BUSINESS CYCLES AND ACCOUNTING QUALITY

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ABSTRACT

This study tests the accounting quality during booms and bust phases of business cycles along with the impact of financial regulations such as the Regulation of Fair Disclosure (2000) and the Sarbanes Oxley Act (2002). Using a cohort of 677 firms with constant data of 18 years (12186 firm annual years) from US 1500 Index for the period 1993-2010, this study uses more robust econometrics approaches such as Arellano-Bond generalized method of moments (GMM) and system GMM in addition to Panel least square, Fixed Effects, and Random Effects models. This study finds that business cycles affect accounting quality and firms do more earnings management during expansion phases as compared to contraction phases of economic business cycles. Also, this study shows positive impact of the regulations on accounting quality. This study contributes to accounting literature through analysis of accounting quality metric, discretionary accruals based earnings management using more robust econometric technique; the system GMM.
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CHAPTER I

INTRODUCTION

The concept of accounting quality has attracted significant attention of investors, regulators and researchers recently in the wake of major corporate scandals in the United States (US) such as Enron, WorldCom and HealthSouth. In an efficient capital market, stock prices adjust to new information. Information imperfections can impact stock prices and price discovery. The quality of accounting information (or accounting quality) is one such information which can impact stock prices and price discovery. Accounting quality is the precision with which financial reports convey information to investors about the firms expected cash flows (Dechow, Ge and Schrand 2010).

Earnings management is one of the reasons for poor accounting quality. Less earnings management is considered as one of the criteria of better accounting quality. Earnings management is managers' judgment which they use 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” (Healy and Wahlen, 1999, p. 368).

There is no unanimous definition available in accounting literature of what constitutes accounting quality (Verleun et al. 2011). It is also an elusive concept because of multiple uses of financial statements (Chen et al. 2010).
However, the users of accounting information understand the notion of accounting quality, though their perceptions might be different (Eugene, 1988). The main purpose behind the accounting quality is improved reliability; transparency and uniformity of financial reporting process (Waroonkun and Ussawanitchakit, 2011). Consequently, earnings quality can meet the primary objective of financial reporting that provides the useful information to investors, creditors and other users to evaluate the firm's cash flow prospects (Entwistle and Phillips, 2003). In brief, accounting quality is that whether the financial reports reflect the underlying economic situation (Chen et al. 2010). To know the underlying economic situation, accounting quality can be defined in the terms of less earnings management, more timely loss recognition and more value relevance (Lang, Raedy, and Yetman,, 2003, Lang, Raedy, and Wilson, 2006, Barth, Landsman, and Lang, 2008, and Chen et al. 2010).

Higher Accounting quality not only increases investors' confidence in financial reporting but also helps enhance the firm's reputation in the capital market. Capital market participants can make sound decisions on the basis of quality information disseminated by companies' financial statements. Higher accounting quality also helps companies achieve higher level of corporate stability and survival (Waroonkun and Ussahwanitchakit, 2011). Conversely, poor accounting quality is economically expensive and associated with less timely price adjustment and a higher cost of equity (Callen, Khan, and Lu, 2012).
One of the measures to improve accounting quality is the Sarbanes Oxley Act (SOX), passed in US on July 30, 2002. This act introduced the significant legislative changes in financial practices and corporate governance regulations for the further prevention of accounting scandals in US. The SOX directs organizations to improve accuracy and reliability of corporate disclosure and thus protecting the interests of investors. In particular, SOX helps improve corporate governance and deters managers’ opportunistic behavior (Hossain et al. 2011). The other is the Regulation of Fair Disclosure (RFD), passed in 2000. The main aim of RFD was to reduce information differences between individual and market participants and also to prohibit selective disclosure of material information (Bailey et al. 2003; Eleswarapu, Thompson, and Venkataratnam, 2004). These regulations provide auditors a more consistent and precise framework to evaluate the financial statements of firms, which in turn benefit all stakeholders.

Similar efforts are made in the European Union (EU) which passed a regulation in 2002. As of 2005 all publicly listed companies in EU are required to comply with the International Financial Reporting Standards (IFRS) (Soderstorm and Sun, 2007 and Barth, Landsman, and Lang et al. 2008). The International Accounting Standard Board (IASB) and the International Accounting Standard Committee (IASC) have issued principles-based standards and limited accounting alternatives to improve accounting quality. Basically, the main notion is to better reflect a firm’s economic position and performance.
As per existing literature, a few studies have been done in this area to track the impact of these regulations. The main focus is on financial regulations that are supposed to be associated with higher accounting quality. The studies are: an analysis of accounting quality between cross-listed firms on US Exchange and non-cross listed firms (Lang, Ready, and Yetman, 2003), a comparison of accounting quality between International Accounting Standards accepted firms (IAS firms) and Non-International Standards accepted firms (Non-IAS firms) (Barth, Landsman, and Lang., 2008) and a examination of accounting quality before and after Sarbanes Oxley Act (Verleun et al. 2011).

The main aim of financial regulations previously passed is to make sure that financial reports provide fair information on timely basis with its value relevance. Only these regulations cannot improve accounting quality, unless all the factors that motivate firms’ managers to adjust accounting numbers are identified. Researchers find that accounting quality affect the investment-cash flow sensitivities for firms that issue either public or bank debt (Beatty, Liao, and Weber, 2010), stock price, and future stock returns (Callen, Khan, and Lu, 2011). In short, accounting quality influences investors (capital market) and other users. Therefore, it becomes significant to explore all possible factors that can affect the quality of accounting information.

Some of the theories related to earnings management (poor accounting quality) are “Bonus Schemes” (Healy 1985), “Import Relief” (Jones, 1991), “Earnings Surprises” (Rajgopal et al. 2007), and “Initial Public Offerings”. However, there is a further need to identify all other possible reasons that can
lead to lower accounting quality. In the light of these factors, it might be bit easier for regulators to set accounting standards that really can help enhance the accounting quality. One of the undiscovered factors which can affect firms' accounting quality is 'business cycles'. Business cycles include expansion and contraction periods that can be causes of the higher or lower accounting quality. During expansion, economy goes up and, down during contraction period. The following section presents the research objectives.

Research Objectives of Thesis

This study aims to contribute to the existing literature of accounting quality by addressing the following research questions:

1. What are the characteristics of accounting quality?
2. What are the effects of poor/good accounting quality?
3. What are the different metrics used to measure accounting quality?
4. Whether business cycles (expansion and contraction periods) affect the accounting quality or not?

The next section provides a detailed roadmap of the organization of the thesis.

Organization of Thesis

The objective of this study is to reveal the effects of business cycles, expansion and contraction periods on accounting quality in addition to financial regulations; the Regulation of Fair Disclosure (2000) and the Sarbanes Oxley Act (2002). In doing so, the research provides detailed information about the literature related to the concept of accounting quality and research done in this area. The second chapter reviews the literature and
develops hypotheses. Chapter 3 presents the data and methodology used in empirical investigation. Chapter 4 provides empirical results. Finally, chapter 5 presents the conclusions.
CHAPTER II

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

This chapter reviews the literature on accounting quality and states the hypotheses for empirical verification. This chapter is divided into three sections. Section 1 discusses about accounting quality and its characteristics. Section 2 shed light on the effects of accounting quality. Section 3 discusses the accounting quality measures existed in accounting quality literature. Section 4 proceeds with hypotheses building and related literature.

2.1 Accounting Quality and its characteristics

Accounting quality plays an important role in firm's valuation (Gaio and Raposo, 2011). It is not only of interest to users of financial statements but also practitioners, regulators, and academics. Accounting quality is widely discussed in the literature and has economic consequences such as cost of capital (Leuz and Verrecchia, 2000); efficiency of capital allocation (Sun 2006; Bushman, Piotroski, and Smith, 2011) and international capital mobility (Young and Guenther, 2002). The International Accounting Standard Board (IASB) has created a conceptual framework which includes qualitative characteristics of good financial reporting. The elements of conceptual framework consist of timeliness, neutrality and comparability (Francis, Olsson and Schipper, 2006). Good accounting quality is associated with reliability (neutrality) and relevancy (timeliness) of financial statements along with
comparability. Hulzen et al., (2011) also apply these characteristics (except comparability) to examine the effect of the two methods of estimation of goodwill (for e.g. amortization and impairment) on accounting quality.

There is no unanimous definition in literature on what constitutes accounting quality (Schipper and Vincent, 2003; Verleun et al. 2011). Researchers have defined accounting quality as per their research agendas. Waroonkun and Ussahwanitchakit (2011) define accounting quality as the combination of four dimensions: (i) accounting standard compliance, (ii) regulation related accounting practices, (iii) best accounting method concerns (the judgments by managements to select accounting policy), and (iv) public expectation mind set (building of public trust). The presence of these dimensions is supposed to lead to financial report efficiency, information valuables, and accounting performance.

Most studies related to accounting quality relate to its market impacts (Francis, Olsson, and Schipper, 2006; Barth, Landsman, and Lang, 2008; Dechow, Ge and Schrand 2010; Chen, Jiang, and Lin, 2010; and Callen, Khan, and Lu, 2012). Accounting quality is the potential of accounting measures to better reflect the firm’s true economic position and performance (Barth, Landsman, and Lang, 2008). There are several other definitions available in accounting literature. Some of the researchers consider ‘persistent earnings’ as of higher quality earnings, but some others relate higher quality earnings to accurate representation of economic implications of underlying transactions
and events (McNichols, 2002). Consistent with latter, accounting quality is the precision with which financial reports convey information to investors about the firms expected cash flows (Dechow, Ge and Schrand 2010). This definition relates to the capital markets perspective of earnings quality.

Dechow and Dichev (2002) relate earnings quality to 'the magnitude of estimation errors' in accruals. They also define earnings quality as the relationship between accruals and cash flows (McNichols, 2002). Researchers (for e.g. Dechow and Dichev, 2002; McNichols, 2002; Francis et al. 2004, 2005; Kim and Qi, 2010; and Garcia-Terul et al. 2010) associate accruals quality with accounting quality. Large accruals signify low earnings quality and less persistent earnings (Dechow and Dichev, 2002). Dechow and Dichev assume high persistent earnings as higher accounting quality. However, recent research considers it (persistent earnings or earnings smoothing) as lower accounting quality.

