Determinants and consequences of fair value accounting adoption: Evidence from China

Rui YE

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Abstract

The idea of fair value accounting originates from well-developed capital markets, and it is questionable whether it can function well when the underlying markets for assets and liabilities lack liquidity, and when asset pricing lacks efficiency because of underdeveloped institutional environment. In this thesis, I explore the use and valuation usefulness of fair value measurement among the domestic listed companies in China during the ten-year period of 2007 to 2016. I also investigate the determinants and capital market consequences of firm-level fair value accounting adoption. Examination of the annual reports of the listed companies shows that the proportion of fair value-measured assets and liabilities is increasing over the years. Some companies provide additional information relating to fair value estimates as detailed as required by the accounting standards while many companies do not disclose such information or just put boilerplate in the footnotes. Different levels of fair values are found to be associated with analyst forecast accuracy in different ways and the fair value-related disclosure helps analysts' interpretation of level 3 fair values. Analyses focusing on fair value-measured financial instruments show that fair value accounting could influence future firm-level stock price crash risk directly through the information uncertainty relating to the recognized unrealized fair value changes. There is also evidence that fair value accounting influences future stock price crash risk indirectly through selective sales of financial assets. The stock price crash risk effect is more pronounced among firms with regulatory incentives to manage earnings. Focusing on the subsequent measurement model choice of investment property, I find that institutional factors such as the development of underlying asset markets and state ownership could affect the use of fair value accounting in China. In addition, there is evidence of undesirable capital market consequences among firms with incentives to manage earnings through fair value estimates.

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Abbreviations

ASBE: Accounting standards for Business Enterprises（China)

ASC: Accounting Standards Codification (US)

CASC: China Accounting Standards Committee

CEO: chief executive officer

CF: the IFRS Conceptual Framework

CICPA: Chinese Institute of Certified Public Accountants

CSRC: China Securities and Regulation Committee

FASB: Financial Accounting Standards Board (US)

FVA: fair value accounting

HCA: historical cost accounting

HKEX: Hong Kong stock exchange

IASB: International Accounting Standards Board

IAS: International Accounting Standards

IFRS: International Financial Reporting Standards

IPO: Initial public offering

MOF: The Ministry of Finance (China)

NPC: The National People's Congress of the People's Republic of China

NSOE: non-state-owned enterprise

OCI: other comprehensive income

OLS: ordinary least squares

SFAS: Statements of Financial Accounting Standards (US)

SHSE: Shanghai stock exchange

SOE: state-owned enterprise

ST: special treatment

SZSE: Shenzhen stock exchange

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Chapter 1 Introduction

1.1 Introduction

This thesis aims at exploring the consequences of and factors that would affect the implementation of fair value accounting (FVA) in China. China has a long history of prohibiting market valuations and FVA, but with its adoption of the IFRS-converged accounting standards in 2007, fair value measurement is reintroduced[1] into its accounting system. While fair value is an advanced valuation technique that could benefit the companies, there are concerns that China may not be sufficiently prepared for implementing FVA in an effective and meaningful way (e.g. He et al. 2012). Although fair value measurement has been reintroduced into China for more than ten years, most of the relevant academic work are descriptive and there are only a few empirical studies on the implementation effect of FVA in China.

This chapter introduces the general research background and provides an overview of the thesis. Section 1.2 introduces the general research background relating to FVA. To better understand how the development and application of FVA in China differs from the place it originates and develops, Section 1.3 reviews the history and current status of fair value application in China's accounting standards. Section 1.4 summarises the research objectives, motivation and main findings of the thesis, and the last section presents the thesis structure.

1.2 General research background

Fair value measurement was first developed in the US and was imported into China accounting standards with the spread of international accounting standards. To understand the general controversies relating to FVA that could also matter in China's context, Section 1.2.1 briefly introduces the definitions and key arguments about fair value accounting[2] in the broader accounting literature. To understand the differences in the development of FVA, hence the potential differences in current research focus in China and in the developed economies, Section 1.2.2 briefly summarises the history of FVA application in the US and in IFRS.

1.2.1 Definition of fair value, fair value accounting and the related debates

Fair value is a measurement basis for assets and liabilities presented on a firm's balance sheet. FVA applies when fair value is used for initial and subsequent measurement of an asset or liability (Barth and Taylor 2010). The definition of fair value was first standardised in the late 2000s by the world's two major accounting standard setters, the FASB and IASB (McDonough et al. 2019). According to the international accounting standards, fair value is "the price that would be received to sell an asset

[1] Fair value measurement was adopted in China accounting standards for a short period before 2007. See Section 1.3.1 for more details.

[2] For more details about the debates over FVA, see Landsman (2007) and McDonough et al. (2019).

or paid to transfer a liability in an orderly transaction between market participants at the measurement date" (IASPlus 2011, FASB 2006).

A fair value hierarchy that reflects the level of judgment associated with the inputs to determine fair values was introduced into IFRS 13 and SFAS 157 to enhance the consistency and comparability among fair value measurements. Specifically, level 1 and level 2 inputs are observable while level 3 uses unobservable inputs. Level 1 inputs are the quoted market prices and should be used before other inputs. If no active markets exist for the assets or liabilities to be measured, their fair values are estimated on the basis of similar items and other relevant market data (level 2 fair value). Level 3 inputs apply to situations where the markets do not exist or are illiquid and thus neither level 1 nor level 2 fair values are available. Level 3 fair values are usually derived from valuation models with assumptions based on the reporting entity's own information and data.

Fair value accounting draws lots of attention during the 2007-2008 financial crisis, and some argue that it plays a role in the crisis (e.g. Laux and Leuz 2009, 2010). The major concerns over FVA include the potential procyclicality it could be introduced into bank balance sheets, the lack of relevance and reliability[3] of fair value information, and the appraisal costs and audit fees relating to fair value estimates (e.g. Penman 2007, Novoa et al. 2009, Campbell et al. 2015). On the contrary, supporters of FVA argue that compared to its main alternative-historical cost accounting (HCA), FVA faithfully represents the financial position of a company and is decision-useful for investors and other financial statement users (e.g. Barth 2008, Kothari et al. 2010). Despite the debate over FVA, the application of fair value measurement has been increasing in the international accounting standards over the recent years.

1.2.2 Development of fair value accounting in the US and in IFRS

The term 'fair value' first showed up in the US in 1898, and fair value measurement and FVA were generated and developed in the western context with the demand for accounting for changing prices (Georgiou and Jack 2011). Before the Great Depression, fair value measurement was widely used by the US companies. However, in 1938 President Franklin D. Roosevelt ended the use of this measurement. This is because the use of fair value accounting was believed to make the soundness of the banking system look worse than it really is. The bad appearance of the banking system then prevented further investments and eventually led to the Great Depression (Bowers 2011).

[3] Reliability has been replaced by "Faithful Representativeness" in the current IFRS, but reliability is still the more familiar term in the current literature. See Section 2.4.1 for more details on the definition of relevance and reliability.

With the issuance of SFAS No. 12 Accounting for Certain Marketable Securities in 1975, fair value measurement started slowly returning to the US accounting standards. However, its expansion had been suspended again in the 1980s savings and loans industry failures because many believe fair value is one of the primary causes of the failures. The Enron scam in the early 2000s induces the concern that the use of fair value accounting would lead to more accounting frauds because of the expanded room for management discretion and manipulation of book numbers (Bowers 2011, McDonough et al. 2019).

In September 2006, SFAS No. 157 (ASC 820) was issued by the FASB to clarify the definition of fair value, to establish a framework for measuring fair value and to expand fair value disclosures. The statement was effective from the fiscal year after November 15th, 2007 and it was applied to the "non-financial assets and liabilities that are recognized, or disclosed, at fair value on a recurring basis" and the "financial assets of all publicly-traded companies" since its effective day. SFAS No.157 is expected to make compliance of fair value measurements easier and to increase their consistency and comparability. In addition, the expanded disclosure provides more transparent fair value information and makes the information less confusing for financial statement users (FASB 2006, 2018, Bowers 2011).

In February 2007, FASB issued SFAS No. 159 The Fair Value Option for Financial Assets and Financial Liabilities (also known as ASC 825-10). Consistent with FASB's statement of working toward the goal of measuring all financial instruments at fair value, SFAS 159 expanded the application of fair value and its objective is to "improve financial reporting by providing entities with the opportunity to mitigate volatility in reported earnings caused by measuring related assets and liabilities differently without having to apply complex hedge accounting provisions" (FASB 2007, p. 3). Entities are allowed to apply this statement to elective eligible financial assets and liabilities. The decision to apply the fair value option to certain assets and liabilities is irrevocable except for situations (election dates) such as business combinations, consolidation or deconsolidation of a subsidiary or variable interest entity, and significant debt reconstruction (FASB 2007). The development of fair value-related accounting standards in the US shows that the major concerns from the policy makers and practitioners over FVA are the earning management, earnings volatility, and transparency of the fair value information.

Based on the argument that fair value accounting is more relevant for the fundamental goal of financial reporting (i.e. decision-making), the International Accounting Standards Board (IASB) is promoting the use of fair value measurement like the FASB (Peng and Bewley 2010). In November 2006, the IASB published a discussion paper on fair value measurements which indicates the elevating status of fair value measurement. An exposure draft for comments on fair value

measurement that is similar to SFAS No. 157 was issued in May 2009 by IASB (IASPlus 2011). Both theoretical and empirical studies are suggesting that fair value is likely to expand in IFRS (e.g. Barth 2006, Landsman 2006, Watts 2006). However, empirical evidence on the costs and benefits of FVA is still mixed and inconclusive. The implementation outcomes of IFRS fair value requirements in emerging economies which feature less-developed institutional environment remain to be explored (e. g. Ball 2006, 2016). Most of the existing empirical studies on the consequences of FVA adoption are based on relatively developed capital markets, and there is still limited evidence on the quality of fair value information produced outside the US and Europe. The thesis thus fills the important research gap by utilising data of companies listed in mainland China to examine the quality of fair value information produced in this transitional economy. The next section provides an overview of the history and application of fair value measurement in China.

1.3 Fair value measurement in China

China is one of the largest developing country that adopts FVA in recent years, and it shares characteristics such as weak investor protection and weak legal enforcement with most developing countries (Ke et al.2016). The transition from a conservative historical cost-based accounting system to a valuation usefulness-oriented financial reporting system represents one of the major overhauls of China's accounting standards and it fundamentally changed accounting practices in China (Nie et al. 2013, Bewley et al. 2018). Section 1.3.1 introduces the history of fair value adoption in China. Section 1.3.2 provides an overview of the application of fair value measurement in current China accounting standards.

1.3.1 Overview of the history of fair value adoption in China

FVA was first introduced into China accounting standards in the late 1990s and it is still a relatively new concept to the Chinese accountants. With the establishment of Shanghai and Shenzhen stock exchanges in the early 1990s, the authorities[4] in China started developing accounting standards to meet the requirements of investors (Xiao et al. 2004). China started modifying its financial reporting system towards the IFRS since 1992. With the assistance of the World Bank, the MOF established the Experimental Accounting System for Joint Stock Limited Enterprises and the Accounting Standards for Business Enterprises (ASBE) in 1992. This set of accounting standards follows rigid historical cost accounting, and this is potentially due to the Communist Government's perception that the certain western accounting ideas (e.g. the lower-of-cost-or-market rule) were developed by the capitalists to exploit workers (Ezzamel et al. 2007).

[4] The Ministry of Finance (MOF) and China Accounting Standards Committee (CASC). The MOF has authority over accounting affairs (including research activities) under the law (Tang 2000). The CASC is responsible for drafting the accounting standards (CASC 2013).

To eliminate the discrepancies between China accounting standards and IAS, the MOF issued the Accounting System for Joint Stock Limited Enterprises in 1998 (hereafter "1998 System") to replace the 1992 System. It was in this 1998 System that FVA was allowed for the first time in the history of China accounting standards. During this period, fair value measurement was first applied in the accounting of debt restructuring, non-monetary transactions and investments. Any gains or losses relating to the assets and liabilities in those transactions are required to be recognized into net income on the financial reporting date, which is consistent with the IAS requirements effective during that period. In addition, asset impairment is allowed to be recognized using fair value measurement in the 1998 System. However, a series of accounting scandals followed this initial adoption of FVA[5]. In 2001, when China entered the World Trade Organization, another new accounting system was issued to replace the 1998 System and this time FVA was completely suspended. Five years later, with the dynamic interactions and efforts made by China's MOF, the World Bank, the IASB, and the international accounting firms, the accounting standards issued in 2001 were replaced by a revised Basic Standard[6] and new set of China Accounting Standards for Business Enterprises (hereafter "2007 ASBE") to further converge with IFRS (Bewley et al. 2018). The 2007 ASBE are claimed to be significantly converged with the IFRS and FVA was reintroduced into the Chinese accounting standards (IFRS 2005, Peng and Smith 2010).

Despite the setback of FVA adoption in 2001, FVA was reintroduced into China accounting standards in 2006, possibly because of the demand for rapid economic growth, globalization of trade, and for the purpose of achieving full membership in the World Trade Organizations[7] (Bewley et al. 2018). Director General of the Chinese Accounting Regulatory Department claimed that the re-adoption of FVA would improve "the relevance of the accounting information so as to fully evaluate the operating results of the enterprise, reflect the fluctuations of market value in a timely manner, and thus better achieve the objectives of financial reporting" (Liu 2007). To prevent the rampant earnings management activities like those in the first FVA movement, the FVA-related requirements in the 2007 ASBE were adjusted and tailored to China's unique needs. For example, the 2007 ASBE allow the use of fair value only when an active market exists, and when the fair values can be reliably

[5] For instance, some Chinese companies paid off debts through creating a debt restructuring transactions with non-monetary assets. By recognizing the difference between the book value and fair value of the assets as gains, losses were turned into profits. More examples of accounting scandals during this period can be found in Bewley et al. (2018).

[6] The Basic Standard resembles the Conceptual Framework of IASB and US FASB, but with modifications. For example, accounting information users in the Basic Standard include investors, creditors, the government, and other related parties outside the enterprise (MOF 2014a). In the IASB Conceptual Framework, the primary users include investors and creditors (The Framework 1.2). Other parties including the regulators may find the financial reporting information useful but are not the primary users (The Framework 1.10).

[7] For the factors that affect Chinese accounting standard setters' decisions to adopt FVA, see Bewley et al. (2018).

determined. This is different from IFRS where fair value is required to be used whenever applicable[8] (Peng and Bewley. 2010). The Chinese accounting standard setters and regulators believe that FVA can be implemented effectively as long as these standards are grasped correctly (Bewley et al. 2018).

However, due to the long history of rules and historical cost-based accounting system in China, the transition into a principles and fair value-based system requires significant trainings of both its accounting profession and information users to develop professional judgment (Nie et al. 2013). It takes time for both the financial statement preparers and users in China to be trained on concepts and theories that base the new principles-based accounting standards, and to develop professional judgment on the various forms and applications of fair value. Combining with the technical complexities inherent in fair value-related accounting standards, lack of research and practice relating to fair value[9], and other fundamental characteristics of the its capital markets[10], the extent to which FVA has been implemented effectively in China is still not clear by far.

1.3.2 Fair value application and its characteristics in the new China accounting standards

The current accounting system in China comprises 42 standards and one basic standard[11] (CASPlus 2019). Among these standards, FVA is required by ASBE 5 *Biological Assets* for the measurement of living assets[12], ASBE 10 *Annuity Funds* for the measurement of financial assets, ASBE 11 *Share-based Payment* for the measurement of equity-settled liabilities, and ASBE 22 *Financial Instruments* for the measurement of certain types of financial instruments[13]. There is an option for the choice between FVA and HCA for the subsequent measurement of investment property assets as prescribed in ASBE 3 *Investment Property*. The fair value gains and losses are required to be recognized for the assets and liabilities measured under FVA. In addition, there are some other standards mentioning the use of fair value measurement in the recognition of certain assets (e.g. ASBE 9 *Employee Benefits* and ASBE 33 *Consolidated Statements*), impairment tests (e.g. ASBE 1 *Inventory* and ASBE 8 *Impairment*), and footnote disclosures (e.g. ASBE 4 *Fixed Assets* and ASBE 30 *Presentation of the Financial Reports*). The application of fair value measurement in these standards is not "FVA" because fair value gains and losses are not required to be recognized in the financial statements at each reporting date.

[8] Other differences in the fair value-related requirements between IFRS and the new ASBE can be found in Peng and Bewley (2010) and Nobes (2019).

[9] For example, without research evidence on the benefits relating to FVA implementation, the companies may be reluctant to choose the fair value option for investment property and biological assets.

[10] See Xiao and Hu (2017), and the Institutional background sections in Chapters 2, 3, and 4 for more details.

[11] The ASBE *Basic Standard* is equivalent to the IFRS Conceptual Framework.

[12] If there is conclusive evidence that fair value of these assets can be reliably measured on a continuous basis, the living assets should be measured by fair value (ASBE 5.22).

[13] See Nobes (2019) for a summary of the use of fair value measurement in China's current accounting standards.

Most of the accounting requirements in China's new standards are equivalent to those in IFRS, but there are still some exceptions. The most significant divergence relates to the initial and subsequent measurement of non-financial assets (Wang 2006, Peng and Bewley 2010). For example, in the 2007 ASBE, the fair value model is prohibited in the subsequent measurement of property, plant and equipment (PP & E) and intangible assets, while IFRS allow the use of both fair value and historical cost models. Moreover, the 2007 ASBE explicitly state that the cost model should be used for subsequent measurement for investment property and biological assets, unless there is evidence of a reliable fair value. In contrast, the IFRS require the fair value model for these assets unless the fair values are clearly unreliable. In addition, once a Chinese firm chooses to measure investment property at fair values, it cannot switch to cost model in the future. In IFRS such change in measurement models is allowed. The Chinese officials assert that these divergences are caused by China's under-developed market conditions and the need to reduce earnings manipulation opportunities (Peng and Bewley 2010).

1.4 Research objectives, motivation and main findings

The above overview of the institutional background shows that the adoption of FVA in China is primarily driven by social and political factors, rather than grassroots demands from domestic or international users of accounting information (like in the US or in IFRS). Despite the success in implementing FVA in 2007, the motivations of FVA adoption at the country level, the opacity in standard setting process[14], and the institutional environment[15] in China raise the questions of the extent to which the FVA-related standards suit the needs of Chinese listed companies, factors that influence the adoption of the fair value model, and whether the fair values produced by Chines listed companies deliver useful information for stewardship assessment and investors' decision-making. So far there are limited studies on these questions[16]. The lack of empirical evidence on the firm-level influencing factors and consequences of FVA adoption in China, and more broadly in the less-developed markets, motivates my thesis.

To advance understanding of FVA application in China, the thesis consists of three self-contained themes that examine the application of FVA in China. Each of the three themes focuses on a specific aspect of FVA. Specifically, Chapter 2 investigates whether and how fair value information provided

[14] Unlike the Western-style standard setting, the adoption of FVA did not go through the complete due process in China. Specifically, although there was call for comment letters from the Chinese standard setters, any letters they received were not publicly available (Bewley et al. 2018).

[15] The China-specific institutional characteristics that could influence the use and usefulness of fair value accounting is summarised in the following empirical chapters.

[16] For a review of existing empirical work on FVA in China's context, see the literature review section in Chapters 2, 3, and 4.

by the Chinese listed companies relates to financial analyst forecast accuracy. Chapter 3 focuses on the capital market influence of FVA for financial instruments among the Chinese listed companies. Chapter 4 explores the influencing factors and consequences relating to the voluntary adoption of fair value model for investment property assets in China. Each chapter can be read independent of each other, but all three chapters also share the common objective of investigating the effects and influencing factors relating to the adoption of FVA in one of the largest transition economy-China.

In Chapter 2, I investigate the overall level of fair value measurement application among the domestic listed Chinese companies. Moreover, I test how different fair value inputs (i.e. level 1, level 2, and level 3), as well as the related disclosures influence financial analysts' earnings per share (EPS) forecast accuracy in China. Through examining the footnote disclosures in Chinese listed companies' annual reports during 2007-2016 period, this chapter documents that a large number of Chinese listed companies with fair value-measured assets and liabilities do not disclose valuation information as required by the accounting standards. Analyses of companies reporting the fair value inputs information show that the overall level of fair value measurement application in China is significantly lower than in the US, while the relative weights of fair value estimation inputs vary by asset/liability types. Further empirical tests show that the influence of fair value information on financial analysts' forecast accuracy varies by assets/liabilities, by different fair value estimation inputs, by state ownership, by industry and by the overall market conditions. Disclosures of fair value estimation details are found to improve the association between level 3 fair values and analyst forecast accuracy. This chapter highlights the importance of monitoring and improving fair value-related information disclosure in China.

Chapter 3 focuses on fair value-measured financial instruments to examine whether and how fair value accounting relates to firm-level stock price crash risk in China. I find that fair values of available-for-sale securities (AFS) positively relate to future stock price crash risk among the financial firms, while fair values of other fair value-measured financial assets and liabilities (FVTOPL) positively relate to future stock price crash risk among the non-financial firms. To investigate whether the results are driven by information uncertainty of fair value estimates or by earnings management of the fair value-measured financial items, I further estimate two sets of simultaneous equation models. The estimation results show that firms report higher investment income when they recognize unrealized fair value losses, and the investment income further relates to higher future crash risk. There is also evidence that AFS securities' sales positively relate to future crash risk, while unrealized fair value changes are positively associated with stock price crash risk among the financial firms. The results indicate that to maintain market stability, both the investors and regulators should pay attention to the information uncertainty inherent in fair value estimates, as well as real earnings management (through asset sales) induced by the recognition of unrealized fair value changes.

Subsequent to Chapter 3, Chapter 4 explores the determinants and consequences of fair value reporting for investment property. Investment property is the largest class of non-financial assets affected by FVA. Whether fair value reporting should be applied to tangible non-financial assets is a subject of unsolved controversy. China has a booming real estate market during the recent decades, but by the end of 2016, only about 5 % of the listed companies adopted the fair value model for the subsequent measurement of investment property. Based on the innovation diffusion theory and economics-based accounting choice theories, I find that the interactions between the immature real estate market and appraisal industry, conservative attitudes of the standard setters and regulators, and the traditional conservative culture are the primary obstacles to fair value model adoption. Further, the adoption decision relates to proxies of organizational characteristics such as state-ownership and institutional shareholding. Moreover, there is some evidence of unexpected and undesirable consequences relating to fair value model adoption. Nevertheless, the negative consequences are not market-wide so far due to the small number of fair value model adopters.

1.5 Structure of the thesis

The remainder of the thesis comprises of the three chapters mentioned in Section 1.4 and a conclusion chapter. Each of the empirical chapters contains seven sections[17]: Introduction, Institutional background, Literature review, Hypotheses development, Research design, Empirical results, Summary and conclusion. The last chapter concludes the thesis by summarising the main findings, incremental contributions and policy implications. Limitations and future research avenues are also acknowledged and identified in the conclusion chapter.

[17] The thesis is organized in this way because each empirical chapter focuses on a different aspect of FVA and relates to different theories, prior literature and empirical methods. Therefore, dealing with these sections separately in the three empirical chapters will ease the flow of the thesis and facilitate reading.

Chapter 2 Fair value and financial analyst forecast accuracy: Evidence from China

2.1 Introduction

The objective of this chapter is to examine the usefulness of fair value information to financial analysts in China. As mentioned in Section 1.4, the adoption of FVA in China is primarily driven by social and political factors rather than grassroots demands from accounting information users. Although fair value measurement has been reintroduced into China accounting standards for over ten years, so far limited studies published in reputable academic journals have examined the decision usefulness of fair values produced by the Chinese listed companies. Because China is one of the largest developing country that is attracting significant inward investments from other parts of the world, it is of great importance to international and domestic investors, China's regulators and accounting standard setters, as well as the international accounting standard setters to understand whether and how fair value adoption influences firm transparency; the efficient functioning of the capital markets and ultimately the continuous growth of the economy. To provide important insights into the quality of fair value information produced in China, this study attempts to address the following research questions:

1. Whether and how do different levels[18] of fair values relate to financial analyst forecast accuracy in China?
2. Does the disclosure of information relating to fair value hierarchy (e.g. the estimation inputs and models) affect financial analyst forecast accuracy in China?

Financial analysts are one group of sophisticated financial information users directly affected by fair value information, and they play important roles in processing and interpreting financial reporting information to facilitate investors' decision making (Bradshaw 2011). Empirical studies also show that analyst forecast properties are associated with stock price characteristics, such as stock price synchronicity and stock price crash risk (e.g. Piotroski and Roulstone 2004, Beaver et al. 2008, Xu et al. 2013). Research based on the US context provide evidence that fair value information can be useful input to investors' evaluation of firm value (e.g. Song et al. 2010, Magnan et al. 2015, Barron et al. 2016). However, evidence from the developed markets about the decision usefulness of fair value accounting may not apply to the emerging markets where there are relatively less-developed asset markets, weaker investor protection and legal enforcement of government regulations (e.g. Ball et al. 2003, Ke et al. 2016). In addition, both preparers and users in less-developed countries may lack understanding of the accounting standards originated from the developed markets, which could further compromise the valuation usefulness of fair value information.

[18] See Section 1.2.1 for the definitions of fair value levels.

Following the previous literature, this study focuses on the influence of fair value information on the accuracy of analysts' earnings per share (EPS) forecast. Compared to target price forecasts and stock recommendations, the mapping of accounting information into EPS forecast is clearer (Liang and Riedl 2014). In addition, EPS forecast is an indicator of firm's estimated ability to generate income, and it is an important input to other analysts' outputs such as target price forecasts and stock recommendations (Bradshaw 2004, Liang and Riedl, 2014). Among the various properties of EPS forecast, accuracy is one of the most important aspects of analysts' forecast performance (Gu and Wu 2003). For example, analysts themselves are concerned about the accuracy of EPS forecast because it could affect their reputation and compensation (Mikhail et al. 1999). Investors are interested in consensus EPS forecast because it is usually used as a proxy for market expected returns, which is an important input to the investment decisions. Theoretically, fair value accounting is supposed to deliver up-to-date information about the forgone of the firm and thus help decision makers to evaluate firm performance (Koonce et al. 2011). However, the estimation errors, bias, and complexity inherent in fair value estimates could prevent information users from incorporating such information into their decision-making. If the fair values and the related information disclosures provide valuable inputs (misleading information) to financial analysts' forecast tasks, there would be a positive (negative) association between fair value/related disclosures and forecast accuracy. Absence of a significant association between fair values and forecast accuracy may indicate that such information is not relevant to financial analysts.

A pooled cross-sectional regression is estimated to test the first hypothesis (stated in the null form) that different fair value inputs do not relate to financial analysts' forecast accuracy. A sample of 3,083 firm-year observations that disclose fair value hierarchy in the footnotes of the annual reports during 2007-2016 is used to estimate the regression. Among these observations, 964 disclose fair value hierarchy without any additional explanations on the valuation inputs and methods. The regression results show that level 1 and level 3 asset fair values negatively relate to forecast accuracy, while level 1 and level 2 liability fair values positively relate to forecast accuracy.

A propensity score matching (PSM) method together with the pooled cross-sectional regression are used to test the second hypothesis (stated in the null form) that the disclosure of fair value hierarchy-related information does not affect analysts' forecast accuracy. The PSM procedure identified 552 firm-year observations that should have disclosed details relating to level 2 and level 3 fair values as the control group. Comparing with the treatment firms that disclose fair value-related information, I find the fair value-related disclosures positively influence the association between level 3 fair values and forecast accuracy.

Some additional analyses are conducted to provide more comprehensive evidence of the influence of fair value information on analysts' forecast properties. The analyses show that level 3 (2) asset fair values relate to more (less) accurate forecast during the financial/stock market crisis periods. Moreover, level 1 asset fair values relate to more pessimistic analyst forecast, while level 2 and level 3 asset fair values relate to more optimistic forecast. There are some variations in the association between fair values and forecast properties among the financial and non-financial firms, and among the state-owned and non-state-owned companies. Moreover, the main findings are not significantly driven by the systemic risks of particular types of fair value-measured assets or liabilities.

The study contributes to the literature in the following ways. First, it contributes to the fair value hierarchy literature by providing new evidence on the decision usefulness of fair values produced in a major emerging market. Studies in the US generally document positive association between fair value hierarchy and analyst forecast accuracy, For example, Magnan et al. (2015) document positive relation between level 2 fair values and analyst forecast accuracy during the financial crisis period in a sample of US-bank holding companies. Ayres et al. (2017) find positive association between level 1, level 2 fair values and forecast accuracy in a sample of US non-financial firms during their sample period (2007-2013). Unlike the prior literature, I find that in China, where there is less-developed asset markets and weaker legal enforcement, both market-based (level 1) and model-based (level 3) fair values could impair sophisticated information users' ability to predict future earnings.

Second, this study contributes to the fair value-related information disclosure literature by examining the usefulness of information disclosure relating to fair value hierarchy. Barron et al. (2016) investigate whether identifying level 3 fair value-measured items in the footnotes improves analysts' information environment, and Chuang et al. (2017) evaluate the information content of the voluntary disclosures of the controls and processes relating to fair value estimates. Unlike the prior literature, this study examines the usefulness of footnote disclosures about the estimation inputs and methods relating to comparable market prices-based and model-based (i.e. level 2 and level 3) fair values[19].

[19] Vergauwe and Gaeremynck (2019) examine whether footnote disclosure relating to investment property measurement (including fair value estimates) affects information asymmetry by using a sample of European real estate firms between 2007 and 2010. This study differs from theirs in the following ways: (1) they use stock price-based information asymmetry measures while I use analyst forecast accuracy as the dependent variable, (2) their sample is constrained to firms in the real estate industry, while my sample includes a full range of industries, (3) their sample firms are from nine European countries while my sample is from one single country, which reduces the influence of cross-country confounding factors such as culture and legal systems, (4) their sample period is from 2007 to 2010 while I use a longer sample period from 2007 to 2016 which covers both financial crisis and non-crisis periods, and (5) they only examine disclosures relating to investment property assets while this study evaluates the influence of disclosures relating to a broader range of fair value-measured items (i.e. any assets or liabilities that are measured by level 2 or level 3 fair values).

By documenting the usefulness of fair value-related disclosures to the financial analysts, the study also contributes to the international accounting standard setters' concern on the extent and effectiveness of fair value-related disclosure[20] (e.g. KPMG 2017, Filip et al. 2017). Although the disclosure requirements have been formally specified in the accounting standards, this study shows that many listed Chinese companies do not fully comply with the rules. Moreover, there is evidence that in the non-financial companies, the time-series change in disclosure relates to more forecast errors. From a public policy perspective, the findings highlight the importance for domestic regulators to monitor fair value-related information disclosure, and to improve training on market participants about the potential usefulness of footnote disclosure.

Further, this study contributes to the literature on analysts' behaviour in the emerging markets where the information environment is often dependent on regulatory actions by the government. As one major emerging economy with increasing international influence, China is undergoing substantially reform in the financial system, and the modernization of the accounting standards is an important component of this reform. Some studies have examined how reforms in corporate governance relate to financial analysts' forecast properties in this country (e.g. Huang and Wright 2015). However, so far there is limited evidence on the influence of change in accounting standards and the resulting financial reporting information on the information environment of financial analysts in China. This study thus extends the literature by providing evidence on the influence of accounting information on analysts in China, and to advance understanding on financial analyst' behaviour in the emerging markets.

The remainder of this chapter is organized as follows. Section 2.2 reviews the related literature. Section 2.3 introduces the relating institutional background. Section 2.4 develops hypotheses relating to the research questions. Section 2.5 describes the sample and research design employed to test the hypotheses. Section 2.6 reports the empirical results for the main analyses, together with results for robustness checks and additional analyses. The last section concludes the chapter.

2.2 Literature review

This section reviews studies relating to fair value hierarchy and disclosure, as well as other factors that could affect financial analysts' activities and their forecast properties. Overall the literature review shows a lack of evidence on the practice of fair value disclosure and whether and how these disclosures influence financial analyst forecast performance in China. Section 2.2.1 reviews studies on fair value hierarchy and disclosure outside China. Section 2.2.2 reviews studies on fair value

[20] For example, the IASB project Post-implementation Review of IFRS 13 Fair Value Measurement raises the question of how the generic disclosures affect the usefulness of level 3 fair value measurements (Filip et al. 2017).

hierarchy and disclosure in China's context. Section 2.2.3 briefly introduces the studies on other factors that could affect analysts' forecast properties to provide an overview of the determinants of analyst forecast performance. Measures of the financial analyst activities and forecast properties used in the papers relating to fair value accounting, IFRS and analyst forecasts are summarised in Appendix 2.1.

2.2.1 Fair value hierarchy and disclosure literature outside China

The existing literature outside China has examined the decision-usefulness of fair value hierarchy and particular types of relevant disclosure[21]. Some earlier studies focus on the fair value hierarchy produced under the SFAS 157[22] in the US and IFRS 13 in the international setting, and the results on the relevance and reliability of market-based and model-based fair values are mixed. For example, Song et al. (2010) and Siekkinen (2016) find that assets measured by level 3 fair values are less value relevant than level 1 and level 2 fair values, and the relevance of fair values varies by corporate governance and cross-country institutional characteristics. Goh et al. (2015) also show for their sample of US banks during 2008-2011, level 3 fair values are less value-relevant than level 1 and level 2 fair values. Riedl and Serafeim (2011) provide evidence that banks with greater exposure to level 3 assets have higher risk (measured by betas), and the information risk is likely to be more pronounced for banks with ex ante weaker information environment. Unlike these studies, Altamuro and Zhang (2013) and Lawrence et al. (2016) do not find level 1 and level 2 fair values better able to reflect future cash flows, risks and stock returns than level 3 inputs. Freeman et al. (2017) and Fiechter and Novotny-Farkas (2017) further show that asset types play a role in the value-relevance of fair value inputs. Moreover, Ferreira et al. (2019) directly test and find that the extent of managerial judgment and discretion influence the value relevance of level 3 fair value estimates.

Some studies examine the influence of fair value hierarchy on financial analysts' forecast properties. Magnan et al. (2015) investigate how the extent of US bank holding companies' use of fair value accounting affect financial analysts' ability to forecast the firm's future financial performance. They find a positive relationship between firm's fair value exposure and analysts' forecast dispersion. Their further analysis shows that the fair value hierarchy disclosure helps reduce forecast error for banks with sizable fair value measured assets. Moreover, level 2 fair values are associated with enhanced forecast accuracy while level 3 fair values positively relate to forecast dispersion. They argue that the results imply that level 2 fair values convey higher quality private and public information whereas managers act opportunistically in measuring level 3 fair values and thus reduce

[21] See Ghio et al. (2018) for a review of fair value disclosure and hierarchy literature outside China. This section does not provide a thorough literature review but summarises findings in studies most relevant to the key research questions in this study.

[22] SFAS 157 (also codified as ASC 820) in the US is equivalent to IFRS 13.

information quality. Findings of Magnan et al. (2015) are limited to their sample of US bank holding companies during the financial crisis period as their sample period ends in 2009. To provide more comprehensive evidence on the association between fair value hierarchy and financial analysts' forecast accuracy, Ayres et al. (2017) use both financial and non-financial US listed companies' observations during a longer sample period 2007-2013. Their results show that the positive association between level 1 and level 2 fair values and forecast accuracy is concentrated in non-financial firms, and they suggest that not only the measurement issue, but also the business purpose and accounting treatment of fair value-measured assets and liabilities could affect analyst forecast accuracy.

A few studies focus on fair value-related disclosure. Barron et al. (2016) evaluate whether disclosures about level 3 items reduce financial analysts' uncertainty about firms' future earnings by using a sample of US firms which held significant amounts of level 3 assets and liabilities. They point out that level 3 fair values are of particular concern to information users because such fair values involve considerable managerial discretions in selecting and applicating valuation techniques, making estimation assumptions and inputs. The footnote disclosures are therefore designed to reduce the information risk associated with model-based fair values. They provide evidence that the disclosure of level 3 fair values, as required by SFAS 157 Fair Value Measurements, is associated with reduced analyst forecast errors. Moreover, the unrealized gains and losses on level 3 fair values have predictive value for firms' future performance. Chuang et al. (2017) examine both the determinants and consequences of voluntary disclosures about the controls and processes in estimating fair values among US banks and insurance companies. They find that these additional disclosures have incremental information content. Using a sample of European real estate firms during 2007-2010, Vergauwe and Gaeremynck (2019) construct a disclosure index and find some evidence that footnote disclosure relating to investment property fair values affect information asymmetry.

2.2.2 Fair value hierarchy and disclosure literature in China

Compared to the burgeoning literature on fair value hierarchy and related disclosure outside China, only a few papers have examined the relevance of fair value hierarchy in China and all of these papers are published in domestic Chinese journals. Some studies focus on the financial industry. Deng and Kang (2015) use a sample of financial listed companies in China during 2007-2013 and they find level 1 fair values are more value-relevant than other two levels of fair values. Bi and Zhang (2018) find that level 1 fair values are more relevant than level 2 and 3 fair values for assets, and level 1 and 2 fair values are more relevant than level 3 fair values for liabilities. In addition, the quality of corporate governance has an influence on the relevance of level 2 and 3 fair values. They use a sample of 144 financial firm-years during the 2010-2014 period. Li and Xiang (2016) also focus on the value

relevance of fair value hierarchy in China's financial industry but their sample period is from 2012-2015. They also find that level 1 fair values are value relevant.

Some studies use both financial and non-financial samples. Mao et al. (2015) collect 389 firm-year observations during the 2007-2012 period to examine the association between voluntarily disclosed fair value hierarchy and information asymmetry in China. They find negative (positive) association between information asymmetry and level 1 and 2 (level 3) fair values. They conclude that the disclosure of fair value hierarchy information helps reduce information asymmetry among the investors. However, the results could be influenced by self-selection bias. Li (2016) examines the value relevance of fair value hierarchy of a sample of listed companies during 2014-2015 (the mandatory disclosure period). She finds that level 1 and 2 fair values are value relevant for assets, while level 2 and 3 (level 1) fair values are (not) value relevant for liabilities. However, this study does not test the relevance of fair values among financial and non-financial companies separately, and whether there are differences in the information content of fair value hierarchy across these two industries remain unknown.

Overall, the existing studies in China are limited in scope, and their findings about the relevance of fair value hierarchy are still inconclusive. In particular, almost all of these papers examine the value-relevance of fair value hierarchy, and none of them have considered financial analysts' use of the fair value hierarchy information. Moreover, the fair value hierarchy-related disclosure practices and their information content, as well as the potential influence of asset types underlying the fair value measurements have not been explored. The limitations in current fair value accounting research in China open up ample research opportunities.

2.2.3 Other determinants of financial analyst forecast accuracy

Other than fair value hierarchy and disclosure, other studies also find that analyst forecast properties are affected by particular fair value-measured assets, liabilities and transactions. Moreover, the broader literature examines how analysts' forecast properties are affected by financial reporting characteristics, and firm-level factors. These studies either indicate potential effects of fair value accounting on analysts' information environment or suggest factors that should be controlled for in fair value accounting studies. The calculation methods for forecast accuracy (or error, bias) and control variables used in papers reviewed in this subsection are summarised in Appendix 2.1.

Prior research has used both experimental and empirical archival research methods to examine the role of fair value information in analysts' forecast tasks. An experimental study by Hirst et al. (2004) shows that disclosure of fair value gains and losses in the footnotes cannot replace recognition in the financial statements. Koonce et al. (2011) find that whether fair values are used to measure asset or

liability, fair value gains or losses, and maturity of fair value-measured items affect investors' views about the value relevance of fair value information. The experiment by Clor-Proell et al. (2014) documents that reporting format of fair value changes affect investors' valuation judgement. Archival studies also document that fair value accounting matters to the financial analysts in both financial and non-financial companies (e,g, Bischof et al. 2014), and in different settings such as financial derivatives (Chang et al. 2016), hedging (Panaretou et al. 2013, Campbell et al. 2015), investment properties (Liang and Riedl 2014), as well as during the financial crises and non-financial crisis periods (e.g. Lim et al. 2013).

The extent of information disclosure, financial reporting complexities, other firm-level and analyst-level characteristics are also found to affect financial analysts' following decisions and forecast properties. Some studies focus on the effects of particular accounting standard change on analysts' forecast properties (e.g. Hirst and Hopkins 1998, Acker et al. 2002). Some studies examine the informativeness of disclosures to analysts (e.g. Lang and Lundholm 1996, Hope 2003 a, b). They generally find that increased disclosure attracts more analyst following, improves forecast accuracy and reduces forecast dispersion. Complexities of tax-law changes, intangible assets, impairment charges and the overall complexity of firms' financial reports are also found to affect analysts' forecasts (Plumlee 2003, Barth et al. 2001, Gu and Wang 2005, Lehavy et al. 2011, Chen et al. 2015).

Other than the above financial reporting characteristics, firm size, growth rate, book-to-market ratio, number of analysts following, return volatility, cross-listing, international diversification, legal origins, year and industry effects are found to affect analyst' forecasts (e.g. Barth et al. 2001, Duru and Reeb 2002, Lang et al. 2003, Lehavy et al. 2011). These factors are usually controlled for in specifications to test the role of financial reporting characteristics in analysts' forecast performance. Details of the way these firm-specific variables affect analyst forecast properties are discussed in the research design section.

Analysts' personal characteristics and incentives are considered when the studies aim at examining the determinants of individual analyst forecast properties. Prior studies have found that experience, innate ability, available resources, incentives, and working form (e.g. team or individual) relate to analysts' forecast performance (e.g. Clement 1999, Mikhail et al. 2003, Clement et al. 2007, Brown and Hugon 2009). Also, there is an increasing number of studies using Chinese analyst data to examine the determinants of their forecast properties (e.g. Hu et al. 2008, Bartholdy and Feng 2013, Xu et al. 2013, Huang and Wright 2015, He et al. 2018). However, usually the individual-level factors are not included in the control variable list when forecast accuracy is calculated at the consensus level. This is because of the implicit assumption that consensus forecast (either mean or median) removes heterogeneity in analysts' forecasting ability (O'Brien 1990).

2.3 Institutional background

This section briefly introduces the relevant institutional background. To help understand the reporting practice and accounting information quality in China, Section 2.3.1 introduces the legal power of accounting standards and discusses the monitoring mechanisms of accounting information in this country. Section 2.3.2 summarises the disclosure requirements and practices relating to fair value measurement in China. Section 2.3.3 provides an overview of the financial analyst industry in China to help understand whether fair value information and forecast accuracy matter to financial analysts in this country.

2.3.1 The accounting standards and monitoring mechanisms for accounting information in China

The application of ASBEs is compulsory for the listed companies in China. Although the accounting standards in China have been substantially converged with the IFRS and they are supposed to be of high quality, the weak legal enforcement and corporate governance likely impair the quality of the accounting information. Specifically, at present, the ASBEs are issued by the Ministry of Finance (MOF) and they take the form of governmental regulations. All companies listed in domestic stock exchanges are required to report under the ASBEs since 2007, and other enterprises are encouraged to implement the ASBEs (CASPlus 2019). As part of the legal system, the ASBEs in China are compulsory in nature and non-compliance with the standards is equivalent to violation of laws and regulations (Liu 2007). The monitoring mechanisms for accounting information quality in China include the regulatory activities of the China Securities and Regulation Committee[23] (CSRC), the MOF and the stock exchanges; the monitoring and quality assurance review of the Chinese Institute of Certified Public Accountants (CICPA); the audit firms; and the firm itself (Firth et al. 2011).

Among these monitoring mechanisms, CSRC is the main regulator of the security markets and financial reporting information in China. It is a ministry-level commission and has both a central location in Beijing and regional offices. The Security Law in China delegates the CSRC authority to investigate and sanction listed companies and other market participants involved in malpractices[24]. The listed companies are inspected on a regular basis. Due to limitation in resources such as experienced and qualified personnel, the inspection is usually initiated especially when there are complaints from investors or the media. Moreover, due to the high cost of information, the CSRC usually focuses on material violations of laws and regulations rather than every tiny aspect of potential harmful malpractice. The listed company, its management and auditor will be issued an

[23] Similar to the Securities Exchange Commission (SEC) in the US.

[24] The threat of civil litigation is very weak in China so the CSRC is deemed as an important mechanism to deter corporate malpractice (Wei 2005).

enforcement action (penalties range from fine, to reprimands, to suspension of audit work, to revoking licenses) once a financial statement fraud is detected. However, not all non-compliance or violations of laws or regulations will be punished due to the high cost of legal enforcement[25] (Chen et al. 2011).

In addition to the CSRC, the MOF also inspects listed firms regularly, and it has the power to punish the malpractices of companies listed in the Shanghai and Shenzhen stock exchanges. Similar to the CSRC, the MOF also has limited resources and is unlikely to identify and punish every violation of rules and regulations. The CICPA, as a semi-governmental institution, is also involved in accounting information monitoring, but they have relatively limited enforcing power. The Shanghai and Shenzhen stock exchanges are close to the listed companies and they formulate their own listing rules that prescribe the release and format of financial reports. Punishment of violating the listing rules could include correction, internal and/or public criticism, or penalties. The listed firms, listing sponsors, and the management members can be the subjects of the punishment. However, similar to other governmental departments, there is a lack of resources to identify malpractices and implement legal enforcement in the stock exchanges (Zhu 2013).

At the firm level, there is a lack of good ethical behaviour among business executives due to ignorance and weak law enforcement. Despite the established legal system modelled on that in the developed markets, good governance exists on paper but may not be implemented in practice (Firth et al. 2011). In addition, the prevalent concentrated ownership structure, state-ownership among the Chinese listed companies could also impair the quality of their accounting information (e.g. Huang and Wright 2015).

2.3.2 Fair value-related disclosure requirements, application of fair value estimates and disclosure practices of Chinese listed companies

Although fair value measurement has been allowed or required to be used by the Chinese listed companies since 2007, there were no consistent and standardised requirements towards its application[26] until the China's version of fair value measurement standard, ASBE 39 Fair Value Measurement[27], becomes effective on July 1, 2014. ASBE 39 clarifies the definition of fair value and sets out requirements for disclosure relating to fair value-measured assets and liabilities. Specifically,

[25] Legal enforcement costs could arise from the investigation process, evidence collection, arrestment, prosecution or punishment.

[26] In 2010, the MOF issued a notice asking the listed companies to disclose fair value inputs in the annual reports (MOF 2010). However, the notice is not legally binding and only a few companies voluntarily disclose the fair value hierarchy before 2014 (Bi and Zhang 2018).

[27] Its IFRS equivalent is IFRS 13 Fair Value Measurement. Wang et al. (2017) compare the two sets of accounting standards.

for recurring[28] fair value measurements, the enterprises are required to disclose the classes and amounts of fair value-measured assets and liabilities; the fair value hierarchy; amounts, reason, and timing of transfers between fair value levels; the valuation techniques and inputs of level 2 and level 3 fair values, and the reasons of changes in the valuation techniques. The reconciliation from the opening balances to the closing balances for level 3 fair value measurement; description of the change in unobservable inputs of level 3 fair value measurement when the change could result in significant change in fair values also need to be disclosed. When the highest and best use of a non-financial asset differs from its current use, the enterprises need to disclose this fact and the reason (ASBE 39.44). For non-recurring fair value measurements, there are fewer disclosure requirements but the fair value hierarchy, and description of valuation techniques and inputs of level 2 and level 3 fair values are still required to be disclosed in the footnotes (ASBE 39.45). There is no requirement of retroactive adjustment for fair value measurement reported before the effective date of ASBE 39.

Through analysing the footnote disclosures in the annual reports of domestic listed Chinese companies during 2007 to 2016, I find that 3,097 out of the 11,189 firm-year observations with fair value-measured assets and liabilities[29] have fair value hierarchy disclosure. Table 2.1 reports the distribution of fair value hierarchy disclosure by year and by industry during this 10-year period. The table shows that the number of companies disclosing fair value inputs increases significantly from 96 in 2013 to 828 in 2014, indicating the effects of ASBE 39 on the listed companies' disclosure practices. However, even during the mandatory fair value hierarchy disclosure period (2014-2016), the disclosure level is still lower than the regulators and standard setters would expect. A large proportion (about 50%) of the companies with fair value-measured assets and liabilities[30] do not report the inputs of their fair value estimates. Among the 18 industries, the financial industry (industry code "J") exhibits the highest level of legal compliance. This probably is because they have relatively intense fair value-measured assets and liabilities compared with other industries, and

[28] Recurring (Non-recurring) fair value measurements refer to fair value measurements required or allowed by other ASBE to be measured in the balance sheet at the financial reporting date (in particular circumstances) (ASBE 39. 43). The definitions of recurring and non-recurring fair value measurements in ASBE 39 are the same as those in IFRS 13.

[29] Including trading financial assets and liabilities, available-for-sale financial assets, derivative financial assets and liabilities, and fair value-measured investment property assets and biological assets.

[30] Note that the available-for-sale securities (AFS) held by some Chinese companies are purely measured by historical costs because there are no active markets for such assets (e.g. shares of an unlisted company). These companies can only be identified through a thorough check of the footnote disclosures. Including these companies in the sample can lead to over-estimation of the number of companies with fair value-measured assets and/or liabilities, and under-estimation of the proportion of fair value hierarchy disclosure firms. This is also one reason that I do not test whether the disclosure of fair value hierarchy affects analyst forecast properties-it is difficult to identify the number of companies with fair value-measured assets and liabilities but do not disclose fair value hierarchy. Some companies report AFS but in actual they do not measure AFS by fair value.

therefore are under more stringent regulatory monitoring[31] on their fair value-related information disclosure.

[Insert Table 2.1 here]

Table 2.2 presents the intensity[32] of different levels of fair value estimates. These statistics are calculated using the sample of companies that disclose fair value hierarchy during 2007-2016. After removing 8 observations with missing total assets value and 6 observations with mistaken disclosures (i.e. those with larger than 1 fair value estimates to total assets ratios), only a small proportion of assets and liabilities (mean 6.06%, with 5.58% assets and 0.48% liabilities) are measured at fair value among the sample Chinese listed companies. Specifically, Panel A of Table 2.2 shows that level 1, level 2 and level 3 fair value estimates for assets represent 2.99%, 2.05% and 0.54% of total assets respectively. These statistics are significantly lower than those reported by the US companies during the similar period[33]. Panel B and Panel C of Table 2.2 present fair value estimates for the sub-samples of financial and non-financial companies respectively. The financial companies have much larger portions of assets and liabilities measured at fair value than the non-financial companies, and the proportions are approximate to those in the US (e.g. Ghio et al. 2018, Panel B of Table 2.2). The non-financial companies, on the other hand, start reporting fair value hierarchy information only from 2009 and on average they have a relatively small proportion of fair value estimates both for assets and for liabilities. Among companies that disclose fair value hierarchy, about 31.27% of them do not disclose valuation methods relating to the fair value estimates.

[Insert Table 2.2 here]

Taking the types of assets and liabilities into consideration, 1,518 of the firm-year observations report non-zero held-for-trading assets (HFTA), 1,682 report non-zero available-for-sale financial assets (AFS), 299 report non-zero derivative financial assets (DFA), 582 report non-zero held-for-trading liabilities (HFTL), 312 report non-zero derivative financial liabilities (DFL), and 153 report non-zero

[31] In addition to the monitoring mechanisms mentioned in Section 2.3.1, the banks and insurance companies in China are under the supervision of China Banking and Insurance Regulatory Commission (CBIRC). The CBIRC is a government institution under the State Council which is established in 2018 after merging the former China Banking Regulatory Commission (CBRC) and China Insurance Regulatory Commission (CIRC).

[32] Calculated as the amounts of fair value estimates (level 1, level 2 and level 3 respectively) divided by total assets.

[33] For example, Ghio et al. (2018) show that for a sample of US companies, level 1, level 2 and level 3 fair value estimates for assets represent about 9.33%, 8.32% and 2.11% of total assets respectively. In terms of liabilities, Ghio et al. (2018) report that level 1, level 2 and level 3 fair value estimates for liabilities represent about 0.33%, 1.68% and 2.15% of total assets respectively. On the contrary, in China the proportion of fair value-measured liabilities in total assets is 0.248%, 0.185% and 0.045% for level 1, level 2 and level 3 fair value estimates respectively.

investment properties (IP)[34]. Panel A of Table 2.3 shows that level 1 AFS represent most fair value estimates in the full sample and in the non-financial industry (2.16% and 1.99% respectively). In the financial companies, level 2 AFS represent most fair value estimates (6.43%), followed by level 1 AFS (3.58%), level 2 HFTA (3.55%) and level 1 HFTA (3.26%). Regarding liabilities, Panel B of Table 2.3 shows that on average level 1 held-for-trading liabilities (HFTL) represent most fair value estimates for the full sample and the non-financial sample (0.21% and 0.21% respectively). Level 2 HFTL represent most fair value estimates in the financial companies (0.62%), followed by level 1 HFTL (0.19%) and level 3 HFTL (0.14%).

[Insert Table 2.3 here]

2.3.3 Overview of the financial analyst industry in China

The financial analyst industry is still fledgling but is under rapid development in China. It started to emerge with the development of China's capital markets over the 1990s[35] and its development did not speed up until the early 2000s[36] (Hu et al. 2008, Huang and Wright 2015). The demands for investment analysis began to increase gradually in the 2000s with the increasing extent of market openness and the resulting rapid increase in institutional shareholding (Barniv and Bao 2009). The Chinese financial analysts got the formal name in 2005 and the ethic regulations were issued in the same year. There are 73 securities firms with about 700 analysts in 2005 and the number has increased to 126 securities firms with 2,257 registered financial analysts by July 2016 (Bartholdy and Feng 2013, SAC 2016).

Similar to their western peers, the main service provided by financial analysts in China is to collect and analyse information, and to make investment recommendations to facilitate the activities of the securities firms (Wang et al. 2011). The funds will allocate their trading volume according to these investment recommendations and the analysts will be evaluated by the funds according to their performance. The rankings of analysts (i.e. the "Star" analysts) will be published in New Fortune or Invest Today and the ranking will strongly affect an analyst's salary. For the securities firms, more Star analysts will attract more business from institutional investors (Bartholdy and Feng 2013). The potential monetary benefits associated with the ranking provide financial analysts in China with strong incentives to make accurate forecasts.

[34] In addition, three companies report non-zero fair value-measured biological assets (Stock codes: 000488, 002054 and 603993). Due to the small number of observations I do not present descriptive statistics for biological assets.

[35] The two major stock exchanges, Shanghai and Shenzhen Stock Exchanges were established in 1990 (Allen et al. 2013).

[36] In 1999 a licensing system of financial analysts was adopted, and in the following year the Securities Analysts Association of China (SAAC) was established to ensure the healthy development of China's securities market (Bartholdy and Feng 2013).

In terms of the information sources, some earlier studies show that financial analysts in China rely heavily on personal communication with insiders to obtain information. One possible reason is the high information asymmetry among the Chinese listed companies, which is caused by opportunistic accounting manipulation and deficient voluntary information disclosure. According to the interviews conducted by Wang and Ahammad (2012), Chinese financial analysts rank company visits and private meetings as the most useful venues to gather price-sensitive information and they are required by their employers to conduct site visits once or twice per year. The site visits can help analysts verify the information they have and collect additional information. The effectiveness of the conversation with the firms they analyse depends on the "Guanxi" (also translated as personal connection) between analysts and managers[37]. Nevertheless, the Chinese regulatory body has been aware of potential problems relating to analysts' private information collection, and such activities have reduced after the China Securities Regulatory Commission (CSRC) issued Listed Companies Information Disclosure Administrative Rules (Directive 40) [38] on 30 January 2007 (Jiang et al. 2019).

Overall, the above institutional background shows that fair value measurement still has a limited range of application in China. In terms of the disclosure requirements and practices, ASBE 39 is largely similar to IFRS 13. However, due to the weak corporate governance and enforcement mechanisms, not all Chinese listed companies fully comply with the fair value-related accounting and disclosure requirements. The extent to which different levels of fair values and the disclosed information are useful to the financial analysts remain empirical questions to be examined. The next section develops hypotheses relating to the research questions.

2.4 Hypotheses development

To develop the hypotheses, Section 2.4.1 summarises the qualitative characteristics of accounting information outlined in the Conceptual Framework (CF) of Financial Reporting. Then Sections 2.4.2 to 2.4.3 draw on the qualitative characteristics of financial reporting outlined in the CF to map the influence of fair value information into analyst forecast accuracy. The institutional environment of Chinese listed companies is also taken into consideration when developing the hypotheses.

[37] After the information is collected, the Chinese analysts will use a module similar to those used by their peers in the developed countries to analyse the macro-economy, industry-based and firm-specific information (Hu et al. 2008).

[38] The Directive 40 is similar to the Regulation Fair Disclosure issued by the US Securities Exchange Commission (SEC) in 2000, with the purpose of constraining insider trading by restricting firms' selective disclosures of private information to financial analysts and institutional investors before public disclosure (Jiang et al. 2019).

2.4.1 Conceptual Framework of financial reporting

The CF describes the objective of financial reporting and it is a practical tool that can help evaluate existing standards and practices (Herrmann et al. 2006). According to the CF, one objective of financial reporting is to provide the existing and potential investors with information that is useful for their decisions of buying, selling or holding equity instruments[39] (IASB 2015, p.22-23). For financial information to be decision-useful, it has to be both relevant and faithfully represent what it purports to represent, and the decision usefulness of financial information is enhanced by comparability, verifiability, timeliness and understandability.

Relevant financial information can provide predictive and confirmatory value to information users. Predictive value refers to the capability of financial information to be used as an input to help users predict future outcomes, while confirmatory value refers to the information's capability of providing feedback about previous evaluations. Another fundamental qualitative characteristic of financial information, faithful representation, refers to the ability of the information to represent what it purports to represent. The information would be complete, neutral and free from error to be faithful representation. Specifically, the information has to contain all descriptions and explanations necessary for a user to comprehend the depicted underlying economic phenomenon, and the selection or presentation of financial information should be neutral and free from bias. Such neutrality is supported by prudence which avoids overstatement of assets and income, and understatement of liabilities and expenses. Moreover, the process used to produce description of the economic phenomenon itself needs to be without errors or omissions.

The relevance and faithful representativeness of financial information can be further enhanced if the information is comparable, verifiable, timely and understandable. Comparability means that users are able to identify and understand similarities and differences among the reporting items, and the information is verifiable if users can check by themselves that the information represents what it purports to represent. The information is timely if it is available in time for influencing users' decisions, and the information needs to be classified, characterized and presented clearly and concisely to be understandable. Such understandability may be supported by appropriate disclosures.

Financial reporting information that meets the above qualitative characteristics defined by the CF is supposed to be useful inputs to investors' decision making, which, in other words is associated with higher firm-level transparency regarding the underlying firm performance. Depending on the extent

[39] Note that there is a difference in the objective of the IFRS CF and the ASBE Basic Standard. In the ASBE, the financial reporting users not only include investors, but also include creditors, government and its relevant departments, as well as the general public (ASBE Basic Standard.4, MOF 2014a). Nevertheless, the quality requirements for accounting information are similar in ASBE and IFRS.

to which fair values and related disclosure produced by the companies meet the qualitative characteristics described by the CF, we would expect a positive association between the quality of accounting information and analyst forecast accuracy.

2.4.2 Fair value hierarchy and financial analyst forecast accuracy

The fair values can be estimated by using market prices (level 1 fair value), market price of similar assets or liabilities (level 2 fair values), and model-estimated fair values (level 3 fair values). A major concern regarding the relevance and faithful representation of fair values is the distortions and subjective judgement involved in model-based fair value inputs. The involvement of managers' estimation may either reveal useful firm-specific information to the market or relate to greater measurement errors and bias (Penman 2007, Magnan et al. 2015). Level 3 fair values are solely determined by manager's estimates and these estimates are applied to assets and liabilities without liquid secondary markets. Without active markets, the fair values may be obtained from faulty models or influenced by management's opportunism (DeFond et al. 2015). These errors and bias could dampen the extent of faithful representativeness and may obscure firms' true performance and lead to greater information asymmetry between insiders and outside investors (Song et al. 2010). However, managers can also deliver private information on asset values through level 3 fair values.

The impact of level 1 fair value inputs on financial analyst forecast accuracy is also ambiguous. Level 1 fair values are solely determined by market prices and they are viewed as the most reliable inputs, but the market prices capture both short-term market fluctuations and long-term trends (Magnan et al. 2015). It could be challenging for financial analysts to distinguish between these temporary and permanent components particularly in China, where the market is highly volatile (e.g. Piotroski and Wong 2012). Between level 1 and level 2 fair values, level 2 estimates are mostly based on market inputs, but the management can also convey private information through these values by selecting comparable market prices. Overall, whether the three levels of fair values relate to better information environment in China is not clear, and whether one type of fair value estimation input is more useful to analysts than the others is also not clear. Accordingly, the first hypothesis is stated in the null form as:

Hypothesis 1a: Leve 1, level 2, and level 3 fair values are not associated with financial analysts' forecast accuracy in China.

Hypothesis 1b: Different types of fair value estimation inputs (i.e. level 1, 2 and 3 fair values) have the same association with financial analysts' forecast accuracy in China.

2.4.3 Disclosure of fair value hierarchy-related information and financial analyst forecast accuracy

Although there could be biases and distortions incorporated in fair values, investors could verify the validity of these fair value estimates by analysing disclosures about the assumptions, models and methods used to generate fair values. Such disclosures are designed and required by the accounting standards to improve the verifiability and understandability of fair value information and to enhance the decision-usefulness of financial reporting[40]. Without the relevant disclosures, there could be significant uncertainty regarding future cash flows from the balance sheet assets and liabilities. The investors therefore can have difficulty assessing the quality of earnings and apply discounts appropriately as a basis for future performance expectation (Magnan et al. 2015). After the effectiveness of ASBE 39 in 2014, Chinese companies that have fair value-measured assets and liabilities are required to comply with stricter disclosure requirements. However, due to weak legal enforcement, many companies do not disclose the methods they used to generate model-based fair values, or they provide such disclosures but just in the legal form and without real firm-specific information. The 2016 Accounting Supervision Report of Listed Companies[41] issued by the CSRC also points out that some companies do not comprehend the differences between fair value inputs and make incorrect classification of fair value hierarchy (CSRC 2016). The disclosures relating to the fair value hierarchy may help analysts better understand the risks and uncertainties relating to different levels of fair values. Alternatively, when they are just disclosed in form but not in substance, the disclosures may not be useful or even misleading to the analysts. Given the above arguments, whether these disclosures can enhance relevance and faithful representativeness of fair values is questionable. Therefore, the second hypothesis is stated in the null form as follows:

Hypothesis 2: Disclosures about the estimation details of fair value hierarchy do not influence the association between fair values and financial analyst forecast accuracy in China.

2.5 Research design

This section presents the empirical models, variables and sample used to test the hypotheses. Section 2.5.1 describes the data source and sample selection procedures. Section 2.5.2 describes the regression models and variables used to test the hypotheses.

[40] See ASBE 39 Chapter 11 (MOF 2014b).

[41] The CSRC spot-checked the 2016 annual reports of 612 listed companies and formed the report.

2.5.1 Data source and sample selection

Table 2.4 presents the preliminary sample selection procedures. The initial sample consists of 22,806 firm-year observations in the China Stock Market and Accounting Research (CSMAR) database for which data is available from 2007 to 2016. After screening out observations without fair value-measured assets and liabilities[42], the annual reports of all companies listed in the domestic Chinese stock exchanges (i.e. Shanghai and Shenzhen stock exchanges) during the new accounting standards period 2007 to 2016 are checked for the availability of fair value hierarchy information by using the keywords "level 1"[43] and "level"[44]. Details of their fair value information[45] are then manually collected for further analyses. The annual financial reports are obtained from Cninfo[46], listed companies' websites, as well as the websites of Shanghai and Shenzhen stock exchanges. The screening and data collection procedures result in 3,119 firm-year observations with fair value hierarchy disclosure. After removing observations with mistaken fair value disclosure and those with missing total assets value in CSMAR, there are 3,083 firm-year observations left in the sample for hypotheses testing[47]. The financial analyst forecast data, other accounting and stock market data are extracted from the CSMAR database. The number of observations used in the regression analyses may vary due to the availability of different variables.

[Insert Table 2.4 here]

2.5.2 Model specifications

The pooled cross-sectional[48] regression specification (1) tests how different levels of fair values relate to analysts' forecast properties. The key variables of interest are the fair value variables ($FV_{i,t}$). The independent variables are lagged by one period to avoid simultaneity with forecast properties in the hypothesis tests.

$$ACCURACY_{i,t+1} = \alpha + \beta FV_{i,t} + \sum_j \gamma_j Control_{i,j} + \varepsilon_{i,t} \qquad (1)$$

[42] See note 12 for the list of fair value-measured assets and liabilities.
[43] Including the Chinese characters "第一层" and "第 1 层".
[44] The Chinese characters are "层次" and "层".
[45] Including the types of assets and liabilities measured by fair value, the corresponding amounts, and whether there is disclosure about the valuation methods of the fair values. All fair values reported at million/thousand yuan in the notes are adjusted to Chinese *yuan*.
[46] All listed companies in China are required to disclose information in Cninfo (www.cninfo.com.cn) as required by China Securities Regulatory Commission.
[47] See Section 2.3.1 for more details about the sample.
[48] In robustness checks I also report results of firm-fixed effect model estimates.

For the second hypothesis, because the decision of fair value estimation methods disclosure is endogenous, the propensity-score-matching method[49] is used to reduce the influence of endogeneity. The probit model (2) is estimated to identify a matched sample that is likely to disclose the fair value-related information. The independent variables used to predict the probability of disclosure include the proportion of level 2 and level 3 fair value estimates (L2FV and L3FV), big 4 auditors (BIG4), state-ownership (STATE), the strength of legal enforcement in different provinces (LAW), institutional ownership, (INSTI), firm size (SIZE), analyst coverage (ANA), share concentration (TOP10), return on assets (ROA), industry and year fixed effects (e.g. Xiao et al. 2004, Firth et al. 2011, Barron et al. 2016). The definitions of these variables are summarised in Appendix 2.2.

$$Prob(DISCLO_{i,t} = 1) = Probit(\alpha + \beta_1 L2FV_{i,t} + \beta_2 L3FV_{i,t} + \beta_3 BIG4_{i,t} + \beta_4 STATE_{i,t} + \beta_5 LAW_{i,t} + \beta_6 INSTI_{i,t} + \beta_7 SIZE_{i,t} + \beta_8 ANA_{i,t} + \beta_9 TOP10_{i,t} + \beta_{10} ROA_{i,t} + \sum_j \gamma_j Control_{i,j} + \varepsilon_{i,t}) \quad (2)$$

To test whether the disclosure of fair value estimation methods affects the association between fair value hierarchy and analyst forecast accuracy, an interaction term between the fair value variables and a dummy variable of the information disclosure is added as specified in model (2). The key variable of interest in model (2) is $FV_t \times DISCLO_t$. If the related disclosures improve (reduce) the usefulness of fair values, we would expect a significant and positive (negative) β_2. Otherwise, if the related disclosure is not relevant, β_2 would be insignificant.

$$ACCURACY_{i,t+1} = \alpha + \beta_1 FV_{i,t} + \beta_2 FV_{i,t} \times DISCLO_{i,t} + \beta_3 DISCLO_{i,t} + \sum_j \gamma_j Control_{i,j} + \varepsilon_{i,t} \quad (3)$$

In estimating the above model specifications, the standard errors are clustered at the firm level[50] to control for within-firm correlations (Petersen 2009). The continuous variables in the specifications are winsorised at 1% level to reduce the influence of extreme values. The financial analyst forecast variables, fair value variables, and the control variables used in model specifications (1) and (3) are described in the next sub-sections.

[49] To further reduce the endogeneity concern, I also report results estimated from Heckman (1979) two-stage procedure in robustness checks section.

[50] The main findings are qualitatively similar when the standard errors are clustered at both firm and year levels (i.e. two-way clustered robust standard errors) to control for both within-firm and within-year correlations. The results are available upon request.

2.5.2.1 Dependent variable

Following previous studies, I use the accuracy of analysts' EPS forecasts as the dependent variable (e.g. Liang and Riedl 2014, Magnan et al. 2015). I focus on forecast accuracy because the association between fair value information and other analyst-related measures (e.g. stock price reactions to forecast revisions, number of analysts following, forecast frequency and timeliness, stock recommendations) can be difficult to interpret. For example, improved firm disclosures driven by fair value information could lead to increase in market reactions to forecast revisions (or number of analysts following) if the market believes analysts are able to develop unique insights using the fair value information. However, there could also be decrease in market reactions (or number of analysts following) if investors believe better disclosure crowds out analysts' advantage in generating private information. Consequently, market reactions to forecast revisions is a noisy measure of the usefulness of fair value information. Similarly, increase in forecast timeliness and forecast frequency can reflect either improvement or deterioration in analysts' information environment. For stock recommendations, they reflect both accounting and non-accounting information and the accuracy of stock recommendations is also difficult to measure (Byard et al. 2011).

I focus on analysts' EPS forecast because accounting information is an important input into EPS forecasts (e.g. Hope 2003 a,b, Bradshaw et al. 2009). EPS forecasts can further contribute to firm valuation, and they are also viewed as proxies for the quality of other analysts' outputs. I do not examine analysts' forecast of target prices because the mapping of accounting information into target prices is less clear. Analysts can use not only EPS but also other inputs (e.g. dividends, cash flows, P/E ratios) to forecast target prices. In addition, off-balance sheet factors such as management skills in identifying opportunities and managing risks are usually taken into consideration in the price estimation process. Therefore, unlike EPS forecast, the extent to which fair value information is used as input in target price forecasts is not clear (Liang and Riedl 2014).

Following previous studies, the accuracy of analyst forecasts is calculated by using their one-year-ahead (year t+1) EPS forecasts made within 60 days following firm i's earnings announcement date (e.g. Chen et al. 2015). The unsigned forecast accuracy ($ACCURACY_{i,t+1}$) is calculated by the following steps: First, I take the average of analyst j's EPS forecast across all analysts for firm i for year t+1 made within 60 days following firm i's earnings announcement date. Second, I take the absolute value of the difference between mean forecasted EPS[51] and actual EPS of firm i in year t+1. Third, following Liang and Riedl (2014), I scale this absolute EPS forecast error by the absolute

[51] Some papers use the median forecast EPS as consensus forecast because the median is less sensitive to outliers (Ernstberger et al. 2008). I use median forecast EPS in robustness tests to calculate the forecast properties measures.

value of mean EPS forecast for firm i for year t+1[52]. Following previous studies (e.g. Chen et al. 2015), I also multiply the absolute forecast error by minus 1 so that a larger ACCURACY reflects greater analysts' forecasts accuracy. In addition, ACCURACY is winsorised at 1th percentile and 99th percentile to reduce the impact of extreme values (e.g. Campbell et al. 2015, Chang et al. 2016).

$$ACCURACY_{i,t+1} = \frac{(-1) \times |MeanFEPS_{i,t+1} - AEPS_{i,t+1}|}{|MeanFEPS_{i,t+1}|}$$

2.5.2.2 Fair value variables

The following variables are used to measure the extent of fair value intensity among Chinese listed companies. L1ATA is calculated as level 1 fair value-measured assets divided by total assets for firm i in year t; L2ATA is calculated as level 2 fair value-measured assets divided by total assets for firm i in year t; L3ATA is calculated as level 3 fair value-measured assets divided by total assets for firm i in year t; L1LTA is calculated as level 1 fair value-measured liabilities divided by total assets for firm i in year t; L2LTA is calculated as level 2 fair value-measured liabilities divided by total assets for firm i in year t; L3LTA is calculated as level 3 fair value-measured liabilities divided by total assets for firm i in year t. L1FV is the sum of L1ATA and L1LTA; L2FV is the sum of L2ATA and L2LTA; L3FV is the sum of L3ATA and L3LTA. DISCLO is a dummy variable which equals to 1 if firm i discloses the valuation methods relating to fair value estimates in year t, and it equals 0 otherwise.

