Wang, Ye

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# The 2007-2008 financial crisis and accrual anomaly

# THE 2007-2008 FINANCIAL CRISIS AND ACCRUAL ANOMALY

**YE WANG**

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**THE 2007-2008 FINANCIAL CRISIS AND ACCRUAL ANOMALY**

**YE WANG**

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Dr. Yutao Li, Ph.D.
Supervisor
Thesis Examination Committee

Dr. Ebenezer Asem, Ph.D.
Co-Supervisor
Thesis Examination Committee

Dr. Vishaal Baulkaran, Ph.D.
Reader
Thesis Examination Committee

Dr. Yao Tian, Ph.D.
External Examiner
Thesis Examination Committee
San José State University
San José, California, US

Dr. Mahfooz Ansari, Ph.D.
Committee Chair
Thesis Examination Committee

## Abstract

This paper investigates how the 2008 financial crisis affects the accrual anomaly documented by Sloan (1996). I find that the accrual anomaly increases during the financial crisis period and the increase in accrual anomaly does not differ between firms relying and not relying on external financing. Additional analysis shows that arbitrage risk and transaction costs could have contributed to the increase in accrual anomaly during the financial crisis period.

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## Chapter 1 Introduction

The accrual[1] anomaly documented by Sloan (1996) is an efficient market anomaly resulted from mispricing of accruals earnings. Extant studies show that accrual anomaly is associated with investors' earnings fixation (e.g., Sloan, 1996; Xie, 2001; Hirshleifer, Hou, Teoh & Zhang, 2004; Hirshlefier, Lim & Teoh, 2011), firm growth (e.g., Fairfield, Whisenant & Yohn, 2003; Titman, Wei & Xie, 2004; Zhang, 2007), arbitrage risk or transaction costs (Mashruwala, Rajgopal, & Shevlin, 2006), and accruals characteristics such as the relative persistence of accruals to cash (Green, Hand, & Soliman, 2011).

Sloan (1996) suggests that naïve investors may lack the ability to tell the differences between accrued earnings and cash earnings and therefore fixate their attention on earning information as a whole and overprice the accrued earnings. Eventually, when accrued earnings are not realized as investors expect, the future stock price declines, leading to abnormal negative returns. This explanation is referred to as, "the earnings fixation hypothesis" (Dechow, Khimich, & Sloan, 2011). Hirshlefier et al. (2011) further argue that a psychological constraint called "the investor limited attention" is a possible explanation for investors' incapability to tell the difference between accrual earnings and cash earnings. Although both sophisticated and naïve investors may be subject to behavioral bias such as limited attention, Hirshlefier et al. (2011) and other researchers (e.g., Collins, Gong &

[1] Accrual accounting is an accounting procedure to anticipate future cash receipts and cash payment (IASB, 2010). Accordingly, accrual earnings are the income that have been made but have not been received yet and their delivery is not guaranteed (Dechow, Khimich and Sloan, 2011). Therefore, they essentially are an estimation of future cash income and have lower reliability and persistence (Dechow et al, 2011). In an efficient market, we expect to observe no association between the level of accruals and future stock return because rational investors should be able to price the lower persistence of accruals correctly and assign a lower price to firms with high accruals. However, Sloan (1996) found otherwise.

Hribar, 2003; Ali & Gurun, 2009) argue that sophisticated and professional investors are less subjected to limited attention than naïve and individual investors.

In the meantime, researchers argue that accrual anomaly could be a growth-related anomaly (e.g., Fairfield et al., 2003; Titman et al., 2004; Zhang, 2007). For example, Fairfield et al. (2003) argue that accrual anomaly could be a special case of a broader growth anomaly. Zhang (2007) finds that growth is positively correlated with accrual anomaly and accruals capture not only information about earnings but also information about investment and growth. In addition to earnings fixation and firm growth explanation, Mashruwala et al. (2006) suggest that arbitrage risk and transaction costs could prevent the accrual anomaly to be arbitraged away; Green et al. (2011) argue that the level of accrual anomaly may increase when the relative persistence of accruals to cash flows increases.

The recent 2007-2008 financial crisis has a dramatic impact on investors' investing activities (Duchin, Ozbas & Sensoy, 2010) and firms' financial activities (Kahle & Stulz, 2013). For example, researchers (e.g. Ben-David, Franzoni, & Moussawi, 2012; He, Khang, & Krishnamurthy, A, 2010) document that the 2008 financial crisis discouraged hedge fund activities and as a result, the proportion of sophisticated investors who can tell the difference between the persistence of cash flow and accrual in the market may decline. In contrast to the decline in the activities in sophisticated investors, several studies document that retail investors still traded actively during the financial crisis period (e.g. Hoffmann, Post, & Pennings, 2013; Dorn & Weber, 2013; Merkle & Weber, 2014) . If earnings fixation is the main factor driving accrual anomaly, the decrease in the activities of sophisticated investors relative to naïve investors in equity market could lead to an increase in accrual anomaly. In addition, the 2008 financial crisis may also affect hedge fund

activities indirectly because the higher risk and uncertainty in the market could increase arbitrage risk and transaction costs, which could discourage hedge fund or other investors from arbitraging the mispricing of accruals or prevent them from arbitraging successfully (Mashruwala et al., 2006). Therefore, the accrual anomaly may also increase as a result of an increase in arbitrate risk and transaction costs.

The financial crisis also has a greater impact on firms that highly rely on external financing than on firms that rely on external financing to a lesser extent (Dell'Ariccia, Detragiache, & Rajan, 2008). If the 2008 financial crisis caused a shock to firms' financing and investing activities and accrual anomaly is a type of growth anomaly, I expect to observe the increase in accrual anomaly is less pronounced for firms heavily relying on external financing than for firms relying on external financing to a lesser extent.

Using data in Compustat and CRSP from 2004 to 2009, I employ the Ordinary Least Square (OLS) regression model to test my predictions. The results show that accrual anomaly increases during the financial crisis period, confirming my first prediction. This increase in accrual anomaly can be due to a decrease in hedge funds activities and an increase of arbitrage risk and transaction costs that can prevent investors to arbitrage away the mispricing of accruals (Mashruwala et al., 2006). Second, I do not find any evidence that supports the growth-based hypothesis: the increase of accrual anomaly during the financial crisis is similar for firms with a high reliance on external financing versus those that do not, suggesting firm growth did not affect accrual anomaly.

My study contributes to the literature in several dimensions. First, my study provides empirical evidence that the magnitude of accrual anomaly increases during the

financial crisis and such increase could be due to a decrease in hedge fund activities, an increase in arbitrage risk and transaction costs. Second, this is the first paper studying accrual anomaly in the financial crisis setting. Third, the paper documents that how different variables such as arbitrage risk, transaction costs and accruals behave during the 2008 financial crisis period and provide some insight for investors to deal with market inefficiency during the financial crisis period.

This dissertation proceeds as follows. The next section reviews previous literature in accrual anomaly. In section 3, I develop the hypotheses. In Section 4, I discuss the research design and variable measurement. Section 5 discusses sample and descriptive statistics. Section 6 discusses the results followed by section 7 with conclusion.

# Chapter 2 Literature Review

## *2.1 Accrual Anomaly*

### *2.1.1 Earning Fixation Explanation*

Sloan (1996) investigates whether stock market prices are able to fully reflect information about future earnings contained in the accrual and cash flow components of current earnings. Sloan (1996) finds that the accrual component of earnings displays lower persistence than the cash flow component of earnings due to the subjectivity involved in estimating accrual earnings. Stock market prices fail to distinguish such differences between the persistence of the accrual component of earnings and the cash flow component of earnings, leading to an under-reaction to cash earnings and an over-reaction to accrual earnings. Sloan (1996) indicates that these reactions might be because naïve investors only "fixate" on the earnings figure on the financial statement without knowing the different properties of accrual earnings and cash flow earnings. As a result, when naïve investors interpret earnings information, they usually overweight the value of accrual earnings and underweight the value of cash flow earnings since earnings are taken into consideration as a whole by investors. Sloan (1996) documents that firms with high reported accruals tend to have low abnormal stock returns in subsequent periods as compared to firms with low reported accruals. He argues that such phenomena occurs because investors are unable to distinguish the persistence between different earnings components. The phenomena that there is a negative association between current accrual earnings and future stock returns is called accrual anomaly and Sloan (1996)'s explanation for the cause of accrual anomaly is referred to as, "the earnings fixation explanation" (Dechow et al., 2011).

In general, subsequent studies find evidence supporting the earnings fixation explanation. For example, Xie (2001) finds that accrual anomaly is caused mainly by discretionary accruals (abnormal accruals).[2] Xie (2001) suggests that discretionary accruals are influenced by managers reporting incentives and contain a greater amount of low persistence components. However, investors have difficulty discerning managers' reporting discretion and are not able to distinguish the persistence of discretionary accruals from the persistence of normal accruals. Consequently, since they are unable to distinguish the low persistence of discretionary accruals, investors assign a high weight to the high level of discretionary accruals, and when the discretionary accruals are not realized in the subsequent period, the stock price falls, resulting in negative abnormal returns.

