MANAGERIAL OPPORTUNISM AND EARNINGS SURPRISE: AN INVESTIGATION OF INSIDER TRADING AND PERCEIVED MARKET VALUATION DIVERGENCE

by

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*We also certify that written approval has been obtained for any proprietary material contained therein.
To my beloved husband Richard Yufeng Liu and my dear parents Guangli Peng and Nianfeng Yu who stood by me through my graduate study.
# TABLE OF CONTENTS

LIST OF FIGURES .......................................................... 6
LIST OF TABLES ............................................................ 7
LIST OF APPENDIX ......................................................... 8

ACKNOWLEDGMENTS ....................................................... 9

ABSTRACT ........................................................................ 10

CHAPTER

1. INTRODUCTION .......................................................... 12

2. LITERATURE REVIEW .................................................. 21
   2.1 Introduction .......................................................... 21
   2.2 Information Asymmetry .......................................... 22
   2.3 Insider Trading .................................................... 24
   2.4 Market Pricing on Accounting Earnings and Earnings Components .................................................. 27
   2.5 Insider Trading and Earnings Management .............. 29

3. THEORETICAL MODEL AND HYPOTHESES DEVELOPMENT 34
   3.1 Introduction .......................................................... 34
   3.2 Model Preliminaries .............................................. 35
   3.3 Managerial Insiders’ Payoff Optimization Problems .......... 38
   3.4 Investors’ Payoff Optimization Problems ...................... 41
   3.5 Managerial Insider Trading and Earnings Discretion ........ 43

4. DATA AND SAMPLE SELECTION ..................................... 46
4.1 Sample Selection 46
4.2 Earnings Characteristics Variables 49
4.3 Timeline 50
4.4 Descriptive Statistics 53

5. EMPIRICAL TESTS AND RESULTS 55
5.1 Introduction 55
5.2 The Mishkin Test 56
5.3 Market Pricing of Accounting Accruals 58
5.4 Insider Trading and Abnormal Returns 62
5.5 Empirical Tests of H1(a) and H1(b) 64
5.6 Additional Results of Predictive Power of Insider Trading 68
5.7 Empirical Tests of Q1 71
5.8 Empirical Tests of H2(a) and H2(b) 73

6. CONCLUDING REMARKS 77

7. REFERENCES 90
LIST OF FIGURES

1. Model Preliminaries and Theoretical Timeline 94
2. Theoretical Propositions and Empirical Hypotheses 95
3. Windows of Stock Returns and Earnings Characteristics and Insider Trading Periods 96
4. Empirical Hypotheses and Operational Tests 97
LIST OF TABLES

1. Descriptive Statistics 98


3. Buy-and-Hold Abnormal Returns by Insider Trading 100

4. Insiders’ Open Market Trades on the Market Valuation Divergence of Accruals about Future Earnings 101

5. Insiders’ Unscheduled Stock-Option Grants on the Market Valuation Divergence of Accruals about Future Earnings 102


7. Excess Returns by Insider Trading and Earnings Characteristics 105

8. Insider Open Market Trading on the Market Valuation Divergence of Discretionary Accruals about Future Earnings 106
LIST OF APPENDIX

1. Econometrical Comparison between the Pooled Estimates and the Firm-Specific Average Estimates 108
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This research studies whether the difference in managerial and investors’ beliefs about firm value, “market valuation divergence”, is related to managerial insider trading, and if so, whether there is evidence of private accounting information to capture these different beliefs. The main idea involves two steps. First, insiders carefully measure and compare the market’s reaction to their company’s earnings announcement with their own informed assessment. Second, they act and trade as if they observe the divergence in the market’s security valuation from their own assessment. Accordingly, this study hypothesizes that such insider trading is associated with managers’ perceptions of such market valuation divergence. The traditional view is that insider trading reveals managers’ implicit assessment of company prospects. The hypothesis of this study is that such trading decisions also incorporate managers’ private perceptions about the divergence in security pricing from their own opinion.

The particular focus of this study is a set of publicly traded non-financial companies whose reported earnings are in the middle of the earnings distribution spectrum (which includes companies whose earnings meet or just beat their earnings
benchmark versus companies whose earnings just miss the benchmark). The sample consists of 4,357 non-financial firm-year observations from 1996 to 2005. The study applies methodological framework of the Mishkin (1983) test to address the hypothesis. It assesses the relations involving market pricing, characteristics of company earnings and managerial insider trading as these variables relate to the fundamental idea of market valuation divergence. In addition, managerial insiders may have control over the timing of their open market trades and unscheduled stock-option grants. This study analyzes insider trading considering both open market transactions and the unscheduled stock-option grants.

The results of this study indicate managerial opportunism. When the market does not fully assess the valuation implication of accounting accruals, managerial insider trading (broadly conceived to include open market transactions and unscheduled stock-option grants) corresponds to buying or selling behavior associated with managers’ private accounting information and the direction of market valuation divergence.
CHAPTER 1
INTRODUCTION

...two years ago we were selling at 10 times revenues when we were at $64. At 10 times revenues, to give you a 10-year payback, I have to pay you 100% of revenues for 10 straight years in dividends. That assumes I can get that by my shareholders. That assumes I have zero cost of goods sold, which is very hard for a computer company. That assumes zero expenses, which is really hard with 39,000 employees. That assumes I pay no taxes, which is very hard. And that assumes you pay no taxes on your dividends, which is kind of illegal. And that assumes with zero R&D for the next 10 years, I can maintain the current revenue run rate. Now, having done that, would any of you like to buy my stock at $64? ...I was thinking it was at $64, what do I do? I’m here to represent the shareholders. Do I stand up and say, “Sell”? I’d get sued if I said that. Do I stand up and say, “Buy”? Then they say you’re Ken Lay. So you just sit there and go, “I’m going to be a bum for the next two years. I’m just going to keep my mouth shut, and I’m not going to predict anything.” And that’s what I did. ¹

(Business Week, April 2002)

...Options have long been used to attract and retain people from CEOs on down. Companies give employees the right to buy a set number of shares at a fixed price for several years. The price is generally where the stock trades when the options are granted. Simple, right? If only. As common as options have become, doling them out is something of a black art. ...Time-travel grants: Also known as backdated or "look-back" options, and almost certainly illegal. ...Forward-dating, springloading, bullet-dodging: These schemes involve looking forward rather than looking back. Some companies purposely adopted policies that priced options at a future low point in the stock. Others "springloaded" their grants by awarding them just before good news hit (boosting the stock) or engaged in "bullet dodging" by holding off on grants until after releasing bad news so employees would get lower-priced options. If companies followed disclosed policies and properly accounted for them, says Grundfest (Stanford law professor), it's unclear they've violated the law, no matter how unseemly the practices may appear.

(Fortune, July 2006)

¹ In an interview of Scott McNealy, the then-CEO of Sun Microsystems, by Business Week in year 2002. What did Mr. Scott McNealy do during the year of 2000 when Sun Microsystems securities hit a high at $64 per share? He sold between $90 and $100 million worth of Sun securities.
This research examines the “market valuation divergence” of accounting accruals to explain the timing of managerial insider\(^2\) trading and to explore the specific nature of private accounting information that insiders may possess and use in their trades for profit. Market valuation divergence is defined as the difference between the market’s belief about company future earnings embedded in security prices and insiders’ assessment conditioned on their private information.

In particular, this research investigates the following set of questions:

- Do insiders time their trades and unscheduled stock-option grants based on private information for excess returns?
- If so, is there measurable divergence between the market’s and insiders’ valuation assessment that is captured by or correlated with insiders’ private accounting information?
- Is the direction of insider trading (in increasing or decreasing equity holdings) related to such valuation divergence?
- If so, can investors use insiders’ trading decisions to infer insiders’ private perceptions of such valuation divergence in security pricing?
- And finally, what is the nature of insiders’ private accounting information and perceptions of such valuation divergence? Is it from insiders’ reporting discretion? Or is it due to insiders’ superior knowledge about company prospects and economic conditions?

Prior literature has discussed the apparent market overreaction (under-reaction) to accounting earnings and earnings components (see Bernard and Thomas, 1989, 1990; Sloan, 1996; DeFond and Park, 2001), and insiders’ superior information and insider

\(^2\) In this study managerial insiders, interchangeable with insiders, are defined including CEO, CFO, COO, president and chairman of the board.
trading on company prospects (see Lakonishok and Lee, 2001; Beneish and Vargus, 2002; Ke, Huddart and Petroni, 2003). This study draws on this work to motivate the idea of market valuation divergence and to hypothesize that market valuation divergence is associated with the timing of managerial insiders’ trading decisions. Specifically, it hypothesizes that insiders are capable of perceiving the divergence in the market’s valuation of company accounting earnings from their own assessment. Insider trading to either invest in or divest from their company’s securities reveals not only insiders’ implicit assessment of company prospects but also their private perceptions about the divergence in the market security pricing from their own private assessment.

Moreover, in light of previous studies (see Beneish and Vargus, 2002; Aboody, Hughes and Liu, 2003), it conjectures that insiders’ superior knowledge and private perceptions of such valuation divergence is related to their discretion over company financial reporting.

These working hypotheses are motivated by two lines of research. One line of research investigates the role of accounting information in security pricing. Prior research has demonstrated the importance of accounting earnings and accruals in valuing securities (see Dechow, 1994; Subramanyam, 1996). In addition, previous studies also suggest that the market does not appear to fully understand the valuation implication of accounting accruals in security pricing (see Sloan, 1996; Xie, 2001; DeFond and Park, 2001; Beneish and Vargus, 2002; Kothari, Loutskina and Nikolaev, 2005). The other line of research focuses on insiders’ information advantage and insider trading for private gains. A large body of research indicates that insiders
possess and use superior information in their personal trading and corporate decisions (see Ritter, 1991; Ikenberry, Lakonishok and Vermaelen, 1995; Baker and Wurgler, 2002; Ke, Huddart and Petroni, 2003; Jenter, 2005). Nevertheless, other studies show only limited excess returns associated with insiders’ trades (see Lakonishok and Lee, 2001).

This study argues that at the arrival of a company’s earnings announcement, when the market does not fully incorporate the valuation implication of accounting accruals in security pricing, insiders are capable of perceiving such market mispricing relative to their own assessment. Therefore, insiders can make profitable trading and stock-option granting decisions based on their private perceptions of such market valuation divergence. This study expects that insiders tend to increase their equity holdings, through open market purchases or unscheduled stock-option grants, when they perceive a market undervaluation of the company’s securities. Insiders tend to decrease their equity holdings, through open market sales, when perceiving an overvaluation of the securities in the market. Moreover, considering insiders’ possible discretion over financial reporting, this study predicts that when managerial insiders manage earnings upward and perceive a subsequent market overvaluation, they tend to decrease their equity holdings; when managerial insider manipulate earnings downward and observe a subsequent market undervaluation, they tend to increase their equity holdings.

The data of this study consists of 4,357 non-financial firm-year observations in the middle of the earnings distribution spectrum (which includes the companies whose reported earnings just miss their consensus analyst forecasts and the companies who
meet or just beat the forecasts), with data available on Compustat, CRSP and I/B/E/S from 1996 to 2005. Additional filters are required when analyzing insiders’ open market trades and unscheduled stock-option grants from Thomson Financial Insider Filing Data files. This study examines the market overvaluation (undervaluation) of company securities by measuring the apparent market overestimation (underestimation) of the valuation implication of accounting accruals for future earnings. The Mishkin (1983) test is implemented to investigate the divergence in the market’s valuation from insiders’ private assessment and to examine the association between the timing of insider trading and such market valuation divergence.

Consistent with the predictions, this study finds that the timing of insiders’ open market purchases and unscheduled stock-option grants is associated with a market undervaluation of company securities. In particular, when insiders increase their equity holdings, the market appears to have either overestimated the valuation implication of negative accounting accruals or underestimated the implication of positive accounting accruals. Insiders’ sales are informative about a market overestimation of the valuation implication of positive accruals and thus a market overvaluation of company securities. However, in companies with negative accounting accruals, the evidence about the timing of insiders’ open market sales seems mixed and insiders’ sales appear unrelated to a market overvaluation of these securities. These results have immediate implications regarding the timing and the informativeness of insiders’ trading decisions. An investment strategy, based on insider trading pattern and company earnings
characteristics, offers significant and positive excess return of 13% in a 60-trading-day window upon the next release of company annual earnings.

In addition, regarding the specific nature of insiders’ private accounting information, this study finds that insiders tend to manage earnings in favor of their trades. Particularly, empirical evidence shows that when managerial insiders manage earnings upward, they tend to decrease their equity holdings as the market overvalues the implication of such income-increasing discretionary accounting accruals; when managerial insiders manage earnings downward, they tend to increase their equity holdings as the market undervalues the implication of such income-decreasing discretionary accruals.

Moreover, the evidence demonstrates that insider trading in the period of the first two months following an annual earnings announcement has become indicative of insiders’ private perceptions of the contemporaneous market valuation divergence. Investors therefore can use these earlier insiders’ trades to infer insiders’ private accounting information and to adjust their valuation of company securities in a more prompt fashion.

This study contributes to accounting literature in several ways. First, it contributes to our understanding of the timing of insiders’ open market trades and unscheduled stock-option grants by investigating the notion of “market valuation divergence” in the context of an annual earnings announcement. Previous studies have primarily followed the theme that insiders exercise their discretion over financial reporting to manipulate earnings in favor of their trades. Nevertheless, the divergence
in the market’s security valuation from insiders’ own assessment is a necessary condition for excess returns in insiders’ trades. This study suggests that managerial insiders are sophisticated. Not only they are able to manage accounting earnings, but also they assess and compare the market’s reaction to the released accounting information with their own valuation. When insiders, inferring from their private knowledge, perceive the divergence in the market’s valuation from their own, they make their portfolio trading decisions for private gains. Therefore, insiders’ information advantage and their perceptions of such valuation divergence are essential in timing their strategic trading decisions.

In addition, this study strengthens the claim that managerial insiders trade on their private information for profit by examining and comparing the market’s and insiders’ trading behavior around an information event. Prior literature has provided mixed evidence regarding whether insiders exploit their private information in their personal portfolio decisions. This study investigates the market’s reaction and insider trading pattern on arrival of annual earnings and accounting accruals, and thus upon an information event. It focuses on insider trading motivated by private perceptions of the divergence in the market’s assessment of accounting accruals from their own belief in security pricing. Certainly, insiders may also trade following the earnings announcement for diversification or liquidating or other purposes. However, no systematic association will be expected in this case, between insider trading pattern and the contemporaneous market valuation divergence.
Thirdly, it adds to the literature about the specific nature of insiders’ private information by examining one possible source of insiders’ perceptions of the divergence in the market’s valuation from their own assessment. Prior literature indicates that insiders tend to manipulate earnings in favor of their trades. This study reinforces this claim and shows that insider trading and their perceptions of such market valuation divergence are at least associated with their reporting discretion.

Furthermore, this study examines the timing of insider trading in both their open market transactions and the unscheduled stock-option grants. Most previous studies use insiders’ open market trades to examine insiders’ capability of timing their portfolio decisions. Nevertheless, insiders may also have control over the timing of their company’s unscheduled stock-option grants. With the recent coverage of more than one hundred companies’ stock-option backdating practice in popular and business press\(^3\), it becomes apparent that insiders have strong incentives to manipulate the timing of their stock-option grants for private gains. This study investigates both insiders’ open market transactions and their company’s unscheduled stock-option grants, to understand the timing of insider trading and its association with insiders’ private accounting information.

Finally, this study is also of interest to investors. By incorporating the informativeness of insider trading and earnings characteristics, this study constructs an

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\(^3\) See, for example, the following articles: “Matter of Timing: Five More Companies Show Questionable Options Pattern” (Wall Street Journal, May 22, 2006) by Charles Forelle and James Bendler; “Monster Worldwide Gave Officials Options Ahead of Share Run-Ups” (Wall Street Journal, June 12, 2006) by Charles Forelle and Mark Maremont; and, “Options gone wild! Separating the flagrantly illegal from the merely slimy” (Fortune, July 10, 2006) by Adam Lashinsky.
investment strategy with excess positive returns. The empirical inference is that the informativeness of insider trading is rather conditional on company earnings characteristics. A simple strategy of following insider trading may not be profitable. It suggests that investors should analyze the properties of accounting earnings and distinguish the scenarios when insider trading is insightful to company prospects. Based on insider trading pattern and company earnings characteristics, investors therefore infer managerial insiders’ private accounting information and adjust security valuation.

The remainder of the dissertation is organized as follows. Chapter two provides a review of previous studies regarding the market pricing of accounting information and insider trading in the market. Theoretical model, testable hypotheses and empirical predictions are developed, in chapter three, to investigate the timing of insider trading and the specific nature of insiders’ private perceptions. Chapter four describes sample selection, variable construction and the timeline in this research. Chapter five presents empirical tests and results. Chapter six offers summary and concluding remarks.
CHAPTER 2
LITERATURE REVIEW

2.1 Introduction

To understand the timing of insider trading and its association with insiders’
private perceptions of the divergence in the market’s security valuation from their own
assessment, several issues need to be discussed in the framework of information
asymmetry:

- Managerial insiders possess private knowledge about the valuation
  implication of accounting earnings or accruals for company prospects.
- Due to asymmetric information between investors and managerial
  insiders, the divergence can exist between the market’s valuation and
  insiders’ assessment, which insiders privately observe. And there is
  evidence of insiders’ private accounting information to capture these
different beliefs in security pricing.
- Managerial insiders have discretion over the company’s financial
  reporting. The divergence between the market’s and insiders’
  assessment can be associated with the different beliefs about the
  valuation implication of accounting earnings or accruals under such
  managerial reporting discretion.