2.5.2.3 Control variables

Other than the fair value variables, a number of other factors that have been found to be associated with financial analysts' forecast properties are included in the model. In line with Duru and Reeb (2002), I control for task complexity attributes, earnings attributes, forecast attributes, and firm and industry fixed effects. The definition of the control variables and how these variables could affect forecast properties are explained below.

Task complexity attributes

Firm size, growth rate, leverage, profitability, stock price attributes, places of listing, and corporate governance characteristics have been found to affect the complexity of analyst forecast tasks and thus their forecast properties. Firm size (SIZE) is commonly controlled for in the literature. It is calculated as the natural log of market value of equity at the end of year t-1. The logarithm transformation reduces the skewness of market value equity. Larger firms could disclose more

[52] When forecast error is deflated by earnings, the results can be interpreted as percentage error of the forecast or actual EPS (Barron et al. 1999). Prices are also widely used as deflator in the literature, but changes or noise in price at particular point in the fiscal year could also bias the results (Hodgdon et al. 2008).

information than smaller companies and thus have better information environment (e.g. Hope 2003a, Lehavy et al. 2011). However, larger firms could also be more complex and thus firm size could negatively relate to analyst forecast accuracy (Duru and Reeb 2002). Therefore, I do not predict a direction for the coefficient on firm size. Following prior studies, growth rate is measured by the book-to-market ratio (BTM) (e.g. Ernstberger et al. 2008 and Panaretou et al. 2013). It is calculated as book value of equity divided by equity market value at the end of year t-1. Earnings of firms with high growth rates are less predictable and thus the forecast errors are likely to be higher for these firms. Therefore, I expect a negative coefficient on BTM.

Differences in the disclosure requirements across stock exchanges are also likely to affect the information environment of a company and thus affect analyst performance. Therefore, I also control for stock exchange (EXCHANGE) and cross-listing (CROSS). EXCHANGE is a dummy variable that equals 1 (0) if a company is listed in Shanghai (Shenzhen) stock exchange. The Shanghai and Shenzhen stock exchanges require different information disclosures. For example, Shenzhen stock exchange requires companies to disclose investor site visits information since 2009, but Shanghai stock exchange does not have such requirements (Cheng et al. 2016). CROSS is a dummy variable that equals 1 if a company is listed both in the domestic stock exchanges and in other stock exchanges (e.g. Hong Kong, the US). The foreign stock exchanges usually have stricter disclosure requirements and enforcement to enhance companies' commitment to information disclosure (Leuz and Verrecchia 2000). However, the cross-listed companies may also involve in more international operations and thus have earnings that are more difficult to estimate (Ernstberger et al. 2008). Therefore, the direction of the coefficient on CROSS cannot be determined a priori.

Corporate governance characteristics are also likely to affect information quality and thus the performance of financial analysts (Lehavy et al. 2011, Huang and Wright 2015). Therefore, I include state ownership (STATE), institutional shareholding (INSTI), share concentration (TOP10) as the control variables. STATE is calculated as the percentage of sate-owned shares to total number of outstanding shares, INSTI is calculated as the percentage of institution-owned shares to total number of outstanding shares, and TOP10 is measured as the sum of shares hold by top 10 shareholders divided by total number of outstanding shares. In line with prior studies, I expect higher INSTI to be associated with better information environment and hence more accurate forecasts, and I do not predict the direction for STATE and TOP10.

Firm-level profitability (ROA), leverage (LEVER) and turnover (TURNOVER) can also affect the complexity of forecast task. Profitability is measured by return on assets (ROA), calculated as income before extraordinary items divided by total assets at beginning of year t. When a firm is performing well, it may have less incentives to manage earnings, and the analysts may be motivated to collect

and process information to make more accurate forecasts (Chang et al. 2016). Therefore, a positive coefficient on ROA is expected. LEVER is calculated as the book value of debt divided by total assets of the firm. Highly levered firms may be more likely to smooth earnings, but their earnings could also have more pronounced cyclical effects (Panaretou et al. 2013). Therefore, sign of the coefficient on LEVER is not clear a priori. Share turnover (TURNOVER) is also controlled for as an explicit, stock market-based measures of information uncertainty (Chang et al. 2016). TURNOVER is measured as the number of shares traded in year t divided by the average number of shares outstanding in year t. Higher turnover is likely to be associated with better information environment and more accurate forecasts, therefore a positive coefficient on TURNOVER is expected.

Earnings attributes

Previous studies suggest that earnings are less predictable for firms with relatively higher earnings volatility and for those making a loss (e.g. Lang and Lundholm 1996, Duru and Reeb 2002). Therefore, I also control for earnings surprises (ESURPRI) and whether the company makes a loss or not (LOSS) in the empirical models. LOSS is a dummy variable that equals 1 if a firm-year reports negative earnings, and 0 otherwise. I expect a negative association between LOSS and analysts' information environment measures because companies are more likely to engage in earnings management (e.g. through big bath accounting) and make EPS difficult to predict (Das 1998, Peek 2005). ESURPRI is measured as the difference in EPS of firm i in year t and year t-1, scaled by total assets at the end of year t-1. Similar to LOSS, I expect a negative coefficient on ESURPRI.

Forecast attributes

Forecast attributes such as forecast horizon and analyst coverage can also affect forecast accuracy. Forecast horizon (HORI) is defined as the number of days between the financial statement reporting date and the date of the consensus forecast. Previous studies show that analysts have more information available and less uncertainty about a company's earnings in a fiscal year when their forecasts are issued closer to the earnings announcement date (e.g. Duru and Reeb 2002). Therefore, longer forecast horizon tends to relate to less accurate forecast, and a negative sign is expected for HORI. Forecast coverage (ANA) is the number of analysts following a company in the time period of calculating the consensus forecast. More analysts following the same company suggest more intense competition among the analysts (Lys and Soo 1995). Therefore, the analysts could have incentives to provide accurate forecast, and in the meantime there is more information produced by analysts for the company (Hope 2003a). Accordingly, a positive coefficient is expected on ANA.

In addition to the above variables, I also use year dummies to control for time-specific effects that could affect forecast properties of financial analysts during the investigated period[53]. Also, previous

[53] In robustness checks I re-estimate the results using firm-fixed effects model. The firm-fixed effects model

studies show forecast properties are likely to vary across industries. For example, forecast accuracy is found to be lower for dynamic and competitive industries (Ernstberger et al. 2008). Gu and Wang (2005) also find smaller earnings forecast error among biotech and pharmaceutical firms, and medical treatment equipment manufactures. They argue that this is because of the stringent regulatory monitoring of these firms. Accordingly, I include industry dummy variables to control for the variation in business complexity or information uncertainty associated with particular industries. The next section presents the empirical findings.

2.6 Empirical results

2.6.1 Descriptive statistics

Table 2.5 presents the descriptive statistics for the variables used in the main analyses of this study. The value of ACCURACY varies from -10.429 to -0.003 when the sample comprises of both the financial and non-financial companies, and the mean value (-0.611) is significantly lower than the similar measure in Ayres et al. (2017)[54]. This suggests that on average the Chinese financial analysts' earnings forecast is less accurate than their US peers. When decomposing the sample into financial and non-financial industries, the average ACCURACY of financial firms is higher than the non-financial firms (p-value<0.01, t-stat: 4.691). Even with winsorization, the standard deviations of ACCURACY in the different samples are noticeable for the dependent variables. The significant differences between the mean and median ACCURACY are observed in prior China and non-China analyst-related studies (e,g. Huang and Wright 2015, Duru and Reeb 2002). The positive mean values of the unsigned measure of forecast accuracy (BIAS)[55] show that on average analysts' forecasts are optimistically biased for both the financial and non-financial companies.

In terms of the fair value variables, the descriptive statistics show that there is a higher proportion of fair value-measured assets than liabilities, both in the financial and non-financial companies. In addition, level 2 fair values account for the highest proportion of both assets and liabilities in the financial companies (mean: 10.4% and 0.7% respectively), while level 1 fair values account for the highest proportion of fair value-measured assets and liabilities in the non-financial companies (mean: 2.4% and 0.2% respectively). On average, 7.3% (2.7%) of the total assets are measured by level 1 fair values, 11.1% (0.9%) of the total assets are measured by level 2 fair values, and 1.2% (0.4%) of the total assets are measured by level 3 fair values in the financial (non-financial) companies. Among

controls for most of the cross-sectional variation in fair values and the related disclosures. It tests whether the within-firm (i.e. time-series) variation in fair values or related disclosures explains the within-firm variation in stock price crash risk (Wooldridge 2000, He 2016).

[54] The mean ACCURACY is -0.038 in Ayres et al. (2017), with a sample containing both US financial and non-financial companies over the period 2007-2013.

[55] See Section 2.6.5.2 for the method of calculating BIAS.

the financial (non-financial) companies that disclose fair value hierarchy, 75 % (68%) of them also provide information about the valuation methods of level 2 and/or level 3 fair value estimates.

For the control variables, the mean firm-year within the sample has approximately RMB 9.7 billion in total market capitalization, and the average market capitalization of sample financial firms is larger than the non-financial firms (p-value<0.01, t-stat: 32.23). The market values of most firm-years in the samples are larger than their book values. The financial firms and non-financial firms are different in many other characteristics. For example, the average institutional shareholding for financial companies is 10.54%, while it is only 5.02% among the non-financial companies. In addition, the share structures of non-financial firms on average are more concentrated than the financial firms (p-value<0.01, t-stat: -5.055), and there are more analysts following the financial firms than the non-financial firms (p-value<0.01, t-stat: 20.925). The next sub-section presents results on the correlations between the variables.

[Insert Table 2.5 here]

2.6.2 Univariate analyses

In Table 2.6, the Pearson univariate correlations between the variables show that level 2 (3) fair values of trading securities assets positively (negatively) relate to forecast accuracy at statistically significant levels. In addition, forecasts are more accurate among larger companies, companies with higher institutional shareholding, better performance, and more analyst following. On the contrary, higher earnings surprises, negative earnings, higher leverage, and longer forecast horizon relate to lower forecast accuracy. The strength of the correlations between the independent variables ranges from 0 to 0.583. In addition to the correlations between SIZE and BTM (coefficient: 0.459, p-value<0.01), SIZE and EXCHANGE (coefficient: 0.301, p-value<0.01), SIZE and CROSS (coefficient: 0.485, p-value<0.01), SIZE and TOP10 (coefficient: 0.407, p-value<0.01), SIZE and LEVER (coefficient: 0.379, p-value<0.01), SIZE and ANA (coefficient: 0.564, p-value<0.01), BTM and ANA (coefficient: 0.308, p-value<0.01), BTM and LEVER (coefficient: 0.583, p-value<0.01), LEVER and ROA (coefficient: -0.466, p-value<0.01), the correlations among other control variables are either insignificant or lower than 0.3. In addition, the variance inflation factors (VIFs) of the variables in the regressions are all below 10, indicating that there are no severe multicollinearity problems in the regression analyses.

[Insert Table 2.6 here]

2.6.3 Main results

2.6.3.1 Fair value hierarchy and financial analyst forecast accuracy

Panel A of Table 2.7 reports results on the tests for the association between fair value hierarchy and financial analyst forecast accuracy. Columns (1) to (3) show that when controlling for industry and year fixed effects, level 1 fair value for liabilities positively relates to forecast accuracy both in financial and non-financial companies. In addition, level 2 and 3 fair value for liabilities positively relate to ACCURACY. However, level 1 fair value for assets is negatively associated with ACCURACY in the financial firms. After adding the control variables, Colum (4) shows that in the entire sample all three levels of asset fair values are negatively associated with forecast accuracy while level 1 and 2 liability fair values positively relate to ACCURACY. In the financial firms, Column (5) shows that level 1 asset fair values negatively relate to ACCURACY (coefficient: -1.152, p-value<0.01), while level 1 liability fair values are positively associated with ACCURACY (coefficient: 2.988, p-value<0.1). Level 1 asset (liability) fair values remain negatively (positively) relate to forecast accuracy in the non-financial companies as shown in Column (6). In addition, level 3 asset fair values are also negatively associated with ACCURACY (coefficient: -7.542, p-value<0.05), while level 2 and 3 liability fair values have positive association with forecast accuracy (coefficient: 18.769, p-value<0.01 and coefficient: 21.758, p-value<0.05 respectively).

The negative association between level 1 fair values and forecast accuracy among financial companies is similar to Ayres et al. (2017), who conduct similar tests on US financial firms' samples. However, the results contrast with Magnan et al. (2015) who find positive association between fair value hierarchy and forecast accuracy among a sample of US bank-holding companies. Moreover, while Ayres et al. (2017) find significant and positive association between fair value hierarchy and forecast accuracy among their entire and non-financial firms' samples, I do not find similar results for the Chinese samples.

In terms of practical significance, a one-standard deviation change (0.060) in level 1 asset fair values relates to a 0.127 (0.060×2.110) decrease in accuracy in the full sample. In the financial and non-financial firms, the decreases in accuracy relating to one-standard deviation change in level 1 asset fair values are 0.097 (0.084×1.152) and 0.116 (0.055×2.105) respectively. Given that the mean absolute value of ACCURACY is 0.611, the change in level 1 asset fair values relates to an approximate change of 20.79% (0.127/0.611) around the mean in the full sample. The change is more pronounced using the median absolute value of ACCURACY (0.294), which relates to an approximate change of 43.20% (0.127/0.294) around the median. For level 3 asset fair values, a one-standard deviation change relates to 20.79% (43.21%) decrease in mean (median) forecast accuracy in the full sample. The change in level 3 asset fair values relates to 25.52% (42.83%) decrease in mean (median) forecast accuracy in the non-financial firms. Similarly, other statistically significant

association also have economic significance. The results to some extent reject Hypothesis 1a that the fair value estimation inputs are not associated with analysts' forecast accuracy in China.

Panel B of Table 2.7 reports the coefficient tests for Hypothesis 1b. In tests using the full sample, level 2 asset fair values differ significantly from level 3 asset fair values (F-stat: 3.04, p-value<0.1). In the financial firms, level 1 asset fair values differ significantly from level 2 asset fair values (F-stat: 7.29, p-value<0.05). In the non-financial firms, level 2 asset fair values differ significantly from level 3 asset fair values (F-stat: 3.43, p-value<0.1) and level 1 liability fair values differ significantly from level 2 liability fair values (F-stat: 3.64, p-value<0.1). Combining with the regression coefficients, the results suggest that level 1 and level 3 asset fair values influence forecast accuracy more than level 2 fair values, while level 2 liability fair values influence forecast accuracy more than level 1 fair values. The results to some extent reject Hypothesis 1b that different levels of fair values have the same association with analysts' forecast accuracy in China.

The control variables, institutional shareholding (INSTI) and firm performance (ROA) positively relate to forecast accuracy. The association are consistent with more institutional shareholding and better firm performance relate to better information environment and hence more accurate forecast. The coefficients on negative earnings (LOSS) and earnings surprise (ESURPRI) are negative, suggesting that the earnings of loss-making firms and firms with more volatile earnings are more difficult to predict. There are slight differences in the significance of control variables between financial and non-financial companies.

[Insert Table 2.7 here]

2.6.3.2 Disclosure of fair value hierarchy-related information and financial analyst forecast accuracy

Panel A of Table 2.8 reports the results of the prediction model (2) for the PSM procedure. The area under ROC curve (AUC) is 0.734 (0.711) in the full sample (non-financial sample), which suggests that the prediction model has the ability to distinguish between the disclosure and non-disclosure groups[56]. The AUC is comparable to prior studies. For example, Barron et al. (2016) report 0.776 AUC in their prediction model of firms having level 3 fair value-measured items. The coefficients on level 2 and level 3 fair values (L2FV and L3FV) are positive and significant both in the full sample and in non-financial firms, indicating that firms with higher proportions of L2FV and L3FV are more likely to disclose the related estimation methods. Firm size (SIZE) is also positively and significantly associated with disclosure (DISCLO) in the full sample. Interestingly, firms audited by big 4 audit

[56] If a prediction model does not have any ability to discriminate, the AUC will equal 0.5 (Barron et al. 2016).

firms (BIG4) are less likely to disclose fair value-related information. This possibly is because the firms try to avoid additional audit costs or challenges relating to the information disclosure. Panel B presents the t-statistics and p-values of the differences between the disclosure and non-disclosure groups after PSM. There are no statistically significant differences in the variables across these two groups at the conventional levels.

[Insert Table 2.8 here]

Table 2.9 reports the results of the regression model (3). Column (1) shows that in the full sample, level 3 fair values negatively relate to forecast accuracy (coefficient: -19.118, p-value<0.1), and the positive coefficient on L3FV×DISCLO (21.333, p-value<0.1) indicates that the disclosure of estimation methods reduces the negative influence of level 3 fair values on forecast accuracy. To reduce the concern that the results are driven by firms that report zero level 3 fair values, I also estimate the regression on a sample of firms that have non-zero level 3 fair values. Column (2) shows that the coefficient on L3FV×DISCLO remains positive and significant (25.226, p-value<0.05) in the full sample. For the non-financial firms[57], results reported in Columns (3) and (4) also show positive and significant coefficients on L3FV×DISCLO, both for the non-financial sample (23.226, p-value<0.05) and for the observations that report non-zero level 3 fair values (26.998, p-value<0.05).

The significance and directions of the control variables are similar to those reported in Table 2.7. Specifically, institutional shareholding (INSTI) and return on assets ratio (ROA) positively relate to forecast accuracy, while some columns report negative coefficients on negative earnings (LOSS) and earnings volatility (ESURPRI). In addition, there are significant coefficients on book-to-market ratio (BTM), state-ownership (STATE), and leverage (LEVER) in the non-financial firms, indicating that the control variables to some extent have explanatory power for the dependent variable.

[Insert Table 2.9 here]

2.6.4 Robustness checks

To determine the robustness of the main results, I replace and add alternative dependent and independent variables, estimate firm-fixed effect model instead of the pooled cross-sectional regression, and use alternative method to reduce the self-selection concern regarding a firm's decision to disclose fair value-related information.

[57] There are only 91 financial firm observations in the PSM sample, and the coefficient on L3FV×DISCLO is not significant for the financial sample, possibly because of a lack of statistical power relating to the small sample size.

Panel A of Table 2.10 reports robustness tests results for the association between fair value hierarchy and analyst forecast accuracy. Column (1) reports results using forecast accuracy measure calculated from the median instead of mean consensus EPS forecast. Column (2) reports results using the original value of the variables. To test whether the findings are sensitive to measure of firm size, Column (3) reports results using the logarithm of total assets at the beginning of the year as the size measure. Because prior studies also find that the complexity of assets hold by the company can affect analyst forecast performance (e.g. Barth et al. 2001), I add the proportion of intangible assets (INTANGI) and the level of goodwill (GWTA) as additional control variables. INTANG is measured as the ratio of intangible assets to total assets at the end of year t-1, and GWTA is calculated as the proportion of goodwill recognized on the balance sheet to total assets at the end of year t-1. To control for the underlying risks of the fair value-measured items, I also control for the volatility in the unrealised fair value gains and losses (FVVOLA) calculated as the standard deviation of quarterly fair value changes in year t (Goncharov et al. 2014). The results of the regression with additional control variables are reported in Column (4). Level 1 and level 3 asset fair values remain negatively relate to forecast accuracy, while level 1 liability fair values remain positively associated with forecast accuracy across the four columns. When controlling for the cross-sectional variations in the independent variables by estimating the firm-fixed effect model, Column (5) show that the coefficients on asset fair values become insignificant, indicating that the cross-sectional rather than time-series variations in asset fair values influence forecast accuracy (e.g. He 2016).

Panel B of Table 2.10 reports the results of robustness checks for the influence of fair value-related disclosure on forecast accuracy. The coefficients on the interaction term between level 3 fair values and related information disclosure (L3FV×DISCLO) remain positive and significant when the regressions are estimated using alternative measure of forecast accuracy, alternative proxy for firm size, and additional control variables. However, when the original values are used in the regression, Column (2) shows that the coefficient on L3FV×DISCLO is positive although not significant. The result may be caused by the influence of extreme values in the variables. When the firm-fixed effect model is estimated, the coefficient of interest is also positive but not significant, suggesting that in the presence of level 3 fair values, the analyst forecasts are more accurate for the disclosure firm than the non-disclosure firm, but a time-series change in the information disclosure may not necessarily relate to improved analyst forecast accuracy.

To further reduce the potential endogeneity issue, in addition to the PSM method in the main analyses, I also use the Heckman (1979) two-stage model to adjust for potential self-selection bias relating to the information disclosure decision. Big 4 audit firms (BIG4) and the ranking of legal enforcement at provincial level (LAW) are not included in the second-stage model to satisfy the requirement of

exclusion restrictions[58] (Lennox et al. 2012). An inverse-mills ratio estimated from model (3) is included to adjust for self-selection bias relating to the information disclosure decision as the following model shows:

$$\text{ACCURACY}_{i,t+1} = \alpha + \beta_1 FV_{i,t} + \beta_2 FV_{i,t} \times DISCLO_{i,t} + \beta_3 DISCLO_{i,t} + \beta_4 IMR_{i,t} + \sum_j \gamma_j Control_{i,j} + \varepsilon \quad (4)$$

Panel C of Table 2.10 reports the Heckman second stage results. The results in Columns (1) to (3) show that the coefficients on L3FV×DISCLO are positive and significant for the full sample, the financial and non-financial firms in the pooled cross-sectional regression. When the firm-fixed effect model is estimated, Column (5) shows that the fair value-related information disclosures have a positive and significant influence on forecast accuracy for the financial firms, but negatively relate to forecast accuracy at statistically significant level in the non-financial companies. The results suggest that for the non-financial companies, analyst forecasts are more accurate among firms that disclose the fair value-related information than those without such information disclosure. However, when a non-financial company changes from non-disclosure to disclosure, either the information they provide is misleading or the analysts following these companies lack the expertise to incorporate the relevant disclosure into their forecasts.

[Insert Table 2.10 here]

2.6.5 Additional analyses

To provide additional insights into the influence of fair value hierarchy on financial analysts' forecast accuracy, I further test the association between fair value hierarchy and analyst forecast accuracy during the financial/stock market crisis and non-crisis periods; whether fair value hierarchy relates to analyst forecast optimism; whether asset types matter to the association between fair value hierarchy and analysts' forecast accuracy; the association between fair value information and forecast dispersion, and the role of state-ownership in the association between fair value information and forecast properties. The tests and results are detailed in the following sub-sections.

[58] The two variables are excluded from the second stage because there is no convincing evidence that they directly affect firm-level financial analyst forecast accuracy. However, due to the lack of strictly exogenous instrumental variables that can be excluded from the second stage regression, the self-selection issue may not be fully addressed by the Heckman model (Lennox et al. 2012). Nevertheless, the results reported in robustness checks in general are consistent with those reported in the main analyses, indicating the positive effects of fair value-related disclosure on forecast accuracy.

2.6.5.1 Fair value accounting and financial analyst forecast accuracy during the crisis and non-crisis periods

To investigate whether fair value measurement is particularly useful when fair value and historical cost diverge in China's context, I examine the association between fair values and financial analyst forecast accuracy during the financial/stock market crisis and non-crisis periods (e.g. Liang and Riedl 2014). A dummy variable CRISIS and its interaction with the fair value hierarchy variables are added to model (1) to examine the role of financial and stock market crisis. CRISIS equals 1 if the firm-year observations are in years 2007 to 2009 and in year 2015[59], and it equals 0 in other non-crisis years. In the sample observations, 939 are from the crisis periods and 2,144 observations are from the non-crisis periods.

Table 2.11 reports the results for the role of financial/stock market crisis in the decision usefulness of fair value hierarchy. In addition to the control variables used in the main analyses, all the regressions control for the underlying risks of the fair value-measured assets and liabilities (FVVOLA). Column (1) shows that in the full sample, the coefficients on level 1 and 3 asset (level 1 and 2 liability) fair values remain negative (positive) after adding the CRISIS variable and its interactions terms. The coefficient on L2ATA×CRISIS is negative and significant (-5.107, $p<0.01$), indicating that level 2 asset fair values relate to less accurate forecast during financial/stock market crisis periods. By contrast, the coefficient on L3ATA×CRISIS is positive and significant (20.817, $p<0.01$), indicating that level 3 asset fair values relate to more accurate forecast during financial/stock market crisis periods. The positive coefficient on L3ATA×CRISIS remains (26.271, $p<0.01$) when the regression is estimated on the sample of non-financial companies.

[Insert Table 2.11 here]

2.6.5.2 Fair value hierarchy and financial analyst forecast bias[60]

The measure of forecast accuracy in the main analyses captures the absolute size of forecast error without the direction of such error. However, analysts' forecasts can be either optimistic (positive difference between forecast and actual EPS) or pessimistic (negative difference between forecast and actual EPS), depending on the extent of judgement errors, economic and behavioural incentives of the analysts (Ramnath et al. 2008). If fair values relate to unexpected positive (negative) earnings shock (i.e. higher (lower) earnings than consensus forecast), we would expect more pessimistic

[59] 2007-2009 is the global financial crisis period while 2015 is the China stock market crisis period. The value of A-shares (shares of domestic listed companies) in China declined about 30% in the 2015 stock market crisis (Kim et al. 2019).

[60] Also known as forecast optimism, signed forecast accuracy. These terms are used interchangeably in this chapter.

(optimistic) forecast bias (Eames and Glover 2003). To provide additional insights into the influence of fair value information on financial analysts, the following singed forecast error is used to capture the degree of optimism/pessimism of analysts' forecasts:

$$BIAS_{i,t+1} = \frac{MeanFEPS_{i,t+1} - AEPS_{i,t+1}}{|MeanFEPS_{i,t+1}|}$$

In table 2.12, Columns (1) to (3) show that when estimating the regressions without control variables, level 1 asset fair values relate to downwardly biased forecast in the full sample and in the non-financial firms, while level 1 liability fair values relate to forecast pessimism across different samples. After adding the control variables, Columns (4) shows that in the full sample, level 1 asset fair values relate to downwardly biased forecast at significant level (coefficient: -1.119, $p<0.01$), while level 2 asset fair values relate to forecast optimism (coefficient: 0.663, $p<0.1$). When decomposing the sample by industry, Column (5) shows that level 3 asset fair values relate to optimistically biased forecast (coefficient: 2.370, $p<0.1$) in the financial firms, while Column (6) shows that level 3 asset fair values relate to pessimistically biased forecast (coefficient: -1.232, $p<0.01$) in the non-financial firms.

[Insert Table 2.12 here]

2.6.5.3 Fair value hierarchy, asset types and financial analyst forecast accuracy

To investigate whether the association between fair value hierarchy and analyst forecast accuracy is driven by systematic risks of particular types of fair value-measured assets or liabilities, I further decompose different levels of fair values by the asset types and estimate their association with forecast accuracy. Table 2.13 show that level 1 HTFA, AFS, and DFA fair values are all negatively associated with forecast accuracy in the financial firm observations, although only the coefficients on AFS and DFA are significant. In the non-financial sample, coefficients on level 1 HFTA and AFS fair values are negative and significant, indicating that the negative influence of level 1 asset fair values on accuracy does not vary much across different types of assets. For liability fair values, level 1 HFTL fair values positively relate to forecast accuracy both in financial and non-financial firms, while level 1 DFL fair values positively relate to forecast accuracy in the financial sample at statistically significant level. In general, there is no significant evidence that the systematic risk of particular types of assets drive the association between fair value hierarchy and forecast accuracy.

[Insert Table 2.13 here]

2.6.5.4 Fair value hierarchy, related disclosures and analyst forecast dispersion

The forecast accuracy tests above provide some evidence on how fair value information produced by Chinese companies relates to analyst uncertainty. To evaluate the way analysts react to such uncertainty, I further examine the association between fair values and forecast dispersion. Forecast dispersion is widely used in the literature as a proxy for uncertainty among analysts and divergence in their perceptions (Liu and Natarajan 2012). Whether fair value information relates to increased or decreased forecast dispersion depends on the extent to which financial analysts herd towards forecasts made by other analysts. Previous studies show that analysts tend to mimic other analysts' earnings forecasts when they are of lower ability, and when the information is complex or incomplete (Trueman 1994, Welch 2000, Clement and Tse 2005). If analysts manage the uncertainty or complexity of fair value information by herding towards the consensus forecast, we would expect negative association between fair values and forecast dispersion. On the contrary, if uncertainty in fair values generates diverse interpretations, and analysts rely on their own expertise to analyse the fair value information and signal their ability by issuing bold earnings forecasts, then their earnings forecast would be more dispersed (Hong et al. 2000, Chang et al. 2016). Forecast dispersion is calculated as the standard deviation of analysts' EPS forecasts for year t+1 made within 60 days after the earnings announcement, deflated by the absolute value of mean EPS forecast for firm i in year t+1.

The results in Table 2.14 show that level 2 liabilities' fair values relate to more dispersed analyst forecasts among all firms and financial firms, while level 3 liabilities' fair values negatively relate to analyst forecast dispersion both in the full sample and in the sub-samples. Regarding the fair value-related disclosures, Column (5) of Table 2.14 shows that disclosures relating to level 3 fair values help reduce forecast dispersion among the financial firms. On the contrary, Column (6) of Table 2.14 shows that disclosures relating to level 3 fair values increase analyst forecast dispersion among the non-financial firms. Overall, the results indicate that analysts in different industries react to the information uncertainty contained in different fair value information in different ways.

[Insert Table 2.14 here]

2.6.5.5 Fair value, state-ownership and analyst forecast properties

A distinct feature of Chinese listed enterprises is the dominant role of state ownership. The state-owned companies may not have much incentive to manipulate fair value information as their primary objective is not to maximize profit and to maximize asset prices. However, Huang and Wright (2015) argue that state-owned companies have more agency conflicts and are less transparent, which deteriorate analysts' performance and provide them with incentives to bias forecast upward to gain

access to insider information from the state-owned companies[61]. Table 2.15 presents the results of tests on the role of state-ownership in the usefulness of fair value information to financial analysts in China. Columns (1) and (3) show that the interaction terms between the proportion of state ownership and level 3 fair value-measured assets are positive and significant. When replacing the proportion of state ownership with a dummy variable that differentiates between state-owned and non-state-owned enterprises, Columns (4) and (6) also show that fair values relate to more accurate analyst forecasts among state-owned than non-state-owned enterprises. The results are consistent with the proposition that state-owned companies have less incentives to bias fair value estimates.

[Insert Table 2.15 here]

2.7 Conclusion

The fair value measurement has been reintroduced into China for more than 10 years, but there is still limited evidence on the decision usefulness of fair value information produced in China. Using a sample of Chinese listed companies during 2007-2016, this study (1) documents the fair value reporting practices of companies in a major emerging market, (2) examines the association between fair value hierarchy and financial analyst forecast accuracy, and (3) investigates whether the disclosure of fair value estimation methods is useful to financial analysts.

Using a sample of firm-year observations that have fair value disclosure during the 2007-2016 period, the study finds that in China, both level 1 and level 3 asset fair values negatively relate to analyst forecast accuracy, while level 1 and level 2 liability fair values positively relate to forecast accuracy. The results reject Hypothesis 1a that the fair values do not relate to analyst forecast accuracy. The F-tests on the association between different levels of fair values and analyst forecast accuracy further reject Hypothesis 1b that different levels of fair value estimates have the same association with analyst forecast accuracy. Analyst forecasts are more accurate for a company with model-based level 3 fair values and at the same time provides information about the estimation inputs and methods than for those without such disclosure. The results reject the second hypothesis that disclosures estimations details of fair value hierarchy do not influence the association between fair values and analyst forecast accuracy. Further analyses show that level 2 (3) asset fair values relate to less (more) accurate forecast during the crisis periods. There is also some evidence that level 3 (1) asset fair values relate to optimistically (pessimistically) biased forecast in the financial (non-financial) industry. In addition, there is no strong evidence that the systemic risk of particular types of fair value-measured items drive the main findings.

[61] See Chapter 4 Section 4.4.4 for more details about the differences between state-owned and non-state-owned enterprises in China.

The findings have implications for policy makers, regulators, investors and the academics. From the perspective of policy maker and capital market regulator, the negative association between market-based fair value estimates and analyst forecast accuracy suggests that to improve the decision-usefulness of fair value information, it may be necessary to enhance the efficiency of the underlying asset markets. Moreover, the non-compliance of the disclosure requirements among the Chinese listed companies highlights the importance for regulatory monitoring on the fair value-related footnote disclosures. Without appropriate legal enforcement, improvement in the accounting standards alone may not necessarily lead to high quality accounting information and favourable market outcomes (Ball et al. 2003). In addition, the absence of the influence of level 2 fair value estimation details on analyst forecast accuracy implies that the regulators need to take actions to improve the usefulness of this type of information disclosure.

Findings in this study also suggest that the firms' fair value estimation inputs and related disclosures need to be taken into consideration when investors rely on analysts' forecasts to make investment decisions. In addition, different from findings from the US (e.g. Ayres et al. 2017, Magnan et al. 2015), the study shows that market-based fair values could relate to less accurate forecasts in China, where the adoption of FVA is primarily driven by social and political motivations. The results imply that findings in the developed capital markets may not be generalized to other less-developed markets. Therefore, academics in the international setting need to pay more attention to variations in institutional characteristics when evaluating the consequences of FVA and IFRS adoption.

The study makes three contributions to the literature. First, it provides new evidence on the decision usefulness of fair value hierarchy produced in a major emerging market and shows that the market-based fair values can also be misleading when the underlying asset markets are underdeveloped. Second, it documents the fair value-related information disclosure practices in the major emerging market and provides evidence that explanations about the estimation methods can help the information users better understand the model-based fair values. Third, the study contributes to the financial analysts' literature by showing the influence of fair value accounting information on the group of sophisticated information users in an emerging market.

Some limitations of this study provide future research opportunities. For example, this study focuses on the accuracy of analysts' consensus EPS forecasts. Future research can examine the accuracy of other types of analyst forecasts (e.g. net asset value forecast and operating cash flow forecast). Future studies could also investigate whether fair value information affects other properties (e.g. precision of analysts' private and common information set) of analyst forecast. Analysts' personal characteristics can also be taken into account to examine whether fair value information affects

different analysts in different ways. Future studies could also construct more sophisticated proxies for footnote disclosures to examine the usefulness of fair value-related disclosures in more detail. The channels or underlying mechanisms through which fair value information influences analyst forecast properties can also be explored in the future. In addition, this study only evaluates whether the fair value information matters to the analysts and does not examine whether and how the underlying accounting activities affect the stock price attributes. As an extension to this study, the next chapter focuses on financial instruments, which is the largest class of assets affected by fair value accounting, to investigate the influence of fair value accounting on one type of stock price attributes-stock price crash risk.

Chapter 2 Tables

Table 2.1 Application of fair values and disclosure of fair value hierarchy among Chinese listed companies during 2007-2016

	2007			2008			2009			2010			2011			2012			2013			2014			2015			2016			Total		
Industry	With FV hierarchy disclosure	With FV-measured A/L	Total number of companies	With FV hierarchy disclosure	With FV-measured A/L	Total number of companies	With FV hierarchy disclosure	With FV-measured A/L	Total number of companies	With FV hierarchy disclosure	With FV-measured A/L	Total number of companies	With FV hierarchy disclosure	With FV-measured A/L	Total number of companies	With FV hierarchy disclosure	With FV-measured A/L	Total number of companies	With FV hierarchy disclosure	With FV-measured A/L	Total number of companies	With FV hierarchy disclosure	With FV-measured A/L	Total number of companies	With FV hierarchy disclosure	With FV-measured A/L	Total number of companies	With FV hierarchy disclosure	With FV-measured A/L	Total number of companies	With FV hierarchy disclosure	With FV-measured A/L	Total number of companies
A	0	6	24	0	9	25	0	10	27	0	7	37	0	9	37	0	7	40	0	8	41	4	28	41	7	35	44	8	35	45	19	154	361
B	0	13	57	0	18	58	2	24	58	4	21	63	4	19	65	4	23	67	4	25	68	27	53	70	25	57	71	26	58	74	96	311	651
C	0	289	829	0	317	870	8	318	968	16	348	1,231	25	405	1,409	27	403	1,502	27	454	1,532	454	1,052	1,621	499	1,182	1,752	543	1,320	1,953	1,599	6,088	13,667
D	0	32	82	0	34	83	2	39	84	3	37	87	4	41	88	4	36	91	4	39	91	31	83	93	34	82	95	36	85	98	117	508	892
E	0	20	42	0	21	42	1	24	49	1	21	56	3	24	65	4	23	67	5	21	68	19	49	69	20	60	78	23	68	90	77	331	626
F	0	73	117	0	73	119	1	70	122	0	69	133	3	71	138	3	70	141	4	80	141	69	121	144	74	126	149	76	136	156	230	889	1,360
G	0	28	65	0	31	66	2	28	69	6	33	74	9	34	76	10	34	80	9	33	81	36	62	81	32	68	84	37	71	87	142	422	763
H	0	4	10	0	3	10	0	4	11	0	4	11	0	4	11	0	4	11	0	4	11	4	10	11	4	9	11	5	8	11	13	54	108
I	0	21	51	0	20	57	1	25	78	1	28	107	1	29	132	1	28	146	2	29	155	34	105	161	39	134	176	50	155	214	129	574	1,277
J	4	31	41	7	31	41	17	34	43	23	40	48	27	43	51	30	45	52	34	46	52	48	52	53	51	56	56	68	69	69	309	447	506
K	0	56	122	0	62	123	2	63	125	3	61	125	4	52	125	4	54	125	5	53	125	52	99	125	57	101	126	65	103	126	192	704	1,247
L	0	13	23	0	12	23	0	11	27	0	11	31	0	15	32	3	13	32	2	14	34	13	25	34	12	29	39	13	30	42	43	173	317
M	0	3	5	0	3	5	0	2	7	0	3	10	0	2	12	0	2	12	0	2	12	5	13	19	7	16	23	6	18	28	18	64	133
N	0	3	18	0	1	18	0	3	18	0	2	23	0	3	25	0	4	26	0	4	26	2	16	30	3	17	32	4	20	34	9	73	250
P	0	0	2	0	0	2	0	0	2	0	0	2	0	0	2	0	0	2	0	0	2	0	1	2	0	1	3	1	3	3	1	5	22
Q	0	1	4	0	2	4	0	2	5	0	2	5	0	2	6	0	2	7	0	4	7	0	5	7	1	6	7	2	7	7	3	33	59
R	0	12	23	0	11	23	0	15	26	0	13	31	0	14	34	0	15	36	0	16	36	16	28	38	17	34	41	25	44	47	58	202	335
S	0	12	24	0	16	24	0	14	23	0	14	23	0	14	23	0	12	23	0	15	23	14	20	23	13	20	23	15	20	23	42	157	232
Total	4	617	1,539	7	664	1,593	36	686	1,742	57	714	2,097	80	781	2,331	90	775	2,460	96	847	2,505	828	1,822	2,622	895	2,033	2,810	1,004	2,250	3,107	3,097	11,189	22,806

A: Agriculture, forestry, animal husbandry and fishery; B: Mining industry; C: Manufacturing industry; D: Industry of electric power, heat, gas and water production and supply; E: Construction industry; F: Wholesale and retail industry; G: Transport, storage and postal service industry; H: Accommodation and catering industry; I: Industry of information transmission, software and information technology services; J: Financial industry; K: Real estate industry; L: Leasing and commercial service industry; M: Scientific research and technical service industry; N: Water conservancy, environment and public facility management industry; O: Industry of resident service, repair and other services; P:Education; Q: Health and social work; R: Industry of culture, sports and entertainment; S: Diversified industries (2012 CSRC industry codes provided by CSMAR).

Table 2.2 Proportion of fair value estimates to total assets for a sample of Chinese listed companies between 2007 and 2016

Panel A Full sample=3,083 firm-year observations											
Mean	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**Overall**
Fair value-measured assets											
Level 1	11.165%	4.655%	2.196%	2.894%	2.311%	3.069%	2.787%	2.803%	3.035%	3.157%	2.986%
Level 2	30.554%	19.821%	4.415%	3.170%	2.898%	3.337%	3.398%	1.513%	1.844%	2.032%	2.052%
Level 3	0.001%	0.018%	0.046%	0.110%	0.076%	0.148%	0.366%	0.303%	0.601%	0.821%	0.542%
Fair value-measured liabilities											
Level 1	0.505%	0.041%	0.003%	0.045%	0.009%	0.150%	0.270%	0.294%	0.228%	0.275%	0.248%
Level 2	30.528%	15.797%	0.066%	0.108%	0.146%	0.120%	0.280%	0.146%	0.104%	0.114%	0.185%
Level 3	0.001%	0.012%	0.004%	0.051%	0.061%	0.060%	0.225%	0.015%	0.049%	0.049%	0.045%
Panel B Financial companies (industry="J")=304 firm-year observations											
Mean	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**Overall**
Fair value-measured assets											
Level 1	11.165%	4.655%	3.854%	5.356%	5.773%	7.265%	6.578%	6.623%	9.140%	8.529%	7.235%
Level 2	30.554%	19.821%	9.684%	7.364%	8.214%	9.755%	8.942%	9.181%	12.349%	13.620%	10.966%
Level 3	0.001%	0.018%	0.102%	0.206%	0.170%	0.292%	0.665%	1.480%	1.582%	2.581%	1.214%
Fair value-measured liabilities											
Level 1	0.505%	0.041%	0.007%	0.009%	0.011%	0.062%	0.049%	0.266%	0.255%	0.445%	0.203%
Level 2	30.528%	15.797%	0.140%	0.218%	0.352%	0.209%	0.680%	0.742%	1.060%	1.363%	1.362%
Level 3	0.001%	0.012%	0.010%	0.121%	0.184%	0.107%	0.223%	0.169%	0.071%	0.237%	0.152%
Panel C Non-financial companies=2,779 firm-year observations											
Mean	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**Overall**
Fair value-measured assets											
Level 1	.	.	0.888%	1.155%	0.644%	0.971%	0.802%	2.571%	2.659%	2.764%	2.521%
Level 2	.	.	0.255%	0.209%	0.339%	0.128%	0.494%	1.048%	1.196%	1.185%	1.077%
Level 3	.	.	0.001%	0.042%	0.030%	0.077%	0.210%	0.231%	0.541%	0.692%	0.468%
Fair value-measured liabilities											
Level 1	.	.	0.000%	0.070%	0.007%	0.194%	0.385%	0.295%	0.226%	0.262%	0.253%
Level 2	.	.	0.008%	0.031%	0.048%	0.075%	0.070%	0.110%	0.045%	0.022%	0.056%
Level 3	.	.	0.000%	0.002%	0.001%	0.037%	0.226%	0.006%	0.047%	0.035%	0.034%

Note: Due to missing total assets value, 6 firm-year observations with fair value hierarchy disclosure is dropped from the sample for descriptive statistics. In addition, 8 firm-year observations with larger than one fair value estimates to total assets ratio is dropped from the sample to reduce the impact of reporting or coding error.

Table 2.3 Proportion of assets and liabilities measured at fair value in total assets during 2007 to 2016

Panel A Assets measured at fair value

Types	All companies	Financial companies	Non-financial companies
L1HFTA	0.831%	3.263%	0.541%
L2HFTA	0.455%	3.553%	0.086%
L3HFTA	0.036%	0.188%	0.018%
L1AFS	2.157%	3.576%	1.988%
L2AFS	0.918%	6.425%	0.262%
L3AFS	0.233%	1.091%	0.131%
L1DFA	0.016%	0.019%	0.016%
L2DFA	0.022%	0.111%	0.011%
L3DFA	0.000%	0.002%	0.000%
L1IP	0.183%	0.000%	0.183%
L2IP	0.423%	0.000%	0.423%
L3IP	0.148%	0.000%	0.148%
Total	5.423%	18.227%	3.808%

Panel B Liabilities measured at fair value

Types	All companies	Financial companies	Non-financial companies
L1HFTL	0.206%	0.187%	0.208%
L2HFTL	0.082%	0.624%	0.017%
L3HFTL	0.017%	0.135%	0.002%
L1DFL	0.031%	0.017%	0.033%
L2DFL	0.012%	0.104%	0.001%
L3DFL	0.000%	0.002%	0.000%
Total	0.348%	1.070%	0.262%

Table 2.4 Preliminary sample screening procedures

Firm-year observations between 2007 and 2016	22,806
Less: Firm-year observations with zero/missing fair value-measured assets and liabilities	11,617
Firm-year observations without fair value hierarchy disclosure	8,092
Missing total asset value	6
fair value-measured assets or liabilities larger than total assets	8
Firm-year observations after preliminary screening	3,083

Note: the fair value-measured assets and liabilities refer to held-for-trading financial assets and liabilities, available-for-sale financial assets, derivative financial assets and liabilities, and two types of non-financial assets with the fair value option (i.e. investment property assets and biological assets).

Table 2.5 Descriptive statistics

Panel A All firms

Variables	N	Mean	SD	p50	p25	p75	Min	Max
ACCURACY	2,127	-0.611	1.373	-0.294	-0.576	-0.117	-10.429	-0.003
BIAS	2,127	0.362	1.240	0.203	0.002	0.498	-2.600	8.918
L1ATA	3,083	0.029	0.060	0.003	0.000	0.023	0.000	0.335
L2ATA	3,083	0.018	0.051	0.000	0.000	0.000	0.000	0.290
L3ATA	3,083	0.004	0.019	0.000	0.000	0.000	0.000	0.145
L1LTA	3,083	0.002	0.011	0.000	0.000	0.000	0.000	0.089
L2LTA	3,083	0.001	0.005	0.000	0.000	0.000	0.000	0.042
L3LTA	3,083	0.000	0.001	0.000	0.000	0.000	0.000	0.013
L1FV	3,083	0.031	0.063	0.004	0.000	0.028	0.000	0.349
L2FV	3,083	0.019	0.054	0.000	0.000	0.001	0.000	0.300
L3FV	3,083	0.005	0.020	0.000	0.000	0.000	0.000	0.145
DISCLO	3,083	0.687	0.464	1.000	0.000	1.000	0.000	1.000
SIZE	2,825	23.297	1.289	23.065	22.368	23.994	21.131	27.462
BTM	2,863	1.735	2.722	0.841	0.432	1.776	0.090	15.752
EXCHANGE	2,127	0.558	0.497	1.000	0.000	1.000	0.000	1.000
CROSS	2,898	0.208	0.406	0.000	0.000	0.000	0.000	1.000
STATE	3,082	0.175	0.680	0.000	0.000	0.000	0.000	5.041
INSTI	2,869	5.569	5.880	3.810	1.720	7.280	0.170	36.564
TOP10	3,083	59.681	16.718	60.070	47.220	71.800	24.010	96.290
ROA	3,083	0.035	0.043	0.028	0.012	0.056	-0.114	0.176
LEVER	3,082	0.520	0.225	0.520	0.345	0.689	0.076	0.948
TURNOVER	2,824	70.755	76.771	45.121	20.918	92.073	0.444	412.586
LOSS	2,986	0.070	0.255	0.000	0.000	0.000	0.000	1.000
ESURPRI	3,080	0.016	0.077	0.005	-0.008	0.027	-0.184	0.476
HORI	2,127	5.868	0.059	5.869	5.839	5.900	5.685	6.035
ANA	2,621	2.158	0.854	2.197	1.609	2.773	0.693	3.912

Panel B Financial firms

Variables	N	Mean	SD	p50	p25	p75	Min	Max
ACCURACY	257	-0.236	0.254	-0.146	-0.333	-0.043	-1.491	-0.003
BIAS	257	0.017	0.347	0.018	-0.120	0.180	-1.292	1.491
L1ATA	304	0.072	0.084	0.042	0.002	0.127	0.000	0.335
L2ATA	304	0.104	0.076	0.082	0.050	0.150	0.000	0.290
L3ATA	304	0.011	0.026	0.001	0.000	0.009	0.000	0.145
L1LTA	304	0.002	0.009	0.000	0.000	0.000	0.000	0.089
L2LTA	304	0.007	0.012	0.001	0.000	0.005	0.000	0.042
L3LTA	304	0.001	0.003	0.000	0.000	0.000	0.000	0.013
L1FV	304	0.073	0.087	0.042	0.002	0.129	0.000	0.349
L2FV	304	0.111	0.081	0.091	0.053	0.158	0.000	0.300

Table 2.5 Panel B continued

L3FV	304	0.012	0.027	0.001	0.000	0.011	0.000	0.145
DISCLO	304	0.750	0.434	1.000	0.500	1.000	0.000	1.000
SIZE	279	25.316	1.371	25.381	24.346	26.324	21.558	27.462
BTM	275	6.717	5.820	4.056	1.301	12.817	0.138	15.752
EXCHANGE	257	0.786	0.411	1.000	1.000	1.000	0.000	1.000
CROSS	304	0.487	0.501	0.000	0.000	1.000	0.000	1.000
STATE	303	0.506	1.250	0.000	0.000	0.215	0.000	5.041
INSTI	284	10.539	10.121	7.040	2.590	16.860	0.170	36.564
TOP10	304	64.264	19.233	63.790	47.815	76.010	24.010	96.290
ROA	304	0.019	0.020	0.013	0.010	0.024	-0.077	0.176
LEVER	304	0.818	0.167	0.907	0.749	0.937	0.076	0.948
TURNOVER	278	44.984	63.910	22.454	8.192	52.100	0.444	412.586
LOSS	278	0.011	0.104	0.000	0.000	0.000	0.000	1.000
ESURPRI	303	0.011	0.060	0.002	-0.000	0.007	-0.184	0.476
HORI	257	5.872	0.053	5.868	5.849	5.897	5.694	6.035
ANA	290	3.074	0.706	3.258	2.773	3.555	0.693	3.912

Panel C Non-financial firms

Variables	N	Mean	SD	p50	p25	p75	Min	Max
ACCURACY	1,870	-0.662	1.453	-0.317	-0.602	-0.132	-10.429	-0.003
BIAS	1,870	0.410	1.309	0.242	0.030	0.534	-2.600	8.918
L1ATA	2,779	0.024	0.055	0.002	0.000	0.019	0.000	0.335
L2ATA	2,779	0.009	0.038	0.000	0.000	0.000	0.000	0.290
L3ATA	2,779	0.004	0.018	0.000	0.000	0.000	0.000	0.145
L1LTA	2,779	0.002	0.011	0.000	0.000	0.000	0.000	0.089
L2LTA	2,779	0.000	0.003	0.000	0.000	0.000	0.000	0.042
L3LTA	2,779	0.000	0.001	0.000	0.000	0.000	0.000	0.013
L1FV	2,779	0.027	0.058	0.003	0.000	0.022	0.000	0.349
L2FV	2,779	0.009	0.039	0.000	0.000	0.000	0.000	0.300
L3FV	2,779	0.004	0.019	0.000	0.000	0.000	0.000	0.145
DISCLO	2,779	0.680	0.466	1.000	0.000	1.000	0.000	1.000
SIZE	2,546	23.076	1.068	22.931	22.303	23.749	21.131	27.462
BTM	2,588	1.205	1.301	0.759	0.412	1.507	0.090	12.100
EXCHANGE	1,870	0.527	0.499	1.000	0.000	1.000	0.000	1.000
CROSS	2,594	0.175	0.380	0.000	0.000	0.000	0.000	1.000
STATE	2,779	0.139	0.574	0.000	0.000	0.000	0.000	5.041
INSTI	2,585	5.023	4.913	3.660	1.651	6.810	0.170	36.564
TOP10	2,779	59.179	16.346	59.740	47.060	70.960	24.010	96.290
ROA	2,779	0.037	0.045	0.032	0.013	0.060	-0.114	0.176
LEVER	2,778	0.487	0.206	0.488	0.327	0.649	0.076	0.948
TURNOVER	2,546	73.569	77.540	48.613	22.928	95.380	0.444	412.586

Table 2.5 Panel C continued

LOSS	2,708	0.076	0.265	0.000	0.000	0.000	0.000	1.000
ESURPRI	2,777	0.017	0.078	0.007	-0.009	0.030	-0.184	0.476
HORI	1,870	5.867	0.060	5.869	5.837	5.900	5.685	6.035
ANA	2,331	2.044	0.801	2.079	1.386	2.639	0.693	3.912

Table 2.6 Pearson correlation table

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)
ACCURACY	1.000																									
BIAS	-0.714***	1.000																								
L1ATA	0.026	-0.099***	1.000																							
L2ATA	0.071***	-0.072***	0.130***	1.000																						
L3ATA	-0.053**	-0.010	0.040**	0.066***	1.000																					
L1LTA	0.030	-0.021	0.024	-0.025	0.001	1.000																				
L2LTA	0.050**	-0.045**	0.092***	0.327***	0.010	0.018	1.000																			
L3LTA	0.026	-0.012	-0.028	0.064***	0.069***	-0.003	0.094***	1.000																		
L1FV	0.031	-0.099***	0.963***	0.116***	0.043**	0.270***	0.089***	-0.029	1.000																	
L2FV	0.073***	-0.073***	0.132***	0.989***	0.064***	-0.021	0.437***	0.070***	0.119***	1.000																
L3FV	-0.045**	-0.011	0.033*	0.068***	0.972***	0.007	0.017	0.244***	0.036**	0.066***	1.000															
DISCLO	0.024	-0.009	0.069***	0.084***	0.062***	-0.014	0.045**	0.017	0.065***	0.084***	0.053***	1.000														
SIZE	0.069***	-0.074***	-0.004	0.246***	0.045**	-0.008	0.260***	0.123***	-0.012	0.258***	0.013	-0.053***	1.000													
BTM	0.027	-0.030	-0.089***	0.212***	0.038**	-0.030	0.188***	0.122***	-0.093***	0.222***	0.032*	0.031*	0.459***	1.000												
EXCHANGE	0.004	-0.029	0.058***	0.084***	0.037*	0.025	0.088***	0.034	0.062***	0.089***	0.000	-0.072***	0.301***	0.232***	1.000											
CROSS	0.025	-0.051**	0.045**	0.114***	0.024	-0.014	0.162***	0.082***	0.036*	0.125***	0.012	-0.115***	0.485***	0.237***	0.212***	1.000										
STATE	0.005	0.002	0.058***	0.086***	0.041**	-0.018	0.018	0.057***	0.049***	0.083***	0.031*	-0.051***	0.121***	0.071***	0.071***	0.078***	1.000									
INSTI	0.098***	-0.061***	0.000	0.189***	0.031*	-0.013	0.022	-0.003	-0.005	0.180***	0.021	0.041**	0.178***	0.249***	-0.028	-0.065***	0.009	1.000								
TOP10	0.011	-0.006	-0.111***	0.016	0.032*	-0.017	0.061***	0.037**	-0.112***	0.018	0.015	-0.079***	0.407***	0.184***	0.158***	0.270***	0.257***	0.015	1.000							
ROA	0.403***	-0.420***	0.050***	-0.060***	-0.010	-0.007	-0.047***	-0.021	0.045**	-0.063***	-0.018	-0.033*	0.062***	-0.238***	-0.131***	-0.026	-0.012	-0.004	0.127***	1.000						
LEVER	-0.062***	0.025	-0.078***	0.234***	0.089***	0.037**	0.170***	0.046**	-0.067***	0.241***	0.069***	0.012	0.379***	0.583***	0.264***	0.222***	0.125***	0.160***	0.088***	-0.466***	1.000					
TURNOVER	0.028	0.002	0.077***	-0.020	0.003	0.050***	-0.036*	-0.009	0.091***	-0.024	0.022	0.094***	-0.262***	-0.266***	-0.196***	-0.261***	-0.070***	-0.033*	-0.274***	0.128***	-0.256***	1.000				
LOSS	-0.172***	-0.052**	-0.047**	-0.033*	0.029	-0.019	-0.040**	-0.021	-0.045**	-0.036*	0.034*	-0.005	-0.140***	-0.027	-0.007	-0.043**	0.028	-0.057***	-0.067***	-0.183***	0.076***	0.007	1.000			
ESURPRI	-0.126***	0.127***	-0.007	-0.006	0.031*	-0.012	-0.021	-0.004	-0.006	-0.008	0.042**	0.027	-0.120***	-0.071***	-0.055**	-0.042**	-0.022	0.006	-0.017	-0.144***	-0.021	0.089***	0.019	1.000		
HORI	-0.034	0.090***	0.001	0.035	0.036*	0.030	0.012	0.008	0.011	0.036*	0.048**	0.016	0.013	0.002	-0.019	-0.040*	0.031	0.000	0.000	-0.050**	0.027	0.015	-0.095***	-0.052**	1.000	
ANA	0.171***	-0.147***	0.018	0.199***	0.025	-0.023	0.134***	0.088***	0.008	0.203***	0.017	-0.071***	0.564***	0.308***	0.058***	0.296***	0.031	0.242***	0.172***	0.192***	0.230***	-0.123***	-0.122***	-0.010	0.003	1.000

t statistics in parentheses, ***, **, * denotes statistical significance at the 1%, 5% and 10 % level (two-tailed test), respectively.

Table 2.7 Fair value hierarchy and financial analyst forecast accuracy
Panel A Multivariate analyses for Hypothesis 1a

	Dependent variable=$ACCURACY_{t+1}$					
	(1) All firms	(2) Financial firms	(3) Non-financial firms	(4) All firms	(5) Financial firms	(6) Non-financial firms
$L1ATA_t$	-0.242	-1.626***	0.212	-2.110**	-1.152***	-2.105**
	(-0.445)	(-5.233)	(0.279)	(-2.408)	(-3.341)	(-2.071)
$L2ATA_t$	0.381	0.069	0.600	-1.176*	0.285	-0.709
	(0.761)	(0.263)	(0.697)	(-1.694)	(1.160)	(-0.694)
$L3ATA_t$	-5.299	0.007	-6.112	-6.686**	0.515	-7.542**
	(-1.586)	(0.008)	(-1.488)	(-2.082)	(0.589)	(-1.965)
$L1LTA_t$	7.174***	3.756**	7.869***	5.863***	2.988*	6.240***
	(3.938)	(2.308)	(4.166)	(3.490)	(1.932)	(3.590)
$L2LTA_t$	2.584	1.423	11.402***	6.265**	0.595	18.769***
	(1.282)	(1.444)	(2.887)	(2.019)	(0.627)	(3.101)
$L3LTA_t$	14.716**	3.125	17.363*	12.852	1.595	21.758**
	(2.256)	(0.751)	(1.705)	(1.354)	(0.375)	(2.016)
$SIZE_t$				-0.071	0.048*	-0.087
				(-1.455)	(1.758)	(-1.627)
BTM_t				-0.010	0.007	-0.099**
				(-0.656)	(1.590)	(-1.992)
EXCHANGE				0.049	-0.011	0.050
				(0.595)	(-0.223)	(0.576)
$CROSS_t$				0.101	-0.058	0.109
				(0.926)	(-1.101)	(0.844)
$STATE_t$				0.036	-0.014	0.056
				(0.671)	(-0.938)	(0.836)
$INSTI_t$				0.013***	-0.000	0.018***
				(3.387)	(-0.251)	(3.151)
$TOP10_t$				-0.001	-0.000	-0.002
				(-0.507)	(-0.501)	(-0.627)
ROA_t				15.791***	0.471	15.733***
				(8.554)	(0.334)	(8.400)
$LEVER_t$				0.320	-0.111	0.568**
				(1.230)	(-0.390)	(2.205)
$TURNOVER_t$				0.001	-0.000	0.001
				(1.458)	(-0.637)	(1.304)
$LOSS_t$				-0.579**	0.261*	-0.520*
				(-2.178)	(1.864)	(-1.931)

Table 2.7 Panel A continued

$ESURPRI_t$				-2.135***	-1.096***	-2.197***
				(-3.703)	(-2.802)	(-3.521)
$HORI_t$				-0.143	-0.171	-0.259
				(-0.299)	(-0.538)	(-0.492)
ANA_t				0.073	0.050	0.067
				(1.521)	(1.205)	(1.272)
Constant	-1.092**	-0.177***	-1.174**	0.807	-0.457	1.717
	(-2.404)	(-45.832)	(-2.496)	(0.258)	(-0.210)	(0.511)
Industry fixed effects	YES	YES	YES	YES	YES	YES
Year fixed effects	YES	YES	YES	YES	YES	YES
N	2127	257	1870	1851	238	1613
R^2	0.047	0.302	0.040	0.275	0.435	0.279
adj. R^2	0.032	0.259	0.025	0.257	0.359	0.260

Panel B Coefficient tests for Hypothesis 1b

	All firms		Financial firms		Non-financial firms	
	F-stat.	Prob.	F-stat.	Prob.	F-stat.	Prob.
L1ATA=L2ATA	0.680	0.409	**7.290**	**0.009**	0.750	0.386
L1ATA=L3ATA	2.080	0.150	1.980	0.166	2.280	0.131
L2ATA=L3ATA	**3.040**	**0.082**	0.010	0.903	**3.430**	**0.064**
L1LTA=L2LTA	0.020	0.892	1.610	0.211	**3.640**	**0.057**
L1LTA=L3LTA	0.310	0.578	0.050	0.832	0.640	0.424
L2LTA=L3LTA	0.260	0.607	0.070	0.789	0.040	0.849

t statistics in parentheses, ***, **, * denotes statistical significance at the 1%, 5% and 10 % level (two-tailed test), respectively.

Table 2.8 Propensity score matching models and statistics
Panel A Selection model

	Dependent variable=$DISCLO_t$	
	(1)	(2)
	All firms	Non-financial firms
$L2FV_t$	2.946*	3.159*
	(1.890)	(1.692)
$L3FV_t$	5.818*	5.678*
	(1.743)	(1.658)
$BIG4_t$	-0.401**	-0.335**
	(-2.520)	(-2.008)
$STATE_t$	-0.002	0.088
	(-0.022)	(0.756)
LAW_t	-0.006	-0.002
	(-0.818)	(-0.312)
$INSTI_t$	0.010	0.013
	(1.051)	(1.147)
$SIZE_t$	0.131*	0.053
	(1.949)	(0.741)
ANA_t	0.007	0.013
	(0.086)	(0.160)
$TOP10_t$	-0.001	-0.005
	(-0.382)	(-1.400)
ROA_t	-0.432	0.283
	(-0.331)	(0.214)
Constant	-17.583	-0.350
	(-0.042)	(-0.200)
Industry fixed effects	YES	YES
Year fixed effects	YES	YES
N	2264	1993
pseudo R^2	0.172	0.148
Area under ROC curve	0.734	0.711

t statistics in parentheses, ***, **, * denotes statistical significance at the 1%, 5% and 10 % level (two-tailed test), respectively.

Table 2.8 continued

Panel B All firms after PSM

Variables	G1(DISCLO=0)	Mean1	G2(DISCLO=1)	Mean2	MeanDiff	t-stat.	p-value
L2FV	552	0.013	552	0.013	0.000	0.554	0.580
L3FV	552	0.003	552	0.002	0.001	0.393	0.695
BIG4	552	0.245	552	0.250	-0.005	-0.209	0.834
STATE	552	0.122	552	0.139	-0.017	-0.516	0.606
LAW	552	8.402	552	8.556	-0.154	-0.332	0.740
INSTI	552	5.750	552	5.620	0.129	0.394	0.694
SIZE	552	23.380	552	23.360	0.017	0.238	0.812
ANA	552	2.136	552	2.131	0.006	0.109	0.913
TOP10	552	60.590	552	60.270	0.319	0.324	0.746
ROA	552	0.037	552	0.036	0.002	0.736	0.462

Panel C Non-financial sample firms after PSM

Variables	G1(DISCLO=0)	Mean1	G2(DISCLO=1)	Mean2	MeanDiff	t-stat.	p-value
L2FV	505	0.006	505	0.005	0.001	0.675	0.500
L3FV	505	0.003	505	0.003	0.000	0.105	0.916
BIG4	505	0.192	505	0.202	-0.010	-0.395	0.693
STATE	505	0.102	505	0.106	-0.004	-0.132	0.895
LAW	505	8.578	505	8.707	-0.129	-0.262	0.794
INSTI	505	5.165	505	4.917	0.248	0.902	0.367
SIZE	505	23.230	505	23.200	0.027	0.431	0.667
ANA	505	2.033	505	2.036	-0.003	-0.052	0.959
TOP10	505	60.680	505	61.120	-0.443	-0.451	0.652
ROA	505	0.038	505	0.039	0.000	-0.079	0.937

Table 2.9 Fair value-related disclosure and financial analyst forecast accuracy

	Dependent variable=ACCURACY $_{t+1}$			
	(1) All firms	(2) All firms excluding L3FV=0 observations	(3) Non-financial firms	(4) Non-financial firms excluding L3FV=0 observations
$L1FV_t$	-2.278*	-3.472*	-1.075	1.360
	(-1.679)	(-1.776)	(-1.199)	(0.469)
$L2FV_t$	0.867	2.747	2.237	5.375
	(0.846)	(1.098)	(1.413)	(0.799)
$L3FV_t$	-19.118*	-23.067**	-21.028*	-27.415**
	(-1.773)	(-2.065)	(-1.897)	(-2.088)
$L2FV_t \times DISCLO_t$	-2.334	0.426	-1.913	-4.067
	(-1.168)	(0.199)	(-0.866)	(-0.521)
$L3FV_t \times DISCLO_t$	21.333*	25.226**	23.226**	26.998**
	(1.859)	(2.147)	(2.030)	(2.009)
$DISCLO_t$	0.122	-0.305	0.025	-0.274
	(1.301)	(-1.384)	(0.260)	(-0.905)
$SIZE_t$	0.013	0.016	-0.037	-0.120
	(0.229)	(0.150)	(-0.547)	(-0.770)
BTM_t	-0.055	-0.012	-0.184**	-0.061
	(-1.581)	(-0.379)	(-2.572)	(-0.690)
EXCHANGE	0.015	-0.170	0.066	0.201
	(0.134)	(-0.650)	(0.601)	(0.720)
$CROSS_t$	0.019	0.190	0.044	0.270
	(0.120)	(0.879)	(0.276)	(1.197)
$STATE_t$	-0.040	0.006	0.182**	0.027
	(-0.346)	(0.161)	(2.368)	(0.285)
$INSTI_t$	0.017***	0.010	0.027***	0.066**
	(2.861)	(0.864)	(3.285)	(2.538)
$TOP10_t$	-0.001	0.001	-0.004	0.004
	(-0.412)	(0.150)	(-1.211)	(0.369)
ROA_t	13.299***	22.358***	15.309***	20.091**
	(5.500)	(2.663)	(6.143)	(2.246)
$LEVER_t$	0.324	1.208	0.651*	1.636
	(0.902)	(1.188)	(1.910)	(1.412)
$TURNOVER_t$	0.001	-0.002	0.000	-0.001
	(1.337)	(-1.023)	(0.031)	(-0.645)
$LOSS_t$	-0.538	-0.636	-0.579*	-0.762*
	(-1.485)	(-1.102)	(-1.790)	(-1.730)

Table 2.9 continued

$ESURPRI_t$	-1.978**	1.219	-2.635***	-0.859
	(-2.261)	(0.754)	(-3.049)	(-0.408)
$HORI_t$	-0.903	-2.396	-1.112	-1.418
	(-1.234)	(-1.659)	(-1.563)	(-0.834)
ANA_t	0.044	-0.015	0.044	-0.119
	(0.664)	(-0.106)	(0.623)	(-0.784)
Constant	3.419	9.947	5.647	5.331
	(0.749)	(1.136)	(1.230)	(0.506)
Industry fixed effects	YES	YES	YES	YES
Year fixed effects	YES	YES	YES	YES
N	889	171	806	113
R^2	0.250	0.547	0.330	0.610
adj. R^2	0.213	0.412	0.296	0.432

t statistics in parentheses, ***, **, * denotes statistical significance at the 1%, 5% and 10 % level (two-tailed test), respectively.

Table 2.10 Robustness checks
Panel A Fair value hierarchy and financial analyst forecast accuracy

	(1) Alternative ACCURACY using median forecast	(2) No winsorization	(3) Alternative firm size	(4) Additional control variables	(5) Firm-fixed effect model
$L1ATA_t$	-2.028**	-2.445**	-1.225*	-1.971**	-1.532
	(-2.184)	(-2.132)	(-1.696)	(-2.278)	(-0.971)
$L2ATA_t$	-1.319	-1.273*	-1.083**	-1.210*	-0.688
	(-1.624)	(-1.749)	(-2.320)	(-1.693)	(-0.623)
$L3ATA_t$	-4.856*	-4.241*	-5.964**	-6.808**	-9.118
	(-1.804)	(-1.896)	(-2.065)	(-2.058)	(-1.233)
$L1LTA_t$	6.571***	6.253***	2.535**	5.372***	5.107**
	(3.438)	(2.874)	(2.191)	(3.159)	(1.988)
$L2LTA_t$	6.762*	2.542**	3.647	5.334*	13.147*
	(1.963)	(2.469)	(1.554)	(1.751)	(1.698)
$L3LTA_t$	13.611	2.751	18.631	7.580	24.785**
	(1.287)	(0.915)	(1.253)	(0.793)	(2.288)
$SIZE_t$	-0.053	-0.142	-0.031	-0.051	0.103
	(-1.057)	(-0.831)	(-0.809)	(-0.985)	(0.821)
BTM_t	-0.009	0.009	-0.010	-0.010	0.016
	(-0.423)	(0.239)	(-0.799)	(-0.622)	(0.402)
EXCHANGE	0.055	-0.103	0.030	0.082	
	(0.616)	(-0.711)	(0.455)	(0.983)	
$CROSS_t$	0.123	-0.028	0.008	0.114	
	(1.071)	(-0.145)	(0.092)	(1.023)	
$STATE_t$	0.021	0.090	0.036	-0.124*	-0.004
	(0.336)	(1.295)	(1.256)	(-1.770)	(-0.057)
$INSTI_t$	0.014***	0.006	0.008**	0.013***	0.022*
	(3.327)	(1.319)	(2.547)	(3.339)	(1.904)
$TOP10_t$	-0.002	-0.009	-0.002	-0.001	-0.015
	(-0.681)	(-1.563)	(-1.299)	(-0.424)	(-1.398)
ROA_t	16.668***	16.617***	4.678***	15.799***	18.181***
	(7.917)	(2.837)	(4.273)	(8.578)	(4.789)
$LEVER_t$	0.113	-0.536	-0.007	0.370	-0.498
	(0.351)	(-0.785)	(-0.030)	(1.434)	(-0.723)
$TURNOVER_t$	0.001	-0.000	0.000	0.001	0.001
	(1.302)	(-0.004)	(0.154)	(1.333)	(1.287)
$LOSS_t$	-0.436	-0.523	-3.837***	-0.559**	0.505
	(-1.582)	(-0.889)	(-10.966)	(-2.122)	(1.435)

Table 2.10 Panel A continued

$ESURPRI_t$	-2.272***	-1.543	-0.501	-2.322***	-2.832***
	(-3.605)	(-1.445)	(-1.002)	(-3.950)	(-2.972)
$HORI_t$	-0.003	0.073	0.717	-0.151	-0.160
	(-0.006)	(0.066)	(1.601)	(-0.313)	(-0.310)
ANA_t	0.073	0.245**	0.118***	0.049	-0.048
	(1.416)	(2.021)	(2.918)	(0.976)	(-0.580)
$GWTA_t$				1.212***	
				(2.618)	
$INTANGI_t$				0.772**	
				(2.487)	
$FVVOLA_t$				8.056	
				(0.627)	
Constant	-0.574	1.434	-4.233	0.379	-1.576
	(-0.167)	(0.154)	(-1.551)	(0.120)	(-0.356)
Industry fixed effects	YES	YES	YES	YES	
Year fixed effects	YES	YES	YES	YES	YES
N	1850	1851	1852	1848	1851
R^2	0.254	0.070	0.513	0.281	0.188
adj. R^2	0.236	0.047	0.501	0.263	0.176

t statistics in parentheses, ***, **, * denotes statistical significance at the 1%, 5% and 10 % level (two-tailed test), respectively.

