

## **Citation for published version:**

Trombetta, M., & Imperatore, C. (2014). The dynamic of financial crises and its non-monotonic effects on earnings quality. *Journal of Accounting and Public Policy*, 33(3), 205-232.

**DOI:** <https://doi.org/10.1016/j.jaccpubpol.2014.02.002>

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# **The dynamic of financial crises and its non-monotonic effects on earnings quality**

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*Forthcoming in Journal of Accounting and Public Policy*

## **Abstract**

Despite the wealth of research examining earnings quality and earnings management, we still have much to learn about the effects of macroeconomic factors on accounting discretion's decisions; the recent financial crises may be one of such factors. Nevertheless, the extant literature is inconclusive about the direction of the relationship between earnings quality and economic downturn. In this study, we focus on the extent to which organizational survival may be an objective of earnings management. In this manner, we add to research considering earnings target as an objective of earnings manipulation. Furthermore, our results suggest that these objectives likely change as crisis becomes worse. Consequently, we argue that the relationship between financial crises and earnings management is non-monotonic. Earnings management decreases when the intensity of the crisis is low, while it increases when the crisis is acute.

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## 1. Introduction

Recent research has analyzed the role played by financial reporting in the economic downturn. Whalen (2008), Katz (2008) and Kothari and Lester (2012) concur that financial reporting directly contributed to the turmoil and uncertainty by inducing artificial market volatility and instability through the use or misapplication of Fair Value Accounting. A theoretical argument in favor of this claim is presented by Plantin et al. (2008) and this would in turn benefit from further empirical support (Laux and Leuz, 2010). On the other hand Barth and Landsman (2010) and Magnan and Markarian (2011) contend that financial reporting experienced several shortcomings during the crisis and it did not properly account for uncertainty and did not adequately monitor, measure and disclose the impact of risk-taking on financial statements, thus hindering the reliability and relevance of financial statements. Finally, Badertscher et al. (2010), Laux and Leuz (2009), Ryan (2008) and Turner (2008) argue that regulators and financial institutions exerted a more determinant effect than accountants on the stability of financial markets.

Notably lacking from this literature is the examination of how accounting quality may react during a period of financial distress and especially the extent to which financial instability, once in place, may affect managers' accounting choices and, especially, earnings manipulation behaviors. One exception is the work by Choi et al. (2011) investigating the effects of the Asian Crisis of 1997–1998. According to their data earnings management increased during and after this crisis. However their focus is on value relevance and not on earnings management directly. Moreover they analyze only one crisis assuming that it was happening during those years, but they do not use a systematic way to measure the intensity of the crisis. Our aim is to go beyond their analysis by using a direct measurement of the intensity of the financial crisis and to characterize the relationship between this measure and earnings management directly and on a longer period of time including more than one episode of crisis. We are able to show that the intensity of the crisis affects earnings management activities.

Although earnings quality and earnings management have long been an important area of interest in the accounting literature, few studies have analyzed the effect of macroeconomics factors on accounting discretion's decisions (see Liu and Ryan, 2006; Aboody et al., 1999 as two significant exceptions). More specifically Johnson (1999) and Jenkins et al. (2009) investigated the association between the business cycle and earnings quality and obtained mixed results. Our contribution to this literature resides in taking in explicit consideration the role that financial market conditions may play in shaping the relationship between macroeconomic factors and earnings quality and accounting choice. As shown by IMF (2008) and Claessens et al. (2011) financial distress and the business cycle are two distinct phenomena. Despite their strong interaction, these two phenomena do not always follow the same dynamic. For example, not all the episodes of financial distress lead automatically to an economic downturn. Hence the novelty of our approach consists in explicitly adding a proxy for financial distress into the analysis. In particular we will use the measure of "crisis" as provided by Hakkio and Keeton (2009) which is based on financial markets indicators rather than on more traditional business cycles variables.

As noted above, the existing literature does not provide a clear-cut indication about the direction of the relationship between earnings management and macroeconomic factors, making it difficult to predict the direction of the relationship between crisis and

earnings management. Hansen (2010) has recently drawn the attention to the importance of taking into account the possible existence of different and potentially conflicting benchmarks while studying earnings management. We claim that financial distress could be the missing variable in the analysis of the effects of macroeconomics factors on this activity and that it could significantly affect the benchmarks of earnings management. By adopting a risk-taking perspective towards earnings management we argue that organizational survival could be considered a target for financial reporting in addition to traditional earnings benchmarks and that this alternative perspective may prompt non-monotonic accounting choices during periods of financial distress (March and Shapira, 1987). During a period of financial turmoil, firm's survival represents more of a critical issue than in normal times. Consequently, the relationship between earnings management and financial crisis may be non-linear and vary according to the intensity of the crisis.

Our analysis, conducted on a sample of 5.964 U.S. listed companies during the years 1996–2011, provides support for our hypothesis. First of all we document that financial crises significantly affect earnings management activities over and above the business cycle. However the direction of the effect is non-monotonic; for moderated levels of financial distress, we find that managers have less incentive to manipulate earnings. Arguably, managers are less willing to take risks that could threaten firm's survival in a situation already characterized by difficulties and uncertainty. However, as the financial crisis becomes more intense, we find that managers are more likely to engage in earnings management activities. Hence the inclusion of financial distress as an element of the analysis provides a way to rationalize the conflicting results obtained by the previous literature focusing on business cycles only.

The study is organized as follows: in Section 2 we review the previous literature and we develop our empirical hypothesis. In Section 3 we describe the sample and the methodology used for testing the hypothesis previously defined. Section 4 presents our empirical results, while in Section 5 we perform robustness checks and additional analyses. Section 6 draws some conclusions, discusses the limitations of the analysis and points out some directions for future research.

## **2. Prior literature and hypotheses development**

Johnson (1999) and Jenkins et al. (2009) investigate the relationship between the business cycle and the value relevance of earnings. They provide evidence that the association between earnings and returns (i.e. earnings value relevance) is sensitive to business cycles. Both Johnson (1999) and Jenkins et al. (2009) consider as macroeconomic conditions real economy-based factors by referring to characteristics of the business cycle such as economic growth or production. Thus they adopt a broad and real-based definition of macroeconomic expansion/recession without directly considering capital market-related factors that could influence managers' incentives to engage in earnings management. Furthermore their results are inconclusive: Johnson (1999) documents that earnings are more persistent and value relevant during periods of economic expansions than during a recession while Jenkins et al. (2009) show that the conservatism and value relevance of current earnings are higher during economic contractions than during economic expansions.

In order to explore more deeply the relationship between macroeconomics factors and earnings management, we want to expand the previous analysis and to consider

also the behavior of financial markets. This will allow us to study financial crises and not just business cycles.

### *2.1. Financial crises and business cycles*

In general terms, a financial crisis can be defined as an interruption in the normal functioning of financial markets. However, agreeing on a more specific definition is challenging since no two episodes of financial crisis are exactly the same. For example the Group of Ten (2001) views a (systemic) financial crisis as an event that will trigger a loss of economic value of a substantial portion of the financial system, together with a decrease in confidence and an increase in uncertainty about the operation of the financial system itself. Nevertheless economists tend to associate financial crises with certain key phenomena. The relative importance of these phenomena may differ from one episode of financial crisis to another but every episode seems to involve at least one and often all of them. We will follow the work of Hakkio and Keeton (2009) for the definition and measurement of a financial crisis. They single out few fundamental elements of a financial crisis.

The first element is an increase in uncertainty among lenders and investors about fundamental values of assets. This increased uncertainty about fundamental values typically translates into greater volatility in the market prices of the assets by causing investors to react more strongly to new information<sup>1</sup>.

The second element of financial crises is the uncertainty about the behavior of other investors. Keynes noted that the incentive of the individual is to anticipate “what average opinion expects average opinion to be” (Keynes, 1936). This kind of recursive behavior becomes more prevalent when lenders and investors become more uncertain about the fundamental values of assets. Like uncertainty about fundamentals, uncertainty about the behavior of other investors tends to show up in increased volatility of asset prices. In particular when investors base their decisions on guesses about other investors’ decisions, prices of financial assets become less tied to fundamental values.

A third element of a financial crisis is a sharp decrease in the willingness to hold risky and/or illiquid financial assets<sup>2</sup>. As a consequence lenders and investors will demand higher expected returns on risky assets and lower returns on safe assets. These shifts in preferences away from risky and/or illiquid assets and toward safe and/or liquid assets are often referred to as “flight to quality” and “flight to liquidity”, respectively.

A final element of financial crisis is an increase in the asymmetry of information between lenders and borrowers or buyers and sellers of financial assets. Mishkin (1991) and Gorton (2008) suggested that such asymmetries of information might worsen during a period of financial distress because the variation in the true quality of borrowers and financial assets might increase or because lenders lose confidence in the accuracy of their information about borrowers. Under these circumstances banks are less available to lend,

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<sup>1</sup> Suppose, for example, that the maximum price an investor is willing to pay for a firm’s stock depends on his estimate of the firm’s long-run profitability. Suppose also that the investor revises this estimate whenever he receives new information about the firm’s profit outlook. Then the greater the investor’s initial uncertainty about the firm’s long-run profitability, the more the investor will revise his estimate of the firm’s profitability in response to new information, and thus the more he will change his offer price in response to that information.

<sup>2</sup> An illiquid asset is defined as one that the owner cannot be confident of selling at a price close to its fundamental value if faced with a sudden and unexpected need for cash.

thus raising the interest rate charged on new loans and/or increasing their minimum credit standards. Then firms have more difficulties to qualify for loans and pay a higher average cost of borrowing. In addition financial crises cause investors to demand higher returns on equity, making it more expensive for firms to raise funds by issuing new equity and, at the same time, reducing the average price of assets on secondary markets.

When financial crisis is serious enough, it is likely to have a significant adverse effect on the real economy. However the relationship between real business cycles and financial crises is a complex one. Claessens et al. (2011) reiterate that the existing knowledge about the interactions between business and financial cycles is quite limited. Using a vast global database over the period 1960–2007 they are able to document some interesting results. For example they show that the degree of synchronization of business and financial crises varies according to the features and the intensity of the financial crisis. Moreover these features will affect the duration and amplitude of recessions and expansions. These results in line with IMF (2008) that points out the importance of the area of origin of the financial distress (banking sector versus securities or foreign exchange market) in shaping the severity of the potential downturn associated with the financial distress.

These recent works demonstrate that, despite the complexity of the task, it is possible to develop empirical indicators of the intensity of a financial crisis. Moreover they stress the importance of looking at business and financial cycles together in order to better capture the macroeconomic dynamics.

## *2.2. Financial crises and earnings management*

Under conditions of financial distress where markets are more skeptical and are experiencing a flight to quality, a flight to liquidity and an increase in the asymmetry of information, new potential investors will be more reluctant to invest in the firm and/or might require a higher return for their investment given the higher perceived risk. Existing investors might decide to sell their securities, sending a negative signal to the market and other investors. Also creditors could be more reluctant to lend money because they are expecting a higher likelihood of default. Bartov et al. (2002) show that, when a firm is facing potential financial distress, the market reward for beating or meeting earnings expectation is larger than that for financially sound firms, thus suggesting that beating earnings expectation conveys information about firm's ability to survive and future earnings prospects. For all these reasons managers can use earnings manipulation in order to affect market's evaluation of firm's probability to survive and, hence, reduce the average cost of capital. More generally, Matsumoto (2002) and Kasznik and McNichols (2002), among others, provide evidence that managers use earnings manipulation to achieve firms' targets and, then, avoid the communication of bad earnings news to the market. Graham et al. (2005) show that, when the overall economy is down, CEOs make choices that boost earnings and delay the reversal of these actions until the economy recovers. On the basis of these works we would expect that during a period of financial distress managers are more willing to undertake earnings manipulation activities.

However another strand of literature<sup>3</sup> shows that firms in financial difficulties are

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<sup>3</sup> e.g. Jones (1991) and De Angelo and De Angelo (1991).

likely to engage less in earnings management. This activity is not costless and a financial crisis is likely to increase the costs associated to earnings manipulations thereby discouraging managers to engage in it. Specifically, earnings management costs could arise from the possible actions by auditors (Ronen and Sadan, 1981; Trueman and Titman, 1988; Zang, 2012), SEC enforcement and legal liability (Ronen and Sadan, 1981). The scrutiny by auditors and regulators implies a higher probability to be detected with the consequent negative effects on management's reputation. Moreover the legal responsibility of the manager, in case misleading accounting practices are discovered, makes earnings management a risky activity for managers and reduces their incentives to manipulate financial statements. Consistently Huijgen and Lubberink (2005) and Willekens and Bauwhede (2003) show that in a situation of stronger litigation risk managers are less likely to manipulate earnings in order to reduce the exposure to the heightened litigation risk. Periods of financial crises are typically characterized by a stronger attention of media and regulators on firms' activities and behaviors and a higher litigation risk. As a consequence, firms should be more exposed to scrutiny from outsiders and managers are likely to perceive a higher risk of being detected if they undertake aggressive earnings management practices.