The remainder of this section therefore takes up these issues.
2.2 Information Asymmetry

The concept of information asymmetry⁴ has been well elaborated in Akerlof’s Lemon paper in 1970. Akerlof (1970) investigates the relations between asymmetric information concerning uncertainty⁵ on the quality of goods and market participants’ behaviors. He demonstrates mathematically that information asymmetry problem can either cause an entire market to collapse or contract it into an adverse selection of low-quality products. A key insight in his paper is that economic agents may have strong incentives to offset the adverse effects of information asymmetry problems on market efficiency. Akerlof (1970) argues that many market institutions, such as guarantees from car dealers, brands, chain stores and so on, may be regarded as emerging from attempts to resolve the problems due to asymmetric information.

Related, agency theory deals with potential problems resulting from the existence of asymmetric information in a principal-agent relation. In a setting that managers act as an agent to investors (i.e., the principal), managers are expected to carry out business on behalf of investors. Typical agency problem arises when there is conflict of interests between the managers and the investors. As solutions suggested in Jensen and Meckling (1976), monitoring structure (for example, outsider directors,

⁴ In *New Keynesian Economics/Post Keynesian Alternatives* (1998), Isenberg defined, “the concept of information asymmetry constructs on the idea that all information can be obtained and has an objective or a subjective probability density function. Once information is available in markets, it is often asymmetrically distributed and can be categorized into private and public knowledge.”

⁵ In *New Keynesian Economics/Post Keynesian Alternatives* (1998), Isenberg defined the concept of uncertainty under study, “not associate with probabilistic knowledge, but with the absence of probabilistic knowledge. It corresponds to a situation of unknowability, in which participants with certain uncertainty in markets do not have any relevant information at all.”
auditors and so on) and compensation scheme (for example, performance-based payment, such as stock and stock option grants) should be designed to align the interests of the agent with those of the principal. However, when managers possess private information regarding their company’s business and reporting choices, managers could possibly maximize their own interests, if they decide to, even at the expense of investors. Especially, when investors have rather limited knowledge about and can hardly assess the company’s performance.

In the context of financial reporting, managerial insider is the most informed party to assess and to report company performance. Due to managers’ discretion over financial reporting and due to potential interest conflicts and certain constraints in the framework of financial reporting, managers possess superior and private knowledge regarding their company’s current and future performance. They may have better assessment about the valuation implication of company accounting numbers. And they may make strategic decisions for their company’s or their own benefit, based on their private and superior information. Although market makers may adjust the equilibrium ask and bid spreads to account for possible private information that insiders possess, information that the market makers extract from insiders’ trading propositions may be far from perfect, relative to private information that insiders obtain. Therefore, in the framework of information asymmetry, insiders’ role as an agent of their company allows them to obtain private and superior information regarding company prospects. Insiders’ information advantage could drive the timing of their trading decisions for profit.
2.3 Insider Trading

By virtue of insiders’ privileged position in a company, managerial insiders have private access to superior information. They may develop better foresight of company prospects and thus better assessment of the valuation implication of accounting earnings or accruals.

...*Company executives and directors know their business more intimately than any Wall Street analyst ever would. They know when a new product is flying out the door, when inventories are pilling up, whether profit margins are expanding or whether production costs are rising...You always hear about the smart money. Generally, that is the smart money.*  
(Individual Investor, Feb. 1998)

Prior accounting literature has provided supporting evidence that insiders possess and exploit their private knowledge and make strategic decisions in their trades. Penman (1985) suggests that insiders seem to possess private information about their company’s future performance in addition to the information being publicly disclosed in management forecasts. Aboody and Lev (2000) demonstrate that insiders appear to have superior knowledge regarding their company’s research and development expenditures. Beneish and Vargus (2002) find that insider trading is informative about a company’s one-year-ahead earnings persistence (which is the valuation implication of the company’s current earnings for future earnings). Ke, Huddart and Petroni (2003) show that insiders’ portfolio decisions seem to indicate that they know in advance about the pattern of their company’s future earnings up to two years ahead. Jenter (2005) examines insiders’ trading decisions in value versus growth companies. He argues that the trading decisions are associated with managers’ views of the market overvaluation
These previous studies suggest that insiders may possess private and superior information about company future earnings and prospects.

In addition, prior literature has also examined the association between insider trading and insiders’ discretion over accounting information and other news release. Aboody and Kasznik (2000) show that insiders tend to delay “good” news until their options are awarded while rush forward “bad” news before the option grants. In a similar vein, McVay, Nagar and Tang (2005) demonstrate that insiders seem to manipulate accounting earnings in an upward direction till they sell their company’s securities.

Other studies surrounding insider trading have probed managerial insiders’ corporate decisions in various contexts. Ritter (1991) examines a company’s timing of IPOs and suggests that managers tend to opportunistically issue securities at the time of high market valuation. Ikenberry, Lakonishok and Vermaelen (1995) investigate insiders’ decisions on share repurchases and find an association between repurchase decisions and high subsequent returns. Their results indicate that managers make repurchase decisions when perceiving a market undervaluation of their company’s securities. D’Mello and Shroff (2000) examine the companies’ decisions in fixed-price repurchase tender offers. Based on an earnings-based valuation model, they suggest that managers tend to repurchase their companies’ securities when their assessment of the securities exceeds the market’s valuation. Baker and Wurgler (2002) provide an

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6 He points out, however, that alternative explanations could also appear to be logical in interpreting his empirical evidence. For instance, managers may simply react to their company’s book-to-market ratio and make their trading decisions without using much private information.
extensive overview about a company’s capital structure decisions. They suggest that managers have better knowledge about their own company and managers are able to time the equity market, either to issue securities when the company’s market value is high or to repurchase equity when the market value is low.

Nevertheless, a comprehensive study of insider trading by Lakonishok and Lee (2001) suggests that only limited excess returns can be generated from insiders’ purchases in small companies. Lee (1997) and Chan, Ikenberry, and Lee (2003) show respectively that, in the context of seasoned equity offering and share repurchases, insider trading does not predict subsequent excess returns.

In summary, there is mixed evidence regarding insiders’ exploiting private and superior information in their trading decisions. One line of literature suggests that insiders seem able to time the equity market in their personal portfolio and corporate decisions. Insiders possess and use their private knowledge and they tend to exercise their reporting discretion in favor of their personal trades. The other line of research, however, documents very limited excess returns from insiders’ trading decisions, contradicting that insiders use their private information in personal trades for profit.

This study considers managerial insiders’ information advantage and thus capacity to perceive the divergence in the market’s valuation from their own assessment. It decides to investigate the timing of insider trading and its association with such market valuation divergence following an accounting information event where the divergence could be empirically estimated. In addition, it is yet unclear about the specific nature of private information that insiders possess and use in their trading.
As accounting earnings become the most notable information for security valuation, this research investigates insiders’ trading following an annual earnings announcement. It conjectures that upon the earnings announcement, insiders observe the market’s valuation of company securities embedded in security prices. When insiders possess private information about company prospects and thus superior knowledge about the implication of current accounting earnings for security valuation, they perceive and trade on the divergence in the market’s valuation from their own assessment.

2.4 Market Pricing on Accounting Earnings and Earnings Components

Prior research has demonstrated the importance of accounting earnings and accruals in valuing securities (see Dechow, 1994; Subramanyam, 1996). In addition, due to the recognition and matching principles of accounting information, it is expected that reported accounting earnings reflect company performance in a more timely fashion than cash flows. Statement of Financial Accounting Concepts No.1 states that,

> Information about enterprise earnings and its components measured by accrual accounting generally provides a better indication of enterprise performance than does indication about current cash receipts and payments... Information about enterprise earnings based on accrual accounting generally provides a better indication of an enterprise’s present and continuing ability to generate favorable cash flows than information limited to the financial aspects of cash receipts and payments.

Therefore, the market would use a company’s accounting information along with macro-economic and industry data to arrive at its expectation of company prospects.
On the other side, however, the market’s assessment of available accounting earnings may diverge from the valuation implication of such accounting information due to various reasons. For instance, accrual process often involves a significant amount of estimation of future cash receipts and payments and a subjective allocation of past cash receipts and payments. Besides, managerial insiders often have more discretion over accruals than cash flows, and self-interested managers could exercise reporting discretion in favor of their own financial or political interests. They may distort earnings as a measure of company performance.

Prior “market anomaly” literature has provided evidence about the market’s mispricing of accounting earnings and accruals. Bernard and Thomas (1989, 1990) investigate the market’s reaction to quarterly earnings. They document post-earnings-announcement-drift by showing that the market tends to under-react to earnings surprises. Sloan (1996) examines the market’s pricing upon cash flow versus accrual components of earnings. His finding suggests that cash flow and accrual components of earnings have different valuation implication; the market appears to overestimate the persistence of accrual component while it underestimates the persistence of cash flow component. This finding is namely the “accrual anomaly”. Collins and Hribar (2000) provide a comparison between these two market anomalies and show that the accrual anomaly is distinct from post-earnings-announcement-drift. DeFond and Park (2001) examine the reversal nature and the market’s pricing of abnormal accounting accruals. They show that the market seems unable to fully impound the valuation implication of such abnormal accruals in security pricing. Kothari, Loutska and Nikolaev (2005)
revisit the accrual anomaly and suggest an alternative interpretation based on agency theory of overvalued equity instead of the original investors’ fixation argument (see Sloan, 1996).

In summary, accounting earnings and accruals are essential in valuing company securities. However, the market does not appear to fully understand the valuation implication of accounting earnings and accruals. Therefore, this study decides to examine the market overvaluation (undervaluation) of company accounting earnings and accruals following an annual earnings announcement. Furthermore, considering managerial insiders’ information advantage, this study conjectures that when the market overvalues (undervalues) the implication of accounting earnings and accruals, insiders’ own assessment can diverge from the market’s valuation. Insiders can time and make their personal trading decisions when they perceive such market valuation divergence of company securities.

2.5 Insider Trading and Earnings Management

Earnings management has been extensively studied for decades in accounting literature because of its implication about accounting information quality and managerial decisions on accounting choices and financial disclosure policies. Schipper (1989) defines earnings management as,

_A purposeful intervention in the external financial reporting process, with the intent of obtaining some private gain (as opposed to, say, merely facilitating the neutral operation of the process)._
Another well-recognized definition of earnings management by Healy and Wahlen (1999), is stated as follows,

*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.*

Both definitions acknowledge and emphasize the management discretion in financial reporting. Both view earnings management as an approach by the managers to opportunistically window-dress the financial reporting and maximize their own personal interests, such as influencing their contractual outcomes and inflating the value of their own security-related portfolios and so forth.

Healy (1985) and Holthausen, Larcker and Sloan (1995) show that because managers’ bonus contract is based on reported earnings, managers have incentives to manipulate earnings to increase their own bonus. Similarly, Fudenberg and Tirole (1995) presume that company poor performance increases the probability of managers’ dismissals, while good performance cannot compensate managers for future’s poor performance. These arguments present an economic rationale for managers to smooth earnings. DeFond and Park (1997) present empirical evidence to support that managers utilize discretionary accruals to secure their jobs and to obtain the less volatile earnings pattern in anticipating firm’s future earnings. However, in DeFond and Park (1997) discretionary accruals are used both as the dependent variable and partitioning variable to categorize pre-managed earnings (which are backed out from reported earnings by subtracting the estimated discretionary accruals). Elgers, Pfeiffer and Porter (2003)
point out that selection bias and statistical validity become potential concerns in the research design.

A more recent study by Beneish (1999) studies managers’ incentives to overstate earnings for companies subject to SEC enforcement actions. He indicates that managers of the investigated firms tend to sell their shares when the market price is inflated by misleading information. Balsam, Cheng and Sankaraguruswamy (2003) indicate that insiders are inclined to manage earnings down before an option grant, to obtain a low exercise price. They document a negative relation between a company’s discretionary accruals and its subsequent option grants. Cheng and Warfield (2005) show that managers manage earnings to obtain benefits from their stock-based compensation, and the higher the stock-based compensation, the less informative the reported earnings in the market. McVay, Nagar and Tang (2006) show that insiders tend to make positive discretionary accruals to meet or beat their earnings benchmark and insiders are likely to sell their company’s shares when the market overvalues the implications of such positive discretionary accruals.

Despite concerns about earnings management and the quality of reported accounting information, investors tend to rely heavily on accounting earnings in their investment decisions. Teoh, Welch and Wong (1998a and 1998b) examine phenomena of long-run underperformance of company initial public offerings. They indicate that the possible reason for the underperformance is that managers tend to overstate company earnings and future prospects at the initial public offerings and the market is not able to fully undo earnings management. Bartov, Givoly and Hayn (2002) show
that the market rewards companies which meet or beat earnings expectations, and the
rewards, at a smaller magnitude, still exist for companies which are likely to have
engaged earnings management to meet or beat such earnings target. Das and Zhang
(2003) demonstrate that missing earnings expectations, even by only one cent would get
companies harshly penalized by the investors. In order to meet or beat analysts’
forecasts, companies tend to make income-increasing working capital accruals to round
up one more cent of earnings per share to avoid penalty from the market on just missing
the earnings forecasts. The finding by Beneish and Vargus (2002) suggests that insiders
tend to exercise their discretion to manage earnings up by making positive discretionary
accruals, and the market’s mispricing and insiders’ superior knowledge are most likely
related to such positive discretionary accruals.

A review by Matsumoto (2002) demonstrates that companies manage earnings
upwards or guide analysts’ forecasts downwards to meet or beat earnings expectation.
In addition, the likelihood of involving earnings management is associated with
company transient institutional holdings, reliance on stakeholders (such as employees,
suppliers and so on) and the value-relevance of earnings in the market. All these factors
provide contractual and capital market incentives for managers to exercise managerial
discretions on reported earnings for private gains. Therefore, this study decides to
investigate the market overvaluation (undervaluation) of company discretionary versus
non-discretionary accounting earnings. It examines the timing of insider trades and its
association with such market overvaluation (undervaluation) in company discretionary
versus non-discretionary accruals. It explores the nature of insider private accounting information in their personal trades for profit.

To summarize, prior literature has shown some evidence of the apparent market overreaction (under-reaction) to accounting earnings and accruals. It seems reasonable to use a company’s accounting accruals as a window into the divergence between the market’s valuation and insiders’ own assessment. In addition, considering insiders’ privileged position and information advantage in their companies, it appears logical to further investigate the nature of insiders’ private accounting information in their trades. This study thus looks at the market overvaluation (undervaluation) of company discretionary versus non-discretionary accounting earnings. This study proceeds to probe such valuation divergence and its association with insiders’ trading decisions.
CHAPTER 3
THEORETICAL MODEL AND HYPOTHESES DEVELOPMENT

3.1 Introduction

As previously discussed, the market’s pricing of accounting earnings and earnings components may diverge from managerial insiders’ valuation. Insiders can observe such valuation divergence and trade for private gains, in the presence of the market’s misvaluation, regardless of whether the earnings are managed or not. In light of previous studies, this study takes a company’s annual earnings announcement as the information event. It uses the company’s earnings and the earnings components to measure the divergence between the market’s valuation and insiders’ assessment.

The following series of events are developed to structure this study:

- Managerial insiders privately assess their company’s economic performance,
- Managerial insiders decide whether to exercise reporting discretion,
- Managerial insiders report company performance in the form of an earnings announcement, which may differ from insiders’ own assessment,
- The market interprets and reacts to the earnings announcement and adjusts its valuation of company securities,
- Managerial insiders observe the market’s reaction and compare the market’s valuation with their own assessment, and
Managerial insiders engage in insider trading, corresponding to their perceptions of the divergence in the market’s valuation from their own belief.

Under the above structure, this study applies a theoretical model to probe and derive conditions for trading decisions from the perspective of managerial insiders and the market, respectively. It introduces the preliminary setting of the model in section 3.2. Managerial insiders’ and the market’s payoff optimization problem are developed in section 3.3 and section 3.4, respectively. A set of hypotheses is developed for empirical exploration regarding the association between the timing of insider trading and market valuation divergence. Managerial insiders’ discretion over financial reporting and its association with insiders’ information advantage and insider trading pattern are discussed in section 3.5.

3.2 Model Preliminaries

The model considers a one-period7 portfolio decisions by the market and managerial insiders, respectively, with a single company’s security to optimize monetary payoffs. The model presumes information asymmetry and thus valuation

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7 Although a one-period design ignores issues such as reputation and a multi-period design is more comparable to empirics, this study relies on a one-period model to simplify the essence of information asymmetry between insiders and the market and thereby focuses on possible valuation divergence and its association with insiders’ portfolio decisions within the period.
divergence in the market’s valuation from managerial insiders’ assessment.\(^8\) Suppose \(PVD_0\) denote such market valuation divergence.\(^9\) Therefore,

\[
\text{Assumptions: } |PVD_0| \neq 0 \tag{3.1}
\]

In particular, managerial insiders possess private knowledge about their company’s current and future performance. They are capable of assessing the valuation implication of current accounting information for the company’s one-period-ahead performance, denoted as \(VI_0^M\). At time \(t=0\), managerial insiders disclose accounting earnings \(E_0\) to the market. Based upon the announced accounting and other public information, investors interpret the valuation implication of such accounting earnings \(VI_0\) and make their trading decisions \(I_0\), which get reflected in the security prices.

The market’s valuation \(VI_0\) is observable to both investors and managerial insiders. On the other hand, managerial insiders’ implicit assessment \(VI_0^M\) is private knowledge to which only insiders have access. Therefore, insiders have the opportunity to compare the market’s pricing with their own assessment. Please note that it is presumed that there exists a valuation divergence between the market’s and insiders’ beliefs, \(|PVD_0| \neq 0\) and \(VI_0^M\) is different from \(VI_0\).

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\(^8\) Whether there exists market valuation divergence is a rather empirical issue. This research investigates the apparent occurrence of valuation divergence in empirical section(s). This theoretical section follows prior literature and presumes market valuation divergence. It analyzes the effects of such valuation divergence on insiders’ and the market’s portfolio decisions.