Recent papers on accrual anomaly (e.g., Richardson, Sloan, Soliman, & Tuna, 2005) document evidence consistent with Xie (2001), indicating that the estimation error in accruals (reliability of accrual) is associated with the lower persistence of accruals and a greater mispricing. Furthermore, Hirshlefier et al. (2011) document that a single psychological constraint, limited attention, is the reason for investors' incapability to understand information in accruals and this causes accrual anomaly. These studies suggest that the existence of accrual anomaly is mainly due to investors' fixation on the level of earnings and their failure to understand the low persistence of accrual earnings caused by the subjectivity and estimation errors involved in reporting accrual earnings.

While Sloan (1996) attributes accrual anomaly to investors' failure in understanding the persistence of accrual and cash flow earnings, researchers continue to investigate

[2] Managers have substantial discretion over the amounts and the timing of accruals. If managers exercise this discretion to report certain amount of accruals, these accruals are called discretionary accruals.

whether sophisticated investors are equipped with better skills to distinguish the persistence between the two components of earnings. For example, Ali, Hwang, and Trombley (2000) investigate whether the accrual anomaly is attenuated if firms have a higher percentage of sophisticated investors. However, they find that the negative relationship between accrual earning and the subsequent annual stock returns is even bigger in larger firms (i.e., firms with more sophisticated investors) than in smaller firms (i.e., firms with less sophisticated investors). Bradshaw, Richardson and Sloan (2001) find that even sophisticated analysts and auditors do not fully use the information in accruals and their attention is also fixated on earnings. Zach (2006) finds that evidence on association between abnormal returns and accrual reversals in high accrual firms but not in low accrual firms, suggesting that "the earnings fixation explanation" may only be able to explain the accrual anomaly observed in high accrual firms. These findings raise doubt regarding Sloan's (1996) argument that the accrual anomaly is caused by earnings fixation of naïve investors. Hirshleifer et al. (2004), on the other hand, find that investors tend to focus on net income profitability as a whole rather than cash profitability and overvalue the firms whose net operating income outstrip free cash flow, providing strong support for Sloan's (1996) argument. Collins et al., (2003) also find that firms with high institutional ownership have less accrual anomaly. In addition, researchers also argue that accrual anomaly could be too costly to be arbitraged away (Lev & Nissim, 2006; Ali, Chen, Yao & Yu, 2008).

Researchers also investigate whether earnings fixation is more pronounced in high sentiment[3] periods, leading to a greater mispricing of accrual earnings in such a period. Ali

[3] Investor sentiment is the belief about the direction of stock price in the future and the investment risk, unjustified by the facts (Baker & Wurgler, 2007).

et al. (2009) and Stambaugh, Yu, and Yuan (2012) find evidence that accrual anomaly is stronger for small firms during high investor sentiment because investors tend to be overly optimistic about the market during that period of time.

### 2.1.2 *Growth-Based Explanation*

Researchers also argue that accrual anomaly is related to firm growth. Fairfield et al. (2003) argues that accrual is not just a component of earnings but also a component of growth in net operating assets. They find that both accrual earnings and growth in net operating assets have a negative relationship with future returns on assets. They suggest that investors overvalue the accruals because they overvalue the growth of the firms they invest in and the investment firms made. Zhang (2007) provides evidence directly linking firm investment/growth with the level of accruals. He demonstrates that accruals co-vary strongly with measures of firm growth (i.e., growth in the number of employees, investment in fixed assets) and accrual anomaly is more pronounced in firms with strong correlation between accruals and measures of growth. His finding suggests that accruals capture investment information, as well as earnings quality.

The growth-based explanation also attracts criticism (e.g., Titman et al., 2004; Cooper, Gulen, & Schill, 2006; Anderson & Garcia-Feijoo, 2006). Despite Fairfield et al.'s (2003) argument that accrual anomaly could be a special case of a more general growth anomaly, Wei and Xie (2008) find that although both capital investment anomaly and accrual anomaly are highly correlated with each other, there is a distinction between them because the mispricing from both accrual and capital investment is bigger than the mispricing from either of these two variables. There are also studies that provide empirical evidence directly

against the growth-based explanation. Chan, Chan, Jegadeesh and Lakonishok (2006) and Richardson, Sloan, Soliman and Tuna (2006) find that accruals that are unrelated to sales perform better when predicting future returns than those accruals that are related to sales. Chu (2011) finds that for firms with negative operating capital, their net operating accruals and growth in sales move in opposite directions, suggesting that accrual anomaly does not link to firm growth. [4]

### 2.1.3 *Other Explanations*

Although a large amount of accrual anomaly studies focus on the earnings fixation explanation and the growth-based explanation, some other factors could explain accrual anomaly. Arbitrage risk could be one factor that influences accrual anomaly (Mashruwala et al., 2006). Mashruwala et al. (2006) indicate that in order to hedge the mispriced asset and make mispricing eventually disappear, arbitrageurs need to find perfect substitutes for shorted assets. However, if the substitute is not available, hedging will not be completely implemented and the mispricing will remain. Therefore, the lack of substitute is one type of arbitrage risk for the arbitrageurs. Accordingly, the greater the arbitrage risk the greater the mispricing of accruals.

Mashruwala et al. (2006) suggest that transaction cost is a factor that influences accrual anomaly because the higher transaction costs would prevent investors from arbitraging away the mispricing of accrual successfully. Using stock price as a proxy for

[4] There is also a risk-based explanation for accrual anomaly, claiming abnormal return exists because of risk factors but not accruals (Dechow et al, 2011). Khan (2008) claims he is able to capture accruals by using a four-factor risk model but his research results are questioned by Hirshleifer, Hou, & Teoh (2012) and Ohlson, & Bilinski (2012). Both of them obtain results inconsistent with the theory the accruals reflect risk.

transaction cost,[5] Mashruwala et al. (2006) find that accrual anomaly is stronger among stocks with low prices. Therefore, Mashruwala et al.'s (2006) finding suggests a positive relationship between transaction cost and accrual anomaly.

The characteristics of accruals could also affect accrual anomaly. Green et al. (2011) argue the relative persistence of accrual to cash could affect the magnitude of accrual anomaly. If the mispricing is due to inability of investors to tell the difference between accrual persistence level and cash persistence level, the larger the gap between these two, the larger accrual anomaly. Green et al. (2011) find the evidence supporting their argument.

### *2.2 The 2007-2008 Financial Crisis*

The 2007-2008 financial crisis occurred as a result of consumer defaults on subprime mortgages (Duchin et al., 2010). This crisis led to severe bank failures in U.S. history (Duchin et al., 2010) and has had a profound negative impact on investors and the capital market (e.g. Barberis, 2013; Duchin et al., 2010; Kahle et al., 2013). One thing that changes dramatically during this down market is hedge funds activities. Ben-David et al. (2012) find that hedge funds activities decrease during the financial crisis period mainly due to the financial constraints caused by credit shock. Unlike other funds, hedge funds are usually invested by institutional and sophisticated investors in order to profit from the market inefficiency, including accrual anomaly (e.g., Stein, 2009; Green et al., 2011). Combining a list of hedge funds from Thomson-Reuters and mandatory institutional quarterly portfolio holdings reports, Ben-David et al. (2012) find that equity holding in hedge funds decrease almost 20% on average during the financial crisis period. He et al. (2010) also find that

[5] Bhardwaj and Brooks (1992) argue that there is a direct inverse relationship between the stock price and transaction cost.

hedge funds capital decreased about 337 billion in total using data from *Hedge Fund Flow Report* by Barclay Hedge (2009). On the other hand, using CRSP Mutual Fund Database, Ben-David et al. (2012) find that the decrease of mutual fund activities during the financial crisis is only one-third of the decrease of hedge fund activities and argue that the difference could come from the different investor base in these two types of funds.[6] Furthermore, using 2007–09 Survey of Consumer Finances (SCF) panel data from the Federal Reserve Board, Bricker et al. (2011) point out that equity holding of individual investors in US market fall by about 5% during the financial crisis period, suggesting a smaller decrease of individual investors' activities during financial crisis compared to the decrease of professional investors' activities. Furthermore, researchers find that the individual investors were still very active in the market during the financial crisis: using brokerage records of Netherlands' individual investors and buy-sell ratio analysis, Hoffmann et al. (2013) find that individual investors' net buying activities increase significantly during the financial crisis period, indicating that individual investors tend to enter the market instead of de-risking their investment during the financial crisis. Dorn et al. (2013) also use the brokerage records of individual investors in a German bank to study investor behaviour during the financial crisis. They find that that the bank's brokerage client population actually increased during the financial crisis period. Using transaction data from a UK brokerage provider and also buy-sell ratio analysis, Merkle et al. (2014) also find that the net buying behaviour from individual investors in the UK market during the financial crisis.

[6] The mutual fund investors are mainly retail investors who are less sophisticated than institutional investors who dominate hedge funds exclusively (Ben-David et al., 2010).