The inquiry from outsiders and the managers' legal liability are not the only possible sources of costs and risks of earnings manipulation. Managers might be motivated to reduce earnings management practices in order to interrupt the "numbers game" that they started to play with the market when they decided to engage in earnings manipulation in the first place. Jensen (2005) notes that the "numbers game" brings about an overvaluation of the firm's equity, since the firm's stock price is higher than its underlying fundamental value, and consequently an overstatement of firm's assets in the balance sheet. This overvaluation is quite risky for the firm especially if it is not able to deliver the performance that justifies the value assigned by the market because "once managers start lying in the earnings management game, it is nearly impossible to stop because the game cascades forward" (Jensen, 2005, page 4). CFOs surveyed by Graham et al. (2005) support this idea, explaining that, as firm's financial conditions do not improve, small earnings management activities can cascade and lead to big write-offs and/or large negative surprises in subsequent periods. In a period of financial crisis the risks associated with the numbers game are higher given the greater difficulties to perform as the market expects, the higher probability of being discovered and the stronger negative consequences if the "game" is detected. For this reason managers might prefer to contain earnings management activities that the firm cannot afford and that could generate further damage in the future.

Therefore, on the basis of prior literature, we can expect either more or less earnings management during a financial crisis. We claim that this inconclusiveness could be due to the fact that assuming a monotonic linear relation is an oversimplification. Consequently we would like to explore more deeply this relationship.

Incentives to manipulate earnings can be divided into two categories: internal factors such as firm's characteristics (Dechow et al., 2010), bond covenants (DeFond and Jiambalvo, 1994) or management compensation contracts (Healy and Wahlen, 1999; Fields et al., 2001) and external factors such as normative and regulatory setting (Barth et al., 2008; Leuz et al., 2003). Among the external factors a special emphasis has been put on the role of capital markets in encouraging or discouraging earnings management practices. For example Dechow et al. (1995) and Graham et al. (2005) document that most of the incentives to manipulate earnings derive from the market and from how

it reacts to the disclosure of earnings news. We may identify two types of capital market motivations: (1) “extraordinary incentives”, in periods surrounding particular capital market transactions; (2) “ordinary incentives”, related to the achievement of specific thresholds of profitability. Examples of situations of extraordinary incentives are management buyouts, equity offers (IPO, raising capital) and stock financed acquisitions. In all these cases the ultimate purpose of earnings manipulation is to conclude the transaction at more favorable terms for the firm (Teoh et al., 1998a,b). In the case of ordinary incentives, managers engage in earnings management activities in order to achieve some critical thresholds. Kasznik and McNichols (2002) show that the capital market is particularly sensitive to the ability of the firm to achieve earnings benchmarks and it rewards firms that meet the targets and it penalizes firms that miss them. In particular if the firm is not able to meet an earnings target, then the market infers that the firm has poor future prospects and, hence, depresses the firm’s stock price. Consequently, Healy and Wahlen (1999) and Matsumoto (2002) argue that managers have incentives to engage in earnings management activities in order to meet the expectations of financial analysts or of some specific type of investors and, hence, to avoid reporting earnings lower than expectations (i.e. negative earnings surprises).

We want to combine this distinction between ordinary and extraordinary incentives with the view of earnings manipulation as a risky activity for the firm. When managers decide to manipulate earnings, de facto, they decide to take some risks. According to behavioral theories of decision making and risk taking,<sup>4</sup> managers’ risk preferences are affected by the framing of problems. Hence reference points appear critical in managers’ risk-taking decisions. We interpret earnings thresholds as risk taking reference points.

Prior studies on earnings management have highlighted few potential thresholds: loss avoidance (Burgstahler and Dichev, 1997), previous years’ or seasonally lagged quarterly earnings (Barth et al., 1999; Degeorge et al., 1999) or analysts’ consensus forecasts (meeting these earnings benchmarks and recognize that their attainment represents one of the main motivation for earnings management activities. Nevertheless in a period of financial distress earnings benchmarks might not be the only reference points that managers take into account. We expect that, as the uncertainty and turbulence within the markets increase, managers become more concerned about firm’s survival and would consider it as an additional reference point respect to more “traditional” earnings benchmarks. March and Shapira (1987, 1992) argue that the threat to survival is going to affect managers’ risk preferences and decisions. Thus, when the intensity of the crisis is low, firms will perceive the survival under threat and, then, will be reluctant to take risks that could further jeopardize the existence of the firm. Hence we expect firms to undertake less earnings management practices. However, when the intensity of financial distress increases, the extraordinary incentive provided by the survival of the firm might encourage risk taking since there is nothing to lose and taking risks could be a way to escape the menace (Bowman, 1982). In this situation managers will be more inclined to take risk and should be more likely to undertake earnings management practices.

Consequently, we state the empirical hypothesis of our analysis as follows.

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<sup>4</sup> e.g. Kahneman and Tversky (1979) and Wiseman and Gomez-Mejia (1998).

Hypothesis. *The relationship between the intensity of a financial crisis and earnings management practices is non-monotonic: when the intensity of the crisis is low we observe less earnings management; when the intensity of the crisis is high we observe more earnings management.*

### **3. Empirical methodology**

#### *3.1. Data and sample description*

The analyses are conducted on a sample of U.S. companies listed on the New York Stock Exchange during the period 1996–2011. By focusing on a single country-setting, we limit possible confounding effects linked to different environments (i.e. level of development of the market, regulation, culture among the others). Moreover, contrary to most prior studies on earnings management, we use quarterly data because we have the possibility to compute our indicators of financial distress on quarterly basis and, hence, to obtain a deeper level of analysis. Even if we do not make any specific prediction about the timing of the effects of the financial crisis on earnings management, it is a fact that the monitoring of crises is done on a quarterly basis. The possibility of using quarterly data allows us to be consistent with this procedure and increases the number of observations.

We collect accounting data from Compustat North America database and the Financial Stress Index from the Federal Reserve Bank of Kansas City. Firstly we obtain from Compustat North America all U.S. firm-quarters observations from 1995 to 2013. We exclude all financial firms (SIC codes between 6000 and 6999) because they have different earnings management's measurement processes that might affect models' results. Furthermore we eliminate firms with missing values and we trim all variables used in the earnings management models at the 1st and 99th percentiles in order to mitigate the effect of possible outliers. Finally we require at least 20 observations in each two-digit SIC grouping per quarter as a condition for computing earnings management metrics. Then our final sample consists of 79.777 firm-quarter observations representing 5.964 U.S. unique firms between 1996 and 2011.<sup>55</sup> Table 1 describes the sample selection process.

[Table 1 around here]

#### *3.2. Earnings management metrics*

There is a wide debate in the accounting literature on how to measure earnings management and there is no agreement upon which measure is the most proper. Among the several models suggested by the literature to estimate the earnings management activities, we adopt as our primary measure the widely-used discretionary accruals computed following the modified Jones model (Jones, 1991). In our robustness checks we use several alternative metrics of earnings management in order to further validate our results.

Discretionary accruals have been computed by adopting the cross-sectional version of

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<sup>5</sup> Our sample is deliberately unbalanced in attempt to avoid a survival sample bias.

the modified Jones model as described in Francis et al. (2008). In particular we estimate the modified Jones model for each two-digit SIC-quarter grouping as follows:

$$\frac{TA_{it}}{A_{i(t-1)}} = \alpha_0 + \alpha_1 \left( \frac{1}{A_{i(t-1)}} \right) + \alpha_2 \left( \frac{\Delta REV_{it}}{A_{i(t-1)}} \right) + \alpha_3 \left( \frac{PPE_{it}}{A_{i(t-1)}} \right) + \varepsilon_{it} \quad (1)$$

where  $TA_{it}/A_{i(t-1)}$  = firm  $i$ 's total accruals in quarter  $(t)$  (measured as the difference among the change in current assets ( $\Delta CA$ ), net of the change in cash and short term investment ( $\Delta Cash$ ), the change in current liabilities ( $\Delta CL$ ), net of the change in short term debt ( $\Delta STD$ ) and depreciation and amortization (Dep))<sup>6</sup> divided by total assets at the beginning of quarter  $(t)$ ;  $A_{i(t-1)}$  = firm  $i$ 's total assets at the beginning of quarter  $(t)$ ;  $\Delta REV_{it}/A_{i(t-1)}$  = firm  $i$ 's change in revenues between quarter  $(t - 1)$  and quarter  $(t)$ , divided by total assets at the beginning of quarter  $(t)$ ;  $PPE_{it}/A_{i(t-1)}$  = firm  $i$ 's gross value of property, plant and equipment in quarter  $(t)$ , divided by total assets at the beginning of quarter  $(t)$ .

Following Kothari et al. (2005), we include a constant term in the estimation model.<sup>7</sup> The industry- and quarter-specific parameter estimates from Eq. (1) are used to estimate the firm-specific normal accruals ( $NA_{it}$ ) for our sample firms:

$$NA_{it} = \alpha_0 + \alpha_1 \left( \frac{1}{A_{i(t-1)}} \right) + \alpha_2 \left( \frac{(\Delta REV_{it} - \Delta REC_{it})}{A_{i(t-1)}} \right) + \alpha_3 \left( \frac{PPE_{it}}{A_{i(t-1)}} \right) + \varepsilon_{it} \quad (2)$$

where  $\Delta REC_{it}$  is the change in accounts receivable from the preceding quarter.

Our measure of discretionary accruals is the difference between total accruals and the fitted normal accruals, defined as  $DA_{it} = (TA_{it}/A_{i(t-1)}) - NA_{it}$ .

Following prior works we use the absolute value of the discretionary accruals ( $ABS\_DA$ ) as proxy for the magnitude of earnings management activities. However, in order to check for possible differences in the purpose of earnings management we also analyze separately positive accruals as proxy for income-increasing earnings management ( $Positive\_DA$ ) and negative accruals as proxy for income-decreasing earnings management ( $Negative\_DA$ ) (Cohen et al., 2008).

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<sup>6</sup> Hribar and Collins (2002) suggest that using a balance sheet approach to test for earnings management might induce measurement errors in the accrual estimation and the risk of a measurement error is higher in the case of discontinued operations. In this case researchers might conclude that earnings management exist when it is not the case by introducing a "negative bias to estimated accruals as net current assets tend to decrease when firms divest operations" (Hribar and Collins, 2002, page 108). Hence they suggest the adoption of a cash flow approach by computing accruals as the difference between the earnings before extraordinary items and discontinued operations minus the operating cash flows reported in the statement of cash flows in quarter  $t$ . We believe that the negative bias induced by the balance sheet approach might favor the rejection of the null hypothesis of no earnings management versus a reduction in earnings management but it goes against the rejection of the null hypothesis of no earnings management versus an increase in earnings management.

<sup>7</sup> The inclusion of a constant has several advantages: (1) it provides an additional control for heteroskedasticity, (2) it mitigates problems arising from the omission of the size variable, and (3) it makes the estimated discretionary accruals measures more symmetric, thereby increasing the power of the tests (Krishnan et al., 2011).

### 3.3. Financial crisis metrics

To identify financial crises, previous academic literature adopted several approaches. One approach relies on historical narratives of well-known systemic banking crises, when bank capital was eroded, lending was disrupted, and there was often the need for significant public intervention. An extension of this approach is to adopt both a chronology of events about banking crises and date currency crises by using quantitative threshold (Kaminsky and Reinhart, 1999; Reinhart and Rogoff, 2009a, 2009b). The implementation of narrative approaches to determine financial crises provides a rich database of episodes but it has some limitations. First of all the episodes of stress identified are usually of considerable length and varying intensity, making it difficult to identify both when the financial stress peaked and whether there was any meaningful causal relationship to an economic downturn. Moreover they focus mainly on banking crises and currency crises and pay little attention to pure securities markets episodes.

Another approach identifies crises through binary variables based on extreme values of one or two underlying financial variables. For instance currency crises are usually determined as significant devaluations, losses in reserves, and/or defensive interest rate increases. Instead equity crises are defined as a sharp decline in the overall market index where the decline can be indicative of greater expected loss, higher dispersion of potential losses (higher risk), or increased uncertainty about the return of firms (Illing and Liu, 2003). In both cases, crises are treated as banking and/or currency phenomena, rather than system-wide events.

For the purpose of our study, we are interested in a systemic measure and in its dynamic (i.e. how and when it started; how it evolved, etc.). The Financial Stress Index (*Kcfsi*) proposed by Hakkio and Keeton (2009) fulfills our purposes. This index is built using financial market based indicators in real time and of monthly frequency. 11 financial market variables are considered: (1) 3-month LIBOR/3-month T-bill spread (TED), (2) 2-year swap spread, (3) Off-the-run/on the run 10-year Treasury spread, (4) Aaa/10-year Treasury spread, (5) Baa/Aaa spread, (6) High-yield bond/Baa spread, (7) Consumer ABS/5-year Treasury spread, (8) Negative value of correlation between stock and Treasury returns, (9) Implied volatility of overall stock prices (VIX), (10) Idiosyncratic volatility (IVOL) of bank stock prices, (11) Cross-section dispersion (CSD) of bank stock returns. Each of these variables is associated to one or more key features of financial crisis. Given these 11 indicators, a composite and unique Index of Financial Stress (*Kcfsi*) is computed by using the method of principal components.

