

ACCOUNTING RESTATEMENTS: MARKET AND LIQUIDITY IMPACTS

by

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ABSTRACT

Accounting restatements are significant economic events that impact a firm's reputation for integrity and reliable reporting. This study used around 2900 firms of United States to study the stock market and liquidity impacts at accounting restatement during 1997 to 2010. In addition, this study also attempts to capture the impacts of regulatory initiatives like Sarbanes-Oxley Act (SOX) on stock market and liquidity impacts of accounting restatements. This study used Fama-French 3 factor model for calculating the expected abnormal return and found that post-regulation negative abnormal return is lower than pre-regulation period. This study also documented that post-regulation period and business cycle was negatively related with illiquidity. However, no statistical significance was found between accounting restatement and illiquidity.

JEL Classification: G14, M40, M41, M48.

Key Words: Accounting Restatements, Fama-French 3 Factor Model, Liquidity/Illiquidity.

TABLE OF CONTENTS

	Abstract	ii
	Table of contents	iii
	List of Tables	iv
	List of Figures	v
	Abbreviations	vi
	Acknowledgements	vii
<i>Chapter I</i>	<i>Introduction</i>	1
<i>Chapter II</i>	<i>Review of Literature and Hypothesis Development</i>	5
Section 2.1	Impacts of Accounting Restatement	5
Section 2.2	Stock Markets Impacts of Accounting Restatement	10
Section 2.3	Liquidity Impacts of Accounting Restatements	17
Section 2.4	Conclusions	24
<i>Chapter III</i>	<i>Database and Methodology</i>	25
Section 3.1	Database	25
Section 3.1.1	Stock Market Impacts	25
Section 3.1.2	Measures of Illiquidity	30
Section 3.2	Methodology	31
Section 3.2.1	Stock Market Impacts	31
	a. Market Model	31
	b. Fama-French 3 Factor Model	32
Section 3.2.2	Liquidity Impacts	34
<i>Chapter IV</i>	<i>Impacts of Accounting Restatement in U.S.- Empirical Results</i>	39
Section 4.1	Stock Market Impacts	39
	a. Pre-regulation period	40
	b. Post-regulation	42
Section 4.2	Liquidity Impacts	45
Section 4.3	Conclusions	48
<i>Chapter V</i>	<i>Concluding Observations</i>	49
	<i>Bibliography</i>	51
	<i>Appendix 3.1</i>	58

LIST OF TABLES

Table 2.1	Previous literature on stock market impacts on accounting restatements	12
Table 3.1	Details of Accounting Restatements from GAO: 1997 to 2002	28
Table 3.2	Details of Accounting Restatements from Audit analytics: 2003 to 2010	28
Table 4.1	Cumulative Average Abnormal Returns using Fama French 3 Factor Model from 1997 to 2002	40
Table 4.2	Cumulative Average Abnormal Returns using Fama French 3 Factor Model from 2003 to 2010.	42
Table 4.3	Descriptive Statistics	45
Table 4.4	Correlation Matrices	45
Table 4.5	Determinants of Corporate Illiquidity in U.S.	46
Appendix	Pre-Regulation Average Abnormal Returns using Fama-French 3 Factor Model	63
Table 4.1	Post-Regulation Average Abnormal Returns	64
Appendix	using Fama-French 3 Factor Model	

List of Figures

Figure 3.1	Number of accounting restatements in the United States 2001-2007	29
Figure 4.1	Comparative Average Abnormal Returns using Fama French 3 Factor model for pre and post regulation period in U.S.	44

ABBREVIATIONS

AA- Audit Analytics
AR- Abnormal Returns
AAR- Average Abnormal Returns
AES- Absolute Effective Spread
ALR- Amihud' Illiquidity (2002)
BC- Business cycle
CAAR- Cumulative Average Abnormal Returns
CEO- Chief Executive Officer
CRSP- The Center for Research in Security Prices
ER- Expected Return
FF 3Factor- Fama French 3 factor Model
GAO- Government Accountability office
GAAP- Generally accepted Accounting Principles
HML- High Minus Low
IAS- International Accounting Standard.
ILLIQ- Illiquidity
LogTA- Natural logarithm of Total Assets
Perm No- Permanent Security Number
QS- Quoted Spread
RES- Relative Effective Model
REST- Accounting Restatement
RFD- Regulations on Fair Disclosure
RS- Relative Spread
SEC- Securities and Exchange Commission
SMB- Small Minus Big
SOX- Sarbanes Oxley Act of 2002
TKR- Ticker Symbol
U.S.- United States

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Chapter I

INTRODUCTION

Restatement of financial accounts and its consequences are an important issue for investors, auditors, managers and regulators. Restatements of financial accounts cloud the integrity of financial reports (Palmrose et al. 2004; Bardos 2011; Burks 2011). This was the by-product of the financial house clearing that was necessary to restore investor confidence in the wake of Enron, WorldCom, Tyco and other corporate scandals. Investors reassess their perspectives about the quality of management internal controls of the firm after accounting restatement. In addition, restating firms could take long term consequences such as litigation risk and changes to management and board. Several studies found that restating firms suffer an average of up to a 10% in abnormal stock return over a two days window surrounding accounting restatement (Wu 2002; Anderson and Yohn 2002; Palmrose et al. 2004; Burks 2011; Bardos et al. 2013).

The number of firms issuing restatements of financial accounts is on the rise in United States (U.S) and reached to a record 1801 restatements in 2006 (Reilly 2006; Burks 2011). Between 1997 and 2002 accounting restatements has resulted in a total loss of market capitalization of \$100 billion (GAO 2002). The Securities and Exchange Commission (SEC) considers accounting restatements as ‘the most visible indicator of improper accounting’ (Schroeder 2001). The processing costs of both individual and institutional investors increase because of restatement (Burks 2011; Lin et al. 2012). The negative impact on stock prices consequently raises the cost of capital (Kravert and Shevlin 2009).

In the literature a distinction is made between accounting restatement and accounting misstatement (Dechow et al. 1996). Restatement corrects past error and could be viewed as improving reporting quality (Bardos 2011). Accounting misstatement is defined as those which are subject to enforcement actions by regulators (Dechow et al. 1996).

According to Plumee and Yohn (2010), the reasons for accounting restatements include accounting complexity, second guessing of management judgment, proliferation of accounting rules and divergent implementation of guidelines/regulation (e.g. application of Regulations of Fair Disclosure (RFD) of 2000; application of Sarbanes-Oxley Act (SOX) of 2002-especially section 404 requirements¹).

Previous researches on accounting restatements showed negative returns on stock prices of restating firms (e.g. ranging from -4 percent to -10 percent) after a restatement announcement (Dechow et al. 1996; Anderson and Yohn 2002; Palmrose et al. 2004; Hribar and Jenkins 2004; Akhigbe et al. 2005; Bardos 2011; Bardos et al. 2013). The negative stock market reaction is attributed to increase in information risk because of increased uncertainty about management credibility and transparency of financial statements (Hribar and Jenkins 2004; Palmrose et al. 2004; Francis et al. 2005; Kravert and Shevlin 2009). The decrease in credibility of management and increase in investors' concerns that management is opportunistically making accounting decisions leads to

¹SOX Section 404 (Sarbanes-Oxley Act Section 404) mandates that all publicly-traded companies must establish internal controls and procedures for financial reporting and must document, test and maintain those controls and procedures to ensure their effectiveness.

firm-specific information risk which is non-diversifiable risk factor that enhances the cost of capital (O'Hara 2003; Easley and O'Hara 2004; Lambert et al. 2007; Kravert and Shevlin 2009).

Another important effect of restatements is the liquidity impacts (Bardos 2011; Lin et al. 2012). Information risk may impact trading volume (referred as 'liquidity risk') (Krizenowski and Zhang 2010; Bardos 2011; Bardos et al. 2013). A high level of information asymmetry will induce managers to manipulate earnings and many studies theorize that investors have difficulty in incorporating the information into asset prices (Grossman and Stiglitz 1980; Bloomfeld 2002; Burks 2011).

Restating firms experience large shareholder losses at restatement announcement and this losses increase the liquidity risk (illiquidity) of the firm (Krizenowski and Zhang 2010; Bardos 2011; Lin et al. 2012; Bardos et al. 2013). The reason is that market makers widen the bid-ask spread (a measure of liquidity) in order to protect themselves from other traders who has better information than them and to be compensated for bearing greater risk (Glosten and Milgrom 1985; Kyle 1985; Amihud and Mendelson 1988; Diamond and Verrecchia 1991; Leuz and Verrecchia 2000). Thus liquidity effect enables to understand the full impact of a restatement (Bardos 2011; Bardos et al. 2013).

There are limited studies to capture the impacts of regulations like Regulations on Fair Disclosure (RFD) and Sarbanes Oxley Act (SOX) on market impacts on accounting restatement. Most of the studies relating to the accounting restatement are before SOX

period (Dechow et al. 1996; Turner et al. 2001; Anderson and Yohn 2002; GAO 2002; Richardson et al. 2002; Wu 2002; Palmrose et al. 2004; Hribar and Jenkins 2004; Akigbe et al. 2005; Ng 2008; Jayaraman 2008; Wilson 2008; Bardos 2011; Bardos et al. 2013). Several regulatory initiatives were intended to increase transparency and timeliness of financial reports. The purpose of such initiatives was to lower the threshold for errors that required restatements (Verrecchia 2001; Wilson 2008; Bardos 2011).

Although there are some studies in the stock market impacts of accounting restatements, the methodology used and robustness of their results are open to question. The present study attempts to overcome such deficiencies and provide empirical evidence with regard to stock market and liquidity impacts using a large database (e.g. around 2900 firms) for the time period 1997 to 2010. In addition, the present study also attempts to capture the impacts of regulatory initiatives like SOX on stock prices and liquidity impacts of accounting restatements. The main contribution of the present study is the regulatory and liquidity impacts of accounting restatements.