Besides hedge fund activities, other factors may have also changed during the financial crisis period and affect the magnitude of accrual anomaly. For example, during the 2008 financial crisis, market liquidity decreased sharply due to liquidity shock (Cornett, McNutt, Strahan, & Tehranian, 2011). Therefore, it is possible that the substitutes for arbitrage would be more difficult to find during the financial crisis. In a similar way, when the market is down, transaction costs could increase because of higher risk, higher uncertainty, and lower liquidity.

The financial crisis in 2008 also led to a significant credit supply shock (Ivashina & Scharfstein, 2010). Campello, Graham, and Harvey (2010) show that many firms, especially those financially constrained firms experienced investment cuts, dividend reductions, and decrease of cash saving during the financial crisis. Furthermore, many firms experienced a decrease in net equity issuance and expected cash flow (Kahle et al., 2013). Although firms with access to credit lines may be able to ease the impact of the financial crisis on their investment plans, many firms have to decrease their investment or even sell their assets in order to survive (Campello, Giambona, Graham, & Harvey, 2001). Therefore, the financial crisis forced many firms to go through the disinvestment and/or reduction of firm assets. Such effect is particularly stronger for the firm with low cash reserves or higher net short-term debt (Duchin et al., 2010) and younger firms (Iyer, Peydró, da-Rocha-Lopes, & Schoar, 2014). More importantly, Dell'Ariccia et al. (2008) find that firms highly reliant on external financing are hurt more by the financial crisis due to credit supply shock than those not highly reliant on external financing. Since firms highly reliant on external financing are hurt more by the financial crisis, it is harder for them to borrow

compared with those firms not highly reliant on external financing. As a result, it is harder for them to grow or expand during the financial crisis period (Dell'Ariccia et al., 2008).

## Chapter 3 Hypothesis Development

The decrease of hedge funds activities during the 2008 financial crisis period documented by Ben-David et al. (2012) implies a possible withdrawal of institutional investors in the market. Meanwhile, Ben-David et al. (2012) report that the decrease of mutual fund activities for the same time period was not as severe, suggesting a less withdrawal of individual investors in the market compared to professional investors since mutual funds are primarily invested by retail investors. Bricker et al. (2011) confirm a smaller percentage of decrease on individual investors' equity holding compared to the percentage of decrease of hedge funds activities. In addition, researchers (e.g. Hoffmann, Post, & Pennings, 2013; Dorn & Weber, 2013; Merkle & Weber, 2014) also find that individual investors were still very active during the financial crisis period in European market. As a result, the earnings fixation effect is expected to increase during the 2008 financial crisis period, leading to a higher accrual anomaly level. Also, because accrual anomaly could be arbitraged away due to hedge funds activities, the decrease of hedge funds activities itself could lead to an increase of accrual anomaly as well because less investors were trying to arbitrage accrual anomaly away. In addition, the increase of both arbitrage risk and transaction costs could also lead to an increase of accrual anomaly because these two factors prevent accrual anomaly to be arbitraged away successfully.

Therefore, my first hypothesis is:

**H1: The magnitude of accrual anomaly (mispricing of accruals) is higher during the financial crisis period than before the financial crisis period.**

During the 2008 financial crisis, firms highly reliant on external financing are hurt more by credit supply shock and have more difficulty to grow (Dell'Ariccia et al., 2008). If the firm growth does explain accrual anomaly, I expect to see a lower level of accrual anomaly from firms highly reliant on external financing compared to those firms not highly reliant on external financing. In other words, the level of accrual anomaly among firms highly relying on external financing should be lower than the level of accrual anomaly among other firms, regardless of how the financial crisis influences accrual anomaly. Therefore, my second hypothesis is:

**H2: Ceteris paribus, the magnitude of accrual anomaly (mispricing of accruals) is lower for firms highly reliant on external financing than other firms during the financial crisis.**

## Chapter 4 Measurements and Research Design

### *4.1 H1 Test*

To test whether accruals mispricing is higher during the financial crisis period than the period before the financial crisis, I estimate following extended version of Ali et al.'s (2009) model:

$$Eret_{i,t+1} = \beta_{0t} + \beta_1 DFC_{i,t} + \beta_2 TotalAccrual_{i,t} + \beta_3 PriorRet_{i,t} + \beta_4 BooktoMarket_{i,t} + \beta_5 Sentiment_{i,t} + \beta_6 Sentiment_{i,t} * TotalAccrual_{i,t} + \beta_7 DFC_{i,t} * TotalAccrual_{i,t} + U_{i,t+1} \quad (1)$$

Where:

$Eret_{it+1}$ are the abnormal returns calculated from the 4th to the 16th months after the end of the fiscal year. I follow Sloan (1996) and use size adjusted returns in my main analysis. I calculate the size adjusted returns by using the difference between monthly individual raw returns and monthly market capitalization-based Portfolio Index returns, both downloaded from CRSP and containing NYSE, NYSE MKT, and NASDAQ common stocks of US companies. Returns are calculated for the 4th to the 16th months after the end of the fiscal year to ensure sufficient time has passed for financial reports to be released.

$DFC_{i,t}$ is a dummy variable set to zero for observations in the years before the financial crisis (i.e. 2004 - 2006), and otherwise set to one (2007 – 2009).

$TotalAccrual_{i,t}$ is total amount of accruals, which is the key variable of the analysis. I follow Hribar and Collins (2002) and use cash flow statement information to estimate accruals as the following[7]:

TotalAccruals=EBXI-CFO (2)

where EBXI is earnings before extraordinary items and discontinued operations; and CFO is operating cash flows (from continuing operations) taken directly from the statement of cash flows.[8] In addition, following previous studies (e.g., Sloan, 1996; Richardson et al., 2005; Lev et al., 2006), I use deflate total accruals by average total assets.

$BooktoMarket_{i,t}$ is the ratio of the book value of equity to the market value of equity. Book value of equity is for the fiscal year that ended at least four months after but less than sixteen months before the returns measurement month. The market value of equity is for the most recent calendar year-end. Book to Market ratio is included in the analysis to control any associated risk or mispricing (Ali et al., 2009).

$PriorRet_{i,t}$ is the cumulative stock returns for the six months preceding the return measurement period. It is included in the analysis to control any momentum related risk or mispricing (Ali et al., 2009).

$Sentiment_{i,t}$ represents investor sentiment condition for each firm-year observation. In this study, I use the sentiment index provided by Baker and Wurgler (2006). Such index

[7] Sloan (1996) uses balance sheet information to estimate accruals. Hribar and Collins (2002) suggest that accruals using cash flow statement information to estimate accruals are more accurate as compared to accruals estimated from balance sheet because accruals estimated from balance sheet could contain substantial measurement error due to divestitures of on-going businesses, mergers and acquisitions and foreign currency adjustments.

[8]The cash portion of discontinued operations and extraordinary items should be subtracted from total cash from operations to arrive a cash flow from continuing operations.

is calculated based on six different proxies from previous studies: (1) closed-end fund discount (e.g., Lee, Shleifer & Thaler, 1991), (2) New York Stock Exchange share turnover (e.g., Baker & Stein, 2004), (3) the number of initial public offerings (e.g., Ritter,1991), (4) average first-day returns of IPOs (e.g., Ritter,1991), (5) the equity share in new equity and debt issues (e.g., Baker & Wurgler, 2000), and (6) the dividend premium (e.g., Baker et al.,2006). Sentiment is included in analysis as a control variable because it also affects earning fixation of naïve investors (Ali et al., 2009).

The coefficient $\beta_7$ in the equation (1) represents the effect of the financial crisis on accrual anomaly and it is used to test H1. According to H1, the negative association between current total accruals and future returns is expected to be more pronounced during the financial crisis. Therefore, H1 predicts $\beta_7 < 0$. The coefficient $\beta_1$ captures the effect of the financial crisis on future abnormal returns. The financial crisis has a negative impact in capital markets and the coefficient $\beta_1$ is expected to be negative. The coefficient $\beta_2$ represents the association between accruals and future abnormal returns. As Sloan (1996) documents, higher accruals are associated with a negative future abnormal return. Therefore, the coefficient $\beta_2$ is expected to be negative and significant, indicating the presence of accrual mispricing. The coefficient $\beta_3$ represents the effect of prior cumulative returns on future abnormal returns. Jegadeesh and Titman (1993) document that stocks with high returns in the past continue to outperform stocks with poor prior performance. Therefore, the coefficient $\beta_3$ is expected to be positive. The coefficient $\beta_4$ captures the association between book to market ratio, and Rosenberg, Reid, and Lanstein (1985) find a positive relation between average returns and book-to-market ratio. Therefore $\beta_4$ is expected to be positive. The coefficient $\beta_5$ captures the effect of sentiment level on future

abnormal returns. Baker et al. (2006) find a negative relationship between investor sentiment and stock returns and therefore, the coefficient $\beta_5$ is expected to be negative. The coefficient $\beta_6$ represents the effects of investor sentiment on accrual anomaly. As discussed before, high investor sentiment could lead to a higher level of accrual anomaly and a stronger negative association between total accruals and future returns. Therefore, the coefficient $\beta_6$ is expected to be negative.