By construction *Kcfsi* can be both positive and negative. Negative values of *Kcfsi* indicate periods of financial stability while positive values suggest a worsening in financial market conditions. On this basis, we create a dummy variable (i.e. *Dummy\_Kcfsi*) that assumes value 1 if the value of *Kcfsi* is positive and 0 otherwise. We use this dummy variable to identify periods of financial crisis. Then we use the average value of the *Kcfsi* in quarter (*t*) as our measure of the intensity of the financial crisis.

### 3.4. Models

In order to compare our results to the previous literature that focused on real business cycles, we perform a regression analysis where the dependent variable is earnings management and the main independent variable is the financial crisis's indicator

together with real business cycle and some other control variables.

$$\begin{aligned}
 DA_{it} = & \beta_0 + \beta_1 Crisis_t + \beta_2 Contraction_t + \beta_3 GDP_t + \beta_4 SOX_t + \beta_5 Time_t \\
 & + \beta_6 LogTA_{it} + \beta_7 LEV_{it} + \beta_8 Growth_{it} + \beta_9 CFO_{it} + \beta_{10} ROA_{it} \\
 & + \beta_{11} Rm\_disx_{it} + \beta_{12} SdCFO_{it} + \beta_{13} SdREV_{it} + \beta_{14} LagTAC_{it} \\
 & + \varepsilon_{it} \quad (3)
 \end{aligned}$$

The dependent variable ( $DA_{it}$ ) has three variants: (1) the absolute value of discretionary accruals (i.e.  $ABS\_DA_{it}$ ); (2) positive discretionary accruals or income-increasing discretionary accruals (i.e.  $Positive\_DA_{it}$ ); (3) negative discretionary accruals or income-decreasing discretionary accruals (i.e.  $Negative\_DA_{it}$ ). The independent variable ( $Crisis_t$ ) takes two forms: (1) dichotomous variable taking value 1 if  $Kcfsi$  is positive and 0 otherwise (i.e.  $Dummy\_Kcfsi_t$ ); (2) continuous variables represented by the  $Kcfsi$  index (i.e.  $Kcfsi_t$ ).

Given that our aim is to distinguish the effects of financial distress from the effects of the business cycle, we insert two control variable that capture different aspects of the business cycle. As a proxy for the real business cycle we use business cycle indicator regularly produced by National Bureau of Economic Research (NBER). Thus the variable  $Contraction$  is a dummy variable that takes a value of 1 during a contraction and 0 otherwise.  $Gdp$  is the quarterly variation of the Gross Domestic Product.<sup>8</sup> Consistent with prior research, we enter in the model some control variables related to firm characteristics.

In particular we consider firm size, measured by the natural logarithm of total assets ( $Logta$ ), because it is expected that larger firms are more carefully monitored by the market and other stakeholders, which makes implementing earnings management more difficult. Moreover we take in account the firm leverage ( $Lev$ ), measured by the debt ratio, since previous studies show that firms facing financial constraints have an incentive to manipulate earnings in order to avoid a potential loss from disclosing a financial problem. We also introduce a control variable for firm's performance, measured by Return on Assets ( $Roa$ ) and cash flow from operations scaled by total sales ( $Cfo$ ) because they represent potential determinants of earnings management (Marra et al., 2011).

In addition, previous studies (Cohen et al., 2008) show that after the introduction of the Sarbanes–Oxley Act in 2002 we observe a significant decline in accrual-based earnings management. For this reason, we add a dummy variable that takes value 1 after the approval of SOX and 0 otherwise in order to control for the effect of the new law. It has been argued that after the introduction of SOX, real earnings management may have increased. For this reason we also control for real earnings management by introducing abnormal discretionary expenses ( $Rm\_disx$ ) calculated using the method proposed by

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<sup>8</sup> We gather data for  $Gdp$  from Bureau of Economic Analysis. As robustness checks we substitute  $Gdp$  with two dummy variables, the first one assuming value 1 if a negative variation in  $Gdp$  occurred in the quarter and 0 otherwise and the second one taking value 1 after two consecutive quarters with a negative variation in  $Gdp$ . Results are qualitatively the same by using the two alternative specifications. The inclusion of both  $Contraction$  and  $Gdp$  do not create multicollinearity problems (VIF for both variables are below the critical threshold of 10). Furthermore we run the analyses without including  $Gdp$  and results are the same. Noteworthy IMF (2008) suggested that recession and contraction represent two different phenomena and one that does not necessarily implicate the other. As a consequence it is reasonable to include both variables.

Zang (2012).

According to Hribar and Nichols (2007) unsigned earnings management are particularly sensitive to the firm's operating volatility like volatility of sales and volatility of cash flows. In particular they argue that when the partition variable (in our case financial crisis) is correlated with these characteristics, the exclusion of these variables as control can create an omitted variable bias. Since financial crisis is likely to be correlated to these variables, we included the following variables: (a) SDREV namely the standard deviation of sales as proxy for the volatility of sales; (b) SDCFO representing the volatility of cash flows and computed as the standard deviation of cash flows from operations; (c) GROWTH representative of sales growth measured as the variation in revenues between quarter ( $t$ ) and quarter ( $t - 1$ ) divided by revenues in quarter ( $t - 1$ ).

In addition we add the lagged value of total accruals in quarter ( $t - 1$ ) (Lag $tac$ )<sup>9</sup> (Krishnan et al., 2011) to control for the general accruals over time and, hence, for the possibility that the changes in earnings management practices (both magnitude and purpose) are due to the effect of past accounting choices and not to the current financial market conditions. Finally we enter a time variable equal to the difference between the fiscal year-quarter and 1996-quarter1 and firm fixed effects to control for time- and firm-period specific effects,<sup>10</sup> respectively.

In order to test our hypothesis concerning a non-monotonic relationship between financial crisis and earnings management, we then include in regression (3) a quadratic term (i.e.  $Kcfsi^2$ ) computed as the mean-centered value of  $Kcfsi$  in quarter ( $t$ ) squared. We choose to mean-center  $Kcfsi$  in order to avoid multicollinearity issues. Hence the main model used to test our hypothesis is the following:

$$DA_{it} = \beta_0 + \beta_1 Kcfsi_t + \beta_2 Kcfsi_t^2 + \beta_3 Contraction_t + \beta_4 GDP_t + \beta_5 SOX_t + \beta_6 Time_t + \beta_7 LogTA_{it} + \beta_8 LEV_{it} + \beta_9 Growth_{it} + \beta_{10} CFO_{it} + \beta_{11} ROA_{it} + \beta_{12} Rm\_disx_{it} + \beta_{13} SdcFO_{it} + \beta_{14} SdREV_{it} + \beta_{15} LagTAC_{it} + \varepsilon_{it} \quad (4)$$

The dependent variables and the control variables are defined as in Eq. (3). Specifically we expect the coefficient for the main effect  $Kcfsi$  ( $\beta_1$ ) to be statistically significant and negative and the quadratic term  $Kcfsi^2$  ( $\beta_2$ ) to be statistically significant and positive.

Variable description and measurement are summarized in Table 2.

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<sup>9</sup> Consistent with Barton and Simko (2002) and Baber et al. (2011), we used two alternative variables to take into account the possible effects of prior accounting practices and likely to act as constraints for current earnings management activities. Specifically we consider the net operating assets at the beginning of the fiscal year (NOA) and we distinguish current and non-current NOA. We calculate current net operating assets, designated NOA<sub>WC</sub>, as the difference between current assets net of cash and short term investment and current liabilities net of short term debt, deflated by sales. Non-current net operating assets, designated NOA<sub>NC</sub>, are computed as the difference between total net operating assets (sum of shareholder's equity net of cash and short term investment, long-term debt and debt in current liabilities) and current NOA<sub>WC</sub> computed above. Finally we employ time- and industry-adjusted NOA by partitioning firms in each two-digit SIC codes for each year and then estimating the mean NOA<sub>WC</sub> and mean NOA<sub>NC</sub> for each sub-group. The findings do not change.

<sup>10</sup> We run Hausman-test to verify the suitability of firm-fixed effects. The test warrants the adoption of firm-fixed effects.

[Table 2 around here]

## 4. Results

### 4.1. Descriptive statistics and correlation

Fig. 1 plots the trend of our Financial Stress Index (*Kcfsi*) and the periods of contraction as identified by NBER. By looking at the figure, we can identify two episodes of financial distress ( $Kcfsi > 0$ ) in our sample, with a period of relative stability ( $Kcfsi < 0$ ) before and in between them. The first financial instability goes from 1998 to 2002. In fact this period combines two phenomena. For the first part of this period, we can attribute the instability to the bailout of the LCTM fund. In the second part of this period, the persistent instability may be associated with the end of the internet bubble and the accounting scandals occurred at the beginning of the new millenium that led to the approval of the Sarbanes–Oxley Act in 2002. During this period of financial crisis we observe a contraction but not a recession with respect to the real business cycle. The second episode corresponds to the last financial crisis that began in 2007. In this case we also observe a recession with respect to the real business cycle.

[Figure 1 around here]

As we can see from the figure, even though they are somehow correlated, the dynamics of financial crisis and business cycles are different. We have also computed the concordance index used by Claessens et al. (2011). In this case the value of the index is 0.83, showing that the two series are correlated but do not perfectly overlap.

These trends are consistent with the descriptive statistics presented in Table 3. This table presents descriptive statistics for the whole sample (Panel A). It also presents descriptive statistics for two sub- samples. The first sub-sample (Panel B) includes all the observations with negative *Kcfsi* (i.e. no crisis), whereas the second sub-sample (Panel C) includes all the observation with positive *Kcfsi* (i.e. crisis). In Panel A it's worth noticing that both the mean (0.2257) and the median value (0.2000) of *Kcfsi* are positive thereby suggesting that the period under consideration is, on average, a time of financial instability.

As we can expect, Table 3 shows a general worsening of firms' fundamentals during a period of financial crisis: most of the differences are negative and statistically significant at 1% level.

[Table 3 around here]

Table 4 presents the correlation matrix for all the variables.

Noteworthy both *Dummy\_Kcfsi* and *Kcfsi* are not significantly correlated with absolute discretionary accruals (*ABS\_DA*) while *Kcfsi* is significantly negatively correlated with positive (*Positive\_DA*) and negative discretionary accruals (*Negative\_DA*) confirming the suspicion that the relationship between earnings management and financial crisis deserves further analysis.

[Table 4 around here]

#### 4.2. Multivariate results

We begin our analysis by investigating whether there is a monotonic significant relation between earnings management and financial distress. Table 5 exhibits the results of estimating firm fixed-effects model (3) with robust standard errors clustered by firm by adopting *Dummy\_Kcfsi* as proxy for financial crisis.

[Table 5 around here]

All the models are statistically significant at 1% level. The coefficient for *Dummy\_Kcfsi* in the first model (absolute discretionary accruals) is negative and statistically significant at 1% level. This result shows that financial distress appears to have a significant effect on the level of earnings management. This effect turns out to be negative showing a reduced level of overall earnings management when financial markets are in turmoil. When we looked at signed discretionary accruals, we see that the effect is statistically stronger for income increasing accruals than for income decreasing accruals.

When we focus on real business cycle variables (i.e. Contraction and Gdp), observe that they are both (weakly) significant for absolute discretionary accruals, and not or very weakly significant for positive or negative discretionary accruals. These results provide evidence for financial markets as crucial in determining the effects of macroeconomic factors on earnings management.

Regarding the other control variables, we notice that the coefficients for dichotomous variable SOX are consistent with Cohen et al. (2008). Moreover most of the firm-related controls are statistically significant and in the direction expected by previous works. Noteworthy the coefficient for *Rm\_disx* is positive and statistically significant for absolute and positive discretionary accruals while it is negative and statistically significant for negative discretionary accruals. Since higher values of *Rm\_disx* indicate lower amounts of discretionary expenditures cut by firms to augment reported earnings, these findings suggest that firms use accrual-based and real-based earnings manipulations as substitutes, consistently with previous works (Cohen et al., 2008; Zang, 2012). Finally the coefficients for the time variable are significant and positive for *ABS\_DA* as well as for positive discretionary accruals thus suggesting an overall decrease in earnings management over the sample period.

In Table 6 we provide the results of estimating model (3) by using the raw value of *Kcfsit* as our proxy for the intensity of a financial crisis.

[Table 6 around here]

Also these models are statistically significant at 1%. However the main findings are not consistent to those described in Table 5 because the coefficient for *Kcfsi* is not significant in any of the models. In Table 6 the results related to the control variables are similar to those found in Table 5. Overall the findings provided in Tables 5 and 6 are in line with the previous literature in the sense that they do not provide conclusive evidence on the role played by macroeconomic factors and in particular by financial distress on earnings management. However, as we argued in the hypothesis development,

this inconclusiveness could be due to non-monotonicity in the relationship.