Table 2.10 Panel B Fair value-related disclosure and financial analyst forecast accuracy

	(1) Alternative ACCURACY using median forecast	(2) No winsorization	(3) Alternative firm size	(4) Additional control variables	(5) Firm-fixed effect model
$L1FV_t$	-1.502	-2.495	-1.582	-1.713	-0.698
	(-1.248)	(-1.562)	(-1.357)	(-1.449)	(-0.674)
$L2FV_t$	-0.879	0.161	-0.466	-0.816	1.897
	(-0.962)	(0.545)	(-0.638)	(-1.048)	(1.116)
$L3FV_t$	-16.750*	-8.501	-16.536*	-16.890**	1.814
	(-1.950)	(-1.301)	(-1.942)	(-2.045)	(0.787)
$L2FV_t \times DISCLO_t$	-1.742	-2.263	-1.660	-1.627	-1.633
	(-0.965)	(-1.142)	(-1.149)	(-1.249)	(-0.836)
$L3FV_t \times DISCLO_t$	17.808*	8.214	17.965**	17.892**	6.741
	(1.930)	(1.253)	(1.974)	(2.032)	(1.535)
$DISCLO_t$	0.082	0.178	0.100	0.088	0.236*
	(0.957)	(1.209)	(1.274)	(1.125)	(1.670)
$SIZE_t$	0.047	(1.253)	0.028	0.054	0.510**
	(0.829)	0.087	(0.703)	(1.124)	(2.250)
BTM_t	-0.058*	-0.072**	-0.057**	-0.049**	0.112
	(-1.662)	(-2.368)	(-2.043)	(-1.984)	(1.331)
EXCHANGE	0.031	-0.101	-0.006	0.025	
	(0.297)	(-0.663)	(-0.072)	(0.293)	
$CROSS_t$	0.020	-0.303	-0.057	-0.037	
	(0.146)	(-0.947)	(-0.465)	(-0.296)	
$STATE_t$	-0.029	0.008	-0.021	-0.100	-0.088
	(-0.319)	(1.586)	(-0.274)	(-1.219)	(-0.851)
$INSTI_t$	0.017***	-0.008*	0.014***	0.014***	-0.018
	(2.781)	(-1.668)	(2.836)	(2.891)	(-1.202)
$TOP10_t$	-0.003	2.985	-0.003	-0.004	0.031*
	(-0.976)	(1.316)	(-1.167)	(-1.476)	(1.768)
ROA_t	3.113*	-0.213	3.689**	3.588**	1.406
	(1.783)	(-0.417)	(2.515)	(2.408)	(0.252)
$LEVER_t$	-0.339	0.000	-0.082	0.014	0.720
	(-0.729)	(0.465)	(-0.256)	(0.049)	(0.682)
$TURNOVER_t$	0.000	0.000	0.000	-0.000	0.002
	(0.115)	(0.465)	(0.022)	(-0.259)	(1.339)

Table 2.10 Panel B continued

$LOSS_t$	-4.182***	-5.520***	-3.758***	-3.747***	-4.254***
	(-6.176)	(-4.302)	(-6.842)	(-6.908)	(-4.835)
$ESURPRI_t$	-0.646	-1.829	-0.639	-0.725	-1.782
	(-0.892)	(-1.483)	(-0.967)	(-1.148)	(-0.747)
$HORI_t$	0.806	1.012	0.331	0.275	0.156
	(1.092)	(0.929)	(0.575)	(0.477)	(0.214)
ANA_t	0.060	0.125	0.061	0.043	-0.210
	(0.939)	(1.397)	(1.132)	(0.762)	(-1.194)
$GWTA_t$				1.275***	
				(2.604)	
$INTANGI_t$				0.453	
				(1.124)	
$FVVOLA_t$				38.212*	
				(1.922)	
Constant	-6.869	-8.939	-3.642	-3.957	-14.039**
	(-1.492)	(-1.221)	(-1.044)	(-1.096)	(-1.979)
Industry fixed effects	YES	YES	YES	YES	
Year fixed effects	YES	YES	YES	YES	YES
N	889	889	889	889	889
R^2	0.460	0.342	0.494	0.501	0.449
adj. R^2	0.433	0.309	0.469	0.475	0.433

t statistics in parentheses, ***, **, * denotes statistical significance at the 1%, 5% and 10 % level (two-tailed test), respectively.

Table 2.10 Panel C Heckman second stage results for fair value-related disclosure and analyst forecast accuracy

	Dependent variable=ACCURACY $_{t+1}$					
	(1) All firms	(2) Financial firms	(3) Non-financial firms	(4) All firms	(5) Financial firms	(6) Non-financial firms
$L1FV_t$	-1.495*	-1.290	-1.290	-1.296	-0.714	-1.557
	(-1.731)	(-1.313)	(-1.313)	(-0.839)	(-1.409)	(-0.749)
$L2FV_t$	0.273	1.241	1.241	2.555	0.214	8.095
	(0.211)	(0.525)	(0.525)	(1.379)	(0.348)	(1.621)
$L3FV_t$	-19.866*	-20.530*	-20.530*	0.112	-3.125*	4.787
	(-1.866)	(-1.796)	(-1.796)	(0.024)	(-1.825)	(0.826)
$L2FV_t \times DISCLO_t$	-1.563	-1.555	-1.555	-2.117	-0.238	-6.363
	(-1.303)	(-0.699)	(-0.699)	(-1.304)	(-0.395)	(-1.637)
$L3FV_t \times DISCLO_t$	18.566*	19.861*	19.861*	-7.656*	3.975**	-12.395**
	(1.672)	(1.667)	(1.667)	(-1.725)	(2.161)	(-2.023)
$DISCLO_t$	0.495	0.086	0.086	-0.992	-0.081	-3.532*
	(0.726)	(0.071)	(0.071)	(-1.110)	(-0.305)	(-1.667)
IMRt	-0.282	-0.059	-0.059	0.691	0.021	2.196*
	(-0.714)	(-0.084)	(-0.084)	(1.241)	(0.114)	(1.744)
$SIZE_t$	-0.061	-0.078	-0.078	0.129	0.155*	0.294
	(-1.242)	(-1.366)	(-1.366)	(1.037)	(1.907)	(1.433)
BTM_t	-0.004	-0.123*	-0.123*	0.018	0.007	0.083
	(-0.217)	(-1.773)	(-1.773)	(0.479)	(0.651)	(0.928)
EXCHANGE	0.059	0.064	0.064			
	(0.661)	(0.661)	(0.661)			
$CROSS_t$	0.138	0.145	0.145			
	(1.163)	(1.000)	(1.000)			
$STATE_t$	0.015	0.035	0.035	-0.014	-0.028	0.022
	(0.237)	(0.444)	(0.444)	(-0.174)	(-1.416)	(0.199)
$INSTI_t$	0.011***	0.017***	0.017***	0.024*	0.003	0.030**
	(2.760)	(2.779)	(2.779)	(1.963)	(0.577)	(2.170)
$TOP10_t$	-0.002	-0.002	-0.002	-0.014	-0.000	-0.016
	(-0.737)	(-0.818)	(-0.818)	(-1.272)	(-0.058)	(-1.118)
ROA_t	16.709***	16.464***	16.464***	17.626***	-2.140	17.918***
	(7.909)	(7.757)	(7.757)	(4.643)	(-0.861)	(4.609)
$LEVER_t$	0.165	0.473	0.473	-0.399	-0.587	-0.212
	(0.523)	(1.449)	(1.449)	(-0.584)	(-1.164)	(-0.264)
$TURNOVER_t$	0.001	0.001	0.001	0.001	0.000	0.001
	(1.449)	(1.168)	(1.168)	(1.315)	(0.717)	(1.454)

Table 2.10 Panel C continued

$LOSS_t$	-0.449*	-0.375	-0.375	0.512	0.403	0.539
	(-1.648)	(-1.353)	(-1.353)	(1.458)	(1.227)	(1.532)
$ESURPRI_t$	-2.341***	-2.352***	-2.352***	-2.952***	-0.648	-3.255***
	(-3.684)	(-3.456)	(-3.456)	(-3.096)	(-0.933)	(-3.058)
$HORI_t$	-0.054	-0.114	-0.114	-0.017	-0.043	-0.207
	(-0.099)	(-0.187)	(-0.187)	(-0.034)	(-0.113)	(-0.343)
ANA_t	0.056	0.052	0.052	-0.024	0.017	-0.049
	(1.074)	(0.914)	(0.914)	(-0.287)	(0.242)	(-0.531)
Constant	-0.118	0.468	0.468	-3.277	-3.524	-5.853
	(-0.034)	(0.120)	(0.120)	(-0.746)	(-1.307)	(-1.005)
Industry fixed effects	YES	YES	YES			
Year fixed effects	YES	YES	YES	YES	YES	YES
N	1843	1605	1605	1844	238	1606
R^2	0.254	0.258	0.258	0.187	0.168	0.202
adj. R^2	0.236	0.239	0.239	0.175	0.062	0.189

t statistics in parentheses, ***, **, * denotes statistical significance at the 1%, 5% and 10 % level (two-tailed test), respectively. Columns (1) to (3) report results on pooled cross-sectional regressions, and Columns (4) to (6) report results on firm-fixed effect model estimates.

Table 2.11 Fair value hierarchy and financial analyst forecast accuracy during crisis and non-crisis periods

	Dependent variable=$ACCURACY_{t+1}$		
	(1)	(2)	(3)
	All firms	Financial firms	Non-financial firms
$L1ATA_t$	-2.578**	-0.975**	-2.890**
	(-2.278)	(-2.179)	(-2.098)
$L2ATA_t$	-0.034	0.546	0.069
	(-0.062)	(1.414)	(0.088)
$L3ATA_t$	-9.886**	-0.241	-11.821**
	(-2.424)	(-0.257)	(-2.434)
$L1LTA_t$	5.169***	2.356	4.582**
	(2.915)	(1.467)	(2.300)
$L2LTA_t$	5.348*	0.790	17.536***
	(1.681)	(0.610)	(2.728)
$L3LTA_t$	9.253	2.397	14.771
	(1.001)	(0.574)	(1.416)
$L1ATA_t$×CRISIS	1.615	-0.418	2.774
	(1.170)	(-0.453)	(1.534)
$L2ATA_t$×CRISIS	-5.107***	-1.025	-4.663
	(-3.093)	(-1.095)	(-1.352)
$L3ATA_t$×CRISIS	20.817***	4.047	26.271***
	(2.725)	(1.561)	(2.714)
$L1LTA_t$×CRISIS	1.094	14.290	16.834
	(0.056)	(0.713)	(0.763)
$L2LTA_t$×CRISIS	36.171	5.824	73.351
	(1.014)	(0.265)	(1.373)
$L3LTA_t$×CRISIS	1379.780	-964.803	843.200
	(0.754)	(-0.691)	(0.281)
CRISIS	0.154	0.046	0.200
	(0.876)	(0.556)	(0.770)
$SIZE_t$	-0.073	0.040	-0.092*
	(-1.478)	(1.592)	(-1.708)
BTM_t	-0.009	0.007	-0.099**
	(-0.584)	(1.639)	(-2.014)
EXCHANGE	0.053	0.000	0.058
	(0.654)	(0.004)	(0.674)
$CROSS_t$	0.095	-0.049	0.104
	(0.879)	(-0.925)	(0.815)
$STATE_t$	0.047	-0.007	0.068
	(0.916)	(-0.473)	(1.064)

Table 2.11 continued

$INSTI_t$	0.013***	-0.000	0.017***
	(3.352)	(-0.183)	(3.028)
$TOP10_t$	-0.001	-0.000	-0.002
	(-0.549)	(-0.320)	(-0.661)
ROA_t	15.853***	1.550	15.786***
	(8.656)	(0.819)	(8.515)
$LEVER_t$	0.311	-0.031	0.542**
	(1.209)	(-0.096)	(2.139)
$TURNOVER_t$	0.001	-0.000	0.001
	(1.589)	(-0.157)	(1.333)
$LOSS_t$	-0.580**	0.136	-0.511*
	(-2.168)	(0.933)	(-1.887)
$ESURPRI_t$	-2.194***	-1.023**	-2.199***
	(-3.737)	(-2.363)	(-3.495)
$HORI_t$	-0.140	-0.100	-0.237
	(-0.288)	(-0.339)	(-0.444)
ANA_t	0.074	0.054	0.070
	(1.560)	(1.328)	(1.336)
$FVVOLA_t$	15.521	-10.927	27.565*
	(1.254)	(-1.573)	(1.913)
Constant	0.846	-0.872	1.479
	(0.271)	(-0.443)	(0.424)
Industry fixed effects	YES	YES	YES
Year-fixed effects	YES	YES	YES
N	1848	238	1610
R^2	0.284	0.462	0.290
adj. R^2	0.263	0.369	0.268

t statistics in parentheses, ***, **, * denotes statistical significance at the 1%, 5% and 10 % level (two-tailed test), respectively.

Table 2.12 Fair value hierarchy and financial analyst forecast bias (signed forecast accuracy)

	Dependent variable=$BIAS_{t+1}$					
	(1) All firms	(2) Financial firms	(3) Non-financial firms	(4) All firms	(5) Financial firms	(6) Non-financial firms
$L1ATA_t$	-1.526***	0.588	-2.392***	-1.119***	-0.154	-1.232***
	(-3.901)	(1.525)	(-5.005)	(-2.656)	(-0.262)	(-2.650)
$L2ATA_t$	-0.183	-0.513	-0.479	0.663*	0.357	0.587
	(-0.426)	(-1.405)	(-0.720)	(1.889)	(0.638)	(1.319)
$L3ATA_t$	0.650	0.029	0.079	0.408	2.370*	-0.352
	(0.261)	(0.030)	(0.026)	(0.238)	(1.764)	(-0.172)
$L1LTA_t$	-3.920**	-4.847**	-4.445***	1.002	-2.288	1.044
	(-2.478)	(-2.585)	(-2.601)	(1.052)	(-0.942)	(0.995)
$L2LTA_t$	-1.807	-1.589	-5.716*	-0.293	-1.327	-2.269
	(-1.118)	(-1.066)	(-1.949)	(-0.194)	(-0.777)	(-0.839)
$L3LTA_t$	-3.945	-8.369	-0.231	-11.566	-7.687	-20.758
	(-0.630)	(-1.535)	(-0.025)	(-0.881)	(-1.579)	(-0.725)
$SIZE_t$				0.017	0.053**	0.018
				(0.574)	(2.059)	(0.578)
BTM_t				0.001	0.016	0.010
				(0.171)	(1.523)	(0.313)
EXCHANGE				0.014	0.028	0.010
				(0.310)	(0.442)	(0.209)
$CROSS_t$				-0.045	-0.084	-0.049
				(-0.828)	(-1.478)	(-0.786)
$STATE_t$				0.004	0.008	0.003
				(0.177)	(0.277)	(0.109)
$INSTI_t$				0.003	0.002	0.004
				(1.356)	(1.031)	(1.251)
$TOP10_t$				0.003**	0.002	0.004**
				(2.215)	(1.501)	(2.185)
ROA_t				-4.899***	-9.255***	-4.688***
				(-5.483)	(-3.295)	(-4.888)
$LEVER_t$				-0.473**	-1.477**	-0.459**
				(-2.564)	(-2.543)	(-2.501)
$TURNOVER_t$				0.000	0.002***	-0.000
				(0.012)	(3.194)	(-0.121)
$LOSS_t$				3.875***	0.935	3.899***
				(12.269)	(1.550)	(12.323)

Table 2.12 continued

$ESURPRI_t$				0.382	-0.074	0.599
				(0.810)	(-0.064)	(1.249)
$HORI_t$				0.590*	-0.688	0.704*
				(1.682)	(-1.590)	(1.867)
ANA_t				-0.028	-0.000	-0.033
				(-0.806)	(-0.008)	(-0.861)
Constant	0.860*	-0.207***	1.108**	-3.140	4.127	-4.112*
	(1.956)	(-42.743)	(2.380)	(-1.494)	(1.564)	(-1.849)
Industry fixed effects	YES	YES	YES	YES	YES	YES
Year fixed effects	YES	YES	YES	YES	YES	YES
N	2127	257	1870	1851	238	1613
R^2	0.054	0.245	0.052	0.589	0.392	0.593
adj. R^2	0.040	0.198	0.037	0.579	0.310	0.582

t statistics in parentheses, ***, **, * denotes statistical significance at the 1%, 5% and 10 % level (two-tailed test), respectively.

Table 2.13 Fair value hierarchy, asset types and financial analyst forecast accuracy

	Dependent variable= $ACCURACY_{t+1}$			
	(1) Financial firms	(2) Non-financial firms	(3) Financial firms	(4) Non-financial firms
$L1HFTATA_t$	-1.223*	2.412**	-0.770	-2.144*
	(-1.868)	(2.439)	(-1.487)	(-1.679)
$L2HFTATA_t$	-0.471	-3.523	0.046	-3.647
	(-0.836)	(-0.764)	(0.087)	(-0.765)
$L3HFTATA_t$	2.336	14.858	-0.557	31.461
	(0.366)	(0.470)	(-0.095)	(1.060)
$L1AFSTA_t$	-1.513***	0.380	-1.611**	-1.967**
	(-3.121)	(0.440)	(-2.644)	(-2.191)
$L2AFSTA_t$	0.744**	-2.843	0.541	-5.627
	(2.018)	(-0.663)	(1.321)	(-1.439)
$L3AFSTA_t$	0.910	-14.413	2.144	-17.922
	(0.659)	(-1.050)	(1.571)	(-1.477)
$L1DFATA_t$	-55.519	105.240	-347.645**	72.124
	(-0.570)	(0.672)	(-2.538)	(0.382)
$L2DFATA_t$	56.905**	267.133**	49.150	153.640
	(2.179)	(2.108)	(1.580)	(0.882)
$L3DFATA_t$	580.861	44.660	-550.909	43441.405***
	(0.136)	(0.017)	(-0.153)	(3.903)
$L1HFTLTA_t$	4.000**	6.548***	5.470***	4.591***
	(2.202)	(4.184)	(2.682)	(2.775)
$L2HFTLTA_t$	0.443	26.104**	0.844	10.144
	(0.296)	(2.456)	(0.513)	(1.119)
$L3HFTLTA_t$	37.002	-153.250	21.030	110.346
	(0.995)	(-0.499)	(0.427)	(0.401)
$L1DFLTA_t$	111.883	-45.733	332.953**	-177.546
	(1.211)	(-0.225)	(2.471)	(-0.801)
$L2DFLTA_t$	-23.877	140.150	-34.387	105.114
	(-1.028)	(1.384)	(-1.253)	(0.832)
$L3DFLTA_t$	387.765	1992.654	-1.535	-2151.672
	(0.142)	(0.728)	(-0.001)	(-0.812)
$L1IPTA_t$		-4.156		8.930
		(-0.645)		(1.289)
$L2IPTA_t$		1.907*		1.680
		(1.840)		(1.198)
$L3IPTA_t$		-4.030		-6.926
		(-0.549)		(-1.030)

Table 2.13 continued

$SIZE_t$			0.044*	-0.087*
			(1.828)	(-1.792)
BTM_t			0.006	-0.114**
			(1.363)	(-2.195)
EXCHANGE			0.020	0.032
			(0.470)	(0.377)
$CROSS_t$			-0.047	0.105
			(-0.913)	(0.801)
$STATE_t$			-0.022	0.068
			(-1.541)	(1.014)
$INSTI_t$			-0.001	0.018***
			(-0.843)	(3.421)
$TOP10_t$			-0.000	-0.002
			(-0.031)	(-0.677)
ROA_t			2.087	15.792***
			(1.543)	(8.133)
$LEVER_t$			0.237	0.595**
			(0.804)	(2.372)
$TURNOVER_t$			-0.000	0.001
			(-0.563)	(1.025)
$LOSS_t$			0.266*	-0.507*
			(1.869)	(-1.912)
$ESURPRI_t$			-1.312***	-2.337***
			(-3.124)	(-3.715)
$HORI_t$			-0.260	-0.394
			(-0.829)	(-0.771)
ANA_t			0.019	0.038
			(0.495)	(0.737)
Constant	-0.179***	-1.733***	-0.064	2.631
	(-36.657)	(-2.945)	(-0.032)	(0.801)
Industry fixed effects	YES	YES	YES	YES
Year fixed effects	YES	YES	YES	YES
N	249	1640	232	1527
R^2	0.314	0.034	0.500	0.284
adj. R^2	0.240	0.011	0.405	0.258

t statistics in parentheses, ***, **, * denotes statistical significance at the 1%, 5% and 10 % level (two-tailed test), respectively.

Table 2.14 Fair value hierarchy, fair value related disclosure and financial analyst forecast dispersion

	Dependent variable=Dispersion$_{t+1}$					
	(1) All firms	(2) Financial firms	(3) Non-financial firms	(4) All firms	(5) Financial firms	(6) Non-financial firms
$L1ATA_t$	0.266	-0.182	0.267			
	(1.273)	(-0.884)	(1.060)			
$L2ATA_t$	0.140	-0.096	0.149			
	(0.765)	(-0.595)	(0.548)			
$L3ATA_t$	0.726	0.490	0.811			
	(0.933)	(1.026)	(0.833)			
$L1LTA_t$	-0.680	-0.216	-0.671			
	(-1.298)	(-0.219)	(-1.158)			
$L2LTA_t$	1.922*	3.195**	-0.304			
	(1.691)	(2.527)	(-0.261)			
$L3LTA_t$	-5.712**	-12.056**	-7.532***			
	(-2.465)	(-2.467)	(-3.247)			
$L1FV_t$				0.139	0.286	-0.089
				(0.805)	(0.818)	(-0.497)
$L2FV_t$				0.418*	-0.386	0.241
				(1.820)	(-1.087)	(0.737)
$L3FV_t$				-1.180*	0.268	-1.495**
				(-1.897)	(0.406)	(-2.217)
$L2FV_t \times DISCLO_t$				-0.637	0.639	-0.464
				(-1.618)	(1.020)	(-0.825)
$L3FV_t \times DISCLO_t$				4.324	-4.649**	5.187*
				(1.549)	(-2.263)	(1.773)
$DISCLO_t$				0.015	-0.075	0.023
				(0.624)	(-1.158)	(0.926)
$SIZE_t$	0.001	0.005	-0.002	-0.015	0.020	-0.013
	(0.081)	(0.208)	(-0.156)	(-0.826)	(1.032)	(-0.631)
BTM_t	0.006	0.007	0.028*	0.009	0.006	0.056***
	(1.297)	(1.115)	(1.711)	(1.275)	(1.152)	(3.096)
EXCHANGE	-0.011	-0.030	-0.010	-0.032	-0.033	-0.032
	(-0.514)	(-1.073)	(-0.434)	(-1.345)	(-1.113)	(-1.336)
$CROSS_t$	-0.007	0.025	-0.011	-0.015	-0.053	-0.024
	(-0.266)	(0.581)	(-0.379)	(-0.390)	(-1.164)	(-0.580)
$STATE_t$	0.002	0.082***	-0.016	0.026	0.085**	-0.007
	(0.121)	(2.718)	(-1.178)	(1.105)	(2.143)	(-0.214)

Table 2.14 continued

$INSTI_t$	-0.002*	-0.001	-0.002	-0.002	-0.002	-0.001
	(-1.745)	(-0.819)	(-1.275)	(-1.044)	(-1.295)	(-0.375)
$TOP10_t$	0.002***	0.001	0.002***	0.002***	-0.000	0.002***
	(3.118)	(1.139)	(2.858)	(2.816)	(-0.020)	(2.627)
ROA_t	-2.271***	-0.895	-2.204***	-1.088***	-0.623	-0.877**
	(-5.311)	(-1.056)	(-4.820)	(-2.646)	(-0.505)	(-2.023)
$LEVER_t$	-0.038	-0.510**	-0.076	0.127	-0.363**	0.041
	(-0.449)	(-2.177)	(-0.851)	(1.209)	(-2.110)	(0.361)
$TURNOVER_t$	0.000**	0.000	0.000**	0.000*	0.000	0.001**
	(2.002)	(0.246)	(2.249)	(1.854)	(0.731)	(2.379)
$LOSS_t$	0.420***	-0.360*	0.416***	0.512***		0.484***
	(4.383)	(-1.812)	(4.332)	(3.935)		(3.744)
$ESURPRI_t$	-0.044	-0.372	-0.023	0.020	0.024	0.046
	(-0.234)	(-0.957)	(-0.116)	(0.097)	(0.033)	(0.220)
$HORI_t$	-0.141	-0.081	-0.091	-0.236	-0.115	-0.243
	(-0.808)	(-0.359)	(-0.473)	(-0.944)	(-0.485)	(-0.947)
ANA_t	0.011	0.023	0.014	0.007	0.050	0.011
	(0.620)	(0.565)	(0.748)	(0.279)	(0.698)	(0.420)
Constant	0.968	0.676	0.784	1.436	0.414	1.370
	(0.902)	(0.554)	(0.662)	(0.890)	(0.268)	(0.848)
Industry fixed effects	YES		YES	YES		YES
Year fixed effects	YES	YES	YES	YES	YES	YES
N	1566	226	1340	744	87	657
R^2	0.181	0.137	0.199	0.232	0.514	0.256
adj. R^2	0.158	0.014	0.173	0.186	0.292	0.208

t statistics in parentheses, ***, **, * denotes statistical significance at the 1%, 5% and 10 % level (two-tailed test), respectively.

Table 2.15 Fair value hierarchy, state ownership and financial analyst forecast accuracy

	Dependent variable= $ACCURACY_{t+1}$					
	(1) All firms	(2) Financial firms	(3) Non-financial firms	(4) All firms	(5) Financial firms	(6) Non-financial firms
$L1ATA_t$	-2.396**	-0.962**	-2.272**	-1.723**	-1.095**	-1.831**
	(-2.520)	(-2.456)	(-2.119)	(-2.115)	(-2.600)	(-2.003)
$L2ATA_t$	-0.790	0.042	-0.109	-0.804	0.578	-0.397
	(-1.280)	(0.140)	(-0.123)	(-1.113)	(1.437)	(-0.412)
$L3ATA_t$	-7.709**	0.405	-8.183**	-11.064***	0.203	-12.238**
	(-2.269)	(0.398)	(-2.059)	(-2.641)	(0.189)	(-2.483)
$L1LTA_t$	5.753***	1.839	6.440***	3.222*	-0.472	3.056
	(3.410)	(1.032)	(3.735)	(1.729)	(-0.155)	(1.589)
$L2LTA_t$	6.932**	0.792	18.568***	0.897	0.601	12.000*
	(2.052)	(0.863)	(3.257)	(0.202)	(0.305)	(1.690)
$L3LTA_t$	16.974	0.484	16.052	4.064	0.402	-1.153
	(1.429)	(0.106)	(1.546)	(0.382)	(0.084)	(-0.109)
$L1ATA_t \times STATE_t$	2.807	-1.378*	2.969			
	(1.268)	(-1.843)	(1.512)			
$L2ATA_t \times STATE_t$	-6.638	1.020	-17.338			
	(-1.470)	(0.864)	(-1.575)			
$L3ATA_t \times STATE_t$	87.134**	-8.677	83.325**			
	(2.481)	(-0.639)	(2.540)			
$L1LTA_t \times STATE_t$	21.968	-11.107	-104.105			
	(0.204)	(-0.238)	(-0.792)			
$L2LTA_t \times STATE_t$	7.547	-30.797	22.103			
	(0.052)	(-0.734)	(0.091)			
$STATE_t$	0.029	0.003	0.081			
	(0.488)	(0.061)	(1.445)			
$L1ATA_t \times STATEOWN_t$				-0.666	-0.079	-0.263
				(-0.529)	(-0.148)	(-0.156)
$L2ATA_t \times STATEOWN_t$				-1.315	-0.688	-3.333
				(-1.008)	(-1.113)	(-0.864)
$L3ATA_t \times STATEOWN_t$				21.265***	0.512	25.630***
				(2.840)	(0.233)	(2.738)
$L1LTA_t \times STATEOWN_t$				11.443*	7.378	14.250**
				(1.772)	(1.040)	(2.160)
$L2LTA_t \times STATEOWN_t$				17.910*	-0.302	29.167
				(1.733)	(-0.074)	(1.448)

Table 2.15 continued

$L3LTA_t \times STATEOWN_t$				732.950**	91.931	1435.524***
				(2.540)	(1.025)	(3.084)
$STATEOWN_t$				-0.210***	0.065	-0.196**
				(-2.607)	(1.075)	(-2.279)
$SIZE_t$	-0.075	0.049	-0.078	-0.058	0.048*	-0.064
	(-1.499)	(1.626)	(-1.428)	(-1.161)	(1.811)	(-1.166)
BTM_t	-0.015	0.002	-0.125**	-0.016	0.004	-0.126**
	(-0.994)	(0.304)	(-2.248)	(-0.929)	(0.729)	(-2.426)
EXCHANGE	0.047	-0.010	0.040	0.061	-0.006	0.048
	(0.573)	(-0.199)	(0.465)	(0.745)	(-0.118)	(0.548)
$CROSS_t$	0.093	-0.078	0.083	0.070	-0.053	0.066
	(0.849)	(-1.460)	(0.652)	(0.633)	(-0.926)	(0.515)
$INSTI_t$	0.012***	0.000	0.016***	0.014***	0.001	0.017***
	(3.309)	(0.173)	(2.919)	(3.266)	(0.368)	(2.946)
$TOP10_t$	-0.001	-0.000	-0.002	-0.001	-0.001	-0.001
	(-0.422)	(-0.195)	(-0.649)	(-0.262)	(-0.744)	(-0.442)
ROA_t	15.916***	0.743	15.757***	15.920***	0.584	15.728***
	(8.586)	(0.552)	(8.296)	(8.686)	(0.391)	(8.440)
$LEVER_t$	0.364	0.016	0.679**	0.440*	-0.027	0.745***
	(1.359)	(0.060)	(2.571)	(1.668)	(-0.093)	(2.737)
$TURNOVER_t$	0.001	-0.000	0.001	0.001	-0.000	0.001
	(1.508)	(-1.174)	(1.214)	(1.486)	(-0.385)	(1.241)
$LOSS_t$	-0.555**	0.326	-0.491*	-0.541**	0.192	-0.482*
	(-2.048)	(1.306)	(-1.813)	(-2.058)	(1.525)	(-1.816)
$ESURPRI_t$	-2.194***	-0.911**	-2.210***	-2.157***	-1.150**	-2.275***
	(-3.760)	(-2.137)	(-3.516)	(-3.690)	(-2.677)	(-3.583)
$HORI_t$	-0.130	-0.080	-0.175	-0.075	-0.177	-0.227
	(-0.272)	(-0.225)	(-0.339)	(-0.155)	(-0.578)	(-0.423)
ANA_t	0.074	0.047	0.064	0.044	0.054	0.041
	(1.532)	(1.126)	(1.230)	(0.878)	(1.313)	(0.765)
Constant	1.102	-1.133	1.086	0.263	-0.601	1.175
	(0.353)	(-0.462)	(0.326)	(0.084)	(-0.287)	(0.341)
Industry fixed effects	YES		YES	YES		YES
Year fixed effects	YES	YES	YES	YES	YES	YES
N	1852	238	1614	1852	238	1614
R^2	0.281	0.445	0.292	0.286	0.436	0.291
adj. R^2	0.262	0.355	0.270	0.266	0.341	0.270

t statistics in parentheses, ***, **, * denotes statistical significance at the 1%, 5% and 10 % level (two-tailed test), respectively.

Chapter 2 Appendices

Appendix 2.1a Summary of the fair value accounting/IFRS related papers

Authors(year)	Focus	Sample	Analyst forecast properties examined	Key findings
FVA-related studies				
Peek (2005)	Voluntary accounting policy changes, including change of CCA t	71 Duch firms that have accounting changes from 1988 to 1999	Earnings forecast errors and analysts' forecasting superiority over price-based prediction model	Accounting changes affect the time series and composition of earnings and thus influence forecast acc
Lim et al.(2013)	IAS 39 reclassification choice	98 banks from 21 countries	Earnings forecast accuracy, dispersion	The reclassification choice during the financial crisis reduced forecast accuracy and increased forecas
Panaretou et al. (2013)	Hedge accounting under IFRS	UK FTSE 350 (non-financial) firms over 2003-2008	Earnings forecast accuracy, dispersion	Derivative usage under IFRS is negatively associated with forecast error and dispersion
Liang and Riedl(2014)	FVA vs. HCA	UK and US investment property firms over 2002-2010	Accuracy of net asset value forecast and earnings forecast,information content of NAV and EPS forecasts	Higher NAV (lower EPS) forecast accuracy for firms using FVA model
Li (2014)	SFAS 157	US financial institutions over 2001-2009	Quality of common, private and total information quality	All three levels of fair value negatively relate to information quality measures, positively relate to fore
Campbell et al. (2015)	Fair value of cash flow hedges	US (non-financial)companies over 2001-2008	Earnings forecast bias for periods t+1,t+2,t+3	Negative association between forecast errors and unrealized cash flow hedging gains/losses, weaker as
Magnan et al.(2015)	SFAS 157 fair value disclosure	US bank-holding companies over 1996-2009	Earnings forecast accuracy, dispersion, precision of analsyts' public and private information	Positive association between fair value exposure and forecast dispersion, level 2 fair values relate to g
Wei and Xue (2015)	Financial assets fair values	China A-share non-financial firms over 2009-2011	Earnings forecast accuracy,bias, dispersion, meet or beat forecast	Listed firms sell AFS to meet or beat forecasts, hold of AFS relate to more accurate and less dispered
Chang et al.(2016)	Derivatives	US listed non-financial companies during 1998-2011	Earnings forecast accuracy, dispersion, bias, sales forecasts	Analysts' forecasts are less accurate and more diversed for new derivative users, and the results are dri
Barron et al. (2016)	SFAS157 disclosures regarding level 3 fair values	US listed companies over 2005-2009	Earnings forecast accuracy, dispersion,total information uncertainty	level 3 fair value disclosures relate to reduced uncertainty and lower forecast errors
Ayers et al. (2017)	Total FVA exposure and fair value hierarchy	US listed companies over 2007-2013	Earings forecast accuracy, forecast bias	Leve 1 and 2 fair values positively relate to forecast accuracy among non-financial companies, and ass
IFRS-related studies				
Ashbaugh and Pincus(200	Voluntary IAS adoption	80 firms that adopted IAS over 1990-1993	Earnings forecast error	Forecast accuracy improves after firms adopt IAS
Bae et al.(2008)	International GAAP differences	Firms from 49 countries during 1998-2004	Foreign analyst following and forecast accuracy	Greater GAAP differences relate to few foreign analyst following and lower forecast accuracy
Ernstberger et al.(2008)	Voluntary adoption of IFRS or US GAAP	German listed companies over 1998-2004	Earnings forecst accuracy	Aoption of IAS/IFRS or US GAAP relates to higher forecast accuracy, in the years of switching from l
Hodgdon et al. (2008)	IFRS compliance	Firms (non-financial) that claim to comply with IFRS duirng 1999 and 2000	Earnings forecast error	IFRS compliance relates to lower forecast error
Kim and Shi (2012)	Voluntary IFRS adoption	Firms (non-financial) from 29 countries that voluntarily adopt IFRS over 199	Analyst coverage, precision of total, public and private information used by analysts	Voluntary IFRS adoption attract more analysts; increases the precision of both public and private infor
Byard et al.(2011)	Mandatary IFRS adoption	Firms from 20 EU countries over 2003-2006	Analyst following, earnings forecast accuracy, dispersion, analsyts' public, private and total information unce	Forecast errors and dispersion reduced after mandatory IFRS adoption, and enforcement regimes and f
Wang et al. (2008)	Mandatory IFRS adoption	Firms from 17 EU countries over 2003-2006	Earnings forecast error, dispersion	Mandatory IFRS adopters have improved information environment, and the effects differ across countr
Tan et al.(2011)	Mandatory IFRS adoption	Firms from 25 countries that adopted IFRS during 1988 to 2007	(Foreign and local) analyst following and forecast accuracy	Mandatory IFRS adoption attracts foreign analyst following and improves forecast accuracy, but local a
Cotter et al. (2012)	Mandatory IFRS adoption	145 largest Australian firms over 2003-2007	Forecast error and dispersion	Forecast accuracy improves in the IFRS adoption year, but IFRS impact disclosures do not relate to lo
Glaum et al.(2013)	Mandatory IFRS adoption	German companies over the periods 1997-2005	Earnings forecast error	Forecast accuracy improves after IAS adoption, and increase in disclosure quality is one explanation fo
Horton et al. (2013)	Mandatory IFRS adoption	All countries with I/B/E/S coverage over 2001-2007	Earnings forecast error, dispersion, precision of analsyts' public and private information	Foreast error decreases for mandatory IFRS adopters and the improvement is driven by both informati
Preiato et al. (2013)	Mandatory IFRS adoption and enforcement	Firms from 39 countries over 2002-2009	Earnings forecast error, dispersion	Auditing and accounting enforcement affect analsyts' forecasts
Barniv and Myring (2015)	Differences between IFRS and US GAAP	Cross-listed EU firms traded in the US security markets over 2003-2007	Relative and absolute earnings forecast accuracy, analyst following, stock recommendations, forecast disper	Forecast accuracy is significantly affected by firm-specific differences between IFRS and US GAAP a
Wang et al.(2012)	China accoutning standard change in 2007	Chinese listed companies (non-financial) over 2002-2008	Foreign analyst following, forecast accuracy	Foreign analyst following and forecast accuracy increase after accoutning standards change
Ding et al.(2017)	China accoutning standard change in 2007	Chinese listed companies over 2004-2007 (2002-2009)	Forecast error	Forecast accuracy decrease after IFRS adoption, financial assets held for trading relate to decline in fo

Appendix 2.1b Calculation of forecast accuracy(bias/error) in the fair value accounting/IFRS related papers

Authors(year)	Numeritor	Denominator	Multiplier	Window(s) for forecasts used to calcuate accuracy
FVA-related studies				
Peek (2005)	absolute value of financial analyst EPS forecast error	share price at the end of the prior fiscal year	1	Forecasts outstanding at the fiscal year end
Lim et al.(2013)	|Mean forecasted EPS-actual EPS|	share price at the end of the prior fiscal year	-1	period between the release of 2008 and 2009 earnings forecasts
Panaretou et al. (2013)	|Actual EPS-mean forecasted EPS|	stock price at the beginning of the financial year	1	the last I/B/E/S reporting month prior to the release of actual earnings
Liang and Riedl(2014)	|Reported EPS-most recent mean analyst forecast EPS|	|mean EPS forecast|	1	the most recent mean analsyt forecast for year t
Li (2014)	|Actual EPS-mean forecasted EPS|	one thousandth of total assets per share as of the end of the previous quarter	100	the period between 10-Q and earnings replease date
Campbell et al. (2015)	Actual earnings-mean forecasted earnings	price at the end of year t	1	first mean consensus forecast of earnings following 10K filing date
Magnan et al.(2015)	|Median forecasted EPS-actual EPS|	stock price at the end of the year	-1 (ranked)	At the end of year t
Wei and Xue (2015)	|Mean forecasted EPS-actual EPS| & Mean forecasted EPS-actua	mean forecasted EPS	1	No mention
Chang et al.(2016)	|Consensus EPS forecast-actual EPS|	the most recent price per share for firm i in period t	-100	the most recent consensus annual earnings forecast in period t
Barron et al. (2016)	mean(individual forecast2-actual earnings2)	quarter t beginning stock price	1	30-day prior to and 30-day following 10K filing date
Ayers et al. (2017)	|Actual EPS-consensus analyst forecast|	year-end stock price(meand and median forecasts)	-1	All final forecasts for all analyst following firm i
IFRS-related studies				
Ashbaugh and Pincus(200	|Reported EPS-median analyst forecast|	stock price at the beginning of year t	1	6-month period prior to firms' fiscal year ends (first month with available forecasts)
Bae et al.(2008)	|Earnings forecast by analyst i-actual earnings|	most recent stock prices (monthly) in the previous year	-100	the latest forecast for each firm/year/analyst with a minumum of 30 (5) days before the I/B/E/S report
Ernstberger et al.(2008)	|Actual EPS-median forecasted EPS|	stock price at the middle of the forecast month	-1	each month before the EPS report date
Hodgdon et al. (2008)	|Actual EPS-forecasted EPS by analyst i|	|Actual EPS|	1	All available forecasts in years 1999 and 2000
Kim and Shi (2012)	Actual earnings-mean forecasted earnings	N/A	N/A	The most recent one-year-ahead forecasts of annual earnings
Byard et al.(2011)	|Actual EPS-median forecasted EPS|	stock price at the beginning of year t	100	12-month period prior to the fiscal year-end for firm i in year t
Wang et al. (2008)	|Mean forecasted EPS-actual EPS|	stock price at the beginning of year t	1	Most recent mean annual earnings forecast
Tan et al.(2011)	|EPS forecasted by foreign analyst i-actual EPS|	the latest available stock price in the previous year	-100	The last earnings forecasts made by foreign analyst j before the annucal earnings announcement date
Cotter et al. (2012)	|Actual EPS-median forecasted EPS|	stock prices 3 months prior to the fiscal year end t	1	3 months prior to time t
Glaum et al.(2013)	|Actual EPS-median forecasted EPS|	the median of stock prices in year t+1(actual EPS)	1	From publication of annual reports of year t until the end of the fiscal year t+1
Horton et al. (2013)	|actual earnings-consensus forecast|	|actual earnings|(stock price, or no deflator)	1	70,40,100, 160,220 days away from the end of the fiscal period
Preiato et al. (2013)	|actual EPS-median consensus EPS forecast in month t|	price that month	1	1 to 11 months preceding the earnings announcement month
Barniv and Myring (2015)	(|analyst i's forecast error|/|mean forecast error|)-1; absolute fore	NA/; price at time t	-1/-100	No mention
Wang et al.(2012)	|forecasted EPS by analyst i-actual EPS|	closing price at the end of the year	1	Announcement date of annual earnings (year t) to announcement date of second quarter earnings (year
Ding et al.(2017)	|Mean forecasted EPS-actual EPS|; |forecasted EPS by analyst i-a	the latest available stock price of firm i during year t	1	No mention

Appendix 2.1c Control variables and research designs of the fair value accounting/IFRS related papers

Authors(year)	Research design	Control variables	Cluster	Outliers	Endogeneity
FVA-related studies					
Peek (2005)	Wilcoxon singed rank test, Wilconxon rank sum test	N/A	N/A	N/A	N/A
Lim et al.(2013)	OLS	firm size, earnings surprise, negative earnings, number of analyst following, financial stability, forecast horizon, StdROA, EPS, legal origin	country-clustered standard errors	Each variable is winsorized at 1% and 99% levels	Heckman two-stage
Panaretou et al. (2013)	DID	firm size, earnings variability, leverage, MTB, number of analyst following, negative earnings, level of earnings, year and industry fixed effects	Regressions adjusted for within firm clusters	dependent variables are winsorized at the 99th percentile	DID
Liang and Riedl(2014)	DID	forecast horizon, firm size, number of analsyt following, LOSS, change in EPS, leverage, firm's riskiness,insder shareholding, BTM, year fixed effects	standard errors are clustered by firm	Unknown	DID
Li (2014)	OLS	firm size, analyst following, LOSS, quarter fixed effects, growth in total assets, EPS below mean forecast, stock return volatility	standard errors are clustered at firm level	Winsorized at top and bottom 1 percentiles of their distributions	Additional control var
Campbell et al. (2015)	Pooled OLS	firm size, big 4 auditors, number of analyst following, earnings volatility, forecast horizon, industry and year fixed effects	White(1980) standard errors	All variables are truncated at 1 and 99 %	N/A
Magnan et al.(2015)	Generalized least square(GLS) with AR1 autocorrelation	loans at the amortised cost,riskines of banks' portfolio, market liquidity, change of quarterly GDP, quarterly unemployment rate,analyst following,stock price volatility,bank size, Tier 1 ca	All standard errors are adjusted for heteroskedasticity	Variables are ranked	N/A
Wei and Xue (2015)	OLS	firm size, ROA, unexpected earnings, change in ROA,performance volatility, growth,forecast horizon, firm-specific and industry-specific experience, year and industry fixed effects	Unknown	Unknown	Heckman two-stage
Chang et al.(2016)	PSM+DID	number of analyst following, firm size, intangibles, stock return volatility, MTB, stock and debt issuance, share turnover, annual stock returns, earnings surprises, geographic and industry sa	standard errors are clustered	Continuous variables are winsorized at 1st and 99th percentiles	PSM+DID
Barron et al. (2016)	PSM+DID	firm size, 10-K filing, sum of 3-day return around the filing date, number of analyst following, industry fixed effects	two-way cluster robust standard errors	Trunctuate at the top and bottom 1%	PSM+DID
Ayers et al. (2017)	Pooled cross-sectional OLS	firm size, earnings volatility, leverage, MTB, change in earnings, number of operating segments, number of analyst following, industry and firm fixed effects	standard errors are clustered at country level	ACCURACY is winsorized at the 2% and 98% levels, all other continuous variables winsorize at 1% and 99% levels	N/A
IFRS-related studies					
Ashbaugh and Pincus(200	OLS	firm size, number of analyst following	None	All variables are winsorized at 1% and 99% levels	N/A
Bae et al.(2008)	OLS	firm size, forecast horizon, number of analyst following, cross-listing, analyst general and firm-speciific experience, forecast diversity, brokage size, industry fixed effects	Standard errors are adjusted at country-pair level	Unknown	Varioud model specif
Ernstberger et al.(2008)	OLS	firm size, number of analyst following, forecast horizon, beta, LOSS, cross-listing, stock exchanges, change in GDP, industry and year fixed effects	Standard errors are clustered by firm	Dependent variable is winsorized at the 99th percentile	Heckman two-stage
Hodgdon et al. (2008)	pooled OLS, and OLS with fixed effects	firm size, lines of business, negative earnings, number of analyst following, US listing,international diversification, micro-based country, change in EPS, forecast horizon, disclosure and cc	standard errors are adjusted for within-firm correlation	Unknown	N/A
Kim and Shi (2012)	Heckman two-stage, 2SLS, weighted least squares	firm size,accrual, negative earnings, big 4, analyst dispersion(earnings variability), ROA, USGAAP,LAW, country-level governance,GDP, year and industry fixed effects	Standard errors are clustered at firm level	Each variable is winsorized at 1% and 99% levels in robustness test	Heckman two-stage, a
Byard et al.(2011)	DID	firm size, analyst following, forecast horizon	Cluster on country	All continuous variables are winsorized at the 1% and 99 % levels	DID
Wang et al. (2008)	DID	firm size, negative earnings, change in earnings, sign of change in earnings, forecast horizon, quarterly reports, number of analyst following	Standard errprs are clustered	All variables are winsorized at the 1% and 99 % levels	DID
Tan et al.(2011)	Negative binomial model, DID,all variables are in the cha	firm size, BTM, intangible assets, return volatility, cross-listing, security issuance, stock turnover, stock return, number of analyst folloing the firm, forecast horizon, analysts' general and f	standard errors are clustered at country level	Unknown	DID
Cotter et al. (2012)	Pooled OLS	firm size, earnings surprise, number of analyst earnings forecasts included in the consensus forecast, management earnings guidance	Unknown	Disclosure scores are winsorised at three SD to exclude outliers	N/A
Glaum et al.(2013)	Structural equation model	firm size, leverage, number of analyst following, ROA, EPS change, sign changes of EPS, year and indsutry fixed effects	Unknown	All continuous variables are ranked	residual-variable test,
Horton et al. (2013)	DID	level of absolute accruals, analyst coverage, firm size, negative income, forecast horizon, US reporting or listing, average forecast error, firm fixed effects	double cluster standard errors at the firm and at the year	Unknown	DID, restriction on sa
Preiato et al. (2013)	OLS	firm size, BTM, ROA, LOSS,forecast horizon, change of forecast, forecast error last year, leverage, year fixed effects	Standard errors are cluster by firm-year (and the bootstr	Take the median instead of mean, take the log of 1+variable	N/A
Barniv and Myring (2015)	Cluster firm-effect regression; negative binomial regressi	Analysts characteristics, firm characteristics, country characteristics	Standard errors are clustered by firm (firm-year)	Unknown	Natural experiment
Wang et al.(2012)	OLS	Analysts characteristics, firm characteristics	Standard errors are clustered at firm level	Unknown	N/A
Ding et al.(2017)	OLS	Leverage, firm size, income volatility, abnormal return of year t-1,state-ownership, analyst coverage, forecast horizon, broker, underwriter,forecast dispersion, industry fixed effects	Unknown	Unknown	N/A

Appendix 2.2 Variable definitions

ACCURACY: unsigned earnings forecast accuracy, see Section 2.5.2.1 for calculation details
ANA: the number of analyst coverage, calculated as the logarithm of one plus the number of analysts following the firm
BIAS: signed earnings forecast accuracy, see Section 2.6.5.2 for calculation details
BIG4: a dummy variable equals 1 if a firm-year observation is audited by big 4 (Deloitt, PwC, Ernst & Young, KPMG) audit firms, 0 otherwise
BTM: book-to-market ratio, calculated as the book value of equity divided by the market value of equity
CRISIS: a dummy variable that equals 1 if year equals 2007, 2008, 2009 or 2015, 0 otherwise
CROSS: a dummy variable that equals 1 if a firm issues shares both in the domestic stock exchanges and in other stock exchanges
DISPERSION: earnings forecast dispersion, calculated as the standard deviation of analysts' EPS forecasts for year t+1 made within 60 days after the earnings announcement, divided by the absolute value of mean EPS forecast for firm i in year t+1
DISCLO: a dummy variable which equals to 1 if firm i discloses the valuation methods relating to fair value estimates in year t, and it equals 0 otherwise
ESURPRI: calculated as the difference in current year EPS and prior year EPS, divided by total assets
EXCHANGE: a dummy variable that equals 1 (0) for companies listed in Shanghai (Shenzhen) stock exchange
FVVOLA: the standard deviation of the quarterly unrealized fair value changes for firm i in year t
GWTA: calculated as goodwill at the end of year t divided by total assets at the end of year t-1
HORI: analyst forecast horizon, calculated as the number of days between the release date of financial reports and the date of the consensus forecast
IMR: inverse mills ratio
INSTI: the number of institution-owned shares divided by total outstanding shares
INTANGI: calculated as intangible assets at the end of year t divided by total assets at the end of year t-1
LnATA:, level n fair value-measured assets divided by total assets for firm i at the end of year t, n equals 1,2 or 3
LnLTA: level n fair value-measured liabilities divided by total assets for firm i at the end of year t, n equals 1,2 or 3
LnHFTATA: level n fair value-measured held-for-trading assets divided by total assets for firm i at the end of year t, n equals 1,2 or 3
LnAFSTA: level n fair value-measured available-for-sale securities divided by total assets for firm i at the end of year t, n equals 1,2 or 3
LnDFATA: level n fair value-measured derivative financial assets divided by total assets for firm i at the end of year t, n equals 1,2 or 3
LnHFTLTA: level n fair value-measured held-for-trading liabilities divided by total assets for firm i at the end of year t, n equals 1,2 or 3

Appendix 2.2 Variable definitions (continued)

LnDFLTA: level n fair value-measured derivative financial liabilities divided by total assets for firm i at the end of year t, n equals 1,2 or 3

LnIPTA: level n fair value-measured investment properties divided by total assets for firm i at the end of year t, n equals 1,2 or 3

L1FV: the sum of L1ATA and L1LTA

L2FV: the sum of L2ATA and L2LTA

L3FV: the sum of L3ATA and L3LTA

LAW: the strength of legal enforcement of the province where the firm is located. The variable is based on the index in Fan et al. (2011)

LEVER: calculated as book value of debt divided by book value of total assets

LOSS: a dummy variable that equals 1 for firm-year observations that report negative core earnings, 0 otherwise

ROA: return on assets, calculated as income before extraordinary items divided by total assets

SIZE: the natural logarithm of market value of equity

STATE: the proportion of state-owned shares in total outstanding shares

STATEOWN: a dummy variable equals 1 if the enterprise is owned by the state, 0 otherwise

TOP10: the sum of shares held by top 10 shareholders divided by total outstanding shares

TURNOVER: the number of shares traded in year t divided by the average number of outstanding shares in year t

Chapter 3 Fair value accounting and stock price crash risk: Evidence from financial instrument measurement in China

3.1 Introduction

The objective of this chapter is to examine whether fair value accounting affects firm-level stock price crash risk in China. The 2007-2008 financial crisis has sparked off the debate on the role of fair value accounting in inducing excess stock price volatility, and on the reliability and usefulness of fair value information. Supporters of fair value accounting argue that fair values reflect timely information about firm performance and reduce managers' ability to hide bad news (Barth 2014, DeFond et al. 2015). However, the critics argue that fair values may only reflect transitory and short-term market movements, and fair value estimates incorporate too much noise and bias which may increase firm opacity and impair investors' ability of evaluating firm performance (Hodder et al. 2006, Plantin et al. 2008). Some opponents of fair value accounting also argue that it caused excessive asset sales among the financial institutions during the financial crisis period (Amel-Zadeh et al. 2017). Whether and how fair value accounting affects firm transparency, the effect of which will be ultimately incorporated into stock prices, remains to be explored.

Stock price crash risk is the third moment[62] of stock price distributions and it has come to the spotlight after the 2007-2008 financial crisis. The frequency of extreme negative stock returns[63], as reflected by stock price crash risk, could significantly affect the welfare of market participants (DeFond et al. 2015). For example, investors' portfolios can lose value during the extreme negative events and the following dramatic decline of stock prices. The plummet in stock prices and the decline in the value of portfolios will then turn into real wealth losses when the investors have to cut their losses (Li and Zeng 2019). Although the role of FVA in the financial crisis has been under debate during the past decade, there is limited direct empirical evidence on whether and how FVA influences stock price volatility. Moreover, empirical evidence on the application of FVA outside the US and Europe is particularly scarce. Therefore, this study attempts to fill the gaps in literature by investigating the following research questions in China's context:

1. Do financial instruments' fair values relate to firm-level stock price crash risk in China? If so,
2. How do financial instruments' fair values relate to firm-level stock price crash risk in China?

I focus on financial instruments for the following reasons. Financial instrument is the largest class of assets influenced by fair value measurement, and more than half of the Chinese listed companies have such assets while the proportion of financial instruments in the firms' total assets are increasing during

[62] The first moment of stock price is stock return, and the second moment of stock price is the standard deviation of stock return (Piotroski et al. 2015).

[63] Also known as the left tail risk of stock returns (e.g. Li and Zeng 2019).

recent years. Therefore, studying fair value accounting for financial instruments has economic significance. Moreover, the role of financial assets' fair value changes in selective trading of AFS securities has been a concern in accounting literature, and there is still limited evidence on the investor welfare effects of these activities (e.g. Barth and Taylor 2010, He et al. 2012, Amel-Zadeh et al. 2017, Dong and Zhang 2018). Relating to this stream of literature, this study thus has the potential to provide incremental evidence on the real effects and capital market consequences of fair value accounting.

China is chosen as the research setting for the following reason. First, it is one of the largest developing markets with rapid growth of foreign direct investment (FDI), while prior studies show that stock price crash risk of the Chinese listed companies is higher than the global average (Piotroki and Wong 2013). In the recent 2015 Chinese stock market crash, the domestic market index plunged by about 30% and there was a loss of more than US $3 trillion in the market value (Kim et al. 2019). As stock price crashes are likely to impair the warfare of both domestic and global investors, it is of significant importance for market participants in China and in other emerging markets with similar market development to understand sources of such crashes. Second, there have been concerns over the application of FVA and IFRS in relatively under-developed institutional environment such as China (e.g. He et al. 2012). Therefore, the study may likely to be of interest to international regulators and financial accounting standard setters as these interest parties would like to know the outcomes of implementing international accounting standards in capital markets which are at similar development stages like China.

Theoretical framework by Jin and Myers (2006) predicts that increased opacity in financial reporting information allows managers to hide bad news from the public. However, managers will lose control of bad news when the amounts of such news are accumulated to certain threshold. In this situation, bad news will be revealed all at once and becomes a surprise to market participants. These market participants may decide to leave the market together and thus result in a stock price crash. According to this theory, if FVA increases (decreases) firms' capabilities of hiding bad news, there will be higher (lower) stock price crash risk relating to the unrealized fair value changes. The positive accounting theory predicts that managers have incentives to manage earnings for contracting, asset pricing or regulatory purposes.

Based on these theories, the institutional environment of China and prior literature on earnings management relating to fair value-measured financial instruments, I hypothesize (in the null form) that the fair value through profits or losses (FVTOPL) financial assets and liabilities[64] and available-for-sale (AFS) securities do not relate to stock price crash risk. To explore potential channels through

[64] Including assets/liabilities designated at fair value through profit or loss and held-for-trading (HFT) securities.

which financial instruments' fair values relate to stock price crash risk, I further examine whether the unrealized fair value gains and losses relate to stock price crash risk and whether investment income[65] and its component, the realized gains and losses from AFS securities, mediate[66] in the association between unrealized fair value changes and stock price crash risk.

A sample of 9,971 firm-year observations with fair value measured financial instruments over the period 2007-2016 is employed to test the hypotheses. A pooled cross-sectional regression is estimated for the first research question and the results show that the fair values of AFS securities (FVTOPL financial instruments) positively relate to future stock price crash risk among the financial (non-financial) firms. Two sets of simultaneous equation models are constructed to examine whether the association between fair value-measured financial instruments and stock price crash risk are driven by the recognition of unrealized changes in fair values into current core earnings and/or earnings management relating to the unrealized fair value changes. The results show that among firms with the incentive to reverse unrealized fair value losses from FVTOPL items, the absolute values of unrealized fair value losses positively relate to investment income, while investment income positively relates to future stock price crash risk. Analyses using AFS sales as the path show that realized gains and losses from AFS securities positively relate to future stock price crash risk among all firms and non-financial firms, while unrealized fair value changes have a direct positive influence on future crash risk among the financial firms.

Four additional analyses are conducted to further explore the circumstances under which fair values relate to future stock price crash risk. The results show that level 3 fair value measured AFS securities positively relate to future stock price crash risk, indicating the positive association between AFS securities and stock price crash risk among the financial firms may be driven by information uncertainty of fair value estimates. Stock price crash risk relating to AFS securities is higher among non-financial firms that have incentive to reverse earnings loss through AFS securities' sales, indicating that the regulatory benchmark would be one reason of the potential association between fair value measured financial instruments and stock price crash risk. There is also some evidence of the influence of market volatility and share ownership on the association between fair values and stock price crash risk.

[65] Investment income includes gains and losses from the disposal or sale of available-for-sale securities, other financial assets and long-term equity investments, and profits or losses related to associates and joint ventures.

[66] I examine the mediating role of investment income and sale of available-for-sale securities in the stock price crash risk effects of fair value accounting because excess (or opportunistic) asset sales caused by fair value accounting is a major concern among the academics, policy makers, and practitioners (e.g. He et al. 2012, Amel-Zadeh et al. 2017). However, whether FVA affects investors' welfare through such asset sales remains to be explored.

The study contributes to the literature in the following ways. First, the study contributes to the policy debate on whether FVA relates to excessive stock market volatility. Because of the requirements to adjust asset value to the market value on the financial reporting date, FVA has been criticised during the 2007-2009 financial crisis for causing fire sales and procyclical leverage (Bratten et al. 2016). Both the regulators and practitioners express concern on the potential earnings volatility and stock price volatility associated with the implementation of FVA (Gonchorov 2015). Some studies have provided evidence on the association between balance sheet-based fair value exposure measures and stock price crash risk (e.g. DeFond et al. 2015).However, how FVA relates to stock price crash risk, and whether FVA matters to the capital markets outside the US and the Europe remain to be explored. This study thus contributes to the policy debate and extends this stream of literature by directly examining two channels through which FVA could influence stock price crash risk in the context of a major emerging market[67].

Second, the study extends the FVA-related earnings management literature by providing evidence on the investors' welfare consequences of these activities. He et al. (2012) show that Chinese listed companies sell AFS securities to reduce unrealized fair value losses from HFT securities. Guo et al. (2019) find evidence that Chinese companies use the classification option and sale of AFS securities to avoid excess earnings volatility induced by unrealized fair value gains and losses. Studies outside China also provide evidence of earnings management through the selective trading of AFS securities (e.g. Barth et al. 2017, Dong and Zhang 2018). However, earnings management can either reduce the usefulness of financial information to investors or can deliver useful managerial inside information (Barth and Taylor 2010, Scott 2015). By documenting a positive association between realized gains and losses from AFS securities sales and future stock price crash risk in China when there is a negative change in the fair value of FVTOPL items, the study shows that FVA-related earnings management could impair investor welfare in a relatively weak institutional environment.

Third, this study adds to the literature on the determinants of stock price crash risk by examining fair value accounting as one potential influencing factor. Empirical studies on the impact of accounting conservatism (Kim and Zhang 2016), tax avoidance (Kim et al. 2011) and earnings smoothing (Chen et al. 2017) on stock price crash risk provide evidence that managers' opportunistic manipulation of earnings could result in higher stock price crash risk. Divergent from these studies, my study shows that the recognition of future cash flows into current earnings could also be one factor that can

[67] Understanding the channels through which FVA relates to unfavourable market consequences can help the policy makers develop better ways to reduce the unfavourable consequences. For example, if asset sales induced by FVA lead to stock price crash risk, improving the investors' awareness of the implications of such real earnings management *a priori* may help prevent the excess market volatility.

influence stock price crash risk, either through the direct influence on information uncertainty or through the indirect channel of firms' real earnings management activities.

The rest of this chapter is organized as follows. Section 3.2 reviews the relevant literature. Section 3.3 introduces the institutional background and Section 3.4 develops hypotheses relating to the research questions. Section 3.5 describes the research design and Section 3.6 presents the results of empirical analyses. The last section concludes.

3.2 Literature review

This section reviews main studies relating to the market pricing implication of fair values, and studies on the role of financial reporting and stock price crash risk. Overall, only four papers have provided some evidence on the association between fair value and stock price crash risk (i.e. DeFond et al. 2015, Lim et al. 2017, Hsu et al. 2018, Hsu and Wu 2019). These studies rely mostly on balance sheet-based fair value measures and none of them has examined the channels through which FVA influences stock price crash risk. Section 3.2.1 summarises findings of the papers on fair value reporting and stock price crash risk. To shed light on potential channels through which FVA influences firm-level stock price crash risk, Section 3.2.2 reviews studies relating to the predictive ability of fair value information. Section 3.2.3 reviews literature on earnings management relating to AFS securities. Section 3.2.4 reviews studies relating to the role of financial reporting in stock price crash risk[68].

3.2.1 Fair value reporting and stock price crash risk

Four recent papers explore whether fair values and relevant disclosures relate to stock price crash risk. DeFond et al. (2015) find that in a sample of international banks, those with higher exposure to fair values are prone to experience stock price crash. Also using a sample of international banks, Lim et al. (2017) report positive association between level 1 fair values and stock price crash risk among countries with lower levels of financial development, country-level of trust, the extent of security regulations, and fewer disclosure requirements. These two studies focus on the association between fair value numbers reported on the balance sheet and stock price crash risk. Taking a different perspective, Hsu et al. (2018) examine whether fair value disclosure requirements affect crash risk among the US banking firms. They find that the increased disclosures result in lower crash risk, and the reduction is greater in banks with more financial assets measured by level 3 fair values. Using a

[68] The extant stock price crash risk literature has examined the impacts of financial reporting characteristics, managerial and corporate governance characteristics, capital market factors, informal institutional characteristics on stock price crash risk (see Habib et al. 2018 for a literature review). Because this study focuses on the relation between financial reporting and stock price crash risk, other non-financial reporting factors that could affect firm-level stock price crash risk and are included as the control variables will be briefly discussed in Section 3.5.2.4.

sample of Chinese listed companies during 2007-2011, Hsu and Wu (2019) find higher stock price crash risk after firms adopt the fair value model for subsequent measurement of investment property. They further document that the positive association between fair value reporting and crash risk is weaker among firms with stronger corporate governance.

Although not directly examining the influence of fair values on stock price crash risk, Gonchorov (2015) documents that the unrealized fair values recognized in earnings relate to excessive stock price volatility (measured by the variance of price changes) in a sample of UK investment trusts. Further analyses show that the positive association between unrealized fair values and stock price volatility is influenced by institutional shareholding and financial analyst coverage. This paper provides some indirect evidence that the unrealized fair value changes component may relate to future stock price crashes.

In general, there has been some evidence on the association between stock price crash risk and fair value reporting, as well as some environmental factors that could influence the association. However, the channels through which fair value accounting influences stock price crash risk have not been well understood. To shed light on the potential reasons that FVA influences firms' incentives and ability to withhold bad news and thus impacts upon crash risk, the following subsections review the existing studies on the predictive ability of fair values, earnings management relating to AFS securities, and financial reporting and stock price crash risk studies respectively.

3.2.2 Information content of fair value information

Prior value-relevance studies provide some indirect evidence on the predictive ability of fair value information on future performance in different contexts. These studies generally suggest that the ability of fair values to predict future firm value depends on the extent of errors and biases incorporated in the value estimates. For example, Barth (1994) finds that investment securities fair value information is more powerful than the recognized historical costs in explaining share prices. In addition, she argues that research that does not find FV information relevant and reliable can be explained by fair value estimation errors and cross-sectional differences in sample firms. Barth et al. (1996) examines the value-relevance of fair value information disclosed under SFAS No. 107 *Disclosures about Fair Value of Financial Instruments* and finds a significant relationship between bank share prices and loans' fair values. Eccher et al. (1996) and Nelson (1996) also examine the fair values disclosed under SFAS No.107 but they find mixed results on the association between firm valuation and loans, deposits, long-term debt or net off-balance sheet financial instruments disclosed in fair value.

Using a sample of 56 US publicly held property-liability insurance companies during the period 1985-1991, Petroni and Wahlen (1995) examine the value relevance of different investment securities. They document significant association between share prices and the fair values of equities and Treasury securities. However, they do not detect significant evidence that the fair value of municipal and corporate bonds relates to prices. The results suggest that reliability of fair value estimates affects the value relevance of different types of securities. Carroll et al. (2003) use a sample of 143 closed-end mutual funds during 1982-1997 to compare the value-relevance of fair value information and historical cost information. Their cross-sectional analysis show that fair value information is value relevant even after controlling for historical costs information. Moreover, the difference in the value relevance of fair value gains and losses is similar to that in Barth (1994). In addition, they provide evidence that even the fair values of securities traded in illiquid markets have explanatory power for stock prices, which is in contrast to Petroni and Wahlen (1995). In China's context, Qu and Zhang (2015) investigate the value-relevance of earnings and book value of the Chinese listed companies during the 1991 to 2010 period. Although they find increase in the value-relevance of earnings and book value during the 20 years of institutional change period, they do not find FVA to be a contributing factor.

Some papers focus on the unrealized fair value gains and losses reported in other comprehensive income (OCI). For example, Bratten et al. (2016) examine whether the unrealized fair value gains and losses included in OCI can predict future earnings of the US banks. They find significant association between the fair value oriented OCI components and future earnings, and the association remains significant during the financial crisis period. They also find that the predictive ability is affected by the reliability of the fair values. Easton and Zhang (2017) also examine the predictive ability of OCI components and they find that the unrealized holding gains and losses from AFS securities is not transitory, while the investors seem to misprice the total amount of unrealized gains and losses as real economic gains and losses.

3.2.3 Earnings management relating to available-for-sale securities

The academic interests and discussions of earnings management relating to financial assets are firstly triggered after the implementation of the SFAS 115 in 1993 in the US. Similar to IAS 39 and the 2007 ASBE 22, SFAS 115 requires the financial investments to be classified as HFT, AFS or HTM according to managerial intention. Research in the 1990s provide evidence of earnings smoothing or upward earnings management through opportunistic classification of the financial assets[69] and selective trading of financial securities[70]. A recent study by Barth et al. (2017) shows that both listed

[69] See Guo et al. (2019) for more detailed review of these earlier studies.
[70] See Dong and Zhang (2018) for a review of earlier papers relating to the selective trading of AFS securities.

and unlisted banks in the US sell AFS securities to manage earnings and regulatory capital. They also find evidence of "big bath" and earnings smoothing among banks with either negative or positive earnings. Using hand-collected data of the amount of gains and losses from AFS securities sales, Dong and Zhang (2018) also find the US commercial banks selectively sell AFS securities to smooth earnings, and to meet or beat analysts' EPS forecast. They further document that the reporting format of unrealized AFS securities fair value changes affects the degree of earnings management. Specifically, there is significant (no significant) evidence of opportunistic AFS securities trading among banks reporting unrealized holding gains and losses in the shareholders' equity statement (income statement).

In China's context, Ye et al. (2009) find that the companies tend to classify financial assets into AFS securities to reduce the earning volatility caused by fair value changes. They also find that the companies sell AFS securities to avoid earnings decline. He et al. (2012) document evidence of earnings management associated with the application of FVA on financial assets. They find that the sample Chinese listed companies are likely to recognize gains from sale of AFS and to reverse negative value changes in trading securities, and firms with strong incentives to avoid loss are more likely to sell AFS for a gain. They further find evidence that the earnings management activities are more prevalent among politically connected firms, firms that hire non-big 4 auditors, and firms located in regions with weak institutional environments. Wei and Xue (2015) extend the sample period in He et al. (2012), and they find evidence that Chinese listed companies sell AFS securities to meet or beat financial analysts' forecast. Luo et al. (2018) show that investment income (including realized gains and losses from AFS sales) negatively relate to core earnings, indicating that the Chinese listed companies engage in the "real" type earnings management after the implementation of new accounting standards in 2007. A case study by Guo et al. (2019) also finds evidence of earnings management relating to AFS securities in a Chinese listed company. However, whether these earnings management activities affect the welfare of the market participants remain unknown.

3.2.4 Financial reporting and stock price crash risk

A stream of research examines the impact of financial reporting opacity on stock price crash risk. These studies are based on the theory that managers have incentives to withhold bad news, and when such bad news stockpile over a certain threshold, it will be released to the market all at once. The sudden release of bad news then leads to evacuation of investors and thus crash in stock prices (Jin and Myers 2006). Some theoretical studies provide support for this argument. For example, the model by Bleck and Liu (2007) proposes that managers are likely to continue a poor project for compensation purpose when the project is measured by historical cost. This is because the historical cost model does not provide the project's market value until its maturity, thus impairs outsiders' ability to evaluate the true value of the project. In the model of Benmelech et al. (2010), managers with

equity-based contracts tend to continue with negative net present value projects so that they can maximize their compensation. These agency theory-based models support the view that managers have incentives to withhold bad news for a certain period.

Some empirical studies directly test the relation between financial information opacity and stock price crash risk based on the theoretical framework of Jin and Myers (2006). Hutton et al. (2009) use accumulated accrual to measure financial reporting opacity and they document a positive association between opacity and stock price crash risk. Using three firm-level proxies for financial reporting, Kim and Zhang (2014) also provide evidence of the positive association between opacity and investors' expectation of future crash risk. As managers tend to rely more on real earnings management (REM) rather than accruals management in the post-Sarbanes-Oxley (SOX) period, Francis et al. (2016) investigate and document that firms with higher level of REM are more likely to crash. An underlying assumption of Francis et al. (2016) is that REM represents the level of managerial opportunism which relates to firm opacity. However, Gunny (2010) argues that current-period REM improves firm performance in subsequent periods. Therefore, REM activities may also be informative of firm fundamentals rather than obfuscating the real underlying performance. Using a sample of US listed banks, Cohen et al. (2014) find that earnings management of banks increases crash risk during the crisis period. However, the effect is not significant during periods of economic boom. Cohen et al. (2014) advance the literature on earnings management and crash risk by constructing a new measure of discretionary earnings for banks. They take into consideration the influence of SFAS 157 on earning management and include both discretionary loan loss provisions and discretionary realization of securities gains and losses into their measure of earnings management. The cross-country study by Du et al. (2016) also finds that the extent of accounting information disclosure affects stock price crash risk of banks.

In addition to measures of earnings management, some studies investigate the association between other earnings attributes and stock price crash risk. Chen et al. (2017) investigate whether earnings smoothing is beneficial or detrimental to investors by testing the relation between earnings smoothing and stock price crash risk. They find evidence that earnings smoothing increases the downside risk of equity values, indicating that managers may smooth earnings as a means to mask true performance of the firm rather than to communicate private information to outside investors. However, greater analyst coverage and higher institutional shareholdings are found to attenuate the unfavourable effect of earnings smoothing. Kim and Zhang (2016) argue and find evidence that conditional conservatism is one mechanism of constraining earnings management and hence can reduce crash risk. Their findings are consistent with the view that asymmetric verifiability requirement of conservative accounting policy dampens managers' ability of providing unverifiable good news but brings forth

timely recognition of unfavourable news (Kothari et al. 2010). Consequently, the probability of future price crashes is lower as a result of decreased level of hidden bad information.