\(^9\) \(PVD_0\) denotes the divergence in the market’s valuation from managerial insiders’ own assessment. When the market valuation is higher than insiders’ assessment, \(PVD_0 > 0\); when the market valuation is lower than insiders’ assessment, \(PVD_0 < 0\).
In this setting, if insiders privately perceive such market valuation divergence, they can make trading decisions $M_0$ for profit. Investors in the market, on the other hand, can hold onto their original assessment $V_{I_0}$ and portfolio decisions $I_0$. Alternatively, as insiders’ trading decisions become observable, investors can revise their security valuation and adjust their portfolio decisions $I_0^A$ by considering both the implication of the accounting information and the informativeness of managerial insiders’ portfolio decisions.

At the end of this period, upon the arrival of the company’s next accounting earnings $E_1$, the actual valuation implication of accounting earnings $E_0$ (regarding the one-period-ahead company earnings $E_1$) becomes public in the market. The divergence in the market’s valuation from the company’s actual one-period-ahead performance $VD_0$ becomes known and the information is incorporated in the security prices. Managerial insiders profit is based on the excess returns, $y^M$ from their portfolio decisions $M_0$. Investors are assessed based on their monetary payoffs, $y^I$ from the portfolio decisions, either $I_0$ or $I_0^A$. Figure 1 summarizes the above model preliminaries and theoretical timeline.

[Insert Figure 1 here]
3.3 Managerial Insiders’ Payoff Optimization Problems

In the setting defined above, this section examines insiders’ trading decisions and monetary payoffs. It assumes that insiders are risk neutral. They possess private knowledge about company prospects and thus the valuation implication of current accounting earnings for the company’s one-period-ahead performance.

As previously discussed, suppose that insiders have superior information and develop their anticipation of company prospects. Following the earnings announcement \( E_0 \) at \( t=0 \), the market reacts to the accounting news and the company’s security price impounds the revised assessment, denoted as \( V I_0 \). Insiders observe the market’s valuation and compare it with their own implicit assessment \( V I_0^M \). Because of insiders’ private and superior knowledge, insiders are capable of perceiving market valuation divergence \( P V D_0 \). Let \( y^M \) denote the excess returns from their portfolio decisions. As managerial insiders earn excess returns from their portfolio decisions, they have incentives to exploit and trade on their private information. They make trading decisions \( M_0 \) (either to increase or to decrease their equity holdings of their company’s security) based on their perceptions of such contemporaneous market valuation divergence.

Nevertheless, although insiders possess superior information about company prospects, insiders’ private perceptions of market valuation divergence \( P V D_0 \) can be different from the divergence \( V D_0 \) in the market’s valuation from the company’s actual...
one-period-ahead performance, depending on completeness and accuracy of managerial insiders’ private knowledge. Consequently, to maximize insiders’ monetary payoffs, this study develops the first proposition:

**Proposition 1:** $M_0 = \{BUY \mid PVD_0 < 0\}$, or

$= \{SELL \mid PVD_0 > 0\}$,

subject to $M_0 \leq$ managerial insiders’ monetary constraints.

And to maximize $\gamma^M = f (PVD_0, VD_0, M_0)$, insiders are to minimize $|PVD_0 - VD_0|$.

(3.2)

In other words, managerial insiders will increase their equity holdings for the company’s securities when they perceive a market undervaluation (i.e., $|PVD_0^M| < PVDBUYM$) and will decrease their equity holdings when they perceive a market overvaluation (i.e., $|PVD_0^M| \geq PVDSELLM$). By accurately anticipating the company’s one-period-ahead performance (i.e., to minimize $|PVD_0 - VD_0|$) and by perceiving and trading on market valuation divergence, managerial insiders can maximize their monetary payoffs.

To empirically investigate the timing of insider trading and its relation to market valuation divergence, this study uses accounting accruals as a proxy to probe market valuation divergence. Since the market overestimation (underestimation) of the persistence of positive (negative) accounting accruals has different implication in security valuation, this study develops the following hypotheses about insider trading with respect to positive versus negative accruals:
**H1(a):** Insiders tend to increase their equity holdings when they perceive an underestimation (overestimation) in the persistence of positive (negative) accruals by the market.

**H1(b):** Insiders tend to decrease their equity holdings when they perceive an overestimation (underestimation) in the persistence of positive (negative) accruals by the market.

For instance, a company’s positive accruals can be the result of new sales contracts which will increase the company’s growth in receivables and earnings in the upcoming several years. Insiders privately know the persistent nature of these positive accruals. Therefore, when insiders perceive that the market underestimates the valuation implication of such positive accruals and thus undervalues the company security, insiders will tend to increase their equity holdings for private gains. Alternatively, positive accruals can result from managerial reporting discretion which will likely reverse in future periods. Insiders privately know about the reversal nature of these positive accruals. When the market overestimates the persistence of such positive accruals and thus overvalues the company security, insiders will tend to decrease their equity holdings for profit.

In some other instances, a company may report negative accruals due to asset write downs or restructuring charges which are less likely to persist in future. Insiders privately know about the transitory nature of these negative accruals. Insiders will tend to increase their equity holdings when they perceive that the market undervalues the company security by overestimating the persistence of such negative accruals. Alternatively, negative accruals can be the result of a company’s poor economic condition which may have negative impact on its future performance. Insiders privately
know about the persistence of these negative accruals. Therefore, when the market underestimates valuation implication of such negative accruals and thus overvalues the company security, insiders will tend to decrease their equity holdings for private monetary gains.

3.4 Investors’ Payoff Optimization Problems

This study continues to consider investors’ trading decisions. Investors are risk neutral. They have the option to revise their assessment and portfolio strategy when insider trading pattern becomes observable in the market.

In such a setting, investors move first following an earnings announcement \( E_0 \). They adjust their assessment of the valuation implication of the released accounting information, denoted as \( V_0 \), and they make trading decisions \( I_0 \). As previously discussed, because of the information advantage, insiders observe the market’s reaction and compare it with their own assessment for their trading decisions \( M_0 \) following the earnings announcement. When such insider trading becomes observable in the market, investors then have the option to revise their trading strategy \( I_0^A \) based on their interpretation of such insider trading pattern. Therefore, to maximize their monetary payoffs, investors need to assess the valuation implication of the released earnings information for the company’s future performance and need to assess whether managerial insider trading is informative when it becomes observable (for instance, do
insiders trade for their portfolio balancing purposes or do they trade due to their private informed perception of the company’s prospects).

In particular, this study presumes the valuation divergence between insiders and investors (i.e., $|PVD_0| \neq 0$) following the accounting earnings announcement. It also considers possible difference between such valuation divergence $PVD_0$ and the divergence $VD_0$ in the market’s valuation from the company’s actual one-period-ahead performance, depending on completeness and accuracy of the insiders’ private knowledge. Investors can then maximize their monetary payoffs by revising their trading strategy based on their assessment of the valuation implication of the released accounting information and their interpretation of the informativeness of managerial insider trading when it becomes observable. Therefore, this study obtains the second proposition:

**Propositions 2:** If $|PVD_0 - VD_0| \rightarrow 0$,

$I^A_0 = \{BUY \mid M_0 = BUY\}$, or

$= \{SELL \mid M_0 = SELL\}$,

subject to $I^A_0 \leq$ investors’ monetary constraints.

Otherwise, if $|PVD_0 - VD_0| \not\rightarrow 0$,

$I^A_0 = \{BUY \text{ or } SELL\}$ and to minimize $|VD_0|$, subject to $I^A_0 \leq$ investors’ monetary constraints.

And to maximize $y^i = f(PVD_0, VD_0, M_0, I^A_0)$, investors are to distinguish when $|PVD_0 - VD_0| \rightarrow 0$ from when $|PVD_0 - VD_0| \not\rightarrow 0$.

(3.3)

In other words, due to information asymmetry in the market, investors’ valuation can diverge from the insiders’ implicit assessment (i.e., $|PVD_0| \neq 0$) and can
also differ from the actual implication of the released earnings for company future performance (i.e., $|VD_0| \neq 0$). Considering insiders’ information advantage and the motives to trade on their private information for profit, investors can view insider trading pattern as an information signal. Subsequently, investors revise their trading strategy by increasing security holdings following insiders’ informed purchases while decreasing the holdings following insiders’ informed sales (i.e., if $|PVD_0 - VD_0| \to 0$, $I_0^A = \{BUY | M_0 = BUY\}$ or $I_0^A = \{SELL | M_0 = SELL\}$). When insiders’ trading decisions are for portfolio balancing or liquidating or other purposes, investors may not follow such insider trading pattern but instead focus on analyzing the released accounting and other public information for security valuation (i.e., when $|PVD_0 - VD_0| \not\to 0$, investors to minimize $|VD_0|$ and $I_0^A = \{BUY \text{ or } SELL\}$).

To empirically investigate the effectiveness of such revised investment strategy, this study proposes to construct a portfolio based on the empirical results regarding the characteristics of accounting earnings and the informativeness of insider trading. Therefore, it seems natural to ask the following empirical question:

**Q1:** Does an investment strategy based on insider trading and company earnings characteristics, generate excess returns?

### 3.5 Managerial Insider Trading and Earnings Discretion

The above model specification and empirical predictions examine the association between the timing of insider trading and insiders’ private perceptions of the
divergence between the market’s valuation and their own assessment. However, they cannot distinguish two competing explanations:

- Insiders strategically manipulate accruals so that they perceive market valuation divergence, or
- Insiders perceive market valuation divergence simply because they possess private knowledge about the economic and other related factors which have impact on company future performance.

In keeping with prior literature (see Beneish and Vargus, 2002; Aboody, Hughes and Liu, 2003), this study proceeds to differentiate managerial discretionary accounting information from non-discretionary component. It hypothesizes the following:

**H2(a):** When insiders manipulate earnings in a downward direction using negative discretionary accruals, insiders tend to increase their equity holdings as they perceive an overestimation in the persistence of such negative discretionary accruals by the market.

**H2(b):** When insiders manipulate earnings in an upward direction using positive discretionary accruals, insiders tend to decrease their equity holdings as they perceive an overestimation in the persistence of such positive discretionary accruals by the market.

For instance, when insiders make negative discretionary accruals to manage earnings downward, insiders privately know about the reversal nature of these accruals in security pricing. When the market does not fully distinguish negative discretionary accruals from non-discretionary component and thus overestimates the valuation implication of such negative discretionary accruals, the firm’s security will be undervalued. Insiders, therefore, can observe such market undervaluation and have incentives to increase their equity holdings.
In other instances, insiders use positive discretionary accruals to manipulate earnings upward. Again, insiders privately know about the reversal nature of such positive discretionary accruals in the firm’s future performance. When the market does not fully incorporate the reversal nature of positive discretionary accruals, insiders can perceive the market overvaluation and decrease their equity holdings when security price is inflated.

In summary, within the framework of information asymmetry, this study models the association between the timing of insider trading and the divergence in the market’s valuation from insiders’ own assessment. It conjectures that managerial insiders have incentives to exploit their information privilege. It hypothesizes that insiders are capable of perceiving market valuation divergence and trade on such private perceptions for profit. Therefore, an investment strategy based on insider trading and company earnings characteristics can provide excess returns in the market. In addition, regarding the nature of insiders’ private information, this study predicts that insiders tend to exercise reporting discretion in favor of their personal trades. Insiders time their trading decisions when they perceive a market overvaluation (undervaluation) of accounting earnings under such reporting discretion. And their reporting discretion becomes a possible source of insiders’ private and superior information in security valuation. Figure 2 summarizes the theoretical propositions and empirical hypotheses.

[Insert Figure 2 here]
4.1 Sample Selection

The data in this study is composed of non-financial\textsuperscript{10} companies with data available on Compustat, CRSP and I/B/E/S files. This study collects accounting data from Compustat files to measure a company’s annual earnings and earnings characteristics. It obtains the company’s security price and return data from CRSP daily files. I/B/E/S provides information such as the company’s annual earnings announcement date and consensus analyst forecasts, based on which this study categorizes firm-years along an earnings distribution spectrum (i.e., a spectrum of firm-year accounting earnings relative to the consensus analyst forecasts). Additional filters are required on the sample when analyzing insider trading behavior from Thomson Financial Insider Filing Data files.

This study examines top managerial insiders’ equity related transactions. Consistent with prior literature, insiders are defined including CEO, CFO, COO, president and chairman of the board. As the objective is to examine the timing of insider trading, insiders’ trading transactions considered in this research are limited to their open market transactions (open market purchases or sales) and the company’s

\footnotesize{\textsuperscript{10} Because of the differences in interpreting earnings properties and accounting accruals between non-financial and financial companies, consistent with prior literature, this study excludes financial companies with Standard Industrial Classification (SIC) codes from 6000 to 6999.}
unscheduled stock-option grants. As shown in a recent study by Collins, Gong and Li (2005), insiders may exercise their discretion over the timing of the company’s unscheduled stock-option grants. Prior statistics show that for every one dollar reduction in its exercise price, the value of each option increases by approximately 68 cents; on an average CEO grant of 65,000 options, a single dollar reduction in exercise price would reap a $44,200 gain (see Aboody and Kasznik, 2000). Therefore, considering insiders’ motivation and control over the timing of their open market transactions and unscheduled stock-option grants, this study analyzes both insiders’ open market transactions and the unscheduled stock-option grants to understand the timing and the decisions of insider trading. Due to the unavailability of stock-option grants prior to 1996 on Thomson Financial Insider Filing Data files, the sample period of this study covers from 1996 to 2005.

In addition, for the purpose of this study, the sample is narrowed to companies in the middle of the earnings distribution spectrum (which include companies whose reported earnings just miss their consensus analyst forecasts and companies who meet or just beat the forecasts). Previous studies have focused on the companies that meet or just beat their earnings benchmark to address the “target beating game” theme (see Matsumoto, 2002; McVay, Nagar and Tang, 2005). On the other hand, prior literature also shows that when a company just misses its earnings benchmark, the market often penalizes the company (see Matsunaga and Park, 2001; Das and Zhang, 2003). Therefore, it seems interesting to explore the market’s pricing and managerial insider trading and reporting behavior in these companies.
Moreover, accounting accruals can be the primary component contributing to earnings surprise in some instances while mitigating the degree of earnings surprise in other instances. Therefore, asymmetric information and the valuation divergence between the market and insiders can be amplified in these companies whose reported earnings are in the vicinity of their earnings targets. As previously discussed, private gains of insider trading will be generated only when the market cannot fully understand the valuation implication of accounting earnings and only when the market’s valuation diverges from insiders’ assessment. This study decides to focus on these companies to examine the market’s pricing and market valuation divergence, and to investigate the timing of insider trading and its association with such market valuation divergence. During 1996 to 2005, this study obtains 4,357 firm-year observations for further investigation.

Consensus analyst forecasts are used in this study as a company’s earnings target. This approach seems appealing because it is representative of the frequently used analyst forecasts as the earnings expectation in the market, especially in recent years (see Brown and Caylor, 2004). Firm-years are classified in the region where the company meets or just beats its earnings target, when the company’s reported earnings are the same as its most recent consensus analyst forecasts or up to one cent above the forecasts. Firm-years are classified in the region where the company just misses its earnings target, when the company’s earnings are up to one cent below the forecasts. Both regions are specified as the middle of the earnings distribution spectrum, which is centered at a company’s earnings target.
4.2 Earnings Characteristics Variables

To analyze and understand a company’s earnings characteristics and its association with market valuation divergence and insider trading pattern, this study uses the cash-flow approach to compute company earnings, cash flows and total accounting accruals (see Hribar and Collins, 2002). Earnings for a company $i$ in year $t$ are obtained as earnings before extraordinary items and discontinued operations (Compustat item #123). Cash flows are operating cash flows from the statement of cash flows (Compustat item #308 – Compustat item #124). Total accounting accruals are computed by subtracting cash flows from earnings. For comparability across companies, earnings, cash flows and total accounting accruals are scaled by average total assets (Compustat item #6).

In addition, this study uses a time-series modified-Jones model to distinguish discretionary accruals from non-discretionary accruals (see Dechow, Sloan and Sweeney, 1995). It implements the following firm-specific time-series regression for each firm-year in the sample:

$$\frac{TA_{i,t}}{AvgAssets_{i,t}} = \beta_1 \frac{1}{AvgAssets_{i,t}} + \beta_2 \frac{(\Delta REV_{i,t} - \Delta AR_{i,t})}{AvgAssets_{i,t}} + \beta_3 \frac{PPE_{i,t}}{AvgAssets_{i,t}} + \epsilon_{i,t}$$  \tag{4.1}

where $TA_{i,t}$ is the total accruals,

$$\Delta REV_{i,t}$$ is change in sale revenues (Compustat item #12),

$$\Delta AR_{i,t}$$ is change in accounts receivables (Compustat item #302),
$PPE_{i,t}$ is gross property, plant and equipment (Compustat item #7).

It estimates non-discretionary accruals ($NDA_{i,t}$) as the predicted values in the firm-specific time-series modified-Jones model and discretionary accruals ($DA_{i,t}$) as the residuals.

4.3 Timeline

The purpose of this study is to examine the market’s pricing at the arrival of an annual earnings announcement and to investigate the timing of insider trading and its association with insiders’ perceptions of the divergence in the market’s valuation from their own. In line with the theoretical timeline (see figure 1), figure 3 plots empirical measurement windows of stock returns and earnings characteristics, and the periods of the market’s and insiders’ trading activities.

[Insert Figure 3 here]

The first window (window 1) is a three-trading-day window around a company’s annual earnings announcement. In this window, this study measures the market’s initial reaction to the earnings announcement. Due to variation in the time between a company’s annual earnings announcement and its release of next annual earnings, the second window (window 2) is defined beginning on the second trading day after the current earnings announcement till one trading day following the company’s next annual earnings announcement. In this window, this study uses the Mishkin (1983) design to assess and compare the valuation implication of the
company’s current earnings with the market’s valuation. Based on the comparison, this study can then estimate the market overvaluation (undervaluation) of company securities.