Rest of the study is scheduled as follows: section II reviews the literature and develops hypothesis, section III discusses database and methodology, section IV presents the empirical results of stock market impacts and liquidity impacts on accounting restatement, and finally, chapter V summarizes the conclusions of the study.

Chapter II

REVIEW OF LITERATURE AND HYPOTHESIS DEVELOPMENT

This chapter provides critical review of the literature on restatements of financial accounts and develops the hypothesis for empirical investigation. This chapter reviews literature related to (a) the impacts of accounting restatement; (b) stock market impacts of accounting restatements; (c) the liquidity impacts on accounting restatement; and (d) impacts of regulations on stock market and liquidity at accounting restatement.

This chapter is organized into four sections. Section 1 briefly summarizes the impacts of accounting restatement; section 2 briefly describes the stock market impacts of accounting restatements; and section 3 briefly discusses the liquidity impacts on accounting restatements. Finally section 4 summarizes the conclusions of this chapter.

2.1 Impacts of accounting restatement:

Accounting restatement is one of the indicators of financial reporting quality (Palmrose and Scholz 2004). Restatements occur when financial reports are discovered not to be consistent with Generally Accepted Accounting Principles (GAAP)². Restatement is normally viewed as negative news as it reduce the credibility of firm's accounting earnings (Anderson and Yohn 2002; Wu 2002). But, on the other hand, accounting restatements are not necessarily bad if it corrects past error and store

²Once a firm detects a prior accounting error, it has to disclose (in the period when the error is identified and corrected) both the nature of the error and the effect of its correction (if material) on each financial statement line item and any per share amounts affected. The correction of the prior error implies a "prior-period adjustment" to the beginning balance in retained earnings, as well as a restatement of previously issued financial statements (APB Opinion No. 20 (APB [1971]), replaced by SFAS No. 154 in 2005 (FASB [2005])).

confidence in reported financial numbers and result in the financial information being more efficiently incorporated with stock prices (Wilson 2008; Plumee and Yohn 2010; Bardos 2011).

The literature of accounting restatement could be broadly divided into following categories (a) The impacts of accounting restatement on board and management; (b) stock market impacts on accounting restatements; (c) contagion effect of accounting restatements; (d) financial reporting quality of restating firms; (e) economic consequences of accounting restatements; (f) impacts of regulations like SOX on stock prices after accounting restatement.

Previous researches emphasized on the consequences and characteristics of earnings restatements (Hribar and Jenkins 2004; Palmrose and Scholz 2004, Palmrose et al. 2004; Srinivasan 2005; Desai et al. 2006). Srinivasan (2005) and Desai et al. (2006) found evidence of higher management and board of director turnover. Desai et al. (2006) documented a high incidence of management turnover in the 24 months following a restatement announcement.

It is also demonstrated in previous literature that firms restating their earnings suffer significant costs immediately following the restatement. Palmrose et al. (2004) documented a significant loss in market value immediately following the restatement. Hribar and Jenkins (2004) found that firms experience an increase in cost of equity capital immediately following the restatement. Their analysis suggest that depending on

the model used, a company's cost of capital increases between 7 and 19 percent in the month following a restatement. They also found that, on average, firms lose 3 percent of their market value in the 18 days preceding the restatement announcement, and another 9 percent in the 5 days surrounding the announcement. Graham et al. (2008) found higher spreads and tighter loan contract terms with loans initiated after a restatement.

Previous researchers examined the effect of restatement announcements within capital market (Dechow et al. 1996; Turner et al. 2001; Anderson and Yohn 2002; Wu 2002; Akigbe et al. 2005; Krizenwoski and Zhang 2010; Bardos 2011; Bardos et al. 2013). Most of the empirical studies related to stock market impacts on accounting restatement showed negative abnormal returns (ranges from -4% to -10%). The divergence in empirical results could be attributed to the type of the model used to estimate the abnormal returns and event windows³.

Contagion effect on accounting restatement was also considered in previous research. This accounting "contagion" is higher when peer and restating firms use the same auditor (Christine and Kevin 2008). Gleason et al. (2008) found that accounting restatements that adversely affect shareholder wealth of restating firms also affect share prices of non-restating firms in the same industry. Kravert and Shevlin (2009) found an increase in the pricing of discretionary information risk for non-restatement firms in the same industries as the restatement firms, consistent with an intra-industry information transfer effect.

³Variation of results in stock market impacts on accounting restatement is briefly discussed in section 2 of chapter II.

Financial reporting quality of restating firms is another area of research in accounting restatement. Ecker et al. (2006) argued that market participants continue to perceive restatement firms as having poorer earnings quality in the year after the restatement occurs⁴. Wilson (2008) found that earnings response coefficients for restatement firms exhibit a U-shaped pattern. Earnings decreased after the restatement announcement, but were no longer significantly lower after a period of four quarters following the restatement. This suggested that the perceived loss of reporting credibility was not sustained in the long-term. Moore and Pfeiffer (2004) developed direct measures of financial reporting quality around restatements. They examined conditional total accruals before and after the accounting restatement announcement. However, they found no evidence of changes in these measures around restatements. Christine and Kevin (2008) found that improvements in reporting quality are significantly higher for firms with Chief Executive Officer (CEO) turnover surrounding the restatement announcement, but significantly lower for firms with auditor turnover, where the incoming auditor was of lower quality than the outgoing.

Some research works focus on the regulatory impacts of restating firms (Kinney and McDaniel 1989, Richardson et al. 2002; Palmrose and Scholz 2004; Baber et al. 2006). The Securities and Exchange Commission (SEC) used restatements to motivate and justify its earnings management initiative. Kinney and McDaniel (1989) and

⁴Ecker et al. (2006) showed that a returns-based measure of earnings quality indicate the following: poorer perceived earnings quality for restatement firms in the periods preceding the restatement announcement year, even lower perceived quality in the restatement year, and somewhat improved quality in the year following.

Palmrose and Scholz (2004) found that earnings restatements were often followed by class-action lawsuits against the company. In their study on predicting earnings management, Richardson et al. (2002) interpreted their results as consistent with capital-market pressures motivating companies to adopt more aggressive accounting policies. However, most of the studies related to regulatory impacts on accounting restatement were restricted up to year 2002.

Liquidity impacts of accounting restatement is one of the important area of research although the empirical work is limited. Liquidity risk/illiquidity is a substantial risk component when only cost at the bid-ask-spread level is accounted for. Restating firms experience not only large shareholder losses at restatement announcement but this losses also increase the liquidity risk /illiquidity of the firm (Bardos 2011)⁵. Most of the studies showed that liquidity dries up at accounting restatement (Krizenwoski and Zhang 2010; Naes et al. 2010; Bardos 2011; Lin et al. 2012).

Although various impacts of accounting restatement were studied in previous literature, the main focus of this study is on three important impacts of accounting restatement: (a) stock market impacts on accounting restatement; (b) liquidity impacts on accounting restatements and (c) the regulatory impacts on accounting restatement.

⁵ Liquidity impacts on accounting restatement is broadly discussed in section 3 of chapter II.

2.2 Stock market impacts of accounting restatement:

During the mid- to late 1990s market capitalization declines with restatements (GAO 2002). As the number of restatements data has increased, the business media has emphasized into this subject. Many researchers examined the effect of restatement announcements within capital market. The market reaction to a restatement announcement is examined in terms of abnormal returns. The most common model for abnormal returns is the *market model and Fama-French model*⁶. From a number of literature on stock market impacts of restatements, it is observed that market model is commonly used for event study⁷ (Dechow et al. 1996; Turner et al. 2001; Anderson and Yohn 2002; Wu 2002; Akigbe et al. 2005; Krizenwoski and Zhang 2010; Bardos 2011; Bardos et al. 2013). Only Hribar and Jenkins (2004) and Kravert and Shevlin (2009) used Fama-French model for the stock market impacts on accounting restatements.

Most of the empirical studies related to stock market impacts of accounting restatements showed negative abnormal returns in the range from -4 percent to -10 percent (Dechow et al. 1996; Turner et al. 2001; Anderson and Yohn 2002; Richardson et al. 2002; Wu 2002; Palmrose et al. 2004; Hribar and Jenkins 2004; Akhigbe et al. 2005; Kravert and Shevlin 2009; Bardos 2011; Bardos et al. 2013). But some studies report more negative reactions to restatement involving fraud and revenue recognitions (Wu 2002; Palmrose et al. 2004; Akighbe et al. 2005). Palmrose et al. (2004) examined the determinants of market reactions to restatement announcements. They documented an

⁶ Details of various models are explained in section 2 of chapter III

⁷ See chapter III for details.

economically and statistically negative market reaction to restatement announcements using market-adjusted abnormal returns. They found that more severe reactions are associated with restatements that include negative implications for management integrity and competence (fraud) and that have a more negative impact on previously reported earnings, and when the impact on net income is not quantified in the initial announcement. Akhigbe et al. (2005) found that more negative returns are associated with revenue recognition problems. Wu (2002) also noted that when restatements involves revenues, the abnormal return is even lower, -14.4% or less.

However, the magnitude impacts in the stock market vary depending on the time frame and models used for empirical investigation. For example, Hribar and Jenkins (2004), Kravert and Shevlin (2009) and Bardos (2011) applied the event study method for the period of 1997 to 2002 dataset to obtain the stock market reaction on accounting restatement. And their results were -7%, -9% and -5.4%, respectively. The model Hribar and Jenkins (2004) and Kravert and Shevlin (2009) used for the stock market impacts on accounting restatements is the Fama-French model. Turner et al. (2001) and Anderson and Yohn (2002) used market model for the period of 1997 to 1999. Their negative returns were -12% and -3.49%, respectively. Though they used the same time frame to capture the stock market impacts on accounting restatement, their event window was different (Turner et al. (2001) used 2 days of event period and Anderson and Yohn (2002) used 6 days event period surrounding accounting restatement). Since there is lack of consistencies in the model used to estimate the abnormal returns and event windows, it is hard to generalize the previous literature.

Despite of differences in the abnormal returns, it has been observed from previous researches that market responses negatively at restatements. Table 2.1 summarizes previous literature review on stock market impacts on restatements.