### *4.2 H2 Test*

To test whether the increase in accrual anomaly is more pronounced for firms reliant on external financing during the financial crisis, I estimate the following model:

$$Eret_{i,t+1} = \beta_{0t} + \beta_1 DFC_{i,t} + \beta_2 RelyingFirms_{i,t} + \beta_3 TotalAccrual_{i,t} + \beta_4 PriorRet_{i,t} + \beta_5 BooktoMarket_{i,t} + \beta_6 Sentiment_{i,t} + \beta_7 Sentiment_{i,t} * TotalAccrual_{i,t} + \beta_8 DFC_{i,t} * TotalAccrual_{i,t} + \beta_9 RelyingFirms_{i,t} * DFC_{i,t} + \beta_{10} RelyingFirms_{i,t} * TotalAccrual_{i,t} + \beta_{11} RelyingFirms_{i,t} * DFC_{i,t} * TotalAccrual_{i,t} + U_{i,t+1} \quad (3)$$

Where:

$\beta_2 RelyingFirms_{i,t}$ is a dummy variable that takes the value of one for firms highly reliant on external financing and zero otherwise. Following Rajan and Zingales (1996), I calculate the level of external financing for firms as the ratio of capital expenditure financed by external funds ((financing ratio =(capital expenditure – cash flow from operations)/capital expenditure). A firm is deemed highly reliant on external finance when its financing ratio

is among the top 50% of the sample. Other variables are defined the same as in equation (1).

The coefficient $\beta_{11}$ in equation (3) represents the effect of firm capital structure on accrual anomaly during financial crisis and it is used to test H2. I expect the level of accrual anomaly during the financial crisis for firms that are highly reliant on external financing to be lower than those which do not highly rely on external finance during the financial crisis. Therefore, H2 predicts $\beta_{11}$ >0. The coefficient $\beta_2$ captures the effect of firm capital structure alone on future abnormal returns. Generally speaking, firms highly reliant on external financing have higher stock price and firm value (Masulis, 1983). Therefore, I expect the coefficient $\beta_2$ to be positive and significant. Also, the coefficient $\beta_3$ is expected to be negative and significant because accruals lead to a negative future abnormal return (Sloan1996).

## Chapter 5 Sample and Descriptive Statistics

### *5.1 Sample*

I obtained company financial information from COMPUSTAT Database (North America) and stock return data from CRSP monthly return files. My initial sample includes all firm-years with available data on COMPUSTAT and CRSP for the period 2003–2010. Then I delete: 1) financial and utility firms (4900<SIC<4999; 6000<SIC<6999) since they are highly regulated by the government; 2) firms with negative total assets or book value of equity because these variables are used to standardize other variables and they can not be zero or negative (Beer, Hamdi & Zouaoui, 2013); 3) firms with book-to-market values within the top and bottom 1 percent to reduce outlier effects; 4) firm-years with year-end stock prices below $5 are deleted in order to reduce the effect of microstructure-induced return volatility (Conrad & Kaul, 1993). I also remove firms with total accrual values within the top and bottom 1 percent in order to further reduce the influence of outliers. My final sample includes 12,507 firm-year observations. Finally, I follow Clinch et al. (2010)[9] and delete the observations with missing data.

### *5.2 Descriptive Statistics*

Table 1 reports the descriptive statistics for (Panel A) and correlation among (Panel B) the annual variables used in the test of accrual anomaly before and during the financial crisis period. All variables are computed using data available for each year 2004-2009 in CRSP and Compustat. There are a total of 12,507 observations included. The mean (median) accrual value for the sample employed (for the period 2004 – 2009) is -0.06 (-

[9] Clinch et al. (2010) reduce their observations with missing financial statement information and return information. .

0.05), while the standard deviation is 0.07. The monthly abnormal returns are, on average, positive (0.03). The median of abnormal returns are negative and very close to 0 (-0.02). The mean of the sentiment index is positive but very small (0.002), indicating a low sentiment period on average from year 2004-2009. In addition, the correlation analysis shows that total accrual has a negative correlation with future stock returns as expected. Prior returns have a positive correlation with future stock returns as expected. However, sentiment shows a positive correlation with future returns. The financial crisis period (*DFCit*), Book to Market ratio (*BooktoMarketit*) and firms' capital structure ($RelyingFirms_{i,t}$) on the other hand, does not show any significant correlation with future stock returns. The descriptive statistic is generally consistent to the prior studies (e.g., Ali et al., 2009; Li, Niu, Zhang, & Largay, 2011).

## Chapter 6 Results

### *6.1 Testing of H1*

I first use OSL regression to test my prediction in H1. H1 states that the magnitude of accrual anomaly (mispricing of accruals) would be higher during the financial crisis period than in the period before the financial crisis. I predict that the slope coefficient on the interaction term $DFC_{i,t} * TotalAccrual_{i,t}$ in eq.1 is negative. A negative coefficient means an increase in the accrual anomaly during the financial crisis.

Panel A in table 2 reports the empirical results for H1 using the Ordinary Least Squares (OLS) regression. Overall, the results from OLS regression provides evidence that accrual anomaly increases during the financial crisis. Specifically, the coefficient on the interaction term between $DFC_{i,t}$ and $TotalAccrual_{i,t}$ (*coefficient =-0.50; standard error = 0.14)* is negative and statistically significant at the 1% level. This result suggests that, on average, accruals mispricing is higher during the financial crisis period than during the period before the financial crisis, suggesting the financial crisis actually increases the level of accrual anomaly in the market. To further confirm the result, I analyze the accrual anomaly separately in the period before and during the financial crisis (table 2); the regression results show that there is no accrual anomaly from year 2004 to year 2006, consistent with Green et al.'s (2011). However, the coefficient on the total accruals is negative and statistically significant at the 1% level (*coefficient =-0. 39; standard error = 0.09)* during the financial crisis period from 2007-2009. Therefore, the empirical results lead to a support to H1: financial crisis does increase the mispricing of accrual.

The coefficients on the control variables are generally consistent with the predictions. For example, the coefficient on $BooktoMarket_{i,t}$ *(coefficient =0.01; standard error =0.01)* is positive but insignificant; the coefficient on $Sentiment_{i,t}$ *(coefficient =0.09; standard error =0.06)* is positive and insignificant, which is inconsistent with prior studies (e.g., Baker et al., 2006). The coefficient on $PriorRet_{i,t}$*(coefficient =0.03; standard error =0.01)* is also positive and significant, consistent with Ali et al. (2009).

### *6.2 Testing of H2*

H2 states that, ceteris paribus, the increase in the magnitude of accrual anomaly (mispricing of accruals) is less for firms highly reliant on external financing than other firms during the financial crisis. I predict that the slope coefficient on the interaction term $RelyingFirms_{i,t} * DFC_{i,t} * TotalAccrual_{i,t}$ in eq.3 is positive. A positive coefficient suggests that if firm growth explains accrual anomaly, the shock to relying firms' growth caused by financial crisis can lead to a decline in the accrual anomaly among these firms.

Panel B in table 2 reports the empirical results for H2 using the Ordinary Least Squares (OLS) regression. Overall, the results from OLS regression analysis does not support H2: the coefficient on the interaction term $RelyingFirms_{i,t} * DFC_{i,t} * TotalAccrual_{i,t}$ (*coefficient =-0.01; standard error =0.23)* is negative and statistically insignificant, suggesting that here is no difference in the mispricing of accruals between firms highly reliant on external financing and other firms during the financial crisis. This result suggests that firm growth itself may not have any association with accrual anomaly and some possible association between these two found in previous studies could be due

to the correlation between accruals and firm-based variables used to measure the firm growth.

The coefficients on the control variables are generally consistent with the predictions. For example, the coefficient on $BooktoMarket_{i,t}$ *(coefficient =0.01; standard error =0.01)* is positive but insignificant. The coefficient on $PriorRet_{i,t}$*(coefficient =0.03; standard error =0.01)* is also positive and significant, a result that is consistent with prior studies. However, the coefficient on $Sentiment_{i,t}$ *(coefficient =0.08; standard error =0.06)* is positive and insignificant, indicating an inconsistent result with prior studies (e.g., Baker et al., 2006) and suggesting positive relationship between sentiment and future returns on the stock market.

### *6.3 Robustness Test Results*

To ensure the robustness of my results, I use firm-fixed effects to control for time-invariant firm characteristics. In addition, I use market-adjusted abnormal return as a measure of abnormal returns (Clinch, Fuller, Govendir, and Wells, 2012). Specifically, I subtract the market returns (measured by the CRSP value-weighted market index returns) from individual firms' returns in order to obtain the market abnormal returns.