One important and related concept of earnings quality is earnings management. Earnings management interests those who are concerned with

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1 'Persistent earnings' is one of the measures of earnings quality and is viewed as more (McNichols, 2002). The notion of estimation errors includes both intentional and unintentional errors (Dechow and Dichev, 2002).
2 Estimation error is the difference between the amount accrued and the amount realized (McNichols, 2002). Accruals accounting is one of two approaches (other is cash based accounting) used to provide economically meaningful information beyond cash transactions (Gibbins, 2007). Under this approach revenues and expenses are recorded when earned and incurred accordingly, regardless cash is received or paid. Estimates, adjustments, judgments are made to make financial statements more meaningful. Researchers calculate accruals by subtracting cash flows from net income (Barth, Landsman, and Lang, 2008). Accruals can be calculated by widely used Jones or Jones modified models for research purposes.
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4 Earnings smoothing is one of the two (other is managing towards a target) forms of earnings management (Barth, Landsman, and Lang, 2008). It is generally defined as the smoothing of reported earnings over time (Ronen and Yaari, 2007, p.317).
5 The terms 'earnings quality' and 'accounting quality' are used interchangeably in accounting literature.
accounting quality (Francis, Olsson and Schipper, 2006). It is considered as a main characteristic of accounting quality. It is a purposeful intervention in external financial reporting process with the intent of obtaining some private gain (Schipper, 1989). Less earnings management evidence higher accounting quality and vice versa. In addition to less earnings management, researchers such as Lang, Raedy, and Yetman (2003); Lang, Raedy, and Wilson (2006); and Barth, Landsman, and Lang, (2008); characterize higher accounting quality in the terms of more timely loss recognition, and higher value relevance of earnings and equity book value.

2.2 Accounting Quality and its effects

Researchers demonstrate the impact of accounting quality on firms’ reputation and their survival level. Similarly, they also exam its impact on stock prices and future stock returns. Better accounting quality can reduce information asymmetry costs and financial constraints (Beatty and Liao, 2010). The weight of empirical evidence points to a statistically significant and economically meaningful association between accounting quality and expected returns (and abnormal returns) i.e. realized returns (Francis, Olsson and Schipper, 2006).

Empirical studies relate higher accounting quality to lower agency cost, lower cost of capital (Bhattacharya, Daouk, and Welker, 2003; 2012; Francis et al. 2004; 2005), and higher investment efficiency (Biddle and Hilary, 2006). Accounting quality also affects debt contracting options (Bharath, Sunder, and Sunder, 2008). Borrowers with poor accounting quality have to depend on
private debt (bank loans). In addition, poor earnings quality lowers the value of corporate cash holdings (Sun, Young, and Rehman, 2012).⁶

Furthermore, accounting quality solve two purposes. First is, higher accounting quality (high quality information) leads to higher quality judgments and decisions. Second, it provides signals to participants who prepare and disseminate information about their performance (Francis, Olsson and Schipper, 2006). In fact, accounting quality (financial reporting quality) concerns with those who use financial reports for investment purposes and for contracting purposes as well as with those who set the financial reporting standards (Schipper and Vincent, 2003). Hence, low quality information results to unintended wealth transfers, capital misallocation, and loopholes in financial standards.

2.3 Accounting Quality Measures

Accounting quality measures can be classified as either accounting based or market based (Francis et al. 2004; Francis, Olsson, and Schipper, 2006).⁷ Accounting based measures use accounting data whereas market based measures base on market data. Accounting based measures assume that 'the function of earnings is to allocate cash flows to reporting periods via accruals whereas 'market based accounting measures assume that the function of earnings is to reflect economic income as represented by stock returns' (Francis, Olsson, and Schipper, 2006).

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⁶ Corporate cash holdings denote to corporate cash reserves. Firms with poor accounting quality would hold more corporate cash with its lower value. For e.g. more cash holdings can create agency problems because excess cash can be easily diverted to managers' private benefits or for their pet projects and investors discount the value of cash holdings on their expectations that how the cash would be used. This increased agency cost can deteriorate firm's value (Sun, Young, and Rehman, 2012).

⁷ Francis, Olsson, and Schipper, 2006 can be referred for more details on accounting quality metrics.
Olsson, and Schipper, 2006). The remainder of this section discusses several measures of accounting quality used in accounting research.

2.3.1 Accruals quality.

This measure is based on the view that how well accruals map into cash flows realizations. Accruals quality is the standard deviation of the residuals from firm specific regressions of working capital accruals on last-year, current, and one-year-ahead cash flows from operations (Dechow and Dichev, 2002). High mean and low-variance firms have good accounting quality and vice versa (Francis, Olsson, and Schipper, 2006).

The firm specific regression is:

\[ \Delta WC_t = b_0 + b_1 CFO_{t-1} + b_2 CFO_t + b_3 CFO_{t+1} + \epsilon_t \]  

(2.1)

\( CFO= \) cash flows from operations;

\( \Delta WC= \) change in working capital;

2.3.2 Abnormal accruals (or Discretionary accruals).

Inverse measure of earnings/accounting quality is abnormal accruals (Francis, Olsson, and Schipper, 2006). Abnormal accruals are not well explained by accounting fundamentals. The abnormal accruals are measured using Jones or modified versions of Jones (1991) model. The most widely used version to compute discretionary accruals is the Modified Jones model by Dechow, Sloan, and Sweeny, (1995). However, the total accruals are estimated

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*Accruals quality, persistence, predictability, and smoothness are accounting data based accounting quality measures. Market based measures are value relevance, timeliness, and conservatism (Francis, Olsson, and Schipper, 2006).

*\( \Delta WC = \) Accounts Receivable + \( \Delta \) Inventory - \( \Delta \)Accounts payable - \( \Delta \)Taxes payable + \( \Delta \) Other assets (net). Refer Dechow and Dichev, 2002 for details.

10 Abnormal accruals captures management's financial reporting decisions (or discretion) (Francis, Olsson, and Schipper, 2006).
using the original equation used by Jones (1991). The following regression is run to obtain residuals in the year \( t \) and for firm \( i \):

\[
TACC_{it} = a_1 \frac{1}{A_{it-1}} + a_2 \Delta REV_{it} + a_3 PPE_{it} + \varepsilon_{it}
\]

(2.2)

Where: \( TACC \) = Total accruals,
\( \Delta REV \) = change in revenues lagged by total assets;
\( \Delta REC \) = change in net receivables lagged by total assets;
\( PPE \) = gross property, plant and equipment lagged by total assets; and
\( a_1, a_2, \) and \( a_3 \) = firm specific parameters.

The abnormal accruals are determined by subtracting non-discretionary (normal) accruals from total accruals. Modified Jones model works to measure nondiscretionary accruals. Modified Jones model calculates the nondiscretionary accruals using the following equation:

\[
NDACC_{it} = a_1 \frac{1}{A_{it-1}} + a_2 (\Delta REV_{it} - \Delta REC_{it}) + a_3 PPE_{it}
\]

(2.3)

\( NDACC \) = nondiscretionary accruals.

2.3.3 Earnings persistence.

This measure captures earnings sustainability (Francis et al. 2004; Francis, Olsson, and Schipper, 2006). Followed by previous research (e.g. Lev 1983; Ali and Zarowin, 1992), Francis et al. 2004 measures earnings persistence as the slope coefficient estimate, \( \theta_{1,j} \), from an autoregressive model of order one (AR1) for annual split-adjusted earnings per share
\( X_{j,t} \) measured as firm \( j \)'s net income before extraordinary items in year \( t \) divided by weighted average number of outstanding shares during year \( t \):\(^{11}\)

\[
X_{j,t} = \phi_{0,j} + \phi_{1,j} X_{j,t-1} + u_{j,t} \quad (2.4)
\]

This equation is typically estimated in time series, firm-by-firm, using maximum likelihood estimation. The resulting estimates of \( \phi_{1,j} \) captures the firm \( j \)'s persistence of earnings. The slope coefficient value close to one implies high persistent earnings and close to zero implies low quality earnings.

2.3.4 Predictability.

This accounting quality measure is based on the view that an earnings number tends to repeat itself is of high quality. This measure is the error variance from equation (2.4) and estimated as:

\[
\text{Predictability} = \sqrt{\sigma^2(\phi)} \quad (2.5)
\]

Large/ small values imply that lower/ higher earnings/accounting quality.

2.3.5 Smoothness.

The main notion behind this measurement is that ‘managers use their private information about future income to smooth out transitory fluctuations and thereby a more representative reported earnings number’. To the extent that current earnings which are more representative of future earnings are of higher quality, smoother earnings indicate higher earnings quality and vice versa.

\(^{11}\) Refer Francis et al. 2004; and Francis, Olsson, and Schipper, 2006 for more details on this measure.
There is no consensus on earnings smoothness as an indicator of good accounting quality. Researchers (for e.g. Leuz, Nanda, and Wysocki, 2003; Lang, Ready, and Yetman, 2003; Ball and Shivkumar, 2005; Lang, Ready, and Wilson, 2006; and Barth, Landsman, and Lang, 2008) assume that firms with more variable earnings are of good quality accounting. That is, less earnings smoothing, more earnings variability, which in turn, leads to better accounting quality. The notion behind is that managers artificially reduce earnings variability as accounting standards/ regulations provide leeway to do so.

Earnings smoothness can be measured in different ways: 1) the ratio of the firm's standard deviation of operating income scaled by assets, to the standard deviation of cash flows from operations scaled by total assets (Leuz et al. 2003); 2) the ratio of firm $j^{th}$ standard deviation of net income before extraordinary items divided by beginning total assets, to its standard deviation of cash flows from operations divided by beginning total assets (Francis et al. 2004).

2.3.6 Earnings variability.

This metric of accounting quality is based on the variability of the change in net income scaled by total assets (Lang, Raedy, and Wilson, 2006; Barth, Landsman, and Lang 2008). A smaller variance of the change in net income is interpreted as evidence of earnings management which in turn is evidence of lower accounting quality (Barth, Landsman, and Lang, 2008). Earnings variability metric is the variance of the residuals from the regression of change in net income on variables identified in prior research as control for
these factors (Barth, Landsman, and Lang, 2008). Higher earnings variability means less earnings smoothing, and better accounting quality. This metric of accounting quality is widely used in the accounting literature (Lang, Raedy, and Yetman, 2003; Lang, Raedy, and Wilson, 2006; Barth, Landsman, and Lang, 2008; Paglietti, 2009).