The first period (period 1) to measure insiders’ trading transactions starts on the second trading day after a company’s annual earnings announcement and ends on two trading days before its announcement of next annual earnings. As previously discussed, when insiders possess superior information about company prospects and earnings characteristics, insiders foreknow about the company’s price-relevant forthcoming disclosures, such as the company’s next annual earnings. Insiders can perceive the valuation divergence in the market’s belief from their own assessment of the valuation implication of current earnings for future performance. Insiders can subsequently engage in portfolio trading based on such private perceptions. Therefore, the direction of insiders’ trades within this period can be associated with company earnings properties and market valuation divergence on arrival of its current earnings announcement.

The second period (period 2) is from the second trading day after the company’s current earnings announcement up to one calendar month following the announcement. The third period (period 3) is from the second trading day after the company’s current earnings release till two calendar months afterward. Both periods are defined to measure insiders’ trading transactions before a company’s upcoming quarterly announcement. Insider trading within these two periods, respectively, is examined to determine the predictive power of insiders’ trades in anticipating the company’s future
earnings and in perceiving the divergence in the market’s valuation from their own. The fourth period (period 4) is defined as a 60-trading-day period starting from one trading days before the company’s next annual earnings announcement. If insiders’ trades in period 1 (or in period 2 or 3) are indicative of a company’s future earnings and market valuation divergence, positive excess returns from insider trading should be expected in this period on arrival of the company’s next annual earnings.

Alternatively, this study could examine insider trading in the periods prior to a company’s earnings announcement. Previous studies have shown that insiders appear capable of timing their sales before the release of “bad” news and timing their purchases or option grants in advance to the announcement of “good” news (see Aboody and Kasznik, 2000; Ke, Huddart and Petroni, 2003). However, exploring insider trading following a company’s annual earnings announcement serves the objective of this study. It provides a window into insiders’ private perceptions of the divergence in the market’s valuation from their own assessment at the arrival of the accounting news release. Only when the market reacts to accounting information following the news announcement, insiders may observe and trade subsequently on their perceptions of such market valuation divergence, if any, for private benefits.

Moreover, insider trading following the news release bears less litigation risk. Recent studies by Jagolinzer and Roulstone (2004) and Huddart, Ke and Shi (2006) demonstrate that relative to trading before the earnings announcement, managerial insiders often trade more heavily after the announcement; they appear to profit from their foreknowledge about the company’s price-relevant information in the forthcoming
disclosures. Therefore, this study decides to focus on insider trading following a company’s earnings announcement. It examines the association between the timing of insider trading and insiders’ perceptions of the divergence in the market’s belief from insiders’ own assessment on the valuation implication of current earnings for the company’s future performance.

4.4 Descriptive Statistics

Table 1 provides descriptive statistics relating to size, some performance measures and earnings characteristics in the sample of this study. It shows that the sample companies (which are in the middle of the earnings distribution spectrum) are relatively large in market capitalization. The mean (median) market value of common equity is $4,938 ($569) million, comparing with the mean (median) of the universe at $3,493 ($379) million. The sample companies appear to have more growth potential. The mean (median) of book-to-market ratio is 0.45 (0.34) as compared with that of the universe at 0.58 (0.44). The sample companies’ mean (median) leverage ratio, 0.19 (0.14), is comparable to that of the universe.

In addition, the sample companies are, on average, profitable. The mean (median) income before extraordinary items (as a percentage of average total assets) is 0.05 (0.06). However, the mean (median) profitability of the universe is -0.01 (0.04). The mean (median) total accruals of the sample is comparable to that of the universe, while cash flow component of earnings are different. The sample’s mean (median) cash flows is 0.09 (0.10), while the mean (median) of the universe is 0.05 (0.08).
Finally, size, performance measures and earnings characteristics, respectively, has comparable distributions in the sub-sample of companies who meet or just beat their consensus analyst forecasts versus in the sub-sample where companies just miss the forecasts. Except that the companies who just miss their earnings benchmark are, on average, smaller in market capitalization and in total assets.

[Insert Table 1 here]
CHAPTER 5
EMPIRICAL TESTS AND RESULTS

5.1 Introduction

This chapter provides the results of empirical tests designed to analyze insider trading and its association with insiders’ perceptions of the divergence in the market’s valuation from their own. To empirically measure the apparent market overvaluation (undervaluation) of company securities on arrival of an earnings announcement, the framework of the Mishkin (1983) test is applied and discussed. Within this framework, this study investigates the mechanism of the market pricing. It also estimates excess returns from insiders’ trades as evidence of their private and superior knowledge in security pricing.

It proceeds to analyze the dynamics of insider trading and its association with the apparent market overvaluation (undervaluation) to test H1(a) and H1(b) (see section 3.3). Additional analyses are then performed to empirically decide the windows of insider trading when it firstly becomes indicative of insiders’ private perceptions of market valuation divergence. Based on the informativeness of insider trading and company earnings characteristics, this section constructs a trading strategy for excess returns in answering Q1 (see section 3.4). Finally, to test H2(a) and H2(b) (see section 3.5), it probes the specific nature of the price-relevant information that insiders may
privately possess and use in their portfolio trading decisions. Figure 4 summarizes empirical hypotheses and corresponding operational tests of this study.

[Insert Figure 4 here]

5.2 The Mishkin Test

The rationale to implement the Mishkin (1983) test is to empirically measure the apparent market overvaluation (undervaluation) of company securities and to estimate insider trading and its association with insiders’ perceptions of market valuation divergence. Using the Mishkin (1983) test, this study simultaneously analyzes the two following regressions (i.e., forecasting regression and market-pricing regression) to

11 “The rational expectation hypothesis asserts that the market’s subjective probability distribution of any variable is identical to the objective probability distribution of that variable, conditional on all available past information.” (Mishkin, 1983) Applying to the market, it therefore asserts that \( E(y_{t+1} - y_{t+1} | \phi) = 0 \).

It “implies that \( y_{t+1} - y_{t+1} \) (a measure of abnormal returns) should be uncorrelated with any past available information.” In the context of a company’s earnings announcement, this study investigates the market’s expectation of the company’s one-period-ahead earnings based on current earnings and earnings components. Allowing \( X_{t+1}^* \) denote the market’s expectation and \( X_{t+1} \) denote the actual one-period-ahead earnings, it develops the following equation to estimate the market’s pricing,

\[
y_{t+1} - \bar{y}_{t+1} = \beta(X_{t+1} - X_{t+1}^*) + \varepsilon_{t+1}, \text{ where } X_{t+1}^* = \alpha_0 + \alpha_1 CFO + \alpha_2 TACC.\]

It “stresses that only when new information hits the market will \( y_{t+1} \) differ from \( \bar{y}_{t+1} \).” This is equivalent to the proposition that only unanticipated changes in \( X_{t+1} \) can be correlated with \( y_{t+1} - \bar{y}_{t+1} \).” (Mishkin, 1983) Therefore, once it obtains the value of \( y_{t+1} - \bar{y}_{t+1} \) and \( X_{t+1} \), it can estimate the market’s expectation \( X_{t+1}^* \).

Simultaneously, this study estimates the actual valuation implication of the current earnings and earnings components, using a forecasting equation,

\[
X_{t+1} = \alpha_0 + \alpha_1 CFO + \alpha_2 TACC + \varepsilon_{t+1}.
\]

The design of the Mishkin test is the joint test of the forecasting regression and the market-pricing regression. The constraint of \( \alpha_j = \alpha_j^* \) will demonstrate the valuation divergence, if any, between the market’s expectation and the valuation implication of the company’s current accruals for its future performance.
estimate and compare the actual valuation implication of accounting earnings and earnings components with the market pricing\textsuperscript{12}.

\[ Earnings_{t+1} = \alpha_0 + \alpha_1 CFO_t + \alpha_2 TACC_t + \epsilon_{t+1} \]  
\[ Abnormal Returns_{t+1} = \beta (Earnings_{t+1} - \alpha_0^* - \alpha_1^* CFO_t - \alpha_2^* TACC_t) + \epsilon_{t+1} \]  

In the forecasting regression (equation 5.1), it regresses the company’s one-period-ahead earnings on its current cash flows and accrual components of earnings. It shows that how these current earnings components forecast the company’s next period earnings. In the market-pricing regression (equation 5.2), it regresses the company’s abnormal returns on its unexpected earnings (which is the difference between the company’s actual one-period-ahead earnings \( Earnings_{t+1} \) and the market’s expectation \( \alpha_0^* + \alpha_1^* CFO_t + \alpha_2^* TACC_t \)). As a company’s current earnings components and its one-period-ahead earnings can be obtained, the forecasting regression can estimate the actual valuation implication of current earnings components (i.e., \( \alpha_1 \) and \( \alpha_2 \)). Moreover, as the abnormal returns in the period are also available, the market-pricing regression can then estimate the market’s assessment of these earnings components (i.e., \( \alpha_1^* \) and \( \alpha_2^* \)). Therefore, by comparing \( \alpha_2 \) with \( \alpha_2^* \), this study assesses whether the market overvalues, undervalues or properly values the valuation implication of accounting accruals for security pricing.

\textsuperscript{12} As previously discussed, insiders often possess private knowledge about the valuation implication of accounting accruals. This study decides to compare the market pricing with the actual valuation implication of such accounting accruals. It analyzes the timing of insider trading and its association with market valuation divergence in the valuation implication of accounting accruals.
In addition, to investigate insider trading and its association with the divergence in the market valuation from their own assessment, this study categorizes the sample into two groups. One group is composed of companies where insiders increase their equity holdings following the company’s earnings announcement. The other group consists of companies where insiders decrease their equity holdings after the earnings announcement. This study then performs the Mishkin (1983) test (see equation 5.1 and 5.2) in both groups. It is conjectured that if managerial insiders privately perceive and trade on the market misvaluation, insiders increase their equity holdings when the market undervalues company securities; insiders decrease their equity holdings when the market overvalues company securities. Therefore, this study examines the timing of insider trading and the informativeness of insider trading regarding the market mispricing in the valuation implication of accounting accruals.

5.3 Market Pricing of Accounting Accruals

To understand insider trading and its association with insiders’ perceptions of the divergence in the market’s valuation from their own assessment, this section begins by analyzing the apparent market overvaluation (undervaluation). Following prior literature, this study applies the Mishkin (1983) test to determine how the market assesses the valuation implication of current earnings components. As previously discussed, in the framework of the Mishkin (1983) test, this section estimates and compares the market pricing with the actual valuation implication of current earnings components in equation 5.1 and 5.2. Equation 5.1 is the forecasting equation, in which
\( \alpha_2 \) is estimated as the actual valuation implication of current accruals for the company’s one-period-ahead earnings. Equation 5.2 is the market pricing equation, in which \( \alpha'_2 \) is estimated as the market’s assessment of accruals for future earnings. Therefore, the difference \( \alpha_2 - \alpha'_2 \) shows the divergence between the actual valuation implication of current accruals and the market’s assessment.

Consistent with prior studies (see Sloan, 1996), panel A of table 2 reports that the pooled estimate of the actual valuation implication of total accruals \( \alpha_2 \) is 0.409, lower than that of cash flow \( \alpha_1 \), which is 0.671. In addition, when comparing the market’s estimate \( \alpha'_2 \) to the actual implication \( \alpha_2 \), it shows that the market appears to overestimate the persistence of total accruals \( \alpha_2 - \alpha'_2 = -0.409 \). Therefore, the market’s assessment seems to diverge, on average, from the valuation implication of current accounting accruals.

[Insert Table 2 here]

As the time-series properties of earnings could vary due to firm-specific characteristics, the pooled estimates may suffer from a varying parameters problem. I then implement firm-specific estimation to ensure the results. By comparing the firm-specific average estimates of \( \alpha_2 \) and \( \alpha'_2 \) in panel A of table 2, the firm-specific average estimates seem to provide consistent evidence. The market tends to overestimate the valuation implication of current accruals in security pricing \( \alpha_2 - \alpha'_2 = -0.151 \). Although the firm-specific estimation considers possible variations in the time-series properties of earnings across different companies, this approach, nevertheless, faces a
challenge of limited observations for statistical tests. Moreover, the econometrical analysis (see appendix 1) shows that the pooled estimates in the design are systematically unbiased relative to the firm-specific average estimates. This study then proceeds to analyze using the pooled estimation procedures, although the pooled estimates may still have a varying parameters problem which may weaken the statistical inference.

Moreover, the overestimation (underestimation) of positive versus negative accruals has different implication regarding the market’s overvaluation (undervaluation) of company securities. This study then separates the sample in two subsets, the firm-years with positive accounting accruals versus the firm-years that report negative accruals. Panel B of table 2 presents the results of the market overestimation (underestimation) of the accruals persistence in the two subsets.

Consistent with prior finding (see Sloan, 1996), the market, on average, appears to overestimate the valuation implication of either positive or negative accruals ($\alpha_2 - \alpha_2^* = -0.164$ for positive accruals and $\alpha_2 - \alpha_2^* = -0.271$ for negative accruals). Surprisingly, this study finds that the pattern of the market mis-estimation in the persistence of positive versus negative accruals differs between the companies whose earnings just miss their consensus analyst forecasts and the ones who meet or just beat the earnings forecasts. In particular, in the subset of companies with positive accruals, the market seems to overestimate the persistence of positive accruals when companies meet or just beat their consensus analyst forecasts ($\alpha_2 - \alpha_2^* = -0.215$), resulting in an overvaluation of company securities; however, when companies just miss their earnings
benchmark, the market appears to underestimate the persistence of positive accruals 
\( (\alpha_2 - \alpha_2^* = 0.454) \), resulting in an undervaluation of company securities. In the subset of companies with negative accruals, the market seems to overestimate the persistence of negative accruals when companies meet or just beat the earnings forecasts 
\( (\alpha_2 - \alpha_2^* = -0.291) \) or when companies just miss the earnings benchmark 
\( (\alpha_2 - \alpha_2^* = -0.279) \).

In summary, it appears that the market cannot fully understand the valuation implication of the company’s accounting accruals for its one-year-ahead earnings. The empirical evidence shows that in companies with positive accruals, if the company meets or just beats its consensus analyst forecasts, the market tends to react to its positive accruals more favorably than it should; if the company misses its earnings benchmark, the market tends to overreact to the “bad” earnings news by undervaluing the company’s positive accruals. In companies who report negative accruals, the market seems to overestimate the valuation implication of such negative accruals and thus tends to undervalue company securities, whether the company meets or just beats or just misses its earnings benchmark.

Therefore, when the market cannot fully interpret the valuation implication of accounting accruals, insiders, who possess superior knowledge, can perceive the divergence in the market’s valuation from their own assessment. Insiders can make their personal trading based on such private perceptions for profit. This study proceeds to examine insider trading and its association with such market valuation divergence.
5.4 Insider Trading and Abnormal Returns

This section analyzes buy-and-hold abnormal returns from insider trading as a window into insiders’ foreknowledge about company prospects and earnings characteristics. Consistent with previous studies (see Piotroski and Roulstone, 2005), table 3 shows in the three-day window around an annual earnings announcement (see window 1 in figure 3), insiders purchase with falling security prices (for instance, the mean excess return is -0.007 in full sample) while sell with increasing prices (for instance, the mean excess return is 0.010 in full sample).

[Insert Table 3 here]

Moreover, to understand insiders’ trading behavior in anticipation of their company’s future earnings, this study probes the excess returns from insiders’ trades. As previously discussed, if insiders possess private foreknowledge about the company’s one-year-ahead earnings, insiders can assess the valuation implication of current earnings for future earnings. By observing and comparing the market’s reaction to current earnings with their own assessment, insiders can perceive the market valuation divergence and make their trades for profit. On arrival of the release of their company’s one-year-ahead earnings, positive excess returns can be obtained when the market incorporates and adjusts its valuation at the arrival of the “new” accounting information.

Table 3 reports the raw and the market-adjusted buy-and-hold abnormal returns in a 60-trading-day window around the company’s one-year-ahead annual earnings announcement (see period 4 in figure 3) to estimate excess returns from insiders’ trades. Consistent with the conjecture, insiders’ purchases are associated with significantly
positive excess returns (for instance, 0.064 in full sample). Nevertheless, insiders’ sales are also associated with positive excess returns (for instance, 0.036 in full sample), although the magnitude of excess returns is significantly lower than that when insiders purchase.

In addition, this study examines the company’s performance in the period when insiders purchase or sell (see period 1 in figure 3). Insiders’ purchases are consistent with a trend of the company’s improving performance (for instance, in full sample, in the period of insiders’ purchases, the average excess return is -0.054, while the average excess return in the period upon the forthcoming announcement is 0.064 in a 60-trading-day window). Insiders’ sales appear to reveal a trend of the company’s declining performance (for instance, in full sample, the mean excess return in the period when insiders sell is 0.295 compared with an average excess return in the latter period of 0.036).

These results suggest that insiders’ purchases successfully predict an upward pricing movement, yet insiders’ sales are less informative in anticipating price movements. Considering that both insiders’ monetary wealth and human capital are tied to their company’s performance, insiders are often under-diversified. Therefore, insiders’ purchases, which expose insiders to additional firm-specific risks, may often provide a positive signal to the company’s improving future performance and thus positive excess returns. Insiders’ sales, on the contrary, may be motivated by numerous reasons, for example, portfolio rebalancing, personal liquidity, anticipation of the
company’s declining future performance and so forth, and thus may not be as informative as insiders’ purchases.

Nevertheless, these results have little bearing on the nature of insiders’ private accounting information. This research proceeds to examine the association between insider trading and insiders’ perceptions of market valuation divergence in the valuation implications of accounting accruals.

5.5 Empirical Tests of H1(a) and H1(b)

This section employs the framework of the Mishkin (1983) test to examine whether insiders make trading decisions based on their perceptions of the divergence in the market’s valuation from their own assessment. It explores the timing of insider trading and its association with such market valuation divergence through insiders’ open market transactions and their company’s unscheduled stock-option grants.