#### *6.3.1 H1 & H2: Firm-fixed Effect Results*

I provide panel data regression analysis results for H1 and H2 when the Firm-fixed effect control is applied in the test in Table 3. Panel A in Table 3 shows that in H1 Test, the coefficient on the interaction term between $DFC_{i,t}$and $TotalAccrual_{i,t}$ (*coefficient =-0.75; standard error = 0.13)* is still negative and statistically significant. H2 test result

shown in Panel B indicates that the coefficient on the interaction term $RelyingFirms_{i,t} * DFC_{i,t} * TotalAccrual_{i,t}$ (*coefficient =0.11; standard error =0.23)* is positive as we expect but insignificant, suggesting the same result as the one in my main analysis: firm growth influenced by firm's capital structure does not create any impact on accrual anomaly during the financial crisis. Therefore, the Firm-fixed effect controlled regression analysis results for H1 and H2 tests are consistent with the results from the main analysis.

*6.3.2 Using Market-Adjusted Abnormal Return*

Table 4 provides the test results for H1 and H2 when market-adjusted abnormal return is used. The market adjusted abnormal return is measured by the difference between individual firms' return and the CRSP value-weighted market index returns. The results from these two tests confirm the results from the main test. The results presented in Panel A show that the coefficient on the interaction term between $DFC_{i,t}$and $TotalAccrual_{i,t}$ (*coefficient =-0.51; standard error = 0.14)* is still negative and statistically significant. The test results for H2 shown in Panel B indicates that the coefficient on the interaction term $RelyingFirms_{i,t} * DFC_{i,t} * TotalAccrual_{i,t}$ (*coefficient =0.03; standard error =0.24)* is positive as we expect but still insignificant.

***6.4 Additional Tests and Discussions***

The main analysis and the robustness test results indicate that while the mispricing of accruals indeed increases during the financial crisis period from 2007-2009, firm growth influenced by firm's capital structure does not have any impact on the accrual anomaly level. I interpret these results as possible evidence that there is an increase in earning fixation effect due to the possible change in investor composition. However, as discussed

in the previous sections, the change of accrual anomaly during financial crisis could be influenced by at least three other factors: arbitrage risk, transaction cost, and relative persistence of accruals to cash. The arbitrage risk and transaction costs could increase due to high uncertainty and risk in the market during the financial crisis and lead to an increase of accrual anomaly. If relative persistence of accruals to cash increase during the financial crisis, it will also lead to an increase of accrual anomaly. To rule out other possible explanations for the increase of accrual anomaly during the financial crisis period, I conduct additional analysis in this section to test the change of these factors during the financial crisis period. Employing the measures and proxies used by Green et al (2011), I analyze the changes in these factors from 2004 to 2009 using OLS regression analysis as the following:

$$Explainations_t = \beta_{0t} + \beta_1 DFC_{i,t} + \beta_2 Years + U_{i,t+1} \qquad (4)$$

Where:

*YEARS* is set to 1 in 2004 and incremented by one each year thereafter.

The variable $Explainations_t$ contains three proxies for three factors mentioned above, including:

*AGG_RISKt* is the market capitalization-weighted average of idiosyncratic risk of extreme accruals decile firms for year t, where idiosyncratic risk is measured by the log of the standard deviation of residuals from a time-series market model regression of the daily stock returns of extreme accruals decile firms on the CRSP value-weighted index in year t. This proxy measures the annual arbitrage risk.

*AGG_PRICEt* is the equal-weighted average of the price of extreme accruals decile firms for each year t. This proxy measures the annual transaction cost. The higher *AGG_PRICEt* is, the lower the transaction cost would be.

*AGG_RELPERSISTt* is $A_t/B_t$, where $A_t$ and $B_t$ are the estimated coefficients in the yearly cross sectional regressions:

$$IB_{i,t+1}/AVGTA_{i,t+1} = INT_t + A_t\ ACC_{i,t}/AVGTA_{i,t+1} + B_t\ CF_{i,t}/AVGTA_{i,t+1} + U_{i,t} \qquad (5)$$

$IB$ is annual income before extraordinary items, $CF$ is annual operating cash flows, $ACC = IB - CF$, $AVGTA$ is average annual total assets, and $INT$ is an intercept (outliers are deleted at the extreme 1% of each variable each year).

Table 5 reports descriptive statistics for the EXPLAN variables (Panel A) and correlations among them (Panel B). The descriptive statistic results are consistent with Green et al (2011) except for variable AGG_PRICEt since the measurement for proxy I employ is slightly different from the one used in Green et al.'s (2011).[10]

*6.4.1 Arbitrage Risk Explanation Test*

Using equation 4, I regress *AGG_RISKt against* $DFC_{i,t}$ to measure the change in arbitrage risk from 2004-2009. Results are reported in Table 6. The positive and significant coefficient of $DFC_{i,t}$ (*coefficient =0.06; standard error = 0.00)* indicates an increase in the

[10] Green et al. (2011) use AGG_PRICEt, the equally-weighted average of PRICEit, the log of extreme accruals decile firm i's average price for the 125 trading days ending March 31st of year t as the proxy for transaction costs.

arbitrage risk during the financial crisis. As discussed in the previous section, an increase in the arbitrage risk could lead to an increase in accrual anomaly.

*6.4.2 Transaction Costs Explanation Test*

Similar to the test in 6.4.1, I regress *AGG_PRICEt against* $DFC_{i,t}$ with control variable $Years$ to examine the change in transaction costs from 2004-2009. I report the results in Table 7. The negative and significant coefficient on $DFC_{i,t}$ (*coefficient =-2.56; standard error = 0.04 ;)* indicates a decrease of price and an increase in transaction cost during the financial crisis. As discussed in the previous section, an increase in the transaction costs could lead to an increase in accrual anomaly.

*6.4.3 Relative Persistence Explanation Test*

To test the influences of the relative persistence of accrual to cash on accrual anomaly, I regress *AGG_RELPERSISTt* against $DFC_{i,t}$ with control variable $Years$ to test their movement from 2004-2009. The results are presented in Table 8. The positive and significant coefficient of $DFC_{i,t}$ (*coefficient =0.94; standard error = 0.01 ;)* indicates an increase in the relative persistence of accrual to cash, which means a decrease in the gap between the persistence of accrual and persistence of cash after the occurrence of financial crisis. According to discussion in the previous section, this decrease should lead to a decrease rather than an increase in accrual anomaly.

## Chapter 7 Conclusions

Using data from Compustat and CRSP, I document that the magnitude of accrual anomaly increases during the financial crisis period. Investigating why accrual anomaly change during the financial crisis, I examine that whether earning fixation, firm growth, arbitrage risk, transaction cost, and the relative persistence of accrual to cash can explain the increase of the accrual anomaly. My empirical analysis suggests that the decrease of hedge funds activities, as well as the increases of arbitrage risk and transaction costs during the financial crisis, could be the main reasons for the increase in accrual anomaly during that time period. In addition, this study examines whether accrual anomaly increases differently for firms during financial crisis because the firm growth of firms with different capital structure were hurt differently during the financial crisis. My analysis finds that the accrual anomaly during the 2008 financial crisis is similar for firms highly reliant on external financing and other firms. As discussed above, there are multiple possible reasons for the increase of accrual anomaly during the financial crisis period and the change of earnings fixation effect in the market is one of them. Therefore, relying on the exogenous shock on firms' growth, this paper provides evidence more consistent with the earning fixation explanation rather than the growth explanation for accrual anomaly.

However, two limitations are in order. First, although I argue that hedge fund activities are the main contributor to the increase in accrual anomaly, I cannot test this explanation directly due to lack of data. Second, because of data constraint, I am not able to distinguish the alternative explanations among earning fixation, arbitrage risk and transaction costs. Therefore, further study could test hedge fund activities directly during the financial crisis to provide direct evidence. Furthermore, hedge funds activities are still

not direct measurement for earning fixation of investors. A better proxy for earning fixation of investors is needed for future study in order to distinguish and quantify the effects from earning fixation, arbitrage risk and transaction costs on accrual anomaly during financial crisis more clearly.

## References


Ali, A., Chen, X., Yao, T., and Yu, T. (2008). Do mutual funds profit from the accruals anomaly?. Journal of Accounting Research, 46(1), 1-26.

Ali, D. A., L. Hwang, and M. Trombley, 2000. Accruals and future stock returns: tests of the na ïve investor hypothesis. Journal of Accounting, Auditing & Finance 15, 161-181.

Ali, A., and Gurun, U. G. (2009). Investor sentiment, accruals anomaly, and accruals management. Journal of Accounting, Auditing & Finance, 24(3), 415-431.

Anderson, C., and L. Garcia-Feijoo. 2006. Empirical evidence on capital investment, growth options, and security returns. Journal of Finance 61: 171–194.

Baker, M., and Wurgler, J. (2000). The equity share in new issues and aggregate stock returns. The Journal of Finance, 55(5), 2219-2257.

Baker, M., and Stein, J. C. (2004). Market liquidity as a sentiment indicator. Journal of Financial Markets, 7(3), 271-299.

Baker, M., and Wurgler, J. (2006). Investor sentiment and the cross ‐ section of stock returns. The Journal of Finance, 61(4), 1645-1680.

Baker, M., and Wurgler, J. (2007). Investor sentiment in the stock market.