Given that, we now shift our attention to the possibility that there exists a threshold in the intensity of financial distress that triggers a change in firm behavior from ordinary to extraordinary benchmarks.

For this purpose, we partition the sample into two sub-groups using the values of Financial Stress Index (*Kcfsi*). In particular we transform *Kcfsi* into a binary variable that takes value 1 if the Financial Stress Index is above its mean and 0 if the Financial Stress Index is below its mean.<sup>11</sup> Then, for each of the two sub-samples, we run our regression model (3) using *Kcfsi* as proxy for financial distress. Table 7 (Panel A and B) presents the results related to the two sub-groups (i.e. below and above the mean).

[Table 7 around here]

Panel A reports the results of model (3) when the value of *Kcfsi* is below its mean thus representing a period of moderate financial instability or of financial stability. As we can see from the table, *Kcfsi* has a negative and weakly statistically significant coefficient for *ABS\_DA* and positive discretionary accruals while it is not significant for negative discretionary accruals. These results imply that in a period of moderate financial turbulence managers are less likely to manipulate earnings upwards.

In Panel B we show the results of the model when the value of *Kcfsi* is above the mean namely for periods of extreme financial distress. In this case the coefficient of *Kcfsi* is always statistically significant and assumes opposite signs: it is positive for *ABS\_DA* and *Positive\_DA* and negative for negative discretionary accruals. Therefore when financial distress achieves extreme values managers are more likely to undertake earnings management practices.

Taken together, the findings reported in Table 7 suggest that financial distress does not have a monotonic effect on managers' incentive to manipulate earnings thus providing preliminary support to our hypothesis of a non-linear relation between earnings management and financial crisis.

In order to fully test this hypothesis we run the quadratic model (4) for the whole sample. Table 8 presents the results.

[Table 8 around here]

As expected the coefficient for the quadratic term  $Kcfsi^2$  is highly significant (1% level) in all the three models thus supporting our hypothesis that earnings management is not monotonically associated with financial distress.<sup>12</sup> In particular, consistently with the above findings, the estimated coefficient of *Kcfsi* is still negative and statistically significant for *ABS\_DA* and positive discretionary accruals. Moreover the coefficient of  $Kcfsi^2$  is positive and highly significant for *ABS\_DA* and positive discretionary

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<sup>11</sup> Alternatively we used as partition variable the median value and the third quarter value of *Kcfsi* and results are qualitatively the same.

<sup>12</sup> We use a Wald test to verify whether we should include a quadratic term in the model. In all the three cases the test confirms the validity of including a quadratic element. We also use the `utest` command of Stata in order to test for the existence of a U-shaped relationship between our variables of interest. For all the three models the test supports the existence of such a relationship.

accruals.<sup>13</sup>

Overall results provide evidence for a U-shaped relationship between earnings management and financial crisis. When the intensity of the financial crisis is low managers prefer to reduce their earnings management practices in particular those that are income increasing. However, as financial conditions worsen, managers change their attitude and are more likely to manipulate earnings, again with a prevalence of income-increasing activities.

As anticipated above, a possible explanation of this result is that in the initial phase of a financial crisis the main issue is firm's survival and, then, managers are less willing to take risky activities able to jeopardize firm's existence.

As a consequence top management prefers to decrease earnings management practices in attempt to avoid their negative consequences capable to damage the firm that is already facing a situation of uncertainty and distress. Nevertheless, when financial distress exacerbates, firms may find their existence already compromised. Hence managers have nothing to lose and, therefore, they are more willing to take risks and manipulate earnings. Indeed by inflating earnings managers might hope to obtain several advantages (i.e. more favorable contractual conditions, lower cost of capital, a less adverse reaction of the market) that could delay or avoid the dismissal of the business. This intuition can be confirmed by using the modified version of Altman's  $Z$ -score proposed by Badertscher (2011) and Zang (2012). A higher (lower) value of this score implies less (more) probability of bankruptcy. We computed the value of this score for each observation. Again we use the mean of  $Kcfsi$  as the dividing point between low level of crisis and high level of crisis. Then we compare the mean of the  $Z$ -score for periods of more intense financial crisis with the average value for period of less intense financial crisis. The results are presented in Table 9 Panel A.

As we can see the mean of the  $Z$ -score is statistically lower in periods of intense financial distress than in period of moderate financial distress. We then used the thresholds values proposed by Altman (1968) of 2.99 and 1.8 in order to separate firms into three categories: "safe", "grey" and "distressed". The results presented in Table 9 Panel B show that the proportion of distressed firms is higher in periods of intense financial crisis.

[Table 9 around here]

Overall these results provides support for our explanation of the non-monotonic behavior of earnings management during financial distress by showing that on average firms are in significantly worst financial condition in periods of intense financial crisis than in periods of moderate financial crisis.

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<sup>13</sup> In order to take into account the possible bias due to the truncation at 0 of positive (income-increasing) and negative (income-decreasing) discretionary accruals, we re-run our analyses by using truncated regressions. We obtain similar results: we found a U-shaped relationship for positive discretionary accruals but not for negative discretionary accruals.

## 5. Sensitivity analyses

### 5.1. Alternative earnings management proxies

The modified Jones model of discretionary accruals has several limitations often outlined by previous studies (Dechow et al., 2011). For this reason we re-run our analyses by using four alternative measures of earnings management in order to corroborate our results.

Kothari et al. (2005) suggest that discretionary accrual estimates are likely to be correlated with firm performance. Hence we use performance-adjusted discretionary accruals as a first alternative proxy for earnings management. We use two different approaches in computing performance-adjusted discretionary accruals. The first approach is to simply include past-quarter ROA in the modified Jones analysis (Kothari et al., 2005; Krishnan et al., 2011). Thus Eq. (1) becomes:

$$\frac{PTA_{it}}{A_{i(t-1)}} = \alpha_0 + \alpha_1 \left( \frac{1}{A_{i(t-1)}} \right) + \alpha_2 \left( \frac{\Delta REV_{it}}{A_{i(t-1)}} \right) + \alpha_3 \left( \frac{PPE_{it}}{A_{i(t-1)}} \right) + \alpha_4 ROA_{i(t-1)} + \varepsilon_{it} \quad (5)$$

And Eq. (2):

$$PNA_{it} = \alpha_0 + \alpha_1 \left( \frac{1}{A_{i(t-1)}} \right) + \alpha_2 \left( \frac{(\Delta REV_{it} - \Delta REC_{it})}{A_{i(t-1)}} \right) + \alpha_3 \left( \frac{PPE_{it}}{A_{i(t-1)}} \right) + \alpha_4 ROA_{i(t-1)} + \varepsilon_{it} \quad (6)$$

where  $ROA_{i(t-1)}$  is the return on assets in the previous quarter.

The difference between performance-adjusted total accruals and the fitted performance-adjusted normal accruals (PDA) is our first measure of performance-matched discretionary accruals.

In the second approach, after the estimation of discretionary accruals (i.e. Eqs. (1) and (2)), we partition firms within each two-digit SIC code into deciles based on their prior year's ROA (Kothari et al., 2005; Krishnan et al., 2011). Our second measure of performance-matched accruals ( $KOT\_DA$ ) is the difference between firm's DA and the median DA for its ROA decile in quarter ( $t$ ).

Since we adopt quarterly data, our measure of discretionary accruals may suffer of a seasonality-related bias.<sup>14</sup> In order to take into account this possible bias, we adopt the measure suggested by Barton and Simko (2002) that account for the seasonality. In particular we add to our estimation model (e.g. Eqs.(1) and (2)) fiscal-quarter indicators Q1, Q2, Q3 and Q4. Then our estimation model is modified as follows:

$$\frac{BART\_TA_{it}}{A_{i(t-1)}} = \alpha_0 + \alpha_1 \left( \frac{1}{A_{i(t-1)}} \right) + \alpha_2 \left( \frac{\Delta REV_{it}}{A_{i(t-1)}} \right) + \alpha_3 \left( \frac{PPE_{it}}{A_{i(t-1)}} \right) + \alpha_4 Q1_{it} + \alpha_5 Q2_{it} + \alpha_6 Q3_{it} + \alpha_7 Q4_{it} + \varepsilon_{it} \quad (7)$$

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<sup>14</sup> Brown and Pinello (2007) provide evidence that the probability to engage in income increasing earnings management is lower in the fourth quarter because of the auditor and board scrutiny on the annual reporting process. Given that, earnings management appears more likely in the interim quarters than in the fourth one.

$$BART\_NA_{it} = \alpha_0 + \alpha_1 \left( \frac{1}{A_{i(t-1)}} \right) + \alpha_2 \left( \frac{(\Delta REV_{it} - \Delta REC_{it})}{A_{i(t-1)}} \right) + \alpha_3 \left( \frac{PPE_{it}}{A_{i(t-1)}} \right) + \alpha_4 Q1_{it} + \alpha_5 Q2_{it} + \alpha_6 Q3_{it} + \alpha_7 Q4_{it} + \varepsilon_{it} \quad (8)$$

Our measure of seasonality-adjusted discretionary accruals ( $BART\_DA$ ) is the difference between  $BART\_TA$  and  $BART\_NA$ .

Finally, because the previous measures of discretionary accruals consider both the short-term and long term items of accruals, we adopt the Abnormal Working Capital Accrual, based on Francis et al.'s (2008) adaptation of Dechow and Dichev's (2002) model thus considering only the short-term component represented by the working capital.

The Dechow and Dichev's (2002) model allows to isolate the "expected" and "unexpected" portion of working capital accruals based on their association with cash flows. In order to compute the "expected" working capital accruals we estimate the following model for each industry:

$$\frac{TCA_{it}}{A_{it}} = \beta_0 + \beta_1 \left( \frac{Cfo_{it}}{A_{it}} \right) + \beta_2 \left( \frac{Cfo_{i(t-1)}}{A_{it}} \right) + \beta_3 \left( \frac{Cfo_{i(t+1)}}{A_{it}} \right) + \beta_4 \left( \frac{\Delta REV_{it}}{A_{it}} \right) + \beta_5 \left( \frac{PPE_{it}}{A_{it}} \right) + \varepsilon_{it} \quad (9)$$

where  $TCA_{it}/A_{it}$  = firm  $i$ 's working capital accruals in quarter ( $t$ ) scaled by total assets at the end of quarter ( $t$ ) computed as the difference among the change in current assets ( $\Delta CA$ ), net of the change in cash and short term investment ( $\Delta Cash$ ), the change in current liabilities ( $\Delta CL$ ), net of the change in short term debt ( $\Delta STD$ );  $Cfo_{it}/A_{it}$  = firm's cash flow from operations in quarter ( $t$ ), computed as the difference between income before extraordinary items and total accruals, scaled by total assets at the end of quarter ( $t$ );  $\Delta REV_{it}/A_{it}$  = firm  $i$ 's change in revenues between quarter ( $t - 1$ ) and quarter ( $t$ ), scaled by total assets at the end of quarter ( $t$ );  $PPE_{it}/A_{it}$  = firm  $i$ 's gross value of property, plant and equipment in quarter ( $t$ ), scaled by total assets at the end of quarter ( $t$ ).

The variation in working capital accruals that is not associated with the cash flow from operations in the current period, prior period and future period, as well as the change in revenues and the level of property, plant and equipment represents the unexplained or discretionary working capital accruals. Thus we use the firm- and quarter-specific residuals from Eq. (9) as our last measure of earnings quality (DD).

Our main result on the non-monotonic effect of financial crisis on earnings management are presented in Table 10 only for the Absolute value of the corresponding dependent variable.<sup>15</sup> They hold for the all the alternative measures of earnings management adopted except for DD.

[Table 10 around here]

<sup>15</sup> Those for Positive\_DA and Negative\_DA are available from the authors.

## 5.2. *Alternative financial crisis proxy*

As we discussed before, there are various ways of defining a financial crisis. Hence it could be possible that our results depend on the particular index of financial distress chosen. For this reason we looked for an alternative proxy that could be used to detect periods of financial crisis. So we re-estimated the models using as the dependent variable the Financial Stress Index produced by the Federal bank of St. Louis (*Stfsi*). The results, presented in Table 11, hold and we still find statistically significant evidence of a quadratic effect.

[Table 11 around here]

## 5.3. *Additional test for survival reference point*

We documented a significant change in the likelihood of bankruptcy while moving from less intense financial crisis periods to periods where the crisis is more severe. This result could depend on the threshold used to determine periods of intense and less intense financial crisis. So we repeated the test on the value of the Z-score by using the median instead of the mean. Once again the results suggest that for higher level of crisis the mean percentages of “safe” and “grey” firms is smaller than for lower level of financial distress while the average percentage of “distress” firms is greater in acute phases of crises than in more stable periods.

## 5.4. *Industry analyses*

We conducted a coarse industry analysis by focusing on 4 main industries adopting an approach similar to Abarbanell and Bushee (1997). In particular we distinguish:

- (a) Manufacturing (firms with a SIC code beginning with number 3).
- (b) Primary products (firms with a SIC code beginning with number 2 or 1).
- (c) Service (firms with a SIC code beginning with number 7 or 8).
- (d) Wholesale/Retail (firms with a SIC code beginning with number SIC 5).