Divergent from the above studies, Kim et al. (2011) explore how specific financial accounting techniques and their combination lead to financial reporting opacity and test their effect on stock price crash risk. They argue that tax avoidance is a means to conceal bad news, which could lead to increased crash risk. Controlling for accruals earnings management, they find evidence consistent with this argument, and they also document that strong external monitoring mechanisms could constrain managers' ability of using tax avoidance activities to conceal negative information. However, in addition to Kim et al. (2011), few studies have considered specific financial accounting regulations and techniques as potential triggers of stock price crash.

Overall, the above literature review implies that FVA could influence stock price crash risk either through changing information uncertainty regarding future performance (by recognizing future cash flow into current earnings), or through influencing firm-level earnings management activities. However, whether and how FVA affects stock price crash risk through these two channels have not been examined by the prior literature. To understand whether FVA could influence crash risk through these two channels in China's context, the next section introduces the relevant institutional background.

3.3 Institutional background

This section reviews the relevant institutional background. Section 3.3.1 summarises the accounting standards relating to financial instruments in China. Section 3.3.2 provides an overview of the characteristics of China's financial markets and financial instrument investment among the listed companies. Section 3.3.3 introduces the earnings management incentives and opportunities of the Chinese listed companies.

3.3.1 Accounting standards relating to financial instruments in China

Before the implementation of 2007 ASBE, the most recent accounting standards relating to financial assets were issued in 2001 (hereafter "2001 ASBE"). In the 2001 ASBE *Investment*, financial assets are classified as bond investment, equity investment and accounts receivable. These financial assets are measured at the lower of historical cost and market value (Guo et al. 2019). Specifically, business investments that a company expect to hold for less than one year are classified as short-term investments and are part of the current assets. Investments that a company expects to hold for more than one year are classified as long-term investments. Short-term investments are required to be recognized at purchase price. The investment's carrying value will be reduced when the company receives its dividend, and the difference between the selling price and book value of the short-term

investment is recognized as a gain or loss from investment. No fair value changes during the holding period are recognized under the 2001 ASBE. For the long-term investment, either equity model or cost model is required for the measurement of these assets and an impairment in the value of long-term investment will be recognized under certain circumstances[71].

To adapt to the rapid development of its capital markets, China constantly follows the international accounting standards to update its guidelines for financial instruments reporting. ASBE 22 *Recognition and Measurement of Financial Instruments* effective from 2007 (hereafter "2007 ASBE 22") is the first accounting standard for financial instruments, and it is substantially similar to IAS 39 *Financial Instruments: Recognition and Measurement*. Under the 2007 ASBE 22, financial assets are classified into four categories: fair value through profit or loss (FVTOPL)[72], available-for-sale (AFS) securities[73], held-to-maturity investments, and loans and receivables. Fair value measurement is applied on FVTOPL and AFS securities, and there are differences in the subsequent measurement of these two types of financial assets. The unrealised gains and losses of FVTOPL are recognised in profits and losses, while the changes in fair value of AFS securities are recognised in equity and transferred to profits and losses when the AFS securities are derecognised. AFS securities can also be measured by the cost method if the market prices and reliable fair values are not available (MOF 2006a).

In terms of the disclosure requirements, the unrealized fair value gains and losses from FVTOPL securities are reported in the income statement, as one component of the operating profits. The unrealized gains and losses from AFS securities are required to be presented in the equity statement as part of the comprehensive income in the 2007 ASBE (MOF 2006b). In 2009, the MOF issued the "Interpretation No. 3 of Accounting Standard for Business Enterprises", which requires companies to present OCI both in the income statement and in the statement of shareholders' equity. In addition, details of the OCI are required to be disclosed in the footnotes of the financial statements (MOF 2009, Ji 2017). The revised ASBE 30 *Presentation of Financial Statements* in 2014 further clarifies and explains how the components of OCI (including changes in the fair value of AFS securities) should to be presented in the income statement, with relevant details disclosed in the footnotes (MOF 2014c).

[71] See Guo et al. (2019) for more details about the requirements of 2001 ASBE.

[72] FVTOPL items have two sub-categories: held-for-trading (HFT) securities and securities designated at FVTOPL. See Fiechter and Novotny-Farkas (2017) for more discussions about the two groups of FVTOPL assets. FVTOPL assets usually include stock, funds, bonds and financial derivatives. In practice some financial derivatives are reported on the balance sheet independent of the FVTOPL securities. The separately reported financial derivatives assets and liabilities can be downloaded directly from CSMAR.

[73] Usually includes stocks and funds.

Problems such as highly subjective classification of financial assets; complexity in the measurement methods; lack of application guidance for particular transactions (e.g. asset securitizations) arise after the implementation of 2007 ASBE 22 (Guo et al. 2019). In response to these problems and to convergence with IFRS, the MOF issued a new ASBE 22 in 2017 (hereafter "2017 ASBE 22"). Under the 2017 ASBE 22[74], the financial investments should be measured at fair value and can be classified as either fair value changes recognized in profit and loss (FVTOPL), or fair value through other comprehensive income (FVTOCI). The initial classification is irrevocable. When a firm sells the FVTOCI assets, the unrealized fair value changes recognized in OCI are transferred to equity (as retained earnings) instead of to income (MOF 2017a). The 2017 ASBE 22 becomes effective for companies listed in overseas stock exchanges (including those listed both in the domestic and overseas stock exchanges, and those listed overseas only) beginning in 2018. Other domestic listed companies start using the new ASBE 22 in 2019, while other non-listed companies that use the ASBEs will start using the new standards in 2021. Despite the effective dates, early adoption of the new standards is encouraged (MOF 2017b).

3.3.2 Characteristics of China's financial asset markets and financial instrument investments of the listed companies

The fair value-measured financial assets comprise mainly of corporate shares, government and corporate bonds, and financial derivatives. The stock, bond and derivatives markets in China are relatively young and immature compared with those in the developed countries, but they are under rapid development in recent years. In terms of the stock market, the two stock exchanges, Shanghai (SHSE) and Shenzhen stock exchanges (SZSE) were established in 1990[75]. By 2019, the market capitalization of SHSE ranks the 4th largest while that of the SZSE ranks the 8th among the 144 stock exchanges in the world[76]. The stock market in China has experienced significant ups and downs after its establishment and the market index reached a height in 2007. However, during the 2007-2008 financial crisis, the market lost three quarters of its value. Due to the government's stimulus package, the market recovered slightly in 2009 but dropped again in 2010. In early 2015 the market value reached another peak, but a massive stock market crash followed in August 2015[77]. Overall, the

[74] Equivalent to IFRS 9 *Financial Instruments*.

[75] In addition to the main board companies traded in the two stock exchanges, there is a second-tier market for small and medium enterprises (opened in 2004); a third-tier market mainly for delisting firms, other over-the-counter transactions and for growth enterprises (launched in 2006); and a NASDAQ-style Growth Enterprises Market for private small and medium-sized hi-tech, electronic and pharmaceutical companies (opened in 2009). In July 2019, a new sci-tech innovation board (STAR market) started trading (Xinhua 2019). The prices of the small- and medium-cap stocks are argued to be more likely influenced by speculative trading than the large-cap stocks (Allen et al. 2013).

[76] Source: https://www.stockmarketclock.com/exchanges.

[77] See Appendix 3.1 for a comparison of the SHSE, SZSE, and the US Dow Jones Industrial average market indices.

China's stock market has been featured by prevalent speculative trading and high level of price volatility[78] (Allen et al. 2013).

The bond market, in terms of size, is smaller than the stock market in China, and it is the third largest in the world (O'Malia 2017). By June 2016, the total outstanding bonds in China reached 57.6 trillion yuan, with an annual growth rate of 43% (Zhang 2016). However, due to the lack of high-quality bond-rating agencies and accounting/auditing systems, the pricing system of the bond market is underdeveloped. The lack of a well-constructed yield curve also results in a lack of historical prices (Allen et al. 2013). Nevertheless, the infrastructures of the bond market are improving over the years and the development helps the advancement of the derivatives market.

The financial derivatives market is an important component of the modern financial system and it is still at the early stages of development in China[79] (O'Malia2017). Currently a number of derivate products are in use. The oldest form of derivatives is the commodity future, which was first traded in the Zhengzhou commodity futures market in 1990. There are also other risk management tools such as exchange rate forwards (launched in 1997), swaps and futures (launched during 2006-2007); interest rate derivatives; and equity derivatives (Yan 2010). An index future was launched in 2010 and 95 percent of the investment accounts in that year are opened by individual investors. While the target customers of the index future are those with hedging needs, the proportion of more sophisticated institutional investors is increasing over the years (Allen et al. 2013). These financial derivatives are used by both the financial and non-financial companies to hedge risk exposures but their proportions in the overall business is small.

Table 3.1 shows that the proportion of companies with fair value-measured financial items has been increasing since the adoption of fair value measurement in 2007. By the end of 2016, about 75.4% of the listed companies hold investments in financial assets. Specifically, about 87% (50%) of the financial (non-financial) companies have fair value-measured financial assets. Figure 3.1 illustrates the total amounts of fair value-measured assets and liabilities held by the Chinese listed companies during 2007-2016. There is a decreasing trend in the total value of fair value-measured liabilities during the ten-year period, while the total value of fair value-measured assets exhibits an opposite trend. Among the financial assets, AFS securities have the largest size and their total value increased from about RMB 3 billion yuan in 2007 to about 15 billion yuan in 2016.

[78] The figures in Appendix 3.2 show that the annualized average price volatility in SHSE and SZSE is about 30-40%, while the Dow Jones Industrial Average has an annualized average price volatility of about 20%.

[79] For example, the warrant was launched twice in 1992 and in 2005, but due to speculative trading and the resulting sharp rise and fall in prices, warrant trading was suspended in 1996 and 2011 respectively (Wang and Zhang 2012).

[Insert Figure 3.1 here]

[Insert Table 3.1 here]

Figure 3.2 illustrates the proportion of fair value-measured assets and unrealized fair value changes in total assets among the listed companies. The AFS securities account for the largest proportion in total assets compared with HFT securities and derivatives, and the financial companies have significantly more intensive investment in the financial instruments than the non-financial companies. For the unrealized fair value gains and losses, both financial and non-financial companies report negative net values in 2008, probability due to the influence of the financial crisis. Figure 3.3 shows that the proportions of unrealized fair value gains and losses in operating profits reach a peak for both financial and non-financial companies in 2008 (the year of financial crisis), and then largely remain within 10% in the following years. Table 3.2 presents the proportions of fair value-measured financial assets in total assets among companies with non-zero financial assets. On average, the financial (non-financial) companies have about 8.110% (0.394%) of HFT securities, 11.541% (2.734%) of AFS securities, and 0.077% (0.004%) of derivatives assets. The fair value-measured financial assets and liabilities on average account for about 20.413% (3.262%) of the total assets in financial (non-financial) companies.

[Insert Figure 3.2 here]
[Insert Figure 3.3 here]

[Insert Table 3.2 here]

3.3.3 Earnings management incentives and approaches of Chinese listed companies[80]

The China's capital markets are among one of the least transparent[81] in the world. The Chinese listed companies are influenced by political, legal and other institutional factors to maintain opacity. For example, the compensation of the government bureau officials does not relate much to firm performance, which reduces their incentives to make the right decisions. Moreover, the governments' conflicting roles as owner of the listed companies and capital market regulators weaken the

[80] This section reviews earnings management incentives and approaches shared by both the non-financial and financial companies in China. There are still limited empirical evidence on earnings management behaviours specific to the Chinese financial companies. See Zhu and Bao (2017) for a review of earnings management studies in Chinese financial companies.

[81] For example, China is reported as having the second highest synchronicity (i.e. the extent to which a firm's stock price co-move with that of the market, which is a measure of transparency) among the 40 sample countries in Morck et al. (2000), and its level of stock price synchronicity is reported as the highest in Jin and Myers (2006).

effectiveness of the enforcement of laws. The state-owned enterprises may have incentive to avoid reporting bad outcomes and to minimize the associated political costs. Due to weak corporate governance mechanisms (e.g. concentrated ownership), the managers may have incentives to hide expropriation and/or rent-seeking behaviour. The widespread related party-transactions[82], lack of institutional investors, weak investor protection, lack of effective legal enforcement due to lack of legal professionals and institutions, the small reputational penalty and legal sanctions against earnings management, also reduce the demand for transparent accounting information (Jiang et al. 2010, Jian and Wong 2010, Piotroski and Wong 2012, Hung et al. 2015). There is limited application of timely loss recognition among the Chinese firms (Ball et al. 2001, Bushman and Piotroski 2006). To achieve their accounting number targets, the listed companies are found to engage in both accruals-based and real transaction-based earnings management.

Some studies show that the Chinese companies are driven by the government's bright-line rules[83] to manage earnings. For example, Aharony et al. (2000) find that the median return on assets (ROA) of a sample of Chinese SOEs peaks in the initial public offering (IPO) year and decreases in the following years. This pattern of ROA performance is more significant among firms with weaker government support. The findings show that earnings-based IPO selection process is one driver of upward earnings management. In the context of rights issue, the seasoning equity offerings in China require a minimum level of return on equity (ROE) over the last three years. To meet these regulatory benchmarks, many Chinese listed companies manipulate earnings and report ROE around 0, 6% and 10% (e.g. Chen and Yuan 2004, Haw et al. 2004, Yu et al. 2006). Some studies examine tax-induced earnings management among the Chinese listed companies, and they find that a change in the tax rate drive firms to shift taxable income between different tax rate period (e.g. Lin et al. 2012). Welker et al. (2017) find that the Chinese companies are driven by the mandatory dividend payout regulation to manage accruals.

The delisting regulation and ST policy also contribute to Chinese companies' earnings management activities. According to the ST policy, the companies will be delisted if they report more than three consecutive losses. Jiang and Wang (2008) document that the Chinese listed firms use related party transactions to avoid reporting losses. Such opportunistic activities are particularly prevalent among state-owned enterprises, and in provinces with weak legal enforcement and lower level of marketisation. Liu and Lu (2007) investigate controlling shareholders' tunnelling activities among firms with delisting risk and they find that firms avoid reporting four consecutive losses have higher

[82] Such transactions are usually facilitated by the group structure of Chinese companies-the listed companies can initiate transactions with their unlisted parent companies to boost earnings (Jian and Wong 2010).

[83] The capital market regulator, China Securities and Regulatory Committee (CSRC), relies heavily on the bright-line accounting benchmarks to regulate companies because of limited resources (Chen and Yu 2018).

accruals than those failing to do so. Hu et al. (2012) also find that the Chinese companies manage accounting accruals to avoid reporting consecutive losses. Cheng et al. (2010) consider both accrual and real earnings management among the ST, PT (suspended) and delisted firms. They find that these firms substitute accrual management with asset restructuring to manage earnings.

The accounting standards on financial instruments which were effective from 2007 provide opportunities for earnings management through the initial measurement, sale, and subsequent reclassification of the financial assets. To reduce the volatility of the company's profits, the managers can re-classify AFS securities as long-term equity investment. With development of the economy and the capital markets, the number of listed companies and their investment in financial assets have increased rapidly particularly since 2014. To smooth earnings over time, the companies can classify the assets as AFS securities so that the unrealized fair value changes do not have to be recognized as part of the current period earnings (Guo et al. 2019). In addition, due to the extensive related party transactions, Chinese listed companies are likely to obtain AFS securities at low cost and they can achieve large gains when these AFS securities are mark-to-market. The gains are recognised when the companies sell AFS securities. Hence, managers can time the sale of AFS securities to manage earnings (He et al. 2012).

3.4 Hypotheses development

This section develops two sets of hypotheses relating to the research questions. Section 3.4.1 introduces the relevant theories. Section 3.4.2 discusses whether and how fair values of financial instruments relate to stock price crash risk in China. Section 3.4.3 discusses whether and how the unrealized fair value gains and losses relate to stock price crash risk in China.

3.4.1 Theories

3.4.1.1 Theories relating to market pricing and stock price crash risk

According to the efficient market hypothesis, the market prices reflect all available information (Fama 1970). Factors such as the disclosure practices of public companies, the activities and effectiveness of information intermediaries and information dissemination mechanisms, the arbitrage activities can all influence the extent of price efficiency (Piotroski and Wong 2012). In an efficient market, the security prices react rapidly to new information, firm-level residual returns will follow a random walk, display no serial correlation and minimal cross-sectional correlation. However, if there is systematic suppression of negative information, the distributions of market returns tend to be highly skewed to the left, and there is greater frequency of stock return crashes (Jin and Myers 2006, Chen et al. 2001). Specifically, Chen et al. (2001) argue that if bad news is not disclosed in a timely manner, when such information ultimately reaches the market, there will be a larger subsequent price reaction than when such information is disclosed instantaneously. Jin and Myers (2006) later show a negative association

between the level of information disclosure and the skewness of negative returns, indicating that the previously withheld news contributes to large stock prices crashes.

3.4.1.2 Theories relating to earnings management

Earnings management is defined as "purposeful intervention in the external financial reporting process, with the intent of obtaining some private gain", and it occurs when managers execute their discretions in financial reporting choices and transactions (Schipper 1989). Earnings management activities could bias the true underlying performance of the company and could thus affect outcomes of accounting number-based contracts, or to affect the short-term stock prices (Healy and Wahlen 1999). Depending on the extent to which managers' interests are aligned with those of the shareholders, earnings management can also signal long-term firm value (Scott 2015).

The positive accounting theory predicts that managers' accounting choices are influenced by contractual arrangements such as managerial compensation contracts and bond covenants (Watts and Zimmerman 1978). Hence managers have incentives to manage earnings to maximize their compensation and to avoid violating bond covenants. From the capital market perspective, the financial reporting decisions made by managers are driven by considerations for agency cost, information asymmetry and externalities that affect non-contracting parties (Fields et al. 2001). Based on the theories, current earnings management literature investigates the influence of three principal sets of motives on firms' earnings management behaviours: contracting motives, capital market motives, and third-party motives (Graham et al. 2005).

Research taking the contracting perspective examines how managers use different methods of earnings management to meet or beat earnings targets in executive compensation contracts and debt covenants (e.g. Daniel et al. 2008, Dechow et al. 2010). Capital market-based earnings management studies examine how managers adjust earnings to achieve favourable capital market outcomes such as meeting or beating analyst forecasts and prior year's earnings (e.g. Degeorge et al. 1999, Cheng et al. 2011, Doyle et al. 2013), and some study firms' earnings management behaviour in specific context such as IPOs and equity offerings (e.g. Teoh et al. 1998 a, b). While most contracting-based and capital market-based incentives lead to upward earnings management and earnings smoothing, incentives relating to third parties such as tax authorities, regulators and rival firms may lead to both upward and downward earnings management.

3.4.2 Fair value of financial instruments and stock price crash risk

The FVTOPL items are reported at their fair values on the balance sheet and the unrealized fair value gains and losses of FVTOPL assets and liabilities are reported in the income statement, as part of the

operating income[84]. On one hand, the recognition and disclosures of fair values may reflect firms' future cash flows in a timely manner, which reduce managers' ability to withhold bad news, improve firm transparency and facilitate investors' evaluation of firm values (Bleck and Liu 2007). In this situation, the adoption of fair value accounting and wide application of fair values in individual firms' financial reports are expected to be associated with lower risk of future stock price crash. On the other hand, there can be noises and bias in fair values due to illiquid market of assets and various managerial incentives (e.g. Dechow et al. 2010, He et al. 2012, Barth et al. 2017). The errors and biases are introduced into the balance sheet with the recognition of fair values, which further increase financial reporting opacity and impairs investors' ability to evaluate firm performance. In addition, because the core earnings and the related financial ratios are frequently used as the regulatory benchmarks in China[85], the listed companies have incentives to manage the FVTOPL's fair values when the unrealized value changes have the potential to violate the regulatory benchmarks. The downside risks contained in the fair values of FVTOPL items may reveal in the forward periods and lead to stock price crash. According to the theory of Jin and Myers (2006), there would be positive association between FVTOPL fair values and stock price crash risk in this context. Given the competing arguments, the first hypothesis is stated in the null form as:

Hypothesis 1a: The fair values of FVTOPL assets and liabilities do not relate to stock price crash risk in China.

Similar to FVTOPL items, the AFS securities are reported at fair value on the balance sheet, but the unrealized fair value gains and losses of these assets are not recognized as part of the operating profit (core earnings). The unrealized changes in AFS fair values are required to be presented in the equity statement before 2009, and such changes are required to be disclosed in the income statement, the statement of shareholders' equity, and in the footnotes during 2009-2013. Since 2014, the unrealized fair value changes and the related details are disclosed in the income statement and footnotes respectively. Because the core earnings rather than comprehensive income are used for regulatory monitoring and contracting purposes (e.g. CEO compensation, debt contracts), based on the earnings management theories, firms may have less incentives to manage the AFS fair values. Combing with the footnote disclosures, the reported value of AFS securities may be less subject to opportunistic bias and deliver timely information about future realized value of the financial assets. In this situation, there would be a negative association between AFS fair values and stock price crash risk.

[84] See Section 3.3.1 for more details about the accounting treatment and disclosure requirements for the fair value-measured assets and liabilities in China.
[85] See Section 3.3.3 for examples of regulations using accounting numbers as the benchmark.

However, the fair value estimates for AFS securities may also contain potentially unintentional bias and errors, as well as the noises inherent in financial instruments' market prices. Such noises in the fair values of AFS securities may reduce firm transparency and increase the likelihood of future crash risk. In addition, the classification of financial assets and timing of realizing fair value gains and losses depend entirely on managers' intention. The company can classify a significant amount of financial investments as AFS securities[86] if the fair value changes of these assets are expected to substantially affect current net profits. Moreover, if a company has the incentive to boost current profits, it can sell the AFS securities with fair value gains and to transfer these gains from OCI into current year earnings. Although ASBE 30 requires companies to classify investments with a holding period of less (more) than 12 months into FVTOPL (AFS) securities, many Chinese listed companies simply classify all investments as AFS securities (Sun et al. 2010). Such classification decision can reduce earnings volatility and provide managers with the opportunities to sell the assets at the right moment. The extent to which the opportunistic classification and sales of financial instruments influence the ability of AFS securities' fair values in affecting firm transparency and hence stock price crash risk is not clear.

Alternatively, many Chinese companies hold equities of business partners for the purpose of maintaining "good relationship" with their partners, rather than aiming at gaining profits from such assets (Zhang et al. 2010). These equities are usually categorized as AFS securities measured by fair value. Sometimes such AFS assets account for large proportion of total fair value-measured assets. Nevertheless, since the objective of holding such assets is not to mask firms' true performance, their fair values may not have a direct association with firm opacity and hence stock price crash risk. Accordingly, hypothesis 1b is stated as follows:

Hypothesis 1b: The fair values of AFS securities do not relate to stock price crash risk in China.

3.4.3 Unrealized fair value gains and losses, earnings management and stock price crash risk

According to the argument in Section 3.4.2, FVA may relate to stock price crash risk either directly through the information content of the reported fair values, or indirectly through real earnings management (opportunistic asset sales) induced by the recognition of unrealized fair value gains or losses into the income statement (Figure 3.4). If the unrealized fair value gains and losses appropriately reflect the changes in the present value of expected future cash flows, the fair value information is up-to-date and is useful for decision-making (Barth 2014). On the other hand, the changes in fair values can be transitory and incorporate short-term market movements that could

[86] See Appendix 3.3 for the proportion of AFS securities in total fair value-measured financial assets and liabilities.

reverse over time (Bratten et al. 2016). The incorporation of noisy asset prices can be prominent given the relatively immature nature of China's financial instruments markets. In this situation, the fair value changes could have little to do with the actual economic value changes of the assets and have limited ability to predict future performance (Chisnall 2011). The signs of the direct influence of unrealized fair value changes on stock price crash risk depend on the extent to which these values deliver useful or misleading information about future cash flows.

[Insert Figure 3.4 here]

Prior empirical studies provide evidence that the Chinese companies manage earnings to smooth unrealized fair gains and losses. For example, He et al. (2012) find earnings smoothing through selling AFS securities. Luo et al. (2018) show that the Chinese listed companies smooth earnings through investment income (realized from the sale of AFS securities, other financial assets and long-term equity investments, and profits or losses related to associates and joint ventures) after the implementation of new accounting standards in 2007. The stock price crash risk literature shows that earnings management relates to stock price crash risk (e.g. Cohen et al. 2014, Chen et al. 2017). Accordingly, it is possible that unrealized fair value gains and losses influence stock price crash risk through the real earnings management channel. The indirect effect of fair value changes on stock price crash risk may differ between FVTOPL and AFS securities. This is because the unrealized fair value gains and losses from AFS securities are not incorporated in the core earnings, thus the managers do not have incentive to manage earnings to reduce the impact of changes in AFS securities' fair values.

Current literature provides ambiguous evidence on the effect of earnings management on investor welfare. On the one hand, certain forms of earnings management (e.g. earnings smoothing and downward earnings management) may reduce earnings volatility and reduce investment risk. On the other hand, income increasing earnings management may hide bad performance of listed companies and is detrimental to investor welfare (Barth and Taylor 2010). If fair value-related earnings management activities facilitate the accumulation of bad news, and investors cannot see through such earnings management activities and detect the bad news, there is higher probability that the bad news may be released all at once in the future and thus lead to stock price crashes (Jin and Myers 2006). Accordingly, the hypotheses relating to the potential channels through which FVA relates to stock price crash risk are written in the null form as:

Hypothesis 2a: Unrealized fair value gains and losses from FVTOPL assets and liabilities do not relate to stock price crash risk in China.

Hypothesis 2b: Investment income does not mediate in the association between unrealized fair value gains and losses from FVTOPL financial items and stock price crash risk in China.

Hypothesis 2c: Realized gains and losses from AFS securities do not mediate in the association between unrealized fair value gains and losses from FVTOPL financial items and stock price crash risk in China.

3.5 Research design

Section 3.5.1 describes the sample and data source. Section 3.5.2 presents the model specifications and variables used to test the hypotheses.

3.5.1 Sample and data source

Table 3.3 presents the preliminary sample selection procedures. The initial sample includes all firm-year observations available in CSMAR during the period of 2007-2016. To avoid potential confounding factors relating to differences in accounting treatments, I remove firm-year observations with fair value-measured investment property assets and biological assets[87]. 2,670 firm-year observations that do not belong to the main board are removed to avoid potential confounding factors relating to the regulatory environment of the stock exchanges. To improve statistical power of the empirical tests, I remove 9,724 firm-year observations without fair value-measured assets and liabilities and 15 observations with missing balance sheet variables. The screening procedures result in 9,971 firm-year observations in the sample and the actual sample size in different tests varies due to the availability of different variables used in these tests. The unrealized fair value gains and losses from AFS securities are manually collected from the footnote disclosure item "Assets and liabilities measured by fair value"[88]. The realized gains and losses from the sale of AFS securities are hand-collected from the footnote disclosure relating to the income statement item "Investment gains/losses"[89]. The fair value hierarchy data used in the additional analyses is obtained from footnotes of companies' annual reports as described in the previous chapter. Other variables are obtained from CSMAR.

[Insert Table 3.3 here]

[87] The Chinese listed companies are allowed to choose between the fair value model and historical model to measure these two types of non-financial assets.

[88] The "Fair value changes from AFS securities" in CSMAR contains large number of missing data so I use the footnote disclosure instead.

[89] Footnote disclosures relating to "Investment gains/losses" and "Assets and liabilities measured by fair value" are available in CSMAR (Chinese version).

3.5.2 Model specifications

This section introduces the model specifications and variables used to test the hypotheses. Section 3.5.2.1 introduces the model used to test the association between financial instruments' fair values and stock price crash risk, Section 3.5.2.2 introduces the structural equations used to test the direct and indirect effects of unrealized fair value gains and losses on stock price crash risk. The crash risk measure and control variables used in the crash risk models are introduced in Section 3.5.2.3 and Section 3.5.2.4 respectively.

3.5.2.1 Financial instruments' fair values and stock price crash risk

The following pooled cross-sectional model is used to test whether the fair values of FVTOPL and AFS securities relate to the probability of firm-level stock price crash risk:

$$CRASH_{i,t+1} = \alpha_0 + \beta_1 FVTOPL_{i,t} + \beta_1 AFS_{i,t} + \beta_j \sum CONTROLS_{j,i,t(t+1)} + \varepsilon_{i,t} \quad (1)$$

Where:

$FVTOPL_{i,t}$ is the fair value of FVTOPL financial instruments for firm i in year t, including HFT securities and securities designated at FVTOPL asset and liabilities, divided by total assets in year t-1;

$AFS_{i,t}$ is the fair value of available-for-sale securities for firm i in year t, divided by total assets in year t-1.

3.5.2.2 Path analysis: Unrealized fair value gains and losses, earnings management and stock price crash risk

I use path analysis[90] to investigate the potential correlation between unrealized fair value gains and losses (the source/causal variable) and stock price crash risk (the outcome variable). Two sets of structural equations are used to investigate the direct and indirect (mediated) paths through which the unrealized fair value gains and losses from financial instruments influence stock price crash risk.

Investment income as one potential earnings management channel

The equations (2) and (3) investigate whether investment income is one potential channel through which the unrealized fair value gains and losses from financial instruments influence stock price crash risk. Equation (2) investigates whether there is earnings management through investment income. If the firms smooth earnings volatility induced by unrealized fair value gains and losses from FVTOPL items, a negative β_1 in equation (2) is expected[91]. Equation (3) tests the direct influence of investment income and unrealized fair value gains/losses on stock price crash risk. β_2 in equation

[90] See Bhattacharya et al. (2012) for more explanations for path analysis.

[91] When using the absolute value of unrealized fair value losses in equations (2) and (4), a positive β_1 indicates the smoothing of unrealized fair value losses.

(3) indicates the direct paths through which the unrealized gains and losses from FVTOPL influence stock price crash risk. The mediated path contains β_1 in equation (2) and β_2 in equation (3). β_1 in equation (2) links the source variable (URFVCTOPL) to the mediating variable (INVESTINCOME). β_1 in equation (3) links the mediating variable (INVESTINCOME) to the outcome variable (CRASH). The total mediated path coefficient between unrealized fair value gains and losses and stock price crash risk is the product of the path coefficient between unrealized fair value gains and losses and investment income, and the path coefficient between investment income and stock price crash risk.

$$INVESTINCOME_{i,t} = \alpha_0 + \beta_1 URFVCTOPL_{i,t} + \beta_2 NI\_IVINCOME\_FV_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 LEVER_{i,t} + \beta_5 CFO_{i,t} + \beta_6 WC_{i,t} + \sum \beta_k INDUS_{k,t} + \sum \beta_m YEAR_{m,t} + \varepsilon_{i,t} \quad (2)$$

$$CRASH_{i,t+1} = \alpha_0 + \beta_1 INVESTINCOME_{i,t} + \beta_2 URFVCTOPL_{i,t} + \beta_j \sum CONTROLS_{j,i,t(t+1)} + \varepsilon_{i,t} \quad (3)$$

Where:
INVESTINCOME is the investment income reported in the income statement divided by total assets;
URFVCTOPL is the unrealized gains and losses from FVTOPL items, divided by total assets;
CRASH is the stock price crash measure. See Section 3.5.2.3 for the calculation of this measure.

Following Luo et al. (2018) and He et al. (2012), the control variables for equation (2) include operating profits/losses net of investment income and unrealized fair value changes (NI_IVINCOME_FV), firm size (SIZE), leverage (LEVER), operating cash flows (CFO), working capital (WC), year and industry fixed effects(one-digit code of CSRC's industry definition in 2012). See Appendix 3.4 for variable definitions and Section 3.5.2.4 for the definition of control variables used in equation (3).

Sale of available-for-sale securities as one potential earnings management channel

To investigate whether AFS securities' sales mediate in the relation between unrealized fair value gains and losses and stock price crash risk, I further decompose investment income into realized gains/losses from AFS sales and other investment income. The following equations (4) and (5) investigate whether AFS sales is one potential channel through which the unrealized fair value gains and losses from financial instruments influence stock price crash risk. If the firms smooth unrealized fair value gains and losses from FVTOPL items through AFS sales, a negative β_1 in equation (4) is expected. The mediated path contains β_1 in equation (4) and β_2 in equation (5). β_1 in equation (4)

links the source variable (URFVCTOPL) to the mediating variable (AFSALE). β_2 in equation (5) links the mediating variable (AFSALE) to the outcome variable (CRASH). The total mediated path coefficient between unrealized fair value gains and losses and stock price crash risk is the product of the path coefficient between unrealized fair value gains and losses and income from selling AFS, and the path coefficient between realized gains and losses from the sales of AFS securities and stock price crash risk.

$$AFSALE_{i,t} = \alpha_0 + \beta_1 URFVCTOPL_{i,t} + \beta_2 OINVEST_{i,t} + \beta_3 NI\_AFSALE\_FV_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 LEVER_{i,t} + \beta_6 CFO_{i,t} + \beta_7 WC_{i,t} + \sum \beta_k INDUS_{k,t} + \sum \beta_m YEAR_{m,t} + \varepsilon_{i,t} \quad (4)$$

$$CRASH_{i,t+1} = \alpha_0 + \beta_1 AFSALE_{i,t} + \beta_2 URFVCTOPL_{i,t} + \beta_j \sum CONTROLS_{j,i,t(t+1)} + \varepsilon_{i,t} \quad (5)$$

Where:
AFSALE is realized gains and losses from AFS securities divided by total assets;
URFVCTOPL is the unrealized gains and losses from FVTOPL items, divided by total assets;
OINVEST is investment income other than those realized from AFS securities' sales, divided by total assets;
NI_AFSALE_FV is operating profits/losses net of sales of AFS securities and unrealized fair value changes;
CRASH is the stock price crash measure. See Section 3.5.2.3 for the calculation of this measure.
Other control variables in equation (4) are the same as those in equation (2). See Section 3.5.2.4 for the definition of control variables used in equation (5).

The roles of earnings management incentives in the stock price crash risk effect of unrealized fair value changes from FVTOPL securities

He et al. (2012) find that fair value changes-induced earnings management through the sale of AFS securities is more pronounced among firms that report negative fair value change in FVTOPL securities, and firms that would have reported negative net income without fair value changes from FVTOPL securities and AFS securities' sales. Accordingly, it is possible that the influence of unrealized fair value changes on stock price crash risk through earnings management (the indirect path) is more pronounced among these firms with incentives to reduce negative changes in FVTOPL items' fair values, and firms with incentives to avoid reporting a loss through AFS sales or other investment income. To examine the role of earnings management incentives, I further estimate the regressions for firms that report negative unrealized fair value changes and firms that would have reported an operating loss without unrealized fair value changes and investment income (or AFS securities' sales).

3.5.2.3 Measure of stock price crash risk

Following previous literature (e.g. Kim and Zhang 2016; Piotroski et al. 2015), the crash risk measure is estimated over the 12-month period ending 4 months after the fiscal year end to account for the effect of earnings release[92]. Daily firm and market returns are used to estimate the following model:

$$return_{i,t} = \alpha_0 + \beta_1 mr_t + \beta_2 mr_{t-1} + \beta_3 mr_{t-2} + \beta_4 mr_{t+1} + \beta_j mr_{t+2} + \varepsilon_{i,t}$$

$return_{i,t}$ is the daily return of firm i, mr_t is the market return at time t. The stock price crash risk measure NCSKEW is calculated using the residuals from annual, firm-specific estimations of the above model using firm i's daily returns in year t, higher value of NCSKEW corresponds to greater crash risk, and it is obtained from:

$$NCSKEW_{i,t} = \frac{-[n(n-1)^{\frac{3}{2}} \sum D_{i,t}^3]}{(n-1)(n-2)(\sum D_{i,t}^2)^{\frac{3}{2}}}$$

Where:

$D_{i,t}$ is the firm-specific daily returns of firm i in year t, and it is calculated as $D_{i,t}$=log (residual+1);

n is the number of trading days of firm i in year t.

3.5.2.4 Control variables in equations using stock price crash risk as the dependent variable

The control variables for equations using stock price crash risk as the dependent variable include return (RETURN), sigma (SIGMA), return skewness (NCSKEW), turnover (TURNOVER), leverage (LEVER), firm growth (GROWTH), return on assets (StdROA), book-to-market ratio (BTM), stock turnover (TURNOVER), firm size (SIZE), year and industry effects which are found to affect stock price crash risk by previous studies (e.g. Chen et al. 2001, Piotroki et al. 2015, Li and Zeng 2019).

Specifically, RETURN is the mean of firm-specific weekly stock returns and it is the first moment of stock returns. SIGMA is the standard deviation (volatility) of firm-specific weekly stock returns and it is the second moment of the stock returns. NCSKEW is the stock price crash risk in the current year and it is the third moment of the stock returns. These variables control for the potential persistence of the different moments of stock returns into future stock price crash risk (Chen et al. 2001, Li and Zeng 2019).

[92] Because the end of fiscal year is December 31 for all Chinese firms, $NCSKEW_t$ is measured from May, year t to April, year t+1. The control variables RETURN, SIGMA and TURNOVER are also calculated using data in the same time period as NCSKEW.

TURNOVER is the average weekly share turnover over fiscal year t. It represents the differences in opinions among investors. Firms with more heterogeneous investor opinions have higher probability of future stock price crashes (Chen et al. 2001). GROWTH is the sales growth rate in year t, measured as the natural logarithm of sales in year t divided by sales in year t-1. The growth potential and related research and development activities may have effects on stock price crash risk. SIZE is the natural logarithm of market capitalization at the end of year t. Larger firms may have more diverse operation and are less likely to experience dramatic stock price crash than smaller firms (Piotroski et al. 2015). Therefore, a negative coefficient is expected on SIZE. BTM is the book-to-market ratio. LEVER is the ratio of total debts to total assets. StdROA is the standard deviation of return on assets[93]. Theses variables are commonly controlled for in prior studies (e.g. Kim et al. 2011a, Piotroski et al. 2015, Li and Zeng 2019). Year and industry fixed effects are included to control for time-invariant and industry-invariant unobservable factors that would affect stock price crash risk. The standard errors in all model specifications are clustered at the firm level to adjust for within-firm correlations (Petersen 2009).

3.6 Empirical results

Section 3.6.1 presents the descriptive statistics, followed by univariate analyses in Section 3.6.2. Main findings are presented and discussed in Section 3.6.3. Results on the robustness checks and additional analyses are presented in Section 3.6.4 and Section 3.6.5 respectively.

3.6.1 Descriptive statistics

Table 3.4 presents descriptive statistics on the sample of Chinese listed firms. The sample firms tend to be large entities, with a mean market capitalization of 5.64 billion RMB yuan. The financial firms on average are larger than the non-financial firms in terms of market capitalization. The mean of the crash risk measure NCSKEW (-0.622) is comparable to that in Piotroski et al. (2015)[94], while the standard deviation is slightly higher (0.713). This indicates that there is greater variation in stock price crash risk across the Chinese listed companies during more recent years. The financial firms on average have higher stock price crash risk than the non-financial firms (-0.567 versus -0.625). There is also considerable variation in other variables, such as the size of FVTOPL items and AFS securities, unrealized fair value gains an losses, investor interest (TURNOVER), firm performance (RETURN and NI_IVINCOME_FV), and risk (SIGMA) across firm-years and across financial and non-financial industries.

[93] The results remain qualitatively similar when using return on assets as the control variable.

[94] The stock price crash risk measure in Piotroski et al. (2015) is based on daily stock returns of the Chinese listed companies during 1993 to 2011. The mean of NCSKEW in their paper is -0.63, and the standard deviation is 0.66.

[Insert Table 3.4 here]

3.6.2 Univariate analyses

Table 3.5 presents a correlation matrix for the variables used in the analyses. AFS securities display positive and statistically significant correlations with both measures of stock price crash risk, indicating potential crash risk effect relating to AFS securities' fair values. There are also significant association between the crash risk measures and several firm-level characteristics (e.g. SIGMA, RETURN, GROWTH, BTMA, SIZE, LEVER), indicating the importance of controlling for these firm-specific variables in the tests.

[Insert Table 3.5 here]

3.6.3 Main findings

3.6.3.1 Financial instruments' fair values and stock price crash risk

Table 3.6 reports the results estimated from the pooled cross-sectional estimations of equation (1). Columns (1) to (3) present the coefficients estimated respectively for all firms, financial and non-financial firms with available data on the estimation variables. Columns (4) and (5) present the coefficients estimated for financial and non-financial firms with unrealized fair value losses. The coefficient on AFS for financial firms is positive and significant at statistical level for financial firms, regardless of the directions of unrealized fair value changes. The results reject Hypothesis 1b and suggest that there is higher future stock price crash risk relating to AFS securities' values in financial firms, although this can be driven by either the information quality of the reported AFS securities' fair values or by potential selective trading of AFS securities. The coefficient on FVTOPL is positive and significant for non-financial firms, for all firms that report FVTOPL fair values (coefficient: 0.446, p-value<0.05) and for firms that report negative unrealized fair value changes (coefficient: 0.929, p-value<0.01). The results reject Hypothesis 1a and suggest that for the non-financial companies, either the information quality of reported FVTOPL fair values or potential opportunistic asset sales relating to changes in FVTOPL fair values are associated with higher stock price crash risk in the future.

In terms of the control variables, the signs of these variables are generally consistent with prior literature. For example, the negative coefficient on firm size suggests that large firms are less crash prone. The directions of the coefficients on TURNOVER, RETURN, GROWTH are consistent with Piotroski et al. (2015), while the directions of the coefficients on BTM, SIGMA, NCSKEW and LEVER are consistent with Kim et al. (2019).

[Insert Table 3.6 here]

3.6.3.2 Unrealized fair value gains and losses, earnings management and stock price crash risk

Table 3.7 presents the simultaneous equation model estimation results, which use investment income as the channel through which unrealized fair value gains and losses can influence stock price crash risk. Panel A shows that current year investment income positively relates to future crash risk. In particular, among firms with negative unrealized fair value changes, larger unrealized fair value losses relate to more investment income at statistically significant level (coefficient: 0.682, p-value<0.01), which further contribute to future stock price crash risk (path coefficient between investment income and NCSKEW: 0.585, p<0.05). The results reject hypothesis 2b that investment income does not mediate in the association between unrealized fair value gains and losses from FVTOPL financial items and stock price crash risk in China.

Panel B of Table 3.7 shows that there is a positive direct path coefficient between unrealized fair value gains/losses and future stock price crash risk among financial firms (coefficient: 2.031, p<0.05). Among financial firms that report unrealized fair value losses, there is a positive path coefficient between investment income and stock price crash risk, although the path coefficient between unrealized fair value gains/losses and investment income is not significant. For non-financial firms, there is a negative direct path coefficient between unrealized fair value gains/losses and future stock price crash risk (coefficient: 2.031, p<0.05). The results reject Hypothesis 2a that the unrealized fair value gains and losses from FVTOPL assets and liabilities do not relate to stock price crash risk in China. Combining with the positive coefficient between FVTOPL and crash risk as reported in Column (3) of Table 3.6, we may infer that some other firm-specific characteristics (e.g. management characteristics) correlate with the investments in FVTOPL financial assets and liabilities. Such characteristics positively relate to future crash risk and drive the positive association between FVTOPL and stock price crash risk.

[Insert Table 3.7 here]

Table 3.8 presents the simultaneous equation model estimates that use realized gains/losses from AFS securities' sales as the channel through which unrealized fair value gains and losses influence stock price crash risk. Panel A shows that unrealized fair value changes positively relate to realized gains/losses from AFS securities (coefficient: 0.125, p-value<0.05), and further contribute to future stock price crash risk (total mediated path coefficient: 0.215, p<0.1). The results reject hypothesis 2c that realized gains and losses from AFS securities do not mediate in the association between unrealized fair value gains and losses from FVTOPL financial items and stock price crash risk in China. The sales of AFS securities also positively relate to future crash risk among firms that report negative fair value changes, although there is no significant evidence that such sales relate to changes in unrealized fair value gains and losses.

Panel B of Table 3.8 shows that there is an positive association between unrealized fair value changes and stock price crash risk among the financial firms (coefficient: 1.711, p<0.05), and the positive association is primarily attributable to the direct link between unrealized fair value changes and stock price crash risk (coefficient: 1.712, p<0.05). When estimating the equations with the absolute value of fair value changes, the size of fair value changes becomes negatively relate to stock price crash risk, indicating that fair value gains and losses may have different influence on crash risk. For non-financial firms, Panel C of Table 3.8 shows that AFS securities' sales positively relate to future stock price crash risk, while the direct influence of unrealized fair value gains and losses on future stock price crash risk is negative and significant (coefficient: -1.946, p-value<0.05). The results are consistent with those reported in Panel C of Table 3.7. The standardized root mean square residual[95] (SRMS) of the estimations reported in Tables 3.7 and 3.8 ranges from 0.004 to 0.027, indicating that the models generally have a good fit.

[Insert Table 3.8 here]

3.6.4 Robustness checks: Alternative variables and samples

The above tests are re-estimated by using alternative measure of stock price crash risk, additional control variables and alternative sample firms. The alternative measure of stock price crash risk is the down-to-top volatility measure (DUVOL) of the crash likelihood. For each firm j over the year period t, firm-specific daily returns are separated into two groups: "down" days when the returns are below the annual mean, and "up" days when the returns are above the annual mean. The standard deviation of firm-specific daily returns is calculated separately for each of these two groups. DUVOL is the natural logarithm of the ratio of the standard deviation in the "down" days to the standard deviation in the "up" days:

$$DUVOL_{j.t} = log\{\frac{(n_u - 1)\sum_{Down} d_{j,t}^2}{(n_d - 1)\sum_{Up} d_{j,t}^2}\}$$

A higher value of DUVOL indicates greater crash risk. DUVOL does not involve third moments, therefore is less likely to be overly influenced by extreme daily returns (Chen et al. 2001).

To examine whether the results in Table 3.6 are sensitive to different control variables, I further add state ownership (STATE), stock exchange (EXCHANGE), and cross-listing (CROSS) as the control

[95] SRMR is the standardized difference between the observed correlation and the predicted correlation. It is an absolute measure of fit. A zero SRMR indicates perfect fit while a SRMR less than 0.08 can be considered as a good fit (Kenny 2015).

variables. STATE is the percentage of state-owned shares to total outstanding shares. The state-owned companies may be more likely to remain opaque to reduce political costs, or they may not have strong incentives to manipulate accounting numbers due to the availability of alternative financing sources (e.g. government subsidy or better access to bank loans). EXCHANGE is a dummy variable that equals one if the company is listed in Shanghai Stock Exchange, and zero otherwise. This variable controls for potential differences in regulatory environment between the different stock exchanges. CROSS is an indicator equals to one if a firm is cross listed in stock exchanges outside mainland China, and zero otherwise. The cross-listed firms may have better corporate governance and financial information quality (Piotroski et al. 2015). The results in Panel A of Table 3.9 show that AFS still positively relates to stock price crash in financial firms, while FVTOPL remains positively relate to crash risk in non-financial firms after adding the additional control variables and changing the crash risk measure.

Because some AFS securities are measured at historical cost, to reduce the influence of historical costs on the results reported in Table 3.6, I re-estimate equation (1) by using a sample of firms with non-zero unrealized fair value changes. The results reported in Panel B of Table 3.9 show that AFS is still positively associated with stock price crash risk in the financial firms.

To investigate whether the results in Tables 3.7 and 3.8 are influenced by extreme variables, I remove three observations with extreme high working capital (WC). The results in Panel C of Table 3.9 show that the main findings remain similar.

[Insert Table 3.9 here]

3.6.5 Additional analyses

To provide further evidence on the potential circumstances under which financial instruments' fair values relate to stock price crash risk, I conduct four additional analyses. Section 3.6.5.1 reports results on the association between different fair value estimation inputs and stock price crash risk. Section 3.6.5.2 reports results on the influence of regulatory benchmark on the crash risk effect of fair values. Section 3.6.5.3 reports results on the influence of asset market volatility on the crash risk effect of fair values. Section 3.6.5.4 examines whether there is difference in the crash risk effect of fair values among state-owned and non-state-owned firms.

3.6.5.1 Fair value estimation inputs and stock price crash risk

To examine whether there are differences in the stock price crash risk effect across different fair value estimation inputs, I decompose FVTOPL and AFS into the three levels of fair values (as described in Chapter 2). Due to the immature capital market in China, it is difficult to obtain reliable fair value

estimates for many financial instruments that lack active and liquid trading (e.g. equity investment in unlisted companies) (Guo et al. 2019). The managerial discretion involved in the model construction and parameter selection when estimating level 3 fair values could provide opportunities for earnings management. There has been evidence of profit inflation using fair value estimates in the Enron and WorldCom accounting scandals (Benston 2006). However, level 3 fair values could also be used to deliver useful private info rmation. If the level 3 fair values and the corresponding fair value gains and losses help companies withhold (reveal) bad news, we would expect higher (lower) stock price crash risk among firms influenced more by the level 3 fair values. There could also be no significant association between the fair values and stock price crash risk if such risk is primarily driven by factors not relating to accounting numbers.

The results in Table 3.10 show that level 1 FVTOPL fair values negatively relate to stock price crash risk while level 3 fair values for AFS securities positively relate to crash risk, both in the financial and non-financial firms. Among non-financial companies that report negative unrealized fair value changes, level 2 FVTOPL fair values negatively relate to stock price crash risk while level 3 fair values for both FVTOPL and AFS securities are positively associated future stock price crash risk. The findings suggest that the model-based fair values are more likely to contain noises and biases while the market-based level 1 and 2 fair values are more verifiable and transparent.

[Insert Table 3.10 here]

3.6.5.2 Regulatory benchmark and the crash risk effect of fair values

Section 3.3.3 shows that the Chinese listed companies have incentive to avoid reporting a loss to reduce the probability of being delisted. To examine whether the transparency of fair value estimates is influenced by the regulatory benchmark, I further add the interaction terms between fair value measured financial items and the earnings management incentives to equation (1). Specifically, FVAFSEM is an indicator variable that equals 1 if the firm-year reports operating profits, but with unrealized fair value losses and negative operating profits less realized gains from the sales of AFS. FVIVEM is an indicator variable that equals 1 if the firm-year reports operating profits, but with unrealized fair value losses and operating profits less investment income is negative.

Column (3) of Table 3.11 shows that among non-financial firms that reverse loss through sales of AFS securities, AFS is correlated with higher future stock price crash risk than other firms. The results may suggest that investors of non-financial companies still lack the ability to see through this type earnings management despite the disclosure requirements relating to AFS securities.

[Insert Table 3.11 here]

3.6.5.3 Market volatility and the crash risk effect of fair values

During periods of high market volatility (e.g. financial crisis and stock market crisis periods), it is possible that fair values deviate more from the historical costs and provide timely information about future firm value. It is also possible that the fair values during such periods contain more noise and short-term price volatility and reduce firm transparency. Column (1) of Table 3.12 shows that FVTOPL relates to higher future stock price crash risk during higher market volatility (i.e. year 2007-2009 and 2015) than lower market volatility periods, while Column (3) of the same table shows that AFS among the non-financial firms relate less to crash risk during the high volatility periods. The results suggest that the underlying accounting treatment of different financial assets may affect the information content of fair values.

[Insert Table 3.12 here]

3.6.5.4 State ownership and the crash risk effect of fair values

One prominent feature of the public sector in China is the dominance of state-ownership in most of the enterprises. The state-owned enterprises may be less focused on profit maximization and it has different compensation contracts from the non-state-owned enterprises, which may make them less likely to manage the accounting numbers. However, enterprises influenced more by state ownership may also be less motivated to provide timely and transparent financial information[96]. To explore whether state ownership influences the ability of fair values to provide useful information about future firm value, I add the interaction terms between state ownership and the fair value-measured financial instruments to equation (1). The results reported in Column (3) of Table 3.13 show that among the non-financial firms with higher proportions of state ownership, the fair values of FVTOPL assets and liabilities relate less to future crash risk than those with less state ownership. Column (4) of Table 3.13 shows that among the financial firms with higher proportions of state ownership, the fair values of AFS securities relate less to future crash risk than those with less state ownership. However, Column (5) shows that among the non-financial firms with higher proportions of state ownership and with the incentive to reverse negative unrealized fair value changes, the fair values of FVTOPL items relate more to future crash risk than those with less state ownership. The results suggest that the influence of state ownership on the crash risk effect of fair values may vary across different industries and the financial targets of the firms.

[Insert Table 3.13 here]

[96] See Chapter 4 Section 4.5.3 for the comparison between state-owned and non-state-owned enterprises in China.

3.7 Conclusion

The role of fair value accounting in excess market volatility has been of public policy and academic concern since the 2007-2008 global financial crisis. Using a sample of Chinese listed companies over the period 2007 to 2016, this study (1) examines whether fair value measured financial instruments relate to future stock price crash risk, (2) investigates whether the recognition of unrealized fair value gains and losses into current earnings contributes to future stock price crash risk, and (3) investigates whether investment income and AFS securities' sales mediates in the association between unrealized fair value changes and stock price crash risk.

The study finds that since 2014, there is a significant increasing trend among the Chinese listed companies (especially the non-financial firms) to invest in financial instruments, and there is a significantly higher proportion of AFS securities than other financial items in total fair value measured financial instruments. The fair values of AFS securities (FVTOPL items) positively relate to future stock price crash risk among the financial (non-financial) firms. According to the stock price crash risk theory by Jin and Myers (2006), the results suggest that there is bad news hoarding relating to the fair values of these assets. Further analyses show that the positive association between AFS securities and future stock price crash risk among the financial firms is likely to be driven by information uncertainty in fair value estimates. The positive association between FVTOPL securities and future stock price crash risk among the non-financial firms tends to be driven by firm characteristics correlated with the investment of FVTOPL securities. The path analyses show that there is some evidence of stock price crash risk induced by the incentives to reverse unrealized fair value losses through real asset transactions.

The findings of the study offer insights to capital market regulators, firms, investors and the academics. For capital market regulators in China, the findings suggest that more monitoring efforts should be paid on the quality of fair value estimates, especially among the financial firms. The opacity in the fair value estimates could impair market stability. For Chinese listed firms, the higher crash risk among firms that sell investment assets to reduce unrealized fair value losses indicates that there can be unfavourable market price consequences of such real earnings management activities. The companies may want to reduce such earnings management activities. The investors should also pay attention to the firms' fair value-induced real earnings management to avoid extreme losses.

For academics, the findings in this study show that the association between the balance sheet-based fair value exposure measures and capital market consequences may be driven by factors relating to investments in fair value measured items, rather than by fair value accounting itself. Future research using the balance sheet-based fair value exposure measure as a proxy for fair value accounting may need to be careful in interpreting the empirical results. Moreover, the study also highlights the need

for the fair value accounting research to examine the investor welfare consequences when trying to draw policy inferences. This is because the asset sales or other fair value-related earnings management may not necessarily worsen invest welfare and may not need to be strictly prevented. In addition, the significant increase in financial instruments' investment since the implementation of ASBE 39 in 2014 also highlights potential real effects of accounting regulations that may worth future academic research.

The study contributes to both the fair value accounting literature and stock price crash risk literature by exploring the potential association and reasons of the relationship between fair value accounting and stock price crash risk in a major emerging market. However, it should be noted that the findings are not conclusive in that some potential confounding factors such as accrual and real earnings management, and analyst forecast properties have not been included in the current analyses. Future research can provide more evidence on the circumstances under which fair values relate to excess stock price volatility. For example, the internal and external monitoring mechanisms such as institutional shareholding, auditors, and analyst coverage may influence the transparency of fair value estimates and the extent of earnings management relating to fair value-measured assets and liabilities. Future research can also explore whether and how the changes in disclosure and accounting requirements relating to financial assets (e.g. the recent implementation of new ASBE 22) affect the influence of FVA on stock price attributes.

The two empirical chapters so far have been focused on the capital market consequences of fair value measurement and accounting. To provide more comprehensive understanding of the implementation of FVA in China, the next chapter takes advantage of the accounting options allowed in the subsequent measurement of investment property to examine how institutional factors and firm-specific incentives affect the adoption of FVA.

Chapter 3 Figures

Figure 3.1 Net value of fair value-measured assets and liabilities held by Chinese listed companies (CNY yuan) during 2007-2016

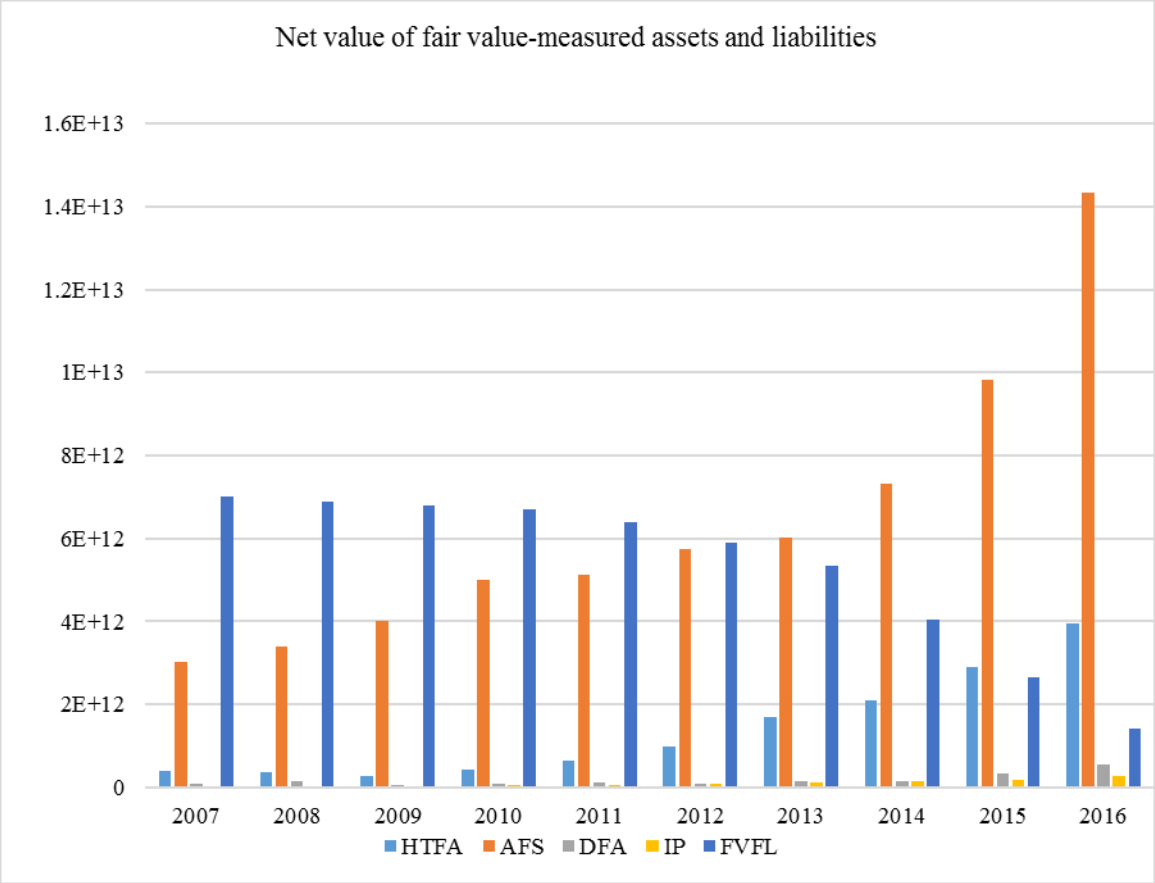
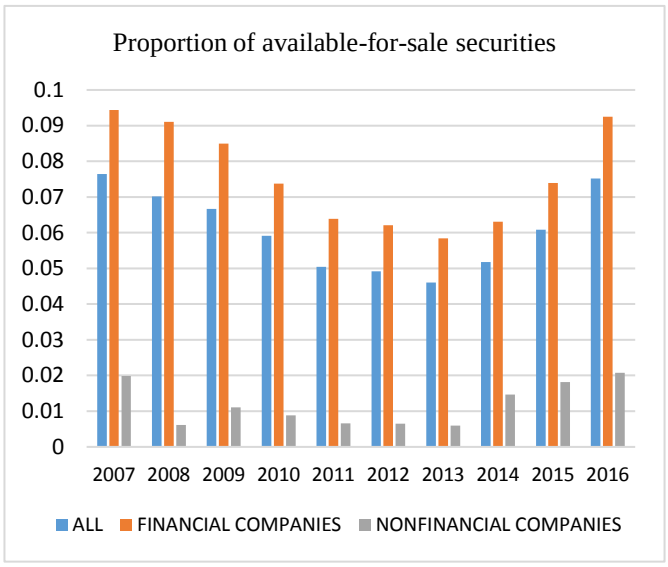
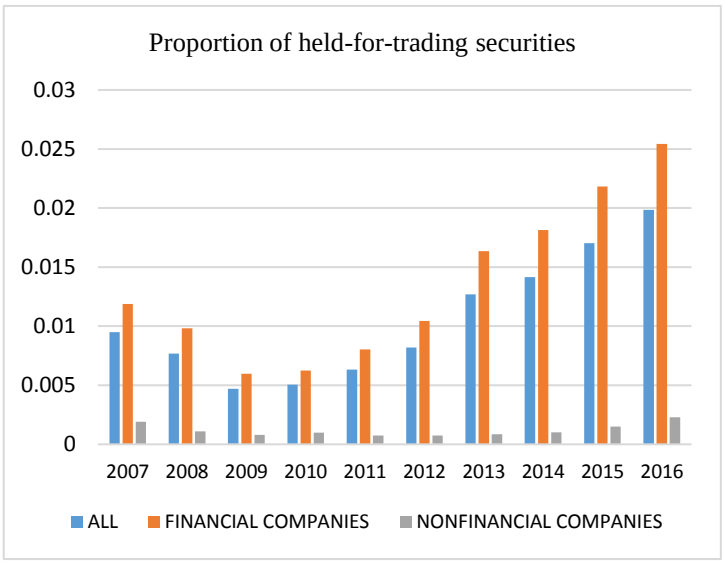
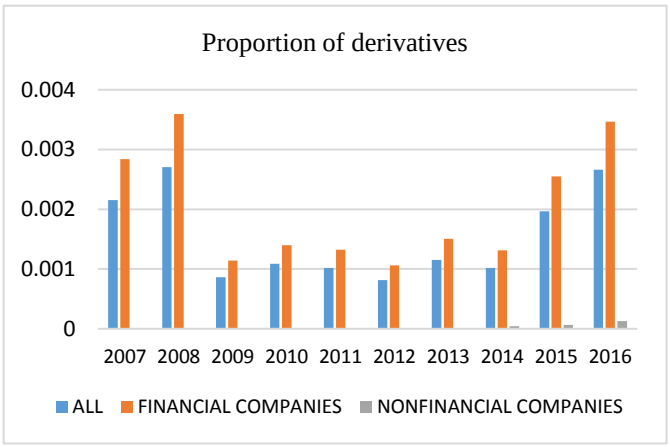
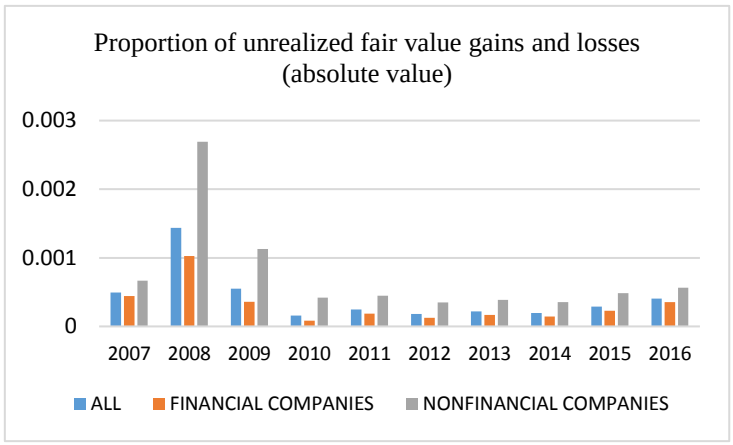


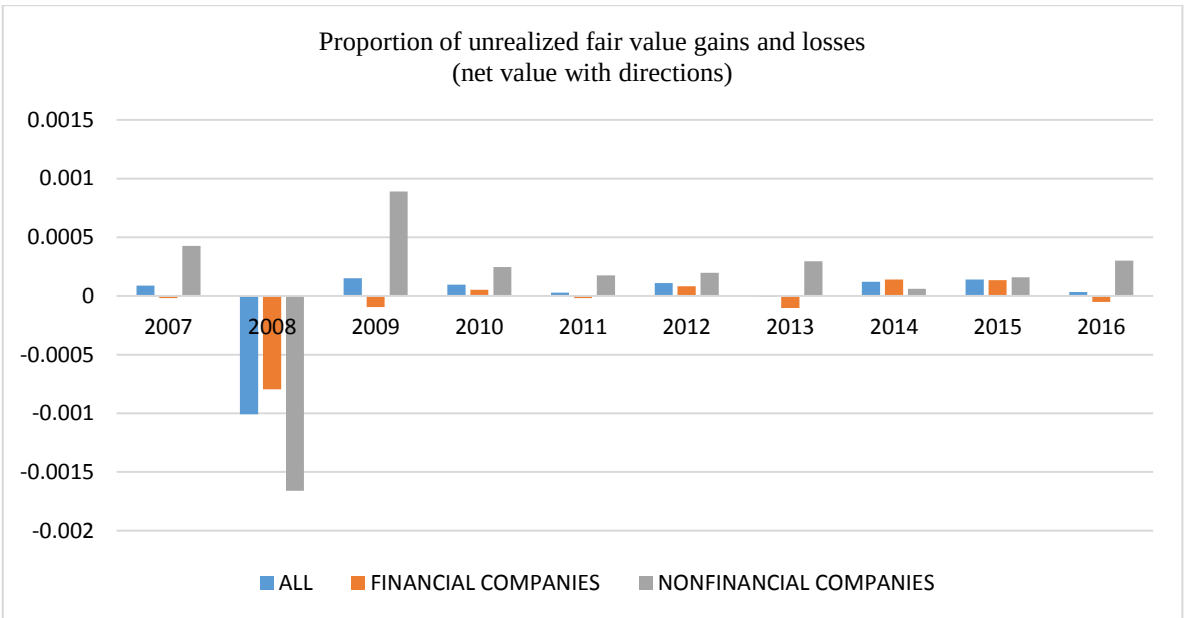
Figure 3.2 Relative percentage of fair value-measured financial assets and unrealized fair value gains and losses





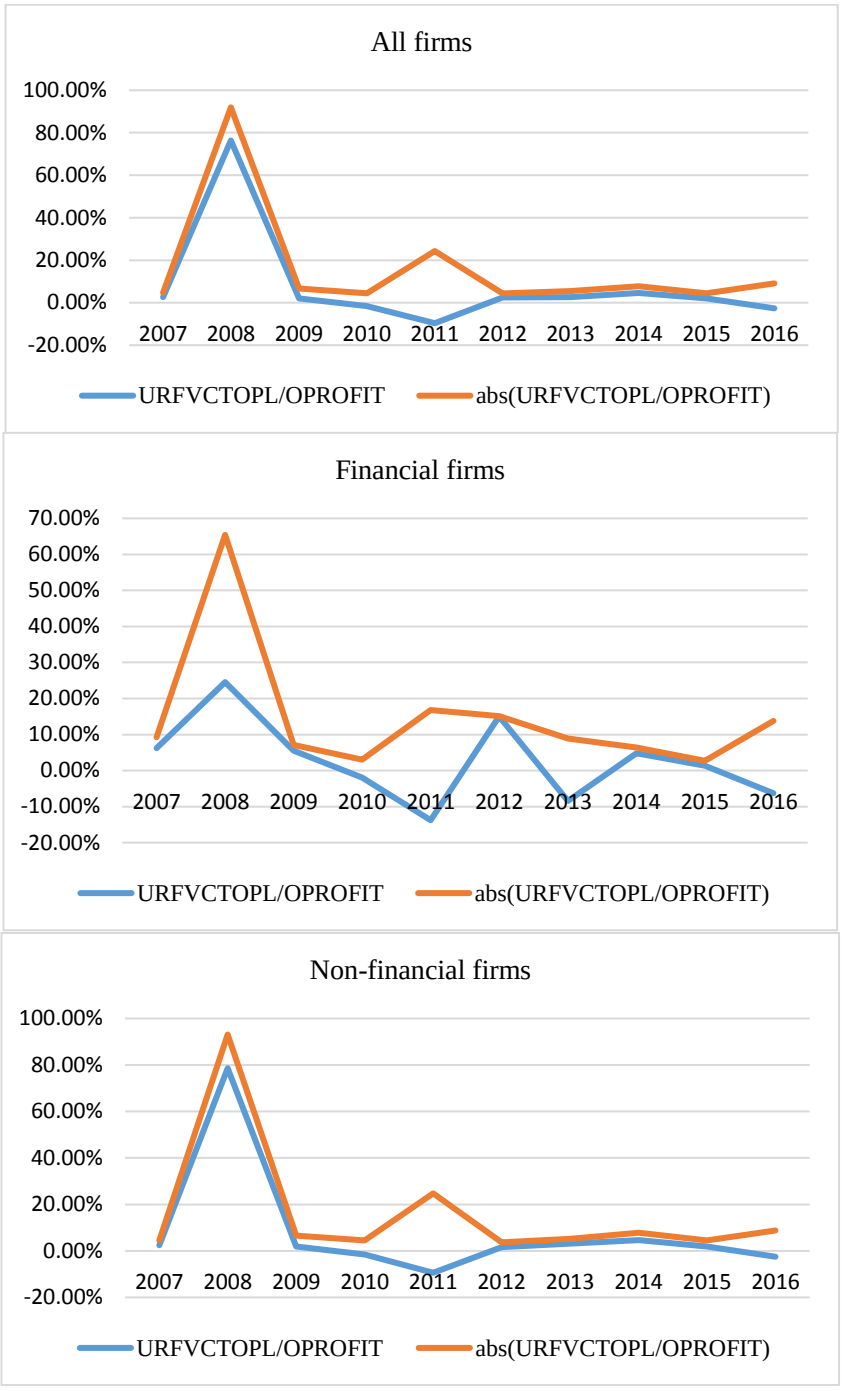






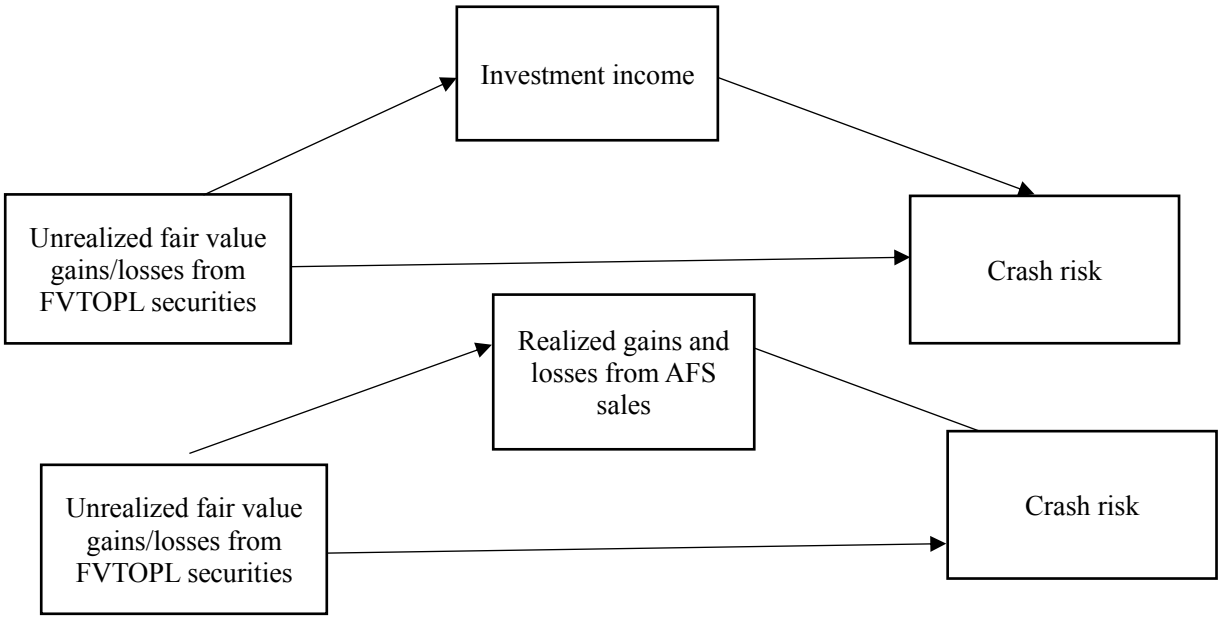
Note: the figures are drawn upon all data available in CSMAR during 2007-2016.