As previously discussed, on arrival of a company’s earnings announcement, when the market’s valuation, embedded in security prices, diverges from insiders’ own assessment, insiders can perceive and trade on such valuation divergence for profit. Although insiders may trade for a variety of reasons and may more likely engage in selling activities for diversification purposes, insiders often have control over the timing of their open market transactions and the company’s unscheduled stock-option grants. Insiders can postpone their trading decisions of either increasing or decreasing equity holdings till they perceive an undervaluation or overvaluation of company securities in the market. Therefore, to examine the association between insider trading and insiders’
perceptions of market valuation divergence, the empirical tests to capture H1(a) and
H1(b) are:

- When insiders increase their equity holdings (either through open market
  purchases or through their company’s unscheduled stock-option grants),
  the company’s security prices are “depressed”, as the market is either
  underestimating the valuation implication of positive accruals or
  overestimating the valuation implication of negative accruals.

- When insiders decrease their equity holdings (through open market
  sales), the company’s security prices are “inflated”, as the market is
  either overestimating the valuation implication of positive accruals or
  underestimating the valuation implication of negative accruals.

Particularly, in equation 5.1 and 5.2, the difference between $\alpha_2$ and $\alpha_2^*$
represents the divergence in the actual valuation implication of accruals from the
market’s belief. It is, therefore, expected that when insiders increase their equity
holdings, $\alpha_2 - \alpha_2^* > 0$ for positive accruals while $\alpha_2 - \alpha_2^* < 0$ for negative accruals;
when insiders decrease their equity holdings, $\alpha_2 - \alpha_2^* < 0$ for positive accruals while
$\alpha_2 - \alpha_2^* > 0$ for negative accruals.

Table 4 presents the empirical results. Consistent with H1(a), panel A of table 4
suggests that when insiders purchase their company’s securities, the securities, on
average, are undervalued. In particular, the market appears to underestimate the
valuation implication of positive accruals ($\alpha_2 - \alpha_2^* = 0.828$) while overestimate the
implication of negative accruals ($\alpha_2 - \alpha_2^* = -0.645$). The pattern is consistent in the
two sub-samples of companies who meet or just beat the earnings forecasts
(\(\alpha_2 - \alpha_2^* = 0.898\) for positive accruals and \(\alpha_2 - \alpha_2^* = -0.723\) for negative accruals) and also the companies whose earnings just miss the benchmark (\(\alpha_2 - \alpha_2^* = 0.781\) for positive accruals and \(\alpha_2 - \alpha_2^* = -0.661\) for negative accruals). Therefore, insiders appear capable of timing their open market purchases when company securities are undervalued.

[Insert Table 4 here]

To examine the timing of insiders’ decision to increase their equity holdings, this study also investigates the unscheduled stock-option grants. As previously discussed, the unscheduled stock-option grants also give managerial insiders discretion over the timing of such grants. Therefore, the company’s unscheduled stock-options can be granted when the market undervalues the company’s securities, which results in a low exercise price for the granted stock-options.

Also, consistent with H1(a), table 5 demonstrates that the unscheduled stock-options are granted when the market undervalues company securities. The market either underestimates the valuation implication of positive accruals (for instance, \(\alpha_2 - \alpha_2^* = 0.236\) in the full subset of companies with positive accruals) or overestimates the implication of negative accruals (for instance, \(\alpha_2 - \alpha_2^* = -0.336\) in the full subset of companies with negative accruals). Therefore, insiders appear capable of timing the grants of the unscheduled stock-options when the market undervalues company securities, so that a low exercise price in these unscheduled stock-option grants is obtained.
To examine insider trading in decreasing their equity holdings and its association with market valuation divergence as stated in H1(b), this study implements the Mishkin (1983) test in companies with insider open market sales. The empirical analysis provides mixed evidence about the informativeness of insiders’ sales in indicating the market overvaluation. In companies with positive accruals, the results in panel B of table 4 show that, consistent with H1(b), insiders’ open market sales are associated with the market overestimation of the valuation implication of positive accruals ($\alpha_2 - \alpha_2^* = -0.247$). The pattern is consistent in the two sub-samples ($\alpha_2 - \alpha_2^* = -0.469$ in the sub-sample of companies who meet or just beat the analyst forecasts and $\alpha_2 - \alpha_2^* = -0.190$ in the sub-sample of companies who just miss the forecasts). It suggests that insiders tend to sell their shares when the market overprices the security in companies with positive accruals.

However, insiders’ selling decisions in companies with negative accruals appear uninformative. Inconsistent with the prediction, insiders’ sales do not correspond to a market undervaluation of these company securities. Instead, when insiders sell their company’s securities, the market seems undervaluing these securities by overestimating the valuation implication of negative accruals ($\alpha_2 - \alpha_2^* = -0.739$). This pattern is also consistent in the sub-samples of companies who meet or just beat their consensus analyst forecasts ($\alpha_2 - \alpha_2^* = -0.721$) and the companies who just miss their earnings target ($\alpha_2 - \alpha_2^* = -0.691$). It indicates that when companies report negative accounting
accruals, the timing of insiders’ open market sales appears unrelated to a market overvaluation^{13}.

In summary, by examining insider trading and the market overvaluation (undervaluation) in accounting accruals, it appears that insiders’ trading decisions in increasing their equity holdings (either through open market purchases or unscheduled stock-option grants) are informative about a market undervaluation. However, insiders’ open market sales are informative about a market overvaluation only when companies report positive accruals.

5.6 Additional Results of Predictive Power of Insider Trading

Prior literature (see Bernard and Thomas, 1989, 1990) shows that the market’s mispricing of company annual earnings often gets mitigated upon the company’s next quarterly earnings announcement. Insiders, capable of timing their trades, may thus attempt to make their trading decisions before the release of the company’s next quarterly earnings for profit. In addition, the above empirical results (see section 5.5) show that in most scenarios insider trading is informative about the apparent market overvaluation (undervaluation) of company securities. Therefore, the earlier the market detects insiders’ informed trades, the quicker the market incorporates insiders’ private knowledge in security pricing. This section explores insider trading in the first quarter after an annual earnings announcement (i.e., period 2 and period 3 in figure 3) and

^{13} In following sections, this study examines whether insiders’ informed trades are related to their opportunistic earnings management and whether their not-so-informed sales in the companies of negative accruals are due to their limited capability of manipulating earnings in such companies.
investigates whether these earlier insiders’ trades are predictive of insiders’ private perceptions of market valuation divergence.

Table 6 demonstrates the predictive power of insider trading in the first two months after an annual earnings announcement\(^{14}\). In particular, insiders’ open market purchases in the first two months after a company’s annual earnings announcement have become indicative of a market undervaluation. In these companies that insiders purchase company securities, the market seems to underestimate the valuation implication of positive accruals (as shown in panel A of table 6, \(\alpha_2 - \alpha_2^* = 1.947\)), while overestimate the valuation implication of negative accruals in security pricing (as shown in panel A of table 6, \(\alpha_2 - \alpha_2^* = -1.066\)). The pattern is consistence in the sub-samples of companies who meet or just beat their consensus analyst forecasts (\(\alpha_2 - \alpha_2^* = 1.329\) for positive accruals and \(\alpha_2 - \alpha_2^* = -1.033\) for negative accruals) and the companies who just miss their earnings target (\(\alpha_2 - \alpha_2^* = 1.967\) for positive accruals and \(\alpha_2 - \alpha_2^* = -2.106\) for negative accruals).

[Insert Table 6 here]

Panel B of table 6 shows that insiders’ open market sales in the first two months following the company’s annual earnings announcement are also predictive of the informativeness of insiders’ sales. In companies with positive accruals, insiders’ sales in the first two months after the announcement are associated with a market

\(^{14}\) This study has also examined the predictive power of insider trading in the first month after an annual earnings announcement. The untabulated results show that insider trading during the first month is not as informative as their trades in the first two months following the announcement.
overvaluation. The market appears to overestimate the valuation implication of positive accruals ($\alpha_2 - \alpha_2^* = -0.387$). The pattern of such overestimation is consistent in companies who meet or just beat their analyst forecasts ($\alpha_2 - \alpha_2^* = -0.528$) and also in the companies who just miss the forecasts ($\alpha_2 - \alpha_2^* = -0.382$).

In companies with negative accruals, insiders’ sales in the first two months following the announcement are, again, unrelated to a market overvaluation ($\alpha_2 - \alpha_2^* = -0.426$, indicating that the market seems to undervalue, instead of overvalue these company securities). This un-informativeness pattern of negative accruals is also consistent in the sub-samples of companies who meet or just beat their consensus analyst forecasts ($\alpha_2 - \alpha_2^* = -0.304$) and companies who just miss the forecasts ($\alpha_2 - \alpha_2^* = -0.599$).

Panel C of table 6 shows that the association between the valuation divergence and the company’s unscheduled stock-option grants during the first two months following an annual earnings announcement. It presents an identical pattern as the one shown in table 5. When the company issues unscheduled stock-options to managerial insiders, the market appears to be undervaluing the company’s securities, which results in a low exercise price in favor of insiders’ future gains. In particular, the market seems to underestimate the valuation implication of positive accruals ($\alpha_2 - \alpha_2^* = 1.303$) while overestimate the implication of negative accruals ($\alpha_2 - \alpha_2^* = -0.222$). The pattern in the companies who meet or just beat their analyst forecasts ($\alpha_2 - \alpha_2^* = 0.862$ for positive
accruals and $\alpha_2 - \alpha_2^* = -0.060$ for negative accruals) and the pattern of companies who just miss the forecasts ($\alpha_2 - \alpha_2^* = 1.259$ for positive accruals and $\alpha_2 - \alpha_2^* = -0.436$ for negative accruals) are also consistent showing the informativeness of the unscheduled stock-option grants regarding a market undervaluation.

In summary, it shows that insider trading (including open market transactions and unscheduled stock-option grants) in the first two months following an annual earnings announcement has predictive power about insiders’ private perceptions of the divergence in the market’s valuation from their own. Therefore, investors can use insiders’ trading behavior in the first two months to detect the valuation divergence and subsequently adjust their trading strategies.

5.7 Empirical Tests of Q1

Based on the above empirical results regarding the company’s earnings characteristics and the informativeness of insider trading, this section constructs an investment strategy. As previously shown, insiders’ purchases are informative about the market undervaluation and insiders’ sales are informative of the market overvaluation only in companies with positive accruals. Therefore, this study constructs a portfolio which takes a long position in securities with positive accruals, in which insiders increase the holdings. It also takes a long position in securities which report negative accruals, whether insiders increase the holdings or not. It takes a short position in securities with positive accruals, in which insiders decrease the holdings.
This section investigates whether the above investment strategy could earn excess returns in answering Q1 (see section 3.4). It ensures previous results that insiders make trading decisions based on their perceptions of market valuation divergence.

In addition, following previous studies (see Sloan, 1996; Beneish and Vargus, 2002), this study also constructs a portfolio that takes a long position in securities with negative accruals while takes a short position in securities with positive accruals. Also, this study obtains another alternative portfolio which simply follows insider trading pattern by taking a long position in securities when insiders purchase while taking a short position in securities when insiders sell. This section then proceeds to estimate and compare the excess returns from the above three portfolio strategies.

Table 7 demonstrates that by incorporating insider trading and the company’s earnings characteristics, the investment strategy obtains a 60-trading-day excess return of 13%, as compared with an excess return of 0.7% or 5% in the other two alternative strategies upon the company’s one-year-ahead annual earnings announcement. As insiders are under short-swing profit rules, this proposed investment strategy is of most interest to other investors in the market.

[Insert Table 7 here]

\[^{15}\text{A strategy of taking a long position in the lowest accrual decile and a short position in the highest accrual decile, instead, could approximately generate an excess return of 10.4\% (see Sloan, 1996) or 11.5\% (see Beneish and Vargus, 2002).}\]
5.8 Empirical Tests of H2(a) and H2(b)

The results of this study have shown that insiders’ purchases are informative about the market undervaluation of company securities while insiders’ sales are informative about the market overvaluation only in companies with positive accruals. Nevertheless, it is still unclear whether the informativeness or un-informativeness of insiders’ trades is due to insiders’ discretion over their company’s financial reporting or due to insiders’ superior knowledge about company prospects.

This section investigates insiders’ reporting discretion and its association with insider trading and with market valuation divergence. As previously discussed, when insiders have desire to increase their equity holdings, insiders have incentives to manage earnings downward and to make purchasing decisions when they perceive an undervaluation of the securities in the market. When insiders have desire to decrease their equity holdings, insiders are motivated to manage earnings upward and to make selling decisions when they perceive an overvaluation. This study then divides the sample into two groups, one with positive discretionary accounting accruals and the other with negative discretionary accruals. The following simultaneous regressions are implemented in these two groups to explore insiders’ private knowledge about the valuation implication of such discretionary accounting accruals and to imply their private perceptions about market valuation divergence in discretionary accruals.

\[
Earnings_{t+1} = \phi_0 + \phi_1 CFO_t + \phi_2 DA_t + \phi_3 POSNDA_t + \phi_4 NEGNDAD_t + \varepsilon_{t+1} \quad (5.3)
\]

\[
Abnormal\ Returns_{t+1} = \\
\beta(Earnings_{t+1} - \phi_0 - \phi_1^{*} CFO_t - \phi_2^{*} DA_t - \phi_3^{*} POSNDA_t - \phi_4^{*} NEGNDAD_t) + e_{t+1} \quad (5.4)
\]
 Particularly, in equation 5.3 and 5.4, the difference between $\phi_2$ and $\phi_2^*$ represents the divergence in the valuation implication of discretionary accruals from the market’s belief. To be consistent with H2(a) and H2(b), it is expected that when insiders make negative discretionary accruals and increase their equity holdings, $\phi_2 - \phi_2^* < 0$ suggesting the market overestimates the valuation implication of such negative discretionary accruals and undervalues company securities. When insiders make positive discretionary accruals and decrease their equity holdings, $\phi_2 - \phi_2^* < 0$ suggesting the market overestimates the valuation implication of such positive discretionary accruals and thus overvalues company securities.

Table 8 demonstrates supporting evidence. When insiders manage earnings downward and increase equity holdings, the market overestimates the valuation implications of negative discretionary accruals and thus undervalues company securities (in panel A of table 8, $\alpha_2 - \alpha_2^* = -0.653$). The pattern is consistent in the sub-samples of companies who meet or just beat their consensus analyst forecasts ($\alpha_2 - \alpha_2^* = -0.827$) and of companies who just miss the forecasts ($\alpha_2 - \alpha_2^* = -0.171$).

When insiders manage earnings upward and sell company securities, the market overestimates the valuation implication of positive discretionary accruals and thus overvalues company securities (in panel B of table 8, $\phi_2 - \phi_2^* = -0.692$). The pattern is consistent in sub-samples of companies who meet or just beat their consensus analyst forecasts ($\alpha_2 - \alpha_2^* = -1.044$) and of companies who just miss the forecasts ($\alpha_2 - \alpha_2^* = -0.130$). Therefore, it appears that the market cannot fully understand the
valuation implication of discretionary accruals. Insiders make positive discretionary accruals in favor of their sales while make negative discretionary accruals in advance to their purchases.

[Insert Table 8 here]

In addition, there are other scenarios when the market’s reaction to company earnings does not correspond to insiders’ reporting discretion. For instance, although insiders make positive discretionary accruals, the market may undervalue, instead of overvalue company securities. In this scenario, the pattern of insider trading shows that insiders consider the valuation implication and market valuation divergence in both discretionary and non-discretionary accruals. As shown in panel A of table 8, although $\phi_2 - \phi_2^* = -0.691$ suggesting a market overestimate of positive discretionary accruals, $\phi_3 - \phi_3^* = 2.296$ and $\phi_4 - \phi_4^* = -0.746$, indicating a market-undervaluation of these accounting components. Insiders increase, rather than decrease, their equity holdings in this case of market undervaluation. Therefore, it appears that insiders’ private information comes not only from their reporting discretion but also from their knowledge about company prospects and economic conditions. However, the evidence remains mixed about insiders’ selling behavior in companies with negative discretionary accruals (see panel B of table 8).

In summary, it seems that insiders tend to use their private perceptions of the market overvaluation (undervaluation) of company securities in their personal trades for profit. Given insiders’ trades are informative in most scenarios but uninformative in companies with negative accounting accruals, an investment strategy based on both
insider trading and company earnings characteristics can generate economically significant positive excess returns. Moreover, it seems that insiders’ private perceptions of market valuation divergence is, at least, associated with their discretion over the company’s financial reporting. In addition, insiders also appear to possess some superior knowledge about their company’s economic condition and future performance.
CHAPTER 6
CONCLUDING REMARKS

This dissertation investigates the concept of “market valuation divergence” and its association with insider trading on arrival of the announcement of company accounting earnings. Most prior studies primarily followed the theme that insiders exercise their discretion over financial reporting to manipulate earnings in favor of their trades. This study emphasizes that the divergence in the market’s security valuation from insiders’ own assessment is a necessary condition for excess returns in insiders’ trades and thus related to the timing of insider trading. It conjectures that insiders, due to their information advantage, are capable of perceiving the divergence, if any, in the market’s valuation of accounting accruals from their own assessment. Insiders’ private perceptions of such valuation divergence are associated with the timing of their trading decisions. Using the framework of the Mishkin (1983) test, this study empirically examines the incidence and directions of market valuation divergence and whether such divergence is related to insiders’ trading decisions. It also investigates the specific nature of insiders’ private accounting information. In other words, whether insiders’ discretion over their company’s financial reporting is a source of insiders’ private perceptions of the valuation divergence. Or insiders simply possess and use their private foreknowledge about the company’s economic conditions and future performance.
The time period examined in this study is from 1996 till 2005, in which company earnings characteristics, the company’s security prices and returns, consensus analyst forecasts and insider trading activities are available on Compustat, CRSP, I/B/E/S and Thomson Financial Insider Filing Data files. This study uses accounting accruals16 as a window into managerial insiders’ private information.