Barberis, N. (2011). Psychology and the Financial Crisis of 2007-2008. Available at SSRN 1742463.

Barclay Hedge, 2009, The Hedge Fund Flow Report, (March). Available via the Internet:

www.barclayhedge.com/research/hedge-fund-flow-report/hedge-fund-flow-report.

Beer, F., HAMDI, B., and Zouaoui, M. (2013). Investor Sentiment and Accruals Anomaly: European Evidence. Available at SSRN 2249675.

Ben-David, I., Franzoni, F., & Moussawi, R. (2012). Hedge fund stock trading in the financial crisis of 2007–2009. Review of Financial Studies, 25(1), 1-54.

Bhardwaj, R. K., & Brooks, L. D. (1992). The January Anomaly: Effects of Low Share Price, Transaction Costs, and Bid ‐ Ask Bias. The Journal of Finance, 47(2), 553-575.

Bradshaw, M. T., Richardson, S. A., and Sloan, R. G. (2001). Do analysts and auditors use information in accruals?. Journal of Accounting research, 39(1), 45-74.

Bricker, J., Bucks, B. K., Kennickell, A., Mach, T. L., & Moore, K. (2011). Drowning or weathering the storm? Changes in family finances from 2007 to 2009 (No. w16985). National Bureau of Economic Research.

Campello, M, Graham, J R, and Harvey, C.R, 2010, "The real effects of financial constraints: Evidence from a financial crisis", Journal of Financial Economics, Volume 97, Issue 3, Pages 470–487

Campello,M, Giambona,E, Graham, J R, and Harvey, C.R, 2011, "liquidity management and corporate investment during a financial crisis". Review of Financial Studies, Vol. 24 Issue 6, p1944-1979.36p.

Chan, K., Chan, L. K., Jegadeesh, N., and Lakonishok, J. (2006). Earnings Quality and Stock Returns*. The Journal of Business, 79(3), 1041-1082.

Chu, J. (2010). Does growth subsume the implications of accruals for future performance?. University of California, Berkeley.

Clinch, G., Fuller, D., Govendir, B., and Wells, P. (2012). The accrual anomaly: Australian evidence. Accounting & Finance, 52(2), 377-394.

Collins, D. W., Gong, G., and Hribar, P. (2003). Investor sophistication and the mispricing of accruals. Review of Accounting Studies, 8(2-3), 251-276.

Conrad, J., and Kaul, G. (1993). Long‐Term Market Overreaction or Biases in Computed Returns?. The Journal of Finance, 48(1), 39-63.

Cooper, M. J., Gulen, H., and Schill, M. J. (2006). What best explains the cross-section of stock returns? Exploring the asset growth effect. Unpublished working paper.

Cornett, M. M., McNutt, J. J., Strahan, P. E., & Tehranian, H. (2011). Liquidity risk management and credit supply in the financial crisis. Journal of Financial Economics, 101(2), 297-312.

Dechow, P., Khimich, N., and Sloan, R. (2011). The accrual anomaly. Available at SSRN 1793364.

Dell'Ariccia, G., Detragiache, E., and Rajan, R. (2008). The real effect of banking crises. Journal of Financial Intermediation, 17(1), 89-112.

Dorn, D., & Weber, M. (2013). Individual Investors' Trading in Times of Crisis: Going It Alone or Giving Up? Working Paper.

Duchin, R., Ozbas, O., and Sensoy, B. A. (2010). Costly external finance, corporate investment, and the subprime mortgage credit crisis. Journal of Financial Economics, 97(3), 418-435.

Fairfield, P., J. Whisenant, and T. Yohn. 2003a. Accrued earnings and growth: Implications for future profitability and market mispricing. The Accounting Review 78: 353–371.

Green, J., Hand, J. R., & Soliman, M. T. (2011). Going, going, gone? The apparent demise of the accruals anomaly. Management Science, 57(5), 797-816.

He, Z., Khang, I. G., & Krishnamurthy, A. (2010). Balance sheet adjustments during the 2008 crisis. IMF Economic Review, 58(1), 118-156.

Hirshleifer, D., K. Hou, S. Teoh, and Y. Zhang, 2004. Do investors overvalue firms with bloated balance sheets? Journal of Accounting and Economics 38, 297–331.

Hirshleifer, D., Lim, S. S., and Teoh, S. H. (2011). Limited investor attention and stock market misreactions to accounting information. Review of Asset Pricing Studies, 1(1), 35-73.

Hribar, P., and Collins, D. W. (2002). Errors in estimating accruals: Implications for empirical research. Journal of Accounting research, 40(1), 105-134.

Hoffmann, A. O., Post, T., & Pennings, J. M. (2013). Individual investor perceptions and behavior during the financial crisis. Journal of Banking & Finance, 37(1), 60-74.

IASB. (2010). Conceptual Framework for Financial Reporting 2010 [PDF]. Retrieved from http://www.ifrs.org/News/Press-Releases/Documents/ConceptualFW2010vb.pdf

Ivashina, V., and Scharfstein, D. (2010). Bank lending during the financial crisis of 2008. Journal of Financial economics, 97(3), 319-338.

Iyer, R., Peydró, J. L., da-Rocha-Lopes, S., and Schoar, A. (2014). Interbank Liquidity Crunch and the Firm Credit Crunch: Evidence from the 2007–2009 Crisis. Review of Financial Studies, 27(1), 347-372.

Jegadeesh, N., and Titman, S. (1993). Returns to buying winners and selling losers: Implications for stock market efficiency. The Journal of Finance, 48(1), 65-91.

Jones, J. J. (1991). Earnings management during import relief investigations. Journal of accounting research, 193-228.

Kahle.K.M and Stulz. R.M, 2013, "Access to capital, investment, and the financial crisis", Journal of Financial Economics. Vol. 110 Issue 2, p280-299. 20p.

Khan, M. (2008). Are accruals mispriced? Evidence from tests of an intertemporal capital asset pricing model. Journal of Accounting and Economics, 45(1), 55-77.

Kothari, S., E. Loutskina and V. Nikolaev, 2007. Agency theory of overvalued equity as an explanation for the accrual anomaly. MIT working paper.

Lee, C., Shleifer, A., and Thaler, R. H. (1991). Investor sentiment and the closed‐end fund puzzle. The Journal of Finance, 46(1), 75-109.

Lev, B., and Nissim, D. (2006). The Persistence of the Accruals Anomaly*. Contemporary Accounting Research, 23(1), 193-226.

Li, Y., Niu, J., Zhang, R., & Largay, J. A. (2011). Earnings management and the accrual anomaly: Evidence from China. Journal of International Financial Management & Accounting, 22(3), 205-245.

Mashruwala, C., Rajgopal, S., & Shevlin, T. (2006). Why is the accrual anomaly not arbitraged away? The role of idiosyncratic risk and transaction costs. Journal of Accounting and Economics, 42(1), 3-33.

Masulis, R. W. (1983). The impact of capital structure change on firm value: Some estimates. The Journal of Finance, 38(1), 107-126.

Merkle, C., & Weber, M. (2014). Do investors put their money where their mouth is? Stock market expectations and investing behavior. Journal of Banking & Finance, 46, 372-386.

Ohlson, J. A., and Bilinski, P. (2012). Risk vs. Anomaly: A New Methodology Applied to Accruals. Anomaly: A New Methodology Applied to Accruals (January 18, 2012).

Rajan, R. G., and Zingales, L. (1996). Financial dependence and growth (No. w5758). National bureau of economic research.

Richardson, S. A., Sloan, R. G., Soliman, M. T., and Tuna, I. (2005). Accrual reliability, earnings persistence and stock prices. Journal of Accounting and Economics, 39(3), 437-485.

Richardson, S. A., Sloan, R. G., Soliman, M. T., and Tuna, I. (2006). The implications of accounting distortions and growth for accruals and profitability. The Accounting Review, 81(3), 713-743.

Richardson, S., Tuna, İ., and Wysocki, P. (2010). Accounting anomalies and fundamental analysis: A review of recent research advances. Journal of Accounting and Economics, 50(2), 410-454.

Ritter, J. R. (1991). The long‐run performance of initial public offerings. The journal of finance, 46(1), 3-27.

Rosenberg, B., Reid, K., and Lanstein, R. (1985). Persuasive evidence of market inefficiency. The Journal of Portfolio Management, 11(3), 9-16.

Sloan, R, 1996. Do stock prices fully reflect information in accruals and cash flows about future earnings? The Accounting Review 71, 289-316.

Stambaugh, R. F., Yu, J., and Yuan, Y. (2012). The short of it: Investor sentiment and anomalies. Journal of Financial Economics, 104(2), 288-302.

Stein, J. C. (2009). Presidential address: Sophisticated investors and market efficiency. The Journal of Finance, 64(4), 1517-1548.

Titman, S., K. C. Wei, and F. Xie. 2004. Capital investments and stock returns. Journal of Financial and Quantitative Analysis 39: 677–700.

Wei, K. J., and Xie, F. (2008). Accruals, capital investments, and stock returns. Financial Analysts Journal, 34-44.