Figure 3.3 Mean percentage of unrealized fair value changes of FVTOPL items in total operating profits



URFVCTOPL is the unrealized fair value gains and losses of fair value-measured financial assets and liabilities (other than available-for-sale securities); OPROFIT is the operating profits/losses, abs(URFVCTOPL/OPROFIT) is the absolute values of unrealized fair value changes divided by the absolute value of the operating income.

Figure 3.4 The channels through which fair value accounting influences stock price crash risk



Note: Investment income includes gains and losses from the disposal or sale of available-for-sale securities, other financial assets and long-term equity investments, and profits or losses related to associates and joint ventures.

Chapter 3 Tables

Table 3.1 Number of companies having fair value-measured financial assets across different industries during 2007-2016

	2007		2008		2009		2010		2011		2012		2013		2014		2015		2016		Total		Percent
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	
A	6	24	9	25	10	27	7	32	9	32	7	34	8	35	26	35	30	37	31	37	143	318	44.969%
B	12	56	17	57	23	57	20	59	18	60	21	61	23	62	50	64	53	65	53	68	290	609	47.619%
C	286	831	315	871	312	932	338	1,103	388	1,206	384	1,252	420	1,267	922	1,322	1,002	1,395	1,081	1,516	5,449	11,696	46.589%
D	30	80	32	81	37	82	35	85	38	85	33	86	36	86	79	88	78	90	81	94	479	857	55.893%
E	20	42	21	42	24	49	20	54	24	60	23	62	21	63	46	63	56	70	64	81	319	586	54.437%
F	72	116	71	117	68	119	67	127	69	132	66	133	75	133	113	134	116	138	123	142	840	1,291	65.066%
G	29	66	32	67	28	68	33	73	34	74	33	76	32	77	59	77	64	80	67	83	411	741	55.466%
H	4	10	3	10	4	11	4	11	4	11	4	11	4	11	10	11	9	11	8	11	54	108	50.000%
I	21	50	20	56	24	63	25	77	27	83	25	83	25	83	65	84	71	88	80	99	383	766	50.000%
J	27	37	26	36	29	37	36	44	40	48	42	49	42	48	47	48	52	52	64	64	405	463	87.473%
K	55	120	58	119	57	119	55	119	45	118	44	115	40	112	84	110	81	106	81	104	600	1,142	52.539%
L	13	23	12	23	11	25	11	26	15	26	12	26	12	27	19	27	22	32	22	33	149	268	55.597%
M	2	4	2	4	1	4	2	6	1	6	1	6	1	6	7	12	8	13	11	18	36	79	45.570%
N	3	18	1	18	3	18	2	19	3	20	4	20	4	19	13	23	13	23	14	25	60	203	29.557%
P	0	2	0	2	0	2	0	2	0	2	0	2	0	2	1	2	1	3	3	3	5	22	22.727%
Q	1	4	2	4	2	4	2	4	2	4	2	4	4	4	2	4	3	4	4	4	24	40	60.000%
R	12	23	11	23	15	25	13	27	13	27	13	28	13	28	21	29	25	31	32	34	168	275	61.091%
S	12	24	16	24	14	23	14	23	14	23	12	23	15	23	20	23	20	23	19	22	156	231	67.532%
Total	605	1,530	648	1,579	662	1,665	684	1,891	744	2,017	726	2,071	775	2,086	1,584	2,156	1,704	2,261	1,839	2,439	9,971	19,695	50.627%
Percent	39.542%		41.039%		39.760%		36.171%		36.886%		35.056%		37.152%		73.469%		75.365%		75.400%		50.627%		

This table presents the number of Chinese listed companies that have fair value-measured items across different industries between 2007 and 2016. Column (1) shows the number of companies that have fair value-measured items, and Column (2) shows the total number of companies. The industry codes refer to the following: A: Agriculture, forestry, animal husbandry and fishery; B: Mining industry; C: Manufacturing industry; D: Industry of electric power, heat, gas and water production and supply; E: Construction industry; F: Wholesale and retail industry; G: Transport, storage and postal service industry; H: Accommodation and catering industry; I: Industry of information transmission, software and information technology services; J: Financial industry; K: Real estate industry; L: Leasing and commercial service industry; M: Scientific research and technical service industry; N: Water conservancy, environment and public facility management industry; O: Industry of resident service, repair and other services; P:Education; Q: Health and social work; R: Industry of culture, sports and entertainment; S: Diversified industries (2012 CSRC industry codes provided by CSMAR).

Table 3.2 Proportions of fair value-measured financial items, unrealized fair value changes and realized gains and losses from available-for-sale securities to total assets during 2007-2016

Panel A All firms with non-zero fair value-measured financial items, N=9,971

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Average
HFTA	0.759%	0.644%	0.619%	0.776%	0.886%	1.081%	1.027%	0.458%	0.572%	0.703%	0.707%
AFS	4.920%	2.140%	3.175%	3.183%	2.417%	2.555%	2.315%	2.832%	3.295%	3.609%	3.092%
DFA	0.002%	0.002%	0.001%	0.002%	0.002%	0.002%	0.006%	0.005%	0.010%	0.019%	0.007%
HFTL	0.021%	0.062%	0.058%	0.052%	0.128%	0.152%	0.240%	0.169%	0.177%	0.182%	0.143%
DFL	0.005%	0.003%	0.001%	0.002%	0.003%	0.002%	0.004%	0.008%	0.013%	0.026%	0.010%
Total	5.708%	2.852%	3.854%	4.015%	3.437%	3.792%	3.592%	3.471%	4.067%	4.539%	3.958%
URFVCTOPL	0.143%	-0.285%	0.095%	-0.004%	-0.074%	0.057%	0.018%	0.000%	0.001%	0.009%	-0.003%
RGAFS	0.088%	0.184%	0.438%	0.254%	0.242%	0.143%	0.200%	0.433%	0.226%	0.161%	0.222%

Panel B Financial firms (industry code "J") with non-zero fair value-measured financial items, N=405

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Average
HFTA	3.239%	6.082%	4.952%	5.186%	8.122%	11.181%	10.794%	7.068%	9.285%	10.088%	8.110%
AFS	13.316%	10.524%	10.475%	8.939%	9.051%	9.068%	8.767%	11.285%	14.186%	16.192%	11.541%
DFA	0.042%	0.062%	0.018%	0.041%	0.043%	0.026%	0.106%	0.069%	0.171%	0.110%	0.077%
HFTL	0.082%	0.015%	0.051%	0.096%	0.157%	0.109%	0.479%	0.827%	0.999%	1.827%	0.608%
DFL	0.113%	0.062%	0.020%	0.035%	0.044%	0.028%	0.061%	0.078%	0.170%	0.108%	0.078%
Total	16.791%	16.745%	15.517%	14.296%	17.416%	20.412%	20.208%	19.327%	24.812%	28.325%	20.413%
URFVCTOPL	0.499%	-1.377%	0.359%	-0.085%	-0.288%	0.451%	-0.217%	0.060%	0.075%	-0.169%	-0.051%
RGAFS	0.659%	0.788%	0.301%	0.394%	0.175%	0.027%	0.041%	0.174%	0.364%	0.242%	0.280%

Table 3.2 Panel C Non-financial firms with non-zero fair value-measured financial items, N=9,566

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Average
HFTA	0.644%	0.417%	0.420%	0.531%	0.475%	0.461%	0.467%	0.256%	0.298%	0.364%	0.394%
AFS	4.528%	1.790%	2.841%	2.863%	2.040%	2.156%	1.945%	2.573%	2.952%	3.156%	2.734%
DFA	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.003%	0.004%	0.016%	0.004%
HFTL	0.018%	0.064%	0.059%	0.050%	0.127%	0.155%	0.226%	0.149%	0.151%	0.122%	0.123%
DFL	0.000%	0.001%	0.000%	0.000%	0.000%	0.001%	0.001%	0.005%	0.008%	0.023%	0.007%
Total	5.190%	2.272%	3.320%	3.444%	2.643%	2.772%	2.639%	2.986%	3.414%	3.682%	3.262%
URFVCTOPL	0.126%	-0.238%	0.082%	0.000%	-0.062%	0.033%	0.031%	-0.001%	-0.001%	0.020%	0.000%
RGAFS	0.061%	0.148%	0.448%	0.242%	0.248%	0.154%	0.215%	0.452%	0.221%	0.158%	0.218%

Note: The proportions are calculated based on the 9,971 firm-year observations (See Table 3.3 below for sample selection procedures).

Table 3.3 Sample selection procedures

Firm-year observations between 2007 and 2016	22,806
Less: Firm-year observations with fair value-measured investment property assets	401
Firm-year observations with fair value-measured biological assets	25
Firm-year observations that do not belong to the main board	2,670
Firm-year observations with zero fair value-measured financial instruments	9,724
Firm-year observations with missing balance sheet variables	15
Number of sample firm-year observations	9,971

Note: the actual number of firm-year observations used in the empirical tests can vary due to availability of data for the variables used in each model specifications.

Table 3.4 Descriptive statistics

Panel A All firms

Variables	N	Mean	SD	p50	p25	p75	Min	Max
NCSKEW	9,925	-0.622	0.713	-0.605	-0.999	-0.227	-10.148	7.828
DUVOL	9,925	-0.225	0.183	-0.229	-0.347	-0.109	-1.735	1.284
FVTOPL	9,669	0.022	0.447	0.000	0.000	0.001	0.000	32.641
AFS	9,971	0.031	0.070	0.005	0.000	0.027	0.000	0.858
URFVCTOPL	8,816	0.000	0.017	0.000	-0.000	0.000	-0.379	1.047
SIGMA	9,940	0.073	0.056	0.061	0.047	0.090	0.013	3.084
RETURN	9,943	0.006	0.018	0.003	-0.002	0.011	-0.065	0.968
GROWTH	9,662	0.119	0.472	0.087	-0.048	0.230	-5.291	7.540
BTM	9,583	1.203	2.309	0.709	0.402	1.310	0.015	143.804
TURNOVER	9,943	0.134	0.111	0.108	0.062	0.173	0.000	1.144
SIZE	9,882	22.453	1.291	22.320	21.603	23.164	18.921	28.543
StdROA	9,667	0.044	0.261	0.019	0.010	0.037	0.000	10.673
LEVER	9,968	0.514	0.487	0.503	0.337	0.661	0.007	27.920
WC	9,518	0.402	17.886	0.160	-0.014	0.362	-73.047	1,713.067
CFO	9,659	0.113	5.284	0.048	0.003	0.100	-16.029	516.832
NI_AFS_FV	8,816	0.087	2.687	0.035	0.009	0.076	-2.157	250.720
NI_IVINCOME_FV	8,816	0.071	2.679	0.026	-0.000	0.064	-2.158	250.609
INVESTINCOME	9,668	0.017	0.098	0.004	0.000	0.015	-0.220	7.438
AFSALE	9,669	0.002	0.016	0.000	0.000	0.000	-0.045	1.125

Panel B Financial firms

Variables	N	Mean	SD	p50	p25	p75	Min	Max
NCSKEW	405	-0.567	0.652	-0.574	-0.927	-0.215	-3.522	2.968
DUVOL	405	-0.222	0.165	-0.234	-0.335	-0.109	-0.611	0.328
FVTOPL	370	0.321	1.962	0.042	0.010	0.207	0.000	32.641
AFS	405	0.115	0.116	0.077	0.047	0.143	0.000	0.807
URFVCTOPL	370	0.005	0.079	0.000	-0.001	0.001	-0.379	1.047
SIGMA	405	0.072	0.102	0.056	0.042	0.077	0.013	1.291
RETURN	405	0.005	0.022	0.001	-0.003	0.006	-0.044	0.240
GROWTH	370	0.191	0.594	0.152	-0.035	0.331	-1.850	5.021
BTM	395	5.191	6.063	1.893	0.844	9.268	0.078	22.026
TURNOVER	405	0.116	0.143	0.071	0.032	0.147	0.001	1.095
SIZE	401	24.404	1.815	24.506	23.000	25.751	20.375	28.255
StdROA	370	0.034	0.105	0.008	0.002	0.026	0.000	1.264
LEVER	405	0.728	0.227	0.789	0.600	0.931	0.020	0.978
WC	219	0.160	1.325	0.000	0.000	0.000	-1.842	17.389
CFO	370	0.153	2.265	0.023	-0.077	0.081	-16.029	30.991
NI_AFS_FV	370	0.135	0.918	0.023	0.016	0.050	-0.110	15.916

Table 3.4 Panel B continued

NI_IVINCOME_FV	370	0.070	0.512	0.016	0.007	0.026	-0.205	8.753
INVESTINCOME	370	0.074	0.440	0.017	0.001	0.038	-0.081	7.438
AFSALE	370	0.008	0.063	0.000	0.000	0.002	-0.026	1.125

Panel C Non-financial firms

Variables	N	Mean	SD	p50	p25	p75	Min	Max
NCSKEW	9,520	-0.625	0.716	-0.606	-1.002	-0.228	-10.148	7.828
DUVOL	9,520	-0.225	0.184	-0.229	-0.347	-0.109	-1.735	1.284
FVTOPL	9,299	0.010	0.227	0.000	0.000	0.001	0.000	20.950
AFS	9,566	0.027	0.065	0.004	0.000	0.022	0.000	0.858
URFVCTOPL	8,446	0.000	0.006	0.000	0.000	0.000	-0.105	0.224
SIGMA	9,535	0.073	0.053	0.061	0.047	0.091	0.015	3.084
RETURN	9,538	0.006	0.018	0.003	-0.002	0.011	-0.065	0.968
GROWTH	9,292	0.116	0.466	0.085	-0.048	0.226	-5.291	7.540
BTM	9,188	1.031	1.809	0.689	0.395	1.247	0.015	143.804
TURNOVER	9,538	0.135	0.109	0.109	0.064	0.173	0.000	1.144
SIZE	9,481	22.370	1.196	22.282	21.570	23.079	18.921	28.543
StdROA	9,297	0.044	0.266	0.020	0.011	0.038	0.000	10.673
LEVER	9,563	0.505	0.493	0.496	0.332	0.648	0.007	27.920
WC	9,299	0.408	18.094	0.166	-0.018	0.365	-73.047	1,713.067
CFO	9,289	0.111	5.369	0.049	0.005	0.101	-11.160	516.832
NI_AFS_FV	8,446	0.085	2.738	0.036	0.009	0.077	-2.157	250.720
NI_IVINCOME_FV	8,446	0.071	2.735	0.027	-0.000	0.066	-2.158	250.609
INVESTINCOME	9,298	0.015	0.047	0.003	0.000	0.014	-0.220	1.748
AFSALE	9,299	0.002	0.011	0.000	0.000	0.000	-0.045	0.231

Table 3.5 Pearson correlation table

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
NCSKEW	1.000																		
DUVOL	0.859***	1.000																	
FVTOPL	0.001	-0.002	1.000																
AFS	0.030***	0.041***	0.013	1.000															
URFVCTOPL	0.006	0.000	0.040***	0.008	1.000														
SIGMA	-0.039***	-0.061***	0.056***	0.005	0.072***	1.000													
RETURN	0.111***	0.063***	0.039***	-0.017*	0.042***	0.660***	1.000												
GROWTH	0.021**	0.007	0.139***	-0.034***	0.077***	0.054***	0.060***	1.000											
BTM	-0.059***	-0.062***	0.071***	0.032***	-0.011	-0.097***	-0.065***	0.052***	1.000										
TURNOVER	0.015	-0.003	0.064***	-0.021**	-0.003	0.381***	0.268***	0.003	-0.172***	1.000									
SIZE	-0.067***	-0.054***	-0.002	0.055***	-0.029***	-0.166***	-0.195***	0.010	0.273***	-0.428***	1.000								
StdROA	-0.008	0.007	0.015	-0.006	0.003	0.049***	0.043***	-0.033***	-0.032***	0.028***	-0.065***	1.000							
LEVER	-0.017*	-0.003	0.007	-0.029***	0.004	0.010	0.014	-0.048***	0.190***	-0.052***	0.039***	0.627***	1.000						
WC	-0.002	0.002	0.755***	-0.006	0.000	0.049***	0.040***	0.132***	-0.036***	0.082***	-0.014	0.012	-0.024**	1.000					
CFO	-0.002	0.000	0.447***	-0.005	0.057***	0.059***	0.048***	0.128***	-0.018*	0.081***	-0.014	0.020**	-0.006	0.983***	1.000				
NI_AFS_FV	-0.003	-0.001	0.528***	-0.005	0.025**	0.056***	0.047***	0.406***	0.008	0.085***	-0.012	0.020*	-0.009	0.995***	0.991***	1.000			
NI_IVINCOME_FV	-0.003	-0.002	0.505***	-0.008	0.012	0.053***	0.046***	0.430***	0.007	0.084***	-0.012	0.019*	-0.009	0.996***	0.993***	0.999***	1.000		
INVESTINCOME	0.009	0.004	0.664***	0.097***	0.349***	0.086***	0.048***	0.199***	0.026**	0.023**	-0.019*	0.021**	-0.002	0.028***	0.014	0.091***	0.056***	1.000	
AFSALE	0.016	0.015	0.209***	0.185***	0.087***	0.033***	0.022**	0.080***	0.030***	0.028***	-0.013	0.001	-0.005	-0.007	0.008	0.016	0.008	0.370***	1.000

t statistics in parentheses, ***, **, * denotes statistical significance at the 1%, 5% and 10 % level (two-tailed test), respectively.

Table 3.6 Fair value-measured financial instruments and stock price crash risk

	Dependent variable=$NCSKEW_{t+1}$				
	(1) All firms	(2) Financial firms	(3) Non-financial firms	(4) Financial firms & NFV=1	(5) Non-Financial firms & NFV=1
$FVTOPL_t$	-0.002	0.006	0.446**	0.049	0.929***
	(-0.259)	(0.498)	(2.327)	(1.481)	(3.342)
AFS_t	0.105	0.424*	0.064	1.216*	0.005
	(1.144)	(1.938)	(0.666)	(1.981)	(0.023)
$SIGMA_{t+1}$	3.034***	-3.018	2.937***	-5.077	2.850***
	(4.274)	(-0.911)	(4.035)	(-1.045)	(2.803)
$RETURN_t$	10.473***	7.067**	11.690***	17.025	11.901***
	(10.851)	(2.645)	(11.360)	(1.288)	(5.955)
$RETURN_{t+1}$	-4.511**	11.137	-4.766**	30.355**	0.720
	(-2.137)	(1.322)	(-2.227)	(2.330)	(0.283)
$NCSKEW_t$	0.151***	0.138***	0.151***	0.267***	0.118***
	(11.607)	(2.957)	(10.917)	(3.465)	(4.651)
$GROWTH_t$	-0.002	-0.019	-0.012	-0.149	-0.035
	(-0.148)	(-0.287)	(-0.833)	(-0.826)	(-1.167)
BTM_t	-0.014***	-0.014**	-0.029***	-0.013	-0.041***
	(-3.369)	(-2.310)	(-4.149)	(-1.120)	(-4.300)
$TURNOVER_t$	-0.618***	-0.690	-0.634***	0.791	-0.020
	(-4.811)	(-1.428)	(-4.775)	(0.798)	(-0.079)
$TURNOVER_{t+1}$	0.184	2.362***	0.136	0.903	-0.076
	(1.525)	(3.302)	(1.110)	(0.391)	(-0.283)
$SIZE_t$	-0.022**	0.071*	-0.028***	0.068	0.009
	(-2.567)	(1.899)	(-3.271)	(1.077)	(0.523)
$StdROA_t$	-0.015	0.364	-0.026	-1.701*	-0.032
	(-0.618)	(0.616)	(-1.223)	(-1.728)	(-0.404)
$LEVER_t$	0.075**	-0.016	0.086**	-0.212	0.062
	(2.189)	(-0.079)	(2.279)	(-0.912)	(0.826)
Constant	-0.246	-1.908*	-0.104	-2.371	-1.050***
	(-1.204)	(-1.813)	(-0.510)	(-1.386)	(-2.705)
Industry fixed effects	YES		YES		YES
Year fixed effects	YES	YES	YES	YES	YES
N	9325	364	8961	171	1915
R^2	0.147	0.167	0.159	0.293	0.144
adj. R^2	0.144	0.114	0.155	0.193	0.128

t statistics in parentheses, ***, **, * denotes statistical significance at the 1%, 5% and 10 % level (two-tailed test), respectively.

Table 3.7 The role of unrealized fair value gains and losses in the crash risk effect of financial item' fair values: Realized investment income as the path

	PATH=INVESTINCOME					
	All firms, Source variable=URFVCTOPL		All firms, Source variable=abs(URFVCTOPL)		NFV=1, Source variable=abs(URFVCTOPL)	
	Coef.	z-Stat	Coef.	z-Stat	Coef.	z-Stat
Panel A Full sample						
r[URFVCTOPL,NCSKEW]	-0.953	-1.320	0.378	0.500	0.911	1.230
Direct path						
p[URFVCTOPL,NCSKEW]	-1.039	-1.364	0.170	0.220	0.512	0.660
Mediated path						
p[URFVCTOPL,PATH]	0.285	1.106	0.703**	2.267	0.682***	2.923
p[PATH,NCSKEW]	0.304**	2.037	0.295**	1.978	0.585**	2.481
Total mediated path	0.086	0.950	0.208	1.480	0.399**	2.070
N. observations	8349		8349		2078	
SRMR	0.006		0.006		0.010	
CD	0.244		0.251		0.198	
Panel B Financial firms						
r[URFVCTOPL,NCSKEW]	1.244	1.180	-1.279	-0.97	2.750	0.640
Direct path						
p[URFVCTOPL,NCSKEW]	2.031**	2.030	-2.291***	-2.698	-1.416	-1.020
Mediated path						
p[URFVCTOPL,PATH]	-0.973***	-3.535	1.219**	2.245	0.818	1.052
p[PATH,NCSKEW]	0.809	0.563	0.830	0.576	5.094***	2.755
Total mediated path	-0.787	-0.630	1.011	0.570	4.167	1.060
N. observations	213		213		87	
SRMR	0.022		0.019		0.027	
CD	0.366		0.391		0.629	
Panel C Non-financial firms						
r[URFVCTOPL,NCSKEW]	-1.728*	-1.940	0.630	0.540	2.237*	1.670
Direct path						
p[URFVCTOPL,NCSKEW]	-1.897**	-2.087	0.389	0.323	2.099	1.560
Mediated path						
p[URFVCTOPL,PATH]	0.502	1.612	0.771**	2.389	0.371**	2.230
p[PATH,NCSKEW]	0.335**	2.160	0.313**	2.037	0.373*	1.765
Total mediated path	0.168	1.270	0.241	1.530	0.138	1.490
N. observations	8136		8136		1991	
SRMR	0.007		0.007		0.010	
CD	0.251		0.255		0.194	

Table 3.8 The role of unrealized fair value gains and losses in the crash risk effect of financial items' fair values: Realized gains and losses from available-for-sale securities' sales as the path

	PATH=AFS SALES					
	All firms, Source variable=URFVCTOPL		All firms, Source variable=abs(URFVCTOPL)		NFV=1, Source variable=abs(URFVCTOPL)	
	Coef.	z-Stat	Coef.	z-Stat	Coef.	z-Stat
Panel A Full sample						
r[URFVCTOPL,NCSKEW]	-0.942	-1.320	0.371	0.490	0.883	1.240
Direct path						
p[URFVCTOPL,NCSKEW]	-1.157	-1.579	0.287	0.370	0.970	1.392
Mediated path						
p[URFVCTOPL,PATH]	0.125**	2.504	0.051	0.848	-0.020	-0.952
p[PATH,NCSKEW]	1.719**	2.490	1.657**	2.392	4.372***	3.589
Total mediated path	0.215*	1.870	0.084	0.840	-0.087	-0.890
N. observations	8349		8349		2078	
SRMR	0.004		0.004		0.006	
CD	0.122		0.116		0.161	
Panel B Financial firms						
r[URFVCTOPL,NCSKEW]	1.711**	2.310	-1.947***	-3.280	1.857	0.790
Direct path						
p[URFVCTOPL,NCSKEW]	1.712**	2.312	-1.955***	-3.245	0.473	0.429
Mediated path						
p[URFVCTOPL,PATH]	0.005	0.054	-0.032	-0.350	-0.641	-1.593
p[PATH,NCSKEW]	-0.203	-0.114	-0.253	-0.138	-2.158	-0.734
Total mediated path	-0.001	-0.040	0.008	0.120	1.384	0.810
N. observations	213		213		87	
SRMR	0.014		0.014		0.024	
CD	0.198		0.200		0.509	
Panel C Non-financial firms						
r[URFVCTOPL,NCSKEW]	-1.727*	-1.950	0.632	0.540	2.194	1.630
Direct path						
p[URFVCTOPL,NCSKEW]	-1.946**	-2.141	0.410	0.336	2.195	1.637
Mediated path						
p[URFVCTOPL,PATH]	0.115*	1.917	0.123*	1.932	0.000	-0.020
p[PATH,NCSKEW]	1.898***	2.699	1.813**	2.557	4.439***	3.488
Total mediated path	0.219*	1.650	0.222*	1.680	-0.002	-0.020
N. observations	8136		8136		1991	
SRMR	0.004		0.004		0.005	
CD	0.126		0.126		0.160	

***, **, * denotes statistical significance at the 1%, 5% and 10 % level (two-tailed test), respectively. r[URFVCTA,NCSKEW] represents the total effects of unrealized fair value gains and losses on future stock price crash risk, p[a,b] represents the direct effects of variable a on variable b. SRMR is the standardized root mean square residual. CD is the coefficient of determination.

Table 3.9 Robustness checks
Panel A Alternative variables

	Dependent variable=$DUVOL_{t+1}$				
	(1) All firms	(2) Financial firms	(3) Non-financial firms	(4) Financial firms & NFV=1	(5) Non-Financial firms & NFV=1
$FVTOPL_t$	-0.002	-0.003	0.203***	0.003	0.278***
	(-0.242)	(-0.290)	(2.731)	(0.441)	(3.254)
AFS_t	0.021	0.116*	0.006	0.139	-0.043
	(0.721)	(1.763)	(0.196)	(1.243)	(-0.819)
$GROWTH_t$	0.001	0.006	-0.002	0.010	-0.006
	(0.221)	(0.281)	(-0.395)	(0.216)	(-0.935)
BTM_t	-0.005***	-0.003*	-0.012***	-0.005*	-0.012***
	(-2.676)	(-1.941)	(-4.195)	(-1.820)	(-4.115)
$TURNOVER_t$	-0.048	-0.203	-0.050	-0.055	0.102
	(-1.478)	(-1.329)	(-1.463)	(-0.231)	(1.622)
$TURNOVER_{t+1}$	-0.038	0.678**	-0.062*	0.581	-0.123*
	(-1.177)	(2.161)	(-1.908)	(1.171)	(-1.713)
$SIZE_t$	-0.022***	0.023**	-0.025***	0.013	-0.012***
	(-8.144)	(2.402)	(-9.273)	(1.005)	(-2.725)
$StdROA_t$	0.010	0.146	0.006	-0.643*	0.002
	(0.782)	(0.754)	(0.597)	(-1.779)	(0.096)
$LEVER_t$	0.028*	-0.005	0.037**	0.016	-0.013
	(1.784)	(-0.069)	(2.278)	(0.175)	(-0.613)
$STATE_t$	-0.009	-0.010	-0.008	-0.016	-0.014
	(-1.195)	(-0.817)	(-0.934)	(-0.701)	(-1.236)
$CROSS_t$	-0.018*	0.050	-0.017*	0.269***	-0.022
	(-1.943)	(1.232)	(-1.931)	(3.094)	(-1.354)
EXCHANGE	0.095***	0.060***	0.096***	0.075***	0.081***
	(20.225)	(2.854)	(20.083)	(2.954)	(9.671)
Constant	0.207***	-0.833***	0.267***	-0.573*	0.012
	(3.299)	(-3.584)	(4.293)	(-1.882)	(0.115)
N	8033	341	7692	173	1967
R^2	0.188	0.228	0.202	0.372	0.201
adj. R^2	0.185	0.178	0.198	0.285	0.186

t statistics in parentheses, ***, **, * denotes statistical significance at the 1%, 5% and 10 % level (two-tailed test), respectively.

Table 3.9 Robustness checks (continued)
Panel B Sample firms with non-zero changes in unrealized fair value gains and losses

	Dependent variable=$NCSKEW_{t+1}$					
	(1) All firms	(2) Financial firms	(3) Non-financial firms	(4) All firms	(5) Financial firms	(6) Non-financial firms
$FVTOPL_t$	-0.003	0.000	-0.044	-0.002	0.016	0.441**
	(-0.526)	(0.051)	(-0.469)	(-0.219)	(1.246)	(2.031)
AFS_t	0.248	0.743**	0.151	0.185	0.445*	0.105
	(1.575)	(2.550)	(0.824)	(1.232)	(1.801)	(0.618)
$SIGMA_{t+1}$				3.703***	-2.082	3.712***
				(3.614)	(-0.628)	(3.364)
$RETURN_t$				9.257***	8.801***	11.556***
				(7.453)	(3.265)	(7.970)
$RETURN_{t+1}$				-1.675	9.682	-2.396
				(-0.626)	(1.151)	(-0.857)
$NCSKEW_t$				0.128***	0.132***	0.129***
				(7.934)	(2.965)	(7.199)
$GROWTH_t$				-0.003	-0.075	-0.019
				(-0.160)	(-1.148)	(-0.917)
BTM_t				-0.012***	-0.013**	-0.029***
				(-3.154)	(-2.161)	(-3.361)
$TURNOVER_t$				-0.592***	-0.445	-0.604***
				(-3.227)	(-0.945)	(-3.043)
$TURNOVER_{t+1}$				0.144	2.171***	0.030
				(0.828)	(2.914)	(0.171)
$SIZE_t$				-0.009	0.068*	-0.019
				(-0.733)	(1.739)	(-1.532)
$StdROA_t$				0.075*	-1.425**	0.071*
				(1.932)	(-2.585)	(1.696)
$LEVER_t$				0.048	-0.143	0.075
				(0.849)	(-0.639)	(1.250)
Constant	-0.497***	-0.416***	-0.498***	-0.573**	-1.789	-0.345
	(-4.987)	(-3.877)	(-4.982)	(-2.073)	(-1.643)	(-1.220)
Industry fixed effects	YES		YES	YES		YES
Year fixed effects	YES	YES	YES	YES	YES	YES
N	4627	360	4267	4511	357	4154
R^2	0.083	0.118	0.094	0.130	0.189	0.151
adj. R^2	0.077	0.090	0.089	0.123	0.135	0.144

t statistics in parentheses, ***, **, * denotes statistical significance at the 1%, 5% and 10 % level (two-tailed test), respectively.

Table 3.9 Robustness checks (continued)
Panel C Remove extreme variables

	PATH=INVESTINCOME		PATH=AFS SALES	
	All firms, Source variable=URFVCTOPL		All firms, Source variable=URFVCTOPL	
	Coef.	z-Stat	Coef.	z-Stat
Panel A Full sample				
r[URFVCTOPL,NCSKEW]	-0.968	-1.360	-0.928	-1.310
Direct path				
p[URFVCTOPL,NCSKEW]	-0.991	-1.332	-1.097	-1.517
Mediated path				
p[URFVCTOPL,PATH]	0.094	0.374	0.113**	2.532
p[PATH,NCSKEW]	0.242*	1.684	1.493**	2.160
Total mediated path	0.023	0.360	0.169*	1.740
N. observations	8348		8348	
SRMR	0.005		0.004	
CD	0.261		0.111	
Panel B Non-financial firms				
r[URFVCTOPL,NCSKEW]	-1.722*	-1.920	-1.715*	-1.940
Direct path				
p[URFVCTOPL,NCSKEW]	-1.826**	-2.034	-1.892**	-2.106
Mediated path				
p[URFVCTOPL,PATH]	0.457*	1.720	0.114**	2.022
p[PATH,NCSKEW]	0.227	1.561	1.563**	2.219
Total mediated path	0.103	1.180	0.177	1.570
N. observations	8135		8135	
SRMR	0.005		0.004	
CD	0.274		0.118	

The table reports results of path analyses after removing three firm-year observations with extreme WC values. ***, **, * denotes statistical significance at the 1%, 5% and 10 % level (two-tailed test), respectively.

Table 3.10 Fair value estimation inputs and stock price crash risk

	Dependent variable=$NCSKEW_{t+1}$				
	(1) All firms	(2) Financial firms	(3) Non-financial firms	(4) Financial firms & NFV=1	(5) Non-Financial firms & NFV=1
$L1FVTOPL_t$	-0.038***	-0.006	0.150	-0.107	-0.270
	(-4.311)	(-0.218)	(0.880)	(-1.526)	(-0.562)
$L2FVTOPL_t$	-0.137	-0.230	-1.471	0.456	-17.368**
	(-1.102)	(-0.649)	(-1.410)	(0.630)	(-2.313)
$L3FVTOPL_t$	-0.254	-0.319	1.296	0.534	18.676**
	(-0.804)	(-0.500)	(0.952)	(0.304)	(2.515)
$L1AFST_t$	-0.014	0.092	-0.057	0.817	0.059
	(-0.209)	(0.200)	(-0.651)	(1.124)	(0.239)
$L2AFST_t$	0.267	0.341	0.571	0.469	0.643
	(1.277)	(0.605)	(1.413)	(0.271)	(0.983)
$L3AFST_t$	0.171***	0.915*	0.103**	1.562	0.149***
	(2.856)	(1.771)	(2.283)	(0.738)	(3.392)
$SIGMA_{t+1}$	4.419***	-5.406	4.146***	-12.365**	3.956**
	(4.638)	(-1.150)	(4.220)	(-2.046)	(2.341)
$RETURN_t$	7.415***	25.459***	8.328***	62.500***	11.490***
	(4.006)	(2.927)	(4.253)	(2.782)	(3.166)
$RETURN_{t+1}$	-7.076***	18.285	-7.688***	47.659**	-9.029*
	(-2.769)	(1.414)	(-2.965)	(2.629)	(-1.958)
$NCSKEW_t$	0.125***	0.147	0.135***	0.213**	0.040
	(4.474)	(1.638)	(4.545)	(2.099)	(0.740)
$GROWTH_t$	0.005	-0.110	-0.022	0.176	-0.131*
	(0.152)	(-0.761)	(-0.671)	(0.538)	(-1.934)
BTM_t	-0.012**	-0.013	-0.038**	-0.034**	-0.062**
	(-2.040)	(-1.656)	(-2.342)	(-2.108)	(-2.374)
$TURNOVER_t$	-0.905***	0.224	-0.862***	5.588**	-0.551
	(-3.670)	(0.168)	(-3.455)	(2.125)	(-1.107)
$TURNOVER_{t+1}$	-0.048	1.927	-0.204	-2.493	0.142
	(-0.183)	(1.245)	(-0.765)	(-0.866)	(0.308)
$SIZE_t$	-0.046**	0.036	-0.061***	0.079	-0.022
	(-2.440)	(0.842)	(-3.124)	(1.341)	(-0.620)
$StdROA_t$	0.095*	-0.449	0.043	6.816***	-0.025
	(1.681)	(-0.592)	(0.789)	(2.914)	(-0.133)
$LEVER_t$	0.015	-0.274	0.075	-0.040	-0.013
	(0.164)	(-0.829)	(0.746)	(-0.052)	(-0.073)

Table 3.10 continued

Constant		0.321	-0.334	0.271	-1.288	-0.442
		(0.633)	(-0.289)	(0.487)	(-0.722)	(-0.418)
Industry effects	fixed	YES		YES		YES
Year effects	fixed	YES	YES	YES	YES	YES
N		2367	234	2133	108	632
R^2		0.174	0.269	0.200	0.502	0.203
adj. R^2		0.159	0.177	0.185	0.343	0.154

t statistics in parentheses, ***, **, * denotes statistical significance at the 1%, 5% and 10 % level (two-tailed test), respectively.

Table 3.11 Regulatory benchmark and financial instruments' fair values

	Dependent variable=$NCSKEW_{t+1}$					
	(1) All firms	(2) Financial firms	(3) Non-financial firms	(4) All firms	(5) Financial firms	(6) Non-financial firms
$FVTOPL_t$	-0.003	0.003	0.391**	-0.003	0.006	0.398**
	(-0.419)	(0.214)	(2.092)	(-0.415)	(0.413)	(2.095)
AFS_t	0.126	0.354	0.066	0.123	0.255	0.079
	(1.096)	(1.494)	(0.543)	(1.033)	(0.913)	(0.632)
$FVTOPL_t \times FVAFSEM_t$	0.097		-0.614**			
	(0.363)		(-2.059)			
$AFS_t \times FVAFSEM_t$	0.011	0.345	1.745***			
	(0.019)	(0.770)	(2.646)			
$FVAFSEM_t$	-0.191*	-0.672***	-0.250***			
	(-1.932)	(-2.793)	(-2.827)			
$FVTOPL_t \times FVIVEM_t$				-0.200	0.090	-0.491
				(-0.537)	(0.160)	(-1.077)
$AFS_t \times FVIVEM_t$				0.063	0.342	-0.170
				(0.161)	(0.376)	(-0.413)
$FVIVEM_t$				-0.055	-0.058	-0.041
				(-1.029)	(-0.249)	(-0.731)
$SIGMA_{t+1}$	2.454***	-2.448	2.361***	2.467***	-2.945	2.373***
	(3.866)	(-0.727)	(3.613)	(3.885)	(-0.885)	(3.633)
$RETURN_t$	10.904***	7.855**	11.899***	10.892***	8.252**	11.853***
	(9.618)	(2.261)	(10.690)	(9.608)	(2.469)	(10.654)
$RETURN_{t+1}$	-1.648	18.818*	-2.059	-1.642	21.451**	-2.069
	(-0.945)	(2.003)	(-1.156)	(-0.942)	(2.407)	(-1.162)
$NCSKEW_t$	0.158***	0.156***	0.161***	0.158***	0.164***	0.161***
	(10.929)	(2.996)	(10.612)	(10.939)	(3.157)	(10.604)
$GROWTH_t$	-0.005	-0.022	-0.015	-0.005	-0.037	-0.015
	(-0.315)	(-0.249)	(-0.939)	(-0.338)	(-0.447)	(-0.938)
BTM_t	-0.013***	-0.011*	-0.027***	-0.014***	-0.012*	-0.027***
	(-3.544)	(-1.746)	(-4.026)	(-3.504)	(-1.916)	(-4.027)
$TURNOVER_t$	-0.549***	-0.759	-0.544***	-0.547***	-0.778	-0.539***
	(-4.014)	(-1.377)	(-3.865)	(-3.994)	(-1.374)	(-3.829)
$TURNOVER_{t+1}$	0.231*	2.758***	0.168	0.230*	2.849***	0.163
	(1.796)	(3.153)	(1.293)	(1.783)	(3.233)	(1.256)
$SIZE_t$	-0.026***	0.061	-0.031***	-0.026***	0.060	-0.031***
	(-2.853)	(1.623)	(-3.409)	(-2.838)	(1.633)	(-3.410)

Table 3.11 continued

$StdROA_t$	-0.006	0.508	-0.016	-0.006	0.513	-0.016
	(-0.236)	(1.166)	(-0.735)	(-0.244)	(1.211)	(-0.746)
$LEVER_t$	0.054**	-0.054	0.063**	0.054**	-0.004	0.063**
	(2.181)	(-0.312)	(2.316)	(2.180)	(-0.022)	(2.316)
Constant	-0.068	-2.385**	0.063	-0.069	-2.379**	0.064
	(-0.314)	(-2.316)	(0.287)	(-0.319)	(-2.240)	(0.291)
Industry fixed effects	YES		YES	YES		YES
Year fixed effects	YES	YES	YES	YES	YES	YES
N	7879	336	7543	7879	336	7543
R^2	0.156	0.186	0.169	0.156	0.183	0.169
adj. R^2	0.152	0.126	0.165	0.152	0.120	0.165

t statistics in parentheses, ***, **, * denotes statistical significance at the 1%, 5% and 10 % level (two-tailed test), respectively.

Table 3.12 Market volatility and the crash risk effect of fair values

	Dependent variable=$NCSKEW_{t+1}$				
	(1) All firms	(2) Financial firms	(3) Non-financial firms	(4) Financial firms & NFV=1	(5) Non-Financial firms & NFV=1
$FVTOPL_t$	-0.005	0.007	0.433**	0.053	1.056***
	(-0.686)	(0.520)	(2.022)	(1.611)	(3.470)
AFS_t	0.166	0.593*	0.250*	1.240*	-0.071
	(1.255)	(1.881)	(1.795)	(2.006)	(-0.193)
$FVTOPL_t \times CRISIS_t$	0.080**	-0.018	0.027	-0.443	-0.697
	(1.971)	(-0.262)	(0.075)	(-0.708)	(-0.942)
$AFS_t \times CRISIS_t$	-0.134	-0.336	-0.425**	-0.986	0.114
	(-0.730)	(-0.718)	(-2.147)	(-1.200)	(0.226)
$CRISIS_t$	-0.035	0.178	0.052	0.565	0.156*
	(-0.841)	(0.672)	(1.122)	(1.153)	(1.925)
$SIGMA_{t+1}$	3.038***	-3.084	2.945***	-6.073	2.751***
	(4.278)	(-0.923)	(4.047)	(-1.242)	(2.818)
$RETURN_t$	10.439***	7.126**	11.731***	13.826	11.828***
	(10.813)	(2.571)	(11.414)	(1.220)	(6.117)
$RETURN_{t+1}$	-4.519**	10.688	-4.798**	28.772**	0.492
	(-2.140)	(1.283)	(-2.241)	(2.212)	(0.198)
$NCSKEW_t$	0.151***	0.138***	0.151***	0.247***	0.119***
	(11.602)	(2.878)	(10.926)	(3.562)	(4.701)
$GROWTH_t$	-0.003	-0.014	-0.012	-0.111	-0.028
	(-0.226)	(-0.206)	(-0.852)	(-0.613)	(-1.002)
BTM_t	-0.014***	-0.013**	-0.029***	-0.017	-0.045***
	(-3.352)	(-2.239)	(-3.904)	(-1.499)	(-4.382)
$TURNOVER_t$	-0.613***	-0.712	-0.628***	0.781	-0.123
	(-4.769)	(-1.448)	(-4.724)	(0.759)	(-0.516)
$TURNOVER_{t+1}$	0.178	2.410***	0.129	0.932	0.018
	(1.478)	(3.213)	(1.052)	(0.430)	(0.068)
$SIZE_t$	-0.022**	0.072*	-0.028***	0.075	0.009
	(-2.546)	(1.912)	(-3.255)	(1.164)	(0.556)
$StdROA_t$	-0.015	0.380	-0.025	-1.813*	-0.032
	(-0.634)	(0.633)	(-1.203)	(-1.858)	(-0.399)
$LEVER_t$	0.075**	-0.038	0.085**	-0.150	0.081
	(2.182)	(-0.180)	(2.259)	(-0.528)	(1.124)

Table 3.12 continued

Constant	-0.213	-2.075**	-0.148	-1.884	-1.073***
	(-1.035)	(-2.097)	(-0.741)	(-1.101)	(-2.924)
Industry fixed effects	YES		YES		YES
Year fixed effects	YES	YES	YES	YES	YES
N	9325	364	8961	179	1993
R^2	0.148	0.168	0.159	0.293	0.149
adj. R^2	0.144	0.109	0.155	0.183	0.132

t statistics in parentheses, ***, **, * denotes statistical significance at the 1%, 5% and 10 % level (two-tailed test), respectively.

Table 3.13 State ownership and the crash risk effect of fair values

	Dependent variable=$NCSKEW_{t+1}$				
	(1) All firms	(2) Financial firms	(3) Non-financial firms	(4) Financial firms & NFV=1	(5) Non-Financial firms & NFV=1
$FVTOPL_t$	0.008	0.008	0.616***	0.042	0.841***
	(0.204)	(0.256)	(3.334)	(0.297)	(2.931)
AFS_t	0.110	0.396	0.091	1.056**	-0.033
	(1.134)	(1.592)	(0.854)	(2.515)	(-0.138)
$FVTOPL_t \times STATE_t$	-0.007	0.000	-0.684**	0.010	2.012*
	(-0.325)	(0.006)	(-2.137)	(0.039)	(1.701)
$AFS_t \times STATE_t$	-0.029	0.129	-0.167	-0.727**	0.027
	(-0.134)	(0.439)	(-0.436)	(-2.045)	(0.056)
$STATE_t$	0.014	-0.083	0.034	0.060	-0.034
	(0.514)	(-0.800)	(1.159)	(0.517)	(-0.723)
$SIGMA_{t+1}$	3.037***	-3.310	2.942***	-6.029	2.759***
	(4.268)	(-0.991)	(4.028)	(-1.270)	(2.825)
$RETURN_t$	10.480***	6.927**	11.616***	10.316	11.892***
	(10.790)	(2.556)	(11.199)	(0.639)	(6.136)
$RETURN_{t+1}$	-4.492**	10.947	-4.727**	28.669**	0.378
	(-2.133)	(1.281)	(-2.215)	(2.216)	(0.152)
$NCSKEW_t$	0.151***	0.133***	0.150***	0.229***	0.119***
	(11.572)	(2.828)	(10.813)	(3.279)	(4.732)
$GROWTH_t$	-0.003	-0.015	-0.010	-0.110	-0.029
	(-0.205)	(-0.227)	(-0.718)	(-0.578)	(-1.020)
BTM_t	-0.015***	-0.015**	-0.034***	-0.019*	-0.038***
	(-3.492)	(-2.318)	(-4.994)	(-1.796)	(-3.909)
$TURNOVER_t$	-0.626***	-0.597	-0.655***	0.659	-0.101
	(-4.673)	(-1.257)	(-4.698)	(0.641)	(-0.421)
$TURNOVER_{t+1}$	0.182	2.428***	0.134	1.271	0.014
	(1.504)	(3.300)	(1.096)	(0.591)	(0.055)
$SIZE_t$	-0.022**	0.069*	-0.028***	0.080	0.008
	(-2.572)	(1.748)	(-3.297)	(1.257)	(0.528)
$StdROA_t$	-0.016	0.360	-0.032	-1.905*	-0.021
	(-0.662)	(0.618)	(-1.567)	(-1.871)	(-0.269)
$LEVER_t$	0.075**	0.033	0.092**	-0.111	0.061
	(2.201)	(0.154)	(2.385)	(-0.374)	(0.846)

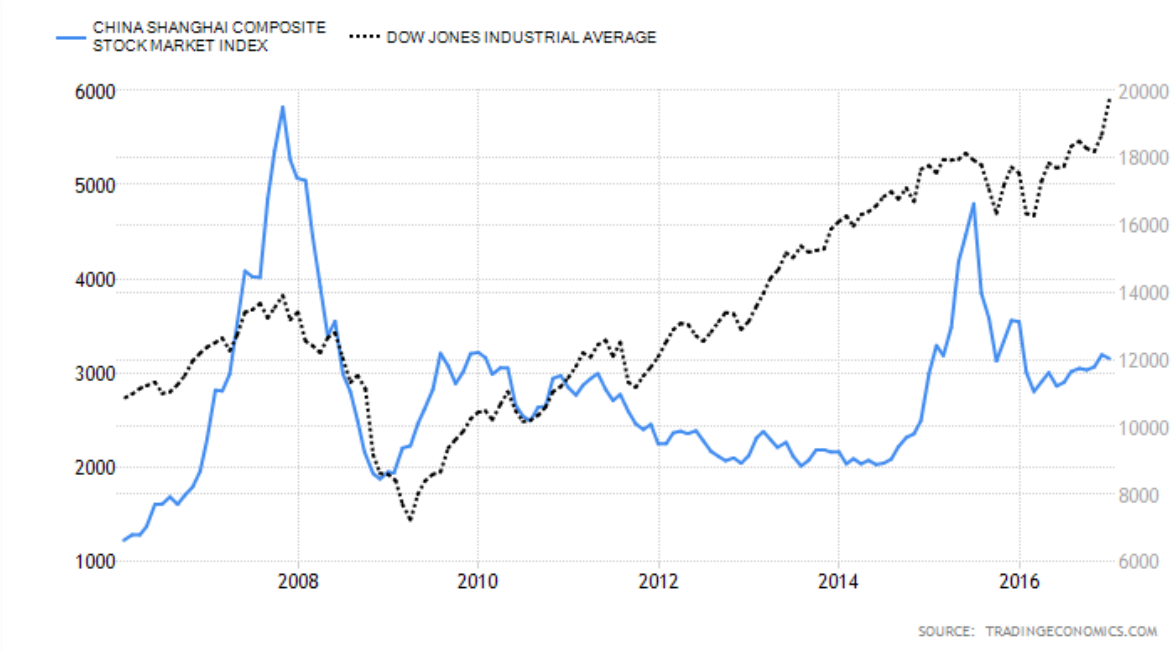
Table 3.13 continued

Constant	-0.245	-1.840*	-0.107	-1.538	-0.897**
	(-1.200)	(-1.677)	(-0.527)	(-0.957)	(-2.454)
Industry fixed effects	YES		YES		YES
Year fixed effects	YES	YES	YES	YES	YES
N	9325	364	8961	179	1993
R^2	0.147	0.170	0.159	0.298	0.149
adj. R^2	0.144	0.109	0.155	0.184	0.132

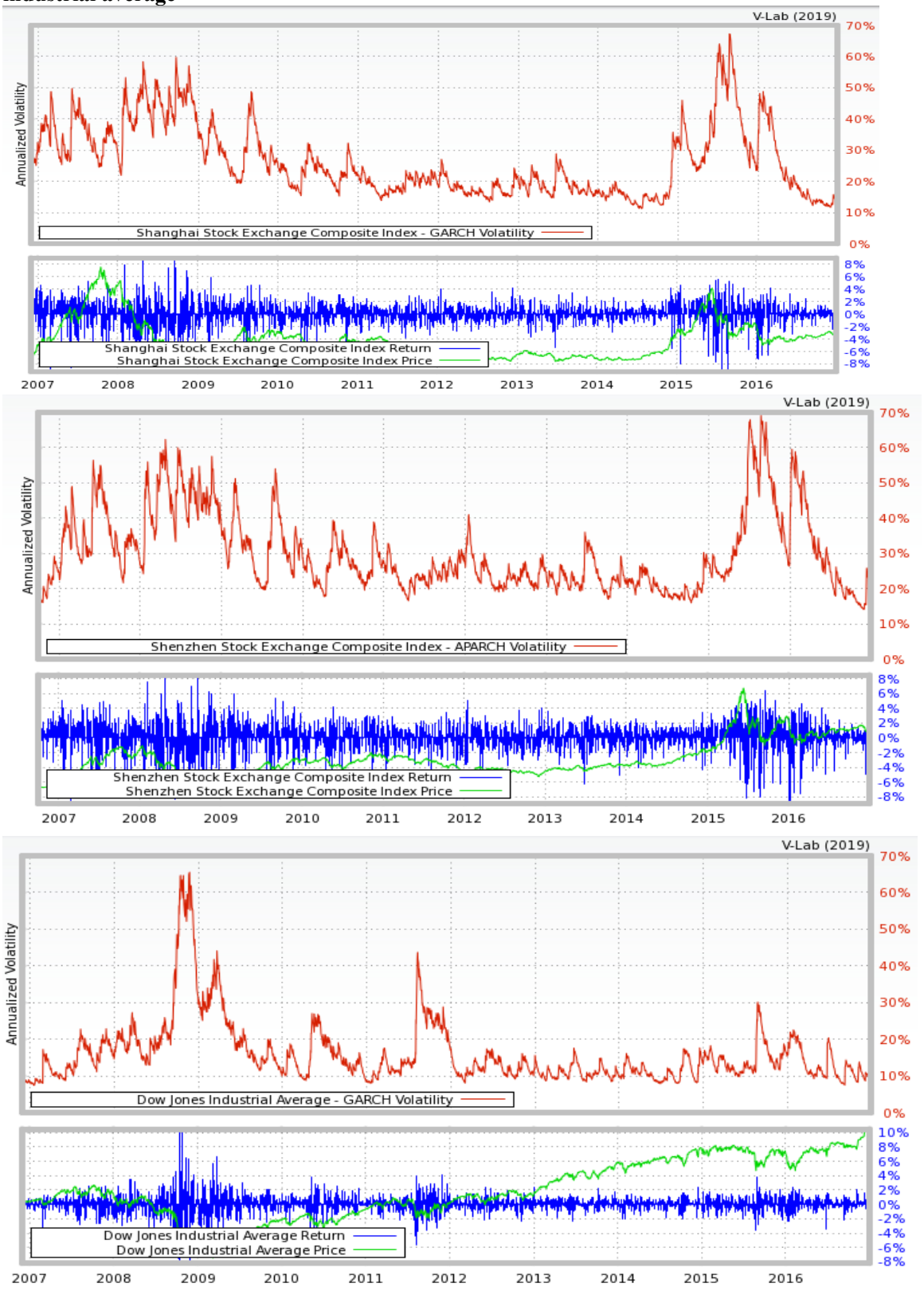
t statistics in parentheses, ***, **, * denotes statistical significance at the 1%, 5% and 10 % level (two-tailed test), respectively.

Chapter 3 Appendices

Appendix 3.1 China, US and UK stock market indexes

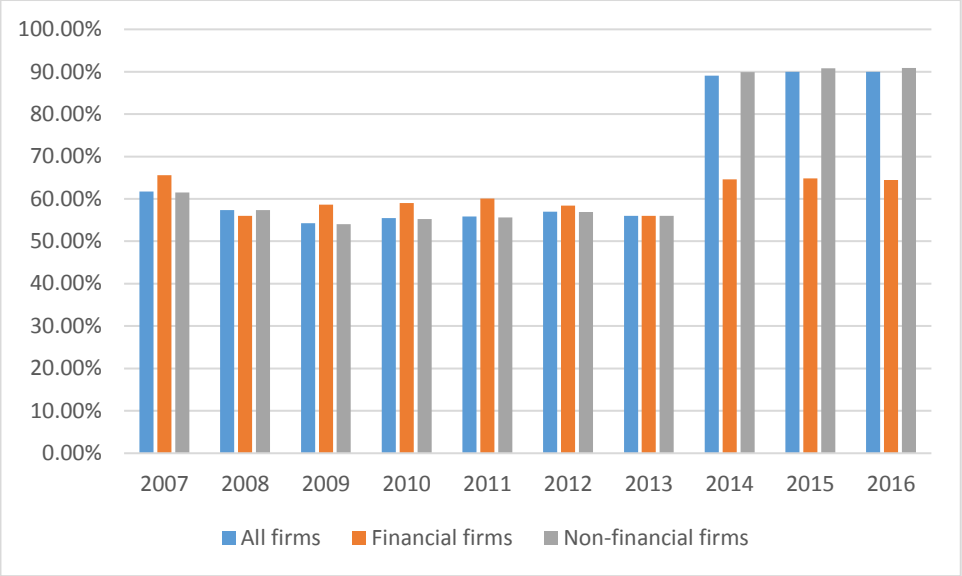


Appendix 3.2 Stock price volatility of Shanghai, Shenzhen stock exchanges and the Dow Jones industrial average



Source: https://vlab.stern.nyu.edu/.

Appendix 3.3 Mean proportion of available-for-sale securities in total fair value-measured financial assets



Appendix 3.4 Variable definitions

AFS: the value of available-for-sale securities at the end of year t, divided by total assets at the end of year t-1

AFSALE: the realized gains and losses from sales of available-for-sale securities at the end of year t, divided by total assets at the end of year t-1

BTM: book-to-market ratio, calculated as the book value of equity divided by market value of equity at the end of year t

CFO: operating cash flows in year t divided by total assets at the end of year t-1

CRISIS: an indicator variable equals 1 if year equals 2007, 2008, 2009 and 2015, 0 otherwise

CROSS: an indicator variable equals 1 if the company issues shares both in the domestic stock exchanges and in other stock exchanges, 0 otherwise

DUVOL: a measure of stock price crash risk. See Section 3.6.4.1 for calculation details

EXCHANGE: an indicator variable equals 1 if the company is listed in Shanghai Stock Exchange, and 0 otherwise

FVAFSEM: an indicator variable equals 1 if the firm-year reports operating profits, but with negative unrealized fair value losses and operating profits less realized gains from the sales of available-for-sale securities is negative

FVIVEM: an indicator variable equals 1 if the firm-year reports operating profits, but with negative unrealized fair value losses and operating profits less investment income is negative

FVTOPL: the value of fair value-measured financial assets and liabilities (excluding available-for-sale securities) at the end of year t divided by total assets at the end of year t-1

GROWTH: growth in sales, calculated as the natural logarithm of sales at the end of year t divided by sales at the end of year t-1

INVESTINCOME: the investment income reported in the income statement at the end of year t, divided by total assets at the end of year t-1

LEVER: total liabilities at the end of year t divided by total asset at the end of year t

L3FVTOPL: the value of level 3 fair value-measured financial assets and liabilities (excluding available-for-sale securities) at the end of year t divided by total assets at the end of year t-1

L3AFS: the value of level 3 fair value-measured available-for-sale securities at the end of year t divided by total assets at the end of year t-1

NCSKEW: a measure of stock price crash risk, see Section 3.5.2.3 for calculation details

NFV: an indicator variable equals 1 if unrealized fair value changes from FVTOPL securities are negative at the end of year t

NI_AFS_FV: operating income less realized gains and losses from available-for-sales securities' sales less unrealized fair value changes at the end of year t divided by total assets at the end of year t-1

NI_IVINCOME_FV: operating income less investment income less unrealized fair value changes at the end of year t divided by total assets at the end of year t-1

OINVEST: total investment income less realized income from available-for-sales securities' sales at the end of year t divided by total assets at the end of year t-1

RETURN: is the mean of firm-specific weekly stock returns for firm i in year t

SIGMA: is the standard deviation of firm-specific weekly stock returns for firm i in year t

SIZE: the natural logarithm of market capitalization at the end of year t

Appendix 3.4 Variable definitions (continued)

STATE: the logarithm transformation of one plus the proportion of state-owned shares in total tradable shares at the end of year t

StdROA: the standard deviation of StdROA in the past five years (including current year)

TURNOVER: the average weekly share turnover over fiscal year t. Share turnover is the total number of shares traded in year t divided by total number of outstanding shares in year t

URFVCTOPL: the unrealized fair value gains and losses reported in the income statement at the end of year t, divided by total assets at the end of year t-1

WC: a measure of working capital, calculated as operating assets less operating liabilities at the end of year t divided by total assets at the end of year t-1

Chapter 4 Model choice for subsequent measurement of investment property in China

4.1 Introduction

Investment property[97] refers to real estate held to earn rental and/or for capital appreciation purposes, and it is one of the most important types of long-term tangible assets that are affected by FVA. Unlike financial assets, the non-financial tangible real estate properties classified as investment property (e.g. buildings and lands) are usually differentiated, have their unique locations and cannot be traded on an exchange. Due to the lack of liquid and active markets, whether FVA should be extended to tangible assets has long been an issue in the policy debate in major economies with the key concern on the reliability of fair value estimates (Sloan 1999, Muller et al. 2011, Barker and Schulte 2017).

With the adoption of a set of accounting standards that is substantially converged with IFRS in 2007, for the first time since the establishment of the stock exchanges in the early 1990s, the Chinese listed companies are allowed to choose between the fair value model and historical cost model for subsequent measurement of investment property[98]. However, by the end of 2016, only about 5% of the listed companies with non-zero investment property assets choose to use the fair value model in China. This adoption rate is much lower than that in the Europe[99]. Given the soaring housing prices and real land prices in China during the past decade[100], it is an unsolved mystery why most Chinese companies do not choose the fair value model, which theoretically should be able to deliver more timely and useful information about firm performance to the information users under such real estate market condition.

Because the US prohibits fair value option for investment property, the extant literatures have been focused on the European setting and provide some findings relating to both the determinants and consequences of the tangible assets fair value option. However, their findings may have limited power in explaining the accounting choice and outcomes outside the European setting, where the institutional environment is relatively under-developed and different in other aspects. To fill the gaps in literature, this study attempts to address the following research questions:

1. Why do most Chinese listed companies choose historical cost model for subsequent measurement of investment property assets?
2. What factors influence some Chinese companies to adopt the fair value option for subsequent measurement of investment property assets?

[97] Section 4.3.2.1 provides details on the definition and scope of investment property.
[98] Before 2007, all buildings and land use rights in China were measured under the historical cost model and were accounted for as fixed assets or other long-term assets (Deloitte 2005).
[99] Prior studies report that over half of the listed companies in Europe report their investment property under the fair value model (e.g. Edelstein et al. 2012, Christensen and Nikolaev 2013, Israeli 2015).
[100] See Fang et al. (2015) and Wu et al. (2016) for more details.

3. What are the market consequences of the adoption versus non-adoption decisions?

Addressing the research questions in China's context has the potential to provide new insights into the application of FVA on non-financial tangible assets, as well as the spread of IFRS across the world. The research questions also relate to the debate over which accounting measurement (fair value versus historical cost) could better improve market transparency, and whether standard setters should expand the use of fair value measurement (e.g. Landsman 2007). China is one of the largest emerging markets with increasing economic significance and foreign direct investments, and it has adopted fair value measurement only in recent years. Due to the booming and extremely volatile real estate markets in China, once a company adopts the fair value model for subsequent measurement of investment property assets, it is possible that its financial performance would be excessively inflated and volatile. The inflation and volatility in financial reporting may ultimately impair efficient resource allocation. As there is an increasing trend among the listed companies to invest in the real estate markets in China, investigation of the determinants and consequences of fair value model adoption in this context is likely to be of interest to Chinese policy makers, international investors who are interested in investing in China, as well as accounting standard setters and regulators in capital markets which are at similar development stage like China.

This study is also likely to be of interest to international regulators and financial accounting standard setters because these interest parties would like to know factors affecting the implementation of international accounting standards in global markets. China does not adopt IAS 40 word-by-word, instead it adopts a version of its own investment property standards modified on the basis of IAS 40. Studying accounting for investment property in this context can help advance our understanding of the adaptability of FVA in less-developed markets, the divergence between IFRS-converged accounting requirements and IFRS, and the reasons of such divergence (Nobes 2006, 2013). Moreover, because the accounting standards in the United States still prohibit the use of FVA for the measurement of all property, plant and equipment, the study may be of interest to the US standard setters to consider whether to allow the fair value model in the measurement of these assets.

For the first research question of why most companies stay with the historical cost model, the innovation diffusion theory[101] sheds light on some potential influencing factors. The theory predicts that the decision to adopt or to reject an innovation is affected by factors such as change agents'

[101] This theory has been widely used in the area of technology diffusion and adoption (Sahin 2006). In the broader accounting literature, this theory has been involved in studying financial accounting standard setting process (e.g. Hussein 1981), the diffusion of management accounting innovations (e.g. Lapsley and Wright 2004, Jackson and Lapsley 2003), diffusion of financial accounting method in the private sector (e.g. Mellett et al. 2009), and voluntary disclosure decisions of the companies (e.g. Xiao et al. 2004b).

promotion efforts[102], and characteristics of both the innovation and the potential adopters (Rogers 2003). Beginning with the characteristics of the innovation, I find that in China the real estate markets have been featured by soaring prices and high volatility, and the appraisal industry is still underdeveloped. These factors increase the complexity and costs of applying the fair value model. I then investigate the attitudes of Chinese accounting standards and regulators towards FVA by comparing the requirements in its accounting standards for investment property assets (ASBE 3 Investment Property) and those in the international accounting standards (IAS 40 Investment Property) (IASPlus 2005, MOF 2006c). Relevant information disclosure and corporate governance requirements, as well as the companies' announcements of accounting policy change are also analysed to evaluate the change agents' promotion efforts, and the potential costs and benefits relating to the accounting policy change.

Though a comparison of ASBE 3 and IAS 40, I find multiple differences in the accounting and reporting requirements for investment property between the two sets of standards that would affect accounting choice of the Chinese listed companies. For example, ASBE 3 Investment Property (hereafter "ASBE 3") explicitly expresses preference towards the historical cost model in subsequent measurement of investment property. Once a company chooses the fair value model, it cannot switch back to the cost model[103]. Therefore, technically if a fair value model adopter would like to be exempted from being influenced by value changes in investment properties, it has to sell all these assets or to change purpose of use from held for capital appreciation to self-use. The accounting requirement thus reduces the trialability of the fair value model and could demotivate some companies from adoption. In addition, fair value gains during first-time transition from owner-occupied property to investment property are required to be recognized in equity, but such gains are recognized in the income statement in IAS 40, and the ASBE 3 has much less disclosure requirements (especially when the company chooses to use historical cost model) compared to IAS 40. These modifications are made potentially due to concerns regarding the less-developed institutional environment in China, and they reflect Chinese accounting standard setters' and regulators' conservative viewpoint towards widely application of FVA. The interactions between the traditional culture for conservative accounting method, conservative attitude of standard setters and regulators, high valuation costs of investment property assets caused by underdeveloped real estate markets and the valuation industry, additional information disclosure costs, as well as the potential risks of volatility introduced by the fair value model, may explain most Chinese companies' preference towards the historical cost model.

[102] In this context, the promotion efforts of the accounting standard setters and regulators.

[103] Nevertheless, 6 out of the 82 fair value model adopters stop using the fair value model during the 2007-2016 sample period for reasons such as material assets reorganization (Shenzhen Development Bank Co., Ltd., stock code 000001 in 2011), mergers and acquisition (BYS, stock code: 000522 in 2013), or change in the purpose of use (e.g. Lingrui Pharma, stock code: 600285 in 2016).

Despite the potential costs relating to the adoption of the fair value model, still there are 82 companies voluntarily switched to the fair value model (hereafter "fair value model adopters") by the end of 2016, with both losses and gains from the revaluation of investment property assets recognized in the income statement on the financial reporting date. From the economic cost-benefit perspective, these companies expect higher benefits than costs from fair value model adoption. From a content analysis of the announcements of accounting policy change of these fair value model adopters, I find that the most common explanations for the accounting policy change are that the companies expect this change to benefit management, investors, the existing and potential creditors. However, the extent to which these announcements reflect the true underlying reasons for fair value model adoption is not clear. Therefore, I then construct empirical models to test potential influencing factors and outcomes on the fair value model adoption decisions.

According to the innovation diffusion theory, organizational characteristics such as leaders' attitude (e.g. managers' attitude) towards the innovation, and innovation characteristics such as relative advantage and complexity could affect the decision to adopt an innovation or not. The accounting choice literature and theories also suggest that contracting, asset pricing and regulation-motivated incentives could affect the cost-benefit trade-off towards (i.e. relative advantage of) an accounting choice. Based on these theories and taken into consideration China's institutional environment, I empirically test whether the Chinese companies' decisions to adopt the fair value model are influenced by debt contracting, asset pricing and regulation-motivated incentives, as well as leaders' (e.g. managers) attitude as proxied by state-ownership, complexity of members in an organization as proxied by institutional shareholding, characteristics of the innovation as proxied by location of the investment property assets when controlling for other potential influencing variables.

The fair value model adopters and changes in their investment property fair values are hand-collected from domestic Chinese listed companies' annual financial reports during the period of 2007 to 2016. To increase the power of my tests, I focus on companies with non-zero investment property assets on the balance sheets. The results show that the adoption decision relates to both short-term and long-term debt contracting incentives, and the real estate and non-state-owned companies are more likely to switch to the fair value model. Among firms with higher proportion of investment property assets (e.g. real estate companies), proxies for investor sophistication and activity of the real estate markets positively relate to the probability of fair value model adoption, indicating that these factors play a role in the accounting choice decision when influence of the accounting change is likely to be more observable. There are some variations in the influencing factors across different time periods, but non-state-owned companies, real estate firms, as well as companies with higher proportion of

investment property assets remain more likely to choose the fair value model over different sample periods.

In addition to factors affecting the decision to adopt the fair value model or not[104], another interesting and important question is the consequences relating to this change in accounting policy. The innovation diffusion theory predicts that there are desirable/undesirable, direct/indirect, and anticipated/unanticipated consequences relating to the adoption or rejection of an innovation, and an understanding of these consequences can help reduce potential adopters' uncertainty about the innovation and facilitate in their decision making (Rogers 2003). In addition, by introducing fair value model into the measurement of investment property assets, standard setters expect accounting information produced under this method to exhibit qualitative characteristics outlined in the conceptual framework (Herrmann et al. 2006). The consequences analyses therefore could provide evidence on the relevance and reliability of investment property fair value estimates, and they can serve as useful inputs to the standard setting debate (e.g. Sloan 1999). By rejecting the null hypothesis that fair value model adoption does not relate to managerial incentives, the analyses on the determinants indicate potential earnings management among the fair value model adopters and raise the question of whether fair value model adoption among Chinese listed companies leads to unexpected and undesirable consequences.

To evaluate whether the investment property fair value model benefits the information users, I examine whether and how fair value model adoption affects financial analyst forecast accuracy and stock price crash risk. A pooled cross-sectional model is estimated to test the market consequences relating to fair value model adoption, with an inverse Mills-ratio estimated from the probit model in the determinants analyses as one of the independent variables to adjust for potential self-selection bias. I also explore the role of potential earnings management incentives in influencing the market consequences relating to the use of fair value model. I find some evidence that stock price crash risk is higher for fair value model adopters with higher investment property assets in the years after initial adoption. Among companies with incentives to use investment property revaluation to manage earnings, financial analyst earnings forecast is less accurate in the first year of fair value model adoption, and the forecasts are more optimistically biased both in the first year of adoption and in the subsequent years. When focusing on the real estate companies, financial analyst forecast is less accurate, more optimistically biased, and stock price crash risk is higher in the first year of fair value

[104] Note that while the tests on the determinants of fair value model adoption contribute to the accounting choice literature (e.g. Christensen and Nikolaev 2013), it also serves an important role in developing the selection model to correct for self-selection bias in analyses of the consequences. This is similar to Israeli (2015, Note 6).

model adoption for real estate companies with higher proportion of investment property assets and earnings management incentives.

To provide further evidence on the relevance and reliability of investment property fair value estimates, I analyse the accounting numbers reported by the fair value model adopters and examine the predictive ability of their earnings components about future earnings. Although under ideal conditions the fair value estimates could deliver timely and relevant information about future earnings, due to the lack of active, arms' length trading markets and immature real estate appraisal industry in China, the revaluation of investment property fair values is highly subjective to managers' estimation and may reduce firm transparency (Zhou et al. 2013, Hemphill et al. 2014). Analyses of the fair value model adopters show that about half of these companies use investment property assets as collateral, six companies adopt the fair value model in their first year of listing, about 40% of the companies issue new equity after their first year of fair value adoption, and there are also new equity issuance among 34.5% of the post-adoption year observations. In addition, some companies succeeded in avoiding earnings decline and net assets decline, reversing loss and negative net assets after adopting the fair value model. These descriptive statistics show that debt financing and equity financing incentives could relate to investment property fair value estimates among these Chinese listed companies. Tests on the predictive ability of earnings components of the fair value model adopters show that the suspected earnings management relating to these fair value estimates reduce the predictive ability of earnings components in the income statement. Further analyses on the consequences of adoption show that analyst forecasts are less accurate, more optimistically biased after fair value model adoption, and stock price crash risk is higher among firm-years with suspected earnings management activities.