In particular, because of managers’ privileged position in a company, they usually possess private and superior information about company prospects and the valuation implication of its accounting earnings. At the arrival of an earnings announcement, when the market valuation of the company’s accounting accruals diverges from insiders’ assessment, insiders can perceive the market overvaluation (undervaluation). Insiders can strategically increase their equity holdings when they perceive a market undervaluation while decrease equity holdings when they perceive a market overvaluation. Therefore, the first set of hypotheses, H1(a) and H1(b), predict the association between insider trading and market valuation divergence. The empirical results indicate that in most contexts, there appears to be a strong association between insider trading and the apparent market misvaluation. Insiders’ purchases of their company’s securities and their unscheduled stock-option grants are associated with a market undervaluation (i.e., the market underestimates the valuation implication of the company’s positive accruals while overestimates the implications of negative accruals).

16 As previously discussed, accounting accruals can be manipulated to achieve the goal of meeting or beating the earnings benchmark in some instances while be used to signal managerial insiders’ private expectations of company prospects in other instance. Also, accounting accruals can also be a primary component contributing to the earnings surprise in some instances while mitigating the degree of the earnings surprise in other instances. Therefore, this study decides to use accounting accruals as a window into insiders’ private knowledge about the valuation implication of such accruals for company prospects.
Insiders’ sales of their company’s securities are associated with a market overvaluation when the company reports positive accounting accruals (i.e., the market overestimates the valuation implication of positive accruals). However, insider sales in companies with negative accruals are not informative regarding a market overvaluation.

Moreover, this study shows that insiders’ trading activities within the first two months following a company’s annual earnings announcement have become indicative of the divergence in the market’s valuation from insiders’ own assessment. When insiders increase their equity holdings in this specified period, the market tends to undervalue the company’s securities; when insiders decrease their equity holdings in this period, the market tends to overvalue the company’s securities. It further confirms H1(a) and H1(b).

Therefore, this study constructs an investment strategy based not only on insider trading but also on the company’s earnings characteristics. Considering that in some instances, insider trading may not be informative about the market misvaluation, a trading strategy by simply following insiders’ trading activities may not be profitable. The investment strategy proposed in this study by considering both insider trading and company earnings characteristics may provide higher excess return. Results show that the strategy proposed in this study could generate an economically significant positive excess return of 13% during a 60-trading-day window upon the announcement of the company’s next one-year-ahead annual earnings. It provides much higher return compared to a simple strategy of following insider trading or the accrual-based trading strategy.
Furthermore, to understand the specific nature of insiders’ superior information, this study examines the association between insiders’ trading decisions and their reporting discretion. Consistent with hypotheses, H2(a) and H2(b), managerial insiders appear to take advantage of their reporting discretion. They tend to increase their equity holdings when they manage earnings downward using negative discretionary accruals and when they perceive a subsequent undervaluation of their company’s securities. They tend to decrease their equity holdings when they manage earnings upward using positive discretionary accruals and when they perceive an overvaluation by the market.

Moreover, insiders also seem to possess and use their superior knowledge about their company’s non-discretionary earnings. In particular, even when insiders make positive discretionary accruals to manage earnings upward, if they perceive an undervaluation (instead of an overvaluation) of company securities in the market, insiders tend to increase (instead of decrease) their equity holdings based on their foreknowledge of the valuation implication of the company’s total accounting accruals (which is a combination of both discretionary and non-discretionary accruals). When insiders make negative discretionary accruals, if the market overvalues (instead of undervalues) company securities, insiders tend to decrease (instead of increase) their equity holdings.

The efforts of this study have revealed that in most contexts insider trading is associated with insiders’ foreknowledge of their company’s future earnings and their private perceptions of the divergence in the market’s valuation from their own. Such valuation divergence on company accounting accruals plays an essential role in helping
us understand the timing of insider trading. The evidence of this study suggests that insiders appear capable of timing their open market trades and the company’s unscheduled stock-option grants. Insiders tend to increase their equity holdings when their company’s securities are being temporarily “depressed” in the market, while decrease their equity holdings when the company’s shares are being “inflated” in the market. Moreover, insiders seem to have incentives to manipulate earnings in favor of their personal trading. They tend to manage earnings upward before their sales of the company’s securities and to manage earnings downward in advance to their purchases.

Additionally, this study is of interest to investors and regulators. Investors can better understand and interpret insider trading and the valuation implication of accounting accruals. Based on insiders’ trading activities and company earnings characteristics, investors can detect the conditions under which the market might have been overvaluing (undervaluing) the company’s securities. Investors can therefore adjust the security pricing in a more prompt fashion. Regulators can better understand the sophistication of insider trading and the specific nature of insiders’ information. The evidence of this study implies current disclosure requirements and restrictions on insider trading are not effective in curtailing insiders from taking advantage of the information asymmetry between the market and themselves.

Meanwhile, the results need be interpreted with caution. Compustat, CRSP, I/B/E/S and Thomson Financial Insider Filing Data files often have complete data available on the larger firms. Moreover, this study focuses on companies in the middle of the earnings distribution spectrum (including companies who meet or just beat their
consensus analyst forecasts and companies who just miss the benchmark). This sample is biased toward larger companies, as shown in the sample descriptive statistics. These larger companies may have different institutional characteristics when compared with smaller companies. Usually, the larger companies have more publicly available information regarding their operations and company performance. The larger companies may have larger institutional ownership and more liquid stock trading. They may incur larger political and regulatory costs. Moreover, the larger companies may face more public pressure to meet or beat their earnings benchmark and may maneuver their reporting practice to achieve such a goal of meeting or beating the earnings target. Therefore, the results need be interpreted given this specific institutional background.

From this perspective, if the sample included smaller companies, results could be either strengthened or weakened. If smaller companies are closely held by a few large investors, information asymmetry between insiders and the market would be mitigated and insiders would have limited incentives to trade, as less profit would accrue to insiders. On the contrary, if smaller companies are relative new companies with uncertain prospects, information asymmetry between insiders and the market may be high. It could therefore magnify the valuation divergence and reinforce insiders’ motivation to trade on their information advantage, which would strengthen the results.

In addition, the proxy for earnings management merits careful interpretation. Following prior research, this study has examined the pattern of discretionary accruals to represent insiders’ discretion in their company’s financial reporting. Previous studies indicate that using balance-sheet approach to estimate total accruals can cause serious
measurement errors in accruals estimates and will contaminate the conclusions of earnings management (see Jones, 1991; Dechow, Sloan and Sweeney, 1995).

Therefore, this study uses the cash-flow approach (see Hribar and Collins, 2002) to estimate accounting accruals. In addition, considering insiders’ private and superior information is rather firm-specific, this study implements the time-series estimation procedure to approximate discretionary accruals to investigate the association between insider trading and the valuation divergence on their company’s accounting accruals and discretionary accruals.

Nevertheless, the cash-flow and time-series estimation approach may also introduce measurement noise. To the extent that both the earnings management measure in this study and insider trading are correlated with the company’s performance, some results of insider trading could be interpreted differently. In other words, insider trading may be associated with their company’s performance rather than their reporting discretion. Kothari, Leone and Wasley (2005) propose a performance-matched discretionary accruals approach to mitigate this problem by using the level of discretionary accruals from a performance-matched firm as a control. This study, as previously discussed, uses the time-series estimation procedure to distinguish discretionary from non-discretionary accruals. A performance-matched approach may have limited implication here.

Following previous studies, this study chooses consensus analyst forecasts as a company’s earnings benchmark to separate the sample into two sub-samples where the companies meet or just beat the benchmark versus where the companies just miss the
benchmark. The results demonstrate that insider trading appears to be associated with the divergence in the market’s valuation from insiders’ own assessment, whether the company meets or just beats or just misses the forecasts. Nevertheless, the choice of a company’s earnings benchmark warrants discussions. A company may choose its consensus analyst forecasts as its earnings target. It could also use the company’s previous earnings as the benchmark. Or the company simply decides to avoid loss as its target. Furthermore, in this study, the use of consensus analyst forecasts from I/B/E/S summary data may introduce some biases. Although this study uses the latest available consensus forecast as a proxy of the company’s earnings benchmark, the summary data file occasionally would include stale forecasts that have not been updated by analysts in forming the consensus forecasts. Some other studies suggest considering companies that have at least five updated forecasts during the month before the event to assure the relevance of consensus analyst forecasts. However, it could bias the sample toward the heavily followed companies. As news media and business press reveal a company’s consensus analyst forecasts in the market, this study decides that it is reasonable to use consensus analyst forecasts from I/B/E/S summary data file as a proxy for a company’s earnings target.

Moreover, this study examines both insiders’ open market transactions and the unscheduled stock-option grants to understand insider trading and its association with insiders’ perceptions of the divergence in the market’s valuation from their own belief. Following prior research, this study categorizes a company’s stock-option grants as scheduled when the grants occur within one-week of the one-year anniversary of the
company’s previous year’s grant date, and as unscheduled if they occur outside of this window or if no options were awarded during the previous year. Considering the recent backdating practice in companies’ option grants, the results of insiders’ unscheduled stock-option grants should be interpreted with caution. It is likely that a company’s backdating grants would fall outside the specified window of the scheduled grants and would then be classified as insiders’ unscheduled stock-option grants. Since most backdating practice allows insiders to issue the grants at a low market price, the classification of backdating practice as a company’s unscheduled stock-option grants would bias the results toward the prediction. It would make it more likely to observe the predicted relation between the timing of insiders’ unscheduled stock-option grants and market valuation divergence. However, it is not yet feasible to distinguish insiders’ backdating practice from other unscheduled stock-option grants. This study attempts to mitigate the bias by investigating insiders’ open market transactions, where the backdating practice is unfeasible. The results show a consistent pattern, confirming that insiders appear to possess and use their private perceptions of the divergence in the market’s valuation from their own in their portfolio decisions for profit.

This study points to a number of avenues that warrant future research. First, this study focuses on a company’s accounting accruals as a window into insiders’ superior information and their perceptions of the valuation divergence between the market’s and their own belief. Future research can refine the analysis to examine the observed pattern in light of a company’s other accounting information, such as cash flows. Although the disclosure of cash flows involves less estimation and is under limited
discretion of insiders, insiders may still possess superior knowledge regarding the valuation implication of cash flows. Subsequently, do insiders make their portfolio decisions considering the valuation divergence of the company’s cash flows? Or the combination of both accounting accruals and cash flows? Examining such association will further shed light on the less understood nature of insiders’ private information in their trades.

In addition, this study finds that insiders’ personal portfolio trading decisions are associated with insiders’ perceptions of the valuation divergence between the market’s belief and insiders’ own assessment. Future research could investigate insiders’ use of their superior knowledge in corporate decisions. For instance, when insiders perceive a market undervaluation of their company’s securities following an earnings announcement, do insiders make share repurchases? When insiders perceive a market overvaluation of the company’s securities, do insiders issue new shares? Or use the overvalued securities to offer mergers and acquisitions? Examining managerial corporate decisions would provide a different perspective to examine the concept of “market valuation divergence”.

Moreover, this study investigates insider trading by looking at the increase versus decrease decisions in insiders’ portfolio positions. Future research could elaborate the issue by probing the magnitude of insiders’ trades. Do insiders trade more heavily when they perceive larger valuation divergence in their company’s securities? This could present interesting insights into the nature and the precision of insiders’
private knowledge about the valuation implication of accounting earnings for their company’s prospects.

Besides insider trading and the market pricing examined in this study, it could be interesting to investigate other institutes in the environment of information asymmetry. For instance, how and how well, in general, does the company’s corporate governance mechanism monitor top managers’ insider trading decisions and transactions? Another instance, institutional investors have been viewed as larger and smarter investors in the market. Do institutional investors observe insider trading pattern and act on their observation in a more timely fashion? When a company is largely owned by institutional investors, does the valuation divergence diminish more quickly? Another instance, how do financial analysts respond to insider trading following the earnings announcement? Do analysts adjust their forecasts or recommendations? And how quickly do analysts adjust their forecasts or recommendations?

Lastly, this study investigates the association between insiders’ personal portfolio decisions and their private perceptions of the valuation divergence in the sample of companies in the middle of the earnings distribution (including the companies whose earnings meet or just beat the consensus analyst forecasts and the companies whose earnings just miss their earnings benchmark). Future research could expand the sample to the universe and may thus provide more comprehensive results about insiders’ use of their private perceptions of market valuation divergence in their trades.
In summary, this study provides insights into insiders’ superior accounting information and their private perceptions of market valuation divergence on such accounting information. It offers an avenue to understand the timing of insider trading. It suggests that insider trading is associated with insiders’ perceptions of the divergence in the market’s valuation from their own assessment. It also provides evidence regarding insiders’ strategic decisions in exercising their reporting discretion in favor of their personal trading. The findings indicate managerial opportunism. As managerial insiders possess private information about accounting accruals and company prospects, they can perceive the market overvaluation (undervaluation) of company securities. When insiders perceive a market undervaluation, they tend to increase their equity holdings (through either open-market purchases or unscheduled stock-option grants) for future profit; when insiders perceive a market overvaluation, they tend to decrease their equity holding (through open-market sales) to obtain a higher selling price when company securities are overpriced. Moreover, managerial insiders strategically manage accounting accruals, report earnings surprise and subsequently time their personal trades in such a manner to benefit from the market overvaluation (undervaluation). Particularly, when insiders manage earnings upward and perceive a market overvaluation, they tend to sell shares at such an “inflated” share price; when insiders manage earnings downward and perceive a market undervaluation, they tend to increase their equity holdings at such a “depressed” share price. These results confirm the notion that managerial insiders exploit their information advantage in their personal trades for private gains.
These results suggest that in the framework of information asymmetry, managerial insiders have incentives to exploit their information advantage regarding the valuation implication of accounting accruals in making their personal trading decisions. The results also suggest that investors should assess both the valuation implication of accounting accruals and the informativeness of insider trading in developing their trading strategies. Policy makers may improve financial reporting and information environment in the market by requiring managerial insiders to disclose their trading activities in a more timely fashion and by providing more details about accounting accruals and company prospects.

This study has several features suggesting further inquiry. Future analysis is suggested to investigate whether managerial insiders also possess private knowledge about the valuation implication of cash flows and to which extent they use such private information in their personal trades. In addition, analysis of managerial insiders’ corporate decisions, such as issuance of additional shares, repurchases of existing shares and so forth, and the association with market valuation divergence could provide another perspective to understand insiders’ use of their private information. Lastly, further study in an expanded sample of the universe could provide evidence on the robustness of the results.
REFERENCE


Figure 1
Model Preliminaries and Theoretical Timeline

(a) With private information, managerial insiders assess the company’s performance and the valuation implication of current accounting information $VI^M_0$. Managerial insiders then disclose certain measurable accounting information, $E_0$ to investors.

(b) Investors react and revise their assessment of the valuation implication of current accounting $VI^M_0$. Investors make trading decisions $I_0$ based upon the new released information $E_0$ and their revised assessment $VI_0^M$. Due to imperfect characteristics of the new released information, investors’ valuation diverges from insiders’ own assessment.

(c) Managerial insiders observe the market reaction to the new release information. Comparing with their own assessment of the valuation implication of current accounting information, insiders perceive the divergence in the market’s valuation from their own. Managerial insiders therefore trade, $M_0$ upon such perceived valuation divergence for profit.

(d) Investors observe the subsequent insiders’ trades $I_0$. Investors can adjust their trades, $I_0'$ according to their interpretation of such insiders’ trading decisions.