In this way we had sufficient observations in each sub-sample and, at the same time, we allowed for some basic industry differences. Indeed we observed differences across industries. The results (not tabulated) show that the curvilinear relationship holds for manufacturing firms and for companies operating in primary products-related industries. However we do not find a (robust) monotonic trend in service and wholesale/retail industries. In such industries financial crisis has a positive and significant effect on discretionary accruals. A deeper analysis of firm characteristics operating in the industries showed that firms operating in service and wholesale/retail industries have generally worse financial conditions during our sample period. As a consequence they could more promptly perceive their survival as compromised.

## 5.5. *Asian Crisis*

The financial distress proxies used so far are centered on the US financial market. Hence they are not well suited to capture another important phenomenon taking place in the sample period: the Asian financial crisis that started in July 1997. This crisis had important effects on other markets outside Asia such as, for example, the US mini-crash of October

1997.

In order to account for the potential effect of the Asian financial crisis, we created two variables: *Mini\_crash* to indicate 1997Q4 and *pre\_asian* (1997q4; 1998q1 and 1998q2; 1998q3). By including these variables into our main quadratic model, we obtained similar results to those presented above. However when we focus on the sub-sample of KFCSI below the mean, once these new variables are included in the analysis, the significance of KFCSI increases. This analysis is presented in Table 12 for the *mini\_crash* variable and it shows the importance of considering the existence of financial crises outside US and their potential implications on US economy and markets.<sup>16</sup>

[Table 12 around here]

### 5.6. Real earnings management analysis

In our previous analysis we have included abnormal discretionary expenses as a control variable for real earnings management, while keeping accrual based earnings management as the main dependent variable. We now want to invert this model specification and use real earnings management as the dependent variable and accruals based earnings management as the control variable.

Following prior works (Cohen et al., 2008; Zang, 2012), we considered three types of real earning management: cutting R&D expenses (unexpectedly low levels of R&D expenses), increasing sales by offering price discounts or more lenient credit terms (unexpectedly low cash flow from operations)<sup>17</sup> and overproducing (unexpectedly high cost of production). All the three measures are computed following the work of Cohen et al. (2008).<sup>18</sup> The results of these analyses are presented in Table 13.

[Table 13 around here]

We find a significant effect of crisis for all the three measures of real earnings management.

For abnormal cash flow the effect is curvilinear. In particular as financial crisis increases, we observe higher level of abnormal cash flows (less real earnings management) but, as financial crisis becomes acute, abnormal cash flows are lower suggesting that firms are more likely to accelerate the timing of sales through price discounts and/or more lenient credits (Cohen et al., 2008). These results are consistent with the increasing concern for firm's survival as financial conditions worsen. The acceleration in timing of sales will boost the sales in the current period while reducing the cash flows. In a period of moderate financial distress, firms will not undertake activities able to jeopardize the firm's existence and, hence, they will be less likely to accelerate the sales while reducing cash flows because of the negative effects that the reduction

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<sup>16</sup> The results with the *pre\_asian* variable are similar and are not tabulated here but are available from the authors.

<sup>17</sup> Even if we take into account abnormal cash flows from operations as additional measure of real earnings management, corresponding results should be considered with caution since prior works (Roychowdhury, 2006; Zang, 2012) pointed out that real activities manipulation can impact them in different directions and, then, the net effect is ambiguous. This is even more likely in a period of financial crisis.

<sup>18</sup> The sample size for *Rm\_prod* is smaller than that for the other measures because we lose observations for the computation of the measure. However we repeated the models for the smaller sample for all the other measures and results are qualitatively the same.

in cash flows might have for the firms' survival. However, as the crisis achieves its peak, price discounts and/or more lenient credits could be the last possibility to increase sales and, hence, save the firm. As a consequence firms would be more likely to engage in these practices.

For both abnormal research and development expenses and abnormal cost of production we found a significant and negative linear effect. The negative effect of KCFSI on abnormal R&D indicates that, as financial crisis increases, the level of abnormal discretionary expenses is lower and, hence, firms are more likely to cut the expenses in order to boost their earnings (higher real earnings management).<sup>19</sup> Instead the negative effect of KCFSI on abnormal cost of production, suggests that as financial conditions deteriorate, firms are less likely to undertake real earnings management by increasing production. The difference between the types of real earnings management can be explained if we take into account the diverse level of feasibility of the practices. Cutting R&D or offering priced discounts or more lenient credit firms are easier and "faster" decisions/activities firms can undertake when financial markets are very turbulent. On the contrary increasing production more than necessary is a more difficult solution to adopt.<sup>20</sup> Lastly we run regression models by excluding our time control. In the main analysis we decided to include a control for time-dimension in order to consider phenomena occurred in the quarter that are likely to affect managers' accounting choices but they are not captured by the other variables in the model such as the higher pressure of the media. However the presence of time could absorb part of the main effect of interest thus potentially "throwing out the baby with the bathwater". Results do not change and they are similar to those presented in Section 4.2.<sup>21</sup>

## 6. Conclusions

The purpose of the work is to study the association between earnings quality and financial crises and contribute to the current debate on the relationship between the current crisis and financial reporting. In particular our contribution to the existent literature is twofold.

First of all we add the financial dimension to the analysis of the relationship between macroeconomics cycles and earnings management. The previous literature had focused on real business cycles. Building on the fact that the dynamic of financial crises and of real business cycles do not fully overlap, we provide evidence that financial crises significantly influence managers' accounting decisions.

Secondly we found that the association between earnings management and financial crises is non-monotonic: earnings quality improves during moderate periods of crisis and worsens as financial crisis becomes extreme. We argue that this result can be explained by considering earnings management decisions from a risk taking perspective. Managers evaluate the risks

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<sup>19</sup> We obtain similar results if we consider only abnormal SG&A according to Athanasakou et al. (2011).

<sup>20</sup> At the same time we should acknowledge the limitations of adopted real earnings management metrics in capturing real earnings management activities. Indeed the lower level of R&D expenses, production as well as higher likelihood of price discount or lenient firms appear as "economically rational" solutions adopted by managers to face the overall situation of difficulties and, hence, it seems difficult to fully disentangle to what extent the observed effects are the result of an opportunistic behavior of managers or something else.

<sup>21</sup> Nevertheless we prefer to include in our main results the time variable because it potentially allows us to control for the quarter-related effects and, also, for the trend in the level of earnings management and, then, to better distinguish the effect in earnings management activities due to the changes in financial conditions and the natural non-stationarity of earnings management.

involved in these practices. This evaluation is likely to be done using a reference point. Our results suggest that in a period of financial crisis, managers do not have a unique reference point. One reference point is represented by the traditional earnings benchmarks suggested by prior works. However, in a period of financial distress, a second reference point exists: firm's survival. During a financial crisis, managers' decisions to engage in earnings management activities depend not only on the probability of achieving earnings targets but also on the probability of survival/bankruptcy of the firm. When the financial crisis is moderate, firms will feel a higher threat to firm's survival. As a consequence they will not take risks in order to protect its existence. On the contrary, when financial conditions get worst, firms are more likely to assume risks and engage in earnings management activities, since their survival is already seriously jeopardized. We support our explanation by showing that the likelihood of bankruptcy is significantly higher when the financial crisis is more intense.

However the study has several limitations that could represent a starting point for future research. First we focused only on one country (U.S.) and, hence, we could obtain different results by considering other settings with different characteristics in terms of regulation, type of economy and culture. Moreover, the analysis might be more complete and provide more interesting insights by examining diverse types of crises.

### *Acknowledgements*

We would like to thank Pietro Bianchi, Salvador Carmona, Cristina Cruz, Fabrizio Salvador and Luis Gomez-Mejia for their helpful comments on previous versions of the paper. We would also like to thank participants at the EAA sponsored workshop held in Prague in September 2012, at the 2013 EAA Annual Meeting held in Paris. The comments of an anonymous reviewer and of the participants at the 2013 Journal of Accounting and Public Policy conference were extremely helpful for the revision and improvement of the paper. Any remaining error is our responsibility only.

Financial support by the Spanish Ministry for the Economy and Competitiveness through grant ECO2010-22105-C03-01 is gratefully acknowledged.

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**Table 1**

Sample selection procedure.

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Population of U.S. listed companies in 1995–2013	820.905
(–) Duplicated observations	820.787
(–) Financial observations (SIC codes: 6000–6999)	604.553
(–) Observations with missing values	312.531
(–) Outliers (1st and 99th percentiles)	165.387
(–) Firms-quarter observations with insufficient data to compute accrual-based earnings management metrics	150.175
(–) Firms-quarter observations with insufficient data to compute other variables of interest	
Final sample	79.777

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**Table 2**

Variable description and measurement.

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DA	Discretionary accruals
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<i>ABS_DA</i>	Absolute value of discretionary accruals computed through cross sectional version of Modified Jones (1991)
<i>Positive_DA</i>	Value of Positive discretionary accruals computed through cross sectional version of Modified Jones (1991)
<i>Negative_DA</i>	Value of Negative discretionary accruals computed through cross sectional version of Modified Jones (1991)
<i>Kcfsi</i>	Quarter-base average value of Financial Stress Index
<i>Dummy_Kcfsi</i>	Dummy variable that takes value 1 if <i>Kcfsi</i> is positive and 0 otherwise
<i>Contraction</i>	Dummy variable that takes value 1 if a contraction occurs in quarter ( <i>t</i> ) and 0 otherwise
<i>Gdp</i>	Quarter-based percentage change in GDP based on chained 2005 dollars
<i>Sox</i>	Dummy variable that takes value 1 after the approval of Sox and 0 otherwise
<i>Time</i>	Fiscal year-quarter minus 1996-Q1
<i>Logta</i>	Natural logarithm of total assets
<i>Lev</i>	Leverage calculated as the ratio of total debt to total assets
<i>Growth</i>	Change of sales between quarter ( <i>t</i> ) and ( <i>t</i> - 1) divided by sales in quarter ( <i>t</i> - 1)
<i>Cfo</i>	Cash flow from operations over total sales
<i>Roa</i>	Return on Assets calculated as income before extraordinary items over total assets
<i>Rm_disx</i>	Abnormal Discretionary expenses (Zang, 2012)
<i>Sdcfo</i>	Volatility of cash flow (standard deviation of cash flow in previous four quarters)
<i>Sdrev</i>	Volatility of sales (standard deviation of sales in previous four quarters)
<i>Lagtac</i>	Total accruals at the beginning of the quarter
<i>Z_score</i>	Modified Altman <i>Z_score</i> computed according to Badertscher (2011) and Zang (2012)

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**Table 3**  
Descriptive statistics.