2.3.7 Value Relevance.

This measure of accounting quality is based on the notion that accounting quality numbers should explain the information that is impounded in returns. Value relevance metric explains the ability of one or more accounting numbers to explain variations in stock returns (Francis, Olsson, and Schipper, 2006). Higher the explanatory power of earnings means higher the variation in returns which results to higher accounting quality. Researchers (such as Lang, Raedy, and Yetman, 2003; Lang, Raedy, and Wilson, 2006; Barth, Landsman, and Lang, 2008; Paglietti, 2009) used this metric for their empirical investigation. The value relevance metric is typically based on explanatory power of regression i.e. adjusted R². Researchers like Collins et al. (1997); Francis and Schipper (1999); and Bushman et al. (2004) run the following regression of returns on the level and change in earnings (Francis, Olsson, and Schipper, 2006):¹²

\[
RET_{j,t} = \delta_{0,j} + \delta_{1,j} EARN_{j,t} + \delta_{2,j} \Delta EARN_{j,t} + \zeta_{j,t} \quad (2.6)
\]

\[ RET_{j,t} = \text{firm } j \text{'th 15 month return ending 3 months after the end of fiscal year } t; \]

¹² Researchers use different regressions to compute the explanatory power for this metric. Research by Lang, Raedy, and Yetman (2003); Lang, Raedy, and Wilson (2006); and Barth, Landsman, and Lang (2008) can also be referred for more details.
$EARN_{j,t} = \text{firm } j^{'th} \text{ income before extraordinary items in year } t$, scaled by market value at end of year $t-1$; and

$\Delta EARN_{j,t} = \text{change in firm } j^{'th} \text{ income before extraordinary items in year } t$, scaled by market value at end of year $t-1$;

2.3.8 Earnings in formativeness/ or earnings response coefficient.

Earnings informativeness (or earnings response coefficient) is measured as the estimated slope coefficient on the level or change in earnings, or some aggregation of the estimated slope coefficients on both the earnings levels and change in earnings from expressions like equation (2.6). The dependent variable can be a long term measure of annual returns or short term market reaction to an event, such as a three-day cumulative abnormal return surrounding an earnings announcement. The slope coefficient on earnings (level or change) indicates the earnings quality (Teoh and Wong, 1993). Teoh and Wang show a positive relation between the credibility of accounting information and the coefficients relating returns to earnings. There are many factors that intervene with the slope coefficient. Researchers control for these other factors in estimating earnings informativeness and posit an intervening variable that causes earnings quality variability. For instance, Teoh and Wong (1993) posit audit by big eight auditors as an intervening variable and test for incrementally positive slope coefficient for firms with better earnings quality based on the intervening variable. They found that firms with big 8 auditors have better earnings quality and in turn greater earnings informativeness as compared to firms with non-big eight auditors.

2.3.9 Earnings opacity.
Earnings opacity is 'the extent to which the distribution of reported earnings of firms fails to present information about true distribution of (unobservable) economic earnings of firms' (Bhattacharya, Daouk, and Welker, 2003). Bhattacharya, Daouk, and Welker (2003) use earnings aggressiveness, loss avoidance, and earnings smoothing as proxies for earnings opacity. These proxies as well as earnings opacity itself can be viewed as measures of accounting quality (Francis, Olsson, and Schipper, 2006).

Earnings aggressiveness is measured as total accruals scaled by lagged total assets. Larger fractions of accruals are being more aggressive and vice versa. Loss avoidance is measured as the ratio of the percentage of firms reporting small positive earnings (i.e. ratio of net income to total assets between 0% and 1%) to the percentage of firms reporting small negative earnings (i.e. ratios of net income to total assets between -1% and 0%). The higher is this ratio (that is, the more likely are small positive earnings relative to small negative earnings), the greater is loss avoidance. Finally earnings smoothing is measured as the correlation between accruals and cash flows, both scaled by total assets.

2.3.10 Timelines

This measure is quite similar to value relevance. Timeliness captures the ability of earnings to reflect good news and bad news that is impounded in returns, and is measured as the explanatory power of regression of earnings on returns. The use of timeliness as a measure of earnings quality is based on the same presumption that supports value relevance as an earnings quality
measure. The measure of timeliness is adjusted $R^2$ from the under mentioned equation (2.7) (Ball et al., 2000 as cited in Francis, Olsson, and Schipper, 2006). Smaller values of timeliness imply less timely (i.e. lower quality) earnings. Equation (2.7) is typically estimated on a firm specific basis in time series.

$EARN_{jt} = \alpha_{0,j} + \alpha_{1,j}NEG_{j,t} + \beta_{1,j}RET_{j,t} + \beta_{2,j}NEG_{j,t}.RET_{j,t} + \gamma_{j,t}$  \hspace{1cm} (2.7)

$NEG_{j,t}= 1$ if $RET_{j,t}< 0$ and 0 otherwise.\(^\text{13}\)

2.3.11 Conservatism (or timely loss recognition)

Conservatism is defined as the differential ability of accounting earnings to reflect economic losses (measured as negative stock returns) versus economic gains (measured as positive stock returns) (Ball et al., 2000). Following Basu (1997), Ball et al. (2000) measure conservatism as the ratio of the slope coefficients on positive returns in a reverse regression of earnings on returns as in equation (2.7) (Francis, Olsson, and Schipper, 2006). Timely loss recognition is also another measure same as conservatism. However, it is measured by using proxy ‘large negative earnings’. The notion behind this metric is that firms who recognize large losses as they occur without deferring them to future periods are of higher accounting quality (Lang, Ready, and Yetman, 2003; Leuz, Nanda, and Wysocki, 2003; Lang, Ready, and Wilson, 2006; Barth, landsman, and Lang, 2008). That is, a higher frequency of large losses is assumed as higher quality earnings.

2.3.12 Managing toward Positive Earnings

\(^{13}\) Other variables are defined in equation 2.6.
The frequency of small positive net income is used as a proxy for this metric. The underlying notion for this metric is that managers prefer to report small positive net income rather than negative net income (Barth, landsman, and Lang, 2008). Firms with the higher frequency of small positive net income are assumed as of lower accounting quality and vice versa.

2.3.13 e-loadings

This is return based measure of accounting quality. ‘The e-loading is the slope coefficient from a regression of excess returns on a factor mimicking portfolio that captures earnings quality (AQfactor), controlling for other factors known to effect returns (market risk premium, size, and book-to-market ratio)’.

The calculation of AQfactor follows the Fama-French procedures for calculating factor-mimicking portfolios. Larger e-loading values (slope coefficients) imply to poor earnings quality and vice versa. The e-loading is the coefficient estimate for AQfactor obtained from the following asset pricing regressions (Ecker et al., 2006):

\[ 1 - \text{factor: } R_{j,t} - R_{F,t} = \alpha_{j,T}^{1f} + \beta_{j,T}^{1f}(R_{M,t} - R_{F,t}) + e_{j,T}^{1f}AQfactor_t + \epsilon_{j,t}^{1f} \] (2.8)

\[ 3 - \text{factor: } R_{j,t} - R_{F,t} = \alpha_{j,T}^{3f} + \beta_{j,T}^{3f}(R_{M,t} - R_{F,t}) + s_{j,T}^{3f}SMB_t + h_{j,T}^{3f}HML_t + e_{j,T}^{3f}AQfactor_t + \epsilon_{j,t}^{3f} \] (2.9)

These equations can be measured using daily, weekly or monthly returns as per research design choice. Ecker et al, (2006) ‘create an accounting-based measure of accruals quality AQj,t, using a restricted sample of firms with seven

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14 The explanation of exact procedure can be found in paper ‘A Returns-Based Representation of Earnings Quality’ by Ecker et al. (2006).
years of accounting data, convert \( AQ \) to a time-specific returns representation \((AQ_{factor})\) (see, Ecker et al., 2006, p.757).

Assuming use of daily returns, \( t \) = index for a trading day in year \( T \); \( R_{j,t} \) = firm \( j \)'s return on day \( t \); \( R_{F,t} \) = the risk free rate on day \( t \); \( R_{M,t} \) = the market return on the day \( t \); \( SMB_t \) = Fama-French small-minus-big factor on day \( t \); \( HML_t \) = Fama-French high-minus-low book to market factor on day \( t \).

For the 1-factor and 3-factor specification, \( e_{j,t}^{1f} \) and \( e_{j,t}^{3f} \) are the estimates of firm's \( j \)'s sensitivity to poor earnings quality in year \( T \) and is return based representation of earnings quality. The other slope coefficients, \( \beta_{j,t}^{1f} \) and \( \beta_{j,t}^{3f} \) as well as \( s_{j,t}^{3f} \) and \( h_{j,t}^{3f} \) capture the firm’s exposure to return-based representations of market risk, size, and book to market value respectively in year 1.

2.4 Hypotheses development

**Accounting Quality and Business Cycles**

An interesting aspect of research in the area of accounting quality is its behavior during different phases of business cycles – does accounting quality improve/ deteriorate during expansion/ contraction period.\(^{15}\) There are a few studies which associate accounting quality with economic conditions (for e.g. Makar, Alam, and Pearson 1996; Makar and Alam 1998; Johnson, 1999; Cohen and Zarowin, 2007; and Jenkins, Kane and Velury, 2009).

\(^{15}\) Business cycles normally include two periods: expansion and contraction. US National Bureau of Economic Research (NBER) defines an expansion as a rise in economic activity, lasting for years and contraction as a significant decline in economic activity spreads across the economy and lasting more than a few months to more than a year, visible in GDP, real income, employment, industrial production, and wholesale-retail sales.
Qinglu (2005) shows managers' engagement in earnings management at different stages of business cycles. This study points that accounting information reflects not only firm-specific characteristics, but also general macroeconomic conditions; therefore, accounting quality may vary across business cycles (Cohen and Zarowin, 2007 and Jenkins, Kane, and Velury, 2009). Thus, motivations exist to tamper with accounting numbers during these economic ups and downs.

Given the fact that business cycles significantly affect the economy, the rise or decline in economic activity also affects the ability of firms to manage earnings (Johnson, 1999; Cohen and Zarowin, 2007; and Jenkins, Kane and Velury, 2009).

In periods of economic expansion, peer pressure to perform well can motivate managers to adjust earnings opportunistically. Also, stock prices react more strongly to bad news in good times compared to good news in bad times. Supporting this, Conrad, Cornell, and Landsman (2002) and Cohen and Zarowin (2007) findings suggest that market penalty for negative unexpected earnings is higher in good times and firms manage earnings more in the up markets to avoid this higher penalty. Under the aforementioned conditions and consistent with Cohen and Zarowin, 2007; and Jenkins, Kane and Velury, 2009, it is hypothesized that:

H1: Higher/lower accounting quality during contraction/expansion period.