Table 2.1: Previous literature on stock market impacts on accounting restatements

Author(s)	Year	Model	Event Period	Result
Dechow et al. (1996)	1981-1992	Market Model	2 days period	-6%
Turner et al. (2001)	1997-1999	Market Model	2 days period	-12%
Richardson et al. (2002)	1995-2000	Market Model	2 days period	-11%
Wu (2002)	1997-2000	Market Model	2 days period	-11%
Anderson and Yohn (2002)	1997-1999	Market Model	6 days period	-3.49%
Palmrose et al. (2004)	1971-1999	Market Model	2 days period	-9%
Hribar and Jenkins (2004)	1997-2002	Fama-French Model	N/A	Negative effects(7 to 20%increase in costs of capital)
Akigbe et al. (2005)	1991-2000	Market Model	N/A	-3.42%
Kravert and Shevlin (2009)	1997-2002	Fama-French Model	2 days period	-5.4%
Krizenwoski and Zhang (2010)	1997-2006	Market Model	2 days period	-5.2%
Bardos (2011)	1997-2002	Market Model	2 days period	-9%
Bardos et al. (2013)	1997-2002	Market Model	2 days period	-9%

From Table 2.1 it can be observed that Dechow et al. (1996) estimated abnormal returns of the magnitude of -6% over a 2-day window surrounding a restatement. Turner

et al (2001) estimated abnormal returns of -12% over a 2-day window surrounding a restatement event between 1997 and 1999. Wu (2002), who estimated 1068 restatements between 1997 and 2000, and Richardson et al. (2002), who identified 440 firms between 1995 to 2000, found abnormal returns of -11% over a 2 day window surrounding a restatement event. Anderson and Yohn's (2002) study based on 161 restatement firms between 1997 and 1999 found abnormal returns of -3.49% over a 6-day window surrounding the first time the restatement became public.

Palmrose et al. (2004), who identified 403 restatements between 1971 and 1999, found abnormal returns of -9 % over a two day window of such an event. However, there is variation within the sample, and 29 percent of firms examined have non-negative announcement returns. Palmrose et al. (2004) suggest that this may be due to industry clustering around specific accounting issues, varied impact of restatements on market perceptions, and the effect of other information being released concurrent with the restatement announcement.

Hribar and Jenkins (2004) used the GAO database and found decreased amount in expected future earnings and increased value in the firm's cost of capital following restatements. Li and Zhang (2006) found strong evidence of informed insider trading surrounding the restatement announcements. Bardos (2011) and Bardos et al. (2013) found negative abnormal return of less than 10% during two days surrounding event window. Based on the above discussion, it is hypothesized that,

H1: Stock market could react negatively to accounting restatement(s).

Another important reason for studying accounting restatement is compliance with the law and its regulations. The Securities and Exchange Commission (SEC) used restatements to motivate and justify its earnings management initiative. Jackson and Madura (2007) explored the impact of the Regulation Fair Disclosure (RFD) of 2000. Regulation Fair Disclosure, also commonly referred to as Regulation FD or Reg FD, is a regulation that was promulgated by the U.S. Securities and Exchange Commission (SEC) in August 2000. The rule mandates that all publicly traded companies must disclose material information to all investors at the same time. Subsequently, Sarbanes-Oxley (SOX) was passed in 2002 imposing additional regulations on financial disclosure requirements. Regulators have claimed that SOX “contains some of the most far-reaching changes that Congress has ever introduced to the business world” (Melancon 2002), and academic research has demonstrated that some improvements in reporting quality have occurred since the implementation of the Act (Lobo and Zhou 2006; Cohen et al. 2008; Bartov and Cohen 2009). This is important because restatements by public companies are of considerable concern to regulators, issuers, and auditors over the quality of financial reporting (Palmrose and Scholz 2004).

The recent financial crisis (2008) made policy makers and regulators to think about the improvement of quality of financial reporting and greater transparency (Wilson 2008; Bardos 2011; Bardos et al. 2013). The Chairman of the SEC, Mary Schapiro cited “the rise in restatements and the broader damage to investor confidence” along with the ineffectiveness of existing regulatory measures as motivating factors for new regulations imposed by the Sarbanes-Oxley Act of 2002. Additional concern regarding the effect of

restatements is expressed in the General Accounting Office's special report for the U.S. Senate on the rising incidence and market consequences of restatements (GAO 2002). The GAO report stated that "the growing number of restatements appears to have shaken investors' confidence in our financial reporting system" (GAO 2002).

Kinney and McDaniel (1989) and Palmrose and Scholz (2004) found that earnings restatements were often followed by class-action lawsuits against the company. Kinney and McDaniel (1989) found that less than 14 percent of their sample with quarterly restatements from 1976 to 1985 had stockholder suits or SEC enforcement actions. Palmrose and Scholz (2004) found that companies with core earnings restatements⁸ have higher frequencies of intentional misstatements (fraud) and subsequent bankruptcy or delisting. Other research on litigation indicates that restatements increase the risk of securities class actions (Jones and Weingram 1996). This also includes actions against auditors (Fuerman 1997, 2000). In a recent study on accounting restatement and litigation risk, Bardos et al. (2013) found that higher litigation risk have much larger negative reaction to restatement announcement. By taking the period from 1997 to 2002, they found that about half of the -9.2% average restatement announcement effect is due to expected litigation costs.

However, not many studies were done relating to stock market impacts on accounting restatement considering the periods after the regulations were implemented (RFD/SOX). Most of the studies related to stock market impacts on accounting restatement were restricted their periods till 2002 and their studies showed negative abnormal returns in the range of -4% to -10%. Some researcher mentioned that several

⁸ Core earnings that is normal, recurring earnings from primary operating activities. For example, pre-tax.

SEC initiatives motivated to increase restatements over the past decades (Verrecchia 2001; Wilson 2008; Bardos 2011; Bardos et al. 2013). Evidence from studies of restatements announced prior to SOX documents that investors are wary of accounting information following restatement announcements (Wilson 2008, Kravet and Shevlin 2009; Hirshchey et al. 2012).

Accounting regulation (RFD/SOX) helped to lower the threshold for errors that required restatements (Bardos 2011). The comprehensive set of regulations imposed under SOX was designed to improve the accuracy and reliability of corporate disclosures (Hamilton and Trautman 2002). Various outcomes of SOX, from improved detection of accounting mistakes, better audit quality, and the imposition of greater deterrents of intentional earnings manipulation should collectively have an effect on investors' opinions of the reliability of financial reports (Perino 2002; Feng and Li 2010; DeFond and Lennox 2011). Evidence from recent research showed that firms recognize these reputation concerns and take action to correct their image following earnings restatements (Hirshchey et al. 2012). Lobo and Zhou (2006) and Cohen et al. (2008) found in their study that accruals-based earnings management is lower after SOX than in the preceding period. Ettredge et al. (2011) found that firms issue more frequent and more transparent earnings guidance after restatements to signal their intent to provide more credible information in the future. Chakravarthy et al. (2011) showed that firms initiate specific repair actions, such as engaging in share repurchases and announcing changes in internal control mechanisms in order to restore their credibility with investors. Based on the concern expressed by regulators and analysts regarding the impacts of

accounting restatement should have lower declines in stock prices. So, the next hypothesis, stated in alternative form is as follows:

H2: Stock market impacts on restatement is hypothesized to decrease after the enactment of regulations (RFD/SOX).

2.3 Liquidity impacts of accounting restatement:

Stock market liquidity is one of the indicator of financial solvency of any firm. Restatements announcements are negative economic shocks that result from negative news about reported accounting numbers (Palmrose et al. 2004). These negative economic shocks increase investors' uncertainty about firms' financial statements and started to reassess their perceptions about the quality of financial information provided to them (Hirshchey et al. 2012). That is why stock price decreases immediately after accounting restatement (Anderson and Yohn 2002; Wu 2002; Palmrose et al. 2004). This negative impact on stock price may influence the liquidity of a firm (Bardos 2011). Thus stock market liquidity helps to understand the full impact of accounting restatement.

Stock market liquidity can be measured by the cost of immediate execution (Naes et al. 2011). Without an efficient market, liquidity tends to dry up and good and efficient market cease to exist (Levitt 2000). Amihud & Mendelson (1986, 2002) believe that an investor willing to transact faces a trade-off. He/She may either wait to transact at a favorable price or insist on immediate execution at the current bid or ask price. The quoted ask (offer) price includes a premium for immediate buying, and the bid price similarly reflects a concession required for immediate sale. Thus, a natural measure of

stock liquidity is the spread between the Bid and Ask prices, which is the sum of the buying premium and the selling concession. Stock market liquidity is related to the cost of executing a transaction in the capital markets (Amihud 2002).

Restating firms have high market expectations for future earnings growth and have higher levels of outstanding debt (Naes et al. 2010). Comparatively little research work was done to understand the liquidity impacts on accounting restatement. Some studies were done in liquidity and asset pricing, some studied the relationship between liquidity and disclosure quality and some studied liquidity around accounting restatement.

One of the first studies to examine the role of liquidity in asset pricing is Amihud and Mendelson (1986). They established a link between the bid-ask spread and asset return. They used Fama-MacBeth (1973) portfolio formation procedure and found a positive relation between annual portfolio return and bid-ask spread.

Brennan and Subrahmanyam (1996) conducted an asset-pricing tests using Fama-French (1993) framework augmented by a liquidity variable. They proposed a measure of illiquidity by the relation between price changes and order flows which was based on Glosten and Harris (1988). However, they found a negative relation between bid-ask spread and expected returns which contradicted the liquidity premium argument. Datar et al. (1998) examined asset returns and liquidity using a share turnover ratio as a proxy of

liquidity. They found that liquidity has an important role in cross-sectional returns of stocks after controlling for size.

