO), size of the firm (Size), Nondiscretionary accruals (NDA), Leverage and Growth, and the interaction variable  $CFO*INDSPE$  show positive coefficients. The interaction term  $CFO*INDSPE$  does not show statistically significant results but  $NDA*INDSPE$  is significant at the 5% level. The statistically insignificant value of  $CFO*INDSPE$  explains that cash flows are easy to audit and the figures are straight forward with no probability for managerial opportunistic estimations, so the results show no difference between the figures shown by clients of specialists and non specialists.

## Chapter 6. Conclusion and Limitations

Earnings quality and Synchronicity are the two significant measures in finance and accounting literature. Synchronicity is used as an important indicator of firm specific information as it symbolizes the co-movement of firm specific returns with industry and market returns. Low price synchronicity represents more firm specific information compared to industry and market information impounded into stock prices. The research interest is on the interaction between discretionary accruals and industry specialization i.e. whether the discretionary accruals of clients audited by specialist are more informative in explaining their impact on stock returns, here the informativeness is measured by synchronicity level.

This study contributes to the auditing literature by examining the approaches that audit firms carry out to differentiate their services, and whether the clients of industry specialist audit firms are benefited by reducing information asymmetry. The study also investigates the benefits to client firms from the perspective of investors in financial markets, and whether the specialization is associated with investors' perception of financial statement credibility. High quality auditors (i.e. specialists) compared to low quality auditors (i.e. non specialists) are likely to enhance the credibility of firm-specific information, and thus smooth the synchronization of firm-specific information into stock prices.

To examine the investors' perception of audit firm specialization and the effect of discretionary accruals audited by specialists on stock returns, two models are formulated using capital asset pricing model (CAPM) using synchronicity as dependent variable. The first model is designed to test the effect of accruals on synchronicity irrespective of clients of specialist or non specialist audit firms. The second model distinguishes specialist from non specialist firms and tests their effect separately on synchronicity. Prior studies show that client firms may self select specialist auditors and consequently the conclusions can be biased. To elude this effect Heckman two-step method is employed to control for self selection bias.

The results from the two above mentioned models provide evidence that audit firms employ differentiation strategies to market their services. The results from the first model demonstrate a negative effect of discretionary accruals on synchronicity. Discretionary accruals, in general, are treated as opportunistic but prior studies show that managers may estimate discretionary accruals for informative reasons. The findings suggest that specialists constrain opportunistic discretionary accruals but they are no better than non specialists in differentiating between the opportunistic and the informative nature of accruals. Similar results were found in prior studies that industry experienced auditors are better able to detect errors within their industry specialization than outside their specialization and reduce earnings management by their clients and increase the market's perception about the quality of their accruals.

New Zealand capital market is relatively small compared to the markets in USA, UK and Australia. The firms in the sample operate in the same jurisdiction, so the governance rules are same for all firms. The literature on stock return synchronicity portrays two different views of  $R^2$  analysis. Some studies see it as an information measure and others noise measure. Chapter 3 has a detailed discussion on this. This study is based on the 'information measure' so results could be different if the tests are based on the noise measure.

In New Zealand BigN firms have more industry specializations compared to non-BigN firms which have no significant specializations. WHK and GRT are ranked 2<sup>nd</sup> in their specialization of mining and consumer industries respectively. Industry specialization is measured using the market share approach and the univariate results of discretionary accruals audited by specialists and non specialists show some mean differences (SPE=-0.008 and NONSPE= -0.0185) and standard deviations of 0.105 and 0.085 respectively. But the test of difference is -1.319 not statistically significant (p= 0.906). The results do not show significant differences between a specialist and non specialist auditor in detecting earnings management. Based on this, the results can be inconclusive whether the differentiation is due to the size or the specialization of the audit firm. The use of another approach such as portfolio share approach might give better results. The study examines only national level specialization but the results could be more comprehensible if further research tests both city and audit partner level specialization.