Earnings Management and Business Cycles
Cohen and Zarowin, 2007 focus on earnings management as a measure of accounting quality over business cycles. While earnings management has been studied extensively, virtually all studies have focused on firm specific effects. Not only firm specific effects, economic conditions also motivate the earnings management practice (Cohen and Zarowin, 2007).

There are main two reasons for earnings management during expansion period. First, bad news in good times has negative stock price impact (Cohen, Cornell and Landsman, 2002). Investors react more adversely to earnings disappointments during good times. Second, relative performance evaluation of managers makes them to manage earnings upward during good times (Cohen and Zarowin, 2007). Managers will be penalized by the capital markets, if they fail to meet expectations. Thus, there are incentives to boost earnings in the expansion period compared to the contraction period.

Based on extant literature on earnings management and business cycles, researchers state investors confidence is up in up markets and additional good news does not influence their beliefs (Conrad et al., 2002 and Cohen and Zarowin, 2007). However, adverse news in up markets definitely affects their beliefs negatively. Under, abovementioned conditions, it is hypothesized:

H2: More earnings management in the expansion period and less in contraction period.

Timely Loss Recognition and Business Cycles

Researchers (for e.g. Johnson, 1999 and Jenkins, Kane and Velury, 2009) document that the relationship between stock returns and earnings is sensitive to business cycles. There may be a possibility of inconsistent
application of accounting principles during different phases of business cycles and financial reporting may be more aggressive during the periods of economic growth. Also, managers, auditors, and investors as well are motivated to report more 'conservative earnings' during contraction period (Jenkins, Kane and Velury, 2009). The reasons are mentioned below:

First is the increased litigation risk in the period of economic decline (Jenkins, Kane and Velury, 2009). So, reporting conservative numbers is the one way to reduce this risk (Watts, 1993 summarized in Jenkins, Kane, and Velury, 2009). Quicker availability of bad news (or conservatism) to all parties enhances the contracting efficiency and reduces the shareholders litigation (Watts, 2003; Ball and Shivakumar, 2005; Lara et al., 2009; and Jenkins, Kane, and Velury, 2009). The second reason is investors demand for conservative earnings to get timely signals “for investigating the existence of negative net present value projects” (Jenkins, Kane, and Velury, 2009, p. 1042). Normally, firms prefer internal sources of funding to external sources, debt over equity financing (Myers, 1984). Conversely, they prefer external funding during contraction period. Therefore, the third reason is preference for external financing and for this purpose, more conservative accounting (or timely loss

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16 Traditional definition of conservatism is “anticipate no profit, but anticipate all losses (Bliss, 1924 summarized in Watts, 2003, p. 208). Accounting literature describes two types of conservatism: unconditional and conditional. Unconditional conservatism means “the reporting of conservative accounting numbers not conditioned on the economic reality”. For e.g. if an asset’s cost is depreciated for five years instead of ten years is likely to lower the current earnings. On the other hand, conditional conservatism means to report “the accounting numbers conditional on the firm experiencing contemporaneous economic loss” (Jenkins, Kane, and Velury, 2009, p. 1044). This definition is unbiased and captures the timely recognition of economic loss. Therefore, the term conservatism refers to conditional conservatism (timely loss recognition) that can "enhance contracting efficiency" (Ball and Shivkumar, 2005, p. 91).
recognition) would be demanded during recession “to reduce the information costs associated with asymmetric information on the part of managers and new outside stakeholders” (Jenkins, Kane, and Velury, 2009). Under the above-mentioned conditions and consistent with Jenkins, Kane and Velury (2009), it is hypothesized:

H3: Firms recognize more frequently timely large losses in contraction period.

Accounting Quality and Regulations

One of the two measures to improve accounting quality is the Sarbanes Oxley Act (SOX), passed in US on July 30, 2002. This act introduced the significant legislative changes in financial practices and corporate governance regulations for the further prevention of accounting scandals in US. The SOX directs organizations to improve accuracy and reliability of corporate disclosure and thus protecting the interests of investors. In particular, SOX helps improve corporate governance and deters managers’ opportunistic behavior (Hossain et al. 2011). It is also cheaper to comply with SOX than to deal with restatements (Linn and Diehl, 2005). Lobo and Zhou (2006) and Verleun et al., (2011), also find significant reduction in discretionary accruals in the post-SOX period relative to pre-SOX period. The other is the Regulation of Fair Disclosure (RFD) passed in 2000. The main aim of RFD was to reduce information differences between individual and market participants and also to prohibit selective disclosure of material information (Bailey et al. 2003; Eleswarapu, Thompson, and Venkataratnan, 2004). Therefore, the impact of these regulations cannot be ignored. Therefore, it is hypothesized:
H4: Higher accounting quality after the passage of regulations and vice versa.
CHAPTER III

DATA AND METHODOLOGY

This chapter discusses the database and methodology used in the study. This chapter is divided into two sections. Section 1 discusses the database used in the study. Section 2 presents the methodology used in the empirical investigation.

3.1 Database

The focus of the present study is non-financial and non-government enterprises in the United States. In order to capture the overall picture of United States corporate sector, the investigation started with all publicly listed companies in the S&P 1500 index in 2010. For these S&P 1500 companies, we collected financial and related data for the period 1980-2010. Data was collected from database indices DataStream, Capital IQ and National Bureau of Economic Research (NBER). The details of variables collected/used for this study with their sources and notations are described in Appendix tables 3.1 and 3.2.

Data set for this study consists of 677 firms out of total S&P 1500 firms from 1993-2010. Our endeavor was to complete balanced panel data set for the periods 1993-2010, we were successful to comply with the constant data for 677 firms for the period 1993-2010. This data set of firms is more than one-third (45%) of total S&P 1500 firms after excluding financial institutions (with SIC Code 6000-6999). Financial institutions were excluded because of their
different dynamics in earnings management as opposed to non-financial firms (McNichols and Wilson, 1988).

The period from 1993-2010 was chosen for the empirical investigation so as to cover pre-REG and post-REG years and to see the impact of these regulations on earnings management in addition to the impact of business cycles on earnings management.

3.2 Methodology

3.2.1 US Business Cycles: Expansions and Contractions

National Bureau of Economic Research (NBER) does not define a recession in terms of two consecutive quarters of decline in real GDP. Rather, a recession is defined as “a significant decline in economic activity spread across the economy, lasting more than a few months, normally visible in real GDP, real income, employment, industrial production, and wholesale-retail sales” (NBER). NBER is a business cycle dating committee and maintains a chronology of the US business cycle17. Furthermore, contractions start at the peak of a business cycle and end at the trough (NBER). That is, contraction period includes all quarters starting from the peak and ending to the trough period. As the data for this study is annual, the data of business cycles are converted to yearly data using the extension of periods. For the purpose, if any one quarter (at least three months) of the year comes under NBER business cycle reference dates, that year is considered as a recession year because even

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17 The chronology comprises dates of peaks and troughs in economic activity.
if there is only one quarter of recession, the impact of this recessionary quarter cannot be ignored on company’s financial statements.

3.2.2. Selection criterion for contraction years

NBER announces contractions (recessions) dates on a quarterly basis. Business cycles reference dates announced from the NBER’s Business Cycle Dating Committee are:

Table 3.1: Business Cycles Reference Dates

<table>
<thead>
<tr>
<th>Peak</th>
<th>Trough</th>
<th>Contraction Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 1980(I)</td>
<td>July 1980(III)</td>
<td>6</td>
</tr>
<tr>
<td>July 1981(III)</td>
<td>November 1982(IV)</td>
<td>16</td>
</tr>
<tr>
<td>July 1990(III)</td>
<td>March 1991(I)</td>
<td>8</td>
</tr>
<tr>
<td>March 2001(I)</td>
<td>November 2001(IV)</td>
<td>8</td>
</tr>
<tr>
<td>December 2007(IV)</td>
<td>June 2009(II)</td>
<td>18</td>
</tr>
</tbody>
</table>

*Note: Quarterly dates are in parentheses. Contraction means peak to trough and the duration is in months. Source: NBER*

For the year of 1980, the recession started in the first quarter (January 1980) and ended in third quarter (July 1980). This period includes six months or two quarters. For the year of 1981, it began in third quarter (July 1981) and continued till the fourth quarter of this year (December 1981), that is, the duration of recession was six month or two quarters. The recession started in 1981 ended in the fourth quarter of 1982 (November 1982) and it includes near about four quarters of this year. Similarly, for the years of 1990 and 1991, recession started in July 1990, the third quarter and ended in March 1991, the first quarter. The duration of recession was two quarters and one quarter for the

18 Refer www.nber.org/
years of 1990 and 1991 respectively. Furthermore, the recession began in the first quarter of 2001 (March 2001) and ended in the fourth quarter (November 2001), that is, the contraction period continued for consecutive eight months or near about three quarters. After that NBER announced December 2007, the fourth quarter as a peak period. As it was the last month of the year, 2007, it does not fulfill the criterion of at least of one quarter of recession for this particular year, therefore, this year was considered as an expansion year. Recession that began in December 2007 continued till June 2009, the second quarter. The duration of recession was four quarters and two quarters for the years of 2008 and 2009 respectively.

Table 3.2: NBER Annual Business Cycles Classification

<table>
<thead>
<tr>
<th>Years</th>
<th>Business Cycle Classification</th>
</tr>
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<tbody>
<tr>
<td>1993</td>
<td>Expansion</td>
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<tr>
<td>1994</td>
<td>Expansion</td>
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<td>Expansion</td>
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<tr>
<td>2000</td>
<td>Expansion</td>
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<tr>
<td>2001</td>
<td>Contraction</td>
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<tr>
<td>2002</td>
<td>Expansion</td>
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<tr>
<td>2003</td>
<td>Expansion</td>
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<td>2004</td>
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<td>2006</td>
<td>Expansion</td>
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<tr>
<td>2007</td>
<td>Expansion</td>
</tr>
<tr>
<td>2008</td>
<td>Contraction</td>
</tr>
<tr>
<td>2009</td>
<td>Contraction</td>
</tr>
<tr>
<td>2010</td>
<td>Contraction</td>
</tr>
</tbody>
</table>

Note: if any one quarter (at least three months) of the year comes under NBER business cycle reference dates, that year is considered as a recession year because even if there is only one quarter of recession, it can affect company’s financial statements. Source: NBER
3.2.3 Accounting Quality Metrics

In order to test the research hypotheses and coherent with prior research, two accounting quality metrics based on accounting data were used: earning management, and timely loss recognition (Lang, Raedy, and Yetman, 2003; Lang, Raedy, and Wilson, 2006; Barth, Landsman, and Lang, 2008; Paglietti, 2009).19

Earnings Management

There are two methods to detect earning management; accruals based and earnings based (Verleun et al. 2011). The most widely used models are accrual based and discretionary accruals are used as a proxy for earnings management. We used both methods to measure earnings management more precisely to get profound results.