Variable	N	Mean	Sd	Min	p25	p50	p75	Max	
<i>Panel A: descriptive statistics for the full sample</i>									
ABS_DA	79,777	.0278	.0299	0	.0082	.0185	.0364	.4819	
Positive_DA	41,209	.0276	.0294	0	.0083	.0187	.0363	.4397	
Negative_D A	38,568	-.0279	.0304	-.4819	-.0365	-.0184	-.0081	0	
Kcfsi	79,777	.2257	1.0516	-.9033	-.5633	.2000	.5400	5.2433	
Logta	79,777	5.5819	2.1301	-1.5847	4.0234	5.5653	7.1401	11.3353	
Lev	79,777	.5106	.3061	-.0294	.2974	.4852	.6569	10.4597	
Growth	79,777	.3955	89.0419	-156.7500	-.0511	.0246	.1089	25,139	
Cfo	79,777	-.4619	20.9351	-2364	-.0304	.0692	.1712	1425	
Roa	79,777	-.0028	.0558	-1.1161	-.0064	.0088	.0206	.2553	
Rm_disx	79,777	-.0034	.0468	-.3652	-.0269	-.0075	.0115	.6029	
Sdcfo	79,777	36.4457	112.0563	.0029	1.4143	5.7476	23.2614	4102.149	
Sdrev	79,777	30.1588	93.1948	.0005	1.1252	4.7941	19.5996	3311.431	
Lagtac	79,777	-.0117	.0412	-.5775	-.0307	-.0115	.0074	.3569	
<i>Panel B: descriptive statistics for the pre-crisis period</i>									
Abs_DA	34,937	.0276	.0296	0	.0081	.0185	.0362	.4094	
Pos_DA	18,177	.0276	.0295	0	.0082	.0186	.0363	.4095	
Neg_DA	16,760	-.0276	.0297	-.3925	-.0362	-.0185	-.0081	0	
Kcfsi	34,937	-.5483	.2044	-.9033	-.6933	-.6167	-.3867	-1.3000	
Logta	34,937	5.5678	2.1580	-1.2588	3.9799	5.5696	7.1481	11.0050	
Lev	34,937	.4999	.2942	.0014	.2943	.4764	.6421	5.8140	
Growth	34,937	.8012	134.5047	-48.7831	-.0407	.0316	.1119	25,139	
Cfo	34,937	-.5118	22.8554	-1870.001	-.0259	.0688	.1699	1425	
Roa	34,937	.0007	.0515	-.9095	-.0023	.0107	.0221	.2553	
Rm_disx	34,937	-.0032	.0461	-.3233	-.0265	-.0074	.0118	.5784	
Sdcfo	34,937	34.5339	103.3212	.0035	1.3521	5.5133	22.3268	4102.149	
Sdrev	34,937	28.6760	87.3041	.0006	1.0803	4.6773	19.0419	2281.754	
Lagtac	34,937	-.0100	.0409	-.4435	-.0293	-.0102	.0089	.3355	
Variable	N	Mean	Sd	Min	p25	p50	p75	Max	diff (1)
<i>Panel C: descriptive statistics for the crisis period</i>									
ABS_DA	44,840	.0279	.0302	0	.0083	.0186	.0366	.4819	-.0003
Positive_DA	23,032	.0277	.0294	0	.0085	.0188	.0364	.4397	-.0000
Negative_D A	21,808	-.0281	.0309	-.4819	-.0368	-.0183	-.0081	0	.0005
Kcfsi	44,840	.8287	1.0510	.0500	.2800	.4567	.9033	5.2433	-1.3770***
Logta	44,840	5.5929	2.1081	-1.5847	4.0633	5.5604	7.1318	11.3353	-.0251*
Lev	44,840	.5189	.3148	-.0294	.3001	.4927	.6697	10.4597	-.0189***
Growth	44,840	.0795	3.1572	-156.75	-.0599	.0194	.1059	406.2766	.7217
Cfo	44,840	-.4231	19.3071	-2364	-.0342	.0694	.1719	460.5616	-.0887
Roa	44,840	-.0056	.0588	-1.1161	-.0096	.0073	.0193	.2064	.0062***
Rm_disx	44,840	-.0036	.0474	-.3652	-.0273	-.0077	.0112	.6029	.0004
Sdcfo	44,840	37.9353	118.3962	.0029	1.4652	5.9203	24.0396	3356.916	-3.4013***
Sdrev	44,840	31.3141	97.5237	.0005	1.1623	4.8897	19.9813	3311.431	-2.6381***
Lagtac	44,840	-.0130	.0414	-.5775	-.0318	-.0125	.0061	.3569	.0030***

(1) Difference between pre-crisis and crisis period;  $H_0$ : difference = 0. Variables defined in Table 2.

Significance levels:

\*  $p$ -Values < 10%.

\*\*  $p$ -Values < 5%.

\*\*\*  $p$ -Values < 1%.

**Table 4**

Correlation matrix.

	<i>Abs_DA</i>	<i>Positive_DA</i>	<i>Negative_DA</i>	<i>Dummy_Kefsi</i>	<i>Kefsi</i>	<i>Contraction</i>	<i>Gdp</i>	<i>Logta</i>	<i>Lev</i>	<i>Growth</i>	<i>Cfo</i>	<i>Roa</i>	<i>Rm_Dissx</i>	<i>Sdcfo</i>	<i>Sdrev</i>	<i>Lagtac</i>
<i>Dummy_Kefsi</i>	0.0042	0.0008	-0.0076	1												
<i>Kefsi</i>	0.0006	-0.0126**	-0.0140***	0.6496***	1											
<i>Contraction</i>	-0.0138***	-0.0195***	0.0081	0.3347***	0.5998***	1										
<i>Gdp</i>	0.0481***	0.0518***	-0.0444***	-0.1877***	-0.5880***	-0.6070***	1									
<i>Logta</i>	-0.2616***	-0.2535***	0.2699***	0.0058*	0.0395***	0.0525***	-0.1048***	1								
<i>Lev</i>	0.0032	-0.0217***	-0.0266***	0.0308***	0.0199***	0.0099***	0.0046	0.2143***	1							
<i>Growth</i>	-0.0002	-0.0003	-0.0029	-0.0040	-0.0028	-0.0014	-0.0010	0.0043	0.0007	1						
<i>Cfo</i>	-0.0027	-0.0118**	-0.0087*	0.0021	-0.0023	-0.0003	0.0017	0.0324***	0.0053	0.0001	1					
<i>Roa</i>	-0.1757***	-0.0105**	0.3016***	-0.0554***	-0.0792***	-0.0442***	0.0334***	0.2502***	-0.1174***	-0.0004	0.0819***	1				
<i>Rm_Dissx</i>	0.1151***	0.0674***	-0.1623***	-0.0040	0.0028	0.0049	-0.0110***	-0.1693***	-0.0389***	0.0014	-0.0265***	-0.2585***	1			
<i>Sdcfo</i>	-0.0373***	-0.0357***	0.0390***	0.0151***	0.0577***	0.0531***	-0.0837***	0.4804***	0.1208***	0.0005	0.0076**	0.0224***	-0.0510***	1		
<i>Sdrev</i>	-0.0697***	-0.0657***	0.0739***	0.0140**	0.0570***	0.0479***	-0.0746***	0.4700***	0.0977***	0.0021	0.0086**	0.0789***	-0.0488***	0.6139***	1	
<i>Lagtac</i>	-0.0103***	-0.0294***	-0.0085*	-0.0362***	-0.0306***	-0.0241***	0.0498***	0.0071**	-0.0705***	-0.0010	0.0053	0.1037***	-0.0368***	-0.0007	0.0153***	1

Variables defined in Table 2.

Significance levels:

\* *p*-Values < 10%.\*\* *p*-Values < 5%.\*\*\* *p*-Values < 1%.

**Table 5**Panel regression models of earnings management on financial crisis with *Dummy\_kcfsi*.

$$DA_{it} = \beta_0 + \beta_1 DummyKfcsi_t + \beta_2 Contraction_t + \beta_3 GDP_t + \beta_4 SOX_t + \beta_5 Time_t + \beta_6 LogTA_{it} + \beta_7 LEV_{it} + \beta_8 Growth_{it} + \beta_9 CFO_{it} + \beta_{10} ROA_{it} + \beta_{11} Rm\_disx_{it} + \beta_{12} SdcFO_{it} + \beta_{13} SdREV_{it} + \beta_{14} LagTAC_{it} + \varepsilon_{it}$$

Variables	<i>ABS_DA</i> Coefficient [st_error]	<i>Positive_DA</i> Coefficient [st_error]	<i>Negative_DA</i> Coefficient [st_error]
<i>Dummy_Kcfs</i> <sub><i>i</i></sub>	-0.0009*** (0.0002)	-0.0009** (0.0003)	0.0007* (0.0003)
<i>Contraction</i>	0.0008* (0.0004)	0.0008 (0.0005)	-0.0009+ (0.0006)
<i>Gdp</i>	0.0001** (0.0000)	0.0001+ (0.0001)	-0.0001 (0.0001)
<i>Sox</i>	-0.0021*** (0.0005)	-0.0021*** (0.0007)	0.0020** (0.0007)
<i>Time</i>	0.0001*** (0.0000)	0.0001*** (0.0000)	-0.0000+ (0.0000)
<i>Logta</i>	-0.0017*** (0.0004)	-0.0010+ (0.0005)	0.0022*** (0.0006)
<i>Lev</i>	0.0097*** (0.0014)	0.0104*** (0.0017)	-0.0090*** (0.0016)
<i>Growth</i>	0.0000** (0.0000)	0.0000* (0.0000)	0.0000 (0.0000)
<i>Cfo</i>	0.0000** (0.0000)	-0.0000 (0.0000)	-0.0000* (0.0000)
<i>Roa</i>	-0.0400*** (0.0059)	0.0717*** (0.0057)	0.0979*** (0.0082)
<i>Rm_disx</i>	0.0954*** (0.0090)	0.0787*** (0.0122)	-0.1038*** (0.0120)
<i>Sdcfo</i>	0.0000*** (0.0000)	0.0000*** (0.0000)	-0.0000*** (0.0000)
<i>Sdrev</i>	0.0000 (0.0000)	0.0000 (0.0000)	-0.0000 (0.0000)
<i>Lagtac</i>	-0.0060+ (0.0035)	-0.0601*** (0.0054)	-0.0519*** (0.0053)
<i>Constant</i>	0.0346*** (0.0023)	0.0310*** (0.0028)	-0.0368*** (0.0029)
<i>N</i>	79,777	41,209	38,568
<i>F-statistic</i>	<i>F</i> (14, 5963) = 38.08	<i>F</i> (14, 5473) = 36.39	<i>F</i> (14, 5518) = 37.44
<i>Prob &gt; F</i>	0.0001***	0.0001***	0.0001***
<i>R-squared</i>	0.0250	0.0294	0.0643

Variables defined in Table 2.

Significance levels:

+ *p*-Values < 10%.\* *p*-Values < 5%.\*\* *p*-Values < 1%.\*\*\* *p*-Values < 0.1%.

**Table 6**

Panel regression models of earnings management on financial crisis with *Kcfsi*: full sample.

$$DA_{it} = \beta_0 + \beta_1 Kcfsi_t + \beta_2 Contraction_t + \beta_3 GDP_t + \beta_4 SOX_t + \beta_5 Time_t + \beta_6 LogTA_{it} + \beta_7 LEV_{it} + \beta_8 Growth_{it} + \beta_9 CFO_{it} + \beta_{10} ROA_{it} + \beta_{11} Rm\_disx_{it} + \beta_{12} SdCFO_{it} + \beta_{13} SdREV_{it} + \beta_{14} LagTAC_{it} + \varepsilon_{it}$$

Variables	<i>ABS_DA</i> Coefficient [st_error]	<i>Positive_DA</i> Coefficient [st_error]	<i>Negative_DA</i> Coefficient [st_error]
<i>Kcfsi</i>	0.0002 (0.0001)	0.0002 (0.0002)	-0.0003 (0.0002)
<i>Contraction</i>	0.0002 (0.0004)	0.0003 (0.0005)	-0.0003 (0.0006)
<i>Gdp</i>	0.0002 <sup>**</sup> (0.0001)	0.0001 <sup>+</sup> (0.0001)	-0.0002 <sup>+</sup> (0.0001)
<i>Sox</i>	-0.0013 <sup>***</sup> (0.0005)	-0.0013 <sup>**</sup> (0.0006)	0.0012 <sup>+</sup> (0.0007)
<i>Time</i>	0.0001 <sup>***</sup> (0.0000)	0.0001 <sup>***</sup> (0.0000)	-0.0001 <sup>**</sup> (0.0000)
<i>Logta</i>	-0.0017 <sup>**</sup> (0.0004)	-0.0011 <sup>*</sup> (0.0005)	0.0022 <sup>***</sup> (0.0006)
<i>Lev</i>	0.0096 <sup>***</sup> (0.0014)	0.0102 <sup>***</sup> (0.0017)	-0.0088 <sup>***</sup> (0.0016)
<i>Growth</i>	0.0000 <sup>**</sup> (0.0000)	0.0000 <sup>*</sup> (0.0000)	0.0000 (0.0000)
<i>Cfo</i>	0.0000 <sup>**</sup> (0.0000)	-0.0000 (0.0000)	-0.0000 <sup>*</sup> (0.0000)
<i>Roa</i>	-0.0392 <sup>***</sup> (0.0059)	0.0727 <sup>***</sup> (0.0057)	0.0972 <sup>***</sup> (0.0082)
<i>Rm_disx</i>	0.0959 <sup>***</sup> (0.0090)	0.0792 <sup>***</sup> (0.0122)	-0.1045 <sup>***</sup> (0.0120)
<i>Sdcfo</i>	0.0000 <sup>**</sup> (0.0000)	0.0000 <sup>**</sup> (0.0000)	-0.0000 <sup>**</sup> (0.0000)
<i>Sdrev</i>	0.0000 (0.0000)	0.0000 (0.0000)	-0.0000 (0.0000)
<i>Lagtac</i>	-0.0057 (0.0035)	-0.0599 <sup>***</sup> (0.0054)	-0.0523 <sup>***</sup> (0.0053)
<i>Constant</i>	0.0346 <sup>***</sup> (0.0023)	0.0309 <sup>***</sup> (0.0028)	-0.0367 <sup>***</sup> (0.0029)
<i>N</i>	79,777	41,209	38,568
<i>F-statistic</i>	$F(14, 5963) = 37.84$	$F(14, 5473) = 35.68$	$F(14, 5518) = 38.31$
<i>Prob &gt; F</i>	0.0001 <sup>***</sup>	0.0001 <sup>***</sup>	0.0001 <sup>***</sup>
<i>R-squared</i>	0.0248	0.0292	0.0642

Variables defined in Table 2.

Significance levels:

<sup>+</sup> *p*-Values < 10%.

<sup>\*</sup> *p*-Values < 5%.

<sup>\*\*</sup> *p*-Values < 1%.

<sup>\*\*\*</sup> *p*-Values < 0.1%.