Xie, H. 2001. The mispricing of abnormal accruals. The Accounting Review 76: 357–373.

Zach, T. (2006). Evaluating the'accrual-fixation'hypothesis as an explanation for the accrual anomaly. In AAA 2005 FARS Meeting Paper.

Zhang, F., 2007. Accruals, investment, and the accruals anomaly. The Accounting Review 82, 1333-1364.

Zuo, L., & Hussain, S. (2008). Financial distress, relative performance and takeovers as drivers for abnormal accruals. Applied financial economics letters, 4(3), 183-186.

## Table 1

## Descriptive Statistics for Main Tests

This table reports the descriptive statistic (Panel A) for and correlation (Panel B) among the annual variables used in the time series test of accrual anomaly before and during the financial crisis period. All variables are computed using data available of each year 2004-2009 in CRSP and Compustat. There are total 12,507 observations included. $\boldsymbol{Eret_{it+1}}$ is cumulative size-adjusted abnormal return for 12 months counting from 4 months after the fiscal year end and is measured by the difference between raw individual returns and capitalization index return; $\boldsymbol{PriorRet_{it}}$ is cumulative individual stock returns of six months preceding the return measurement period; $\boldsymbol{TACC_{it}}$ is total accruals and are calculated as Income before Extraordinary Item and discontinued operations (Compustat data item IBC) minus the operation cash flow (CFO), the difference between the net cash flow from operating activities (Compustat data item OANCF) and discontinued operations and extraordinary items (Compustat data item XIDOC); $\boldsymbol{BooktoMarket_{it}}$ is Book-to-Market ratio and is measured as book value of equity divided by the market value of equity; $\boldsymbol{Sentiment_{it}}$ represents investor sentiment condition for each firm-year observation and is measured by the sentiment index provided by Baker and Wurgler (2006); $\boldsymbol{DFC_{it}}$ is a dummy variable set to zero for observations in the years before the financial crisis (i.e. 2004 - 2006) and to one otherwise (2007 – 2009). $\boldsymbol{RelyingFirms_{i,t}}$ is a dummy variable that takes the value of one for firms highly relying on external financing and zero otherwise and is defined as the ratio of capital expenditure subtracts cash flow from operations divided by capital expenditure (financing ratio). A firm is deemed highly relying on external finance when its financing ratio is among top 50% of the sample. The sample includes all U.S. firms between 2004 and 2009 with the required variables to calculate Total Accruals, excluding financial and utility firms (4900 <=SIC <=4999 and 6000 <=SIC <=6999), firms with negative book value of equity, and firms with book-to-market (BM) values in the top and bottom 1 percent. *** and ** indicate two-tailed significance at the 1% and 5% levels, respectively.

**Panel A. Summary statistics of key variables (12507 Observations)**

| | Mean | Median | Std Dev |
|---|---|---|---|
| $Eret_{it+1}$ | 0.03 | -0.02 | 0.38 |
| *DFCit* | 0.46 | 0 | 0.50 |
| $RelyingFirms_{i,t}$ | 0.47 | 0 | 0.50 |
| $TACC_{it}$ | -0.06 | -0.05 | 0.07 |
| *PriorRetit* | 0.08 | 0.05 | 0.30 |
| *BooktoMarketit* | 0.50 | 0.43 | 0.30 |
| $Sentiment_{it}$ | 0.002 | 0.02 | 0.09 |

**Panel B. Pearson correlation coefficients (12507 Observations)**

| | $Eret_{it+1}$ | *DFCit* | $RelyingFirms_{i,t}$ | $TACC_{it}$ | *PriorRetit* | *BooktoMarketit* | $Sentiment_{it}$ |
|---|---|---|---|---|---|---|---|
| $Eret_{it+1}$ | 1 | -0.01 | 0.004 | -0.02*** | 0.03*** | 0.008 | 0.02** |
| *DFCit* | -0.01 | 1 | -0.07*** | -0.12*** | -0.12*** | 0.18*** | -0.51*** |
| $RelyingFirms_{i,t}$ | 0.004 | -0.07*** | 1 | 0.08*** | -0.04*** | 0.12*** | 0.03*** |
| $TACC_{it}$ | -0.02** | -0.12*** | 0.08*** | 1 | -0.05*** | -0.01 | 0.07*** |
| *PriorRetit* | 0.03*** | -0.12*** | -0.04*** | -0.05*** | 1 | -0.03*** | 0.08*** |
| *BooktoMarketit* | 0.008 | 0.18*** | 0.12*** | -0.01 | -0.03*** | 1 | -0.21*** |
| $Sentiment_{it}$ | 0.02** | -0.51*** | 0.03*** | 0.07*** | 0.08*** | -0.21*** | 1 |

## Table 2

## OLS Regression Results for H1 and H2 Test

This table presents the OLS regression results testing the effect of financial crisis on accrual anomaly. Panel A reports the results for H1 test; Panel B reports the results for H2 test. The dependent variable is size-adjusted abnormal returns in year t+1 ($Eret_{it+1}$). The sample consists of 12507 firm-year observations from 2004-2009. The definitions of other variables are provided in Table 1. *** and ** indicate two-tailed significance at the 1% and 5% levels, respectively. Standard error clustered by firm is included in brackets.

| **Panel A: H1 Test using size-adjusted return** | | | |
|---|---|---|---|
| | Model 2004-2006 | Model 2007-2009 | Model 2004-2009 |
| | Coeff. | Coeff. | Coeff. |
| *Intercept* | 0.01 | -0.01 | 0.02** |
| | (0.01) | (0.01) | (0.01) |
| *DFCit* | | | -0.03*** |
| | | | (0.01) |
| $TACC_{it}$ | 0.14 | -0.39*** | 0.14 |
| | (0.11) | (0.09) | (0.10) |
| *PriorRetit* | 0.09*** | -0.02 | 0.03** |
| | (0.02) | (0.02) | (0.01) |
| *BooktoMarketit* | 0.02 | 0.01 | 0.01 |
| | (0.02) | (0.01) | (0.01) |
| $Sentiment_{it}$ | 0.09 | 0.09 | 0.10 |
| | (0.13) | (0.07) | (0.06) |
| $Sentiment_{it} * TACC_{it}$ | -0.45 | -0.29 | -0.23 |
| | (1.69) | (0.80) | (0.72) |
| $DFCit * TACC_{it}$ | | | -0.50*** |
| | | | (0.14) |
| *Adjusted R-Square* | 0.51% | 0.57% | 0.36% |
| *Observations* | 6741 | 5766 | 12507 |

| **Panel B: H2 Test using size-adjusted return** | |
|---|---|
| | Model 2004-2009 |
| | Coeff. |
| *Intercept* | 0.01 |
| | (0.01) |
| *DFCit* | 0.00 |
| | (0.01) |
| $RelyingFirms_{i,t}$ | 0.03** |
| | (0.01) |
| $TACC_{it}$ | 0.15 |
| | (0.13) |
| *PriorRetit* | 0.03** |
| | (0.01) |
| *BooktoMarketit* | 0.01 |
| | (0.01) |
| $Sentiment_{it}$ | 0.08 |
| | (0.06) |
| $Sentiment_{it} * TACC_{it}$ | -0.21 |
| | (0.73) |
| $DFCit * TACC_{it}$ | -0.46** |
| | (0.18) |
| $RelyingFirms_{i,t} * DFCit$ | -0.06*** |
| | (0.02) |
| $RelyingFirms_{i,t} * TACC_{it}$ | -0.04 |
| | (0.16) |
| $RelyingFirms_{i,t} * DFCit * TACC_{it}$ | -0.01 |
| | (0.23) |
| *Adjusted R-Square* | 0.53% |
| *Observations* | 12507 |

## Table 3

### Firm-fixed Effects Regression on H1 Test and H2 Test

This table presents Firm-fixed effects regression results. Panel A reports the results for H1 test; Panel B reports the results for H2 test. The dependent variable is size-adjusted abnormal returns in year t+1 ($Eret_{it+1}$). The sample consists of 12507 firm-year observations from 2004-2009. Full variable definitions are provided in Table 1 and *** and ** indicate two-tailed significance at the 1% and 5% levels, respectively. Standard error clustered by firm is included in brackets.