Five earnings management proxies were used such as: ‘discretionary accruals’ [DACC], ‘variance of the change in net income [σ (ΔNI)], ‘ratio of the variance of the change in net income to the variance of the change in cash flows [σ (ΔNI)/ σ (ΔCF)], correlation between accruals and cash flows [ρ (ACC, CF)], and ‘frequency of small positive net income’ [SPOS]. 20

(a) Discretionary Accruals (DACC)

Discretionary accruals model is often used as a proxy for earnings management to analyze and identify earnings management practice (Dechow, Sloan, and Sweeny, 1995; Kothari, Leone, and Wasley, 2005) as managers use

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19 Results related to ‘timely loss recognition’ metric and other proxies for earnings management in addition to discretionary accruals are reported in appendix tables 4.1 and 4.2.

20 Earnings management proxies such as σ (ΔNI), σ (ΔNI)/ σ (ΔCF), ρ (ACC, CF), and SPOS are best described in Barth, Landsman, and Lang, 2008)
their discretion on these accruals. The equation regressed to observe the impact of determinants of discretionary accruals was of the following form:

\[ DACC_{it} = \beta_0 + \beta_1 SIZE_{it} + \beta_2 ROA_{it} + \beta_3 LEV_{it} + \beta_4 BC_{it} + \beta_5 REG_{it} + \epsilon_{it} \]  

(3.1)

Where, \( \beta_1 < 0, \beta_2 > 0, \beta_3 > 0, \beta_4 > 0, \) and \( \beta_5 < 0 \)

Where for the firm \( i \) and year \( t \),
\( SIZE = \log \) of end of the year assets;
\( ROA = \) return on assets;
\( LEV = \) total liabilities divided by total assets;
\( BC = \) dummy variable, 1 for expansion period and 0 for contraction period; and
\( REG = \) Dummy variable, 1 for RFD or SOX and 0 otherwise.\(^{21}\)

As per extant literature, Modified Jones model is widely used to measure discretionary accruals (Subramanyam, 1996; Rangan, 1998; Teoh, Wong, and Rao, 1998). The main property of standard Jones model (1991) and Modified Jones model (1995) is that they decompose the total accruals into discretionary and non-discretionary accruals. These models relax the assumption of previous models (such as Healy and DeAngelo) that non-discretionary accruals are constant and mitigate the misspecification of total accruals as discretionary accruals. Modified Jones model overcomes the limitation of standard Jones model (1991) that assumes that revenues are non-discretionary. Also major accounting scandals (for e.g. Enron and WorldCom) disprove this assumption as revenues were inflated to show the companies’ financial health. Modified Jones model captures the sales/revenue based earnings manipulation and takes into account that all credit sales in the event period result from earnings management. Kothari, Leone, and Wasley (2005) criticize the Modified Jones model as revenues are not always the case for

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\(^{21}\)RFD denotes to the Regulation of Fair Disclosure passed in 2000. SOX denotes to the Sarbanes Oxley Act passed in 2002.
accruals manipulation and augment the model with addition of the variable, return on assets (\textit{ROA}) for period's $t$ and $t+1$. Also the Modified Jones model suffers from severe misspecification in stratified random samples. However, they also admit that their model does have its own misspecification problems. Furthermore, among the five models such as Healy (1985), DeAngelo (1986), Jones (1991), Modified Jones (1995), and Industry model (1991), Dechow, Sloan, and Sweeny (1995) found that the Modified Jones model exhibits the most power in detecting earnings management. Therefore, this model was used to measure discretionary accruals. For the measurement of discretionary accruals, total accruals ($TACC$) and non-discretionary accruals are required. Total accruals were calculated using the following model (Dechow et al. 1995).

\[
TACC_{it} = \frac{\Delta CA_{it} - \Delta CL_{it} - \Delta Cash_{it} + \Delta STD_{it} - Dep_{it}}{A_{it-1}}
\] (3.2)

Where for the firm $i$ and year $t$,
- $TACC = \text{Total accruals}$,
- $\Delta CA = \text{change in current assets}$
- $\Delta CL = \text{change in current liabilities}$
- $\Delta Cash = \text{change in cash and cash equivalents}$
- $\Delta STD = \text{change in debt included in current liabilities}$
- $Dep = \text{depreciation and amortization expense}$
- $A = \text{Total Assets}$

Total accruals consist of both discretionary accruals and nondiscretionary accruals. That is, the equation (3.3) was used:

\[
TACC_{it} = DACC_{it} + NDACC_{it}
\] (3.3)

Where for the firm $i$ and year $t$,
- $DACC = \text{discretionary accruals}$ and,
- $NDACC = \text{nondiscretionary accruals}$
Modified Jones model works to measure nondiscretionary accruals. Modified Jones model calculates the nondiscretionary accruals using equation (3.4).

\[ NDACC_{it} = \alpha_1 \frac{1}{A_{it-1}} + \alpha_2 (\Delta REV_{it} - \Delta REC_{it}) + \alpha_3 PPE_{it} \quad (3.4) \]

Where for the firm \( i \) and year \( t \),
\( \Delta REV \) = change in revenues scaled by total assets;
\( \Delta REC \) = change in net receivables scaled by total assets;
\( PPE \) = gross property, plant and equipment scaled by total assets; and
\( \alpha_1, \alpha_2, \) and \( \alpha_3 \) = firm specific parameters.

Estimates of the firm specific parameters, \( \alpha_1, \alpha_2, \) and \( \alpha_3 \) are generated using the equation (3.5) in the estimation period. Thus, the model is:

\[ TACC_{it} = \alpha_1 \frac{1}{A_{it-1}} + \alpha_2 \Delta REV_{it} + \alpha_3 PPE_{it} + \epsilon_{it} \quad (3.5) \]

\( \alpha_1, \alpha_2, \) and \( \alpha_3 \) denote the OLS estimates of \( \alpha_1, \alpha_2, \) and \( \alpha_3 \). The estimates of \( \alpha_1, \alpha_2, \) and \( \alpha_3 \) are those obtained from the original Jones Model. The only adjustment relative to the original model Jones Model is that the change in revenues is adjusted for the change in receivables in the event period to determine non-discretionary accruals.

After the total accruals and nondiscretionary accruals calculated, the final step was to measure discretionary accruals using equation (3.6):

\[ DACC_{it} = TACC_{it} - NDACC_{it} \quad (3.6) \]

The study adopts a dynamic-panel estimation framework as it captures dynamics of business cycles, the Regulation of Fair Disclosure and the Sarbanes Oxley Act on discretionary accruals. In term of empirical methodology frameworks, we present estimates based on panel least square, fixed effects model, random effects model, and generalized method of
moments (GMM). The GMM is the robust estimator and does not require
about the exact distribution of the data generating process. The GMM
empirical work is presented in two varieties: differenced-GMM from Arellano
and Bond (1991) and system-GMM estimator from Blundell and Bond (1998,
2000). The differenced-GMM derives the coefficients from moment
restrictions on the co-variances between the regressors and the error term. The
differenced-GMM controls for endogeneity but the estimate is subject to a
large downward finite sample bias particularly when the number of time series
observations is small, as lagged level of variables are only weak instruments
for subsequent differences. The system-GMM estimator uses in addition to
lagged levels, also lagged first differences as instruments for equations in
levels. By adding the original equation in levels, Blundell and Bond (1998,
2000) argued that the system-GMM estimator performs good predictors for the
endogenous variables in the model even when the series is very persistent.

(b) Variance of the Change in Net Income: $\sigma (\Delta NI)$

Another metric of accounting quality is based on the variability of the
change in net income scaled by total assets (Lang, Raedy, and Wilson, 2006;
Barth, Landsman, and Lang 2008). A smaller variance of the change in net
income is interpreted as evidence of earnings management which in turn is
evidence of lower accounting quality (Barth, Landsman, and Lang, 2008). Earnings variablility metric is the variance of the residuals from the regression
of change in net income on variables identified in prior research as control for
these factors (Barth, Landsman, and Lang, 2008).
\[ \Delta NI_{it} = \beta_0 + \beta_1 SIZE_{it} + \beta_1 GROWTH_{it} + \beta_3 EISSUE_{it} + \beta_4 LEV_{it} + \beta_5 DISSUE_{it} + \beta_6 TURN_{it} + \beta_7 CF_{it} + \beta_8 AUD_{it} + \epsilon_{it} \] (3.7)

Where, for the firm \( i \) and year \( t \):

- \( NI \) = earnings before interest and taxes;
- \( SIZE \) = the natural logarithm of the end of year assets;
- \( GROWTH \) = percentage change in sales/revenues;
- \( EISSUE \) = percentage change in equity;
- \( LEV \) = end of year total liabilities divided by end of year equity book value;
- \( DISSUE \) = percentage change in total liabilities;
- \( TURN \) = sales divided by end of year total assets;
- \( CF \) = annual net cash flow from operating activities divided by end of year total assets;
- \( AUD \) = an indicator variable that equals one if the firm’s auditor is PwC, KPMG, E&Y, and D&T, and zero otherwise.

Relevant observations were pooled to estimate equation (3.7) for the comparison between expansion and contraction periods. For the comparison, the \( \sigma(\Delta NI) \) is the variance of the residuals from equation (3.7). Equation (3.7) helps compute the difference in the \( \sigma(\Delta NI) \) between expansion and contraction period.

(c) The ratio of the variance of the change in net income to the ratio of the variance of the change in cash flows: \( \sigma(\Delta NI)/\sigma(\Delta CF) \)

This metric is based on the ratio of the variance of the change in net income, \( \sigma(\Delta NI) \), to the variance of the change in operating cash flows, \( \sigma(\Delta CF) \). Volatile cash flows typically lead to more volatile net income, and the use of accruals should result to lesser \( \sigma(\Delta NI) \) than \( \sigma(\Delta CF) \) (Barth, Landsman, and Lang, 2008). Also, \( \Delta NI \) and \( \Delta CF \) is likely to be sensitive to a variety of factors un-attributable to the financial reporting system. Thus, equation (9) is similar as equation (8) with \( \Delta CF \) as the dependent variable:

\[ \Delta CF_{it} = \beta_0 + \beta_1 SIZE_{it} + \beta_1 GROWTH_{it} + \beta_3 EISSUE_{it} + \beta_4 LEV_{it} + \beta_5 DISSUE_{it} + \beta_6 TURN_{it} + \beta_7 CF_{it} + \beta_8 AUD_{it} + \epsilon_{it} \] (3.8)
As similar to equation (3.7), relevant observations were pooled for the particular comparison. The $\sigma \Delta CF$ is the variance of group of residuals from equation (3.8). This metric of earnings management tests the difference of the variance ratio, $(\sigma NI) / \sigma (\Delta CF)$ between expansion and contraction period.