Taken together, the results suggest that earnings management incentives do influence Chinese listed companies' decisions to adopt the fair value model, and there are unexpected and undesirable consequences relating to the potential earnings management. The findings imply that the reliability and relevance of investment property fair value estimates produced by the Chinese listed companies may be of concern under certain circumstances.

This study contributes to the literature in the following ways. First, this study is among the first to investigate investment property accounting in a major emerging economy. Prior studies document that the European companies' decisions on recognition versus disclosure of investment property fair values relate to debt-contracting and asset pricing incentives (e.g. Israeli 2015). However, whether their findings can be generalised to companies in other countries outside the Europe, and whether there are other influencing factors remain largely unknown. The fair value model option has been allowed for in China for more than ten years, but only a few companies adopt this accounting option.

Relying on both the economics-based accounting choice theories and innovation diffusion theory, this study extends the investment property accounting research by showing that in addition to the managerial incentives predicted by the agency theory, contextual factors such as characteristics of the real estate markets, regulators and standard setters' attitude towards FVA and characteristics of the enterprises (e.g. state ownership and institutional shareholding) could also influence a company's accounting choice. The findings thus may enrich standard-setters' and investors' understanding of the factors influencing firms' accounting decisions relating to fair value measurement[105].

Second, the study contributes to the literature on international variations in IFRS implementation by documenting differences in reporting requirements between IAS 40 and China's ASBE 3, which is part of a set of accounting standards claimed to be substantially converged with IFRS. Comparison between IAS 40 and ASBE 3 reveals differences mainly in the definition of investment property, preference as reflected in the wording towards the historical cost model, accounting for fair value gains when inventories are transferred into investment property, and the disclosure requirements. The comparison shows how an accounting method is reinvented when being imported into an environment different from where it was originated. One main purpose of the modifications in accounting standards is to reduce earnings management opportunities, but analyses in this study show that opportunism relating to revaluation of investment properties may not be fully eliminated in China. In addition, the divergence between IAS 40 and ASBE 3, as well as variations in reporting and disclosure practice relating to investment property assets raise concern about the comparability of Chinese listed companies' financial statements.

Third, the study extends the literature on the consequences of fair value reporting for investment property assets. Due to the reporting requirements of IFRS, studies in the EU context focus on the consequences of disclosure versus recognition of investment property fair values (e.g. Müller et al. 2015, Israeli 2015). An exception is Liang and Riedl (2014), who compares consequences of investment property fair value model versus historical cost accounting model by exploiting the different accounting requirements in the UK and US. However, there may be some unobservable confounding factors in cross-country studies. The accounting requirements and practices in China that historical cost model users do not disclose their investment property fair values provide a cleaner setting to test the consequences of FVA versus HCA, and the explicit earnings management incentives of the Chinese listed companies facilitate testing the circumstances under which fair value model

[105] The theoretical framework introduced in this study can also be applied to other cross-country research to study the determinants and consequences of accounting choice decisions. In particular, the innovation diffusion theory highlights a number of institutional factors that could affect accounting method choice, when such choices were developed under certain circumstances and were later spread to a different environment (e.g. from the advanced capitalist markets to the emerging countries, or the other way around).

leads to desirable or undesirable consequences. Taking advantage of this setting, this study extends Liang and Riedl (2014) by showing that earnings management is one channel through which the fair value model for investment property affects financial analyst earnings forecast accuracy. Moreover, when firms are engaged in suspected earnings management relating to investment property assets, analyst forecasts are more optimistically biased. By documenting the consequences of fair value model adoption in the context of investment property assets, the study also contributes to the literature on the consequences of fair value accounting implementation in the emerging markets (e.g. He et al. 2012).

The remainder of the chapter is organized as follows. Section 4.2 reviews findings in existing literature on the determinants and consequences of the accounting choice for investment properties. Section 4.3 provides an overview of the key institutional characteristics relating to the research questions. Section 4.4 develops hypotheses relating to the determinants and consequences of fair value model adoption in China, while Section 4.5 outlines the research design for testing the hypotheses. Section 4.6 presents and discusses the empirical results, and the last section concludes.

4.2 Literature review

The choice of fair value versus historical cost model for subsequent measurement of investment property, and estimation of fair values are accounting method choices that can affect either in form or in substance the output of the accounting system (e.g. Israeli 2015). The current literature on investment property provides evidence on both the determinants and consequences of these accounting choices. Section 4.2.1 reviews literature on investment property accounting outside China. Section 4.2.2 reviews investment property accounting studies in China's setting, and section 4.2.3 summarises the findings and discusses the research gaps.

4.2.1 Studies on investment property accounting outside China

4.2.1.1 Determinants of subsequent measurement methods choice outside China

Because the revaluation of investment property is not allowed in US GAAP (KPMG 2017, p.12), most of the existing studies on the determinants of investment property's subsequent measurement method exploit the 2005 mandatory adoption of IAS 40 in the European Union (EU) as their research setting. Prior to mandatory adoption of IAS 40, the EU companies report investment property assets in various forms. They can recognize fair value on the balance sheet; or recognize historical cost on the balance sheet and report fair value in the footnotes; or recognize historical cost but not disclose fair value at all. For example, in Italy and Spain, investment property is explicitly required to be reported under the cost model. As investment property is subsumed under Property, Plant and Equipment, France and Germany de facto require it to be depreciated over an estimate of useful life and take write-off if necessary.

The UK, on contrary, requires revaluation of investment property at fair value or a similar exit-price-type measure on the balance sheet date, but the unrealized changes in fair values are recognized as a component of owners' equity and do not flow through the income statement. Firms in Belgium are allowed to choose between the cost or revaluation model. However, divergent from IAS 40, none of the EU countries allow or require the unrealized fair value gains or losses to be recognized in net income (Muller et al. 2011, Israeli 2015). After IAS 40 becomes effective along with the EU's adoption of IFRS in 2005, investment property asset fair values are required to be recognized on the balance sheet or disclosed in the footnotes, and since then all EU listed firms should provide fair values of their investment property assets after the mandate of this accounting standard.

Some studies focus on the accounting choice in the pre-IAS 40 period. For example, using a sample of EU real estate firms that voluntarily provide investment property fair values before 2005, Muller et al. (2011) find that the voluntary fair value providers are more likely to be audited by big 4 auditors and have less internationally dispersed property portfolios. As the UK mandates revaluation of investment property and Germany allows only the cost model for non-financial assets in the pre-IFRS period, Christensen and Nikolaev (2013) exploit the setting as a quasi-experiment to examine whether the choice between fair value and historical cost model is determined by market forces. Their costs and benefits analyses predict that fair value accounting is more likely to be used when the economic institutions are more suitable, when reliable fair value estimates are easier to obtain, when fair values can facilitate performance measurement, and when debt holders demand for such information. Consistent with their predictions, they find companies in the UK are more likely to adopt the fair value model than those in Germany. Also, they find fair value accounting is more likely to be applied in the real estate industry, and to be applied on investment property than on PPE and intangible assets. Moreover, they find that firms relying more heavily on debt financing are more likely to adopt fair value accounting.

Muller et al. (2008) explore why some European investment property firms choose the fair value model after IAS 40 adoption, and they find that firms choosing the fair value model are more likely to commit to transparent financial reporting a priori through employment of an external appraiser for fair value estimation and voluntarily adopt IFRS before its mandate in Europe. They also find that firms with more dispersed ownership are more likely to choose the fair value model as such firms have stronger demand for transparent reporting and public disclosure.

Exploiting the similar setting but focusing on sample firms that report investment property under cost model before IAS adoption, Quagli and Avallone (2010) test whether the choice of fair value method

made by firms in the EU real estate industry[106] is driven by information asymmetry, contractual efficiency (agency costs) and managerial opportunism reasons. Their analyses show that all three factors, as measured by firm size, market-to-book ratio, a dummy variable for earnings smoothing seem to affect firms' fair value choice. However, leverage (measured as the average debt to asset ratio for firm i over two years before IAS 40 adoption) and the consequence protection of lenders does not have significant association with the choice of fair value model.

Similar to Quagli and Avallone (2010), Israeli (2015) relies on a sample of real estate companies domiciled in France, Italy, Germany and Spain but he tests factors influencing the decisions to recognize versus disclose investment property fair values. He finds that fair value recognizers have stronger debt contracting incentives and asset-pricing incentives than those disclose fair value in the footnotes. Müller et al. (2015) also test the factors affecting the choice of recognition versus disclosure in the EU real estate firms and they document significant influence of big 4 auditors, proportion of investment property, leverage, firm's commitment to transparency, and country-level institutional environment.

4.2.1.2 Consequences of investment property accounting choice outside China

Most of the existing studies focus on the association between stock prices and the decision to adopt the fair value model (or reported fair values) to examine the value-relevance of investment property fair value estimates. Danbolt and Rees (2008) compare the fair value estimates made by firms in the British real estate and investment fund industries, and they find that fair value income of the investment fund industries is more value relevant than historical cost income of the real estate industries. They further show earnings management relating to fair value in the real estate sample and suggest that fair values can be highly relevant and unbiased when they can be reliably obtained. Exploiting the setting of 2005 mandatory adoption of IAS 40 in the EU, Muller et al. (2011) examine whether the provision of investment property fair values reduces information asymmetry, as measured by the bid-ask spreads. They find a decline in information asymmetry among the mandatory IAS 40 adopters, while information asymmetry of these mandatory adopters is still higher than companies that voluntarily disclose fair values before 2005. They suggest that fair values provided by mandatory adopters are of lower reliability, therefore the mandatory reporting regime cannot fully eliminate differences in information asymmetry across firms. Using the voluntary IFRS adopters as the control

[106] Their sample companies are from Finland, France, Germany, Greece, Italy, Spain and Sweden and they are all first-time IFRS adopters. Investment properties are the major assets in the real estate companies, therefore, focusing on this homogeneous group of companies can help enhance the power of test and reduce concerns that the switch to IFRS affects accounting decisions relating not only to investment property, but also the reported numbers of many other assets and liabilities (see also Israeli 2015, p. 1459 Footnote 5).

group, the difference-in-difference research design help mitigate concerns regarding self-selection bias and potential confounding effects from macroeconomics and other IFRS-related factors.

Müller et al. (2015) and Israeli (2015) also take advantage of the IAS 40 adoption setting, but they compare the pricing differences between recognized versus disclosed fair values. Müller et al. (2015) postulate that the disclosed fair value information is of lower reliability and requires higher information processing costs. Consistent with their predictions, they find that equity prices relate more to the fair values for investment properties recognized on the balance sheet than those disclosed in the footnotes. They further find that the discount on disclosed information is mitigated by analyst following (a proxy for information processing costs) and use of external appraisals (a proxy for higher reliability). Israeli (2015) also documents that investors place a discount on the disclosed fair values, but the two types of information have statistically equivalent ability in explaining future net rental income changes and changes in cash flows from operations.

The association between accounting numbers and stock prices provides evidence on the relevance of fair value estimates to investors' decision making, but stock prices can reflect many factors other than the accounting numbers (Sloan 1999). Divergent from the above-mentioned studies, Liang and Riedl (2014) directly examine the effect of FVA versus HCA on analyst forecast accuracy by taking advantage of the difference between the UK and US accounting requirements for investment assets. Before IFRS adoption, UK firms are required to recognize their investment properties at fair value in balance sheets, with the unrealized fair value changes reported in a revaluation reserve. After IFRS adoption, the firms can choose between the fair value model and historical model to report investment properties on the balance sheet. If they choose the fair value model, the unrealized fair value changes will be recognized into the current year income. On the contrary, US firms can only use the historical cost model to measure their investment properties. By comparing analysts' asset value and earnings forecast accuracy for UK and US firms, Liang and Riedl (2014) find that the fair value model is more relevant for balance sheet-based forecasts, while the historical cost model is more useful for income statement-based forecasts. Their findings suggest that the fair value model provides useful inputs into firm valuation, but also introduces additional volatility into the reported earnings compared to the historical cost model.

Some studies focus on the attributes of property fair value estimates. Dietrich et al. (2001) examine the reliability of investment property fair value estimates in the UK, and they find evidence of earnings management relating to the property estimates. Outside the Europe, Bandyopadhyay et al. (2017) examine the predictive ability of fair value revaluations for future cash flow outcomes in Canada. Since the effective of IFRS on January 1, 2011, the Canadian listed companies have the option to use the fair value model to report their investment property under IAS 40. The analyses of

Bandyopadhyay et al. (2017) show that the association between fair value revaluations of investment properties and future cash flows is stronger among more conservative firms, and the market prices the fair value adjustments of less conservative firms at a discount compared to more conservative firms.

4.2.2 Studies on investment property accounting in China

Some studies explore Chinese listed companies' decision to adopt the fair value model, some also provide evidence on the consequences relating to the accounting choice. Zhang et al. (2011) use a cross-listed company-Beijing North Star Company Limited (hereafter "BNR") as a case to study factors affecting companies' accounting choice. BNR is listed in both the domestic Chinese stock exchange and Hong Kong stock exchange, and it reports the investment property assets under historical cost model in the domestic financial reports but adopts the fair value model in reports filed in Hong Kong stock exchange. Zhang et al. (2011) argue that the accounting choice of this case company is made on consideration of accounting standards, attitudes of the regulators towards FVA, comparability of information in different markets, maturity of the markets and investor rationality.

Another case study by Zhou et al. (2013) investigates how fair value model choice of Tianjin Jinbin Development Co., ltd. affects its financial ratios and explore potential reasons of fair value model adoption. They analyse the longitudinal characteristics of the case company and compare the characteristics with five other companies in the same area and same industry, which use the historical cost model. They find that before fair value model adoption, the case company exhibits higher leverage, larger size of investment property assets, lower sales margin, lower return on equity than its counterparts. After adopting the fair value model, the case company reports lower operating costs (due to less depreciation from investment property assets), and fair value gains on investment property assets significantly increase the company's net profits in the year of accounting policy change. However, in the years subsequent to initial adoption, net assets, net profits and related financial ratios of the case company are more volatile than its counterparts. Zhou et al. (2013) argue that external financing demands, size of investment property assets, valuation costs, difficulty in obtaining investment property fair values are factors that could affect firms' accounting policy choice. However, the case studies only focus on one company that is affected by the fair value model, and the extent to which the results can be generalized to other Chinese companies is questionable.

With the increase in the number of fair value model adopters, more recent studies start using empirical models and a larger sample size to investigate the investment property accounting choice. Zhang et al. (2014) use a sample of Chinese listed companies that have investment property assets over 2007-2012 to examine why some companies choose the fair value model. They find that the probability of using fair value model is higher among non-state-owned companies with higher proportion of

investment properties, and it is associated with higher debt-to-asset ratio, and higher management shareholding. They do not find significant evidence that the choice of fair value model is affected by management compensation, earnings smoothing, loss in earnings in two continuous year, and activity of the real estate markets. While their study provides preliminary insights into factors that could affect Chinese listed companies' measurement model decision, the sample period is relatively short and whether there are missing influencing factors in their model is not clear. In addition, they do not document the extent to which the amounts of fair value changes are affected by these factors and the market consequences of the firms' accounting choices.

Taplin et al. (2014) examine the same question as Zhang et al. (2014) and they find that Chinese listed companies are more likely to choose the fair value model if they have incentives to smooth earnings and are cross listed in international stock exchanges, or if they have international revenues. They do not find leverage and insider shareholding to significantly affect the accounting choice. However, in 2008 only 22 Chinese listed companies use the fair value model[107], while Taplin et al. (2014) mention that they choose a random sample of 96 Chinese listed companies with investment property in 2008 and "half (48/96) of the randomly sampled companies used fair value accounting to value their investment properties with the other half using historical cost" (p. 108). This casts doubt on the accuracy of their data and the validity of the findings.

The working paper by Chen et al. (2015) documents that the use of fair value model in China is associated with opportunism, especially in areas with less liquid real estate markets and lower level of investors monitoring. In particular, they provide some evidence that the companies use unrealised fair value gains and losses on investment properties to smooth earnings and to meet or beat the zero earnings benchmark. However, they only use 2007-2009 as the sample period and report that only 21 companies adopt the fair value model by 2009. Chen et al. (2015) further find evidence that Chinese listed companies manage earnings through the investment property fair value estimates, but they do not have tests on market reactions to such earnings management.

The doctoral thesis by Zhou (2015) documents that during the sample period of 2007-2013, Chinese listed companies' adoption of fair value model relates to leverage, firm size, proportion of investment properties, ownership type (i.e. state-owned or non-state-owned), and the extent of marketization. Zhou (2015) further compares the value relevance of investment property fair values and historical costs, and she finds that historical costs for investment properties are more relevant to investors' decision making compared to fair values. Moreover, value-relevance of the investment property fair

[107] According to my own collection of data, and also see Zhang et al. (2014, p.123).

values is affected by appraiser types, ownership property, and firm size. She also finds some evidence that the adoption of fair value model affects firms' future debt contraction.

A recently published paper by Hsu and Wu (2019) documents in their robustness checks that the probability of fair value model adoption in China relates to earnings smoothing incentives, leverage, proportion of investment property assets, and institutional shareholding. Using a sample of listed firms from 2007 to 2011, Hsu and Wu (2019) document higher stock price crash risk for companies adopting the fair value model, and they find that the positive association between fair value adoption and crash risk is mitigated by strong corporate governance. However, they do not examine whether and how the higher crash risk is caused by earnings management relating to the management of investment property fair value estimates, and which corporate governance characteristic has explanatory power in mitigating the association between fair value reporting and crash risk is not clear.

4.2.3 Summary and discussion

In general, the literature shows that various factors influence the subsequence measurement choice, but most studies are based on the EU setting and focus on incentives mentioned in Fields et al. (2001). Limited attention has been paid to the role of institutional factors in influencing the accounting choice decisions, and there is a lack of systematic theoretical frameworks to map the institutional factors into the empirical models. In addition, the results in current research are inconclusive. For example, Quagli and Avallone (2010) do not find significant impact of debt contracting on the choice of fair value model but others find debtors' demand affects the choice (e.g. Christensen and Nikolaev 2013). The mixed results may be caused by differences in the sample firms, construction validity or endogeneity problems. The existing studies in the EU context also provide mixed evidence on the consequences relating to subsequent measurement choice among the countries that adopt IAS 40.

In China's context, the fair value model is only allowed for measuring investment property assets since 2007, when the new set of IFRS-converged China accounting standards becomes effective. The existing literature has documented a very low level of fair value model adoption in the context of investment property (e.g. Xiao and Hu 2017). Although there is some evidence on factors that affect investment property accounting in China's context, the results are still inconclusive. In addition, the divergence in accounting requirements and practices for investment property between China accounting standards and IFRS is not well-documented, and why most companies stay with the historical cost model, as well as the potential determinants and consequences relating to fair value model adoption have not been well-explored. The next section introduces the relevant institutional background.

4.3 Institutional background

This section elaborates on institutional factors that could influence firms' choice of the fair value option in China's context. Section 4.3.1 reviews key features of the real estate markets and valuation appraisal industry in China. Section 4.3.2 summarises the accounting and reporting requirements in ASBE 3 Investment Property and compares the requirements with those in IAS 40. Section 4.3.3 summarises and discusses how these institutional features could influence companies' accounting choices.

4.3.1 Characteristics of the real estate markets and valuation appraisal industry in China

The real estate markets in China have been characterized by speculative fever, booming prices and frequent government intervention since the 1998 housing reform[108]. Due to strict capital controls that constrain investments in international capital markets, and the relatively small stock and bond markets, housing becomes an important investment vehicle of the Chinese households and the demands partially drive up the real estate prices. During the 2008 to 2009 crisis, the Chinese economy faces tremendous pressure and the Chinese stock market declines dramatically for about 60% during this period and still has not recovered to the pre-crisis level to date. In contrast, although the Chinese real estate prices in first-tier cities[109] drops by about 10% in this period, they then recover soon after the crisis, while the housing prices in second- and third-tier cities continue to rise after 2008 (Fang et al. 2015). This continuity in the growth of housing prices is likely to be bolstered by the frequent policy interventions of the central government and fiscal budget motivations of the local governments to generate revenues from land sales (Koss and Shi 2018).

In terms of the land markets, the state owns all urban land in China while land in rural areas has collective ownership (NPC[110] 2004). Land use rights can be granted to private developers through auction or tendering process, and the state-owned enterprises usually obtain land use rights through government allocation (NPC 1995, Glaeser et al. 2017). Accordingly, there are two types of land use rights, the allocated one usually is free and has indefinite usage, while the land use rights obtained from auction or tendering can only be used for a fixed period depending on the purposes of usage[111]. Apart from auction, usually the transfer fee is determined by agreement or negotiation with municipal

[108] Before 1998, the housing was allocated as a kind of compensation to people. In 1998, the government completely abolished the housing allocation system and set up the real estate sector to cope with the negative effects of 1997 Asian Financial Crisis (Wu et al. 2016). Since then, the commercial real estate sector starts growing at fast pace.

[109] Namely, Beijing, Shanghai, Guangzhou and Shenzhen. See Appendix 4.1 and Fang et al. (2015) for a list of 1-tier, 2-tier, and 3-tier cities in China.

[110] The National People's Congress of the People's Republic of China

[111] The maximum duration of land use rights for residential purpose is 70 years. For industrial, educational, scientific and technological, cultural, public health or sports purposes, combined or other purposes, the maximum duration of land use rights is 50 year. Land use rights for commercial, tourism or recreational purposes have maximum duration of 40 years (State Council of the PRC 1990).

and local governments that own the land. For the newly tradable (virgin) land, the government has established a benchmark land pricing system to reflect the value (Hemphill et al. 2014). After an enterprise obtains land use rights from the government, it can transfer the rights in the secondary markets.

With the urbanization process throughout China and the development of housing markets, the real land prices increased five-fold between 2004 and 2015 (Wu et al. 2016). Compared to the relatively opaque prices of buildings, the market prices of land use rights may be more accessible because all transactions are published online[112] since 2010. However, similar to housing prices, the land values are surging, and they are even 3 to 5 times more volatile than the housing prices during the past decade (Deng et al. 2012). There is a starkly rising trend in land prices from 2003 to 2011, and the land values reverse during 2011-2012 and rebounded to high level in 2013 before another decline in price since 2014 (Ciemniak, 2016).

One characteristic of the housing and land markets in China is the variations in market liquidity, price changes and government intervention across different regions in the country. During 2003 to 2011, prices grow at rates over 20% in first-tier cities such as Beijing and Shanghai, while other cities also experienced increase in prices but at lower growth rates. A clear division between the tier 1 and 2 cities and other cities has become the norm since 2013, when the central government released a national policy "National 5" to restrict speculation and to cool down the overheated markets. To control for the volatility in the real estate sector and to maintain social stability, the Chinese government further takes a series of fiscal, economic, and regulatory measures to either cool or encourage the demand or supply of real estate properties. Different policies are implemented in different geographical areas and targeting at different problems[113]. Under the guidance of the central government[114], these policies are implemented by the municipal government (Koss and Shi 2018). The government interventions affect all players in the real estate markets, and both the investment decisions and accounting policy choices of the listed companies are also likely to be impacted directly by conditions of the real estate markets and the results of government interventions.

The appraisal industry and practice in China have been developing rapidly along with the development of its real estate markets. However, there is still a shortage of well-trained appraisers

[112] All land transaction data can be found in www.landchina.com, and the earliest available data dates back to 2010.

[113] For example, in 2010 the home-purchase restrictions policy was implemented in about forty tier 1 and tier 2 cities to control for the soaring housing prices. Property taxes policy was trialled later in Shanghai and Chongqing. More details about the regulations and policies implemented by the Chinese government to influence the housing prices can be found in Du and Zhang (2015).

[114] Including the state council, ministries and the China Banking Regulatory Commission (now the China Banking and Insurance Regulatory Commission).

and ample high-quality data for property valuation[115]. In addition, various ministries and local professional bodies govern the real estate appraisal industry. Government departments at the central, provincial and municipal levels have established their own laws or codes for real estate and land valuation practice[116]. The duplication and inconsistencies in the activities and codes of the government ministries and professional bodies have led to confusion and rivalry in valuation practice. Moreover, similar to the uneven market development across regions, the valuation practice and appraisal industry maturity vary a lot across different provinces and cities. The tier 1 and some tier 2 cities have larger local and international valuation companies, better appraisal services and more transparent market information, while other cities have less standardised valuation practices and well-developed appraisal industry (Hemphill et al. 2014).

The Chinese accounting standard setters are aware of the immaturity of the real estate markets and the appraisal industry, and do not adopt the international accounting standards word-by-word. The next sub-section summarises the China accounting standards on investment property assets and compares the requirements with those in the international accounting standards.

4.3.2 Accounting and reporting requirements for investment property in ASBE 3 *Investment Property* and in other related regulations

"Investment property"[117] is a new item presented in Chinese listed companies' balance sheets since 2007. This section summarises the key definition and accounting requirements in ASBE 3 *Investment Property*, which applies to all domestic listed Chinese listed companies[118]. A comparison of the requirements in ASBE 3 *Investment Property* and its IFRS equivalence IAS 40 *Investment Property* is also made to highlight the modifications made by Chinese accounting standard setters, and to better understand the institutional environment and the influencing factors of Chinese firms' accounting choice. Key differences between ASBE 3 and IAS 40 are summarized in Table 4.1.

[Insert Table 4.1 here]

[115] China has 33,802 charted appraisers by 2015, while the US has 80,500 active real estate appraisers as of June 2014 (Wang 2017, Appraisal Institute 2014).

[116] See Chau and Lai (1995) and Hemphill et al. (2014) for examples of the valuation approaches and practice in China.

[117] Investment property assets were accounted for as fixed assets or other long-term assets in the old China ASBE (effective before 2007) subject to the purposes of use (Deloitte 2005).

[118] Including both A-share and B-share companies. Chinese companies cross-listed in Hong Kong stock exchange are allowed to prepare their financial statements using China Accounting Standards for Business Enterprises since 2010 (HKEX, 2010), so ASBE 3 also affects these companies' financial reports filed in Hong Kong stock exchange.

4.3.2.1 Definition of investment property

Investment property is defined as property held to earn rental and/or for capital appreciation, including leased (through operating lease) land use rights and buildings, and land use rights held for rental purposes (MOF 2006c, d). Properties held for use in the production, supply of goods or services, or held for administrative purposes[119], as well as property held as inventories are not investment property assets. For real estate built by enterprises, the ASBE 15 *Construction Contracts* is applicable, and for the rental income and sale/leaseback of investment real estate, the ASBE 21 *Leases* is applicable. The definition and range of investment property is largely similar to IAS 40 except that in China, only the intangible land use right rather than the physical form of land is measured and reported. This is because the state owns the land and thus value of land is hardly measurable, while the Chinese companies can obtain the rights to use the land through government allocation or peer-to-peer transactions and income from the land use right is measurable (State Land Administration 1992, Zhang and Andrew 2010). The definition in ASBE 3 thus conforms to China's special circumstances and ensures that items included in its scope are measurable.

4.3.2.2 Recognition and initial measurement of investment property

Similar to IAS 40, ASBE 3 requires investment property assets to be measured initially at its cost. For purchased investment property, the initial cost includes the purchase price and taxes of the investment property and any other directly attributable expenditures. For self-constructed investment property, the initial cost includes any necessary expenditures incurred in getting the property into its intended usable state (ASBE 3.7). Unlike IAS 40, ASBE 3 gives an example of the costs of self-constructed property but does not give examples on the initial cost of a property held under a finance lease, probably because such transaction is not widespread in China when the accounting standard is established in 2006[120]. In addition, ASBE 3 allows any subsequent expenditures attributable to the investment property to be included in its initial cost only when the related economic benefits are likely to flow into the enterprise and when the expenditures can be reliably measured (ASBE 3.6). Otherwise, the subsequent costs should be recognized in profits and losses for the period in which they arise (ASBE 3.8). There is no such requirement in IAS 40 and this supplementation may be made to provide more specific guidance for Chinese accounting standard users and to reduce earnings manipulation opportunities (e.g. Peng and Bewley 2010).

[119] These are defined as the "Owner-occupied property" in IAS 40 Investment Property.
[120] It was not until 2004 that the finance lease business started to emerge in China. See http://www.sinotf.com/internetfinance/O2O/2018-02-02/yNMDAwMDMwMjUyNA.html for more details. Also, Zhang and Andrew (2010) discuss how land transaction and leasing system differ from the those in the west, which would affect the accounting requirements.

4.3.2.3 Subsequent measurement models of investment property

After initial recognition, ASBE 3 requires Chinese companies to use the historical cost model for investment property on the date of the balance sheet, unless there is clear evidence of a reliable fair value that can be obtained on a continuous basis (ASBE 3.9-10). The application guidance of ASBE 3 further explains that usually the enterprises should use the cost model for subsequent measurement of investment property, but they can also use the fair value model. In line with IAS 40, one company cannot adopt the two measurement models at the same time (ASBE 3 *Application Guidance*). Unlike the explicit preference for the cost model in ASBE 3, IAS 40 allows an entity to choose either the fair value model or the cost model for subsequent measurement of investment property. In addition, IAS 40 permits entities to change between the fair value and the historical cost models[121], but ASBE 3 prohibits a switch to the cost model once the entity has adopted the fair value model (ASBE 3.12). The differences in wording and in the change between the models imply Chinese regulators' preference for the cost model and may influence Chinese companies' final selection of the accounting model (Peng and Bewley 2010).

Other than the above differences, descriptions on the cost model and the fair value model are similar in ASBE 3 and IAS 40. Under the fair value model, the investment property assets are measured at their fair values on the balance sheet date, and changes in their fair values are recognized in gains and losses in the income statement (ASBE 3.11). Under the historical cost model, investment property assets are reported at their depreciated cost on the balance sheet and the depreciation cost and accumulated impairment losses are recognized in the income statement (ASBE 3.9). Change from the cost model to the fair value model should be accounted for as accounting policy change, and the ASBE 28 *Accounting Policies, Changes in Accounting estimates and Errors* is applicable (ASBE 3.12). Specifically, the entity shall apply the change in accounting policy retrospectively as if the fair value model had always been applied, the opening balance of the equity for the earliest prior period presented should be adjusted, other comparative amounts for each prior period should be adjusted and disclosed unless the cumulated effect of the change is impracticable to determine (ASBE 28.6).

4.3.2.4 Transfer and disposal of investment property

The investment property can be transferred from owner-occupied property (commencement of rental or capital appreciation); inventories (commencement of an operating lease); owner-occupied land use rights, and may later be transferred to owner-occupied property (for owner use) and inventories (held for sale). When an entity adopts the cost model for investment property, the carrying amount of the property transferred remains the same before and after the change (ASBE 3.14). When the investment property carried at fair value is transferred into owner-occupied property, the property's book value

[121] If this leads to a more appropriate presentation (IAS 40.30).

should be its fair value at the date of transfer, and the difference between fair value and the previous carrying amount should be recognized in current period profit or loss (ASBE 3.15).

When owner-occupied property or inventory is transferred into investment property at fair value, the investment property is measured at its fair value at the date of transfer. If the fair value is less than the previous carrying amount, the difference should be recognized as current period loss. If the fair value is greater than the previous carrying amount, the difference should be recognized into Capital Reserve-Other capital reserve[122] (ASBE 3.16). Divergent from ASBE 3, IAS 40 requires any difference (either gain or loss) between the fair value and previous carrying amount be recognized in profit or loss when inventories are transferred into investment property at fair value (IAS 40.63). This difference between ASBE 3 and IAS 40 is another example of the modifications of accounting requirements to constrain earnings management activities in China. In addition, IAS 40 has requirement for investment property under construction (IAS 40.65), but such requirement is absent in either ASBE 3 or its application guidance and the reason is not clear.

When an investment property is disposed of or permanently withdrawn from use, it should be derecognized and the gain or loss on disposal[123] should be recognized in the income statement. The accounting for investment property disposal is largely similar in IAS 40.72 and ASBE 3.17.

4.3.2.5 Presentation, disclosure, and corporate governance relating to measurement method change

ASBE 3 requires the enterprise to disclose the classification, amount and measurement method of their investment property assets; transfer of investment property, the reason of transfer, and the influences of transfer on gains or losses or equity; disposal of investment property and the influences on gains or losses. For investment property measured under the cost model, the enterprise should disclose its depreciation and accumulated impairment. For investment property measured under the fair value model, the enterprise should disclose the valuation method of the fair values and influence of changes in fair value on gains and losses (ASBE 3.19). The disclosure requirements are much simpler in ASBE 3 than in IAS 40. For example, IAS 40 requires details (e.g. rental income and direct operating expenses to generate the rental income) on the amounts recognised in profit or loss (IAS 40.75), but there is no such requirement in ASBE 3. In addition, under the cost model, IAS 40 requires disclosure of fair value of investment property (IAS 40.79) while there is no such requirement in

[122] IFRS equivalence is *Other reserve*. In practice, the fair value gains from transferred owner-occupied property is also disclosed in Other Comprehensive Income. See the annual report of ZTE Corporation (SZ.000063) (2012, p.217) for an example.

[123] Calculated as the difference between the disposal proceeds and carrying amount of the asset and relevant taxes.

ASBE 3. IAS 40 also asks the enterprises to disclose the extent to which fair values of investment property rely on the valuation by a qualified independent valuer (IAS 40.75), but ASBE 3 does not have such provisions. Since ASBE 39 Fair Value Measurement becomes effective in 2014, the fair value model users are required to disclose additional information such as the inputs of investment property fair value estimates (ASBE 39.11.44, MOF 2014b).

In addition to the requirements of accounting standard, the switch from cost model to fair value model generates additional costs in its approval and disclosure. According to the requirements of the Shanghai and Shenzhen stock exchanges, the accounting policy change needs to be submitted to the stock exchange and disclosed to the investors within two trading days after it is approved by the board, the independent directors, and the audit committee (CSRC 2006a, SZSE 2007, SHSE 2007, 2013). Moreover, if the impact of the change in accounting policies on the audited net profit (or equity) of the most recent fiscal year is more than 50%, or change the status of profit and loss, it is treated as a material change and a shareholder's meeting is required to approve the change, and a special audit report needs to be issued and disclosed (SZSE 2007, 2015). For companies involve in real estate business, the Shenzhen stock exchange has additional disclosure requirements for these entities since 2015 (SZSE 2017). Together with the annual expenses on hiring either internal or external appraisers to estimate fair values of investment property assets, the switch from cost model to fair value model for subsequent measurement of investment property is a costly choice for Chinese listed companies.

4.3.3 Summary and discussion: Why most companies do not adopt the fair value model

In the context of China, because FVA is only allowed for subsequent measurement of non-financial assets since 2007, it can be perceived as an accounting innovation to the listed Chinese companies. The above review on China's real estate markets shows that investment property fair values could be highly volatile due to speculative investment and frequent government intervention in tier-1 and tier-2 cities. Along with stringent government monitoring on housing prices in these cities, companies would attract additional political costs and introduce additional volatility into their earnings if they adopt the fair value model. In other less developed areas, however, real estate fair values could be difficult to obtain due to the underdeveloped housing systems and appraisal industry. These characteristics of real estate markets reduce the relative advantage and increase complexity of fair value model adoption in China's context.

The modifications in accounting standards made by the accounting standard setters reflect their attitudes towards investment property fair value model, and they may also help explain the low adoption rate. For example, unlike IAS 40, the China accounting standard does not allow the company to switch back to the historical cost model once it adopts the fair value model. This modification in accounting standard thus reduce the trialability of fair value model and the companies may need

careful consideration in making the accounting policy change. In addition, ASBE 3 does not require historical cost users to disclose the fair values of invest properties and therefore there is lower information production cost if the company stays with the cost model. In practice, with the exception of insurance companies, most Chinese companies that use historical cost (fair value) model to measure investment property do not provide the corresponding fair values (historical costs) of these assets[124]. If a Chinese listed company is to adopt the fair value model, there are also additional disclosure requirements from the stock exchanges, and there are additional corporate governance procedures to go through.

In addition to above-mentioned accounting and disclosure requirements and the immature real estate market, the conservative culture, immature capital market, and government intervention in business enterprises (e.g. Xiao et al. 2004a) are likely to relate to higher costs, lower compatibility, higher complexity for the Chinese companies to adopt the fair value model. These factors together may help explain the low adoption rate of the fair value model in this country.

Despite the costs relating to fair value model adoption, still a few companies made the accounting method change during the past ten years. This accounting policy change is a long-term commission because once the company switch to the fair value model, all investment property assets of the company have to be measured at fair value on the subsequent balance sheet dates. The net assets and earnings of the fair value model adopters in the years following initial adoption will be affected by changes in investment property fair values unless the company sell all of its investment properties or change purposes of use of all these assets[125]. The next section develops five testable hypotheses on the determinants and consequences of Chinese listed companies' accounting choice in the subsequent measurement of investment property assets.

4.4 Hypotheses development

This section develops five hypotheses relating to the determinants and consequences of Chinese listed companies' accounting choice in the context of investment property. Section 4.4.1 summarises theories relating to accounting choice decisions. Hypothesis one (Section 4.4.2) is based on the determinants of accounting choice predicted by the economics-based theories. The determinants of accounting choice in Hypotheses two to four (Sections 4.4.3 to 4.4.5) are based on both the innovation diffusion theory and three prominent features of Chinese companies and capital markets. Hypothesis

[124] Domestic listed companies use the historical cost model also do not disclose details (e.g. location) of their investment properties. Some companies cross-listed in HK stock exchange disclose the location (s) of their investment property assets in the annual reports submitted to HK stock exchange, but do not have such disclosure in their domestic annual reports (e.g. Weichai power, 2009).

[125] For example, change purpose of use from held for capital appreciation to self-use, and investment property assets will be reclassified as fixed assets.

five (Section 4.4.6) relates to the potential capital market consequences of fair value model adoption and is developed based on the theories mentioned in Sections 2.4.1 and 3.4.1.

4.4.1 Theories

From a review of relevant literature, I find that FVA for investment property is new to Chinese companies, and a prominent feature of its implementation in practice is the low adoption rate. However, the motivations underlying the fair value model adoption or non-adoption decisions, and the consequences relating to fair value model adoption remain largely unknown. This section describes the theoretical framework used to study these issues.

4.4.1.1 Economics-based accounting choice theories

According to the definition by Fields et al. (2001), accounting choice refers to any decision made by the managers that can influence the output of the accounting system in a particular way. Theories of accounting choice are derived primarily from the theory of firm and the agency theory. The theory of firm suggests that a firm exists when at least two individuals cooperate in production at contracting costs lower than production in the market (Coase 1937). Because owners of the firm are usually not engaged in its daily operation, the agency theory predicts that due to information asymmetry, the managers have incentives to shirk and shareholders of the firm need some mechanisms to reduce shirking (Jensen and Meckling 1976). A number of contractual arrangements thus evolves to make the firm cost-effective and to maintain its existence.

As part of the cost-effective contractual and organizational arrangements, accounting plays a role both in contracts inside the firm and in the contracting arrangements with parties outside the firm. For example, the firm may use accounting-based compensation contracts to allocate decision rights and to protect shareholders against expropriation of the managers. Also, debt and sales contracts with external capital providers and customers are usually based on accounting numbers (Watts 1992). Accounting choices arise in these contracts to make the firm more cost-effective. The managers, on the other side, have incentives to voluntarily disclose information to signal their efforts and performance. Three sets of incentives (i.e. contractual motivations, asset pricing motivations, and third parties' motivations) have been identified by the accounting choice literature as influencing factors of managers' decisions (Fields et al. 2001).

4.4.1.2 Innovation diffusion theory

The economics-based accounting theories have provided useful insights into the determinants of accounting choice in the developed markets' context. However, FVA is an accounting method evolved in the developed capitalist economy markets, and its adoption in China, which is the largest developing socialist market economy in the world, may be affected by other contextual factors beyond

the above-mentioned theories. The innovation diffusion theory by Rogers (2003) proposes a variety of factors that affect the adoption of innovations and can enrich the analysis of Chinese companies' fair value model adoption decisions. Also, this theory predicts some consequences relating to an adoption or non-adoption decision (Figure 4.1).

[Insert Figure 4.1 here]

According to the innovation diffusion theory, an innovation is defined as "an idea, practice, or project that is perceived as new by an individual or other unit of adoption" (Rogers 2003, p.12), and the diffusion of innovation is a process of reducing uncertainty. An innovation is usually reinvented by the change agents (e.g. domestic accounting standard setters) at its implementation stage. Both characteristics of the adopter and innovation influence the uncertainty about the innovation and help explain its adoption. In addition, structure and norms of the social system are also likely to affect acceptance of the innovation.

Attributes of innovations that affect the adoption decision include relative advantage, compatibility, complexity, trialability, and observability. Relative advantage refers to "the degree to which an innovation is perceived as being better than the idea it supersedes" (Rogers 2003, p. 229), and it is the strongest predictor of the adoption decision. Compatibility refers to whether the innovation is compatible with the existing values, past experience and needs of the potential adopters, and complexity is the degree to which the innovation is difficult to understand and use. Whether the innovation can be experimented (i.e. trialability) and the degree to which the results of it are visible to others (i.e. observability) are also potential motivational factors in the adoption of an innovation.

From the perspective of an organization, the degree to which it accepts an innovation is affected by characteristics of its leaders and attributes of organization structure such as extent of centralization and firm size (Rogers 2003, p.411). For example, organizational size can be positively associated with the innovativeness of an organization because larger firms tend to have more resources and better employee technical expertise to implement the innovation. In an organization where power and control are relatively concentrated, top leaders may be less likely and less motivated to identify the need for an innovation. More discussions about the influence of organizational characteristics on fair value model adoption decision are provided in the following subsections and the empirical model specification section.

In addition to the factors that influence innovation adoption, Rogers (2003, p.436) also points out the importance of studying the consequences that result from the adoption decision. The consequences are classified into three groups: desirable versus undesirable, direct versus indirect, and anticipated

versus unanticipated consequences. Studying the consequences can help people (e.g. those that haven't adopted the fair value model, accounting standard setters) evaluate whether to adopt or reject the innovation in the future.

4.4.2 Managerial incentives and Chinese listed companies' accounting choice

4.4.2.1 Contracting incentives and Chinese listed companies' accounting choice

Contractual incentives arise in the presence of agency costs and absence of complement and perfect market (Scott 2015). The choice towards the fair value model can be influenced by debt contracting in two ways. Due to the higher level of verifiability of the historical cost amounts and thus less room for managerial discretion, the lenders may prefer the cost model to the fair value model and may write the contracts with terms and conditions based on the historical cost-based measures (Watts 2003). On the other hand, fair value may be particularly relevant and can deliver more timely information on the solvency capability to lenders in China as the real estate prices in this country are undergoing rapid growths (Fang et al. 2015).

Some Chinese companies stated in their accounting policy change announcement that reasons for this change are that "the investment property held by the company is mainly commercial properties located in mature commercial districts. The value is increasing fast, the appreciation potential is large and the growth in value is expected to continue", "Under the cost model, book value decreases with depreciation and amortization, and it does not reflect the appreciation in value, thus underestimates corporate value", "(the fair value model) can reduce the debt to asset ratio, and improve financing ability of the company" (Beijing Huaye Capital Holdings CO. Ltd. 2013, Gemdole, 2013, Lonsen 2016[126]). The fact that some fair value-measured investment properties are used as collateral, as disclosed by some companies in their annual reports (e.g. Shanghai Shimao, 2009), also implies Chinese lenders' demand for investment property fair value. Accordingly, hypothesis 1a is stated in the null form as:

Hypothesis 1a: Chinese listed companies' decisions to adopt the fair value model for subsequent measurement of investment property do not relate to debt contracting incentives.

4.4.2.2 Asset pricing incentives and Chinese listed companies' accounting choice

The accounting choice can also be driven by the motivation to influence asset prices. In the presence of information asymmetries, the better-informed insiders can impart information about the timing, magnitude, and risk of future cash flows to less well-informed outsiders through accounting choice. However, the self-interested managers may also expect to increase or reduce stock prices (or meet or

[126] Annual reports of these companies can be downloaded from http://www.cninfo.com.cn/new/index.

beat analysts' earnings forecasts) for reputation or compensation purposes, and thus exploit the accounting choice to report higher or lower earnings (Fields et al. 2001). The accounting method choice can take various forms including earnings smoothing and loss avoidance (Leuz et al. 2003, Burgstahler et al. 2006). The survey by Graham et al. (2005) et al. shows that firms have incentives to report higher earnings to meet or beat certain earnings benchmarks, as many managers believe that meeting benchmarks can reinforce market confidence and help maintain or increase stock prices. In China's context, He et al. (2012) find evidence that firms sell available-for-sale securities (AFS) to offset unrealized fair value loss from trading securities, and they also find that some companies manage fair values in debt restructuring to report higher earnings. Wei and Xue (2015) report that Chinese companies opportunistically sell AFS to meet or beat analyst forecasts. Due to the lack of liquidity and transparency of real estate market in China[127], fair value of investment property can be easily manipulated to increase or decrease reported earnings and to influence share prices. However, it is also possible that earnings management through investment property fair values is easily detectable due to the disclosure requirements. As a result, companies with asset pricing incentives may also be less likely to choose the fair value model. Accordingly, hypothesis 1b is stated in the null form as:

Hypothesis 1b: Chinese listed companies' decisions to adopt the fair value model for subsequent measurement of investment property do not relate to equity financing incentives.

4.4.2.3 Regulation-motivated incentives and Chinese listed companies' accounting choice

Other than the actual (the principles) and potential owners (the investors) of the firm, the managers may also hope to influence the decisions of third parties such as the government regulators (Fields et al. 2001). China's stock exchanges were established in the early 1990s as a vehicle for its state-owned enterprises (SOEs) to raise external capital, and the government intervened in the capital market by implementing various regulations. For example, a Chinese company has to go through stringent procedures by the CSRC to get listed and to achieve equity refinancing. After IPO, the listed companies have to maintain good financial condition as they would have the risk of being delisted if they report losses in three consecutive years (CSRC 2007). In addition, there are also accounting number-based rules to regulate rights issue of the Chinese listed companies. Because the bond market in China is underdeveloped, equity refinancing has lower cost of capital compared with debt refinancing. Therefore, the Chinese listed companies have strong motives to manage earnings and to maintain their access to equity refinancing. The delisting regulation and Special Treatment (hereafter "ST") policy is one of the primary policies that affect managers' accounting choice decisions (e.g. Chen and Yuan 2004, Haw et al. 2005, Chen et al. 2009).

[127] Compared to other developed markets (JLL 2018).

The ST policy was implemented by Shanghai and Shenzhen stock exchanges in 1998 as part of the listed firms' rules. The aim of the ST policy is to provide earning warnings to investors about risky firms and creates a buffer zone between the normal firms and the suspended firms (Jiang and Wang 2008). Specifically, if a firm has a negative net profit for two consecutive fiscal years, an "*ST" cap will be put in front of the stock name to indicate that the firm is in financial distress. The daily share price movement of the ST firms is restricted between -5% and 5%, rather than 10% of the normal firms. In addition, the semi-annual reports of the ST firms must be audited while there is no such requirement for the normal firms. An ST firm would be in danger of delisting if it cannot recover its further performance (CSRC 2007, SZSE 2012). Being in ST status severely undermines the firm's reputation and credit ratings, and can dampen firms' ability of raising additional capital from the stock market. As the ST rules are mainly based on accounting net profit, managers of the Chinese listed firms have strong incentives to avoid loss to protect its important source of capital refinancing, and the choice of fair value model for the subsequent measurement of investment property could be a vehicle for these companies to prevent getting the regulatory cap. However, the firms that are already in financial distress may not be capable of affording the valuation costs and information disclosure costs relating to fair value model adoption. In this situation such firms may be more likely to use the cost model. Accordingly, hypothesis 1c is presented in the null form as follows:

Hypothesis 1c: Chinese listed companies' decisions to adopt the fair value model for subsequent measurement of investment property do not relate to regulation motivated incentives.

4.4.3 Location of the investment property and Chinese listed companies' accounting choice

The review of ASBE 3 in Section 4.4.2.3 shows that if the Chinese companies would like to adopt the fair value model for subsequent measurement of investment property, they have to justify that fair values of these assets can be reliably obtained on a continuous basis. In addition, the accounting literature suggests that managers have incentives to smooth earnings and reduce earnings volatility (e.g. He et al. 2012). Accordingly, volatility of the real estate markets, whether there exist reliable fair values for investment property assets, and accessibility of these values are potential factors that could affect Chinese listed companies' decisions to adopt the fair value model. If the market prices of investment property assets held by the companies fluctuate reasonably and can be obtained easily, we may expect higher probability of fair value model adoption as the fair value model is likely to be more compatible with the companies' needs to deliver useful information to outside investors, and may generate more benefits than costs to the enterprises. However, both the real estate market and the appraisal industry are relatively nascent in China, and the past 20 years have witnessed skyrocketing and highly volatile housing and land prices across different regions in China.

The overview in Section 4.4.1 of the real estate markets, property appraisal industry and valuation practice in China shows that in tier 1 and some tier 2 cities, the institutions are better developed, real estate markets have better liquidity, and property prices are likely to be more transparent and accessible. Consequently, fair values of investment property assets located in these cities are more likely to be measured reliably on a continuous basis. In other words, for companies holding properties in the better-developed cities, the fair value model can be less complicated to use and has greater relative advantage, hence these companies can be more likely to adopt the fair value model. However, there are also likely to be more prevalent speculative trading and stronger government interventions in these better-developed cities, which increase the volatility of investment property fair values. Such volatility in asset values may generate additional information disclosure costs[128]. Given the above arguments, the second hypothesis is written in the null form as:

Hypothesis 2: Chinese listed companies' decisions to adopt the fair value model do not relate to the location of the investment property assets.

4.4.4 State ownership and Chinese listed companies' accounting choice

Leaders' attitude and organizational characteristics of a company (e.g. centralization and organizational slack) are predicted by the innovation diffusion theory to affect the decision to adopt an innovation. Centralization of an organization refers to "the degree to which power and control in a system are concentrated in the hands of a relatively few individuals", and organizational slack refers to "the degree to which uncommitted resources are available to an organization" (Rogers 2003, p.412). More centralized organization is less likely to be innovative, while organizational slack positively relates to the likelihood of innovation adoption. In addition, an adoption decision is more likely to be made when leaders in an organization favour the innovation. State-owned and non-state-owned companies differ in these characteristics and thus the two types of organization could diverge in their preferences for the fair value model.

As a socialist polity, state-owned enterprises play a dominant role in China. State-owned enterprises (SOEs) differ from non-state-owned enterprises (NSOEs) in many ways. The SOEs are ultimately controlled by central or local governments, and they have a number of social and political objectives rather than to maximize profits (Chen et al. 2006). On the other hand, NSOEs are controlled by private individuals and institutions, and the primary objective of these enterprises is to earn profits. In China, compensation contracts in SOEs and NSOEs are usually different, with managers in SOEs (especially those controlled by the local governments) less likely to be measured by accounting performance

[128] For example, companies with more than 20% earnings growth are required to explain the reasons of growth (CSRC 2017, P.16).

benchmarks (Ke et al. 2016). Therefore, managers in SOEs may be less motivated than those in NSOEs to manage the accounting numbers, and the fair value model may have less relative advantage than historical cost model for the SOEs. A counterargument is that because managers in the SOEs have less power in influencing firm performance, they have stronger incentives to influence stock prices through manipulating accounting numbers (Hass et al. 2016). In this case, the SOEs are likely to adopt the fair value model and manage investment property fair values.

In terms of their financing channels and needs, SOEs have easy access to equity and credit markets due to their political connections, and they usually receive preferential treatment from the government (Chen et al. 2011b). Therefore, the SOEs could also have less incentives to produce high-quality accounting information, to reduce information asymmetry and to lower cost of capital through adopting the fair value model. In addition, the fair value model can be less compatible with the objectives of SOEs, especially when fair values of the investment property assets are increasing (e.g. Chen et al. 2011a). However, compared to NSOEs, the SOEs also have higher degree of organizational slack and may be more capable of bearing the high costs in using the fair value model. Hence, their preference towards fair value model is not clear.

Unlike SOEs, NSOEs usually have difficulty in accessing loans from state-owned banks, and they rely more on the external equity markets (Chen et al. 2010). Therefore, NSOEs are under greater pressure from the analysts and have greater incentive to provide high-quality accounting information and to reduce information asymmetry (Chen et al. 2016). However, due to the financial constraints, the NSOEs may also find it more difficult to bear the information production costs associated with adopting the fair value model. Given the competing arguments on the characteristics of SOEs and NSOEs, the third hypothesis is written in the null form as follows:

Hypothesis 3: Chinese listed companies' decisions to adopt the fair value model do not relate to state-ownership.

4.4.5 Investor sophistication and Chinese listed companies' accounting choice

The innovation diffusion theory argues that complexity of members in an organization affects its attitude towards an innovation. Complexity refers to "the degree to which an organization's members possess a relatively high level of knowledge and expertise" (Rogers 2003, p.412). According to the theory, we would expect a listed company to take investor sophistication into consideration when making the accounting choice. There could be lower costs relating to fair value model adoption in firms with more professionalised investors, as they can grasp the implication of fair value model more easily. However, it could also be difficult to achieve consensus about implementing the innovation when the investors have diverse knowledge and expertise.

The China's stock market is dominated by the high proportion of speculative individual investors, rather than by the more sophisticated, professional institutional investors. There are about 101.61 million individual investors by February 2016, which account for 99.71% of the total investors in the stock market (Jiang et al. 2016). The individual investors and institutional investors in China are engaged in different trading strategies, some individual investors prefer stocks with poor past performance, and there is evidence on the impact of individual investors' activities on future stock volatility (Ng and Wu 2006, 2007). In addition, Tan et al. (2008) find investor herding[129] behaviour in both rising and falling market conditions, and in Shanghai stock exchange such behaviour is more pronounced under conditions of rising markets. Yao et al. (2014) also document prevalent herding behaviour in Chinese stock markets, and they find herding is stronger for growth stocks and under conditions of declining markets. Under such circumstances, the volatility associated with investment property fair values could induce excess investor reaction particularly among companies with higher proportion of individual shareholders and may lead to excess volatility in stock prices. To avoid the undesirable stock price fluctuation, companies with fewer sophisticated shareholders may prefer the historical cost model. In other words, companies with more sophisticated investors are more likely to choose the fair value model[130].

Companies with more sophisticated investors can also be less likely to choose the fair value model due to these investors' demands for high-quality accounting information. For example, Chung et al. (2002) find that large institutional shareholders help constrain managers' opportunistic management of discretionary accruals. Koh (2003, 2007) differentiates between long-term and transient institutional investors, and he finds aggressive earnings management is constrained by long-term institutional investors. In China's context, Cheng et al. (2006) find a positive association between earnings timeliness and institutional shareholding, Gao and Zhang (2008) document a negative association between institutional shareholding and earnings management among non-financial listed companies. Bo and Wu (2009) provide evidence on a negative association between institutional shareholding and upward earnings management among the NSOEs. We may infer from these studies that if fair value model is used primarily for earnings management purposes, there could be a negative

[129] Herding refers to a group of investors trading the same direction during a period of time, and it is found to relate to excess volatility in stock prices (e.g. Nofsinger and Sias 1999).

[130] More sophisticated investors may also demand more transparent and higher quality accounting information (e.g. Velury and Jenkins 2006), which increase the likelihood of choosing fair value model if both investors and managers agree the fair value model could produce high-quality information. Alternatively, Bushee (2001) argues that transient institutions myopically price firms and induce managers' short-term earnings management incentives. Yang et al. (2012) report earnings management incentives driven by trading activities of institutional investors in China. Such incentives could also relate to positive association between institutional shareholding and the probability of FVA adoption when the fair value model is used for earnings management purposes.

association between the proportion of sophisticated investors and the probability of fair value model adoption. Ultimately, the decision to adopt the fair value model or not depends on the consensus between influential investors and managers on the quality of information produced under the fair value model. Given these arguments, the fourth hypothesis is written in the null form as:

Hypothesis 4: Chinese listed companies' decisions to adopt the fair value model do not relate to the level of investor sophistication.

4.4.6 Capital market consequences of Chinese listed companies' accounting choice

Depending on the incentives of fair value model adoption, the fair value of investment properties may either contain managers' private information about future cash flows or it can be influenced by earnings management incentives. As most investment properties have less liquid secondary markets than financial assets in China, their fair value inputs are more likely to rely on model estimates and thus firm managers have greater discretion in estimating investment property fair values (Taplin et al. 2014). If the fair value model delivers timely and reliable information about future cash flows to the information users, they may be more capable of forecasting firms' future earnings. Also, there could be less bad news hoarding among the fair value model adopters. On the contrary, if the fair value model is adopted primarily for opportunistic earnings management purposes, the future earnings of fair value model adopters may be less predictable than those using the cost model. At the same time, the managers may be able to withhold more bad news. When such bad news is released all at once in the future, the company would be likely to experience stock price crashes (Jin and Myers 2006). Accordingly, hypotheses 5a and 5b are written in the null form as:

Hypothesis 5a: There is no significant difference in financial analysts' forecast accuracy between adopters of the fair value model for investment property and non-adopters in China.

Hypothesis 5b: There is no significant difference in stock price crash risk between adopters of the fair value model for investment property and non-adopters in China.

4.5 Research design

This section outlines the research design for hypothesis testing. Section 4.5.1 describes the sample and data source; Section 4.5.2 presents model specifications and variables used to test the hypotheses.

4.5.1 Sample and data source

Table 4.2 presents the sample selection procedure. The sample period spans 10 fiscal years, from the effective year of ASBE 3 in 2007 to 2016[131]. To enhance power of the tests, I exclude firms that do

[131] The sample period ends at 2016 because financial data later than this year is not available when the study

not have any investment property assets during the sample period, and this results in 10,284 potential firm-year observations. I then exclude 21 firm-year observations with missing balance sheet data. To ensure that the analyses are focused on A-share companies (i.e. companies listed in domestic stock market), I remove observations with stock codes begin with "900" and "200"[132]. After the initial screening procedure, 9,575 firm-year observations remain in the sample. Depending on the availability of control variables used in hypothesis tests, there is a variation in the final sample size for different tests. Because some companies are listed after 2007, I use an unbalanced panel data set to improve statistical power of my analyses. Fair value model adopters and changes in investment property fair values are identified and hand-collected from the annual reports of the listed companies, and other financial data is obtained from the China stock market & accounting research database (CSMAR).

[Insert Table 4.2 here]

Figures 4.2 and 4.3 show that the amounts of investment property in domestic Chinese stock market are increasing during the sample period. By the end of 2016, there are over 250 billion Chinese *yuan* investment property assets held by about half of the listed companies. Despite the increasing trend in the number of listed companies holding investment real estate assets, as well as the booming real estate market since the early 2000s[133], the adoption rate of fair value model for subsequent measurement of investment property remains very low in China. By the end of 2016, only about 5% of the companies choose to use the fair value model, and this adoption rate is much lower than that in the Europe[134]. For the sample of fair value model adopters, there are 82 observations of first year adoption and 319 post-adoption year observations. For the sample of 9,575 firm-year observations, investment property on average represents 3.54% of firms' total assets. Among the observations that use the fair value model, investment property assets on average represent 13.32% of firm's total assets, indicating the economic importance of this assets within these firms.

[Insert Figure 4.2 here]

[Insert Figure 4.3 here]

is conducted.

[132] Stock code begins with "900" represents H-share companies (i.e. those listed in Hong Kong stock exchange), and stock code begins with "200" represents B-share companies (those traded in foreign currency). See CSRC (2006b) for more details.

[133] See Figure 1 of Lu et al. (2019) for housing price index in China during 2003-2016.

[134] Studies in the European setting report that about half of their sample companies choose the fair value model (e.g. Edelstein et al. 2012, Christensen and Nikolaev 2013, Israeli 2015).

Table 4.3 provides a breakdown of the sample firms by industry and by year. About 63% of the fair value model adopters are from the manufacturing and real estate industry, and there is a slightly increasing trend in fair value model adoption since 2012. The real estate industry has the highest rate of fair value model adoption, and the leasing and commercial service industry has the second highest fair value model adoption rate. Untabulated statistics show that 43 out of the 82 fair value model adopters are located in the economically more developed provinces along the coastline (i.e. Guangdong, Shanghai, Hainan, Jiangsu, Fujian), while other adopters are located in 17 inland provinces. Among the fair value model adopters, about half of the 82 companies use fair value estimates provided by external appraisers in the first year of accounting policy change, 189 out of the 401 fair value model adopter firm-years explicitly state in their footnotes that their investment property fair values are estimated by external appraisers, or are adjusted by the management on the basis of external appraisers' estimates. In terms of estimation inputs to investment property fair values, data collected from 2015 and 2016 shows that the fair values of only 10% of firm-year observations are based on market prices for identical assets (level 1 fair values), while over half (55%) of the firm-year observations use level 2 fair values and the remaining 35% are based on valuation models (level 3 unobservable inputs). The descriptive statistics indicate that reliability of investment property fair values is likely to be of concern.

[Insert Table 4.3 here]

4.5.2 Model specifications

4.5.2.1 Determinants of the measurement model of investment property

To estimate the probability of adopting fair value model for the subsequent measurement of investment property, I estimate the following cross-sectional probit model:

$$\begin{aligned}\text{Prob}(FVIP = 1) = \text{Probit}\big(&\alpha_0 + \beta_j Debt\ \text{contracting incentives}_{i,t} + \\ &\beta_k \text{Asset pricing incentives}_{i,t} + \beta_m \text{Regulatory incentives}_{i,t} + \\ &\beta_n \text{Location of the investment property}_{i,t} + \\ &\beta_o \text{State ownership}_{i,t} + \beta_p \text{Investor sophstication}_{i,t} + \beta_v \sum \text{Controls}_{i,t} + \varepsilon_{i,t}\big) \quad (1)\end{aligned}$$

Where Prob(.) is the probability, FVIP is a dummy variable that equals 1 if investment property assets are measured by the fair value model for firm i in year t, and 0 otherwise. Probit(.) is the cumulative distribution function of the standard normal distribution. To reduce the influence of extreme values, all continuous variables are winsorised at 1% and 99% percentiles. Moreover, standard errors are clustered at the firm level to reduce the potential influence of arbitrary heteroscedasticity and within-

group autocorrelation (Petersen 2009). The experimental variables and control variables are described in the following sections.

Experimental variables

Debt contracting incentives

Following Christensen and Nikolaev (2013), I split leverage in year t-1 into long- term (LDEBT) and short-term (SDEBT) debt-to-asset ratios to test their roles. This decomposition is particularly relevant in China's context because according to its accounting standards, fair value model adoption tends to be a long-term commitment for the listed companies and therefore there may be a difference in the influence of long-term and short-term debt contracting incentives. Also, short-term and long-term debt covenants may rely on accounting-based indicators in different ways. Managers may adopt the fair value model to dilute prior year leverage and increase the probability of raising future debts, or they may stick to the historical cost model when the lenders demand for more reliable accounting information. Therefore, I do not predict a sign for the debt contracting proxies.

Asset pricing incentives

Under the opportunistic contractual perspective, self-interested managers exploit the accounting choice to increase compensation or to avoid violation of debt covenant (Fields et al. 2001, Israeli 2015). When the management compensation plan is written in terms of accounting-based earnings measures, they could be motivated to manipulate accounting numbers to meet the benchmark required to earn the bonus. The managers compensated by stock options may also have incentives to manage earnings to influence stock prices and to obtain the stock option awards. If their compensation contracts do not exclude the unrealized fair value changes as part of the performance measurement (e.g. Manchiraju et al. 2015), it is possible that the managers adopt the fair value model and expect to manage their compensation benchmarks though the estimates of investment property fair values.

To capture the extent to which management bonus or compensation is tied to stock prices, MANAGE is the proportion of management-controlled share to total number of outstanding shares, and if the managers are driven by compensation purpose to adopt the fair value model, MANAGE will be positively associated with the probability of fair value model adoption. If managers expect the adoption of fair value model to signal negative information about firm's future prospect and thus negatively affects stock prices, or if the managers' compensation covenants exclude changes in unrealised fair values from performance benchmark, MANAGE will be negatively associated with the probability of fair value model adoption.

Another proxy to capture asset pricing incentives is meet or beat analyst forecast (MTBTANA). MTBTANA is an indicator variable, and it equals 1 if firm i's actual EPS in year t meets or beats its

consensus analyst forecast after fair value gains and losses on investment property. Analyst consensus forecast is estimated by calculating the median of EPS forecast issued by all analysts following firm i 90 days before the financial reporting date. If the fair value model is adopted to meet or beat the consensus forecast, a positive coefficient on MTBTANA is expected. If managers expect analysts to see through earnings management through investment property revaluations, they may avoid changing the accounting policy[135]. Similar to MANAGE, I do not predict a sign for MTBTANA.

Regulation-motivated incentives

Regulatory incentives include the incentive to avoid the ST cap and the incentive to meet or beat accounting benchmarks to issue new equity. To capture regulatory incentives to meet the net equity and profitability requirements and thus to avoid trading suspension and de-listing[136], ST is a dummy variable equals 1 if company i carries an *ST symbol in year t-1 due to two consecutive year losses. DLOSS is a dummy variable equals 1 if company i without the ST symbol reports a loss in year t-1, and 0 otherwise. This variable captures the loss avoidance incentive. To capture incentives driven by initial public offering, I include a dummy variable FIRSTLIST, which equals 1 for the first-year company i went public, and 0 otherwise. Because once the companies adopt the fair value model, they cannot switch back to the historical cost model, therefore the accounting policy change is a long-term strategy and may relate to new equity issuance decisions in the years after fair value adoption. To capture the incentive driven by new equity issuance, I use RAISECAP, which is an indicator variable that equals to 1 if firm i reports increase in equity capital in year t or year t+1, and 0 otherwise. Companies with regulation-related earnings management incentives may consider the investment property fair value model to achieve their goals, or they may be constrained by resources available to make the accounting policy change. Therefore, I do not predict a direction for coefficients on these variables.

Location of the investment property

According to the list of Chinese city tiers in Fang et al. (2015), I divide the Chinese cities into those with more active and volatile real estate markets (i.e. tier 1 and tier 2, see Appendix 4.1 for the list) cities, and those cities with lower volatility and less transparent market information (i.e. cities other than tier 1 and tier 2 cities). ACTIVITY is a dummy variable that equals 1 if the registration address of company i is in tier 1 or tier 2 cities, and it equals 0 if the company is registered in other cities. By using registration address of the company as a proxy for location of the investment property, I assume that the company invests in real estate assets in cities with similar market conditions as its registration

[135] To investigate financial analysts' perception towards adoption of investment property fair value model, I check the analysts' reports for the fair value model adopters. Some analysts explicitly point out in their reports that significant growth in performance is due to changes in investment property fair values (e.g. Chen 2012).
[136] See also CSRC (2007).

place. To examine the validity of this proxy, I hand-collected the investment property location information from footnotes of fair value model adopters' annual reports. Among the 401 fair value adopter firm-years, 242 of them explicitly disclose information about the location of their investment property assets. Although some companies have investment property assets outside their registration place, the majority of such assets are located in cities with similar market conditions. Nevertheless, ACTIVITY can still be a noisy proxy for the investment property location. If companies locate in lower-tier cities invest (mostly) in properties in tier 1 or tier 2 cities[137], the coefficient on ACTIVITY would be biased downward when ACTIVITY and probability of adoption should be positively correlated. If companies locate in tier 1 or tier 2 cities invest (mostly) in properties in lower-tier cities[138], the coefficient on ACTIVITY would be biased upward when ACTIVITY and the probability of adoption should be positively correlated.

According to the arguments in Section 4.4.3, tier 1 and tier 2 cities have active real estate markets and more accessible property prices, but also higher probability of price volatility and government monitoring and intervention. Therefore, I do not predict a sign for this variable.

State ownership

STATE is a dummy variable that equals 1 if ultimate controller of the company is the government. In robustness tests, I also use the proportion of state-owned shares as an alternative measure of state ownership. According to the arguments in Section 4.4.4, state-owned companies may not have strong incentives driven by financing or compensation purposes to choose the fair value model, or they could also be more capable of bearing the information production costs or under some circumstances motivated by managerial incentives to choose the fair value model. Therefore, I do not predict a sign for this variable.

Investor sophistication

Following Walther (1997), I use the proportion of institutional ownership (INSTI, which includes all types of institutions such as mutual funds, insurance companies, qualified foreign investors) to measure investor sophistication. According to the arguments in Section 4.4.5, more sophisticated investors may demand more relevant information and reduce potential stock price volatility relating to the accounting policy change, or they would exert monitoring and reduce the scope of earnings management and hence reduce the relative advantage of adopting fair value model for the companies. Therefore, I do not predict a sign for this variable.

[137] i.e. where ACTIVITY should be 1 but was donated as 0. Five out of the 242 firm-years with location disclosure belong to this category (Stock code: 600745 during 2012 to 2016).

[138] i.e. where ACTIVITY should be 0 but was donated as 1. Two out of the 242 firm-years with location disclosure belong to this category (Stock code: 600759 during 2007 to 2008).

Control variables

In addition to proxies for incentives, I control for a number of variables that could affect firms' decision to adopt the fair value model. Big 4 auditors (BIG4) may challenge real estate fair values more than non-big 4 auditors, hence I expect a negative association between BIG 4 and fair value model adoption. Cross-listed firms (CROSS) report under IFRS are required to estimate investment property estimates, and there could be less incremental cost if they adopt the fair value model in their domestic reports. Hence I expect a positive association between CROSS[139] and fair value model adoption. Measure of share concentration (TOP 10) captures the demand for fair value information from the outside shareholders. Because the controlling shareholders (insiders) may obtain fair value of investment properties through non-financial statement channels, firms with less dispersed share structure may have less demand to disclose such information publicly. Therefore, TOP 10 may negatively relate to the probability of adopting fair value model.

Book-to-market ratio (BTM) captures information asymmetry, with market value representing the present value of growth opportunities, and book value measuring the value of assets held by the company. Companies having higher level of information asymmetry (higher BTM) may prefer to choose the fair value model to provide more timely information about firm value to the market participants. I also use logarithm transformation of market capitalisation to control for the effects of firm size (SIZE). Larger firms may be more capable of bearing the adoption costs, but in China they can also be less motivated to adopt the fair value model due to concern over political costs, especially when the value of their investment property is increasing. The revaluation of asset values may increase company visibility, attract regulation attention and induce higher probability of larger political costs (e.g. Chen et al. 2011a).

The innovation diffusion theory predicts that members of the social society differ in their perceived risk or award of adoption, and they do not adopt an innovation simultaneously. The number of previous adopters reduces the perceived social risk of adoption, namely, there is a positive correlation between the number of previous adopters and the probability of adoption (Redmond 2003). Therefore, I add two additional control variables, proportion of fair value model adopters in the same industry

[139] Considering potential differences in reporting requirements between B-share (i.e. those listed in domestic stock exchanges but trade in foreign currencies) and H-share companies (i.e. those cross-listed in Hong Kong stock exchange), I breakdown CROSS into CROSSB and CROSSH, to differentiate between these two types of cross-listed companies. The B-shares and H-shares are targeting mainly at foreign investors, and some of these companies report under IFRS. Therefore, it is possible that these cross-listed companies have demands for better information quality and are more likely to adopt the fair value model. There are nine sample firm-years cross-listed in other stock exchanges (e.g. the US), and all of them are historical cost model users. Removing these firm-years from the sample does not affect the main findings.

in year t-1 (INDUSFV) and proportion of fair value model adoption in the same region in year t-1 (REGIONFV) to control for this effect[140]. Companies in the real estate industry are likely to have investment properties as their key operating assets, and companies with a higher proportion of investment property may have greater incentives to choose fair value model to reflect the underlying firm value. Hence, I expect positive coefficients on the dummy variable for real estate companies (REALESTATE) and the relative size of net investment property assets (NIPTA).

4.5.2.2 Consequences of model choice for subsequent measurement of investment property

To provide evidence on whether the fair value model provides useful information to the investors, and whether it affects stock price quality in China's setting, I examine the effects of fair value model adoption on financial analyst forecast accuracy, forecast bias and stock price crash risk in this section. If the fair value model produces relevant information about underlying firm value, and releases timely information about firm performance, we would expect more accurate, less biased analyst forecasts, and lower stock price crash risk among companies adopting this model for subsequent measurement of investment properties.