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**Table1. Variable definition**

<b>Variable</b>	<b>Definition</b>
<b>SYNC</b>	$\log \left[ \frac{R^2}{1-R^2} \right]$ : An empirical measure of annual synchronicity for firm i in year t where $R^2$ is the adjusted R-square statistic from the market model using daily stock returns data, daily industry index return data and daily market index return data
<b>R<sub>i,t</sub></b>	Daily stock return for firm i in period t
<b>R<sub>m,t</sub></b>	Daily stock return of the market (NZX50) in period t
<b>R<sub>j,t</sub></b>	Daily stock return for industry j in period t
<b>INDSPE</b>	An indicator variable that takes the value of 1 if the auditors market share in a year is $\geq$ to 20%, otherwise 0.
<b>SIZE</b>	Natural logarithm of Total assets for firm i in year t.
<b>CAPINT</b>	Property, Plant and Equipment scaled by Sales for firm i in year t
<b>LEVERAGE</b>	Ratio of liabilities to total assets for firm i in year t.
<b>ISSUE</b>	An indicator variable that takes the value of 1 if the number of outstanding shares in firm i increases by more than 10 % during year t, otherwise 0
<b>LOSS</b>	An indicator variable that takes the value of 1 if Earnings after tax (EAT) scaled by lagged total assets (t-1) for firm i in year t is negative and the absolute value of change in EAT scaled by lagged total assets during year t is greater than 10%, otherwise zero
<b>OPCYCLE</b>	(Days sales in inventory and accounts receivable collection days) divided by 30 for firm i in year t
<b>PE</b>	Price to Earnings ratio for firm I in year t
<b>ATO</b>	Asset turnover for firm i in year t, calculated as total sales divided by total assets
<b>CURRENT</b>	Current ratio for firm i in year t, calculated as current assets divided by current liabilities
<b>QUICK</b>	Quick ratio for firm i in year t, calculated as quick assets (CA-INV) divided by current liabilities
<b>REGU</b>	An indicator variable that takes the value of 1 if firm i is a member of a regulated industry in year t, otherwise 0
<b>ABSTACC</b>	The absolute value of total accruals calculated as the difference between earnings after tax (EAT) and operating cash flows of firm i in year t, scaled by the lagged total assets
<b>TA<sub>i,t-1</sub></b>	Total assets for firm i in period t-1
<b>ΔREV</b>	Change in revenue for firm i for the period t from t-1
<b>ΔAR</b>	Change in accounts receivables for firm i for the period t from t-1
<b>PPE</b>	Property, Plant and Equipment of firm i in period t
<b>ROA</b>	Return on assets for firm i in period t measured by Earnings before interest and tax (EBIT) divided by the total assets of the firm

<b>DISACC</b>	Signed discretionary accruals from step 1 of the Modified Jones model. It is the residual value (ABSTACC-NDA)
<b>NDA</b>	Non-discretionary accruals for firm $i$ in year $t$ estimated from the Modified Jones mode (step1)
<b>CFO</b>	Cash flow from operations, scaled by lagged total assets ( $TA_{i,t-1}$ ) for firm $i$ in year $t$
<b>LnTA<sub>i,t-1</sub></b>	Natural logarithm of Total assets for firm $i$ in year $t-1$
<b>GROWTH</b>	Growth of the firm measured by the change in revenue from year $t-1$ to $t$ scaled by total assets of firm $i$ in year $t$
<b>CFO×INDSPE</b>	An interaction term that represents cash flow from operations multiplied by industry specialization indicator variable
<b>NDA×INDSPE</b>	An interaction term that represents non discretionary accruals multiplied by industry specialization indicator variable
<b>DISACC×INDSPE</b>	An interaction term that represents discretionary accruals multiplied by industry specialization indicator variable
<b>Industry dummies</b>	An indicator variable equal to 1 for the respective industry, otherwise 0
<b>Year dummies</b>	An indicator variable equal to 1 for respective fiscal years from 2001 to 2011, otherwise 0

**Table 2: Panel A. Sample Selection procedure**

<b>Data step</b>	<b>Observations</b>
Firm year observations for the period from 2001- 2011	1140
Less: Firm-year observations from Finance, Investment, and Property industries	343
Less: Firm-year observations with missing data	176
Final firm -year sample for the period from 2001- 2011	621