(d) Correlation between Accruals and Cash Flows: $\rho (ACC, CF)$

This metric shows the spearman correlation between accruals and cash flows, $\rho (ACC, CF)$. This metric compares correlation of residuals from equations (3.9) and (3.10), rather than direct correlation between $AC$ and $CF$.

Accruals ($ACC$) are calculated using equation (3.2) (Dechow et al., 1995). Both $ACC$ and $CF$ are regressed on the control variables excluding $CF$:

$$ACC_{it} = \beta_0 + \beta_1 SIZE_{it} + \beta_2 GROWTH_{it} + \beta_3 EISSUE_{it} + \beta_4 LEV_{it} + \beta_5 DISSUE_{it} + \beta_6 TURN_{it} + \beta_7 AUD_{it} + \epsilon_{it}$$  \hspace{1cm} (3.9)

$$CF_{it} = \beta_0 + \beta_1 SIZE_{it} + \beta_2 GROWTH_{it} + \beta_3 EISSUE_{it} + \beta_4 LEV_{it} + \beta_5 DISSUE_{it} + \beta_6 TURN_{it} + \beta_7 AUD_{it} + \epsilon_{it}$$  \hspace{1cm} (3.10)

This metric compares the $\rho (ACC, CF)$ between expansion and contraction period. Less negative correlation between $ACC$ and $CF$ means less earnings management or higher accounting quality.

(e) Small Positive Net Income ($SPOS$)

This metric for managing towards positive earnings is the coefficient on small positive net income, $SPOS$, in the regressions given by equation (3.11). $SPOS$ is an indicator variable that equals one if net income scaled by total assets is between 0 and 0.01 (Lang, Raedy, and Yetman, 2003; Barth,
Landsman, and Lang, 2008). Equation (3.11) estimates \( SPOS \) of firms in the expansion and contraction periods by pooling observations for all periods.\(^{22}\)

\[
BC(0, 1)_{it} = \beta_0 + \beta_1 SPOS_{it} + \beta_2 SIZE_{it} + \beta_3 GROWTH_{it} + \beta_4 EISSUE_{it} + \beta_5 LEV_{it} + \beta_6 DISSUE_{it} + \beta_7 TURN_{it} + \beta_8 CF_{it} + \beta_9 AUD_{it} + \varepsilon_{it} \tag{3.11}
\]

\( BC(0, 1) \) is also an indicator variable that equals one for observations in the expansion period and zero otherwise. A positive coefficient on \( SPOS \) indicates that firms manage earnings toward small positive amounts more frequently in the expansion period than they do in the contraction period.

**Timely Loss Recognition**

The proxy used for timely loss recognition, a characteristic of accounting quality is large negative net income (\( LNEG \)).\(^{23}\) This is one of the test variable in the regression equation (3.12). \( LNEG \) is an indicator variable that equals one for observations for which annual net income scaled by total assets is less than -0.20, and zero otherwise (Barth, Landsman, and Lang, 2008). For the comparison of firms in the expansion and contraction periods, observations were pooled for all periods to estimate equation (3.12).

\[
BC(0, 1)_{it} = \beta_0 + \beta_1 LNEG_{it} + \beta_2 SIZE_{it} + \beta_3 GROWTH_{it} + \beta_4 EISSUE_{it} + \beta_5 LEV_{it} + \beta_6 DISSUE_{it} + \beta_7 TURN_{it} + \beta_8 CF_{it} + \beta_9 AUD_{it} + \varepsilon_{it} \tag{3.12}
\]

A negative coefficient on \( LNEG \) indicates that firms recognize large losses more frequently in the contraction period as compared to expansion period.

\[^{22}\text{Following Lang, Ready, and Wilson (2006); and Barth, Landsman, and Lang, (2008), in the analysis of SPOS and LNEG, results are reported from ordinary least squares rather than from logit/probit estimation because Green (1993) reports that logit models are extremely sensitive to the effects of heteroscedascity.}\]

\[^{23}\text{Barth, Landsman, and Lang (2008) can also be referred for this metric.}\]
CHAPTER IV

EMPIRICAL RESULTS-EARNINGS MANAGEMENT IN US-1993-2010

This chapter presents empirical results of accounting quality of US firms during 1993-2010. This chapter is divided into three sections. The first section presents the results of overall trends in earnings management. The second section presents the results of proximate determinants of earnings management. The third section summarizes the results.

4.1 Overall trends in Earnings Management

Table 4.1: Descriptive statistics for the period 1993-2010
This table presents the variables for the analysis of measuring earnings management through discretionary accruals (calculated by Modified Jones Model) of 677 publicly listed US companies from 1993-2010. The variable SIZE is the log of total assets. ROA is return on assets; LEV is leverage (Total Liabilities/Total Assets); BC states the state of economy whether its expansion or contraction; REG is for the regulations: the Regulation of Fair Disclosure passed (2000) and the Sarbanes Oxley Act (2002).

<table>
<thead>
<tr>
<th></th>
<th>DACC</th>
<th>SIZE</th>
<th>ROA</th>
<th>LEV</th>
<th>BC</th>
<th>REG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>0.008</td>
<td>6.293</td>
<td>0.100</td>
<td>0.530</td>
<td>0.778</td>
<td>0.611</td>
</tr>
<tr>
<td>Median</td>
<td>-0.018</td>
<td>6.265</td>
<td>0.097</td>
<td>0.543</td>
<td>1.000</td>
<td>1.000</td>
</tr>
<tr>
<td>Maximum</td>
<td>2.692</td>
<td>8.902</td>
<td>4.875</td>
<td>3.041</td>
<td>1.000</td>
<td>1.000</td>
</tr>
<tr>
<td>Minimum</td>
<td>-4.760</td>
<td>3.556</td>
<td>-2.663</td>
<td>-0.115</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Skewness</td>
<td>2.508</td>
<td>0.112</td>
<td>3.298</td>
<td>0.736</td>
<td>-1.336</td>
<td>-0.456</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>78.638</td>
<td>2.912</td>
<td>266.764</td>
<td>9.214</td>
<td>2.786</td>
<td>1.208</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>0.175</td>
<td>0.733</td>
<td>0.119</td>
<td>0.209</td>
<td>0.416</td>
<td>0.488</td>
</tr>
<tr>
<td>Observations(n)</td>
<td>12186</td>
<td>12186</td>
<td>12186</td>
<td>12186</td>
<td>12186</td>
<td>12186</td>
</tr>
</tbody>
</table>
Table 4.1 reports the basic descriptive statistics of data used in the empirical investigation. The average logsize of the total assets of US companies for the period 1993-2010 is 6.293. The assets logsize of the smallest firm was 3.556 and the largest firm had an assets logsize of 8.902. Given the part that average logsize of companies far exceeds that of median (6.265) implies that these are large companies in the cohort of companies in the empirical investigation. The average of discretionary accruals was 0.8%, with the highest discretionary accruals percentage being 269.2% and the lowest being -476%. The mean of return on assets was 10%. The maximum and lowest returns on assets were 487.5% and -266.3% respectively which implies wide dispersion in performance. The average leverage ratio was 53%, with the highest leveraged firm having a ratio of 304.1% and the lowest was -11.5%. The economy of United States was in a state of expansion for 78% of the period of study (1993-2010).

Table 4.2: Changes in Discretionary Accruals during pre-REG and post-REG period
This table presents the behavior of discretionary accruals (calculated by Modified Jones Model) of 677 publicly listed companies for pre-REG period (1993-1999), post-REG period (2000-2010), and for the whole period of empirical investigation (1993-2010).

<table>
<thead>
<tr>
<th>Panel</th>
<th>$\alpha$</th>
<th>$\beta$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1993-1999 (n = 4739)</td>
<td>-1.546***</td>
<td>0.030***</td>
</tr>
<tr>
<td></td>
<td>(-88.699)</td>
<td>(7.571)</td>
</tr>
<tr>
<td>2000-2010 (n=7447)</td>
<td>-1.161***</td>
<td>-0.021***</td>
</tr>
<tr>
<td></td>
<td>(-40.464)</td>
<td>(-9.706)</td>
</tr>
<tr>
<td>1993-2010 (n=12186)</td>
<td>-1.399***</td>
<td>-0.003***</td>
</tr>
<tr>
<td></td>
<td>(-129.815)</td>
<td>(-3.343)</td>
</tr>
</tbody>
</table>

Note: Figures in () are t-statistics.
***, **, * indicates statistical significance at 1%, 5%, and 10% respectively (two-sided test).
Table 4.2 reports the time behavior of discretionary accruals during different panels. During 1993-2010, discretionary accruals have dropped by 0.3% per year. Beta (β) indicates that overall accounting quality has improved during this period in US. Pre-REG (1993-1999) period shows increase in discretionary accruals. Discretionary accruals increased by 3% for each additional year. In the post-REG period (2000-2010), results show the decrease in discretionary accruals. Discretionary accruals decreased by 2.1% per additional year. The post-REG period shows that accounting quality has improved after the passage of regulations. In the following sections, we examine the proximate determinants of discretionary accruals.

4.2 Empirical Results- Behavioral Regressions

Table 4.3 (see page 44) presents estimates based on equation 3.1 (in Chapter 3) based on panel least squares, fixed effects, and random effects models. The results are consistent across panel data estimation techniques and have the hypothesized signs and statistically significant except for the LogSize variable (in the panel and fixed/random effects model). The estimates of panel and random effects models are broadly similar. The Hausman Test (χ² statistic) is zero, so null hypothesis cannot be rejected that our preferred model is random effects. The results of this model are consistent with our hypotheses. The firm size is positively correlated with earnings management that is contrary to our hypothesis but; it is also statistically insignificant. Other variables such as BC, ROA, and LEV have same signs as predicted and also are statistically significant at 1%, 5%, and 10%, level respectively. These
results confirm our hypotheses that business cycles, firm’s performance (returns on assets), and leverage are positively associated with earnings management. The results presented in the table 4.2 are inconsistent for the variable regulations (REG) as we hypothesized that it negatively correlates with the earnings management but this variable is highly statistically significant. The main limitation of panel, fixed, and random effects estimation procedure is the correlation of independent variable with the error term \((y/x + e) \text{ cov } x & e \neq 0\). This makes these estimation procedures less reliable and not robust (Stock and Watson, 2011). Hence, we turn to more robust estimation techniques like Arellano-Bond generalized methods of moments (GMM) and system GMM and the results are presented in Table 4.4.