(e) The company discloses all relevant information, $E_1$ regarding company performance. Both investors and managerial insiders are compensated on their portfolio decisions.
## Figure 2
Theoretical Propositions and Empirical Hypotheses

<table>
<thead>
<tr>
<th>Assumption &amp; Propositions</th>
<th>Empirical Hypotheses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Assumption:</strong> (see equation 3.1)</td>
<td><strong>H1(a):</strong> Insiders tend to increase their equity holdings when they perceive an underestimation (overestimation) in the persistence of positive (negative) accruals by the market.</td>
</tr>
<tr>
<td>$</td>
<td>PVD_o</td>
</tr>
<tr>
<td><strong>Proposition 1:</strong> (see equation 3.2)</td>
<td><strong>H1(b):</strong> Insiders tend to decrease their equity holdings when they perceive an overestimation (underestimation) in the persistence of positive (negative) accruals by the market.</td>
</tr>
<tr>
<td>$M_o = {BUY \mid PVD_o &lt; 0}, \text{ or}$</td>
<td><strong>Q1:</strong> Does an investment strategy based on insider trading and company earnings characteristics, generate excess returns?</td>
</tr>
<tr>
<td>$= {SELL \mid PVD_o &gt; 0},$</td>
<td></td>
</tr>
<tr>
<td>subject to $M_o \leq$ insiders’ monetary constraints.</td>
<td></td>
</tr>
<tr>
<td>And insiders are to minimize $</td>
<td>PVD_o - VD_o</td>
</tr>
<tr>
<td><strong>Proposition 2:</strong> (see equation 3.3)</td>
<td></td>
</tr>
<tr>
<td>When $</td>
<td>PVD_o - VD_o</td>
</tr>
<tr>
<td>subject to $I_o^d \leq$ investors’ monetary constraints.</td>
<td></td>
</tr>
<tr>
<td>Otherwise, when $</td>
<td>PVD_o - VD_o</td>
</tr>
</tbody>
</table>
Figure 3 presents the windows of stock returns and earnings characteristics and the periods of insider trading on a timeline representing a typical firm-year. Window 1 starts one trading day before the earnings announcement and ends on one trading day after the announcement. Window 2 begins on the second trading day after the announcement till one trading day after the next annual earnings announcement. Period 1 is from the second trading day after the announcement to two trading days before the next annual earnings announcement. Period 2 starts from the second trading day after the annual earnings announcement up to one calendar month following the announcement. Period 3 is from the second trading day after the announcement date till two calendar months following the announcement. Period 4 is a 60-trading-day period beginning from one trading day before the next annual earnings announcement.
### Empirical Hypotheses and Operational Tests

<table>
<thead>
<tr>
<th>Empirical Hypotheses</th>
<th>Operational Testing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>H1(a):</strong> Insiders tend to increase their equity holdings when they perceive an underestimation (overestimation) in the persistence of positive (negative) accruals by the market.</td>
<td>$Earnings_{t+1} = \alpha_0 + \alpha_1 \text{CFO}<em>t + \alpha_2 TACC_t + \epsilon</em>{t+1}$</td>
</tr>
<tr>
<td><strong>H1(b):</strong> Insiders tend to decrease their equity holdings when they perceive an overestimation (underestimation) in the persistence of positive (negative) accruals by the market.</td>
<td>Abnormal Returns$<em>{t+1} = \beta(Earnings</em>{t+1} - \alpha_1' \text{CFO}<em>t - \alpha_2' TACC_t) + \epsilon</em>{t+1}$.</td>
</tr>
<tr>
<td><strong>Q1:</strong> Does an investment strategy based on insider trading and company earnings characteristics, generate excess returns?</td>
<td>Therefore, for <strong>H1(a)</strong>, it is expected that, $\alpha_2 - \alpha_2' &lt; 0$ for positive accrual in the subset where insiders increase equity holdings (supported), while $\alpha_2 - \alpha_2' &gt; 0$ for negative accruals in this subset (supported).</td>
</tr>
<tr>
<td>In addition, to understand the specific nature of insiders’ private accounting information,</td>
<td>For <strong>H1(b)</strong>, it is expected that, $\alpha_2 - \alpha_2' &lt; 0$ for positive accrual in the subset where insiders decrease equity holdings (supported), while $\alpha_2 - \alpha_2' &gt; 0$ for negative accruals in this subset (mixed).</td>
</tr>
<tr>
<td><strong>H2(a):</strong> When insiders manipulate earnings in a downward direction using negative discretionary accruals, insiders tend to increase their equity holdings as they perceive an overestimation in the persistence of such negative discretionary accruals by the market.</td>
<td>For <strong>Q1</strong>, a trading strategy based on insider trading and company earnings characteristics will generate excess returns (supported).</td>
</tr>
<tr>
<td><strong>H2(b):</strong> When insiders manipulate earnings in an upward direction using positive discretionary accruals, insiders tend to decrease their equity holdings as they perceive an overestimation in the persistence of such positive discretionary accruals by the market.</td>
<td>$Earnings_{t+1} = \phi_0 + \phi_1 \text{CFO}_t + \phi_2 DA_t + \phi_3 POSNDA_t + \phi_4 \text{NEGNDA}<em>t + \epsilon</em>{t+1}$</td>
</tr>
<tr>
<td></td>
<td>Abnormal Returns$<em>{t+1} = \beta(Earnings</em>{t+1} - \phi_1' \text{CFO}_t - \phi_2' DA_t - \phi_3' POSNDA_t - \phi_4' \text{NEGNDA}<em>t) + \epsilon</em>{t+1}$.</td>
</tr>
<tr>
<td></td>
<td>Therefore, for <strong>H2(a)</strong>, it is expected that, $\phi_3 - \phi_3' &lt; 0$ for negative discretionary accruals in the subset where insiders increase equity holdings (supported).</td>
</tr>
<tr>
<td></td>
<td>For <strong>H2(b)</strong>, it is expected that, $\phi_3 - \phi_3' &lt; 0$ for positive discretionary accruals in the subset where insiders decrease equity holdings (supported).</td>
</tr>
</tbody>
</table>
Table 1 presents the summary statistics of the sample firms’ various financial characteristics. Along earnings distribution spectrum, consensus analyst forecasts are used to categorize the sample into a sub-sample of companies that meet or just beat the forecasts versus a sub-sample where firm-years just miss the forecasts. The universe contains all non-financial firm-years from 1996 to 2005 with sufficient information in Compustat, CRSP and I/B/E/S. The full sample is composed of the two sub-samples in the middle of the earnings distribution spectrum, where firm-years either just miss consensus analyst forecasts or meet or just beat the forecasts. This study computes a) market capitalization in millions (Compustat item #24*item #25), b) total assets in millions (Compustat item #6), c) income before extraordinary items as percentage of average total assets (Compustat item #18/avg(item #6)), d) book-to-market ratio (Compustat item #60/(item #24*item #25)), e) leverage (Compustat item #9+item #34)/item #6), and earnings, CFO, total accruals and discretionary accruals using the cash-flow approach.

<table>
<thead>
<tr>
<th></th>
<th>Universe</th>
<th>Full Sample</th>
<th>Meet or Just Beat</th>
<th>Just Miss</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Median</td>
<td>Mean</td>
<td>Median</td>
</tr>
<tr>
<td>Market Capitalization</td>
<td>3493.08</td>
<td>379.34</td>
<td>4938.11</td>
<td>568.71</td>
</tr>
<tr>
<td>Total Assets</td>
<td>2851.99</td>
<td>316.02</td>
<td>2888.43</td>
<td>357.48</td>
</tr>
<tr>
<td>Income Before Extraordinary Items</td>
<td>-0.01</td>
<td>0.04</td>
<td>0.05</td>
<td>0.06</td>
</tr>
<tr>
<td>Book-to-Market Ratio</td>
<td>0.58</td>
<td>0.44</td>
<td>0.45</td>
<td>0.34</td>
</tr>
<tr>
<td>Leverage</td>
<td>0.22</td>
<td>0.19</td>
<td>0.19</td>
<td>0.14</td>
</tr>
<tr>
<td>Earnings</td>
<td>-0.01</td>
<td>0.04</td>
<td>0.05</td>
<td>0.06</td>
</tr>
<tr>
<td>CFO</td>
<td>0.05</td>
<td>0.08</td>
<td>0.09</td>
<td>0.10</td>
</tr>
<tr>
<td>Total Accruals</td>
<td>-0.06</td>
<td>-0.05</td>
<td>-0.05</td>
<td>-0.05</td>
</tr>
<tr>
<td>Discretionary Accruals</td>
<td>-0.012</td>
<td>-0.006</td>
<td>-0.009</td>
<td>-0.001</td>
</tr>
</tbody>
</table>
Table 2
Market Pricing and Valuation Implication of Accruals about Future Earnings

Forecasting regression: \( \text{Earnings}_{t+1} = \alpha_0 + \alpha_1 \text{CFO}_t + \alpha_2 \text{TACC}_t + \epsilon_{t+1} \)
Market-pricing regression: \( \text{Abnormal Return}_{t+1} = \beta (\text{Earnings}_{t+1} - \alpha_0 - \alpha_1 \text{CFO}_t - \alpha_2 \text{TACC}_t) + \epsilon_{t+1} \)

<table>
<thead>
<tr>
<th>Panel A: pooled vs. firm-specific estimates</th>
<th>Pooled vs. Firm-Specific Estimates</th>
<th>Pooled Estimates</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pooled estimates</td>
<td>Firm-specific estimates</td>
</tr>
<tr>
<td>( \alpha_1 )</td>
<td>0.671</td>
<td>0.139</td>
</tr>
<tr>
<td>( \alpha_1^* )</td>
<td>0.797</td>
<td>0.553</td>
</tr>
<tr>
<td>( \alpha_1 - \alpha_1^* )</td>
<td>-0.126</td>
<td>-0.414</td>
</tr>
<tr>
<td>test-statistic</td>
<td>[14.799]**</td>
<td>(0.965)</td>
</tr>
<tr>
<td>( \alpha_2 )</td>
<td>0.409</td>
<td>0.326</td>
</tr>
<tr>
<td>( \alpha_2^* )</td>
<td>0.818</td>
<td>0.477</td>
</tr>
<tr>
<td>( \alpha_2 - \alpha_2^* )</td>
<td>-0.409</td>
<td>-0.151</td>
</tr>
<tr>
<td>test-statistic</td>
<td>[65.608]**</td>
<td>(0.629)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Panel B: pooled estimates in sample subsets of positive vs. negative total accruals</th>
<th>Full Sample</th>
<th>Meet or Just Beat</th>
<th>Just Miss</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive ( \text{TACC}_t )</td>
<td>Negative ( \text{TACC}_t )</td>
<td>Positive ( \text{TACC}_t )</td>
<td>Negative ( \text{TACC}_t )</td>
</tr>
<tr>
<td>( \alpha_1 )</td>
<td>0.650</td>
<td>0.713</td>
<td>0.612</td>
</tr>
<tr>
<td>( \alpha_1^* )</td>
<td>0.706</td>
<td>0.886</td>
<td>0.715</td>
</tr>
<tr>
<td>( \alpha_1 - \alpha_1^* )</td>
<td>-0.056</td>
<td>-0.173</td>
<td>-0.103</td>
</tr>
<tr>
<td>( \alpha_2 )</td>
<td>0.540</td>
<td>0.331</td>
<td>0.479</td>
</tr>
<tr>
<td>( \alpha_2^* )</td>
<td>0.704</td>
<td>0.602</td>
<td>0.694</td>
</tr>
<tr>
<td>( \alpha_2 - \alpha_2^* )</td>
<td>-0.164</td>
<td>-0.271</td>
<td>-0.215</td>
</tr>
</tbody>
</table>

Table 2 presents results of the Mishkin (1983) test. The full sample includes companies of the two sub-samples, where the companies meet or just beat the consensus analyst forecasts or where the companies just miss the benchmark. Panel A reports both pooled versus firm-specific estimates. Panel B separates the full sample and sub-samples, respectively, into companies that report positive accruals versus negative accruals. It reports pooled estimates in these two subsets regarding the market’s pricing and the valuation implication of a company’s accruals. The t-statistics for the difference in the parameter estimates are reported in round parentheses and the chi-square statistics are reported in square parentheses. ***, ** and * indicate significance of the test statistics at 1, 5 and 10 percent significance levels.
Table 3 presents the raw and the market adjusted buy-and-hold abnormal returns in the portfolios based on insiders’ trading activities. The announcement window, [EA0m1, EA0p1] is around the company’s current annual earnings announcement, starting from one trading day before the announcement and ending on one trading day after the announcement. The insiders’ trading window, [EA0p2, EA1m2] starts two trading days following the current annual earnings announcement and ends two trading days before the company’s next annual earnings announcement. Finally, the window to measure excess returns from insiders’ trades, [EA1m1, EA1p58] has 60 trading days, starting one trading day before the next annual earnings announcement and ending 58 trading days after the next announcement. ***, ** and * indicate significance of the t-statistics for the average buy-and-hold abnormal returns at 1, 5 and 10 significance levels.

<table>
<thead>
<tr>
<th>Windows</th>
<th>Insiders’ Purchases</th>
<th></th>
<th></th>
<th>Insiders’ Sales</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BHR</td>
<td>BHAR</td>
<td>test stat</td>
<td>BHR</td>
<td>BHAR</td>
<td>test stat</td>
</tr>
<tr>
<td>Full Sample</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[EA0m1, EA0p1]</td>
<td>-0.006</td>
<td>-0.007</td>
<td>1.644</td>
<td>0.011</td>
<td>0.010</td>
<td>4.604***</td>
</tr>
<tr>
<td>[EA0p2, EA1m2]</td>
<td>0.062</td>
<td>-0.054</td>
<td>1.627</td>
<td>0.417</td>
<td>0.295</td>
<td>11.012***</td>
</tr>
<tr>
<td>[EA1m1, EA1p58]</td>
<td>0.090</td>
<td>0.064</td>
<td>3.710***</td>
<td>0.059</td>
<td>0.036</td>
<td>4.587***</td>
</tr>
<tr>
<td>Meet or Just Beat</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[EA0m1, EA0p1]</td>
<td>-0.005</td>
<td>-0.007</td>
<td>1.412</td>
<td>0.013</td>
<td>0.012</td>
<td>4.840***</td>
</tr>
<tr>
<td>[EA0p2, EA1m2]</td>
<td>0.063</td>
<td>-0.048</td>
<td>1.333</td>
<td>0.386</td>
<td>0.272</td>
<td>10.784***</td>
</tr>
<tr>
<td>[EA1m1, EA1p58]</td>
<td>0.080</td>
<td>0.052</td>
<td>3.051***</td>
<td>0.065</td>
<td>0.042</td>
<td>5.665***</td>
</tr>
<tr>
<td>Just Miss</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[EA0m1, EA0p1]</td>
<td>-0.016</td>
<td>-0.011</td>
<td>0.894</td>
<td>0.004</td>
<td>0.002</td>
<td>0.323</td>
</tr>
<tr>
<td>[EA0p2, EA1m2]</td>
<td>0.055</td>
<td>-0.096</td>
<td>1.106</td>
<td>0.574</td>
<td>0.413</td>
<td>4.117***</td>
</tr>
<tr>
<td>[EA1m1, EA1p58]</td>
<td>0.148</td>
<td>0.134</td>
<td>2.649**</td>
<td>0.032</td>
<td>0.008</td>
<td>0.603</td>
</tr>
</tbody>
</table>
Table 4
Insiders’ Open Market Trades on the Market Valuation Divergence of Accruals about Future Earnings

Forecasting regression: \( \text{Earnings}_{t+1} = \alpha_0 + \alpha_1 \text{CFO}_t + \alpha_2 \text{TACC}_t + \varepsilon_{t+1} \)

Market-pricing regression: \( \text{Abnormal Return}_{t+1} = \beta (\text{Earnings}_{t+1} - \alpha_0 - \alpha_1 \text{CFO}_t - \alpha_2 \text{TACC}_t) + \varepsilon_{t+1} \)

Panel A: Top Insiders’ Open Market Purchases

<table>
<thead>
<tr>
<th></th>
<th>Positive Total Accrals</th>
<th>Negative Total Accrals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Full Sample</td>
<td>Meet or just beat</td>
</tr>
<tr>
<td>( \alpha_1 )</td>
<td>1.016</td>
<td>1.021</td>
</tr>
<tr>
<td>( \alpha_1^* )</td>
<td>0.887</td>
<td>1.283</td>
</tr>
<tr>
<td>( \alpha_2 )</td>
<td>0.954</td>
<td>0.899</td>
</tr>
<tr>
<td>( \alpha_2^* )</td>
<td>0.126</td>
<td>0.001</td>
</tr>
<tr>
<td>predicted (( \alpha_2 - \alpha_2^* ))</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>( \alpha_2 - \alpha_2^* )</td>
<td>0.828</td>
<td>0.898</td>
</tr>
<tr>
<td>test-statistic</td>
<td>3.380*</td>
<td>2.691*</td>
</tr>
<tr>
<td>nobs</td>
<td>130</td>
<td>115</td>
</tr>
</tbody>
</table>

Panel B: Top Insiders’ Open Market Sales

<table>
<thead>
<tr>
<th></th>
<th>Positive Total Accrals</th>
<th>Negative Total Accrals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Full Sample</td>
<td>Meet or just beat</td>
</tr>
<tr>
<td>( \alpha_1 )</td>
<td>0.607</td>
<td>0.553</td>
</tr>
<tr>
<td>( \alpha_1^* )</td>
<td>0.901</td>
<td>1.124</td>
</tr>
<tr>
<td>( \alpha_2 )</td>
<td>0.434</td>
<td>0.393</td>
</tr>
<tr>
<td>( \alpha_2^* )</td>
<td>0.681</td>
<td>0.862</td>
</tr>
<tr>
<td>predicted (( \alpha_2 - \alpha_2^* ))</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>( \alpha_2 - \alpha_2^* )</td>
<td>-0.247</td>
<td>-0.469</td>
</tr>
<tr>
<td>nobs</td>
<td>387</td>
<td>308</td>
</tr>
</tbody>
</table>

Table 4 presents results of the Mishkin (1983) test regarding insiders’ open market transactions and the market valuation divergence of a company’s accounting accruals. Panel A reports the apparent market valuation divergence when insiders purchase the company’s securities. Panel B reports the valuation divergence when insiders sell their company’s securities. \( \alpha_2 - \alpha_2^* \) reflects the divergence in the market’s valuation from the valuation implication of the company’s accruals. The predicted signs of such divergence are based on my hypotheses, H1(a) and H1(b). ***, ** and * indicate significance of the chi-square statistics for the difference at 1, 5 and 10 significance levels.
Table 5
Insiders’ Unscheduled Stock-Option Grants on the Market Valuation Divergence of Accruals about Future Earnings

Forecasting regression: \[ \text{Earnings}_{t+1} = \alpha_0 + \alpha_1 \text{CFO}_t + \alpha_2 \text{TACC}_t + \epsilon_{t+1} \]

Market-pricing regression: \[ \text{Abnormal Return}_{t+1} = \beta (\text{Earnings}_{t+1} - \alpha_0 - \alpha_1^* \text{CFO}_t - \alpha_2^* \text{TACC}_t) + \epsilon_{t+1} \]

<table>
<thead>
<tr>
<th></th>
<th>Positive Total Accruals</th>
<th></th>
<th>Negative Total Accruals</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Full sample</td>
<td>Meet or</td>
<td>Just</td>
<td>Full sample</td>
</tr>
<tr>
<td>(\alpha_1)</td>
<td>0.696</td>
<td>0.630</td>
<td>1.464</td>
<td>0.837</td>
</tr>
<tr>
<td>(\alpha_1^*)</td>
<td>0.549</td>
<td>0.549</td>
<td>0.527</td>
<td>0.886</td>
</tr>
<tr>
<td>(\alpha_2)</td>
<td>0.629</td>
<td>0.556</td>
<td>1.612</td>
<td>0.431</td>
</tr>
<tr>
<td>(\alpha_2^*)</td>
<td>0.393</td>
<td>0.391</td>
<td>0.363</td>
<td>0.767</td>
</tr>
<tr>
<td>(\text{predicted (}\alpha_2 - \alpha_2^*))*</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>(\alpha_2 - \alpha_2^*)</td>
<td>0.236</td>
<td>0.165</td>
<td>1.249</td>
<td>-0.336</td>
</tr>
<tr>
<td>\text{test-statistic}</td>
<td>7.763***</td>
<td>5.930**</td>
<td>2.487</td>
<td>35.462***</td>
</tr>
<tr>
<td>\text{nobs}</td>
<td>517</td>
<td>426</td>
<td>91</td>
<td>1715</td>
</tr>
</tbody>
</table>