**Table 2: Panel B. Audit firm Industry classification**

<b>NZX Industry sectors</b>	<b>Specialist audit firm 1<sup>st</sup> rank</b>	<b>Specialist audit firm 2<sup>nd</sup> rank</b>	<b>No. of Firms</b>	<b>No. of firm years</b>
A01 Agriculture & Fishing	KPMG	DLT	8	71
A02 Mining	KPMG	WHK	1	11
A03 Forestry	PWC		1	11
A04 Building	KPMG	PWC	3	33
A05 Energy	KPMG	PWC	6	58
A06 Food	PWC	DLT	5	30
A07 Textiles & Apparel	KPMG		1	11
A08 Intermediate & Durables	PWC	DLT	10	97
A10 Transport	DLT	E&Y	2	19
A11 Ports	DLT	KPMG	4	44
A12 Leisure & Tourism	PWC	KPMG	4	44
A13 Consumer	PWC	GT	15	150
A14 Media & Communications	KPMG	PWC	5	42
<b>TOTAL</b>			65	621

**BDO:** BDO Spicers; **DLT:** Deloitte; **E&Y:** Ernst and Young; **GT:** Grant Thornton; **KPMG:** KPMG (Klynveld Peat Marwick Goerdeler)  
**PWC:** PriceWaterhouse Coopers; **SR:** Staples Rodway; **WHK:** Williams Hatchman and Kean.

**Table 3. Descriptive Statistics**

Variable	Mean	Standard deviation	Minimum	Maximum
<i>INDSPE</i>	0.52	0.50	0.00	1.00
<i>Size</i>	11.97	1.83	7.34	16.01
<i>CapInt</i>	3.48	23.48	0.44	312.94
<i>Issue</i>	0.16	0.37	0.00	1.00
<i>Leverage</i>	0.43	0.20	0.00	1.10
<i>Loss</i>	0.08	0.265	0.00	1.00
<i>OpCycle</i>	127.99	142.29	46.83	937.00
<i>PE</i>	12.24	24.72	-147.84	207.26
<i>ATO</i>	1.52	1.85	0.14	24.83
<i>Current</i>	2.17	2.72	0.15	29.10
<i>Quick</i>	1.59	2.63	0.16	29.10
<i>Regu</i>	0.08	0.27	0.00	1.00
<i>DISACC</i>	-0.01	0.10	-0.50	0.65
<i>TACC</i>	-48028	199665	-2242000	1373000
<i>TA<sub>t-1</sub></i>	11.89	1.85	7.34	16.01
<i>Growth</i>	0.27	2.05	-0.96	45.69
<i>CFO</i>	0.09	0.16	-1.21	0.90
<i>NDA</i>	-0.03	0.04	-0.55	0.09
<i>SYNC</i>	-1.04	1.12	-2.89	2.52

**Table 4: Audit firm self selection bias correction tests**

	Panel A Heckman selection model (2-step)			Panel B Treatment effect model (2-step)		
	Co-efficient	Z	P> z	Co-efficient	Z	P> z
<b>DISACC</b>						
<i>Constant</i>	0.164	2.08	0.038	-0.131	-2.06	0.040
<i>Cfo<sub>t</sub></i>	1.100	2.32	0.020	4.180	1.63	0.104
<i>Leverage</i>	-0.131	-3.61	0.000	-0.084	-3.22	0.001
<i>Size</i>	0.075	3.48	0.000	0.068	5.06	0.000
<i>AbsTacc</i>	2.060	4.15	0.000	1.360	5.38	0.000
<i>Ln ofTA<sub>t-1</sub></i>	-0.079	3.65	0.000	-0.065	-4.93	0.000
<i>Current</i>	0.030	2.04	0.041	0.037	3.81	0.000
<i>Quick</i>	-0.030	-2.09	0.036	-0.036	-3.64	0.000
<i>Regu</i>	0.050	1.48	0.138	0.005	0.16	0.876
<b>INDSPE</b>						
<i>Constant</i>	0.011	0.03	0.979			
<i>Size</i>	0.018	0.57	0.565			
<i>CapInt</i>	0.008	1.42	0.156			
<i>Leverage</i>	0.040	0.14	0.889			
<i>Issue</i>	0.204	1.43	0.152			
<i>Loss</i>	-0.007	-0.03	0.973			
<i>Opcycle</i>	0.000	0.60	0.550			
<i>PE</i>	-0.002	-0.99	0.324			
<i>ATO</i>	-0.017	-0.36	0.718			
<i>Current</i>	-0.216	-2.73	0.006			
<i>Quick</i>	0.169	2.08	0.037			
<i>Regu</i>	-0.476	-2.34	0.019			
<b>Mills</b>						
<i>Lambda</i>	<b>-0.126</b>	-1.72	0.085	<b>-0.093</b>	-1.82	0.069
<i>Rho</i>	-0.930			-0.826		
<i>Sigma</i>	0.135			0.113		
<b>Note:</b> The Co-efficient, Z, and p values for INDSPE selection equation are same for both Heckman and the Treatment effect models						