**Table 7**Panel regression models of earnings management on financial crisis with *Kcfsi*: Subsamples.

$$DA_{it} = b_0 + b_1 Kcfsi_{it} + b_2 Contraction_{it} + b_3 Gdp_{it} + b_4 Sox_{it} + b_5 Time_{it} + b_6 Logta_{it} + b_7 Lev_{it} + b_8 Growth_{it} + b_9 Cfo_{it} + b_{10} Roa_{it} + b_{11} Rm\_disx_{it} + b_{12} Sdcfo_{it} + b_{13} Sdrev_{it} + b_{14} Lagtac_{it} + e_{it}$$

Variables	<i>ABS_DA</i> Coefficient [st_error]	<i>Positive_DA</i> Coefficient [st_error]	<i>Negative_DA</i> Coefficient [st_error]
<i>Panel A: Panel regression models of earnings management on financial crisis with Kcfsi when Kcfsi is below the mean</i>			
<i>Kcfsi</i>	-0.0016* (0.0007)	-0.0017+ (0.0010)	0.0016 (0.0010)
<i>Contraction</i>	Dropped	Dropped	Dropped
<i>Gdp</i>	-0.0003** (0.0001)	-0.0004** (0.0002)	-0.0000 (0.0001)
<i>Sox</i>	-0.0024* (0.0010)	-0.0018 (0.0013)	0.0026* (0.0013)
<i>Time</i>	0.0001* (0.0000)	0.0001** (0.0000)	-0.0000 (0.0000)
<i>Logta</i>	-0.0022*** (0.0006)	-0.0009 (0.0008)	0.0035*** (0.0008)
<i>Lev</i>	0.0138*** (0.0017)	0.0156*** (0.0026)	-0.0133*** (0.0022)
<i>Growth</i>	0.0000*** (0.0000)	0.0000*** (0.0000)	0.0002 (0.0002)
<i>Cfo</i>	0.0000 (0.0000)	-0.0000+ (0.0000)	-0.0001* (0.0001)
<i>Roa</i>	-0.0345*** (0.0083)	0.0700*** (0.0113)	0.0934*** (0.0122)
<i>Rm_disx</i>	0.0846*** (0.0115)	0.0831*** (0.0170)	-0.0867*** (0.0175)
<i>Sdcfo</i>	0.0000*** (0.0000)	0.0000*** (0.0000)	-0.0000*** (0.0000)
<i>Sdrev</i>	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)
<i>Lagtac</i>	-0.0125* (0.0053)	-0.0723*** (0.0078)	-0.0590*** (0.0084)
<i>Constant</i>	0.0351*** (0.0032)	0.0272*** (0.0044)	-0.0396*** (0.0044)
<i>N</i>	37,405	19,403	18,002
<i>F-statistic</i>	$F(13, 4791) = 55.77$	$F(13, 4268) = 32.53$	$F(13, 4297) = 22.17$
<i>Prob &gt; F</i>	0.0001***	0.0001***	0.0001***
<i>R-squared</i>	0.0251	0.0342	0.0623
<i>Panel B: Panel regression models of earnings management on financial crisis with Kcfsi when Kcfsi is above the mean</i>			
<i>Kcfsi</i>	0.0011*** (0.0002)	0.0012*** (0.0003)	-0.0011*** (0.0003)
<i>Contraction</i>	0.0007+ (0.0004)	0.0009 (0.0006)	-0.0004 (0.0006)
<i>Gdp</i>	0.0004*** (0.0001)	0.0004*** (0.0001)	-0.0003** (0.0001)
<i>Sox</i>	-0.0014* (0.0006)	-0.0018* (0.0008)	0.0014 (0.0009)
<i>Time</i>	0.0001*** (0.0000)	0.0002*** (0.0000)	-0.0001** (0.0000)
<i>Logta</i>	0.0001 (0.0007)	-0.0001 (0.0009)	-0.0003 (0.0008)
<i>Lev</i>	0.0085*** (0.0020)	0.0092*** (0.0024)	-0.0080** (0.0026)
<i>Growth</i>	0.0001 (0.0001)	0.0003*** (0.0001)	0.0000 (0.0000)
<i>Cfo</i>	0.0000* (0.0000)	-0.0000 (0.0000)	-0.0000+ (0.0000)
<i>Roa</i>	-0.0440***	0.0742***	0.1030***

(continued on next page)

**Table 7 (continued)**

$$DA_{it} = b_0 + b_1 Kcfsi_t + b_2 Contraction_t + b_3 Gdp_t + b_4 Sox_t + b_5 Time_t + b_6 Logtai_t + b_7 Lev_{it} + b_8 Growth_{it} + b_9 Cfo_{it} + b_{10} Roa_{it} + b_{11} Rm\_disx_{it} + b_{12} Sdcfo_{it} + b_{13} Sdrev_{it} + b_{14} Lagtac_{it} + e_{it}$$

Variables	<i>ABS_DA</i> Coefficient [st_error]	<i>Positive_DA</i> Coefficient [st_error]	<i>Negative_DA</i> Coefficient [st_error]
<i>Rm_disx</i>	(0.0080) 0.1075***	(0.0069) 0.0739***	(0.0110) -0.1257***
<i>Sdcfo</i>	(0.0132) 0.0000***	(0.0172) 0.0000***	(0.0181) -0.0000***
<i>Sdrev</i>	(0.0000) 0.0000	(0.0000) -0.0000	(0.0000) -0.0000
<i>Lagtac</i>	(0.0000) -0.0015	(0.0000) -0.0656***	(0.0000) -0.0640***
<i>Constant</i>	(0.0048) 0.0256***	(0.0077) 0.0254***	(0.0071) -0.0237***
	(0.0036)	(0.0049)	(0.0044)
<i>N</i>	42,372	21,806	20,566
<i>F</i> -statistic	$F(14, 5062) = 24.19$	$F(14, 4452) = 21.89$	$F(14, 4477) = 23.84$
Prob > <i>F</i>	0.0001***	0.0001***	0.0001***
<i>R</i> -squared	0.0250	0.0326	0.0698

Variables defined in Table 2.

*Significance levels:*

+ *p*-Values < 10%.

\* *p*-Values < 5%.

\*\* *p*-Values < 1%.

\*\*\* *p*-Values < 0.1%.

**Table 8**

Panel regression models of earnings management on financial crisis with quadratic effects.

$$DA_{it} = b_0 + b_1 Kcfsi_t + b_2 Kcfsi_t^2 + b_3 Contraction_t + b_4 Gdp_t + b_5 Sox_t + b_6 Time_t + b_7 Logta_{it} + b_8 Lev_{it} + b_9 Growth_{it} + b_{10} Cfo_{it} + b_{11} Roa_{it} + b_{12} Rm\_disx_{it} + b_{13} Sdcfo_{it} + b_{14} Sdrev_{it} + b_{15} Lagtac_{it} + e_{it}$$

Variables	<i>ABS_DA</i> Coefficient [st_error]	<i>Positive_DA</i> Coefficient [st_error]	<i>Negative_DA</i> Coefficient [st_error]
<i>Kcfsi</i>	-0.0005* (0.0002)	-0.0006* (0.0003)	0.0004 (0.0003)
<i>Kcfsi</i> <sup>2</sup>	0.0003*** (0.0001)	0.0003*** (0.0001)	-0.0003*** (0.0001)
<i>Contraction</i>	0.0005 (0.0004)	0.0006 (0.0005)	-0.0006 (0.0006)
<i>Gdp</i>	0.0003*** (0.0001)	0.0003** (0.0001)	-0.0003** (0.0001)
<i>Sox</i>	-0.0020*** (0.0005)	-0.0021*** (0.0006)	0.0019** (0.0007)
<i>Time</i>	0.0001*** (0.0000)	0.0001*** (0.0000)	-0.0000+ (0.0000)
<i>Logta</i>	-0.0016*** (0.0004)	-0.0010+ (0.0005)	0.0022*** (0.0006)
<i>Lev</i>	0.0097*** (0.0014)	0.0103*** (0.0017)	-0.0089*** (0.0016)
<i>Growth</i>	0.0000** (0.0000)	0.0000** (0.0000)	0.0000 (0.0000)
<i>Cfo</i>	0.0000** (0.0000)	-0.0000 (0.0000)	-0.0000+ (0.0000)
<i>Roa</i>	-0.0392*** (0.0059)	0.0728*** (0.0057)	0.0971*** (0.0082)
<i>Rm_disx</i>	0.0961*** (0.0090)	0.0794*** (0.0122)	-0.1045*** (0.0120)
<i>Sdcfo</i>	0.0000*** (0.0000)	0.0000*** (0.0000)	-0.0000*** (0.0000)
<i>Sdrev</i>	0.0000 (0.0000)	0.0000 (0.0000)	-0.0000 (0.0000)
<i>Lagtac</i>	-0.0061+ (0.0035)	-0.0603*** (0.0054)	-0.0518*** (0.0053)
<i>Constant</i>	0.0335*** (0.0023)	0.0297*** (0.0029)	-0.0357*** (0.0029)
<i>N</i>	79,777	41,209	38,568
<i>F</i> -statistic	<i>F</i> (15, 5963) = 36.75	<i>F</i> (15, 5473) = 34.16	<i>F</i> (15, 5518) = 36.08
Prob > <i>F</i>	0.0001***	0.0001***	0.0001***
<i>R</i> -squared	0.0252	0.0297	0.0646

Variables defined in Table 2.

Significance levels:

+ *p*-Values < 10%.\* *p*-Values < 5%.\*\* *p*-Values < 1%.\*\*\* *p*-Values < 0.1%.

**Table 9**

Test mean differences survival.

	Below Mean <i>Kcfsi</i> ( <i>N</i> = 35,078)	Above Mean <i>Kcfsi</i> ( <i>N</i> = 39,484)	Difference
<i>Panel A: Mean comparison Altman Z_score</i>			
	4.1287	3.5775	.5512***
<i>Panel B: Proportion test Altman Z_score zones of discrimination</i>			
<i>Safe</i>	.3833	.3133	.0699***
<i>Grey</i>	.2074	.1855	.0218***
<i>Distress</i>	.4093	.5011	-.0917***

*Significance levels:*\* *p*-Values < 10%.\*\* *p*-Values < 5%.\*\*\* *p*-Values < 1%.

**Table 10**

Panel regression models of earnings management with alternative earnings measures.

$$DA_{it} = b_0 + b_1 Kcfsi_t + b_2 Kcfsi_t^2 + b_3 Contraction_t + b_4 Gdp_t + b_5 Sox_t + b_6 Time_t + b_7 Logta_{it} + b_8 Lev_{it} + b_9 Growth_{it} + b_{10} Cfo_{it} + b_{11} Roa_{it} + b_{12} Rm\_disx_{it} + b_{13} Sdcfo_{it} + b_{14} Sdrev_{it} + b_{15} Lagtac_{it} + e_{it}$$

Variables	<i>PDA</i> Coefficient [st_error]	<i>KOT_DA</i> Coefficient [st_error]	<i>BART_DA</i> Coefficient [st_error]	<i>DD</i> Coefficient [st_error]
<i>Kcfsi</i>	-0.0006*** (0.0002)	-0.0004* (0.0002)	-0.0007*** (0.0002)	0.0007*** (0.0001)
<i>Kcfsi</i> <sup>2</sup>	0.0003*** (0.0000)	0.0002*** (0.0001)	0.0003*** (0.0000)	0.0001 (0.0000)
<i>Contraction</i>	0.0007* (0.0004)	0.0005 (0.0004)	0.0007 (0.0004)	0.0002 (0.0003)
<i>Gdp</i>	0.0002*** (0.0001)	0.0002*** (0.0001)	0.0002*** (0.0001)	0.0002*** (0.0000)
<i>Sox</i>	-0.0018*** (0.0004)	-0.0021*** (0.0005)	-0.0015*** (0.0005)	-0.0001 (0.0003)
<i>Time</i>	0.0001*** (0.0000)	0.0001*** (0.0000)	0.0001*** (0.0000)	0.0000 (0.0000)
<i>Logta</i>	-0.0011** (0.0004)	-0.0012** (0.0004)	-0.0016*** (0.0004)	-0.0024*** (0.0003)
<i>Lev</i>	0.0083*** (0.0011)	0.0087*** (0.0013)	0.0100*** (0.0012)	0.0032*** (0.0008)
<i>Growth</i>	0.0000 (0.0000)	0.0000*** (0.0000)	0.0000*** (0.0000)	0.0000 (0.0000)
<i>Cfo</i>	0.0000** (0.0000)	0.0000*** (0.0000)	0.0000** (0.0000)	0.0000* (0.0000)
<i>Roa</i>	-0.0446*** (0.0057)	-0.0244*** (0.0057)	-0.0507*** (0.0059)	-0.1344*** (0.0049)
<i>Rm_disx</i>	0.0797*** (0.0078)	0.0897*** (0.0087)	0.0885*** (0.0087)	0.0148** (0.0057)
<i>Sdcfo</i>	0.0000*** (0.0000)	0.0000*** (0.0000)	0.0000*** (0.0000)	0.0000*** (0.0000)
<i>Sdrev</i>	0.0000 (0.0000)	0.0000 (0.0000)	0.0000** (0.0000)	0.0000 (0.0000)
<i>Lagtac</i>	-0.0093** (0.0032)	-0.0008 (0.0035)	-0.0098** (0.0034)	0.0063** (0.0021)
<i>Constant</i>	0.0287*** (0.0020)	0.0301*** (0.0022)	0.0307*** (0.0021)	0.0279*** (0.0014)
<i>N</i>	79,777	79,777	79,777	79,777
<i>F</i> -statistic	<i>F</i> (15, 5963) = 35.15	<i>F</i> (15, 5963) = 35.02	<i>F</i> (15, 5963) = 39.43	<i>F</i> (15, 5963) = 91.94
Prob > <i>F</i>	0.0001***	0.0001***	0.0001***	0.0001***
<i>R</i> -squared	0.0263	0.0205	0.0302	0.1259

Variables defined in Table 2.