Table 5 presents results of the Mishkin (1983) test regarding a company’s unscheduled stock-option grants and the market valuation divergence of the company’s accounting accruals. \(\alpha_2 - \alpha_2^*\) reflects the apparent divergence in the market’s valuation from the valuation implication of the company’s accruals. The predicted signs of such divergence are based on my hypothesis, H1(a). ***, ** and * indicate significance of the chi-square statistics for the difference at 1, 5 and 10 significance levels.
### Table 6
Predictive Power of Insider Trading on the Market Valuation Divergence of Accruals about Future Earnings

**Forecasting regression:** \(Earnings_{t+1} = \alpha_0 + \alpha_1 \cdot CFO_t + \alpha_2 \cdot TACC_t + \epsilon_{t+1}\)

**Market-pricing regression:** \(Abnormal\ Return_{t+1} = \beta (Earnings_{t+1} - \alpha_0^* - \alpha_1^* \cdot CFO_t - \alpha_2^* \cdot TACC_t) + \epsilon_{t+1}\)

#### Panel A: Top Insiders’ Open Market Purchases

<table>
<thead>
<tr>
<th></th>
<th>Positive Total Accruals</th>
<th>Negative Total Accruals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Full sample</td>
<td>Meet or just beat</td>
</tr>
<tr>
<td>(\alpha_1)</td>
<td>1.180</td>
<td>1.215</td>
</tr>
<tr>
<td>(\alpha_1^*)</td>
<td>0.374</td>
<td>0.554</td>
</tr>
<tr>
<td>(\alpha_2)</td>
<td>1.102</td>
<td>0.905</td>
</tr>
<tr>
<td>(\alpha_2^*)</td>
<td>0.000</td>
<td>0.424</td>
</tr>
<tr>
<td>(\alpha_2 - \alpha_2^*)</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>(nobs)</td>
<td>50</td>
<td>37</td>
</tr>
</tbody>
</table>

#### Panel B: Top Insiders’ Open Market Sales

<table>
<thead>
<tr>
<th></th>
<th>Positive Total Accruals</th>
<th>Negative Total Accruals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Full sample</td>
<td>Meet or just beat</td>
</tr>
<tr>
<td>(\alpha_1)</td>
<td>0.743</td>
<td>0.709</td>
</tr>
<tr>
<td>(\alpha_1^*)</td>
<td>1.492</td>
<td>1.916</td>
</tr>
<tr>
<td>(\alpha_2)</td>
<td>0.153</td>
<td>0.141</td>
</tr>
<tr>
<td>(\alpha_2^*)</td>
<td>0.540</td>
<td>0.669</td>
</tr>
<tr>
<td>(\alpha_2 - \alpha_2^*)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>(nobs)</td>
<td>179</td>
<td>155</td>
</tr>
</tbody>
</table>

(continuing on next page)
Table 6 (continued)

Panel C: Top Insiders’ Unscheduled Grants

<table>
<thead>
<tr>
<th></th>
<th>Positive Total Accruals</th>
<th>Negative Total Accruals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Full sample</td>
<td>Meet or just beat</td>
</tr>
<tr>
<td>$\alpha_1$</td>
<td>1.038</td>
<td>0.966</td>
</tr>
<tr>
<td>$\alpha_1^*$</td>
<td>-0.157</td>
<td>0.576</td>
</tr>
<tr>
<td>$\alpha_2$</td>
<td>0.993</td>
<td>0.914</td>
</tr>
<tr>
<td>$\alpha_2^*$</td>
<td>-0.310</td>
<td>0.052</td>
</tr>
<tr>
<td>predicted ($\alpha_2 - \alpha_2^*$)</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>$\alpha_2 - \alpha_2^*$</td>
<td>1.303</td>
<td>0.862</td>
</tr>
<tr>
<td>nobs</td>
<td>166</td>
<td>137</td>
</tr>
</tbody>
</table>

Table 6 presents results of the Mishkin (1983) test regarding the predictive power of insiders’ open market trading (panel A and panel B) and their unscheduled stock-option grants (panel C). $\alpha_2 - \alpha_2^*$ reflects the divergence in the market’s valuation from the valuation implication of the company’s accounting accruals. The predicted signs of such divergence are based on my previous finding of the informativeness of insiders’ trades. ***, ** and * indicate significance of the chi-square statistics for the difference at 1, 5 and 10 significance levels.
### Table 7
Excess Returns by Insider Trading and Earnings Characteristics

<table>
<thead>
<tr>
<th></th>
<th>Accruals</th>
<th>Insiders’ Purchases</th>
<th>Insiders’ Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive accruals</td>
<td>0.036</td>
<td>0.031</td>
<td>0.023</td>
</tr>
<tr>
<td>Negative accruals</td>
<td>0.043</td>
<td>0.082</td>
<td>0.040</td>
</tr>
</tbody>
</table>

**Investment Strategies**

<table>
<thead>
<tr>
<th>(1) Short: Positive accruals accompanied with insiders’ sales</th>
<th>(2) Short: Positive total accruals</th>
<th>(3) Short: Insiders’ sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long: Negative accruals accompanied with insiders’ sales,</td>
<td>Long: Negative total accruals</td>
<td>Long: Insiders’ purchases</td>
</tr>
<tr>
<td>and all the insiders’ purchases</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Portfolio returns**

- 13.0%
- 0.7%
- 5.0%

*Table 7 presents the 60-trading-day market-adjusted buy-and-hold abnormal returns in the portfolios constructed. 
***, ** and * indicate significance of the t-statistics for the average buy-and-hold abnormal returns at 1, 5 and 10 significance levels.*
Table 8  
Insider Open Market Trading on the Market Valuation Divergence 
of Discretionary Accruals about Future Earnings

Forecasting regression:  \( \text{Earnings}_{t+1} = \phi_0 + \phi_1 \text{CFO}_t + \phi_2 \text{DA}_t + \phi_3 \text{POSNDA}_t + \phi_4 \text{NEGNDA}_t + \epsilon_{t+1} \)

Market-pricing regression:  
\( \text{Abnormal Return}_{t+1} = \beta(\text{Earnings}_{t+1} - \phi_0 \cdot \phi_1 \cdot \text{CFO}_t - \phi_2 \cdot \text{DA}_t - \phi_3 \cdot \text{POSNDA}_t - \phi_4 \cdot \text{NEGNDA}_t) + \epsilon_{t+1} \)

Panel A: Top Insiders’ Open Market Purchases

<table>
<thead>
<tr>
<th></th>
<th>Positive Discretionary Accruals</th>
<th>Negative Discretionary Accruals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Full subset Meet or just beat Just miss</td>
<td>Full subset Meet or just beat Just miss</td>
</tr>
<tr>
<td>( \phi_1 )</td>
<td>0.990 0.966 1.155</td>
<td>0.984 0.881 1.524</td>
</tr>
<tr>
<td>( \phi_1^* )</td>
<td>1.084 1.227 -0.048</td>
<td>1.206 1.285 1.339</td>
</tr>
<tr>
<td>( \phi_2 )</td>
<td>0.556 0.508 0.987</td>
<td>0.940 0.823 2.819</td>
</tr>
<tr>
<td>( \phi_2^* )</td>
<td>1.247 1.180 0.986</td>
<td>1.593 1.650 2.990</td>
</tr>
<tr>
<td>( \phi_3 )</td>
<td>1.569 1.544 1.947</td>
<td>0.849 0.728 2.399</td>
</tr>
<tr>
<td>( \phi_3^* )</td>
<td>-0.727 0.220 -9.982</td>
<td>1.562 1.623 2.292</td>
</tr>
<tr>
<td>( \phi_4 )</td>
<td>0.552 0.505 0.859</td>
<td>0.838 0.921 0.020</td>
</tr>
<tr>
<td>( \phi_4^* )</td>
<td>1.298 1.229 2.440</td>
<td>1.547 1.125 8.912</td>
</tr>
<tr>
<td>predicted (( \phi_2 - \phi_2^* ))</td>
<td>+ + +</td>
<td>- - -</td>
</tr>
<tr>
<td>( \phi_2 - \phi_2^* )</td>
<td>-0.691 -0.672 -0.001</td>
<td>-0.653 -0.827 -0.171</td>
</tr>
<tr>
<td>test-statistic</td>
<td>17.042*** 15.514*** 1.350</td>
<td>22.217*** 20.286*** 2.967***</td>
</tr>
<tr>
<td>nobs</td>
<td>233 202 31</td>
<td>222 198 24</td>
</tr>
</tbody>
</table>

(continuing on next page)
Table 8 presents results of the Mishkin (1983) test regarding insider’s open market transactions and its association with market valuation divergence in company discretionary accruals. Panel A reports the apparent market valuation divergence when insiders purchase company securities. Panel B reports the valuation divergence when insiders sell company shares. $\phi_2 - \phi^*_2$ reflects the divergence in the market’s valuation from the implications of discretionary accruals. The predicted signs of such divergence are based on hypotheses, H2(a) and H2(b). ***, ** and * indicate significance of the chi-square statistics for the difference at 1, 5 and 10 significance levels.

### Table 8 (continued)

#### Panel B: Top Insiders’ Open Market Sales

<table>
<thead>
<tr>
<th></th>
<th>Positive Discretionary Accruals</th>
<th>Negative Discretionary Accruals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Full subset</td>
<td>Meet or just beat</td>
</tr>
<tr>
<td>$\phi_1$</td>
<td>0.619</td>
<td>0.574</td>
</tr>
<tr>
<td>$\phi^*_1$</td>
<td>1.277</td>
<td>1.653</td>
</tr>
<tr>
<td>$\phi_2$</td>
<td>0.414</td>
<td>0.370</td>
</tr>
<tr>
<td>$\phi^*_2$</td>
<td>1.106</td>
<td>1.414</td>
</tr>
<tr>
<td>$\phi_3$</td>
<td>0.502</td>
<td>0.464</td>
</tr>
<tr>
<td>$\phi^*_3$</td>
<td>0.405</td>
<td>0.796</td>
</tr>
<tr>
<td>$\phi_4$</td>
<td>0.408</td>
<td>0.366</td>
</tr>
<tr>
<td>$\phi^*_4$</td>
<td>1.172</td>
<td>1.483</td>
</tr>
</tbody>
</table>

predicted ($\phi_2 - \phi^*_2$)  
$\phi_2 - \phi^*_2$ = -0.692, -1.044, -0.130, -0.870, -1.124, -1.037  
**test-statistic**  
12.383***, 10.670***, 3.525*, 16.702***, 15.390***, 3.152*  
nobs  
745, 617, 128, 759, 634, 125
APPENDIX
Econometrical Comparison between the Pooled and Firm-Specific Average Estimates

In the empirical design of this study to understand the time-series properties of accounting earnings components (for example, the coefficients, $\alpha_1$, $\alpha_1^*$, $\alpha_2$ and $\alpha_2^*$ in equation 5.1 and 5.2), the pooled estimation is to estimate a single time-series coefficient for a sample of companies by pooling observations across companies and over time. This approach ignores the variation of earnings time-series properties across companies. An alternative is the firm-specific average estimation, which separates the time-series properties of annual accounting earnings estimated for each company and then take the average of these firm-specific estimates. Nevertheless, this approach may face a challenge of limited observations for statistical tests.

However, econometrically, in two cases, the pooled estimates can be the same as the firm-specific average estimates. Firstly, when the individual company’s coefficients are identical, the pooled estimates should be no different from the firm-specific average estimates. Secondly, when the firm-specific variances of the individual company’s cash flow or accrual components of accounting earnings are identical across firms, the pooled estimate should also be the same as the firm-specific average estimates. When both the conditions are violated, the differences between the pooled estimates and the firm-specific average estimates will still be random (meaning that the estimated coefficients will not be biased) unless there is a systematic relation between the firm-
specific coefficients and the firm-specific variation of the company’s current accounting earnings components in the empirical model of equation 5.1 and 5.2.

Below, it will show, econometrically, whether the pooled estimates differ systematically from the firm-specific average estimates in the design of this study. To simplify the demonstration, I decide to analyze the time-series properties of earnings, rather than of earnings components in the following forecasting model:

Consider the regression model: \( Earn_{t+1} = \alpha_0 + \alpha_1 Earnings_t + \epsilon_{t+1} \). (A1.1)

Although the above regression model is slightly different from the empirical model of this study, which investigate the time-series properties of accounting earnings components, the econometric interpretation of the regression coefficient, \( \alpha_1 \), should be the same as that of the regression coefficient, \( \alpha_1 \) and \( \alpha_2 \) in the empirical model.

In the pooled estimation process,

\[
\alpha_1 = \frac{\sum_{i=1}^{N} \sum_{t=1}^{T} (Earnings_{it} - \overline{Earnings})(Earn_{it+1} - \overline{Earn})}{\sum_{i=1}^{N} \sum_{t=1}^{T} (Earnings_{it} - \overline{Earnings})^2}.
\] (A1.2)

And in the firm-specific average estimation process,

\[
\alpha_1 = \frac{1}{N} \sum_{i=1}^{N} \left( \frac{\sum_{t=1}^{T} (Earnings_{it} - \overline{Earnings})(Earn_{it+1} - \overline{Earn})}{\sum_{t=1}^{T} (Earnings_{it} - \overline{Earnings})^2} \right).
\] (A1.3)

To compare the coefficient estimate in equation A1.2 with that in equation A1.3, I then rewrite the expressions as follows,
Therefore, the firm-specific coefficient of firm $i$,
\[
\sum_{t=1}^{T} (Earnings_{it} - \overline{Earnings})(Earn_{it+1} - \overline{Earn}) / \sum_{t=1}^{T} (Earnings_{it} - \overline{Earnings})^2
\]
contributes to both the pooled and the firm-specific average estimates. Nevertheless, the weights could be different. In particular, the weight for each firm’s coefficient in the firm-specific average estimates is $1/N$. The weight of firm $i$ in the pooled estimates

\[
Pooled \quad \alpha_i = \frac{\sum_{i=1}^{N} \sum_{t=1}^{T} (Earnings_{it} - \overline{Earnings})(Earn_{it+1} - \overline{Earn})}{\sum_{i=1}^{N} \left( \sum_{t=1}^{T} (Earnings_{it} - \overline{Earnings})^2 \right)}
\]

\[
= \frac{\sum_{t=1}^{T} (Earnings_{1t} - \overline{Earnings})(Earn_{1t+1} - \overline{Earn})}{\sum_{i=1}^{N} \left( \sum_{t=1}^{T} (Earnings_{it} - \overline{Earnings})^2 \right)} + \frac{\sum_{t=1}^{T} (Earnings_{2t} - \overline{Earnings})(Earn_{2t+1} - \overline{Earn})}{\sum_{i=1}^{N} \left( \sum_{t=1}^{T} (Earnings_{it} - \overline{Earnings})^2 \right)} + \cdots + \frac{\sum_{t=1}^{T} (Earnings_{Nt} - \overline{Earnings})(Earn_{Nt+1} - \overline{Earn})}{\sum_{i=1}^{N} \left( \sum_{t=1}^{T} (Earnings_{it} - \overline{Earnings})^2 \right)}.
\]

\[
Firm-specific \quad \alpha_i = \frac{1}{N} \sum_{i=1}^{N} \left( \frac{\sum_{t=1}^{T} (Earnings_{it} - \overline{Earnings})(Earn_{it+1} - \overline{Earn})}{\sum_{t=1}^{T} (Earnings_{it} - \overline{Earnings})^2} \right)
\]

\[
= \frac{\sum_{t=1}^{T} (Earnings_{1t} - \overline{Earnings})(Earn_{1t+1} - \overline{Earn})}{N \sum_{i=1}^{T} (Earnings_{it} - \overline{Earnings})^2} + \frac{\sum_{t=1}^{T} (Earnings_{2t} - \overline{Earnings})(Earn_{2t+1} - \overline{Earn})}{N \sum_{i=1}^{T} (Earnings_{it} - \overline{Earnings})^2} + \cdots + \frac{\sum_{t=1}^{T} (Earnings_{Nt} - \overline{Earnings})(Earn_{Nt+1} - \overline{Earn})}{N \sum_{i=1}^{T} (Earnings_{it} - \overline{Earnings})^2}.
\]

(A1.4)
is \( \sum_{t=1}^{T} (Earnings_{it} - \overline{Earnings})^2 / \sum_{t=1}^{N} (\sum_{t=1}^{T} (Earnings_{it} - \overline{Earnings})^2) \). And the earnings time-series properties of firms with larger than average variances of \( Earnings_{it} \) will be more heavily weighted in the pooled estimates; earnings time-series properties of firms with smaller than average variances of \( Earnings_{it} \) will be less weighted in the pooled estimates than in the firm-specific average estimates.

Whether the pooled estimates systematically differ from the firm-specific average estimates thus depends on whether there is a systematic relation between the firm-specific estimates of the time-series properties coefficient and the firm-specific variances of \( Earnings_{it} \). Theoretically, a company’s earnings persistence (the time-series properties coefficient estimated in the model A1.1) is not systematically associated with the variances of the company’s annual earnings. Empirically, this study finds no association between the firm-specific coefficients and the firm-specific variation of current period earnings.

The same analysis applies also to the regression models (equation 5.1 and 5.2). Therefore, it is appropriate to conclude that the pooled estimates in the design of this study are not systematically biased relative to the firm-specific average estimates, although it may still suffer from a varying parameters problem (which may weaken the statistical significance of the estimates). Considering the limited observations for the firm-specific average estimates in the sample, this study continues the analysis about the market valuation divergence and insiders’ trading decisions using the pooled estimation method.