**Table 5. Correlation Matrix**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
<b>SYNC (1)</b>	1.000																	
<b>INDSPE (2)</b>	0.032	1.000																
<b>Size (3)</b>	0.657**	0.040	1.000															
<b>CapInt (4)</b>	-0.076	0.076	0.008	1.000														
<b>Issue (5)</b>	0.042	0.058	-0.073	-0.048	1.000													
<b>Leverage (6)</b>	0.119**	0.024	0.147**	-0.232**	0.027	1.000												
<b>Loss (7)</b>	-0.089*	-0.007	-0.164**	-0.031	0.120**	-0.008	1.000											
<b>OpCycle (8)</b>	-0.071	0.027	-0.101*	0.463**	0.144**	-0.107**	0.143**	1.000										
<b>PE (9)</b>	0.118**	0.014	0.149**	0.104**	-0.090*	-0.079*	-0.050	0.041	1.000									
<b>ATO (10)</b>	-0.148**	0.035	-0.193**	0.603**	-0.051	0.033	-0.013	0.217**	-0.004	1.000								
<b>Current (11)</b>	-0.095*	-0.047	-0.200**	0.440**	0.011	-0.426**	0.083*	0.454**	-0.085*	0.371**	1.000							
<b>Quick (12)</b>	-0.092*	-0.015	-0.156**	0.488**	0.016	-0.426**	0.086*	0.431**	-0.082*	0.372**	0.963**	1.000						
<b>Regu (13)</b>	-0.040	-0.068	0.163**	-0.011	0.038	-0.131**	0.033	0.056	-0.001	-0.173**	-0.055	-0.018	1.000					
<b>DISACC (14)</b>	-0.040	0.053	-0.014	0.111**	0.076	-0.210**	-0.175**	0.134**	0.044	-0.030	0.122**	0.090*	0.055	1.000				
<b>AbsTacc (15)</b>	-0.241**	-0.056	-0.403**	0.025	-0.034	-0.179**	-0.139**	0.078*	0.050	0.091*	0.104**	0.070	-0.041	0.260**	1.000			
<b>Growth (16)</b>	-0.004	-0.047	-0.064	-0.022	0.082*	-0.082*	0.003	0.084*	-0.206**	-0.038	0.014	0.022	0.016	0.050	0.023	1.000		
<b>CFO (17)</b>	0.167**	-0.068	0.169**	-0.057	-0.194**	0.117**	-0.280**	-0.283**	0.157**	0.073	-0.208**	-0.184**	-0.055	-0.542**	-0.076	-0.068	1.000	
<b>NDA (18)</b>	0.113**	-0.028	0.071	-0.065	-0.152**	0.123**	-0.206**	0.014	0.079*	0.113**	0.010	-0.031	-0.205**	-0.107**	0.081*	-0.149**	0.318**	1.000

\*\* and \* denote statistical significance at 1% and 5% level respectively (2-tailed)

**Table 6. Regression results of the impact of industry specialization and the interaction between specialization and discretionary accruals on Stock price synchronicity**