Significance levels:

+ *p*-Values < 10%.\* *p*-Values < 5%.\*\* *p*-Values < 1%.\*\*\* *p*-Values < 0.1%.

**Table 11**

Panel regression models of earnings management with alternative stress index.

$$DA_{it} = b_0 + b_1 Stfsi_t + b_2 Stfsi_t^2 + b_3 Contraction_t + b_4 Gdp_t + b_5 Sox_t + b_6 Time_t + b_7 Logta_{it} + b_8 Lev_{it} + b_9 Growth_{it} + b_{10} Cfo_{it} + b_{11} Roa_{it} + b_{12} Rm\_disx_{it} + b_{13} Sdcfo_{it} + b_{14} Sdrev_{it} + b_{15} Lagtac_{it} + e_{it}$$

Variables	<i>ABS_DA</i> Coefficient [st_error]	<i>Positive_DA</i> Coefficient [st_error]	<i>Negative_DA</i> Coefficient [st_error]
<i>Stfsi</i>	-0.0006 <sup>***</sup> (0.0002)	-0.0009 <sup>**</sup> (0.0002)	0.0001 (0.0003)
<i>Stfsi</i> <sup>2</sup>	0.0003 <sup>***</sup> (0.0000)	0.0004 <sup>***</sup> (0.0001)	-0.0002 <sup>**</sup> (0.0001)
<i>Contraction</i>	0.0007 <sup>+</sup> (0.0004)	-0.0010 <sup>+</sup> (0.0005)	-0.0006 (0.0006)
<i>Gdp</i>	0.0003 <sup>***</sup> (0.0001)	-0.0003 (0.0001)	-0.0003 <sup>**</sup> (0.0001)
<i>Sox</i>	-0.0018 <sup>***</sup> (0.0005)	-0.0020 <sup>**</sup> (0.0006)	0.0017 <sup>**</sup> (0.0007)
<i>Time</i>	0.0001 <sup>***</sup> (0.0000)	0.0001 <sup>***</sup> (0.0000)	-0.0000 <sup>*</sup> (0.0000)
<i>Logta</i>	-0.0017 <sup>***</sup> (0.0004)	-0.0011 <sup>*</sup> (0.0005)	0.0022 <sup>***</sup> (0.0006)
<i>Lev</i>	0.0097 <sup>***</sup> (0.0014)	0.0103 <sup>***</sup> (0.0017)	-0.0089 <sup>***</sup> (0.0016)
<i>Growth</i>	0.0000 <sup>**</sup> (0.0000)	0.0000 <sup>**</sup> (0.0000)	0.0000 (0.0000)
<i>Cfo</i>	0.0000 <sup>**</sup> (0.0000)	-0.0000 (0.0000)	-0.0000 <sup>*</sup> (0.0000)
<i>Roa</i>	-0.0392 <sup>***</sup> (0.0059)	0.0727 <sup>***</sup> (0.0057)	0.0970 <sup>***</sup> (0.0082)
<i>Rm_disx</i>	0.0960 <sup>***</sup> (0.0090)	0.0793 <sup>***</sup> (0.0122)	-0.1046 <sup>***</sup> (0.0120)
<i>Sdcfo</i>	0.0000 <sup>***</sup> (0.0000)	0.0000 <sup>***</sup> (0.0000)	-0.0000 <sup>***</sup> (0.0000)
<i>Sdrev</i>	0.0000 (0.0000)	0.0000 (0.0000)	-0.0000 (0.0000)
<i>Lagtac</i>	-0.0063 <sup>+</sup> (0.0035)	-0.0607 <sup>***</sup> (0.0054)	-0.0519 <sup>***</sup> (0.0053)
<i>Constant</i>	0.0336 <sup>***</sup> (0.0023)	0.0298 <sup>***</sup> (0.0028)	-0.0360 <sup>***</sup> (0.0029)
<i>N</i>	79,777	41,209	38,568
<i>F-statistic</i>	$F(15, 5963) = 37.06$	$F(15, 5473) = 34.90$	$F(15, 5518) = 36.00$
<i>Prob &gt; F</i>	0.0001 <sup>***</sup>	0.0001 <sup>***</sup>	0.0001 <sup>***</sup>
<i>R-squared</i>	0.0252	0.0300	0.0645

Variables defined in Table 2 except from *Stfsi* = alternative measure of financial crisis as defined by the Federal Reserve Bank of St. Louis.

*Significance levels:*

<sup>+</sup> *p*-Values < 10%.

<sup>\*</sup> *p*-Values < 5%.

<sup>\*\*</sup> *p*-Values < 1%.

<sup>\*\*\*</sup> *p*-Values < 0.1%.

**Table 12**

Panel regression models of earnings management on financial crisis with Kcfsi when Kcfsi is below the mean with Asian Crisis indicator

$$DA_{it} = b_0 + b_1 Kcfsi_t + b_2 Contraction_t + b_3 Gdp_t + b_4 Sox_t + b_5 Time_t + b_6 Logta_{it} + b_7 Lev_{it} + b_8 Growth_{it} + b_9 Cfo_{it} + b_{10} Roa_{it} + b_{11} Rm\_disx_{it} + b_{12} Sdcfo_{it} + b_{13} Sdrev_{it} + b_{14} Lagtac_{it} + b_{15} Mini\_crash + e_{it}$$

Variables	<i>ABS_DA</i> Coefficient [st_error]	<i>Positive_DA</i> Coefficient [st_error]	<i>Negative_DA</i> Coefficient [st_error]
<i>Kcfsi</i>	-0.0038 (5.35)**	-0.0040 (3.98)**	0.0034 (3.38)**
<i>Contraction</i>	Dropped	Dropped	Dropped
<i>Gdp</i>	-0.0000 (0.62)	-0.0001 (0.99)	-0.0002 (1.40)
<i>Sox</i>	-0.0026 (2.62)**	-0.0019 (1.47)	0.0027 (2.09)*
<i>Time</i>	0.0000 (0.70)	0.0000 (1.74)	0.0000 (0.86)
<i>Logta</i>	-0.0022 (3.68)**	-0.0009 (1.16)	0.0035 (4.33)**
<i>Lev</i>	0.0139 (7.95)**	0.0155 (6.03)**	-0.0134 (5.99)**
<i>Growth</i>	0.0000 (7.68)**	0.0000 (6.49)**	0.0002 (1.21)
<i>Cfo</i>	0.0000 (1.00)	-0.0000 (1.97)*	-0.0001 (2.05)*
<i>Roa</i>	-0.0329 (3.99)**	0.0702 (6.24)**	0.0916 (7.56)**
<i>Rm_disx</i>	0.0858 (7.46)**	-0.0849 (4.99)**	-0.0869 (4.95)**
<i>Sdcfo</i>	0.0000 (6.24)**	0.0000 (5.33)**	-0.0000 (5.97)**
<i>Sdrev</i>	0.0000 (0.42)	0.0000 (1.02)	0.0000 (0.62)
<i>Lagtac</i>	-0.0127 (2.39)*	-0.0723 (9.33)**	-0.0587 (7.01)**
<i>Mini_crash</i>	0.0065 (7.80)**	0.0066 (5.51)**	-0.0057 (4.34)**
<i>Constant</i>	0.0314 (9.66)**	0.0237 (5.33)**	-0.0365 (8.36)**
<i>N</i>	37,405	19,403	18,002
<i>F-statistic</i>	$F(14, 4791) = 56.66$	$F(14, 4268) = 32.62$	$F(14, 4297) = 21.92$
<i>Prob &gt; F</i>	0.0001***	0.0001***	0.0001***
<i>R-squared</i>	0.0277	0.0367	0.0643

Variables defined in Table 2. *Mini\_crash* is equal to 1 if year-quarter is equal to 1997Q4, and 0 otherwise.

*Significance levels:*

+ *p*-Values < 10%.

\* *p*-Values < 5%.

\*\* *p*-Values < 1%.

\*\*\* *p*-Values < 0.1%.

**Table 13**

Panel regression models of real earnings management on financial crisis with quadratic effects.

$$Rm_{it} = b_0 + b_1 Kcfsi_t + b_2 Kcfsi_t^2 + b_3 Contraction_t + b_4 Gdp_t + b_5 Sox_t + b_6 Time_t + b_7 Logta_{it} + b_8 Lev_{it} + b_9 Growth_{it} + b_{10} Cfo_{it} + b_{11} Roa_{it} + b_{12} Sdcfo_{it} + b_{13} Sdrev_{it} + b_{14} Lagtac_{it} + b_{15} ABS\_Da_{it} + e_{it}$$

Variables	<i>Rm_disx</i> Coefficient [st_error]	<i>Rm_prod</i> Coefficient [st_error]	<i>Rm_cfo</i> Coefficient [st_error]
<i>Kcfsi</i>	-0.0007 (3.08)**	-0.0011 (3.84)**	0.0043 (13.64)**
<i>Kcfsi2</i>	-0.0001 (1.46)	0.0001 (1.47)	-0.0006 (7.77)**
<i>Contraction</i>	0.0016 (4.48)**	-0.0004 (0.74)	-0.0013 (2.03)*
<i>Gdp</i>	-0.0002 (5.22)**	-0.0001 (1.19)	0.0001 (1.06)
<i>Sox</i>	0.0025 (3.59)**	0.0043 (5.37)**	0.0039 (4.93)**
<i>Time</i>	-0.0002 (7.88)**	0.0002 (5.77)**	-0.0001 (4.51)**
<i>Logta</i>	-0.0086 (10.33)**	0.0090 (10.61)**	0.0041 (5.66)**
<i>Lev</i>	0.0002 (0.08)	-0.0004 (0.19)	-0.0018 (0.75)
<i>Growth</i>	0.0000 (17.65)**	0.0000 (6.59)**	-0.0000 (3.27)**
<i>Cfo</i>	-0.0000 (1.12)	-0.0000 (1.68)	0.0001 (3.66)**
<i>Roa</i>	-0.0876 (12.78)**	-0.1519 (18.39)**	0.7297 (68.44)**
<i>Sdcfo</i>	-0.0000 (3.57)**	0.0000 (0.37)	-0.0000 (4.48)**
<i>Sdrev</i>	0.0000 (4.49)**	-0.0000 (0.64)	-0.0000 (1.47)
<i>Lagtac</i>	-0.0076 (3.00)**	0.0004 (0.09)	0.1499 (25.21)**
<i>ABS_da</i>	0.0559 (9.66)**	0.0570 (5.74)**	-0.0061 (0.41)
<i>Constant</i>	0.0343 (8.49)**	-0.0541 (12.67)**	-0.087 (23.67)**
<i>N</i>	79,777	76,205	79,777
<i>F-statistic</i>	$F(15, 5963) = 58.61$	$F(15, 5809) = 44.01$	$F(15, 5963) = 442.69$
<i>Prob &gt; F</i>	0.0001***	0.0001***	0.0001***
<i>R-squared</i>	0.0729	0.0562	0.3870

Variables defined in Table 2. Real earnings management metrics have been computed following the works of Cohen et al. (2008) and Zang (2012).

*Significance levels:*

+ *p*-Values < 10%.

\* *p*-Values < 5%.

\*\* *p*-Values < 1%.

\*\*\* *p*-Values < 0.1%.

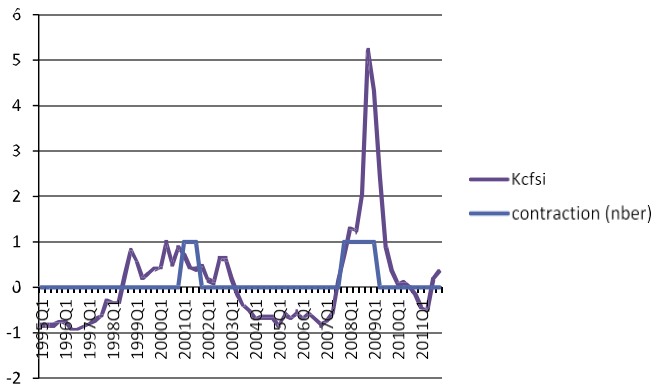


Fig. 1. Comparison of financial crisis and business cycle trends over sample period.