| **Panel A: H1 Test with firm fixed effects** | | | |
|---|---|---|---|
| | Model 2004-2006 | Model 2007-2009 | Model 2004-2009 |
| | Coeff. | Coeff. | Coeff. |
| *Intercept* | N/A | N/A | N/A |
| *DFCit* | | | -0.13*** |
| | | | (0.01) |
| $TACC_{it}$ | 0.05 | -0.82*** | 0.10 |
| | (0.12) | (0.12) | (0.09) |
| *PriorRetit* | -0.37*** | -0.28*** | -0.18*** |
| | (0.02) | (0.02) | (0.01) |
| *BooktoMarketit* | 0.97*** | 0.53*** | 0.46*** |
| | (0.04) | (0.03) | (0.02) |
| $Sentiment_{it}$ | -0.25** | 0.73*** | 0.47*** |
| | (0.12) | (0.08) | (0.06) |
| $Sentiment_{it} * TACC_{it}$ | -3.63** | -1.34 | -1.39** |
| | (1.60) | (0.82) | (0.68) |
| $DFCit * TACC_{it}$ | | | -0.75*** |
| | | | (0.13) |
| *R-Square* | 56.10% | 51.16% | 33.14% |
| *Observations* | 6741 | 5766 | 12507 |

| **Panel B: H2 Test with firm fixed effects** | |
|---|---|
| | Model 2004-2009 |
| | Coeff. |
| *Intercept* | N/A |
| *DFCit* | -0.08*** |
| | (0.02) |
| $RelyingFirms_{i,t}$ | 0.08*** |
| | (0.01) |
| $TACC_{it}$ | 0.15 |
| | (0.15) |
| *PriorRetit* | -0.18*** |
| | (0.01) |
| *BooktoMarketit* | 0.46*** |
| | (0.02) |
| $Sentiment_{it}$ | 0.46*** |
| | (0.06) |
| $Sentiment_{it} * TACC_{it}$ | -1.53** |
| | (0.68) |
| $DFCit * TACC_{it}$ | -0.78*** |
| | (0.19) |
| $RelyingFirms_{i,t} * DFCit$ | -0.11*** |
| | (0.02) |
| $RelyingFirms_{i,t} * TACC_{it}$ | -0.25 |
| | (0.18) |
| $RelyingFirms_{i,t} * DFCit * TACC_{it}$ | 0.11 |
| | (0.23) |
| *Adjusted R-Square* | 33.65% |
| *Observations* | 12507 |

## Table 4

## The OLS Regression Results for H1 and H2 Test using Market Adjusted Abnormal Returns

This table presents the OLS regression results for H1 and H2 test using market adjusted abnormal return. Panel A reports the results for H1 test; Panel B reports the results for H2 test. The dependent variable is market adjusted abnormal returns in year t+1 ($Eret_{it+1}$). The sample consists of 12507 firm-year observations from 2004-2009. Full variable definitions are provided in Table 1 and *** and ** indicate two-tailed significance at the 1% and 5% levels, respectively. Standard error clustered by firm is included in brackets.

| **Panel A: H1 Test using alternative abnormal return** | | | |
|---|---|---|---|
| | Model 2004-2006 | Model 2007-2009 | Model 2004-2009 |
| | Coeff. | Coeff. | Coeff. |
| *Intercept* | 0.04*** | 0.03** | 0.03*** |
| | (0.01) | (0.01) | (0.01) |
| *DFCit* | | | 0.00 |
| | | | (0.01) |
| $TACC_{it}$ | 0.17 | -0.40*** | 0.14 |
| | (0.12) | (0.10) | (0.09) |
| *PriorRetit* | 0.06*** | -0.07*** | -0.01 |
| | (0.02) | (0.02) | (0.01) |
| *BooktoMarketit* | 0.00 | 0.03 | 0.01 |
| | (0.02) | (0.02) | (0.01) |
| $Sentiment_{it}$ | -0.53*** | -0.14 | -0.24*** |
| | (0.13) | (0.07) | (0.06) |
| $Sentiment_{it} * TACC_{it}$ | -0.82 | -0.16 | -0.32 |
| | (1.64) | (0.86) | (0.77) |
| $DFCit * TACC_{it}$ | | | -0.51*** |
| | | | (0.14) |
| *Adjusted R-Square* | 0.62% | 0.94% | 0.89% |
| *Observations* | 6741 | 5766 | 12507 |

| **Panel B: H2 Test using alternative abnormal return** | |
|---|---|
| | Model 2004-2009 |
| | Coeff. |
| *Intercept* | 0.02 |
| | (0.01) |
| *DFCit* | 0.02 |
| | (0.01) |
| $RelyingFirms_{i,t}$ | 0.03** |
| | (0.01) |
| $TACC_{it}$ | 0.16 |
| | (0.12) |
| *PriorRetit* | -0.01 |
| | (0.01) |
| *BooktoMarketit* | 0.01 |
| | (0.01) |
| $Sentiment_{it}$ | -0.24*** |
| | (0.06) |
| $Sentiment_{it} * TACC_{it}$ | -0.30 |
| | (0.77) |
| $DFCit * TACC_{it}$ | -0.51*** |
| | (0.18) |
| $RelyingFirms_{i,t} * DFCit$ | -0.05** |
| | (0.02) |
| $RelyingFirms_{i,t} * TACC_{it}$ | -0.06 |
| | (0.16) |
| $RelyingFirms_{i,t} * DFCit * TACC_{it}$ | 0.03 |
| | (0.24) |
| *Adjusted R-Square* | 1.00% |
| *Observations* | 12507 |

## TABLE 5

### Descriptive Statistics for Additional Tests

This table reports descriptive statistics (Panel A) for and correlations (Panel B) among the annual aggregate variables used in the time-series tests of alternative explanations of the increase of accrual anomaly during the financial crisis. All variables are computed using data available of each year 2004-2009 in CRSP and Compustat. *YEARS* is set to 1 in 2004 and incremented by one each year thereafter. *AGG_RISKt* is the market capitalization-weighted average idiosyncratic risk of extreme accruals decile firms for year t measured by the log of the standard deviation of residuals from a time-series market model regression of the daily stock returns of extreme accruals decile firms on the CRSP value-weighted index in year t. *AGG_PRICEt* is the equal-weighted average of price of extreme accruals decile firms for each year t. *AGG_RELPERSISTt* is At / Bt where At and Bt are the estimated coefficients in the yearly cross sectional regressions IBi,t+1 / AVGTA i,t+1 = INTt + At xACC it / AVGTA it + Bt x CFit / AVGTA it + eit and IB is annual income before extraordinary items, CF is annual operating cash flows, ACC = IB – CF, AVGTA is average annual total assets, and INT is an intercept (outliers are deleted at the extreme 1% of each variable each year).

**Panel A. Summary statistics of explanatory variables (12507 Observations)**

| | Mean | Median | Std Div |
|---|---|---|---|
| *AGG_RISKt* | -1.97 | -2.00 | 0.08 |
| *AGG_PRICEt* | 23.26 | 23.40 | 3.14 |
| *AGG_RELPERSISTt* | 0.32 | 0.11 | 0.36 |

**Panel B. Pearson correlation coefficients (12507 Observations)**

| | *AGG_RISKt* | *AGG_PRICEt* | *AGG_RELPERSISTt* |
|---|---|---|---|
| *AGG_RISKt* | 1 | -0.48*** | -0.29*** |
| *AGG_PRICEt* | -0.48*** | 1 | 0.15*** |
| *AGG_RELPERSISTt* | -0.29*** | 0.15*** | 1 |

## Table 6

## Arbitrage Risk Test

This table reports the liner regression results using *AGG_RISKt* as the dependable variable and *DFCit and Years* as independent variable for the *AGG_RISKt* movement from 2004 to 2009. Full variable definitions are provided in Table 1, Table 4 and *** and ** indicate two-tailed significance at the 1% and 5% levels, respectively. Standard error clustered by firm is included in brackets.

| **Panel A: Time Series Movement Analysis** | |
|---|---|
| | Model 2004-2009 |
| | Coeff |
| *Intercept* | -2.00*** |
| | (0.00) |
| *DFCit* | 0.06*** |
| | (0.00) |
| *Adjusted R-Square* | 15.11% |
| *Observations* | 12507 |

## Table 7

## Transaction Costs Test

This table reports liner regression results using *AGG_PRICEt* as dependable variable and *DFCit* and *Years* as independent variable for the *AGG_PRICEt* movement from 2004 to 2009. Full variable definitions are provided in Table 1, Table 4 and *** and ** indicate two-tailed significance at the 1% and 5% levels, respectively. Standard error clustered by firm is included in brackets.

| **Panel A: Time Series Movement Analysis** | |
|---|---|
| | Model 2004-2009 |
| | Coeff |
| *Intercept* | 26.53*** |
| | (0.02) |
| *DFCit* | -2.56*** |
| | (0.04) |
| *Years* | -0.89*** |
| | (0.01) |
| *Adjusted R-Square* | 72.48% |
| *Observations* | 12507 |

## Table 8

## Relative Persistence Test

This table reports the liner regression results using *AGG_RELPERSISTt* as dependable variable and *DFCit* and *Years* as independent variable for the *AGG_RELPERSISTt* movement from 2004 to 2009. Full variable definitions are provided in Table 1, Table 4 and *** and ** indicate two-tailed significance at the 1% and 5% levels, respectively. Standard error clustered by firm is included in brackets.

| **Panel A: Time Series Movement Analysis** | |
|---|---|
| | Model 2004-2009 |
| | Coeff |
| *Intercept* | 0.75*** |
| | (0.00) |
| *DFCit* | 0.94*** |
| | (0.01) |
| *Years* | -0.36*** |
| | (0.00) |
| *Adjusted R-Square* | 72.54% |
| *Observations* | 12507 |