Because the main analyses state that the choice between the fair value model and the historical cost model is affected by several factors such as contractual, asset pricing and regulatory incentives, the setting studied raises self-selection-related concerns that can affect the results of tests relating to the consequences of fair value model adoption. To adjust for the potential self-selection issues, I use the probit model (1) as a first-stage selection model to test for differences in the market consequences of the choice between fair value and historical cost model (Heckman 1979)[141]. The inverse Mills ratio for each firm-year estimated from model (1) is included in the following cross-sectional pooled ordinary least squares (OLS) models as the second-stage analyses to estimate the consequences relating to the choice between the fair value model and the historical cost model:

$$CONSEQUENCES_{i,t+1} = \alpha_0 + \beta_1 FVIPFIRST_{i,t} + \beta_2 FVIPSUBSE_{i,t} + \beta_3 FVIPFIRST_{i,t} \times NIPTA_{i,t} + \beta_4 FVIPSUBSE_{i,t} \times NIPTA_{i,t} + \beta_5 NIPTA_{i,t} + \beta_6 IMR_{i,t} + \beta_j \sum CONTROLS_{j,i,t(t+1)} + \varepsilon_{i,t} \quad (2)$$

$$CONSEQUENCES_{i,t+1} = \alpha_0 + \beta_1 FVIPFIRST_{i,t} + \beta_2 FVIPSUBSE_{i,t} + \beta_3 FVIPFIRST_{i,t} \times NIPTA_{i,t} + \beta_4 FVIPSUBSE_{i,t} \times NIPTA_{i,t} + \beta_5 FVIPFIRST_{i,t} \times NIPTA_{i,t} \times$$

[140] Classification of industry is based on the 2012 CSRC industry code as provided by CSMAR. Region is based on the conventional classification of the seven geographical areas in China (Appendix 4.2).

[141] In robustness checks, I further use the firm fixed effects model and the PSM method to reduce potential endogeneity concerns.

$$EM\_DUM_{i,t} + \beta_6 FVIPSUBSE_{i,t} \times NIPTA_{i,t} \times EM\_DUM_{i,t} + \beta_7 EM\_DUM_{i,t} + + \beta_8 NIPTA_{i,t} + \beta_9 IMR_{i,t} + \beta_j \sum CONTROLS_{j,i,t(t+1)} + \varepsilon_{i,t} \quad (3)$$

In the empirical models, I include a number of variables that have been found by previous studies to affect financial analysts forecast accuracy, bias and stock price crash risk. The control variables include: discretionary accruals calculated from the modified Jones model (DA), real earnings management proxies (ABCFO, ABPROD, ABDISE), book-to-market ratio (BTM), firm size (SIZE), long-term debt-to-asset ratio (LDEBT), short-term debt-to-asset ratio (SDEBT), share concentration measured by percentage of shares hold by the top 10 largest shareholders (TOP10), percentage of institutional shareholding (INSTI), an indicator variable for state ownership (STATE), an indicator variable that equals 1 if the company is audited by big 4 auditor (BIG4), financial analyst coverage (ANA), trading volume (VOL), an indicator variable that equals 1 if the company is cross-listed in other non-domestic markets (CROSS), a dummy variable (DGW) that equals 1 if there is non-zero goodwill for firm i in year t to control for potential influence of merges and acquisitions. In tests that use financial forecast accuracy as the dependent variable, I also control for forecast horizon (HORI), which is the number of days between the report date and the date of the consensus forecast. In all models, I include industry and firm-fixed effects, and standard errors are clustered at the firm level. Continuous variables are winsorised at 1th percentile and 99th percentile to reduce the impact of extreme values. See Appendix 4.3 for the definitions of the variables.

A set of independent variables in the probit model (1) are not included in the second-stage market consequences tests. The variables excluded include MANAGE, MTBTANA, FIRSTLIST, ACTIVITY, INDUSTRYFV, REGIONFV and REALESTATE. These variables are excluded because there is no convincing evidence that they will directly affect the dependent variables in the second-stage tests. In addition, the exclusion of these variables technically satisfies the exclusion restrictions of the Heckman two-stage self-selection model (Lennox et al. 2012). Admittedly, it is difficult to find compelling instrumental variables which can influence the adoption decision in the first stage but do not directly affect the dependent variables in the second-stage models. To alleviate the concern that the potential self-selection bias still exists, I use the propensity-score-matching method in Section 4.6.3.2 to check the robustness of the results.

The key variables of interest in the tests are FVIPFIRST, FVIPSUBSE, FVIPFIRST×NIPTA, FVIPSUBSE × NIPTA in model (2), FVIPFIRST×NIPTA×EM_DUM and FVIPSUBSE×NIPTA×EM_DUM in model (3). FVIPFIRST is a dummy variable that equals 1 if firm i adopts fair value model for investment property in year t, and FVIPSUBSE is a dummy variable that equals 1 for firm-year observations of fair value model users after the initial year of fair value model

adoption. EM_DUM equals 1 if the firm-year observation exhibits regulation and/or asset pricing incentives to manage earnings, and it equals 0 otherwise. Specifically, a firm-year is defined to have these incentives if it reports negative earnings or net assets, has an "*ST" cap, or reports earnings decline or net asset decline in year t-1. A positive $\beta_1(\beta_2)$ in model (2) indicates that first year adoption (subsequent year use) of fair value model for investment property relates to higher forecast accuracy, more optimistically biased forecast, and higher stock price crash risk. Positive β_3 and β_4 suggest that the effects are stronger among firms with higher proportion of investment property assets. A positive $\beta_5(\beta_6)$ in model (3) indicates that first year adoption (subsequent year use) of fair value model for investment property relates to higher forecast accuracy, more optimistically biased forecast, and higher stock price crash risk among firms with higher proportion of investment property assets and with suspected earnings management activities.

4.6 Empirical results

This section presents the empirical results of hypothesis testing. Section 4.6.1 describes the summative statistics, and Section 4.6.2 discusses the main findings. Robustness checks of the main results are presented in Section 4.6.3. Section 4.6.4 presents additional analysis results.

4.6.1 Descriptive statistics and univariate analyses

Table 4.4 describes the summative statistics of key variables used in the analyses for the sample companies. During the whole sample period, about 4.2% firm-year observations use the fair value model for the measurement of investment property assets. Among the sample observations, there are about 2.8% ST companies, 3.3% first-listing year observations, 10% real-estate companies, and 14.2% of the observations that report a loss. State-owned companies account for over half of the samples, indicating the strong government influence in China's capital markets. In addition, about 6% of the firm-years issue both B-share and domestic shares, and about 5% of the firm-years are cross-listed in the Hong Kong stock exchange. About 8.5% of the sample observations are audited by big four audit firms. Regarding the assumed location of the investment property assets, two thirds (67%) of them are located in first-tier and second-tier cities. The mean proportion of short-term debt to total assets (mean: 0.116) is higher than the proportion of long-term debt (mean: 0.060). In terms of share structure, the mean management shareholding is 0.11% and the mean institutional shareholding is 5.5%. Moreover, share concentration is relatively high, with an average of 55.91% shares controlled by top 10 shareholders.

[Insert Table 4.4 here]

Table 4.5 compares the firm-years reporting under the fair value model to those reporting under the historical cost model, across the mean values of the variables used in the main tests. The table shows

that in addition to short-term debt-to-total assets ratio (SDEBT), share concentration (TOP10), frequency of meeting or beating analyst earnings forecast (MTBTANA) and frequency of reporting a loss(DLOSS), there are notable differences in the key independent variables between the two groups. Specifically, the FVA group has significantly higher proportion of long-term debt-to-asset ratio (LDEBT) than the HCA group (mean difference: 0.048, t-stat: -9.953), and it has more institutional shareholding (INSTI) (mean difference: 1.671, t-stat: -5.072), as well as larger size of investment property assets (NIPTA) than the HCA group (mean difference: 0.107, t-stat: -24.969). The percentage of management ownership (MANAGE) and state-owned companies (STATE) among the fair value model adopters are less than among historical cost model adopters (significant at 0.01 level). In addition, the fair value model adopters are more likely to be real estate companies, cross-listed in other stock exchanges, have higher book-to-market ratio, audited by big four audit firms, and located in tier 1 and tier 2 cities.

[Insert Table 4.5 here]

Table 4.6 reports the correlation coefficients between the key variables used in the main analyses. Panel A of Table 4.6 presents the correlation matrix for the variables used in model (1). The strength of the correlations between these variables ranges from a low of 0 to a high of -0.534. The correlations between FVIP and the independent variables show that the probability of fair value model adoption is correlated with debt contracting incentive measured by long-term debt-to-asset ratio (LDEBT), regulation motived incentives proxied by ST and FIRSTLIST, institutional shareholding, state-ownership at statistically significant level. In addition to the correlations between FIRSTLIST and MANAGE (coefficient: 0.384, p-value<0.01), BTM and LDEBT (coefficient: 0.360, p-value<0.01), SIZE and FIRSTLIST (coefficient: -0.534, p-value<0.01), CROSSH and BIG4 (coefficient: 0.465, p-value<0.01), BTM and BIG4 (coefficient: 0.312, p-value<0.01), REALESTATE and INDUSFV (coefficient: 0.389, p-value<0.01), the absolute values of the other coefficients are less than 0.290. Panel B of Table 4.6 presents the correlation matrix for the variables used in tests for market consequences. The correlations between NCSKEW and FVIPFIRST, NCSKEW and FVIPSUBSE×NIPTA are positive at statistically significant levels, while ACCURACY is negatively correlated with FVIPFIRST×NIPTA at statistically significant level. In general, the correlations between these control variables are not very high, and the highest correlation is between CROSSH and BIG4 (Coefficient: 0.465, p<0.01). Overall, there are no severe multicollinearity problems in the subsequent regression analyses.

[Insert Table 4.6 here]

4.6.2 Main findings

4.6.2.1 Determinants of subsequent measurement model choice

Estimation results for different sample firms

Table 4.7 reports results on the tests for the determinants of the adoption of the fair value model among the full-sample, real estate firms, and firm-years in which net investment property assets account for greater than 7 % of the total assets respectively. Columns (1) and (2) report the coefficients and marginal effects respectively, and the regression is estimated on the full sample. Both SDEBT and LDEBT are positively associated with the likelihood of fair value model adoption, indicating that debt contracting incentives play a role in the accounting choice. The results reject Hypothesis 1a that fair value model adoption does not relate to debt contracting incentives. For asset pricing inventive proxies, MTBTANA negatively relates to the probability of adopting the fair value model (coefficient: -0.228, t-stat: -2.802). The result may indicate that firms are less likely to meet or beat analyst forecast through adopting the fair value model because analysts could see through potential earnings management relating to investment property fair value estimates. The result therefore rejects Hypothesis 1b that fair value model adoption does not relate to asset pricing incentives. The coefficient on STATE is also negative at statistically significant level (-0.680, t-stat: -3.748). The corresponding marginal effect result shows that when holding all other variables at their means, the predicted probability for state-owned companies to adopt the fair value model is 0.028 smaller than non-state-owned companies. The result rejects Hypothesis 3 that fair value model adoption does not relate to state-ownership. The coefficient on INSTI is statistically significant (0.013, t-stat: 1.746), although the marginal effect is zero.

For the real estate companies, the net investment property to total assets ratios range from 0 to 0.981, with a mean value of 0.076. The regression results show that among the real estate firms, those controlled by the state are less likely to adopt the fair value model, indicating that these firms either are less motivated to reduce information asymmetry or tend to avoid political costs relating to value changes in investment property fair values (e.g. Chen et al. 2011a). Institutional shareholding positively relates to the probability of fair value model adoption among these real estate firms (coefficient: 0.042, t-stat: 2.714), indicating that the real estate companies are more likely to adopt the fair value model when investors are more sophisticated. The result is statistically significant at 0.01 level, which rejects Hypothesis 4 that fair value model adoption decision does not relate to investor sophistication.

When focusing on companies with relatively high proportion of investment property assets (NIPTA>0.07), Column (5) of the table shows positive association between the debt contracting incentives and the probability to adopt the fair value model. Coefficient on ACTICITY becomes positive and significant for these sample firm-years (coefficient: 0.535, t-stat 1.831), indicating that

when companies and their investment property assets are located in cities with relatively active real estate markets, the companies are more likely to adopt the fair value model. This result rejects Hypothesis 2 that fair value model adoption decision does not relate to the location of investment property assets. State ownership and Institutional shareholding remain negatively and positively relate to the likelihood of fair value model adoption respectively.

In terms of the control variables, NIPTA and REALESTATE, and BTM exhibit positive and significant association with the probability of fair value model adoption across all columns, suggesting that firms having more intensive investment property assets, real estate companies, and firms with higher information asymmetry are more likely to switch to the fair value model. Among real estate companies and firms with relatively more investment property assets, BIG4 has negative and significant coefficients, indicating that firms audited by higher reputation audit firms are less likely to adopt the fair value model.

[Insert Table 4.7 here]

Estimation results for different sample periods

Roger (2003) suggests that earlier and relatively later innovation adopters could differ in their characteristics and incentives in making the adoption decision. To provide further evidence on whether there are differences in adoption incentives across time, I divide the full sample firm-years into three sub-periods: 2007-2009, 2010-2013 and 2014-2016. The first period, 2007-2009, coincides with the financial crisis period and it also witnesses booming housing prices with relatively less control of real estate prices from the government. As mentioned in Section 4.3, the Chinese government starts intervening in the real estate sector to control the soaring prices since 2010, and fair value model adopters are subject to more stringent disclosure requirements since 2014. Table 4.8 reports results on the determinants of fair value model adoption in these three periods. Columns (1) and (2) report results estimated on firm-years during the 2007-2009 financial crisis period. Among the experimental variables, only STATE is negatively associated with FVIP (coefficient: -0.575, t-stat: -1.901). Coefficients on the control variables show that firms with higher proportion of investment property assets, and real estate companies are more likely to adopt the fair value model, while those audited by big 4 companies are less likely to adopt the fair value model. During 2010 to 2013, SDEBT, LDEBT, DLOSS, FIRSTLIST, INSTI are positively associated with the probability of fair value model adoption, indicating that firms with debt contracting incentives, loss reverse incentives and incentives driven by initial offering, and those with more sophisticated investors are more likely to switch to the fair value model. But potentially due to their financial stress, the ST companies are less likely to choose the fair value model (marginal effect negatively significant at 0.001 level). State-ownership remains negatively relate to the probability of fair value model adoption.

The definition of fair value is clarified, and relevant disclosure requirements are standardised in China since 2014, with the mandate of ASBE 39 *Fair Value Measurement* (MOF 2014b). The change in disclosure requirements may influence the companies' decisions on fair value model adoption. Results in Columns (5) and (6) show that during the 2014-2016 period, both long-term and short-term debt contracting incentives positively relate to the probability of fair value model adoption. However, firm-years that meet or beat analyst earnings forecast, and those with incentives to reverse prior year loss are less likely to switch to the fair value model, indicating that the enhancement in information disclosure reduces companies' incentives to choose the fair value model and to manage earnings through this accounting choice. State-owned companies remain less likely to choose the fair value model adoption during this period, and firms with higher proportion of investment property assets, higher book-to-market ratio, and the real estate companies continue to be more likely to choose the fair value model.

Overall, across the full sample period, state-ownership remains negatively relate to the probability of fair value model adoption, while firms with higher proportion of investment property assets and the real estate companies are more likely to adopt the fair value model. The reluctance of SOEs to adopt the fair value model is consistent with the argument that these companies have easier access to the credit markets due to their political connections, so they have less incentives to spend on fair value estimations. Alternatively, the SOEs also tend to avoid political costs relating to potential earnings volatility associated with the fair value model. For the real estate companies and those with more intensive investment property assets, their adoption of the fair value model may be driven by the incentive to provide investors with more timely information about firm performance and underlying firm value.

[Insert Table 4.8 here]

4.6.2.2 Consequences of subsequent measurement model choice

Table 4.9 presents results on the capital market consequences of fair value model adoption. Panel A of this table reports results estimated using the full sample. Columns (1) and (2) show that there is no significant association between fair value adoption and analyst forecast accuracy. Therefore, there is not significant evidence to reject Hypothesis 5a that there is no significant difference in financial analysts' forecast accuracy between adopters of the fair value model for investment property and non-adopters in China. Column (3) shows a positive association between stock price crash risk measure and FVIPSUBSE×NIPTA (coefficient: 1.073, t-stat: 2.185), and the coefficient is statistically significant at 0.05 level. The result therefore rejects Hypothesis 5b that there is no significant difference in stock price crash risk between adopters of the fair value model for investment property

and non-adopters in China. The result suggests that stock price crash risk tends to be higher among fair value model adopters with intensive investment property assets, after their first year of adoption. However, the result is not robust to alternative estimation samples and variables[142]. The finding is different from Hsu and Wu (2019), who find that the stock prices of fair value model adopters are more likely to crash in China. The differences in findings may be driven by differences in the sample period and in model specifications.

Results in Column (4) show that earnings management relating to investment property fair value estimates impairs analyst forecast performance in the first year of fair value model adoption among firms with higher proportion of investment properties (coefficient: -2.440, t-stat: -1.887). The positive coefficients on FVIPFIRST×NIPTA×EM_DUM and FVIPSUBSE×NIPTA×EM_DUM in Column (5) show that among fair value model adopters that are suspected to engage in earnings management, analyst forecasts tend to be more optimistically biased.

Panel B of Table 4.9 reports results estimated using firm-year observations in the real estate industry. In this reduced sample, FVIPFIRST×NIPTA×EM_DUM is positively associated with analyst forecast bias and stock price crash risk (coefficient: 3.848, t-stat: 2.234 and coefficient: 1.989, t-stat: 2.479, respectively) but is negatively associated with forecast accuracy (coefficient: -5.566, t-stat: -7.196). The results show that the undesirable consequences of earnings management relating to investment property fair value model tend to disappear after first-adoption year, indicating that there is a learning effect among financial analysts and investors of the real estate companies.

Overall, there is consistent evidence on less accurate and more optimistically biased analyst forecast among the fair value model adopters with earnings management incentives. However, there is no robust evidence of stock price crash risk relating to fair value model adoption across different sample firms.

The coefficients on the control variables are generally in line with findings in prior studies. For example, forecast horizon (HORI) negatively relates to forecast accuracy, which is consistent with the argument that more recent forecasts incorporate more updated information and thus could be more accurate. The discretionary accruals and real earnings management proxies also relate to the dependent variables in consistent ways in the two panels.

[Insert Table 4.9 here]

[142] See Tables 4.12, 4.13 for robustness checks results relating to the consequences of fair value model adoption.

4.6.3 Robustness checks

4.6.3.1 Robustness checks for tests on the determinants of fair value model adoption

Alternative variables, samples and model

A set of tests are conducted to check whether the main findings in Table 4.7 are sensitive to alternative variables, samples and estimation models. Table 4.10 reports the results of these tests. Column (1) reports results estimated using log transformation of total assets in year t-1 as the measure of firm size, results of regressions estimated using independent variables without winsorization are reported in Column (2). In addition, I re-estimate model (1) by removing the financial firm-years, the cross-listed firms, and observations of first year listing. The results are reported in Columns (3) to (5) respectively. Column (6) reports results estimated using the logistic regression. Across all sensitivity tests presented in the different columns, debt contracting incentive proxies (SDEBT and LDEBT), NIPTA, REGIONFV, BTM remain positively and significantly associated with the probability of fair value model adoption. In addition, coefficients on MTBTANA and STATE remain negative and significant, which are consistent with findings in the main analyses.

[Insert Table 4.10 here]

Endogeneity

To reduce the concern that some unobserved omitted variables bias the results estimated from the probit model, I match each fair value model firm-year with one historical cost firm-year by firm size, size of the investment property assets and industry. The matching process results in 377 pairs of sample firm-years. Panel A of Table 4.11 compares the firm-specific characteristics of the FVA group and HCA group after matching. The results show that the FVA group has higher long-term debt contracting incentives, more institutional shareholding, and higher BTM than the HCA group. Moreover, the fair value model users are more likely to be audited by big 4 audit firms, and they are likely to be influenced by their peers in the same industry and in the same geographical area. The HCA group tends to have more state-owned companies and higher proportion of managerial shareholding.

Panel B of Table 4.11 reports the results on the determinants of fair value model adoption using the matched sample firm-years. The findings are largely similar to those in the main analyses. Columns (1) and (2) report results on estimations based on the full sample and non-financial sample firm-years respectively. Proxies for long-term and short-term contracting incentives are positively associated with the probability of fair value model adoption, which rejects Hypothesis 1a. The coefficient on MANAGE is negative (-1.117, t-stat=-2.089), indicating that the accounting choice is influenced by potential asset pricing incentives, which rejects Hypothesis 1b. Proxy for investor sophistication is positively associated with the probability of fair value model adoption across different columns,

indicating that companies are more likely to switch to fair value model when they have more sophisticated investors. State-ownership is negatively associated with the probability of fair value model adoption across all four columns, which rejects Hypothesis 3. The coefficient on ACTIVITY becomes positive and significant (0.732, t-stat=2.192) when net property assets account for more than 4% of the total assets in this matched sample, indicating that location plays a role when these assets have relatively higher economic significance. In addition, firm size in Column (1) and Column (4) is negatively associated with the likelihood of fair value model adoption at statistically significant levels, suggesting that the accounting choice may be influenced by political concerns.

[Insert Table 4.11 here]

4.6.3.2 Robustness checks for tests on the consequences of fair value model adoption

Although the above analyses relating to consequences of fair value model adoption use Heckman two-stage model to adjust for self-selection bias, potential endogeneity problems such as reverse causality and unobserved omitted variable bias could still exist. To alleviate the unobserved omitted variables bias concern, I re-estimate the tests by using firm-fixed effects models (An and Zhang 2013). The firm fixed effects model can control for the effects of time-invariant firm-characteristics that might affect both the dependent and independent variables. To examine the sensitivity of the results, I also use alternative sample firm-years and stock price crash measure to re-estimate the regressions. The results are reported in Table 4.12. Panel A of Table 4.12 reports results estimated from regressions including firm fixed effects. Column (2) of Panel A shows that analyst forecast is still optimistically biased both in the first year of fair value model adoption and in the subsequent years after controlling for firm fixed effects. Column (4) shows a negative coefficient on FVIPFIRST×NIPTA×EM_DUM, indicating that analyst forecast is less accurate for fair value model adopters that have earnings management incentives and with more intensive investment property assets, and Column (6) shows that stock price crash risk is higher for these firms. Column (5) shows optimistically biased forecast for these firms both in their first year of adoption and in the following years that use the fair value model. Panel B of Table 4.12 reports results on firm-fixed effects regression using a sample of non-financial firm-year observations, and the crash risk tests use an alternative measure DUVOL to measure the frequency of stock price crashes. The results in this panel are qualitatively similar to those reported in Panel A. Consistent with findings in the main analyses, FVIPFIRST×NIPTA×EM_DUM negatively relates to ACCURACY, while both FVIPFIRST×NIPTA×EM_DUM and FVIPSUBSE×NIPTA×EM_DUM positively relate to BIAS.

[Insert Table 4.12 here]

The propensity score matching approach is also employed to alleviate the endogeneity concern. I match each firm-year reporting under the fair value model with an observation using historical cost model which closely resembles the fair value model observation in terms of a set of firm-specific characteristics. In this case, for each matched pair, their probability to adopt the fair value model should be almost the same except that some companies actually adopt the fair value model. Therefore, if the market consequences are significantly different between the post-match fair value model and historical cost model firms, the only reason driving the difference should be the fair value model adoption event.

The probit regression model (1) is used to estimate the probability (i.e. propensity score) of adopting fair value model, and the matching procedure results in 309 pairs of firm-year observations. Panel A of Table 4.13 compares the FVA versus HCA firms in terms of the characteristics included in model (1). The results show that none of these characteristics differ at any conventional statistically significance level between these two groups of firms. Panel B of Table 4.13 reports the results on market consequences tests estimated using the matched samples. Column (4) of this table shows a significantly negative coefficient (-0.976, t-stat: -2.633) on $FVIPFIRST_t \times EM\_DUM$, indicating that suspected earnings management in the first year of fair value model adoption reduces financial analyst earnings forecast accuracy. Column (5) reports positive coefficients on the interaction terms between earnings management and fair value model adoption in both the first adoption year (coefficient: 0.884, t-stat: 2.116) and subsequent years (coefficient: 0.914, t-stat: 2.521). The results suggest that earnings management leads to optimistically biased analyst forecast among the fair value model adopters. These tests show that adoption of fair value model for subsequent measurement of investment property assets does result in some undesirable consequences.

[Insert Table 4.13 here]

4.6.4 Additional analyses focusing on the fair value model adopters

The main analyses provide some cross-sectional evidence that the decision to adopt the fair value model relates to various earnings management incentives. To provide evidence on whether potential earning management exists among the fair value model adopters[143], I further analyse the accounting numbers reported in their balance sheets and income statements, test the predictive ability of their fair value estimates about future earnings, and compare financial analyst forecast accuracy and stock price crash risk before and after fair value model adoption. The results are presented in this section.

[143] The within-firm-changes research design can also reduce the concerns over self-selection and omitted time invariant firm-specific characteristics (Israeli 2015).

4.6.4.1 Fair value model adopters and potential earnings management

To provide further evidence on whether fair value model adopters are driven by earnings management incentives to make the accounting policy change, I analyse the data disclosed in their footnotes, as well the accounting numbers reported on the balance sheets and income statements. Table 4.14 summarises the key findings. Some fair value model adopters disclose information about their collaterals on loans in the footnotes, and about half of these companies report using the fair value-measured investment properties as collateral. I also collect data on the unrealized fair value gains and losses of investment property assets and compute their influence on current year earnings and net assets. 361 out of the 401 firm-year observations that use the fair value model have non-zero fair value gains and losses on investment property assets. The mean fair value change on investment property assets among the sample companies is 140 million *yuan*, with a maximum fair value gain of 2.16 billion yuan and a maximum fair value loss of 249 million *yuan*. With the unrealized fair value gains on investment property assets, some companies succeeded in avoiding current year earnings and net assets decline, both in the first year of adoption and in the subsequent years of using fair value model. There are also a few loss-making firms reporting unrealized fair value losses on investment properties, indicating potential "big bath" earnings management among these firms.

In terms of potential regulation-driven earnings management, I find that in the first year of voluntary fair value model adoption, 11 out of the 82 adopters successfully remove the "*ST" cap with fair value gains on investment property assets. In the subsequent years, 8 firm-year observations successfully reverse loss with investment property fair value gains and avoid the delisting risk. Though the trace back adjustment requirements on the switch from historical cost model to fair value model, a few companies reverse operating profits loss in the previous year. There are also a few companies reporting a fair value gain on investment property assets and reverse current year losses in operating profits and net assets. Moreover, 6 out of the 82 fair value model adopters use the fair value model in their first year of listing, and quite a few companies report increase in outstanding shares in or after the year of fair value model adoption. These findings further show that investment property fair values reported by Chinese companies may lack reliability.

[Insert Table 4.14 here]

4.6.4.2 Predictive ability of unrealized fair value gains and losses on investment properties about firms' future earnings

To provide further evidence on whether the investment property fair value information meets the qualitative characteristics described in the conceptual framework, I examine the predictability of income statement fair values about firms' future earnings on a reduced sample of firm-year observations with non-zero fair value changes on investment property. If the unrealized fair value

gains and losses convey useful information about future earnings, we would expect a significant association between unrealized fair value gains and losses and future income before extraordinary items (i.e. significant α_1 in model (4)). If α_1 in model (4) is not significant, (i.e. unrealized fair value gains and losses on investment property are not associated with future earnings), but becomes significant after controlling for FVA-related earnings management in model (5), we may infer that the lack of predictive ability of investment property fair values about future earnings can be explained by earnings management activities. Based on previous studies (e.g. Barron et al. 2016, Bratten et al. 2016), I estimate the following pooled cross-sectional OLS models:

$$\mathrm{NI}_{i,t+1} = \alpha_0 + \alpha_1 IPFVUGL_{i,t} + \alpha_2 OTHERFVUGL_{i,t} + \alpha_3 NFVPROFIT_{i,t} + \text{firm} - \text{fixed effects} + \text{industry} - \text{fixed effects} + e_{i,t} \quad (4)$$

$$\mathrm{NI}_{i,t+1} = \alpha_0 + \alpha_1 IPFVUGL_{i,t} + \alpha_2 OTHERFVUGL_{i,t} + \alpha_3 IPFVUGL_{i,t} \times EM\_DUM_{i,t} + \alpha_4 OTHERFVUGL_{i,t} \times EM\_DUM_{i,t} + \alpha_5 EM\_DUM_{i,t} + \alpha_6 NFVPROFIT_{i,t} + \text{firm} - \text{fixed effects} + \text{industry} - \text{fixed effects} + e_{i,t} \quad (5)$$

Where:

$\mathrm{NI}_{i,t+1}$ is net income before extraordinary items at year t+1 for firm i;

$IPFVUGL_{i,t}$ is unrealized fair value gains and losses of investment properties at year t for firm i;

$OTHERFVUGL_{i,t}$ is unrealized fair value gains and losses of assets other than investment properties at year t for firm i;

$NFVPROFIT_{i,t}$ is income before extraordinary items and unrealized fair value gains and losses for firm i in year t;

$EM\_DUM_{i,t}$ represents the dummy variables for FVA-related earnings management. EMREG is an indicator variable for earnings management driven by regulatory incentives, and it equals 1 if the investment property fair value changes allow the firm to remove the "*ST" cap, reverse current year loss, reverse current year negative net assets, or reverse previous year loss through retroactively adjusting changes in investment property fair value estimates. EMAP is an indicator variable for earnings management driven by asset pricing incentives, and it equals 1 if the unrealized investment property fair value changes allow the firm to take "big bath", avoid earnings decline, or avoid net asset decline through revaluation of investment property fair values. EM_DUM is a dummy variable that equals 1 if EMREG or EMAP does not equal 0.

All variables are scaled by beginning-of-the-year total assets, standard errors are clustered at the firm level, and industry and firm-fixed effects are also controlled for in the regressions.

Table 4.15 reports the results on the predictive ability of unrealized fair value gains and losses on investment property about Chinese listed companies' future earnings. Column (1) of Table 4.15 shows that among the companies that adopt the fair value model for subsequent measurement of investment property, the unrealized fair value gains and losses relating to investment properties do not have significant explanatory power for future earnings. However, when taking fair value-related earnings management into consideration, the coefficient on unrealized fair value gains and losses on investment property (IPFVUGL) becomes positive and significant. Column (3) of Table 4.15 shows that earnings management driven by asset pricing purposes also reduces the predictive ability of investment property fair value changes on future earnings (coefficient: -2.504, t-stat: -2.454). Column (4) of the same table shows that the coefficient on the interaction term between investment property fair value changes and earnings management driven by regulatory purposes is negative and significant at the 0.01 level (coefficient: -2.288, t-stat: -2.973). When combining the effects of both asset pricing and regulatory incentives, such earnings management also impairs the predictive ability of investment property fair value changes (coefficient: -3.450, t-stat: -3.558).

[Insert Table 4.15 here]

4.6.4.3 Capital market consequences of fair value model adoption among the fair value model adopters

To investigate whether there is within-firm time-series differences in the market consequences, I re-estimate models (2) and (3) for the sample of fair value model adopters to test the market outcomes before and after fair value model adoption. During the sample period, there are 401 after-adoption observations, and 192 before-adoption observations. The results are presented in Table 4.16. Column (1) shows that analyst forecasts are significantly less accurate after fair value model adoption, especially among those firm-years with more intense investment property assets. Column (2) further shows that the forecasts tend to be biased upward. There is also some evidence of higher stock price crash risk after the first year of fair value model adoption, as reported in Columns (3) and (6). Overall, the within-firm analyses also provide evidence on the undesirable and unexpected consequences relating to fair value model adoption.

[Insert Table 4.16 here]

4.7 Conclusion

Chinese listed companies are allowed to use the fair value model for subsequent measurement of investment property assets since 2007, and by the end of 2016, only about 5% of the companies adopt the fair value option. This study uses the setting to (1) explore why most Chinese companies stay with

the historical cost model, (2) investigate factors that drive some companies to adopt the fair value model, and (3) test the consequences of fair value model adoption.

The innovation diffusion theory suggests that the adoption of an innovation by members in a social system is affected by characteristics of the social system; the change agents' promotion effort, and other factors such as organizational and innovation characteristics. For the first question of why most Chinese companies stay with the historical cost model, I compare the China accounting standards ASBE 3 and IAS 40. Through the comparison, I find that the Chinese accounting standard setters explicitly express a preference for the historical cost model through modifications in both the accounting and disclosure requirements. These modifications reduce the potential benefits and increase costs associated with fair value model adoption. Analyses of the institutional background further show that China has unique property ownership and transfer arrangements, and its real estate markets and appraisal industry have been featured by strong government influence and unbalanced development across regions. These factors further reduce the relative advantage of using the fair value model. Other factors such as the traditionally conservative culture and immature capital markets also help explain why most Chinese listed companies stay with the historical cost model.

I further find strong evidence that NSOEs, real estate companies, and companies with higher proportion of investment property assets are more likely to adopt the fair value model. The findings are consistent with the predictions of the innovation diffusion theory that organizational characteristics such as leaders' attitude towards the innovation and the relative advantage of the innovation affect the adoption of the fair value model. I also find debt contracting incentives, asset pricing incentives, regulatory incentives, activity of the real estate markets, and consideration for investor sophistication influence the decision to adopt the fair value model, but the results vary slightly across different samples and sample periods. The findings reject the null hypothesis based on the economics-based accounting choice theory. Regarding the earnings management investigation and market consequence tests, I identify some evidence of potential earnings management among the fair value model adopters. Moreover, there is evidence that among the suspected earnings management firm-years, the earnings components have less explanatory power for future earnings, and earnings forecasts made by the financial analysts are less accurate and more optimistically biased.

The study makes three contributions to the international accounting and fair value accounting literature. First, it is among the first to examine factors influencing the choice between fair value model versus historical cost model in a major emerging market. The findings show that in addition to the economics-based theory predicted debt contracting and asset pricing incentives, the accounting choice in the emerging market can also be affected by innovation diffusion theory-derived institutional factors. Second, the study contributes to the IFRS literature by documenting the

differences in investment property accounting standards. Third, it provides evidence on the consequences of investment property fair value model adoption in the major emerging economy. The results show that the undesirable consequences relating to fair value model adoption (e.g. less accurate analyst forecasts) exist mostly among firms with earnings management incentives. Other than that, there is limited direct evidence on the unfavourable capital market outcomes of investment property fair value model adoption.

The study has implications for policy makers, investors, firms and academics. For policy makers in China, the findings suggest that despite the modifications in the accounting requirements, managers can still be opportunistic in considering the fair value option for investment property assets, and this could result in unexpected and undesirable market outcomes. For domestic and international investors interested in the Chinese listed companies, the study highlights the importance of paying attention to the opportunistic incentives of fair value model adoption among these companies. The adoption decision may not necessarily be associated with the incentive to provide timely firm performance information. When a firm has the incentives to manage earnings to meet or beat regulatory or other earnings benchmarks, the investment property fair value estimates could be misleading and impair investor welfare. For Chinese listed companies, the findings suggest that the fair value model would not necessarily relate to extreme stock price movement. Therefore, companies with investment property investments may consider the fair value option to deliver information about underlying firm value.

The determinants of firms' choices between the fair value model and the historical cost model are still not fully understood in the accounting literature (Sellhorn and Stier 2019). For researchers interested in understanding the determinants of accounting choice, the study suggests that both the agency-theory predicted incentives and other contextual factors, as mentioned by the innovation diffusion theory, could influence the accounting choice. In particular, in the context of investment property, the characteristics of the real estate markets and the appraisal industry could be one important factor that influences the application of the fair value model.

This study is subject to several limitations and these limitations provide opportunities for future research. First, the analyses focus on a single country. Future research can test whether the findings can generalize to other settings. Also, international data can be employed to test whether other factors of the social system, such as culture, market development and social trusts affect the accounting choice. Second, there are only 82 fair value model adopters (401 fair value firm-years) in the sample period, and only a few sample firms have investment property assets as their core operating assets[144].

[144] Only 178 out of the 9,575 sample firm-year observations have more than 30% net investment property

With the maturity of stock markets and the real estate markets, we may expect more companies adopting the fair value model for the measurement of investment property assets. Future studies may use larger sample to take test whether other factors mentioned in the innovation diffusion model affect the fair value model versus historical cost model choice, and can take the time dimension into consideration and investigate the variations in early adopters and late majority. Future research may also investigate how the interactions between factors mentioned in the innovation diffusion theory affect the determinants and consequences of accounting choice adoption. Third, the study tests whether FVA affects financial analyst forecast accuracy and stock price crash risk. Further studies may examine other consequences relating to the adoption of the fair value model, such as its influence on CEO compensation, audit fees and cost of capital.

assets in their total assets.

Chapter 4 Figures

Figure 4.1 Innovation diffusion theory by Rogers (2003)

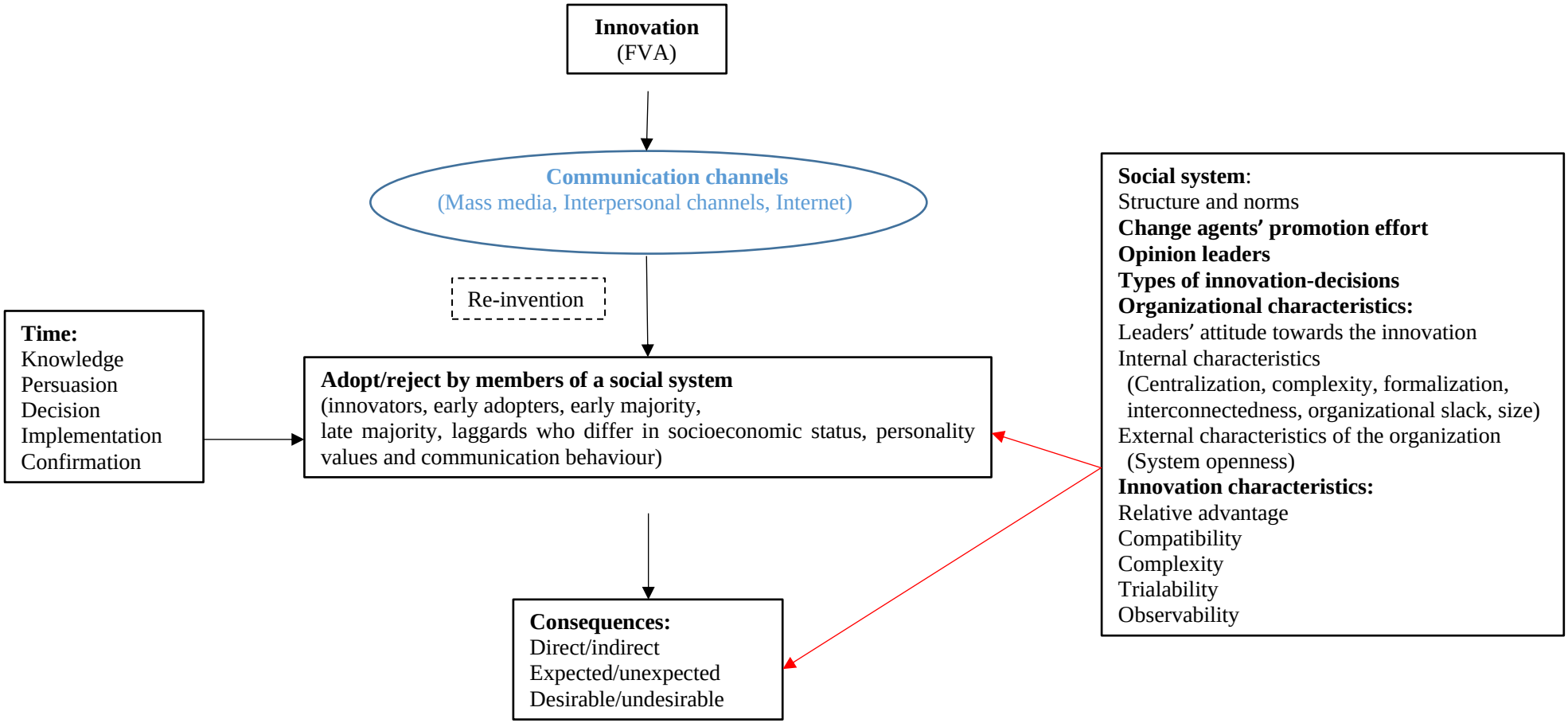


Figure 4.2 Investment property assets held by Chinses listed companies during 2007-2016 (Chinese *yuan*)

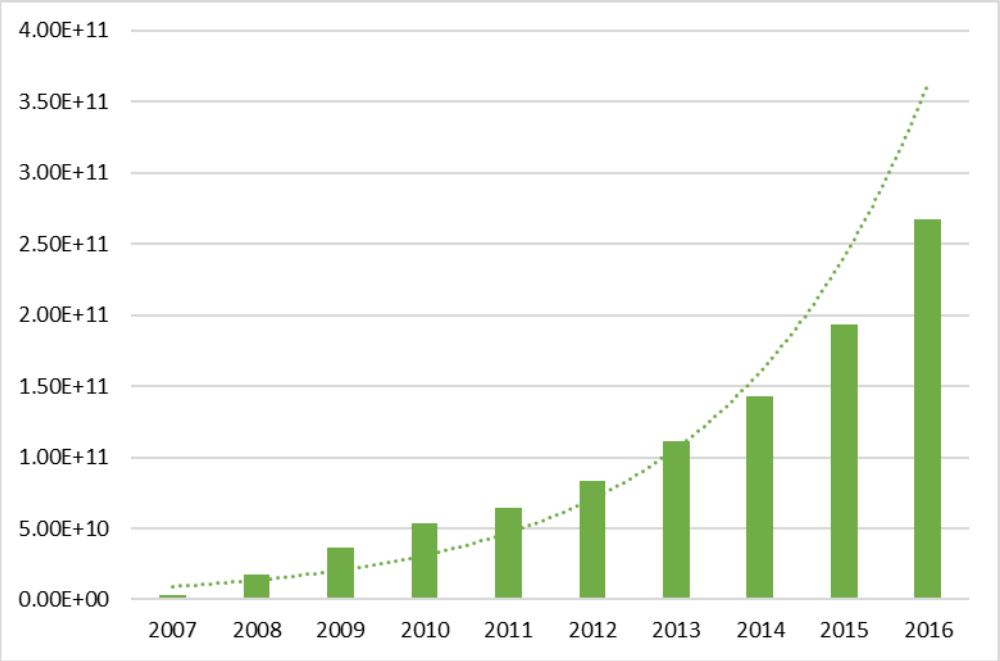
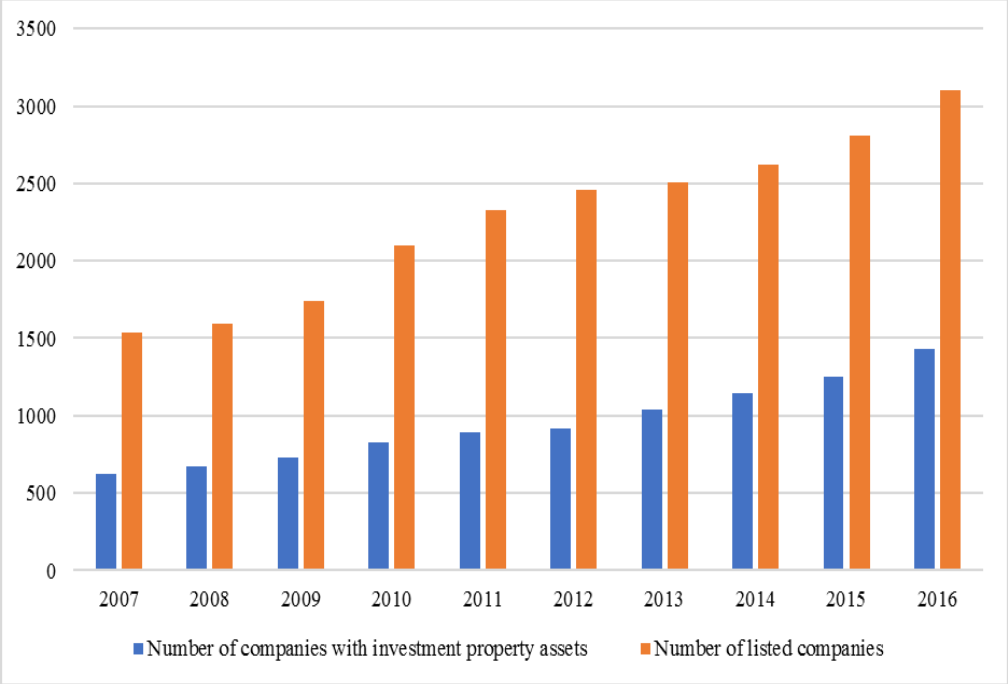


Figure 4.3 Proportion of companies holding investment property in China (2007-2016)



Chapter 4 Tables

Table 4.1 Key differences between ASBE 3 Investment Property and IAS 40 Investment Property

	ASBE 3	IAS 40
Definition of investment property	Property includes land use rights or a building.	Property includes land or a building or part of a building or both.
Recognition and initial measurement	Any subsequent expenditures to the investment property can only be included in its initial cost when the related economic benefits are likely to flow into the enterprise and when the expenditures can be reliably measured.	No such requirements.
Subsequent measurement models	The enterprise should use the historical cost model unless there is clear evidence of a reliable fair value that can be obtained on a continuous basis. Once the fair value model is adopted, the company cannot switch back to the historical cost model.	An entity can choose either the fair value model or the cost model, and it can change between the fair value and cost models if this leads to a more appropriate presentation.
Transfer of owner-occupied property or inventory into investment property at fair value	If the fair value of the asset is greater than the previous carrying amount, the difference should be recognized into capital reserve. If the fair value of the asset is less than the previous carrying amount, the difference should be recognized into current period loss.	Any difference between fair value and previous carrying amount (either gain or loss) should be recognized in current period profit or loss.
Presentation and disclosure	No requirements for the disclosure of investment property fair value under the cost model.	Under the cost model, the entity should disclose the fair value of the investment property.

Table 4.2 Preliminary sample screening procedures

All firm-year observations during 2007-2016		22,806
Less	Firm-years with zero investment property assets	12,522
	Missing balance sheet variables	21
	Stock code begins with "900", "200"	688
Firm-year observations after preliminary screening		9,575

Note: Sample sizes in different tests vary due to differences in the availability of variables.

Table 4.3 Distribution of sample companies by industry and by year
Panel A Distribution of sample companies by industry

Industry		Number of fair value model adopters	Total number of companies	Percentage
A	Agriculture, forestry, animal husbandry and fishery	0	25	0.00%
B	Mining	1	36	2.78%
C	Manufacturing	29	909	3.19%
D	Electric power, heat, gas and water production and supply	4	67	5.97%
E	Construction	1	58	1.72%
F	Wholesale and retail	8	116	6.90%
G	Transport, storage and postal service	3	57	5.26%
H	Accommodation and catering	0	7	0.00%
I	Information transmission, software and information technology services	2	94	2.13%
J	Financial	4	43	9.30%
K	Real estate	23	123	18.70%
L	Leasing and commercial service	3	24	12.50%
M	Scientific research and public facility management	1	18	5.56%
N	Water conservancy, environment and public facility management	1	22	4.55%
P	Education	0	3	0.00%
Q	Health and social work	0	4	0.00%
R	Culture, sports and entertainment	2	28	7.14%
S	Diversified industries	0	18	0.00%
Total		82	1,652	5.05%

Table 4.3 Panel B Distribution of sample companies by year

Year	Number of listed companies (TCO)	Number of companies with non-zero investment property (NZIP)	historical cost model users (NHCA)	fair value model users (NFVA)	Percentage (NFVA/NZIP)
2007	1,539	622	605	17	2.73%
2008	1,593	672	651	21	3.13%
2009	1,742	729	704	25	3.43%
2010	2,097	824	798	26	3.16%
2011	2,331	895	841	29	3.24%
2012	2,460	918	866	42	4.58%
2013	2,505	1,037	990	47	4.53%
2014	2,622	1,144	1,090	54	4.72%
2015	2,810	1,254	1,190	64	5.10%
2016	3,107	1,428	1,352	76	5.32%
Total	22,806	9,575	9,174	401	4.19%

Classification of the industries is based on the 2012 guide issued by China Securities Regulation Committee.

Table 4.4 Descriptive statistics

Variables	N	Mean	SD	p50	p25	p75	Min	Max
ACCURACY	5,422	-0.546	1.023	-0.320	-0.581	-0.130	-8.036	-0.002
BIAS	5,422	0.329	0.876	0.242	0.018	0.524	-2.166	6.147
NCSKEW	8,948	-0.635	0.618	-0.610	-1.001	-0.247	-2.487	1.027
FVIP	9,575	0.042	0.200	0.000	0.000	0.000	0.000	1.000
SDEBT	9,249	0.116	0.120	0.084	0.012	0.182	0.000	0.530
LDEBT	9,165	0.060	0.092	0.011	0.000	0.087	0.000	0.420
MANAGE	8,288	0.111	0.392	0.000	0.000	0.001	0.000	8.910
MTBTANA	9,575	0.175	0.380	0.000	0.000	0.000	0.000	1.000
ST	9,575	0.028	0.166	0.000	0.000	0.000	0.000	1.000
DLOSS	9,574	0.142	0.349	0.000	0.000	0.000	0.000	1.000
FIRSTLIST	9,575	0.033	0.179	0.000	0.000	0.000	0.000	1.000
ACTIVITY	9,575	0.670	0.470	1.000	0.000	1.000	0.000	1.000
STATE	9,573	0.536	0.499	1.000	0.000	1.000	0.000	1.000
INSTI	8,148	5.469	5.971	3.710	1.430	7.660	0.000	70.650
NIPTA	9,249	0.041	0.086	0.011	0.003	0.037	0.000	0.560
BIG4	9,508	0.085	0.279	0.000	0.000	0.000	0.000	1.000
INDUSFV	9,575	0.041	0.046	0.030	0.019	0.043	0.000	0.333
REGIONFV	9,575	0.038	0.019	0.032	0.023	0.047	0.013	0.101
CROSSB	9,575	0.060	0.237	0.000	0.000	0.000	0.000	1.000
CROSSH	9,575	0.051	0.220	0.000	0.000	0.000	0.000	1.000
TOP10	9,572	55.914	16.688	56.110	43.425	68.375	19.940	92.410
REALESTATE	9,575	0.104	0.305	0.000	0.000	0.000	0.000	1.000
BTM	9,190	1.084	1.165	0.698	0.401	1.303	0.095	7.361
SIZE	9,478	21.850	2.216	22.179	21.444	22.955	12.839	27.797
DA	9,240	0.013	0.237	0.011	-0.044	0.071	-8.618	3.498
ABCFO	9,202	-0.154	0.284	-0.121	-0.188	-0.066	-11.105	5.468
ABPROD	8,686	-0.218	0.386	-0.158	-0.271	-0.083	-9.948	11.589
ABDISE	9,081	-0.118	0.207	-0.106	-0.164	-0.041	-4.829	6.200
VOL	9,476	5.527	4.182	4.444	2.557	7.401	0.000	38.333
HORI	5,422	5.869	0.069	5.872	5.836	5.905	5.416	6.122
ANA	9,574	1.287	1.207	1.099	0.000	2.303	0.000	4.382
DGWTA	9,575	0.458	0.498	0.000	0.000	1.000	0.000	1.000

Table 4.5 Univariate analyses

	Fair value model			Historical cost model			Mean(fair value model)-Mean(historical cost model)
Variables	N	Mean	SD	N	Mean	SD	Difference
ACCURACY	245	-0.547	1.031	5177	-0.546	1.023	0.000
BIAS	245	0.333	0.912	5177	0.329	0.875	-0.004
NCSKEW	391	-0.634	0.639	8557	-0.635	0.617	-0.002
SDEBT	396	0.115	0.123	8,853	0.116	0.120	-0.002
LDEBT	377	0.106	0.115	8,788	0.058	0.090	0.048***
MANAGE	346	0.039	0.172	7,942	0.114	0.398	-0.076***
MTBTANA	401	0.162	0.369	9,174	0.176	0.381	-0.014
ST	401	0.047	0.213	9,174	0.027	0.163	0.020**
DLOSS	401	0.147	0.355	9,173	0.142	0.349	0.006
FIRSTLIST	401	0.012	0.111	9,174	0.034	0.181	-0.021**
ACTIVITY	401	0.751	0.433	9,174	0.666	0.472	0.084***
STATE	401	0.359	0.480	9,172	0.544	0.498	-0.185***
INSTI	342	7.069	7.836	7,806	5.398	5.867	1.671***
NIPTA	395	0.144	0.165	8,854	0.037	0.078	0.107***
BIG4	400	0.170	0.376	9,108	0.081	0.274	0.089***
INDUSFV	401	0.081	0.075	9,174	0.039	0.043	0.042***
REGIONFV	401	0.047	0.022	9,174	0.038	0.019	0.009***
CROSSB	401	0.082	0.275	9,174	0.059	0.236	0.023*
CROSSH	401	0.107	0.310	9,174	0.049	0.215	0.059***
TOP10	400	55.903	19.151	9,172	55.914	16.574	-0.012
REALESTATE	401	0.262	0.440	9,174	0.097	0.296	0.165***
BTM	388	1.992	2.006	8,802	1.044	1.096	0.949***
SIZE	400	22.120	2.557	9,078	21.838	2.200	0.282**

***, **, * denotes statistical significance at the 1%, 5% and 10 % level (two-tailed test), respectively.

Table 4.6 Pearson correlation tables

Panel A Correlation matrix for variables used in analyses of the determinants of fair value model adoption

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
FVIP	1.000																				
SDEBT	-0.003	1.000																			
LDEBT	0.103***	-0.035***	1.000																		
MANAGE	-0.039***	-0.098***	-0.141***	1.000																	
MTBTANA	-0.007	-0.065***	0.016	0.010	1.000																
ST	0.024**	0.152***	-0.013	-0.032***	-0.049***	1.000															
DLOSS	0.003	0.275***	0.016	-0.072***	-0.092***	0.290***	1.000														
FIRSTLIST	-0.024**	0.009	-0.030***	0.384***	0.121***	-0.032***	-0.075***	1.000													
ACTIVITY	0.036***	-0.089***	-0.004	-0.028**	0.009	-0.029***	-0.037***	0.003	1.000												
STATE	-0.074***	0.002	0.148***	-0.303***	0.027***	-0.003	0.020*	-0.101***	0.123***	1.000											
INSTI	0.056***	-0.045***	-0.026**	-0.060***	0.128***	-0.030***	-0.075***	-0.055***	0.011	-0.022*	1.000										
NIPTA	0.251***	-0.002	0.023**	-0.063***	-0.029***	0.102***	0.040***	-0.003	0.073***	-0.046***	-0.022**	1.000									
BIG4	0.064***	-0.108***	0.054***	-0.078***	0.101***	-0.039***	-0.053***	-0.004	0.118***	0.139***	0.049***	-0.033***	1.000								
INDUSFV	0.184***	-0.172***	0.149***	-0.081***	0.054***	-0.020**	-0.060***	-0.011	0.091***	0.033***	0.137***	0.081***	0.159***	1.000							
REGIONFV	0.095***	-0.125***	0.057***	0.066***	-0.007	-0.038***	0.002	-0.011	-0.010	-0.091***	0.003	-0.029***	-0.005	0.111***	1.000						
CROSSB	0.020*	0.047***	0.022**	-0.070***	-0.019*	0.021**	0.071***	-0.047***	0.125***	0.121***	-0.067***	0.096***	0.136***	-0.002	-0.016	1.000					
CROSSH	0.053***	-0.100***	0.064***	-0.062***	0.089***	-0.020*	-0.026**	0.021**	0.048***	0.153***	-0.033***	-0.081***	0.465***	0.145***	0.011	-0.039***	1.000				
TOP10	0.000	-0.171***	0.065***	0.193***	0.135***	-0.060***	-0.176***	0.187***	0.052***	0.037***	0.051***	-0.057***	0.189***	0.084***	0.047***	-0.089***	0.232***	1.000			
REALESTATE	0.108***	-0.110***	0.290***	-0.083***	0.001	0.014	-0.051***	-0.053***	0.080***	0.017	0.001	0.210***	0.035***	0.389***	0.018*	0.052***	-0.048***	0.026**	1.000		
BTM	0.164***	0.031***	0.360***	-0.159***	0.070***	-0.031***	-0.037***	-0.087***	0.069***	0.226***	0.059***	-0.059***	0.312***	0.287***	0.005	0.018*	0.259***	0.068***	0.173***	1.000	
SIZE	0.026**	-0.158***	0.100***	-0.262***	0.035***	-0.140***	-0.107***	-0.534***	0.040***	0.187***	0.118***	-0.158***	0.231***	0.122***	0.061***	0.014	0.202***	0.046***	0.041***	0.271***	1.000

***, **, * denotes statistical significance at the 1%, 5% and 10 % level (two-tailed test), respectively.

Panel B Correlation matrix for variables used in analyses of the consequences of fair value model adoption

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)
ACCURACY	1.000																											
BIAS	-0.612***	1.000																										
NCSKEW	0.011	-0.031**	1.000																									
FVIPFIRST	-0.011	0.017	0.018*	1.000																								
FVIPSUBSE	0.005	-0.007	-0.008	-0.017*	1.000																							
HORI	-0.051***	0.076***	-0.005	-0.016	-0.008	1.000																						
VOL	-0.062***	0.078***	0.089***	-0.014	-0.045***	-0.017	1.000																					
DA	0.039***	-0.021	-0.004	-0.001	0.006	0.053***	0.027**	1.000																				
ABCFO	0.032**	-0.013	-0.005	-0.022**	-0.046***	-0.012	0.028***	-0.437***	1.000																			
ABPROD	-0.094***	0.072***	-0.006	0.023**	-0.014	0.027*	0.032***	0.013	0.039***	1.000																		
ABDISE	0.023*	-0.061***	0.009	0.023**	-0.015	-0.024*	-0.021**	-0.027**	0.096***	0.050***	1.000																	
NIPTA	-0.004	-0.042***	0.007	0.146***	0.206***	-0.025*	0.009	-0.025**	-0.058***	-0.039***	0.034***	1.000																
SDEBT	-0.161***	0.100***	0.022**	0.017*	-0.012	-0.011	0.089***	-0.002	0.000	0.078***	-0.049***	-0.002	1.000															
LDEBT	-0.051***	0.026*	-0.055***	0.037***	0.097***	0.023*	-0.089***	0.015	-0.038***	-0.025**	-0.012	0.023**	-0.035***	1.000														
MANAGE	0.019	0.026*	0.019*	-0.008	-0.039***	-0.012	0.170***	0.020*	0.045***	0.015	-0.017	-0.063***	-0.098***	-0.141***	1.000													
ST	-0.061***	-0.060***	0.035***	0.059***	-0.004	-0.073***	-0.030***	-0.015	-0.040***	-0.003	0.018*	0.102***	0.152***	-0.013	-0.032***	1.000												
DLOSS	-0.293***	0.111***	0.048***	0.004	0.002	-0.061***	0.023**	-0.031***	-0.005	0.037***	-0.035***	0.040***	0.275***	0.016	-0.072***	0.290***	1.000											
ACTIVITY	0.039***	-0.053***	-0.015	0.010	0.036***	-0.007	-0.077***	-0.014	-0.051***	-0.023**	0.011	0.073***	-0.089***	-0.004	-0.028**	-0.029***	-0.037***	1.000										
STATE	-0.017	-0.035**	-0.041***	-0.043***	-0.060***	0.008	-0.125***	0.009	-0.036***	0.016	0.007	-0.046***	0.002	0.148***	-0.303***	-0.003	0.020*	0.123***	1.000									
INSTI	0.091***	-0.082***	0.124***	0.015	0.054***	-0.013	-0.107***	0.018	-0.064***	-0.071***	0.048***	-0.022**	-0.045***	-0.026**	-0.060***	-0.030***	-0.075***	0.011	-0.022*	1.000								
BIG4	0.035***	-0.056***	-0.063***	0.021**	0.061***	-0.029**	-0.203***	-0.014	-0.031***	-0.012	0.029***	-0.033***	-0.108***	0.054***	-0.078***	-0.039***	-0.053***	0.118***	0.139***	0.049***	1.000							
CROSSB	0.008	-0.042***	-0.038***	-0.004	0.024**	0.004	-0.130***	0.006	-0.017	-0.016	-0.006	0.096***	0.047***	0.022**	-0.070***	0.021**	0.071***	0.125***	0.121***	-0.067***	0.136***	1.000						
CROSSH	0.005	-0.025*	-0.059***	0.015	0.052***	-0.031**	-0.191***	-0.020*	-0.035***	0.018	0.009	-0.081***	-0.100***	0.064***	-0.062***	-0.020*	-0.026**	0.048***	0.153***	-0.033***	0.465***	-0.039***	1.000					
ANA	0.188***	-0.126***	0.015	-0.002	0.032***	0.001	-0.233***	0.031***	0.018*	-0.070***	0.078***	-0.161***	-0.219***	0.015	0.080***	-0.146***	-0.265***	0.003	0.026**	0.325***	0.243***	-0.072***	0.221***	1.000				
TOP10	0.066***	-0.033**	-0.014	0.008	-0.003	-0.005	-0.200***	0.015	0.000	-0.026**	0.067***	-0.057***	-0.171***	0.065***	0.193***	-0.060***	-0.176***	0.052***	0.037***	0.051***	0.189***	-0.089***	0.232***	0.290***	1.000			
BTM	-0.039***	0.017	-0.104***	0.041***	0.162***	0.041***	-0.156***	0.009	-0.124***	0.039***	0.024**	-0.059***	0.031***	0.360***	-0.159***	-0.031***	-0.037***	0.069***	0.226***	0.059***	0.312***	0.018*	0.259***	0.145***	0.068***	1.000		
SIZE	0.041***	-0.023*	-0.056***	-0.028***	0.043***	0.005	-0.274***	0.026**	-0.040***	-0.037***	-0.002	-0.158***	-0.158***	0.100***	-0.262***	-0.140***	-0.107***	0.040***	0.187***	0.118***	0.231***	0.014	0.202***	0.268***	0.046***	0.271***	1.000	
DGWTA	0.063***	-0.032**	-0.003	0.028***	0.010	0.006	-0.066***	0.010	-0.009	0.009	0.034***	-0.097***	-0.038***	-0.020*	-0.008	-0.070***	-0.107***	0.052***	-0.070***	0.091***	0.040***	-0.060***	0.032***	0.231***	0.031***	0.083***	0.145***	1.000

***, **, * denotes statistical significance at the 1%, 5% and 10 % level (two-tailed test), respectively.

Table 4.7 Determinants of fair value model adoption for investment property: different sample firms

Variables	Full sample		Real estate firms		NIPTA>0.07	
	(1)	(2)	(3)	(4)	(5)	(6)
	Coef.	ME	Coef.	ME	Coef.	ME
$SDEBT_{t-1}$	1.489***	0.051**	-0.350	-0.029	2.914***	0.375**
	(2.652)	(2.572)	(-0.167)	(-0.170)	(2.738)	(2.407)
$LDEBT_{t-1}$	1.469**	0.050**	1.510	0.124	2.128*	0.274
	(2.493)	(2.432)	(1.270)	(1.167)	(1.737)	(1.603)
$MANAGE_{t-1}$	-0.565	-0.019	-3.096	-0.255	-0.755	-0.097
	(-1.605)	(-1.523)	(-1.301)	(-1.147)	(-1.315)	(-1.267)
$MTBTANA_{t}$	-0.228***	-0.007***	-0.063	-0.005	-0.222	-0.025
	(-2.802)	(-2.836)	(-0.403)	(-0.399)	(-1.214)	(-1.309)
ST_{t-1}	-0.163	-0.005	0.439	0.052	-0.431	-0.041
	(-0.685)	(-0.794)	(0.799)	(0.603)	(-1.028)	(-1.476)
$DLOSS_{t-1}$	-0.031	-0.001	0.436*	0.050	-0.843***	-0.070***
	(-0.251)	(-0.257)	(1.764)	(1.365)	(-3.158)	(-3.194)
$FIRSTLIST_{t}$	0.069	0.003			1.187	0.308
	(0.142)	(0.132)			(1.390)	(0.966)
$ACTIVITY_{t}$	0.139	0.005	-0.170	-0.015	0.535*	0.057**
	(0.868)	(0.945)	(-0.465)	(-0.420)	(1.831)	(2.042)
$STATE_{t}$	-0.680***	-0.028***	-0.856***	-0.083**	-0.730**	-0.103**
	(-3.748)	(-3.301)	(-3.107)	(-2.286)	(-2.390)	(-2.246)
$INSTI_{t-1}$	0.013*	0.000	0.042***	0.003**	0.030**	0.004**
	(1.746)	(1.616)	(2.714)	(2.274)	(2.344)	(2.065)
$NIPTA_{t-1}$	4.311***	0.148***	4.610***	0.379***	3.097***	0.399***
	(7.733)	(4.735)	(4.934)	(3.095)	(3.929)	(3.576)
$BIG4_{t}$	-0.158	-0.005	-1.431***	-0.050***	-0.872**	-0.065***
	(-0.594)	(-0.682)	(-3.332)	(-2.582)	(-2.215)	(-3.025)
$INDUSFV_{t-1}$	2.090	0.072	0.449	0.037	0.447	0.058
	(1.333)	(1.274)	(0.152)	(0.153)	(0.130)	(0.130)
$REGIONFV_{t-1}$	11.296***	0.388***	12.382	1.018	25.737***	3.315***
	(3.493)	(2.853)	(1.633)	(1.549)	(3.776)	(4.023)
$CROSSB_{t}$	0.131	0.005	-0.791	-0.037*	0.031	0.004
	(0.391)	(0.344)	(-1.516)	(-1.925)	(0.068)	(0.067)
$CROSSH_{t}$	0.610*	0.038			0.790	0.169
	(1.910)	(1.203)			(0.797)	(0.559)
$TOP10_{t}$	-0.003	-0.000	-0.009	-0.001	-0.003	-0.000
	(-0.750)	(-0.741)	(-0.939)	(-0.889)	(-0.367)	(-0.361)
$REALESTATE_{t}$	4.868***	0.980***			4.519***	0.951***
	(11.798)	(60.432)			(6.932)	(19.119)

Table 4.7 continued

	(1)	(2)	(3)	(4)	(5)	(6)
BTM_{t-1}	0.206***	0.007***	0.311***	0.026***	0.705***	0.091***
	(4.388)	(3.959)	(3.134)	(2.883)	(4.741)	(4.104)
$SIZE_{t-1}$	0.016	0.001	0.253*	0.021	-0.003	-0.000
	(0.642)	(0.647)	(1.774)	(1.532)	2.914***	(-0.078)
Constant	-8.243***		-8.174**		-8.783***	
	(-10.496)		(-2.493)		(-7.880)	
Industry fixed effects	YES	YES	NO	NO	YES	YES
Year fixed effects	YES	YES	YES	YES	YES	YES
N	7506	7506	822	822	868	868
Pseudo R^2	0.270		0.375		0.405	

t statistics in parentheses, ***, **, *denotes statistical significance at the 1%, 5% and 10 % level (two-tailed test), respectively.

Table 4.8 Determinants of fair value model adoption for investment property: different sample periods

Variables	2007-2009		2010-2013		2014-2016	
	(1) Coef.	(2) ME	(3) Coef.	(4) ME	(5) Coef.	(6) ME
$SDEBT_{t-1}$	1.628	0.036	1.738**	0.048**	1.492**	0.066**
	(1.415)	(1.407)	(2.454)	(2.315)	(2.387)	(2.363)
$LDEBT_{t-1}$	1.776	0.039	1.201*	0.033	1.893***	0.084***
	(1.474)	(1.523)	(1.656)	(1.615)	(2.743)	(2.722)
$MANAGE_{t-1}$	-0.364	-0.008	-1.023	-0.028	-0.379	-0.017
	(-0.491)	(-0.474)	(-1.561)	(-1.612)	(-1.022)	(-1.014)
$MTBTANA_{t}$	-0.342	-0.006	-0.116	-0.003	-0.251*	-0.009**
	(-1.385)	(-1.276)	(-0.786)	(-0.851)	(-1.777)	(-2.081)
ST_{t-1}	-0.474	-0.006	-0.849	-0.010***	0.555*	0.043
	(-1.339)	(-1.613)	(-1.523)	(-2.821)	(1.754)	(1.148)
$DLOSS_{t-1}$	0.021	0.000	0.350**	0.013	-0.389**	-0.013***
	(0.071)	(0.070)	(1.995)	(1.366)	(-2.243)	(-2.690)
$FIRSTLIST_{t}$			1.456**	0.182		
			(2.161)	(1.020)		
$ACTIVITY_{t}$	0.317	0.006	0.120	0.003	0.086	0.004
	(0.944)	(1.383)	(0.598)	(0.643)	(0.564)	(0.582)
$STATE_{t}$	-0.575*	-0.017	-0.748***	-0.027***	-0.745***	-0.035***
	(-1.901)	(-1.641)	(-3.400)	(-2.802)	(-4.087)	(-3.963)
$INSTI_{t-1}$	0.014	0.000	0.017*	0.000	0.012	0.001
	(0.801)	(0.909)	(1.740)	(1.505)	(1.287)	(1.237)
$NIPTA_{t-1}$	3.903***	0.087**	4.504***	0.124***	4.968***	0.220***
	(4.762)	(2.232)	(5.754)	(3.666)	(7.627)	(4.820)
$BIG4_{t}$	-0.712*	-0.008**	-0.305	-0.006	-0.098	-0.004
	(-1.666)	(-1.991)	(-0.849)	(-1.118)	(-0.344)	(-0.373)
$INDUSFV_{t-1}$	8.444	0.188	3.367	0.092	-0.173	-0.008
	(0.795)	(0.716)	(0.906)	(0.898)	(-0.056)	(-0.056)
$REGIONFV_{t-1}$	12.333	0.274	14.801***	0.406**	10.473***	0.465***
	(1.631)	(1.287)	(3.294)	(2.394)	(3.388)	(3.324)
$CROSSB_{t}$	0.358	0.012	0.261	0.009	-0.115	-0.005
	(0.822)	(0.607)	(0.808)	(0.629)	(-0.332)	(-0.370)
$CROSSH_{t}$			0.633*	0.034	0.788**	0.072
			(1.865)	(1.111)	(2.204)	(1.335)
$TOP10_{t}$	-0.000	-0.000	-0.001	-0.000	-0.008*	-0.000*
	(-0.054)	(-0.054)	(-0.172)	(-0.171)	(-1.842)	(-1.800)
$REALESTATE_{t}$	4.686***	0.930***	4.689***	0.961***	4.595***	0.975***
	(6.309)	(11.486)	(9.162)	(26.091)	(7.625)	(37.319)

Table 4.8 continued

	(1)	(2)	(3)	(4)	(5)	(6)
BTM_{t-1}	0.192	0.004	0.125**	0.003**	0.257***	0.011***
	(1.576)	(1.395)	(2.242)	(2.361)	(4.461)	(3.820)
$SIZE_{t-1}$	0.061	0.001	0.106	0.003	-0.014	-0.001
	(1.002)	(0.905)	(1.625)	(1.571)	(-0.559)	(-0.552)
Constant	-9.498***		-10.020***		-6.608***	
	(-5.934)		(-6.431)		(-8.262)	
Industry fixed effects	YES	YES	YES	YES	YES	YES
Year fixed effects	YES	YES	YES	YES	YES	YES
N	1165	1165	2733	2733	3178	3178
Pseudo R^2	0.264		0.270		0.299	

t statistics in parentheses, ***, **, * denotes statistical significance at the 1%, 5% and 10 % level (two-tailed test), respectively.