Amihud (2002) and Pastor and Stambaugh (2003) used alternative empirical proxies to examine a different aspect of liquidity. Both papers examined the role of market liquidity risk. Amihud used the daily ratio of the absolute stock return to its dollar volume as an approximate measure of the price impact of order flow and concluded that expected excess returns are in part a premium for stock illiquidity.

Anderson and Yohn (2002) studied the change in bid-ask spreads during three days before announcement of the problem through three days after restatement filing and found that spreads increase for revenue recognition restatements. They found that information asymmetry decreases upon restatement of restructuring items and increases upon revenue recognition restatements. However, Palmrose et al. (2004) were unable to replicate these results, finding no changes in bid-ask spreads around restatement announcement. However, they found a significant association between the dispersion of earnings forecasts by analysts and restatement announcements. Wu (2002) examined a two-day price response around the restatement announcements. They found that at accounting restatements, the market reaction is stronger when the amount restated is larger.

Using a sample of Canadian restatements, Kryzanowski and Zhang (2010) found that relative quoted and effective spreads increase at restatement announcement and remain higher 46 trading days after restatement. They also found that relative (not absolute) spreads and Amihud's (2002) illiquidity estimates increase for revenue recognition restatements. Badertscher and Burks (2010) analyzed changes in liquidity 90 days prior to restatement and 90 days after disclosure. They found no difference in liquidity in these periods for their sample. They also documented that fraudulent restatements result in lower liquidity during accounting restatement.

Restatement could be viewed as low quality information. Because after the accounting restatement, the investors could believe that not only the past accounting information was of low quality, but also the future information may not be reliable (Hirshcley et al. 2012). Investors' uncertainty will increase information asymmetry around the restatement announcements. Previous researchers examined the association between liquidity and disclosure quality and found that better disclosure increases liquidity (Welker 1995; Heflin et al. 2002). Welker (1995) documented that firms in the lowest third of the disclosure rankings have a 50% higher bid-ask spread (an indicator of liquidity). Leuz and Verrecchia (2000) used an event study framework and showed that German firms that disclose financial information by switching to International Accounting Standards (IAS) or U.S. GAAP experience a 35% decrease in bid-ask spread and a 50% increase in stocks turnover. Ng (2008) examined the measures of information quality and found that management forecast frequency is negatively associated with a

firm's liquidity, while relevance of earnings and accrual quality are not significantly associated with a firm's liquidity.

Jayaraman (2008) found that the bid-ask spreads and the probability of informed trading are higher when public information is less informative. Bhattacharya et al. (2010) found that accrual quality is positively associated with high frequency measure of the adverse selection component of the bid-ask spread, and that firms with poor earnings quality experience a greater increase in information asymmetry around earnings announcements. Ascioglu et al. (2005) found that auditor compensation, which has been found to be associated with disclosure quality, decreases liquidity for firms with weak corporate governance.

In a recent study, Bardos (2011) found that liquidity risk is greater with revenue recognition problems. She studied the relationship between liquidity and quality of financial information by analyzing long-term trends using Amihud's (2002) illiquidity measure for restating firms. She found that for most income decreasing restatements liquidity decreases several months before restatement announcement and remains at elevated levels one year after restatement. Overall previous literature points a positive relationship between accounting restatement and stock market liquidity. Therefore the next hypothesis in an alternative form is as follows:

H3: Liquidity is adversely impacted by the restatement announcements.

The former SEC chairman Arthur Levitt remarked in his 1997 speech to inter-American Development Bank, ‘an important benefit of high accounting standard is improved liquidity and lower cost of capital.’⁹ Changes in the liquidity of the US stock market have been coinciding with changes in the accounting regulations (RFD/SOX). If the investors can regain confidence in restating firms with time, the decrease in stock market liquidity will be temporary (Bardos 2011; Bardos et al. 2013). Investors assume that the perceived loss from the restatement will not sustain in the long run (Wilson 2008). Wilson (2008) also found that the decline in information content of earnings response coefficient in the long run is temporary. Therefore, the next hypothesis is as follows:

H4: Stock market illiquidity will gradually decrease after the introduction regulations (SOX).

Firm size is one of the major components of detecting liquidity risk. Previous studies showed that smaller stocks are less liquid than the larger stocks (Pastor and Stambaugh, 2003). Recent research has also documented the relationship between liquidity and firm size (Naes et al. 2011). These studies have shown that investors generally move out of small firms (flight to qualities) to large firms during adverse economic conditions. Hence, the next hypothesis is as follows:

H5: Illiquidity and firm size are negatively related.

⁹<http://www.sec.gov/news/speech/speecharchive/1997/spch176.txt>

The literature has largely neglected the effects of business cycle¹⁰ on accounting restatement. In general, firms performs better in an expansion period. During economic expansion periods investors will become highly confident that the market is in a good state. Under such circumstances, further good news has little impact on investor's beliefs. Such positive news only confirms the current state of the economy. However, bad news causes market prices to fall, since bad news lowers the perception of investors that the market is in the good state. In addition, as uncertainty in the true state of the economy increases, risk-averse investors ask for a higher expected return. The uncertainty about the state of the economy causes an asymmetry in the response to bad news. That is, when investors believe that the economy is in the bad state, additional bad news will cause little impact on investor's beliefs. However, bad news during good times will further uncertainty and will reduce the liquidity of a firm. This leads to hypothesis 6.

H6: Illiquidity is more likely to occur in expansion periods.

Hypothesis 3 to 6 can be expressed in terms of the following behavioral equation:

$$AlR_{it} = \alpha_i + \beta_1 REST_{it} + \beta_2 SOX_{it} + \beta_3 BC_{it} + \beta_4 LogTA_{it} + \varepsilon_{it}.$$

Where:

AlR_{it} = Amihud's Illiquidity (2002)

$REST_{it}$ = Accounting restatement (The variable is a dummy with a value of 1 after accounting restatement and 0 for before accounting restatement.)

SOX_{it} = Sarbanes-Oxley accounting regulations in 2002 (The variable is a dummy with a value of 1 starting in 2002 and 0 for years previous to Sarbanes-Oxley introduction)

BC_{it} = Business Cycle (The variable is a dummy variable with a value of 1 for expansion period and 0 for contraction period)

$LogTA_{it}$ = Total assets of a firm.

ε_{it} = Random variable.

¹⁰ The macroeconomic cycle can be divided into three main stages high growth (expansion), low growth (Recession), and intervening periods of moderate growth (Tomy, 2012).

2.4 Conclusions:

This chapter has reviewed the broad contours of theoretical and empirical literature on stock market impacts on accounting restatement, the relationship between accounting restatement and liquidity impacts considering the influence of regulation. The literatures suggest that at accounting restatement announcements not only abnormal return increases but also liquidity dries up. There are limited study in relevant literature to capture the impacts of regulatory risk (SOX) on accounting restatement. The present study attempts to provide empirical evidence with regards to the impacts of accounting regulations (SOX) on accounting restatement and liquidity. The hypothesis mentioned in this chapter will be tested in the next chapter.

Chapter III

DATABASE AND METHODOLOGY

This chapter provides an overview of the database and methodology used in the empirical investigation of hypothesis developed in chapter II. This chapter is divided into two sections: section 1 provides the sources of the data used in this study, section 2 describes the methodology used for the empirical investigation.

3.1 Database:

3.1.1 Stock market impacts:

The database of accounting restatement announcements used in this study spans years 1997-2010. This data is compiled from two sources: one collected from GAO (2002) with restatement data from 1997 to 2002 and one assembled by the Audit Analytics (AA) with data on restatements from 2003 to 2010.

The United States Government Accountability office (popularly known as GAO¹¹) is the most comprehensive data source of accounting restatements data in U.S. The GAO data include the date of the accounting restatement, the reason for the restatement and the initiating party¹². For the initiating party GAO database use both voluntary and forced restatement. The GAO reports identifies broadly nine possible reasons for the restatements: (i) acquisitions and mergers; (ii) cost or expense; (iii) in process research and development (IPRD), (iv) reclassification, (v) related party transactions, (vi) restructuring, assets, or inventory, (vii) revenue recognition, (viii)

¹¹ www.gao.gov

¹² Whether accounting restatement is done by (a) voluntary restaters (firms that restated without being prompted either external auditors or the SEC) and/or (b) forced restaters (firms requested to restate by SEC or external auditors).

securities related; and (ix) other. According to the GAO report, accounting restatements were identified through a search of press releases and other media coverage using Lexis-Nexis. The restatements included in the database are those resulting from "aggressive"¹³ accounting practices, multiple restatements, intentional and unintentional misuse of facts applied to financial statements, oversight or misuse of accounting rules, and fraud (GAO 2002). The database excludes restatements resulting from normal corporate activity (e.g., mergers and acquisitions) or presentation issues (e.g., changes in business segment definitions).

For the post SOX period (2003 to 2010) the data was collected from Audit Analytics (AA)¹⁴. AA provides detailed research on more than 20,000 public companies and more than 1,500 accounting firms. It reports total restatements by year, average number of days, average number of issues, and percentage of restatements. The Audit Analytics financial restatement database includes data from all electronic filings of SEC registrants since January 1, 2000 and includes financial restatements and/or non-reliance filings (big and small, foreign and domestic) that have taken place. Accounting restatement of AA originate from one of two sources: event filings or periodic reports. This database is designed to identify so-called stealth restatements (those contained in a periodic filing) by utilizing several manual and automated review procedures. The database employs a taxonomy (issue classifications) of more than 40 different accounting error categories, Revenue Recognition, Intangible Assets, Option Backdating, etc. determined by individual review of each restatement.

¹³ The practice of misreporting income statement and balance sheet items to make the financial statements more attractive to investors.

¹⁴ www.auditanalytics.com

The restatement announcements studied here involve only United States companies that are traded on U.S stock exchanges. Comparable financial data for restating firms was compiled from the Center for Research in Security Prices (CRSP) database. CRSP provides the stock prices and related financial data of U.S. firms.

The collection and estimation of data and models were automated using SAS and Eventus software is used to calculate abnormal returns (discussed in the methodology section). Data were calculated and analyzed using Excel and econometric software E-Views (version 7.2).