Table 4.4 (see page 45) reports the estimates based on Arellano-Bond generalized method of moments (GMM) and system GMM. The estimates for the system GMM are reasonable (more robust) and expected signs are as hypothesized for the exogenous variables BC and REG. The main hypotheses, business cycles (BC) and regulations (REG) are statistically and highly significant at 1% level with hypothesized signs. In the system GMM estimates which is our preferred model, all variables signs are same as hypothesized except for assets size. These results clearly show business cycles have positive impact on discretionary accruals (Tables 4.3 and 4.4). The variable REG is negatively correlated with earnings management as hypothesized (table 4.4). That is, the passage of regulations dampened discretionary accruals based earnings management.
4.3 Summary of results

The empirical results show that earnings management as captured by discretionary accruals has decreased by 0.3% per year during 1993-2010 in US. Prior to regulations, earnings management increased, but, subsequent to regulations it has shown a marked decline.

We had presented empirical results on the based on panel least square, fixed effects, and random effects model, Arellano-Bond GMM, and System GMM for discretionary accruals based earnings management. The major limitation of pooled/ least square model is that it suffers from correlation on independent variables with error term and also does not model heterogeneity of firms in panel. Fixed effects and random effects models recognize heterogeneity but suffer from omitted variable bias and low explanatory power. On the basis of Hausman test, random effects model was selected. The results by random effects model showed positive relation between earnings management and business cycles as predicted. These results reflected more earnings management/ lower accounting quality during expansion period; however these results were not consistent with other exogenous variable $REG$. This variable was statistically significant but coefficient sign was inconsistent as hypothesized. To test the validity of results, more robust estimators: Arellano-Bond GMM and system GMM used to run panel regressions. System GMM results provide the same signs for the most crucial variables BC and REG as predicted with highly statistically significant level at 1%.
Table 4.3: Determinants of Discretionary Accruals of US firms based on Modified Jones Model - 1993-2010

The dependent variable is DACC (discretionary accruals). ROA is return on assets (EBIT/Total Assets); LEV is leverage (Total Liabilities/Total Assets). BC (Business Cycle) is a dummy variable with a value of one for expansion period and zero otherwise; REG is also a dummy variable with a value of one for post-REG period and zero, otherwise.

<table>
<thead>
<tr>
<th>Hypothesized Sign</th>
<th>Panel Least Squares</th>
<th>Fixed Effects</th>
<th>Random Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>+/-</td>
<td>-0.128(0.014)***</td>
<td>-0.280(0.043)***</td>
</tr>
<tr>
<td>LogSize</td>
<td>(-)</td>
<td>0.003(0.002)</td>
<td>0.029(0.007)***</td>
</tr>
<tr>
<td>ROA</td>
<td>+</td>
<td>0.034(0.013)***</td>
<td>0.072(0.016)***</td>
</tr>
<tr>
<td>LEV</td>
<td>+</td>
<td>0.014(0.008)*</td>
<td>0.003(0.013)</td>
</tr>
<tr>
<td>BC</td>
<td>+</td>
<td>0.084(0.004)***</td>
<td>0.085(0.004)***</td>
</tr>
<tr>
<td>REG</td>
<td>(-)</td>
<td>0.063(0.004)***</td>
<td>0.054(0.004)***</td>
</tr>
<tr>
<td>Observations(n)</td>
<td>12186</td>
<td>12186</td>
<td>12186</td>
</tr>
<tr>
<td>$R^2$</td>
<td></td>
<td>0.043</td>
<td>0.099</td>
</tr>
<tr>
<td>Jarque-Bera</td>
<td>3071706***</td>
<td>2443605***</td>
<td>2071669***</td>
</tr>
<tr>
<td>(Normality test of residuals)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hausman Test ($\chi^2$ statistic)</td>
<td>zero</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Figures in () are standard errors. 
***, **, * indicates statistical significance at 1%, 5%, and 10% respectively (two-sided test).
Table 4.4: Determinants of DACC of S&P 1500 (US) firms – 1993-2010

The dependent variable is DACC (discretionary accruals). ROA is return on assets (EBIT/Total Assets); LEV is leverage (total liabilities/total assets). BC (business cycle) is a dummy variable with a value of one for expansion period and otherwise zero; REG is also a dummy variable with a value of one for post-REG period and otherwise zero.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Expected Sign</th>
<th>GMM</th>
<th>System GMM</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONSTANT</td>
<td>+/-</td>
<td>-.606(.155)***</td>
<td>.083(.108)</td>
</tr>
<tr>
<td>BC</td>
<td>+</td>
<td>.021(.006)***</td>
<td>.013(.005)***</td>
</tr>
<tr>
<td>REG</td>
<td>(-)</td>
<td>-.037(.005)***</td>
<td>-.020(.006)***</td>
</tr>
<tr>
<td>LOGSIZE</td>
<td>(-)</td>
<td>.008(.055)</td>
<td>.005(.056)</td>
</tr>
<tr>
<td>ROA</td>
<td>+</td>
<td>-.023(.050)</td>
<td>.017(.041)</td>
</tr>
<tr>
<td>LEV</td>
<td>+</td>
<td>.025(.058)</td>
<td>.033(.055)</td>
</tr>
</tbody>
</table>

Observations(n) | 9478 | 10155 |
Number of groups(N) | 677 | 677 |
AR(2) (test of serial correlation) | -2.881 | -2.429 |
No. of lags of endogenous variables used in instrumentations | 3 | 3 |

Note: Figures in () are standard errors.

***, **, * indicates statistical significance at 1%, 5%, and 10% respectively (two-sided test).
CHAPTER V

CONCLUSIONS

The main purpose of this study was to test accounting quality during booms and bust phases of business cycles for US firms. Based on a comparable data set of 677 companies for the period 1993-2010, we examined the impact of business cycles and financial regulation on accounting quality of US firms.

One of the controversial areas is whether the accounting quality has improved or not over the years. Accounting quality is antonym with discretionary accruals. If discretionary accruals which are a proxy for earnings management are decreasing, then one can conclude that accounting quality is increasing. The study showed that there is an overall decrease in discretionary accruals during the period (1993-2010) of empirical investigation, however, discretionary accruals increased before the passage of stricter financial regulations (like RFD and SOX), but decreased after the passage of these regulations.

This study contributes to accounting literature in two ways. First we tested accounting quality using widely used measure of accounting quality using discretionary accruals and found that business cycles affect firms’ accounting quality. This new motivation for earnings management can impact the firm’s accounting quality. Furthermore, our findings indicated more earnings management and poor accounting quality during expansion period of
business cycles and less earnings management and better accounting quality during downward phase of business cycle. There are strong motivations to engage in earnings management practice during expansion period. One is 'peer pressure' to perform well in economic upturn as whole economy is going up. Second is the 'market penalty' (for negative unexpected returns) is more in good times. Also bad news in good times affects stock prices more than good news in bad times. Our results also confirmed that motivations for earnings management are not only endogenous (firm specific) but they are also exogenous.

Second, this study also tested the impact of stricter and enhanced regulations (like RFD and SOX) on accounting quality and found that there is positive impact of regulations on accounting quality (earnings management). Most of the previous literature showed no impact of these regulations on earnings management or accounting quality. But the SOX was passed to improve internal controls of firms and non-compliance of the SOX raised severe penalties such as loss of exchange listing along with multi-million fines and imprisonment of CEO/CFO up to 10 to 20 years. Therefore, there are valid reasons to correlate earnings management and regulations negatively.

One of the major contributions of this study is more robust econometrics technique like system GMM to test our hypotheses. This approach provides efficient inferences assuming a minimal set of statistical assumptions. We believe that we are the first to use this model in accounting research area and hope that this will help researchers to estimate the more
robust results for their models. Our results by using more robust econometrics' tool, system GMM show that earnings management reduced after the passage of these regulations that is accounting quality increased after 2000.

Overall, this study provides new insights to financial regulators, analysts, investors as well as researchers that economic conditions (business cycles) also provide genuine grounds to engage in earnings management practice which in turn reduce the accounting/earnings quality of firms. Moreover, this study confirms that accounting quality has improved after the passage of financial regulations.

In addition to earnings management as an accounting quality metric, we also applied other metrics of accounting quality such as earnings variability; correlation of accruals and cash flows, small positive income, large negative income existed in accounting quality literature to test the accounting quality. These other measures do not have solid theoretical background and also provide mixed results (see appendix table 4.1 and 4.2). Therefore, our inferences are mainly based on widely used and validated model Modified Jones Model for discretionary accruals and more robust technique system GMM for regression run.
Bibliography


## Appendices

### Appendix Table 3.1: Description of variables collected for the study with their source

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Description (Definition)</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>EBIT</td>
<td>Earnings before interest and taxes (EBIT) represent the earnings of a company before interest expense and income tax expense.</td>
<td>DataStream</td>
</tr>
<tr>
<td>Total Assets</td>
<td>Total Assets represents the sum of total current assets, long term receivables, investment in unconsolidated subsidiaries, other investments, net property plant and equipment and other assets.</td>
<td>DataStream</td>
</tr>
<tr>
<td>Revenues or Net Sales</td>
<td>Revenues or Net Sales represent gross sales and other operating revenues less discount, returns and allowances.</td>
<td>DataStream</td>
</tr>
<tr>
<td>Total Liabilities</td>
<td>Total Liabilities represents all short and long term obligations expected to be satisfied by the company.</td>
<td>DataStream</td>
</tr>
<tr>
<td>Cash Flow</td>
<td>Net Cash Flow – Operating Activities represents the net cash receipts and disbursements resulting from operations of the company. It is the sum of Fund from Operations, Funds from/Used for Other Operating Activities and Extraordinary Items. Data for this field is generally not available prior to 1989.</td>
<td>DataStream</td>
</tr>
<tr>
<td>Current Assets</td>
<td>Current Assets represent cash and other assets that are reasonably expected to be realized in cash, sold or consumed within one year or one operating cycle.</td>
<td>DataStream</td>
</tr>
<tr>
<td>Current Liabilities</td>
<td>Current Liabilities represent debt or other obligations that the company expects to satisfy within one year.</td>
<td>DataStream</td>
</tr>
<tr>
<td>Cash or Cash Equivalents</td>
<td>Cash represents money available for use in the normal operations of the company. It is the most liquid of all of the company’s assets.</td>
<td>DataStream</td>
</tr>
</tbody>
</table>
Short Term Debt represents that portion debt payable within one year including current portion of long term debt and sinking fund requirements of preferred stock or debentures.