**Hypothesis 1:**

$$SYNC_{i,t} = \alpha + \beta_1 CFO_{i,t} + \beta_2 NDA_{i,t} + \beta_3 DISACC_{i,t} + \beta_4 Size_{i,t} + \beta_5 Leverage_{i,t} + \beta_6 Growth_{i,t} + \sum_{n=1}^9 Industry\ Dummies + \sum_{2001}^{2011} Year\ Dummies + \varepsilon_{i,t}$$

**Hypothesis 2:**

$$SYNC_{i,t} = \alpha + \beta_1 CFO_{i,t} + \beta_2 NDA_{i,t} + \beta_3 DISACC_{i,t} + \beta_4 Size_{i,t} + \beta_5 Leverage_{i,t} + \beta_6 Growth_{i,t} + \beta_7 INDSPE_{i,t} + \beta_8 CFO_{i,t} \times INDSPE_{i,t} + \beta_9 NDA_{i,t} \times INDSPE_{i,t} + \beta_{10} DISACC_{i,t} \times INDSPE_{i,t} + \sum_{n=1}^9 Industry\ Dummies + \sum_{2001}^{2011} Year\ Dummies + \varepsilon_{i,t}$$

<i>Dep variable: SYNC</i>	Expected sign	Panel A: (Hypothesis 1)		Panel B: (Hypothesis 2)	
		Co-efficient	t-statistic	Co-efficient	t-statistic
Intercept		-5.840	-17.20	-5.875	-17.08
CFO	-	0.206	0.83	-0.091	-0.24
NDA	-/+	-0.296	-0.40	0.722	0.94
DISACC	?	-0.020	-0.06	-0.852*	-1.94
SIZE	+	0.434***	22.77	0.436***	22.84
LEVERAGE	+	0.254	1.26	0.296	1.46
GROWTH	+	0.011	1.15	0.012	1.31
INDSPE	?			-0.172**	-1.96
CFO*INDSPE	+			0.554	1.22
NDA*INDSPE	-			-3.035**	-2.24
DISACC*INDSPE	?			1.584**	2.82
Industry Dummies		Yes		Yes	
Year Dummies		Yes		Yes	
F-Statistics			30.10		26.83
R <sup>2</sup>			0.573		0.579
No. of observations			621		621

- \*, \*\* and \*\*\* indicate significance at  $p < 0.10$ ,  $p < 0.05$  and  $p < 0.01$  or better level respectively based on two-tailed tests.
- Variable definitions are in Table 1

**Table7. Self-proclaimed approach of Audit firms**

Audit firm	Self-proclamation
<b>Deloitte</b>	"Deloitte brings a business mindset combined with <a href="#">deep technical knowledge and extensive industry experience</a> to assist clients to address business issues across the broad spectrum of accounting, financial reporting, governance, compliance, and risk advisory disciplines. We also strive to provide timely communications regarding professional developments and insights regarding matters that may affect the organization's business"
<b>Ernst &amp; Young</b>	"To achieve your potential, you need fast, easy access to the information and people that can help you make the right decisions. That's why we've invested in dedicated Global Industry Centers around the world — centers that serve as virtual hubs for <a href="#">sharing industry-focused knowledge and experience</a> . Our commitment of time and resources means that we can anticipate market trends, identify implications and develop clear points of view on <a href="#">relevant industry issues</a> ".
<b>KPMG</b>	"We combine our multi-disciplinary approach with deep, <a href="#">practical industry knowledge</a> to help clients meet challenges and seize opportunities".
<b>PWC</b>	"The effectiveness of our audits is enhanced by our <a href="#">extensive industry knowledge and experience</a> which we tailor to suit the size and nature of the organization. We organize around industries to share the latest research and points of view on emerging industry trends, develop industry-specific performance benchmarks based upon global best practices, and share methodologies and approaches in complex areas such as financial instruments and tax provisioning. In addition, our network is available to <a href="#">collaborate on accounting or technical issues unique to a particular industry</a> , especially when interpretive guidance is needed".