Table 4.9 Capital market consequences of fair value model adoption
Panel A Capital market consequences of fair value model adoption: Full sample

Variables	Consequences of fair value model adoption			Influence of potential earnings management		
	(1)	(2)	(3)	(4)	(5)	(6)
	$ACCURACY_{t+1}$	$BIAS_{t+1}$	$NCSKEW_{t+1}$	$ACCURACY_{t+1}$	$BIAS_{t+1}$	$NCSKEW_{t+1}$
$FVIPFIRST_t$	0.105	0.332	-0.137	0.210	0.274	-0.130
	(0.284)	(0.952)	(-0.667)	(0.575)	(0.788)	(-0.636)
$FVIPSUBSE_t$	0.386	0.232	-0.202	0.442	0.220	-0.196
	(1.239)	(0.874)	(-1.131)	(1.403)	(0.842)	(-1.104)
$FVIPFIRST_t \times NIPTA_t$	-0.619	0.360	0.945	0.447	-0.995	0.521
	(-0.521)	(0.280)	(1.645)	(0.540)	(-1.146)	(0.902)
$FVIPSUBSE_t \times NIPTA_t$	-2.110	-0.231	1.073**	-2.042	-1.911*	0.910
	(-1.394)	(-0.173)	(2.185)	(-1.282)	(-1.678)	(1.435)
$FVIPFIRST \times NIPTA_t \times EM\_DUM_t$				-2.440*	2.865**	0.844
				(-1.887)	(2.080)	(1.354)
$FVIPSUBSE_t \times NIPTA_t \times EM\_DUM_t$				-0.189	3.391*	0.333
				(-0.090)	(1.845)	(0.438)
EM_DUM_t				-0.123	-0.035	-0.038
				(-1.224)	(-0.406)	(-0.753)
NIPTAt	0.148	-0.690***	-0.392**	0.230	-0.641***	-0.363**
	(0.665)	(-2.860)	(-2.458)	(1.019)	(-2.588)	(-2.233)
IMRt	-0.065	-0.107	0.039	-0.080	-0.079	0.042
	(-0.455)	(-0.899)	(0.470)	(-0.571)	(-0.653)	(0.512)
$HORI_{t+1}$	-0.822***	0.783***		-0.804***	0.757***	
	(-4.389)	(4.555)		(-4.288)	(4.459)	
VOL_{t+1}	-0.008	0.004	0.009**	-0.008	0.004	0.009**
	(-1.314)	(0.627)	(2.460)	(-1.335)	(0.687)	(2.491)
DA_t	1.000***	-1.223***	0.061	1.014***	-1.243***	0.058
	(4.612)	(-6.614)	(0.641)	(4.659)	(-6.691)	(0.608)
$ABCFO_t$	0.856***	-0.847***	-0.050	0.866***	-0.861***	-0.053
	(4.614)	(-5.508)	(-0.599)	(4.656)	(-5.603)	(-0.626)
$ABPROD_t$	-0.402***	0.421***	-0.002	-0.415***	0.438***	0.000
	(-5.228)	(5.924)	(-0.038)	(-5.324)	(6.100)	(0.003)
$ABDISE_t$	-0.194	-0.068	0.101	-0.197*	-0.054	0.103
	(-1.639)	(-0.607)	(1.276)	(-1.659)	(-0.480)	(1.295)
BTM_t	-0.085***	0.031	-0.056***	-0.084***	0.031	-0.056***
	(-2.951)	(1.351)	(-4.023)	(-2.924)	(1.347)	(-4.020)
$SIZE_t$	-0.014	0.005	-0.010	-0.014	0.006	-0.010
	(-1.563)	(0.602)	(-1.345)	(-1.553)	(0.684)	(-1.335)
$LDEBT_t$	-0.550**	0.463**	0.290**	-0.557**	0.473**	0.289**
	(-2.071)	(1.964)	(2.055)	(-2.099)	(2.023)	(2.043)

Table 4.9 Panel A continued

	(1)	(2)	(3)	(4)	(5)	(6)
$SDEBT_t$	-0.639***	0.431**	0.030	-0.635***	0.424**	0.029
	(-3.327)	(2.487)	(0.298)	(-3.310)	(2.445)	(0.287)
$TOP10_t$	0.001	0.000	0.000	0.001	0.001	0.000
	(0.521)	(0.382)	(0.015)	(0.462)	(0.528)	(0.059)
$INSTI_t$	0.000	-0.003**	0.004***	0.000	-0.003**	0.004***
	(0.271)	(-2.169)	(4.544)	(0.227)	(-2.188)	(4.520)
$STATE_t$	0.052	-0.046	0.021	0.052	-0.051	0.021
	(1.451)	(-1.460)	(0.884)	(1.467)	(-1.614)	(0.868)
$BIG4_t$	0.062	-0.043	-0.087**	0.067	-0.047	-0.089**
	(0.829)	(-0.671)	(-2.110)	(0.917)	(-0.761)	(-2.150)
ANA_t	0.127***	-0.062***	0.057***	0.125***	-0.064***	0.057***
	(6.486)	(-3.660)	(4.770)	(6.403)	(-3.802)	(4.702)
$CROSSB_t$	0.077	-0.191***	-0.081*	0.076	-0.182***	-0.080*
	(1.041)	(-3.026)	(-1.684)	(1.033)	(-2.823)	(-1.656)
$CROSSH_t$	-0.130	0.008	-0.088	-0.133	0.013	-0.088
	(-1.226)	(0.099)	(-1.563)	(-1.257)	(0.155)	(-1.546)
ST_t	0.202	-1.053***	0.097	0.315	-1.023***	0.133
	(0.709)	(-4.445)	(0.767)	(1.053)	(-4.139)	(0.975)
$DLOSS_t$	-0.918***	0.230*	0.072*	-0.913***	0.227*	0.072*
	(-6.905)	(1.845)	(1.850)	(-6.868)	(1.818)	(1.861)
$DGWTA_t$	0.107***	-0.079***	0.009	0.106***	-0.077***	0.008
	(3.142)	(-2.684)	(0.397)	(3.131)	(-2.644)	(0.392)
Constant	4.711***	-4.254***	-0.330	4.609***	-4.120***	-0.334*
	(4.199)	(-4.179)	(-1.639)	(4.091)	(-4.081)	(-1.657)
Industry fixed effects	YES	YES	YES	YES	YES	YES
Year fixed effects	YES	YES	YES	YES	YES	YES
N	4308	4308	4308	4308	4308	4308
R^2	0.165	0.110	0.138	0.166	0.115	0.138
adj. R^2	0.155	0.100	0.128	0.156	0.104	0.128

t statistics in parentheses, ***, **, * denotes statistical significance at the 1%, 5% and 10 % level (two-tailed test), respectively.

Table 4.9 Panel B Capital market consequences of fair value model adoption: Real estate companies

Variables	Consequences of fair value model adoption			Influence of potential earnings management		
	(1) $ACCURACY_{t+1}$	(2) $BIAS_{t+1}$	(3) $NCSKEW_{t+1}$	(4) $ACCURACY_{t+1}$	(5) $BIAS_{t+1}$	(6) $NCSKEW_{t+1}$
$FVIPFIRST_t$	0.255	-0.832	0.179	0.361	-0.844	0.098
	(0.517)	(-1.349)	(0.491)	(0.676)	(-1.353)	(0.259)
$FVIPSUBSE_t$	0.281	-0.572	-0.030	0.346	-0.577	-0.114
	(0.631)	(-1.212)	(-0.097)	(0.766)	(-1.258)	(-0.350)
$FVIPFIRST_t \times NIPTA_t$	-1.634	2.170	0.410	0.347	0.630	-0.190
	(-1.179)	(1.353)	(0.473)	(0.483)	(0.764)	(-0.256)
$FVIPSUBSE_t \times NIPTA_t$	-2.040	2.248	1.253	-0.759	1.079	1.759
	(-0.975)	(1.239)	(1.642)	(-0.950)	(1.243)	(1.511)
$FVIPFIRST \times NIPTA_t \times EM\_DUM_t$				-5.566***	3.848**	1.989**
				(-7.196)	(2.234)	(2.479)
$FVIPSUBSE_t \times NIPTA_t \times EM\_DUM_t$				-1.884	1.811	-0.726
				(-0.804)	(0.902)	(-0.658)
EM_DUM_t				-0.017	-0.135	0.101
				(-0.129)	(-0.949)	(1.113)
NIPTAt	0.160	-0.025	-0.742**	0.154	0.097	-0.790**
	(0.260)	(-0.040)	(-2.108)	(0.241)	(0.155)	(-2.100)
IMRt	-0.086	0.224	-0.055	-0.145	0.261	-0.027
	(-0.360)	(0.896)	(-0.325)	(-0.589)	(1.054)	(-0.153)
$HORI_{t+1}$	-0.655*	0.029		-0.392	-0.146	
	(-1.726)	(0.062)		(-1.012)	(-0.355)	
VOL_{t+1}	0.002	0.008	0.025**	-0.000	0.009	0.026**
	(0.157)	(0.629)	(2.307)	(-0.005)	(0.751)	(2.357)
DA_t	1.597***	-1.597***	0.006	1.623***	-1.596***	-0.013
	(2.961)	(-2.980)	(0.026)	(2.953)	(-2.931)	(-0.051)
$ABCFO_t$	1.531***	-1.172**	-0.339	1.534***	-1.159**	-0.353
	(3.018)	(-2.352)	(-1.524)	(3.021)	(-2.297)	(-1.558)
$ABPROD_t$	-0.320*	0.235	0.199*	-0.410**	0.290	0.230**
	(-1.733)	(1.299)	(1.867)	(-1.985)	(1.537)	(2.026)
$ABDISE_t$	0.592	-1.424	0.108	0.074	-1.018	0.253
	(0.779)	(-1.638)	(0.141)	(0.117)	(-1.224)	(0.334)
BTM_t	0.063	-0.037	-0.057**	0.061	-0.034	-0.058**
	(1.423)	(-0.843)	(-2.078)	(1.397)	(-0.780)	(-2.119)
$SIZE_t$	0.032	-0.030	-0.043	0.035	-0.029	-0.046
	(0.657)	(-0.612)	(-1.398)	(0.706)	(-0.586)	(-1.473)
$LDEBT_t$	-0.495	1.058**	-0.263	-0.426	0.992**	-0.258
	(-1.155)	(2.490)	(-0.938)	(-1.136)	(2.525)	(-0.901)

Table 4.9 Panel B continued

	(1)	(2)	(3)	(4)	(5)	(6)
$SDEBT_t$	-1.905**	0.708	-0.922***	-1.827*	0.642	-0.925***
	(-2.032)	(0.814)	(-2.789)	(-1.979)	(0.745)	(-2.781)
$TOP10_t$	0.001	-0.001	-0.001	0.001	-0.001	-0.001
	(0.519)	(-0.388)	(-0.472)	(0.392)	(-0.307)	(-0.354)
$INSTI_t$	0.000	-0.004	0.004*	-0.001	-0.004	0.005*
	(0.006)	(-1.232)	(1.682)	(-0.183)	(-1.167)	(1.916)
$STATE_t$	0.124	-0.065	0.047	0.136	-0.077	0.050
	(1.419)	(-0.804)	(0.756)	(1.521)	(-0.965)	(0.798)
$BIG4_t$	-0.048	0.144	0.030	0.002	0.115	0.014
	(-0.224)	(0.954)	(0.286)	(0.009)	(0.847)	(0.143)
ANA_t	0.077**	-0.002	0.119***	0.076*	-0.008	0.126***
	(1.990)	(-0.037)	(3.735)	(1.939)	(-0.188)	(3.933)
$CROSSB_t$	-0.078	-0.015	0.118	-0.128	0.024	0.112
	(-0.338)	(-0.065)	(1.042)	(-0.530)	(0.098)	(0.996)
$CROSSH_t$	-0.042	-0.073	-0.232**	-0.096	-0.028	-0.221**
	(-0.198)	(-0.390)	(-2.146)	(-0.511)	(-0.155)	(-2.290)
ST_t	0.803	-1.142	0.163	0.746	-0.977	0.094
	(1.318)	(-1.044)	(0.359)	(1.234)	(-0.893)	(0.204)
$DLOSS_t$	-1.295*	0.524	0.028	-1.211*	0.472	0.011
	(-1.957)	(0.693)	(0.122)	(-1.816)	(0.615)	(0.047)
$DGWTA_t$	-0.032	0.106	0.026	-0.027	0.099	0.026
	(-0.370)	(1.588)	(0.423)	(-0.329)	(1.507)	(0.430)
Constant	3.039	0.326	0.403	1.400	1.387	0.444
	(1.474)	(0.126)	(0.578)	(0.648)	(0.618)	(0.630)
Year fixed effects	YES	YES	YES	YES	YES	YES
N	528	528	528	528	528	528
R^2	0.212	0.155	0.141	0.236	0.167	0.149
adj. R^2	0.156	0.094	0.082	0.176	0.102	0.085

t statistics in parentheses, ***, **, * denotes statistical significance at the 1%, 5% and 10 % level (two-tailed test), respectively.

Table 4.10 Robustness checks for tests relating to the determinants of fair value model adoption: Alternative samples and variables

Variables	Alternative firm size measure	No winsorization	No financial firms	No cross-listed firms	No IPO firm-years	Logistic model
	(1)	(2)	(3)	(4)	(5)	(6)
	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.
$SDEBT_{t-1}$	1.414**	0.830*	1.569***	1.750***	1.497***	3.220***
	(2.493)	(1.915)	(2.787)	(2.966)	(2.659)	(2.691)
$LDEBT_{t-1}$	1.214**	1.268**	1.508***	1.226*	1.465**	3.257***
	(2.025)	(2.435)	(2.609)	(1.852)	(2.486)	(2.587)
$MANAGE_{t-1}$	-0.426	-0.707**	-0.560	-0.758*	-0.553	-1.334
	(-1.281)	(-2.042)	(-1.580)	(-1.919)	(-1.562)	(-1.448)
$MTBTANA_{t}$	-0.263***	-0.159**	-0.196**	-0.211**	-0.225***	-0.524***
	(-3.129)	(-2.155)	(-2.438)	(-2.284)	(-2.752)	(-2.751)
ST_{t-1}	-0.042	-0.018	-0.151	-0.131	-0.162	-0.308
	(-0.175)	(-0.085)	(-0.625)	(-0.517)	(-0.684)	(-0.581)
$DLOSS_{t-1}$	0.009	-0.057	-0.030	-0.156	-0.031	-0.121
	(0.074)	(-0.492)	(-0.244)	(-1.120)	(-0.251)	(-0.451)
$FIRSTLIST_{t}$	-0.037	-0.071	0.182			0.413
	(-0.084)	(-0.150)	(0.367)			(0.371)
$ACTIVITY_{t}$	0.121	0.141	0.161	0.086	0.145	0.318
	(0.752)	(0.934)	(0.976)	(0.513)	(0.901)	(0.928)
$STATE_{t}$	-0.731***	-0.636***	-0.731***	-0.574***	-0.683***	-1.447***
	(-3.960)	(-3.806)	(-3.823)	(-3.024)	(-3.751)	(-3.689)
$INSTI_{t-1}$	0.011	0.008	0.020**	0.013	0.013*	0.024
	(1.448)	(1.019)	(2.410)	(1.489)	(1.732)	(1.510)
$NIPTA_{t-1}$	4.665***	0.014*	4.343***	4.331***	4.289***	8.252***
	(7.999)	(1.773)	(7.632)	(7.137)	(7.719)	(7.489)
$BIG4_{t}$	-0.289	-0.032	-0.178	-0.196	-0.142	-0.342
	(-1.077)	(-0.141)	(-0.631)	(-0.522)	(-0.525)	(-0.564)
$INDUSFV_{t-1}$	2.060	3.273**	3.100*	2.199	2.053	4.192
	(1.282)	(2.185)	(1.848)	(1.348)	(1.307)	(1.247)
$REGIONFV_{t-1}$	11.503***	10.848***	11.966***	11.724***	11.269***	23.519***
	(3.497)	(3.389)	(3.656)	(3.445)	(3.477)	(3.465)
$CROSSB_{t}$	0.088	0.307	0.150		0.128	0.273
	(0.265)	(1.046)	(0.446)		(0.381)	(0.382)
$CROSSH_{t}$	0.433	0.491	0.711**		0.581*	1.273*
	(1.340)	(1.596)	(2.096)		(1.822)	(1.840)
$TOP10_{t}$	-0.004	-0.001	-0.006	-0.003	-0.004	-0.007
	(-0.935)	(-0.250)	(-1.162)	(-0.560)	(-0.768)	(-0.665)

Table 4.10 continued

	(1)	(2)	(3)	(4)	(5)	(6)
$REALESTATE_t$	4.737***	3.875***	4.833***	4.976***	4.870***	14.847***
	(11.798)	(11.675)	(11.428)	(11.606)	(11.789)	(13.179)
BTM_{t-1}	0.125**	0.132***	0.192***	0.178***	0.205***	0.418***
	(2.374)	(3.652)	(3.717)	(3.262)	(4.369)	(4.477)
$SIZE_{t-1}$	0.178***	-0.021	0.019	0.005	0.015	0.048
	(2.810)	(-1.043)	(0.719)	(0.202)	(0.617)	(0.804)
Constant	-11.546***	-5.851***	-8.308***	-8.093***	-8.214***	-21.911***
	(-7.867)	(-10.699)	(-10.291)	(-9.637)	(-10.507)	(-11.606)
Industry fixed effects	YES	YES	YES	YES	YES	YES
Year fixed effects	YES	YES	YES	YES	YES	YES
N	7508	7506	7338	6428	7461	7506
Pseudo R^2	0.278	0.180	0.278	0.283	0.269	0.267

t statistics in parentheses, ***, **, * denotes statistical significance at the 1%, 5% and 10 % level (two-tailed test), respectively.

Table 4.11 Robustness checks for tests relating to the determinants of fair value model adoption: Sample firm-years matched by firm size, size of investment property assets, and industry

Panel A Post-matching comparison between the fair value model adopters and the historical cost model adopters

Variables	FVA Group	Mean(FVA)	HCA Group	Mean(HCA)	Mean(FVA)-Mean(HCA)
SDEBT	377	0.118	377	0.107	0.011
LDEBT	359	0.109	369	0.063	0.046***
MANAGE	329	0.034	320	0.068	-0.035*
MTBTANA	377	0.159	377	0.172	-0.013
ST	377	0.045	377	0.042	0.003
DLOSS	377	0.149	377	0.143	0.005
FIRSTLIST	377	0.003	377	0.000	0.003
ACTIVITY	377	0.751	377	0.761	-0.011
STATE	377	0.363	377	0.581	-0.218***
INSTI	325	7.226	310	5.841	1.384**
NIPTA	377	0.131	377	0.135	-0.004
BIG4	377	0.167	377	0.109	0.058**
INDUSFV	377	0.079	377	0.066	0.013**
REGIONFV	377	0.047	377	0.036	0.011***
CROSSB	377	0.088	377	0.103	-0.016
CROSSH	377	0.098	377	0.077	0.021
TOP10	377	55.540	377	53.270	2.270*
REALESTATE	377	0.276	377	0.276	0.000
BTM	367	2.012	362	1.186	0.826***
SIZE	377	22.220	377	22.200	0.021

Table 4.11 Panel B Determinants of fair value model adoption using matched sample

Variables	Full sample	Non-financial firm-years	Real estate firm-years	NIPTA>0.04
	(1)	(2)	(3)	(4)
	Coef.	Coef.	Coef.	Coef.
$SDEBT_{t-1}$	2.531***	2.871***	1.551	4.104***
	(3.042)	(3.364)	(0.771)	(3.742)
$LDEBT_{t-1}$	3.387***	3.775***	1.929	4.273***
	(2.966)	(3.263)	(1.167)	(2.774)
$MANAGE_{t-1}$	-1.117**	-1.156**	-3.996	-2.012**
	(-2.089)	(-2.253)	(-0.996)	(-2.117)
$MTBTANA_{t}$	-0.254	-0.138	-0.092	-0.472*
	(-1.498)	(-0.846)	(-0.312)	(-1.680)
ST_{t-1}	-0.381	-0.350	-0.700	-0.773
	(-0.987)	(-0.852)	(-0.821)	(-1.363)
$DLOSS_{t-1}$	0.096	0.087	0.928**	-0.467
	(0.415)	(0.362)	(2.027)	(-1.579)
$ACTIVITY_{t}$	0.104	0.116	-0.452	0.732**
	(0.369)	(0.399)	(-0.889)	(2.192)
$STATE_{t}$	-0.919***	-1.045***	-1.049***	-1.039***
	(-3.652)	(-4.039)	(-2.643)	(-3.180)
$INSTI_{t-1}$	0.027**	0.035**	0.045*	0.039*
	(2.212)	(2.249)	(1.887)	(1.770)
$NIPTA_{t-1}$	0.759	0.788	1.993*	0.202
	(1.012)	(1.022)	(1.741)	(0.192)
$BIG4_{t}$	-0.194	-0.240	-0.975*	-0.647
	(-0.605)	(-0.714)	(-1.889)	(-1.254)
$INDUSFV_{t-1}$	0.377	2.534	2.906	-0.832
	(0.157)	(1.024)	(0.625)	(-0.204)
$REGIONFV_{t-1}$	18.646***	21.544***	23.381**	25.490***
	(3.574)	(4.081)	(2.041)	(3.182)
$CROSSB_{t}$	0.008	0.004	-1.119*	-0.156
	(0.019)	(0.010)	(-1.828)	(-0.328)
$CROSSH_{t}$	0.139	0.403		0.578
	(0.318)	(0.841)		(0.559)
$TOP10_{t}$	0.001	-0.002	-0.007	0.002
	(0.229)	(-0.252)	(-0.621)	(0.271)
$REALESTATE_{t}$	0.484	0.538		0.443
	(0.652)	(0.730)		(0.485)

Table 4.11 Panel B continued

	Full sample	Non-financial firm-years	Real estate firm-years	NIPTA>0.04
BTM_{t-1}	0.321***	0.217**	0.149	0.679***
	(3.686)	(2.120)	(0.979)	(4.667)
$SIZE_{t-1}$	-0.073*	-0.068	0.272	-0.152**
	(-1.678)	(-1.489)	(1.450)	(-2.248)
Constant	-1.323	-1.563	-7.655**	-0.803
	(-0.932)	(-1.073)	(-1.990)	(-0.413)
Industry fixed effects	YES	YES	NO	YES
Year fixed effects	YES	YES	YES	YES
N	590	556	177	340
Pseudo R^2	0.275	0.283	0.388	0.423

t statistics in parentheses, ***, **, * denotes statistical significance at the 1%, 5% and 10 % level (two-tailed test), respectively.

Table 4.12 Robustness checks for tests relating to the consequences of fair value model adoption: Alternative model, sample and variable

Panel A Firm fixed-effects model

Variables	Consequences of fair value model adoption			Influence of potential earnings management		
	(1) $ACCURACY_{t+1}$	(2) $BIAS_{t+1}$	(3) $NCSKEW_{t+1}$	(4) $ACCURACY_{t+1}$	(5) $BIAS_{t+1}$	(6) $NCSKEW_{t+1}$
$FVIPFIRST_t$	0.064	1.236**	-0.762***	0.120	1.256**	-0.787***
	(0.132)	(2.387)	(-2.616)	(0.244)	(2.551)	(-2.718)
$FVIPSUBSE_t$	0.544	0.831*	-0.630**	0.579	0.855**	-0.664***
	(0.977)	(1.736)	(-2.403)	(0.990)	(1.982)	(-2.590)
$FVIPFIRST_t \times NIPTA_t$	-0.836	0.037	0.504	0.028	-1.353	-0.356
	(-0.506)	(0.018)	(0.610)	(0.019)	(-0.856)	(-0.391)
$FVIPSUBSE_t \times NIPTA_t$	-2.381	-0.698	0.244	-1.167	-3.672	-0.210
	(-0.634)	(-0.206)	(0.322)	(-0.301)	(-1.532)	(-0.213)
$FVIPFIRST \times NIPTA_t \times EM\_DUM_t$				-1.566**	2.201**	1.512*
				(-2.162)	(2.028)	(1.877)
$FVIPSUBSE_t \times NIPTA_t \times EM\_DUM_t$				-2.077	5.050**	0.745
				(-0.819)	(2.498)	(0.829)
EM_DUM_t				0.030	-0.213**	-0.060
				(0.235)	(-2.146)	(-0.927)
NIPTAt	0.156	-1.617**	0.369	0.028	-1.250**	0.493
	(0.232)	(-2.264)	(0.994)	(0.046)	(-2.007)	(1.343)
IMRt	0.019	-0.551***	0.290**	-0.006	-0.530***	0.307***
	(0.091)	(-2.859)	(2.537)	(-0.029)	(-2.728)	(2.659)
$HORI_{t+1}$	-0.444**	0.672***		-0.426**	0.642***	
	(-2.113)	(3.747)		(-2.009)	(3.575)	
VOL_{t+1}	-0.003	-0.004	0.012***	-0.003	-0.004	0.012***
	(-0.358)	(-0.416)	(2.598)	(-0.368)	(-0.398)	(2.618)
DA_t	0.627***	-1.017***	0.094	0.637***	-1.034***	0.086
	(2.835)	(-5.260)	(0.847)	(2.871)	(-5.334)	(0.772)
$ABCFO_t$	0.577***	-0.732***	-0.068	0.583***	-0.738***	-0.073
	(3.078)	(-4.864)	(-0.666)	(3.114)	(-4.941)	(-0.718)
$ABPROD_t$	-0.412***	0.529***	0.003	-0.423***	0.545***	0.011
	(-4.099)	(5.781)	(0.054)	(-4.193)	(6.051)	(0.189)
$ABDISE_t$	-0.160	-0.155	0.091	-0.162	-0.150	0.089
	(-1.088)	(-1.070)	(0.891)	(-1.099)	(-1.037)	(0.868)
BTM_t	-0.129***	0.069**	-0.034**	-0.130***	0.072**	-0.034**
	(-2.863)	(2.106)	(-2.028)	(-2.893)	(2.209)	(-2.058)
$SIZE_t$	-0.001	0.010	-0.010	-0.002	0.013	-0.010
	(-0.087)	(1.102)	(-1.048)	(-0.205)	(1.445)	(-1.026)
$LDEBT_t$	0.303	-0.247	0.632***	0.306	-0.273	0.633***
	(0.716)	(-0.740)	(2.820)	(0.727)	(-0.826)	(2.813)

Table 4.12 Panel A continued

	(1)	(2)	(3)	(4)	(5)	(6)
$SDEBT_t$	-1.022***	0.449	-0.076	-0.989***	0.374	-0.088
	(-2.830)	(1.378)	(-0.439)	(-2.867)	(1.206)	(-0.505)
$TOP10_t$	0.007***	-0.007***	0.003*	0.007**	-0.006**	0.003*
	(2.630)	(-2.667)	(1.760)	(2.578)	(-2.557)	(1.847)
$INSTI_t$	-0.003	-0.004	0.004	-0.003	-0.005	0.004
	(-1.001)	(-1.280)	(1.645)	(-0.988)	(-1.363)	(1.592)
$STATE_t$	-0.034	0.366**	-0.191***	-0.033	0.356**	-0.192***
	(-0.244)	(2.096)	(-2.628)	(-0.238)	(2.058)	(-2.667)
$BIG4_t$	0.101	-0.017	-0.051	0.106	-0.029	-0.057
	(1.335)	(-0.191)	(-0.797)	(1.393)	(-0.334)	(-0.889)
ANA_t	0.195***	-0.110***	-0.019	0.196***	-0.114***	-0.021
	(6.234)	(-3.892)	(-1.089)	(6.231)	(-4.091)	(-1.175)
ST_t	0.553	-1.493***	0.039	0.526	-1.294***	0.094
	(1.261)	(-3.645)	(0.252)	(1.162)	(-3.117)	(0.564)
$DLOSS_t$	-0.368**	-0.282*	0.101**	-0.366**	-0.283**	0.100**
	(-2.446)	(-1.956)	(2.357)	(-2.439)	(-1.970)	(2.351)
$DGWTA_t$	0.107*	-0.009	0.016	0.106*	-0.008	0.016
	(1.834)	(-0.172)	(0.431)	(1.861)	(-0.161)	(0.431)
Constant	1.712	-3.585***	-0.309	1.636	-3.483***	-0.317
	(1.324)	(-3.275)	(-1.218)	(1.256)	(-3.155)	(-1.250)
Industry fixed effects	YES	YES	YES	YES	YES	YES
Year fixed effects	YES	YES	YES	YES	YES	YES
N	4308	4308	4308	4308	4308	4308
R^2	0.083	0.111	0.144	0.085	0.119	0.145
adj. R^2	0.076	0.104	0.137	0.077	0.112	0.137

t statistics in parentheses, ***, **, * denotes statistical significance at the 1%, 5% and 10 % level (two-tailed test), respectively.

Table 4.12 Panel B Firm fixed-effects model, sample without financial firm-years, and alternative stock price crash risk measure

Variables	Consequences of fair value model adoption			Influence of potential earnings management		
	(1) $ACCURACY_{t+1}$	(2) $BIAS_{t+1}$	(3) $DUVOL_{t+1}$	(4) $ACCURACY_{t+1}$	(5) $BIAS_{t+1}$	(6) $DUVOL_{t+1}$
$FVIPFIRST_t$	0.063	1.247**	-0.181**	0.123	1.253**	-0.188**
	(0.129)	(2.401)	(-2.427)	(0.249)	(2.535)	(-2.466)
$FVIPSUBSE_t$	0.544	0.845*	-0.140**	0.582	0.855**	-0.151**
	(0.972)	(1.762)	(-2.125)	(0.993)	(1.981)	(-2.269)
$FVIPFIRST_t \times NIPTA_t$	-0.821	-0.134	0.088	0.174	-1.824	-0.196
	(-0.473)	(-0.063)	(0.453)	(0.106)	(-1.123)	(-1.142)
$FVIPSUBSE_t \times NIPTA_t$	-2.360	-0.753	0.042	-1.122	-3.745	-0.079
	(-0.624)	(-0.220)	(0.193)	(-0.288)	(-1.556)	(-0.310)
$FVIPFIRST \times NIPTA_t \times EM\_DUM_t$				-1.694**	2.632***	0.466***
				(-2.180)	(2.674)	(2.839)
$FVIPSUBSE_t \times NIPTA_t \times EM\_DUM_t$				-2.080	5.028**	0.186
				(-0.818)	(2.482)	(0.815)
EM_DUM_t				0.031	-0.215**	-0.018
				(0.245)	(-2.170)	(-1.157)
NIPTAt	0.141	-1.626**	0.050	0.004	-1.237*	0.088
	(0.208)	(-2.246)	(0.485)	(0.007)	(-1.957)	(0.845)
IMRt	0.019	-0.546***	0.070**	-0.011	-0.516***	0.077**
	(0.091)	(-2.818)	(2.329)	(-0.051)	(-2.647)	(2.480)
$HORI_{t+1}$	-0.442**	0.673***		-0.424**	0.642***	
	(-2.080)	(3.722)		(-1.981)	(3.545)	
VOL_{t+1}	-0.003	-0.005	-0.001	-0.003	-0.004	-0.001
	(-0.321)	(-0.521)	(-0.635)	(-0.332)	(-0.500)	(-0.609)
DA_t	0.674***	-1.080***	0.013	0.686***	-1.100***	0.010
	(2.944)	(-5.485)	(0.427)	(2.985)	(-5.573)	(0.328)
$ABCFO_t$	0.616***	-0.786***	-0.020	0.624***	-0.796***	-0.023
	(3.135)	(-5.065)	(-0.769)	(3.182)	(-5.162)	(-0.853)
$ABPROD_t$	-0.423***	0.551***	0.007	-0.436***	0.570***	0.009
	(-4.096)	(5.920)	(0.409)	(-4.194)	(6.204)	(0.574)
$ABDISE_t$	-0.166	-0.147	-0.008	-0.167	-0.143	-0.009
	(-1.120)	(-1.015)	(-0.327)	(-1.132)	(-0.986)	(-0.354)
BTM_t	-0.130***	0.069**	-0.017***	-0.131***	0.071**	-0.017***
	(-2.874)	(2.091)	(-3.563)	(-2.905)	(2.191)	(-3.589)
$SIZE_t$	-0.001	0.011	-0.003	-0.003	0.015	-0.003
	(-0.137)	(1.174)	(-1.123)	(-0.288)	(1.553)	(-1.075)
$LDEBT_t$	0.301	-0.264	0.072	0.304	-0.287	0.073
	(0.710)	(-0.789)	(1.254)	(0.718)	(-0.865)	(1.261)

Table 4.12 Panel B continued

	(1)	(2)	(3)	(4)	(5)	(6)
$SDEBT_t$	-1.017***	0.461	-0.047	-0.984***	0.385	-0.050
	(-2.812)	(1.414)	(-1.007)	(-2.852)	(1.244)	(-1.060)
$TOP10_t$	0.007**	-0.007***	0.000	0.007**	-0.007***	0.000
	(2.580)	(-2.778)	(0.840)	(2.523)	(-2.659)	(0.929)
$INSTI_t$	-0.003	-0.004	0.001*	-0.003	-0.005	0.001*
	(-0.962)	(-1.255)	(1.750)	(-0.944)	(-1.345)	(1.685)
$STATE_t$	-0.041	0.337*	-0.047**	-0.040	0.327*	-0.048**
	(-0.282)	(1.871)	(-1.990)	(-0.274)	(1.831)	(-2.027)
$BIG4_t$	0.102	-0.017	-0.000	0.107	-0.031	-0.002
	(1.342)	(-0.199)	(-0.019)	(1.404)	(-0.356)	(-0.124)
ANA_t	0.195***	-0.111***	-0.005	0.196***	-0.115***	-0.006
	(6.204)	(-3.908)	(-1.147)	(6.197)	(-4.106)	(-1.231)
ST_t	0.556	-1.494***	0.016	0.527	-1.293***	0.033
	(1.269)	(-3.633)	(0.343)	(1.167)	(-3.103)	(0.668)
$DLOSS_t$	-0.367**	-0.283**	0.014	-0.365**	-0.284**	0.013
	(-2.443)	(-1.967)	(1.173)	(-2.435)	(-1.982)	(1.161)
$DGWTA_t$	0.102*	-0.009	-0.001	0.102*	-0.008	-0.001
	(1.754)	(-0.173)	(-0.060)	(1.781)	(-0.163)	(-0.067)
Constant	1.720	-3.568***	-0.086	1.655	-3.466***	-0.090
	(1.310)	(-3.216)	(-1.305)	(1.253)	(-3.105)	(-1.366)
Industry fixed effects	YES	YES	YES	YES	YES	YES
Year fixed effects	YES	YES	YES	YES	YES	YES
N	4288	4288	4288	4288	4288	4288
R^2	0.084	0.112	0.192	0.085	0.121	0.194
adj. R^2	0.077	0.105	0.186	0.077	0.114	0.187

t statistics in parentheses, ***, **, * denotes statistical significance at the 1%, 5% and 10 % level (two-tailed test), respectively.

Table 4.13 Robustness checks for tests relating to consequences: Results on propensity score matching samples

Panel A Post-PSM comparison between the fair value model adopters and the historical cost model adopters

Variables	FVA Group	Mean(FVA)	HCA Group	Mean(HCA)	Mean(FVA)-Mean(HCA)
SDEBT	309	0.119	309	0.109	0.010
LDEBT	309	0.113	309	0.108	0.005
MANAGE	309	0.034	309	0.045	-0.011
MTBTANA	309	0.152	309	0.146	0.006
ST	309	0.019	309	0.016	0.003
DLOSS	309	0.117	309	0.117	0.000
FIRSTLIST	309	0.003	309	0.010	-0.006
ACTIVITY	309	0.741	309	0.767	-0.026
STATE	309	0.372	309	0.388	-0.016
INSTI	309	6.648	309	7.076	-0.428
NIPTA	309	0.134	309	0.129	0.005
BIG4	309	0.152	309	0.191	-0.039
INDUSFV	309	0.075	309	0.078	-0.003
REGIONFV	309	0.049	309	0.048	0.002
CROSSB	309	0.091	309	0.084	0.006
CROSSH	309	0.094	309	0.123	-0.029
TOP10	309	56.760	309	55.560	1.207
REALESTATE	309	0.301	309	0.282	0.019
BTM	309	1.882	309	1.886	-0.004
SIZE	309	22.320	309	22.280	0.042

Table 4.13 Panel B Consequences of fair value model adoption using PSM sample

Variables	Consequences of fair value model adoption			Influence of potential earnings management		
	(1)	(2)	(3)	(4)	(5)	(6)
	$ACCURACY_{t+1}$	$BIAS_{t+1}$	$NCSKEW_{t+1}$	$ACCURACY_{t+1}$	$BIAS_{t+1}$	$NCSKEW_{t+1}$
$FVIPFIRST_t$	-0.191	0.212	-0.001	0.232	-0.136	0.115
	(-0.969)	(1.026)	(-0.006)	(1.440)	(-0.991)	(0.724)
$FVIPSUBSE_t$	0.020	-0.028	-0.047	0.155	-0.266**	-0.000
	(0.144)	(-0.204)	(-0.540)	(1.189)	(-2.308)	(-0.004)
$FVIPFIRST_t \times EM\_DUM_t$				-0.976***	0.884**	-0.443
				(-2.633)	(2.116)	(-1.603)
$FVIPSUBSE_t \times EM\_DUM_t$				-0.538	0.914**	-0.321
				(-1.435)	(2.521)	(-1.380)
EM_DUM_t				0.181	-0.271	0.270
				(0.758)	(-1.126)	(1.411)
$HORI_t$	-1.419*	1.692*		-1.236	1.517*	
	(-1.776)	(1.922)		(-1.604)	(1.862)	
$NIPTA_t$	-0.453	-0.418	-0.210	-0.344	-0.575	-0.256
	(-0.669)	(-0.699)	(-0.687)	(-0.522)	(-1.040)	(-0.814)
VOL_{t+1}	0.024	-0.045	0.002	0.015	-0.036	0.003
	(0.767)	(-1.630)	(0.122)	(0.524)	(-1.344)	(0.137)
DA_t	1.199*	-1.464**	0.583	1.167*	-1.461**	0.519
	(1.718)	(-2.364)	(1.601)	(1.734)	(-2.481)	(1.378)
$ABCFO_t$	1.097**	-0.516	-0.025	1.059**	-0.437	-0.013
	(2.257)	(-1.124)	(-0.091)	(2.349)	(-1.053)	(-0.047)
$ABPROD_t$	-0.697**	0.254	0.152	-0.693**	0.241	0.173
	(-2.402)	(0.815)	(0.957)	(-2.436)	(0.808)	(1.078)
$ABDISE_t$	-0.123	-0.265	-0.300	-0.238	-0.077	-0.383
	(-0.231)	(-0.547)	(-1.042)	(-0.467)	(-0.165)	(-1.296)
BTM_t	0.084*	-0.056	-0.075**	0.105**	-0.081*	-0.069**
	(1.937)	(-1.331)	(-2.216)	(2.184)	(-1.796)	(-2.010)
$SIZE_t$	-0.017	-0.024	-0.035	-0.023	-0.010	-0.037
	(-0.508)	(-0.791)	(-1.412)	(-0.714)	(-0.372)	(-1.440)
$LDEBT_t$	0.012	-0.194	0.088	-0.075	-0.080	0.102
	(0.015)	(-0.242)	(0.199)	(-0.090)	(-0.111)	(0.223)
$SDEBT_t$	-2.446**	1.229	-0.596	-2.404**	1.261	-0.633
	(-2.140)	(1.307)	(-1.473)	(-2.108)	(1.370)	(-1.570)
$TOP10_t$	0.002	-0.002	0.000	0.001	-0.001	-0.000
	(0.475)	(-0.591)	(0.069)	(0.238)	(-0.221)	(-0.017)
$INSTI_t$	0.003	-0.006	-0.001	0.004	-0.007	-0.001
	(0.591)	(-1.085)	(-0.310)	(0.682)	(-1.161)	(-0.228)

Table 4.13 Panel B continued

	(1)	(2)	(3)	(4)	(5)	(6)
$STATE_t$	0.083	-0.068	0.181*	0.046	-0.022	0.173*
	(0.481)	(-0.476)	(1.846)	(0.261)	(-0.150)	(1.750)
$BIG4_t$	0.077	0.017	0.189	0.077	0.039	0.182
	(0.238)	(0.057)	(1.498)	(0.239)	(0.128)	(1.444)
ANA_t	0.102	0.004	0.087*	0.110	-0.008	0.099*
	(1.567)	(0.073)	(1.745)	(1.606)	(-0.135)	(1.974)
$CROSS_t$	-0.052	-0.048	-0.452***	-0.077	-0.022	-0.461***
	(-0.144)	(-0.148)	(-3.327)	(-0.215)	(-0.068)	(-3.385)
$DGWTA_t$	0.143	-0.137	0.003	0.105	-0.095	0.003
	(0.886)	(-0.918)	(0.036)	(0.686)	(-0.672)	(0.029)
Constant	9.030*	-8.955*	0.121	8.232*	-8.391*	0.228
	(1.920)	(-1.718)	(0.186)	(1.808)	(-1.746)	(0.340)
Industry fixed effects	YES	YES	YES	YES	YES	YES
Year fixed effects	YES	YES	YES	YES	YES	YES
N	351	351	351	351	351	351
R^2	0.209	0.163	0.202	0.233	0.213	0.209
adj. R^2	0.093	0.039	0.087	0.111	0.088	0.086

t statistics in parentheses, ***, **, * denotes statistical significance at the 1%, 5% and 10 % level (two-tailed test), respectively.

Table 4.14 Investment property fair value model and potential earnings management

	Adoption year (82 observations)		**Post-adoption year** (319 observations)	
	Number of companies	Percentage	Number of companies	Percentage
Debt financing				
Use investment property as collateral		About 50%		
Asset pricing incentives				
Avoid earnings decline	9	10.98%	27	8.46%
Avoid net assets decline	17	20.73%	34	10.66%
Big bath	4	4.88%	20	6.27%
Regulation motivated incentives				
Remove "*ST" cap	11	13.41%	8	2.51%
Reverse previous year operating profits loss	5	6.10%	1	0.31%
Reverse current year operating profits loss	4	4.88%	16	5.02%
Reverse negative net assets	2	2.44%	3	0.94%
IPO companies	6	7.32%		N/A
New equity issuance	31	37.80%	111	34.80%

Table 4.15 Predictive ability of unrealized fair value gains and losses on investment property about firms' future earnings

	(1) NI_{t+1}	(2) NI_{t+1}	(3) NI_{t+1}	(4) NI_{t+1}
$IPFVUGL_t$	0.620	3.102***	2.147**	2.077***
	(1.087)	(3.692)	(2.417)	(2.773)
$OTHERFVUGL_t$	2.302	10.394***	9.545***	6.506**
	(1.163)	(3.790)	(3.221)	(2.387)
$NFVPROFIT_t$	1.005***	1.018***	1.007***	1.017***
	(6.920)	(12.727)	(9.994)	(10.358)
$IPFVUGL_t \times EM\_DUM_t$		-3.450***		
		(-3.558)		
$OTHERFVUGL_t \times EM\_DUM_t$		-11.375***		
		(-3.666)		
EM_DUM_t		0.078*		
		(1.683)		
$IPFVUGL_t \times EMAP_t$			-2.504**	
			(-2.454)	
$OTHERFVUGL_t \times EMAP_t$			-10.577***	
			(-3.228)	
$EMAP_t$			0.052	
			(0.813)	
$IPFVUGL_t \times EMREG_t$				-2.288***
				(-2.973)
$OTHERFVUGL_t \times EMREG_t$				-7.001**
				(-2.363)
$EMREG_t$				0.079
				(1.061)
Constant	-0.014	-0.054	-0.035	-0.052
	(-0.120)	(-0.469)	(-0.302)	(-0.457)
Year fixed effects	YES	YES	YES	YES
Industry fixed effects	YES	YES	YES	YES
N	361	361	361	361
R^2	0.376	0.399	0.390	0.388
adj. R^2	0.329	0.348	0.339	0.337

t statistics in parentheses, ***, **, * denotes statistical significance at the 1%, 5% and 10 % level (two-tailed test), respectively.

Table 4.16 Market consequences of fair value model adoption among the fair value model adopters

Variables	Consequences of fair value model adoption			Influence of earnings management		
	(1) $ACCURACY_{t+1}$	(2) $BIAS_{t+1}$	(3) $NCSKEW_{t+1}$	(4) $ACCURACY_{t+1}$	(5) $BIAS_{t+1}$	(6) $NCSKEW_{t+1}$
$FVIPFIRST_t$	0.223	-0.113	-0.192	0.488**	-0.353*	-0.045
	(1.195)	(-0.512)	(-1.197)	(2.565)	(-1.831)	(-0.282)
$FVIPSUBSE_t$	0.760	-0.676	-0.164	0.865*	-0.723*	-0.088
	(1.615)	(-1.600)	(-0.922)	(1.973)	(-1.871)	(-0.500)
$FVIPFIRST_t \times NIPTA_t$	-11.486***	9.767***	1.486*	-13.399***	11.495***	-1.047
	(-5.658)	(4.320)	(1.839)	(-5.869)	(5.125)	(-0.845)
$FVIPSUBSE_t \times NIPTA_t$	-13.668***	10.154***	1.336	-15.844***	10.234***	-0.563
	(-3.883)	(2.789)	(1.412)	(-4.988)	(3.784)	(-0.409)
$FVIPFIRST \times NIPTA_t \times EM\_DUM_t$				0.449	-0.708	2.182**
				(0.332)	(-0.508)	(2.333)
$FVIPSUBSE_t \times NIPTA_t \times EM\_DUM_t$				1.913	0.930	1.355
				(1.097)	(0.613)	(1.239)
EM_DUM_t				-0.553*	0.449	-0.298**
				(-1.679)	(1.411)	(-2.233)
$HORI_{t+1}$	-0.229	1.098		-0.127	1.089	
	(-0.327)	(1.507)		(-0.193)	(1.525)	
$NIPTA_t$	12.896***	-11.854***	-1.417	14.811***	-13.404***	0.092
	(5.014)	(-4.621)	(-1.524)	(6.080)	(-5.744)	(0.091)
VOL_{t+1}	-0.039	0.026	0.007	-0.041	0.024	0.009
	(-0.803)	(0.680)	(0.290)	(-0.822)	(0.599)	(0.395)
DA_t	0.919	-0.654	-0.032	0.989*	-0.900*	-0.096
	(1.603)	(-1.277)	(-0.075)	(1.697)	(-1.827)	(-0.205)
$ABCFO_t$	1.253**	-0.589	0.029	1.230**	-0.621	-0.054
	(2.613)	(-1.321)	(0.087)	(2.627)	(-1.491)	(-0.154)
$ABPROD_t$	-0.759**	0.476	0.025	-0.735*	0.516	0.124
	(-2.290)	(1.548)	(0.145)	(-1.995)	(1.559)	(0.687)
$ABDISE_t$	0.036	-0.193	-0.009	-0.064	-0.070	-0.084
	(0.067)	(-0.368)	(-0.027)	(-0.124)	(-0.142)	(-0.220)
BTM_t	0.065	-0.018	-0.068	0.083	-0.031	-0.076
	(0.732)	(-0.212)	(-1.202)	(0.959)	(-0.386)	(-1.366)
$SIZE_t$	0.018	-0.036	-0.039	0.025	-0.012	-0.043
	(0.509)	(-0.918)	(-1.252)	(0.827)	(-0.358)	(-1.299)
$LDEBT_t$	0.969	-0.460	0.431	0.582	-0.315	0.239
	(1.056)	(-0.662)	(0.774)	(0.655)	(-0.441)	(0.419)
$SDEBT_t$	-4.285**	3.126**	-0.695	-4.008*	2.625*	-0.668
	(-2.001)	(2.142)	(-0.933)	(-1.850)	(1.879)	(-0.926)

Table 4.16 continued

	(1)	(2)	(3)	(4)	(5)	(6)
$TOP10_t$	0.001	0.001	-0.004	-0.001	0.007	-0.003
	(0.093)	(0.167)	(-0.899)	(-0.106)	(0.744)	(-0.774)
$INSTI_t$	0.001	-0.023*	0.005	0.001	-0.025**	0.005
	(0.141)	(-1.916)	(1.157)	(0.136)	(-2.063)	(0.978)
$STATE_t$	0.179	0.560	0.114	0.095	0.576	0.095
	(0.375)	(0.659)	(0.508)	(0.204)	(0.683)	(0.409)
$BIG4_t$	0.753*	-0.095	0.092	1.198**	-0.292	0.093
	(1.850)	(-0.140)	(0.334)	(2.554)	(-0.417)	(0.307)
ANA_t	0.175	0.050	0.053	0.181	0.040	0.050
	(1.433)	(0.516)	(0.867)	(1.478)	(0.459)	(0.841)
$DGWTA_t$	0.370*	-0.396*	0.049	0.270	-0.304	0.009
	(1.947)	(-1.997)	(0.475)	(1.375)	(-1.453)	(0.094)
Constant	-0.248	-5.344	0.755	-0.805	-6.028	0.881
	(-0.060)	(-1.329)	(1.025)	(-0.212)	(-1.543)	(1.115)
Industry fixed effects	YES	YES	YES	YES	YES	YES
Year fixed effects	YES	YES	YES	YES	YES	YES
N	305	305	305	305	305	305
R^2	0.263	0.289	0.181	0.283	0.329	0.201
adj. R^2	0.183	0.211	0.094	0.195	0.247	0.106

t statistics in parentheses, ***, **, * denotes statistical significance at the 1%, 5% and 10 % level (two-tailed test), respectively.

Chapter 4 Appendices

Appendix 4.1: List of cities by tiers in China

First tier cities

Beijing, Shanghai, Guangzhou, and Shenzhen.

Second tier cities

Beihai, Changchun, Changsha, Chengdu, Chongqing, Dalian, Fuzhou, Guiyang, Haikou, Hangzhou, Harbin, Hefei, Hohhot, Jinan, Kunming, Lanzhou, Nanchang, Nanjing, Nanning, Ningbo, Qingdao, Sanya, Shenyang, Shijiazhuang, Suzhou, Taiyuan, Tianjin, Urumqi, Wenzhou, Wuhan, Wuxi, Xi'An, Xiamen, Xining, Yinchuan, and Zhengzhou.

Source: Fang et al. 2015. Demystifying the Chinese Housing Boom. NBER Macroeconomics Annual 30, p.161.

Appendix 4.2 List of geographical regions in mainland China

East region includes 6 provinces/municipalities: Shandong, Shanghai, Jiangsu, Anhui, Zhejiang, Fujian
South region includes 3 provinces/autonomous regions: Guangxi, Guangdong, Hainan,
North region includes 5 provinces/municipalities/autonomous regions: Inner Mongolia, Beijing, Hebei, Tianjin, Shanxi
Central region includes 4 provinces: Henan, Hubei, Hunan, Jiangxi
Northeast region includes 3 provinces: Heilongjiang, Jilin, Liaoning
Northwest region includes 5 provinces/autonomous regions: Qinghai, Gansu, Ningxia, Shanxi, Xinjiang
Southwest region includes 5 provinces/municipalities/autonomous regions: Tibet, Sichuan, Chongqing, Guizhou, Yunnan

Source: http://www.dili520.com/gaozhongdili/bixiusanzhishi/313.html [Accessed on 02 March 2019].

Appendix 4.3 Variable definitions

ABCFO: abnormal cash flow from operations, equal the actual cash flow from operations of firm i in year t less the "normal" ones estimated using coefficient from the following equation for each industry and year:

$$\frac{\mathrm{CFO_{i,t}}}{\mathrm{TA_{i,t-1}}} = \alpha_1 + \mathrm{k_1}\frac{1}{\mathrm{TA_{i,t-1}}} + \mathrm{k_2}\frac{\mathrm{SALE_{i,t}}}{\mathrm{TA_{i,t-1}}} + \mathrm{k_3}\frac{\Delta\mathrm{SALE_{i,t}}}{\mathrm{TA_{i,t-1}}} + \varepsilon_{\mathrm{i,t}} \quad (6)$$

Where CFO is firm i's cash flow from operations in year t, SALE is the sales income

ABPROD: abnormal production costs, equal the actual production costs of firm i in year t less the "normal" ones estimated using coefficient from the following equation for each industry and year:

$$\frac{\mathrm{PROD_{i,t}}}{\mathrm{TA_{i,t-1}}} = \alpha_1 + \mathrm{k_1}\frac{1}{\mathrm{TA_{i,t-1}}} + \mathrm{k_2}\frac{\mathrm{SALE_{i,t}}}{\mathrm{TA_{i,t-1}}} + \mathrm{k_3}\frac{\Delta\mathrm{SALE_{i,t}}}{\mathrm{TA_{i,t-1}}} + \mathrm{k_4}\frac{\Delta\mathrm{SALE_{i,t-1}}}{\mathrm{TA_{i,t-1}}} + \varepsilon_{\mathrm{i,t}} \quad (7)$$

Where PROD is firm i's production costs in year t, and it equals cost of goods sold plus change in inventory

ABDISE: abnormal discretionary expenses, equal the discretionary expenses of firm i in year t less the "normal" ones estimated using coefficient from the following equation for each industry and year:

$$\frac{\mathrm{DISE_{i,t}}}{\mathrm{TA_{i,t-1}}} = \alpha_1 + \mathrm{k_1}\frac{1}{\mathrm{TA_{i,t-1}}} + \mathrm{k_2}\frac{\mathrm{SALE_{i,t-1}}}{\mathrm{TA_{i,t-1}}} + \varepsilon_{\mathrm{i,t}} \quad (8)$$

Where DISE is firm i's discretionary expenditures in year t and it is the sum of selling, general and administrative expenses, research and development costs, and advertising costs

ACTIVITY: an indicator variable that equals 1 if the registration address of a firm is located in tier 1 and tier 2 cities (see Appendix 4.1), and 0 otherwise.

ANA: the extent of analyst coverage, calculated as the logarithm of one plus the number of analysts following the firm

BIG4: a dummy variable equals 1 if a firm-year observation is audited by big 4 (Deloitt, PwC, Ernst & Young, KPMG) audit firms, 0 otherwise

BTM: book-to-market ratio, calculated as the book value of equity divided by the market value of equity

CROSSB: a dummy variable that equals 1 if a firm is listed in the mainland stock exchanges and issues B-shares

CROSSH: a dummy variable that equals 1 if a firm issues shares both in the domestic stock exchanges and in the Hong Kong Stock Exchange

DA: discretionary accrual calculated from the Jones (1991). It equals the difference between total accruals ($TACC_{i,t}$) and the fitted normal accruals ($NA_{i,t}$). I first estimate the following equation for firms within each industry code classified by 2012 CSRC industry code and obtain the coefficients α, β_1 and β_2.

$$\frac{\mathrm{TACC_{i,t}}}{\mathrm{TA_{i,t-1}}} = \alpha\frac{1}{TA_{i,t-1}} + \beta_1\frac{\Delta SALE_{i,t}}{TA_{i,t-1}} + \beta_2\frac{PPE_{i,t}}{TA_{i,t-1}} + \varepsilon_{i,t} \quad (9)$$

Where:

TACC is the total accruals which equals earnings before extraordinary items and discontinued operations less operating cash flows;

Appendix 4.3 Variable definitions (continued)

TA represents total assets;
ΔSales is the annual change in sales;
PPE is gross property, plant and equipment.
Then the coefficient estimates of α, β_1 and β_2 are used in equation (9) to calculate the firm-specific normal accruals (NA):

$$NA_{i,t} = \hat{\alpha}\frac{1}{TA_{i,t-1}} + \hat{\beta}_1\frac{\Delta SALE_{i,t}}{TA_{i,t-1}} + \hat{\beta}_2\frac{PPE_{i,t}}{TA_{i,t-1}} \quad (10)$$

Then $DA_{i,t}$ equals the difference between total accruals ($TACC_{i,t}$) and the fitted normal accruals ($NA_{i,t}$).

DGWTA: calculated as goodwill at the end of year t divided by total assets at the end of year t-1
DLOSS: a dummy variable that equals 1 for firm-year observations that report negative core earnings, 0 otherwise
EM: represents EM_DUM, EMAP and EMREG
EM_DUM: equals 1 if the firm-year observation has regulation and/or asset pricing incentives to manage earnings (i.e. if EMREG or EMAP does not equal 0), and it equals 0 otherwise
EMAP: an indicator variable for earnings management driven by asset pricing incentives, and it equals 1 if the unrealized investment property fair value changes allow the firm to take "big bath", avoid earnings decline, or avoid net asset decline through revaluation of investment property fair values
EMREG: an indicator variable for earnings management driven by regulatory incentives, and it equals 1 if the investment property fair value changes allow the firm remove "*ST" cap, reverses current year loss, reverses current year negative net assets, or reverses previous year loss through retroactively adjusting changes in investment property fair value estimates
FIRSTLIST: an indicator variable that equals 1 for the initial public offering year
FVIPFIRST: an indicator variable that equals 1 for the first year of investment property fair value model adoption, and 0 otherwise
FVIPSUBSE: an indicator variable that equals 1 for the years subsequent to the first year of investment property fair value model adoption, and 0 otherwise
HORI: analyst forecast horizon, calculated as the number of days between the release date of financial reports and the date of the consensus forecast
INDUSFV: proportion of fair value model adopters in the same industry in year t-1
INSTI: the number of institution-owned shares divided by total outstanding shares
IPFVUGL: unrealized fair value gains and losses from investment property
LDEBT: long-term debt divided by total assets

Appendix 4.3 Variable definitions (continued)

MANAGE: the proportion of management-controlled share to total number of outstanding shares, and if the managers are driven by compensation purpose to adopt the fair value model

MTBTANA: an indicator variable that equals 1 if firm i's actual EPS in year t meets or beats its consensus analyst forecast

NIPTA: calculated as the amounts of net investment property divided by total assets

NFVPROFIT: operating income net of unrealized fair value gains and losses

OTHERFVUGL: unrealized fair value gains and losses excluding those arising from fair value changes of investment property

REALESTATE: a dummy variable that equals 1 if the firm belongs to the real estate industry (CSRC 2012 industry classification code), and 0 otherwise

REGIONFV: proportion of fair value model adopters in the same region in year t-1

SDEBT: short-term debt divided by total assets

SIZE: the natural logarithm of market value of equity

ST: a dummy variable that equals 1 if company i carries an *ST symbol in year t-1 due to two consecutive year losses

STATE: in the main analyses, it is a dummy variable that equals 1 if the ultimate controller of a company if the government. In additional analyses it is the proportion of state-owned shares in total outstanding shares

TOP10: the sum of shares held by top 10 shareholders divided by total outstanding shares

VOL: the number of shares traded in year t divided by the average number of outstanding shares in year t

Chapter 5 Conclusion

5.1 Introduction

This chapter concludes the thesis. Section 5.2 summarises the main findings. Section 5.3 highlights the incremental contributions and implications of the thesis. Section 5.4 discusses the research limitations and some future research avenues.

5.2 Summary of findings

This thesis investigates the firm-level determinants and consequences of fair value measurement application among the Chinese listed companies during 2007 to 2016, the ten-year period after the adoption of a new set of IFRS-converged China accounting standards. It documents original evidence on the use and usefulness of fair value hierarchy and related disclosures, fair value accounting for financial instruments and investment property in China.

The use of fair value in China

Regarding the use of fair value measurement, the thesis documents an increasing trend in the application of fair value measurement among the Chinese listed companies in recent years, although the overall levels of fair value-measured assets and liabilities are still lower in China than in the US. In terms of the estimation inputs of fair values, I manually collected the data from the footnotes of the annual reports. Analyses of the data show that the market-based value inputs (level 1) represent the highest proportion of total assets, followed by comparable market inputs (level 2) and model-based estimates (level 3). There are some variations in the application of fair value estimates across financial and non-financial firms and across different types of assets/liabilities. This distribution of fair value estimation inputs is similar to that in the US, although the proportions of different fair value estimation inputs in total assets are significantly smaller in China. By examining the footnote disclosures, I also find that many Chinese listed companies have fair value-measured assets and/or liabilities but do not disclose the fair value hierarchy information. Among the companies that disclose the fair value hierarchy information, about 31.27% of them do not fully comply with the disclosure requirements to disclose estimation details about the fair value hierarchy.

The usefulness of fair value hierarchy and related disclosures to financial analysts in China

To investigate the usefulness of fair value information in China, I first examine whether and how fair value hierarchy and the related disclosures of the estimation details relate to financial analysts' forecast accuracy. Although there have been studies on similar questions in the US context (e.g. Ayres et al. 2017, Magnan et al. 2015), the institutional environment in China is different from that in the US. Moreover, the adoption of FVA in China is primarily driven by social and political incentives rather than grassroots demands from the investors, which raises the questions of whether fair values provided by the Chinese listed companies are useful inputs to investors' decisions. Based on the

qualitative characteristics of accounting information in the IFRS Conceptual Framework, I expect positive association between fair value information and analyst forecast accuracy if such information is useful inputs into the information users' evaluation of firm performance.

The pooled cross-sectional regressions show that the association between fair value and analyst forecast accuracy can vary by the types of fair value-measured items and by the fair value estimation inputs. Specifically, there is evidence that the market-based fair value inputs negatively relate to analyst forecast accuracy in China. The finding is different from other US-based studies, which generally document positive and significantly association between market-based fair values and analyst forecast accuracy (e.g. Ayers et al. 2017, Magnan et al. 2015). For the usefulness of fair value hierarchy-related disclosures, I use a sample of firms that should have disclosed fair value-related information as the control group and find that the provision of estimation details relating to model-based fair values helps improve analysts' forecast accuracy.

Fair value accounting for financial instruments and stock price crash risk in China

To further explore whether and how the underlying accounting activities affect firm transparency and capital market outcomes, the thesis then focuses on the measurement of financial instruments to examine whether and how fair value accounting relates to firm-level stock price crash risk in China. Financial instruments are the largest class of assets/liabilities influenced by fair value accounting, and more than half of the Chinese listed companies have investments in such assets/liabilities. Based on the stock price crash risk theory by Jin and Myers (2006), the positive accounting theory and prior studies on earnings management in China's context (e.g. He et al. 2012, Luo et al.2018), I posit that FVA could influence firm-level stock price crash risk either through the information uncertainty inherent in the fair value estimates, or through real earnings management (i.e. asset sales) induced by the recognition of unrealized fair value gains and losses into current earnings.

The pooled cross-sectional regressions show that the fair values of FVTOPL items (AFS securities) positively relate to future stock price crash risk among the non-financial (financial) firms. To test whether the association between financial instruments' fair values and stock price crash risk are driven by the two potential channels, I then employ the path analysis method. Estimation of the simultaneous equation models suggests that the information uncertainty in AFS securities' fair value estimates drives stock price crash risk among the financial firms. Among the non-financial firms, the stock price crash risk relating to FVTOPL securities may be driven by firm-specific characteristics correlated with these assets. In addition, among the firms that recognize unrealized fair value losses, there is evidence of real earnings management through asset sales and there is higher stock price crash risk relating to such earnings management.

Determinants and consequences of the measurement model choice for investment property

To provide a more comprehensive picture of the application of FVA in China, I then focus on the measurement of investment property to explore the determinants and consequences of fair value model adoption among the Chinese listed companies. Investment property is the largest class of non-financial assets influenced by fair value accounting in China. Unlike certain types of financial instruments that are mandatorily required to be measured by fair value accounting, the fair value model is an option for the subsequent measurement of investment property. Prior studies using the European data have examined and found mixed evidence on the influence of debt contracting and asset pricing incentives on the choice between the investment property fair value model and the historical cost model (e.g. Quagli and Avallone 2010, Christensen and Nikolaev 2013, Israeli 2015). However, the Chinese listed companies have significantly lower adoption rate of the fair value model compared to the European companies, and there is still limited empirical evidence on the influencing factors relating to this accounting choice in China.

Based on the economics-based accounting choice theory and the innovation diffusion theory, I find that in China, the decision to adopt the fair value model relates to debt contracting incentives, maturity of the real estate market and the appraisal industry, and organizational characteristics such as state-ownership and institutional shareholding. In particular, there is consistent and robust evidence that NSOEs, firms with higher proportion of investment property and the real estate firms are more likely to adopt the fair value model. The findings are consistent with the predictions of the innovation diffusion theory that organizational and innovation characteristics affect a firm's decision to adopt an accounting innovation. Using the determinants to adjust for potential self-selection bias, I further find some evidence of unexpected and undesirable capital market consequences relating to the use of fair value model. Specifically, the undesirable capital market consequences are significant when the firms have incentives to use investment property fair value estimates to meet or beat earnings benchmarks. Nevertheless, the negative consequences are not market-wide due to the small number of fair value model adopters.

5.3 Incremental contributions and implications

With the spread of IFRS across the world, FVA has been adopted by more than 100 countries (Ball 2016). However, so far there is still limited empirical evidence on the implementation of FVA outside the US and Europe, where the institutional environment may not be fully compatible with that required for the appropriate function of FVA. The thesis thus complements the existing literature by examining the consequences of FVA adoption, as well as the factors that influence firms' choices between FVA versus HCA in one of the largest transitional economy-China. Moreover, taking advantage of the institutional environment in China, the thesis also provides incremental evidence on three important but less explored questions that are of interest to the academics, standard setters,

regulators and the investors: (1) whether the fair value hierarchy-related disclosures are useful inputs to information users (e.g. Vergauwe and Gaeremynck 2019), (2) whether FVA relates to excess stock price volatility (e.g. DeFond et al. 2015, Goncharov 2015), and (3) whether the institutional infrastructures influence a firm's choice between the FVA and historical cost models (e.g. Christensen and Nikolaev 2013, Sellhorn and Stier 2019).

Contributions to the fair value hierarchy and financial analyst forecast literature

Specifically, this thesis contributes to both the fair value hierarchy and analysts' forecast literature by providing new evidence on the usefulness of fair values to the financial analysts outside the US and the Europe. The results show that the market-based fair values can also be misleading or irrelevant to the information users when the underlying asset markets are underdeveloped. Moreover, taking advantage of Chinese listed companies' non-compliance with the fair value-related disclosure requirements, it is the first to directly examine the usefulness of disclosures about fair value estimation details to information users in a large sample of companies. The study also contributes to the financial analysts' literature by showing the influence of fair value information on the group of sophisticated information users in an emerging market.

Contributions to the fair value accounting and stock price crash risk literature

By examining the association between financial instrument' fair values and the channels through which FVA affects stock price crash risk, this thesis also extends the FVA, FVA-related earnings management literature and the stock price crash risk literature. Prior literature has focused on the balance sheet-based measure of fair value exposure to evaluate the capital market consequences or stewardship roles of fair value accounting[145]. However, these studies do not reveal how FVA affects stock prices. Employing the path analysis method, my study extends the consequences of fair value accounting literature by directly examining whether FVA influences firm transparency and hence stock price crash risk through information uncertainty or through real earnings management. Examination of the stock price crash risk effect of FVA further contributes to the policy debate on whether FVA induces excessive stock price volatility (e.g. Goncharov 2015). The study also extends the FVA-related earnings management literature by providing evidence on the capital market consequences of such opportunistic activities (e.g. He et al. 2012, Dong and Zhang 2018).

[145] For example, using an international sample of commercial banks, DeFond et al. (2015) explore the influence of FVA on stock price crash risk by examining the association between a balance sheet-based fair value exposure measure and crash risk.

Contributions to the accounting choice literature

Taking advantage of the unique institutional characteristics of the real estate markets and capital markets in China, the thesis extends the FVA versus HCA choice literature (e.g. Christensen and Nikolaev 2013) by providing new evidence that both the regional- and firm-level institutional factors can influence a firm's accounting choice. The comparison of IAS 40 and ASBE 3 contributes to the IFRS literature by documenting that there are still differences in IFRS and the domestic accounting standards in a major emerging market. The reasons for such divergence include policy makers' considerations for the underdeveloped asset markets, and potential earnings management that could occur in the weak institutional environment. By examining the consequences of the adoption of investment property fair value model in a major emerging economy, the thesis shows that there can be undesirable consequences relating to fair value model adoption (e.g. less accurate analyst forecasts) when a firm is driven by capital market or contracting incentives to manage earnings.

Implications for policy makers and capital market regulators

The thesis has implications for policy makers, capital market regulators, firms, investors and academics. For policy makers and capital market regulators, the thesis highlights the importance of monitoring information disclosure relating to fair value measurement. Improvement in both the quantity and quality of such disclosures can help the investors better understand the firm performance implications of the fair value estimates and further help improve market efficiency. Findings in the thesis also suggest that to improve the use and decision-usefulness of fair value information in China, and more generally in other emerging markets, it is important to enhance the development in the asset markets and the valuation industry. Moreover, there is a need to pay attention to managers' real earnings management activities especially when there is a decline in asset fair values because such earnings management could further relate to excess market volatility. The policy makers and capital market regulators may also consider implementing more educational schemes for investors and other financial reporting information users to understand the capital market implications of fair value accounting. The improvement in investor sophistication may also help improve market efficiency in China.

Implications for firms

For listed firms in China, findings in the thesis suggest that they can disclose more information in the footnotes if they would like to improve the transparency of model-based fair value information. Moreover, there can be unfavourable market price consequences if a firm sells investment assets to reduce unrealized fair value losses, so the listed companies may want to avoid such earnings management. For companies with investment property assets, the thesis shows that the fair value model would not necessarily relate to extreme stock price movement. Therefore, a company may

consider choosing this measurement model to deliver useful information about firm performance to the investors when there are reliable fair value estimates for their investment properties.

Implications for investors

For investors interested in investing in Chinese listed companies, the thesis implies that they could pay more attention to footnote disclosures when analysing firms influenced by fair value measurement. They may also need to be aware of both the regional level institutional factors and firm-specific characteristics when predicting future change in a firm's accounting policy. In particular, among firms with earnings management incentives, the fair value estimates or the adoption of the fair value model could contain misleading information about future firm value and the investors need to be prepared to see through the fair value-related earnings management.

Implications for academics

There are also some implications for academics. First, the differences in the usefulness of fair value hierarchy to analysts in China and to their peers in the US imply that findings in the developed capital markets may not be generalized to other less-developed markets. Therefore, international accounting researchers may need to pay more attention to variations in institutional characteristics when evaluating the consequences of FVA and IFRS adoption. Second, findings in this study suggest that the balance sheet-based fair value exposure measure may capture both the influence of FVA, and other firm-specific characteristics correlated with the investments in fair value-measured assets and/or liabilities. Future research using the balance sheet-based fair value exposure measure as a proxy to study the impacts of fair value accounting may need to be careful in interpreting the empirical results.

Third, the study shows that there is a need for the fair value accounting researchers to examine the investor welfare consequences when trying to draw policy inferences. This is because asset sales or other fair value-related earnings management may not necessarily worsen investors' welfare and may not need to be strictly prevented. For researchers interested in understanding the determinants of accounting choice in the international context, the study suggests that both the agency-theory predicted incentives and other contextual factors, as mentioned by the innovation diffusion theory, could influence the accounting choice.

5.4 Limitations of the study and future research

Some limitations of the study provide several promising future research avenues. For example, the thesis focuses on the influence of fair value on financial analyst forecast performance and stock price crash risk. Future research could explore other consequences of fair value accounting in China's context, such as cost of debt, audit fees, earnings quality, CEO compensation, and debt contracting.

Second, the industry-specific characteristics of financial institutions (e.g. regulatory capital benchmarks) in China have not been fully considered either in this study or in the broader fair value accounting literature. Future research could examine whether and how regulations in the financial industry affect the use and usefulness of fair value measurement.

Third, the study has provided some preliminary exploration of the role of institutional factors (e.g. asset market characteristics, bright-line regulatory benchmarks) in affecting the use of fair value information in China. Future research can further examine whether the findings in this thesis can be strictly attributed to the institutional environment specific to China. Future research could also explore whether the findings can be extended to other countries, and whether there are other institutional characteristics in China and/or in other capital markets affecting the use and usefulness of fair value accounting.

Given the accounting standards changes in recent years (e.g. the implementation of new standards for financial instruments), future research can also explore how changes in the accounting requirements affect the valuation and stewardship roles of fair value accounting. In addition, the significant increase in financial instruments' investment in China since the implementation of ASBE 39 suggests that the potential real effects of accounting regulations can also be promising future academic research avenues.

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