Depreciation represents the process of allocating the cost of depreciable asset to the accounting periods covered during its expected useful life to a business it is non-cash charge for use and obsolescence of an asset.

Property, plant and equipment — net represents Gross Property, Plant and Equipment less accumulated reserves for depreciation, depletions and amortization.

Receivable – net represents the amounts due to the company resulting from the sale of goods and services on credit to customers (after applicable reserves). These assets should reasonably be expected to collect within a year or within the normal operating cycle of a business.

An auditing firm who audits the firm’s accounts.

Expansion and contraction periods

| Table: 3.2 Description of Variables used in the Study |
|--------------|-----------------|-----------------|
| Notation     | Definition       | Description     |
| SIZE         | Total assets     | Log of end of the year total assets |
| ROA          | Return on assets | Earnings before interests and taxes divided by total assets of the firm |
| LEV          | Leverage         | Debt to total assets ratio of the firm |
| BC           | Business Cycles  | Dummy variable 1 with the value of 1 for the expansion period and 0 otherwise |
| RFD and      | Regulation of    | Dummy variable 2 with the value of 1 if |

56
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
<th>Calculation</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOX</td>
<td>Fair Disclosure and Sarbanes Oxley Act</td>
<td>RFD or SOX from 2000 to 2010 and 0, otherwise</td>
</tr>
<tr>
<td>DACC</td>
<td>Discretionary accruals</td>
<td>Discretionary accruals values as determined using Modified Jones model</td>
</tr>
<tr>
<td>NDACC</td>
<td>Non-discretionary accruals</td>
<td>Non-discretionary accruals values as determined using Modified Jones model</td>
</tr>
<tr>
<td>TACC</td>
<td>Total accruals</td>
<td>Total accruals values calculated as determined using Modified Jones Model</td>
</tr>
<tr>
<td>ΔCA</td>
<td>Current assets</td>
<td>Current assets in the year t less currents assets in the year t-1 scaled by total assets at t-1</td>
</tr>
<tr>
<td>ΔCL</td>
<td>Current Liabilities</td>
<td>Current liabilities in the year t less currents liabilities in the year t-1 scaled by total assets at t-1</td>
</tr>
<tr>
<td>ΔCash</td>
<td>Cash</td>
<td>Cash in the year t less cash in the year t-1 scaled by total assets at t-1</td>
</tr>
<tr>
<td>ΔSTD</td>
<td>Short term debt</td>
<td>Short term debt in the year t less short term debt in the year t-1 scaled by total assets at t-1</td>
</tr>
<tr>
<td>Dep</td>
<td>Depreciation</td>
<td>Depreciation of year t scaled by total assets at t-1</td>
</tr>
<tr>
<td>A</td>
<td>Total assets</td>
<td>End of the year total assets</td>
</tr>
<tr>
<td>ΔREV</td>
<td>Revenues/Net sales</td>
<td>Revenues in the year t less revenues in the year t-1 scaled by total assets at t-1</td>
</tr>
<tr>
<td>PPE</td>
<td>Property, plant and equipment</td>
<td>Property, plant and equipment in the year t scaled by total assets at t-1</td>
</tr>
<tr>
<td>ΔREC</td>
<td>Net receivables</td>
<td>Net receivables in the year t less net receivables in the year t-1 scaled by total assets at t-1</td>
</tr>
<tr>
<td>ΔNI</td>
<td>Net Income</td>
<td>Net income in the year t less net income in the year t-1 scaled by total assets at t-1</td>
</tr>
<tr>
<td>Variable</td>
<td>Description</td>
<td>Formula</td>
</tr>
<tr>
<td>----------</td>
<td>-------------</td>
<td>---------</td>
</tr>
<tr>
<td>GROWTH</td>
<td>Percentage change in net revenues</td>
<td>Revenues in the year t less revenues in the year t-1 scaled by revenues at t-1 multiplied by 100.</td>
</tr>
<tr>
<td>EISSUE</td>
<td>Percentage change in Shareholders' equity</td>
<td>Equity in the year t less equity in the year t-1 scaled by equity at t-1 multiplied by 100.</td>
</tr>
<tr>
<td>DISSUE</td>
<td>Percentage change in liabilities</td>
<td>Total liabilities in the year t less total liabilities in the year t-1 scaled by total liabilities at t-1 multiplied by 100.</td>
</tr>
<tr>
<td>TURN</td>
<td>Turn over</td>
<td>Revenues in the year t divided by total assets in the year t</td>
</tr>
<tr>
<td>CF</td>
<td>Cash flow</td>
<td>Annual net cash flows from operating activities in the year t divided by end of the year total assets at t</td>
</tr>
<tr>
<td>AUD</td>
<td>Auditor</td>
<td>Dummy variable 3 with the value of 1 if auditor is one of big four auditors* and 0 otherwise</td>
</tr>
<tr>
<td>ΔCF</td>
<td>Cash flow</td>
<td>Cash flow in the year t less cash flow in the year t-1 scaled by total assets at t</td>
</tr>
<tr>
<td>ACC</td>
<td>Accruals</td>
<td>Total accruals values calculated using Modified Jones model</td>
</tr>
<tr>
<td>SPOS</td>
<td>Small positive net income</td>
<td>Dummy variable 4 with the value of 1 if net income scaled by total assets is between 0 and 0.01 and 0, otherwise</td>
</tr>
<tr>
<td>LNEG</td>
<td>Large negative net income</td>
<td>Dummy variable 5 with the value of 1 if net income scaled by total assets is less than -0.20 and 0, otherwise</td>
</tr>
</tbody>
</table>

Note* Big four auditors are PwC, KPMG, E&Y, and D&T.
Appendix Table 4.1: Comparison of accounting quality during pre-REG and post-REG period (1993-2010)

\( \Delta NI \) is change in annual earnings before interest and taxes scaled by end of the year total assets; \( CF \) is annual net cash flow from operating activities divided by end of year total assets; \( ACC \) is total accruals calculated by using modified Jones model; \( SPOS \) is an indicator variable that equals one if net income scaled by total assets is between 0 and 0.01; \( LNEG \) is an indicator variable that equals one for observations for which annual net income scaled by total assets is less than -0.20, and zero otherwise.

<table>
<thead>
<tr>
<th>Earnings Management Metric</th>
<th>Prediction</th>
<th>Pre-REG ( (n = 3750) )</th>
<th>Post-REG ( (n = 7305) )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variability of ( \Delta NI )</td>
<td>Post &gt; Pre</td>
<td>0.07</td>
<td>0.14***</td>
</tr>
<tr>
<td>Variability of ( \Delta NI ) over ( \Delta CF )</td>
<td>Post &gt; Pre</td>
<td>1.17</td>
<td>2.33***</td>
</tr>
<tr>
<td>Correlation of ( ACC ) and ( CF )</td>
<td>Post &lt; Pre</td>
<td>-0.53</td>
<td>-0.46***</td>
</tr>
<tr>
<td>Small Positive NI (SPOS)</td>
<td>(-)</td>
<td></td>
<td>0.09***</td>
</tr>
</tbody>
</table>

Timely Loss Recognition

Large Negative NI (LNEG)  

<table>
<thead>
<tr>
<th>Prediction</th>
<th>Pre-REG ( (n = 3750) )</th>
<th>Post-REG ( (n = 7305) )</th>
</tr>
</thead>
<tbody>
<tr>
<td>+</td>
<td></td>
<td>0.18***</td>
</tr>
</tbody>
</table>

Note: Tests to compare \( \sigma \) \( \Delta NI \) (F-test), \( \sigma \) \( \Delta NI \) over \( \Delta CF \) (F-test), \( \rho \) (\( ACC \), \( CF \)) (Z test of the difference between two independent correlations) have been performed to assess the statistically significance of difference. 

***, **, * indicates statistical significance of the difference between expansion and contraction period at 1%, 5%, and 10% respectively (two-sided test).
Appendix Table 4.2: Comparison of accounting quality during Expansion and Contraction period (1993-2010)

$\Delta NI$ is change in annual earnings before interest and taxes scaled by end of the year total assets; $CF$ is annual net cash flow from operating activities divided by end of year total assets; $ACC$ is total accruals calculated by using modified Jones model; $SPOS$ is an indicator variable that equals one if net income scaled by total assets is between 0 and 0.01; $LNEG$ is an indicator variable that equals one for observations for which annual net income scaled by total assets is less than -0.20, and zero otherwise.

<table>
<thead>
<tr>
<th>Earnings Management Metric</th>
<th>Prediction</th>
<th>Expansion (n = 8402)</th>
<th>Contraction (n = 2653)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variability of $\Delta NI$</td>
<td>Exp &lt; Con</td>
<td>0.12</td>
<td>0.14***</td>
</tr>
<tr>
<td>Variability of $\Delta NI$ over $\Delta CF$</td>
<td>Exp &lt; Con</td>
<td>2.40</td>
<td>2.33***</td>
</tr>
<tr>
<td>Correlation of $ACC$ and $CF$</td>
<td>Exp &gt; Con</td>
<td>-0.48</td>
<td>-0.48</td>
</tr>
<tr>
<td>Small Positive NI ($SPOS$)</td>
<td>+</td>
<td></td>
<td>-0.10***</td>
</tr>
<tr>
<td>Timely Loss Recognition</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Large Negative NI ($LNEG$)</td>
<td>(-)</td>
<td></td>
<td>-0.28***</td>
</tr>
</tbody>
</table>

Note: Tests to compare $\sigma$ $\Delta NI$ (F-test), $\sigma$ $\Delta NI$ over $\Delta CF$ (F-test), $\rho$ ($ACC$, $CF$) (Z test of the difference between two independent correlations) have been performed to assess the statistically significance of difference. ***, **, * indicates statistical significance of the difference between expansion and contraction period at 1%, 5%, and 10% respectively (two-sided test).