The composition of the data for pre-regulation (1997 to 2002) period is presented in Table 3.1. Pre-regulation restatement data is taken from GAO database. Of the 919 restatements from the GAO database 331 restatements was omitted as comparable financial data is not available in CRSP. In addition, 152 restatements were not available for computing abnormal returns using Eventus software. The final sample comprises 436 firms that issued accounting restatements.

Table 3.2 shows the data distribution from Audit analytics for post regulation period (2003 to 2010). AA has total of 11826 restatements which contain data from 2000 to 2012, but we used data from 2003 to 2010 from AA. Because GAO database is used for the period of 1997 to 2002. To avoid the replication of restatements firms for the period of 2000 to 2002, 748 firms were deleted. 1439 restatement firms were also deleted

for the data period of 2011 and 2012. Ticker (TKR) symbol was needed for collecting PERMNO¹⁵ from CRSP. There was no TKR for 5039 firms. For this reason we had to delete these firms. 2100 were deleted because these firms were not covered by CRSP. In addition, 104 observations were deleted while computing abnormal return from Eventus software. The final sample from AA comprises 2396 restatements.

Table: 3.1 Details of Accounting Restatements from GAO: 1997 to 2002

	N
Restatement announcement from GAO report	919
Missing necessary data from CRSP(No perm Number)	(331)
Firms missing while computing abnormal return from Eventus software	<u>(152)</u>
Final sample	436

Note: The database of earnings restatements from the GAO report is the basis of the sample. The database consists of restatements that were announced from 1997 to 2002 and includes restatements resulting from "aggressive" accounting practices, intentional and unintentional misuse of facts, oversight or misuse of accounting rules, and fraud. The database excludes restatements resulting from normal corporate activity or financial statement presentation issues.

Table: 3.2 Details of Accounting Restatements from Audit analytics: 2003 to 2010

	N
Restatement announcement from Audit Analytics(From 2000 to 2012)	11826
Omitted firms from 2000 to 2002	(748)
Omitted firms from 2011 to 2012	(1439)
Missing necessary data to collect PREM number from CRSP (Example : TICKER symbol)	(5039)
Missing necessary data from CRSP (No perm Number)	(2100)
Firms missing while computing abnormal return from Eventus software	<u>(104)</u>
Final sample	2396

Note: The database of earnings restatements from the Audit Analytics. The database consists of restatements that were announced from 2003 and 2011.

¹⁵ PERMNO is a unique permanent security identification number assigned by CRSP to each security.

Although restatement numbers in the United States increased prior to 2000, the passage of the Sarbanes–Oxley Act of 2002 (SOX) prompted a dramatic increase in the number of financial statements filed each year. The Act (Section 404 on internal controls) created significant focus on the quality of financial governance by management, audit committees, internal auditors, and external auditors.

Figure: 3.1 Number of accounting restatements in the United States 2001-2007
(Source: Audit analytics, 2008)

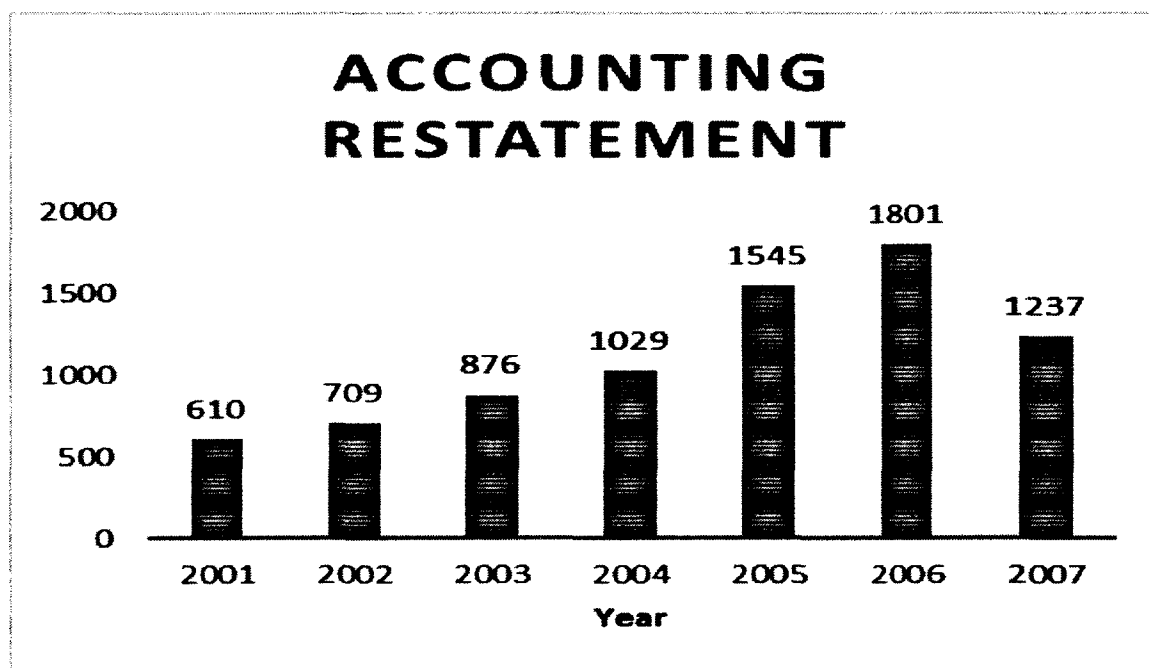


Figure 3.1 describes the number of financial restatements in the United States from 2001 to 2007. Interestingly, the number of restatements drooped in 2007 for the first time since the passage of SOX, although over 1200 restatements were still filed.

3.1.2: Measures of Illiquidity:

Data on illiquidity measures-based on Amihud's Illiquidity (2002)¹⁶ were computed from CRSP for accounting restating firms. The data used to calculate this measure are: daily stock returns and trading volume. We needed PERM number and restatement announcement date for the restated company to get the financial and accounting variables. Company TKR symbol was put manually to CRSP software to get this PERM number. Then monthly stock returns, and trading volumes were accumulated from CRSP software.

This study used cross-section least square method to capture the illiquidity impacts. Microsoft excel and econometric software E-views (version 7.2) was used to calculate and analyze the data.

¹⁶ See section 3.2.2 for details

3.2 Methodology:

3.2.1: Stock market impacts:

To examine the stock market response to restatement announcement standard event study methodology is used. Fama-French 3 factor models is applied for estimation of abnormal return and expected return on a specific stock. The event study procedures in this study are gathered from previous researches by Brown and Warner (1980).

To construct an event study the event, event date, event window, estimation window and estimation model should be determined. The impacts of an event (like restatement) is what the researcher would like to study. The relationship of the said event is studied with the stock prices. The events defined for this study are the announcement date of accounting restatement. The event date is the date of announcement of restatement by the sample firm. It can be expressed as t_0 . The event window comprises some period before and after the event day. The event window in this study is 1 day before and 1 day after restatement and can be expressed as -1 to +1. The selected examination model for this study is Fama French 3 Factor model (discussed below). But comparable estimates are also available for market model.

3.2.1(a) Market Model:

This model assumes that there is a linear relationship between the return of the security and the return of market portfolio. For the purpose of studying the impact of restatement on share prices abnormal returns are computed. Abnormal returns are

obtained by finding the difference between actual returns of the security i on day t and expected returns of security i on day t. The following is the formula for market model to compute abnormal returns:

$$AR_{it} = R_{it} - ER_{it} \quad (3.1)$$

Where

AR_{it} = Abnormal return of security i on day t

R_{it} = Actual return on security i on day t

ER_{it} = Expected return on security i on day t

Actual return on security i in period t is computed as follows:

$$R_{it} = (P_{it} - P_{it-1} / P_{it-1}) * 100 \quad (3.2)$$

Where,

P_{it} = Price of security i on day t

P_{it-1} = Price of security i on day prior to day t

Expected return on security i in period t is computed as follows:-

$$ER_{it} = \alpha + \beta_i R_{mt} + \epsilon_i \quad (3.3)$$

Where

α = Constant

β_i = Relative riskiness of the security to market index

R_{mt} = The rate of return on market index on the day t; and

ϵ_i = random variable

3.2.1(b) Fama- French 3 factor model:

Fama and French (1993) added firm specific attributes like size and value to the market model. The three factors in FF 3 factor model are (i) the excess return on a broad market portfolio; (ii) the difference between the return on a portfolio of small stocks and the return on a portfolio of large stocks; (iii) the difference between the return on a

portfolio of high book-to-market stocks and the return on a portfolio of low book-to-market stocks.

The following formula is used to generate the expected return, where,

$$E(R)_{it} = \alpha_i + \beta_i R_{mt} + \varphi_i SMB_t + \mu_i HML_t + \varepsilon_{it} \quad (3.4)$$

R_{mt} is the rate of the return of the S&P 500 market index on day t ; SMB_t (Small Minus Big) is the average return on three small market capitalization portfolio minus the average return on three large market-capitalization portfolios; HML_t (High Minus Low) is the average return on two high book-to-market equity portfolios minus the average return on two low book-to-market equity portfolios; SMB and HML measure the historic excess returns of small caps and "value" stocks over the market as a whole. ε_{it} is a random variable.

To detect statistically significant effects from restatement announcements, various event windows are examined and t-statistics tests are compiled on the average abnormal returns (AAR) and cumulative average abnormal returns (CAAR).

AARs are computed as follows:

$$AAR_t = \frac{1}{N} \sum_{j=1}^N AR_{jt} \quad (3.5)$$

Where

AAR_t = Average of abnormal return for day t

N = Number of securities in the sample

The abnormal returns are aggregated trading day wise and then divided by number of securities. Thus cross-sectional and time- series aggregation is done. After this cumulative average abnormal return (CAARs) is computed. The formula for CAAR_t:

$$CAAR_t = \Sigma AAR_{t-j} \quad (3.6)$$

Where

t-j = Number of event days before day t

T test is used to determine the statistical significance of CAAR_t and AAR_t. For computation of t statistics the aggregate pre- event standard deviation of abnormal returns of all the securities is computed.

The abnormal returns are calculated for market model and Fama-French 3 Factor model. Although for the empirical purpose Fama-French 3 Factor model is preferred over market model as it has more explanatory variables (SMB, HML) than market model.

3.2.2 Liquidity impacts:

Firms that restate their financial restatements experience large shareholder losses at restatement announcements is widely researched and recognised. Prior literature has found that poor quality of financial information can create information asymmetry between buyers and sellers of stocks which would result in reduce liquidity of firm's stocks (Diamond and Verrecchia 1981; Glosten and Milfrom 1985; Kyle 1985; Amihud and Mandelson 1988; Leuz and Verrecchia 2000; Anderson and Yohn 2002; Baderscher and Burks 2010; Bardos et al. 2013). The main argument is that sophisticated investors like short-sellers, large institutional investors are better informed about the quality of

financial reports during the error period which may lead to a decrease in liquidity during the accounting restatement.

For measuring liquidity, many proxies have been used in the literature. Some of the measures are quantity based (like quoted spread, effective spread, relative spread, etc.) and some are quantity based (like Amihud's illiquidity, Amivest liquidity). These empirical proxies have added considerably to the understanding of liquidity risk (Chordia et al. 2009). For an overview of various concepts of liquidity measures in the literature see Appendix-3.1. To understand the liquidity impacts on accounting restatement from Amihud's Illiquidity (2002) is used in this study.

Amihud's (2002) develops a measure of stock illiquidity that can be easily calculated using daily stock price and volume data. The Amihud (2002) price impact measure, ILLIQ, is defined as the absolute value of daily stock return, R , divided by the daily dollar trading volume, (VOL). It measures the trading volume needed to move the stock price.

$$ILLIQ_{i,t} = \frac{1}{D_t} \sum_{t=1}^T \frac{|R_{it}|}{VOL_{it}} \quad (3.7)$$

Where

$R_{i,t}$ = Absolute daily return on day t for security i ;

$VOL_{i,t}$ = dollar volume on day t for security i ; and

D_t = the number of days for which data are available.

ILLIQ is a measure of the elasticity dimension of liquidity. Elasticity measure of liquidity try to capture sensitivity of prices to trading volume. It is standard to multiply the above equation by 10^6 for practical purposes. The average is calculated overall positive-volume days, since the ratio is undefined for zero-volume days. Amihud (2002) shows that this measure is strongly priced in the cross section of stock markets.

According to Amihud and Mendelson (2006), illiquidity has the following dimensions:

1. Price-impact costs reflect the price concession that a buyer or a seller of a security makes when trading: a discount when selling or a premium when buying. For small orders, the market impact is confined to the bid-ask spread, which is the difference between the buying and selling price quoted by dealers, market-makers and investors who supply liquidity to the market by standing ready to buy and sell at the quoted prices. The bid-ask spread represents a cost to investors because a simultaneous “round trip” buy and sell transaction costs the full bid-ask spread. For larger orders, the price impact exceeds the bid-ask spread and increases in the order size. Depth is the order size at the best quoted price, which is the largest size that does not incur a price impact cost above the bid-ask spread.
2. Search and delay costs are incurred when a trader looks for better prices than those quoted in the market or wishes to reduce the price impact of his order. This often occurs with block orders, where traders search for a counterparty rather than “dump” an order on the market. While saving on price-impact costs [component (1)], the trader bears search and delay costs resulting from the fact that the trade is not executed immediately. In

particular, the trader incurs opportunity costs and risk as the order awaits execution. For example, if a trader wishes to sell a security, the stock price may decline while he is searching for accountability. The trader then trades off the benefit of a lower price-impact cost against the risk of the market turning against him.

3. Direct trading costs include exchange fees, taxes and brokerage commissions. These are also subject to trade-offs: for example, a trader may ask a dealer to liquidate a block, with the dealer bearing the search and delay cost while the trader pays a larger commission.

Amihud's illiquidity (2002) measure is most widely used in empirical investigation. The main advantage of Amihud's illiquidity measure is its sound analytical framework, computational advantage and its role in asset pricing (Brennan et.al. 2013). Recent efforts has been made to further refine Amihud's illiquidity measure by decomposing the Amihud measure into elements that correspond to positive (up) and negative (down) return days (Brennan et.al. 2013).

To analyse the determinants of liquidity or illiquidity during the pre and post regulation period, the following behavioral equation based on firms specific (size) and external variables (REST, SOX and BC) is estimated (using cross-section least squares method).

$$AIR_{it} = \alpha_i + \beta_1 REST_{it} + \beta_2 SOX_{it} + \beta_3 BC_{it} + \beta_4 LogTA_{it} + \epsilon_{it} \quad (3.8)$$

Where,

AIR_{it} = Amihud's Illiquidity (2002)

$REST_{it}$ = Accounting restatement (The variable is a dummy with a value of 1 after accounting restatement and 0 for before accounting restatement.)

SOX_{it} = Sarbanes-Oxley accounting regulations in 2002 (The variable is a dummy with a value of 1 starting in 2002 and 0 for years previous to Sarbanes-Oxley introduction)

BC_{it} = Business Cycle (The variable is a dummy variable with a value of 1 for expansion period and 0 for contraction period)

$LogTA_{it}$ = Total assets of a firm; and

ε_{it} = Random variable.

CHAPTER IV

IMPACTS OF ACCOUNTING RESTATEMENTS IN U.S.: EMPIRICAL RESULT

This chapter presents the empirical results of hypothesis presented in chapter II i.e. stock market impacts and liquidity impacts of accounting restatements in U.S. This chapter is organized as follows: Section 1 presents the empirical evidence of the stock market impacts on accounting restatements. Section 2 provides the results of various liquidity impacts of accounting restatements. Finally section 3 summarizes the main conclusions.

4.1 Stock market impacts:

The stock market impacts of accounting restatements are provided for (a) Pre-regulation and (b) Post-regulation period in U.S. Pre-regulation periods are the period before implementation of SOX act and post-regulation periods are after the implementation of SOX act.

(a) *Pre-regulation:*

Table 4.1 Cumulative Average Abnormal Returns using Fama French 3 Factor Model from 1997 to 2002(N=436)

This table presents the cumulative average abnormal returns (CAARs) using Fama French 3 factor model (1993) from 1997 to 2002. The following formula is used to generate the abnormal return, where,

$$R_{it} = \alpha + \beta_i R_{mt} + \varphi_i SMB_t + \mu_i HML_t + \varepsilon_{it}$$

R_{mt} is the rate of the return of the S&P 500 market index on day t ; SMB_t (Small Minus Big) is the average return on three small market capitalization portfolio minus the average return on three large market-capitalization portfolios; HML_t (High Minus Low) is the average return on two high book-to-market equity portfolios minus the average return on two low book-to-market equity portfolios; ε_{it} is a random variable.

Event Windows	CAARs (%)	Percentage negative (%)
(-30,+30)	-7.14*	56.19
(-20,+20)	-7.92**	57.79
(-10,+10)	-5.82***	58.71
(-5,+5)	-4.67***	55.96
(-3,+3)	-4.79***	61.00
(-1,+1)	-3.63***	60.32
(-30,-2)	-3.47***	55.27
(+2, +30)	-0.06**	50.46

Notes: CAARs are calculated by summing daily returns in the respective event window. *, **, *** denote statistical significance at the 10%, 5%, and 1% levels using a two-tailed test.

Table 4.1 provides the results of Cumulative Average Abnormal Returns (CAARs) for the stock markets impacts on accounting restatement based on Fama French 3 Factor model (FF) from 1997 to 2002 (i.e. pre regulation periods). CAARs are calculated for various short term windows. Previous studies have showed that the financial restatements have a significant negative impact on stock prices for two days (-1, +1) window (Wu 2002; Palmrose et al. 2004). It is evident from Table 4.1 that for the event window (-1, +1) around accounting restatement the impact was negative (-3.63%) for pre-regulation period. This results were statistically significant at 1 percent level. This result is consistent with the findings of Palmrose et al. (2004) and Wu (2002), who documented that stock prices react negatively by up to 10 percent during similar event

periods surrounding accounting restatement announcements. The abnormal return from FF 3 factor model is also consistent with the prior empirical findings except the fact that the magnitude of negative impact is marginally lower. This is expected as previous models are predominantly based on market model and the FF 3 Factor model includes additional firm specific variables (like SMB, HML) then the market model used by previous researches. The results of Table 4.1 indicates that the market captures the new information released by restatements announcement (Hirshcley et al. 2012).

Average Abnormal Returns (AAR) on a daily basis for the stock market impacts on accounting restatements pre regulation period are presented in Appendix Table 1. Based on the results presented in Appendix Table 1, the stock response to accounting restatements is statistically significant at each consecutive day starting at $t=-3$ to $t=+1$ inclusive. For pre-regulation period, the stock reaction using FF 3 Factor model at $t=0$ is -1.22 percent and 53 percent of stocks have a negative AAR. Both AARs and CAARs of pre-regulation period support our first hypothesis (H1) that market reacts negatively at restatement announcement.

(b) Post-Regulation:

Table 4.2 Cumulative Average Abnormal Returns using Fama French 3 Factor Model from 2003 to 2010 (N=2396)

This table presents the cumulative average abnormal returns (CAARs) using Fama French 3 factor model (1993) from 2003 to 2010. The following formula is used to generate the abnormal return, where,

$$R_{it} = \alpha + \beta_i R_{mt} + \varphi_i SMB_t + \mu_i HML_t + \varepsilon_{it}$$

R_{mt} is the rate of the return of the S&P 500 market index on day t ; SMB_t (Small Minus Big) is the average return on three small market capitalization portfolio minus the average return on three large market-capitalization portfolios; HML_t (High Minus Low) is the average return on two high book-to-market equity portfolios minus the average return on two low book-to-market equity portfolios; ε_{it} is a random variable.

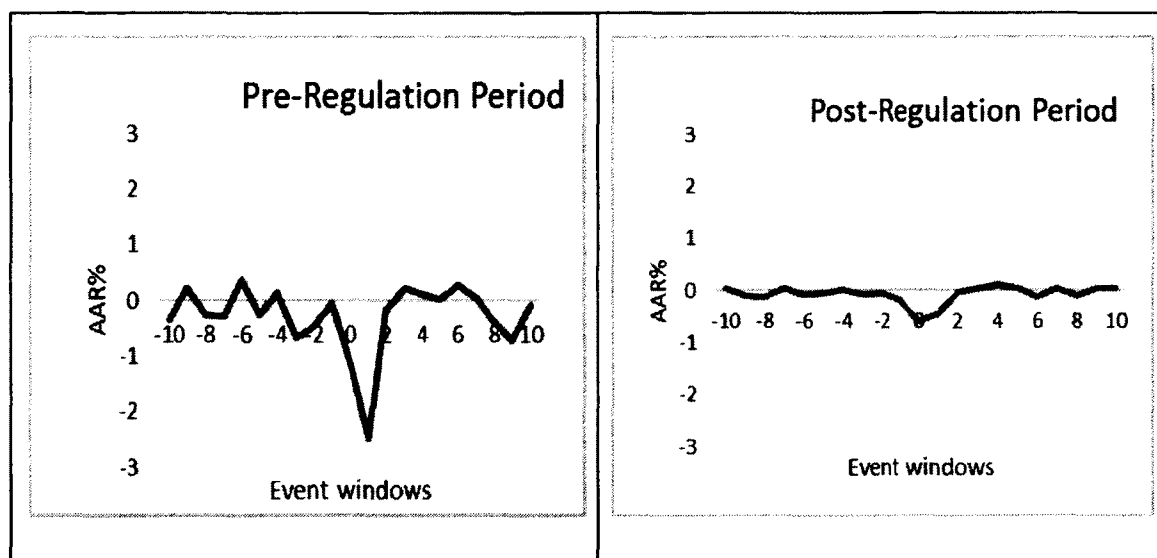
Event Windows	CAARs (%)	Percentage negative (%)
(-30,+30)	-3.55**	53.92
(-20,+20)	-3.46***	55.17
(-10,+10)	-2.40***	55.00
(-5,+5)	-1.89***	54.17
(-3,+3)	-2.01***	56.51
(-1,+1)	-1.67***	59.05
(-30,-2)	-1.81***	53.92
(+2, +30)	-0.07**	50.39

Notes: CAARs are calculated by summing daily returns in the respective event window. *, **, *** denote statistical significance at the 10%, 5%, and 1% levels using a two-tailed test

The post regulation Cumulative Average Abnormal Returns (CAARs) for the stock market impacts on accounting restatements using FF 3 Factor is presented in Table 4.2. Similar short term windows are selected for CAARs for post regulation period as in pre-regulation period. During the post regulation period, in U.S. the estimates of CAAR for 2 days around accounting restatement (-1, +1) was -1.67 percent which is substantially lower than pre-regulation period (-3.63 percent). It seems that market reactions appear to be less severe in the post regulation period. This results of post regulation abnormal return suggests that market is more comfortable with the restatement environment as the investors assume that the change is temporary and there will be transparency in financial statements after the restatement (Wilson 2008; Hirshey et al. 2012). CAARs of FF 3 factor model is significant 1 percent level of significance.

Appendix Table 2 presents Average Abnormal Returns (AAR) for post regulation period. It can be observed that for AARs, the stock market reactions at accounting restatement is statistically significant from day $t=-2$ to $t=+2$ inclusive. The stock reaction is -0.59 percent at $t=0$ and 56 percent of stocks have negative AAR. Both AARs and CAARs of post regulation period supports the hypothesis (H2) that abnormal returns of accounting restatement will be moderated after the implementation of regulation.

Figure 4.1 Comparative Average Abnormal Returns using Fama French 3 Factor model for pre and post regulation period in U.S.



Average Abnormal Returns of the accounting restatement for the selected windows can be better understood from Figure 4.1. This figure presents the comparative pictures of AAR using Fama-French 3 Factor model for pre and post regulation period in U.S. It can be observed from pre-regulation period that there is a marked decline in abnormal returns at accounting restatement announcement date. On the other hand for post regulation period we can observe a moderate decline in AAR. The daily return was decreased in post-regulation period also but the percentage of decline is lower than the pre-regulation period. This happens because before implementation of accounting regulations investors were not sure to trust a restating company. That is why if any

company announced accounting restatement, there was an immediate decrease in their stock price¹⁷.

After implementation of regulations, the investors presumably are less alarmed of egregious accounting mistakes (Wilson 2008; Lin et al. 2012). This explains why firms' issues restatement more frequent after the SOX act.

4.2 Liquidity impact analysis:

Table: 4.3 Descriptive Statistics (Observations 32341)

This Table presents the descriptive statistics for 32341 observations. . ALR is the Amihud's illiquidity (2002). LogTa represents natural logarithm of firm's total assets. REST represents the post restatement dummy variable. SOX represent the introduction of the Sarbanes-Oxley accounting regulations. BC represents Business Cycle.

	ALR	LOGTA	REST	SOX	BC
Mean	0.29***	12.93***	0.53***	0.78***	0.32***
Median	0.01	12.92	1.00	1.00	0.00
Maximum	232	19.79	1.00	1.00	1.00
Minimum	0.00	7.05	0.00	0.00	0.00
Std. Dev.	2.58	1.89	0.49	0.41	0.46

*, **, *** denote statistical significance at the 10%, 5%, and 1% levels using a two-tailed test.

Table: 4.4 Correlation Matrices

This Table presents the descriptive statistics for 32341 observations. . ALR is the Amihud's illiquidity (2002). LogTa represents natural logarithm of firm's total assets. REST represents the post restatement dummy variable. SOX represent the introduction of the Sarbanes-Oxley accounting regulations. BC represents Business Cycle.

	ALR	REST	SOX	BC	LOGTA
ALR	1.000				
PR	-0.001	1.000			
PS	-0.025	0.010	1.000		
BC	0.010	-0.018	-0.503	1.000	
LOGTA	-0.157	-0.000	0.0529	-0.116	1.000

¹⁷Since the fall of Enron, many of public companies have revealed their accounting scandals, financial irregularities and financial fraud shocking academicians, practitioners and stock market participants. They restated their quarterly statements in an attempt to restore investors' trust, but the impacts on their stock prices said just the opposite.

Table 4.3 reports the descriptive statistics of data used in the empirical investigation for 6 months before and 6 months after accounting restatements. The average measure of Amihud'illiquidity (2002) was 0.29 with median considerably lower at 0.01. There was huge variation in Amihud'illiquidity (2002) measurement with standard deviation of 2.58. This is mainly due to large variation in size of firms with average at 12.93 and with median of 12.92. Table 4.4 reports the correlation matrix among the variables. As it is evident from Table 4.4 that there is little correlation among the variables.

Table: 4.5 Determinants of Corporate Illiquidity in U.S.

Note: This table represents the results from the regression model:

$$ALR_{it} = \alpha + \beta_1 REST_{it} + \beta_2 SOX_{it} + \beta_3 BC_{it} + \beta_4 LogTA_{it} + \varepsilon_{it}$$

ALR is the Amihud's illiquidity (2002). Amihud's illiquidity (2002) is defined as the absolute value of daily stock return, R, divided by the daily dollar trading volume. REST represents the announcement of accounting errors that firms made in previous years. The variable is a dummy with a value of 1 after accounting restatement and 0 for before accounting restatement. SOX represent the introduction of the Sarbanes-Oxley accounting regulations in 2002 in response to the large number of corporate accounting scandals of previous years. The variable is a dummy with a value of 1 starting in 2002 and 0 for years previous to Sarbanes-Oxley introduction. BC is a dummy variable (1 for expansion and 0 otherwise) with a negative expected sign. It represents Business Cycles in the economy as a whole. LogTA represents natural logarithm of firm's total assets.

Variables	Expected signs	OLS results
Constant	+/-	3.270***
REST	-	-0.008
SOX	-	-0.173***
BC	-	-0.118***
LogTA	-	-0.216***
Adjusted R square		0.025
F statistics		211.09***

*, **, *** denote statistical significance at the 10%, 5%, and 1% levels using a two-tailed test

Table 4.5 reports the results of the cross section regression of determinants of illiquidity (ALR). The restatement dummy variable (1 for post restatement period and 0

otherwise) has a negative impact on illiquidity. But this variable is not statistically significant. On the other hand, SOX dummy (1 for the post SOX and 0 otherwise) has negative impact on illiquidity and statistically significant at 1% level. Similarly BC dummy (1 for expansion and 0 otherwise) also had a negative and statistically significant impact on illiquidity.

4.3 Conclusions:

The empirical results reported in this chapter shows that stock market reacts negatively at accounting restatement before implementation the accounting rules. This pre-regulation abnormal stock return results is consistent with previous research results. FF 3 Factor model supports the first hypothesis that negative abnormal return would be negative (around 4%) in two days around accounting restatements. The study also validates the hypothesis (H2) that enactment of regulations like SOX has a dampening impact on negative abnormal returns. The impacts of accounting restatements on market illiquidity is less clear with no clear pattern emerging. An analysis of determinants of illiquidity found that regulation (SOX) and business cycle had a negative impact on illiquidity.

Chapter V

CONCLUDING OBSERVATIONS

Accounting restatements are an important feature of the corporate landscape in U.S. and elsewhere. Accounting restatements are reporting failures that have a variety of potential causes and effects on markets, organizations, and stakeholders. Poor quality of accounting information can create information asymmetry between buyers and sellers of stocks. In the wake of a series of public corporate accounting scandals (e.g., Enron, WorldCom) policy makers and regulators have called for improved quality of financial reporting and greater transparency. The Sarbanes-Oxley Act of 2002 officially marked the “changing of the tide” with respect to legal and social attitudes toward non-GAAP financial reporting. As evidenced by the continuing rise in the number of financial restatements announced each year in U.S., firms are still responding to this dramatic redefinition of accepted accounting practices.

Though the number of restatements has been declining in recent years after steady growth in post-SOX, a number of questions still remains. Does the post regulation period have any impacts on stock market and market liquidity after accounting restatement? The present study analyzed around 2900 accounting restatements of U.S. that are included in S & P 500 index to investigate their impacts on stock markets and liquidity. Fama French 3 factor model was used to calculate the expected abnormal return for accounting restatements announcements. The pre-regulation abnormal stock return is consistent with previous research findings. The study found average negative abnormal returns of 3.63 percent for the pre-regulation period. In general, the impacts of accounting restatement on

stock market is significant for all event windows. However, in post-regulation period the magnitude of negative abnormal return was moderated to 1.67 percent which was significantly lower than the pre-regulation abnormal return.

This study also analyzed the determinants of liquidity or illiquidity during the pre and post error period, using cross-section least squares method. For this, firm's specific variable (size) and external variables (REST, SOX and BC) was taken. The study found that regulation and business cycle had a negative impact on illiquidity. This was expected as accounting restatement are no necessarily bad if the restated firms restore confidence in reported financial numbers and results in the financial information. Various outcomes of regulations like improved detection of accounting mistakes, better audit quality and the imposition of greater deterrents of intentional accounting manipulation have an collective effect on investors' opinions of the reliability of accounting restatement (Wilson 2008; Bardos 2011; Bardos et al. 2013). However, this study did not find any statistical significance between accounting restatement and illiquidity.

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APPENDIX-3.1

Following paragraph will describe various matrices used in previous literature for measuring liquidity risk:

1. Quoted Spread (QS):

The simplest proxy for illiquidity is the bid-ask spread, which measures the price effect of a zero transaction size buy as compared with a sell. The *quoted spread*, QS , is the average difference between the best ask and the best bid prices:

$$S^Q = \frac{1}{T} \sum_{t=1}^T (A_t - B_t) \quad (3.9)$$

Where,

A_t = Ask prices

B_t = Bid Prices

The quoted spread can be estimated using a sample of $t = 1 \dots T$ bid and ask quotes, for example from intraday data.

The quoted spread has several drawbacks. It may vary over the day (typically U-shaped) and therefore may not be a good measure of actual trading costs. For example, if trading is busiest when the spread is small, the average trading cost incurred will be smaller than a simple calendar-time weighted average of quoted spreads. One solution is to weight the bid-ask quote observations by the duration between quotes or between trades. Another problem is that the quotes may not be binding, or may be valid for small

volumes only. To measure the actual trading costs, measures based on the prices of actual transactions are therefore often preferred.

2. Relative Spread (RS):

The Relative Spread is obtained by dividing bid-ask difference by the quote midpoint (i.e., the average of the bid and ask quote).

$$S^Q = \frac{1}{T} \sum_{t=1}^T \frac{(A_t - B_t)}{(A_t + B_t)/2} \quad (3.10)$$

The Relative Spread (RS) can also be obtained by using the logarithm of the bid and ask price and generally yields similar results. RS measures the implicit cost of trading a small number of shares.

3. Absolute Effective Spread (AES):

The absolute effective spread is given by

$$S^E = \frac{1}{T} \sum_{t=1}^T 2 |P_t - M_t| \quad (3.11)$$

Where,

$$M_t = \frac{A_t + B_t}{2}$$

The effective spread proxies the equilibrium price by the midpoint of bid and ask quotes prevailing at the time of the trade. However, if there is asymmetric information in the market, the trade itself may affect the equilibrium price. An alternative proxy for the equilibrium price is therefore the midpoint of bid and ask quotes after the transaction.

4. Relative effective spread (RES):

Relative effective spread is absolute effective spread divided by mid-point of bid-ask spread.

$$S^E = \frac{\frac{1}{T} \sum_{t=1}^T 2 |P_t - M_t|}{\frac{A_t + B_t}{2}} \quad (3.12)$$

5. Brennan and Subrahmanyam (1996) :

Brennan and Subrahmanyam (1996) suggest measuring illiquidity based on relation between price changes and order flows based on the analysis of Glosten and Harris (1988). The illiquidity is calculated using return square divided by total volume and absolute value of return;

$$R^2 / TV * |R| \quad (3.13)$$

Where

R^2 = square value of daily returns;

TV= Trading Volume; and

$|R|$ = Absolute value of daily return.

Brennan and Subrahmanyam (1996) methodology provide evidence on the relationship between bid-ask spread and stock returns, analyzing the effect of seasonality.

The result provide a positive liquidity premium in January, although not significantly different from zero.

6. French, Schwert and Stambaugh (1987):

Liquidity risk may depend on many variables that are related to asset prices via other models. For example, liquidity risk depends on volatility, but volatility is related to expected returns via traditional risk. French et al. (1987) examined the relation between stock returns and stock market volatility. They measured risk by the volatility of the stock market. French et al. (1987) documented that changes in market volatility are associated with large changes in required returns.

They estimated the variance of the monthly return to the S&P portfolio as the sum of the squared daily returns plus twice the sum of the products of adjacent returns,

$$\sigma^2_{m,t} = \sum_{i=1}^{N_t} (R_{m,t})^2 + 2 \sum_{i=1}^{N_t-1} R_{m,t} R_{m,(t+1)} \quad (3.14)$$

Where,

$\sigma^2_{m,t}$ = monthly variation of stock market returns (like S & P portfolios)

$R_{i,t}$ = Return of the market at time t; and

There are N_t days in the month.

The first term in equation (3.14) is the sum of squared daily returns in the month t. the second term corrects the bias in daily indices due to non-trading of individual securities. This series is not divided by the number of trading days in the month so that it can be understood as a monthly volume.

7. Pastor and Stambaugh (2003)

Pastor and Stambaugh (2003) develop a measure of price impact called Gamma by running the regression:

$$R_{t+1}^e = \theta + \phi R_t + (\text{Gamma}) \text{sign}(R_t^e)(VOL_t) + \varepsilon_t \quad (3.15)$$

Where,

R_t^e is the stock's excess return above the CRSP value-weighted market return on day t ;
and

VOL_t is the dollar volume on day t.

Intuitively, Gamma measures the reverse of the previous days order flow shock. Gamma should have a negative sign. The larger the absolute value of Gamma, then the larger the implied price impact.

8. Amivest liquidity:

This is a measure of price impact.

$$\text{Liquidity} = \text{Average} \left(\frac{VOL_t}{|R_{1t}|} \right) \quad (3.16)$$

The average is calculated for all non-zero return days, since the ratio is undefined for zero-return days. A larger value of Liquidity implies a lower price impact. The Amivest Corporation has developed by liquidity measures related to Amihud (2002) measure and reported in their publication *liquidity Ratio* from 1997 to 2002.

Appendix Table 4.1: Pre-regulation Average Abnormal Returns using Fama-French 3 Factor Model (N=436)

This table presents the average abnormal returns (AARs) using Fama French 3 factor model (1993) pre-regulation period. The following formula is used to generate the abnormal return, where,

$$R_{it} = \alpha + \beta_i R_{mt} + \phi_i SMB_t + \mu_i HML_t + \varepsilon_{it}$$

R_{mt} is the rate of the return of the S&P 500 market index on day t ; SMB_t (Small Minus Big) is the average return on three small market capitalization portfolio minus the average return on three large market-capitalization portfolios; HML_t (High Minus Low) is the average return on two high book-to-market equity portfolios minus the average return on two low book-to-market equity portfolios; ε_{it} is a random variable.

Days	AAR (%)	Percentage negative (%)
-10	-0.37	54.12
-9	0.19	51.14
-8	-0.16	50.00
-7	-0.24	52.52
-6	0.43	47.01
-5	-0.21	52.52
-4	0.17	52.52
-3	-0.73**	57.56
-2	-0.50**	53.44
-1	-0.10	53.21
0	-1.22***	52.98
+1	-2.57***	60.09
+2	-0.24	53.44
+3	0.22	48.16
+4	-0.03	52.29
+5	-0.03	51.60
+6	0.20	52.29
+7	0.04	53.66
+8	-0.49	55.50
+9	-0.77**	56.94
+10	-0.16	50.11

Notes: Abnormal returns are calculated as the market model using S&P 500 index. *, **, *** denote statistical significance at the 10%, 5%, and 1% levels using a two-tailed test.

Appendix Table 4.2: Post-Regulation Average Abnormal Returns using Fama-French 3 Factor Model (N=2396)

This table presents the average abnormal returns (AARs) using Fama French 3 factor model (1993) for post regulation period. The following formula is used to generate the abnormal return, where,

$$R_{it} = \alpha + \beta_i R_{mt} + \varphi_i SMB_t + \mu_i HML_t + \varepsilon_{it}$$

R_{mt} is the rate of the return of the S&P 500 market index on day t ; SMB_t (Small Minus Big) is the average return on three small market capitalization portfolio minus the average return on three large market-capitalization portfolios; HML_t (High Minus Low) is the average return on two high book-to-market equity portfolios minus the average return on two low book-to-market equity portfolios; ε_{it} is a random variable.

Days	AAR (%)	Percentage negative (%)
-10	0.03	52.74
-9	-0.10*	52.74
-8	-0.12	54.95
-7	0.03	52.51
-6	-0.08	51.91
-5	-0.06	52.14
-4	0.02	50.76
-3	-0.09	52.92
-2	-0.06**	53.98
-1	-0.18**	53.98
0	-0.59***	55.78
+1	-0.45***	53.59
+2	-0.02***	51.47
+3	0.04	50.68
+4	0.12	51.91
+5	0.05	51.70
+6	-0.14**	53.11
+7	0.03	52.26
+8	-0.10	52.42
+9	0.04	51.54
+10	0.03**	50.76

Notes: Abnormal returns are calculated as the market model using S&P 500 index. *, **, *** denote statistical significance at the 10%, 5%, and 1% levels using a two-tailed test.