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IFRS adoption in China and foreign institutional investments

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ABSTRACT

We examine the effectiveness of China's IFRS adoption from the perspective of an important set of financial report users, foreign institutional investors. We find that foreign institutional investment does not increase after China's IFRS adoption, and some evidence that it actually declines, particularly among firms with weaker incentives to credibly implement IFRS, or with greater ability to manipulate IFRS's fair value provisions. We also find that the association between earnings and returns generally declines after IFRS adoption, consistent with reduced earnings quality. In addition, we find that foreign institutional investors' returns decrease after China's IFRS adoption. Finally, the decline in foreign institutional investment is greater among investors from countries with weak institutions that have also adopted IFRS. Taken together, our evidence suggests that the weak institutional infrastructure in China's transitional economy impairs IFRS's intended goal of attracting institutional investment through improved financial reporting quality. Further, financial information users' home country institutions and IFRS adoption experience affect the effectiveness of IFRS adoption.

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1. Introduction

In an effort to improve financial reporting quality and attract foreign investment, China's domestic capital markets now use International Financial Reporting Standards (IFRS) (MOF, 2006; IASB, 2006).[1] Advocates of IFRS claim that it reduces information acquisition costs, thereby increasing investors' willingness to invest across borders (e.g., SEC, 2008; Tweedie, 2008). IFRS, however, is modeled on developed economies with strong institutions, and little is known about the effects of IFRS adoption in large transitional economies such as China, where institutions are weak. Further, foreign institutional investors' home country institutions and IFRS adoption experience may affect the ability of IFRS to attract foreign investment. The purpose of our study is to test whether China's IFRS adoption has achieved its intended goal of attracting foreign institutional investment and whether foreign investors' home country institutions and IFRS adoption experience influence the association between IFRS adoption and foreign institutional investment.

The stated goal of the International Accounting Standards Board (IASB) in formulating IFRS is to create a single set of high quality accounting standards that "take into account the financial reporting needs of emerging economies" (IFRS, 2011). As a result, many developing countries have adopted or are planning to adopt IFRS in the near future. Consistent with this trend, China mandated IFRS adoption for all publicly traded firms beginning in 2007. A primary goal of China's IFRS adoption is to attract greater foreign investment (MOF, 2006).

Prior research has generally found positive capital market consequences following mandatory IFRS adoption (Daske et al., 2008; Li, 2010; Tan et al., 2011; DeFond et al., 2011). Much of this research, however, is based on evidence from the European Union (EU), where economic and legal institutions tend to be stronger than those in China. In settings where IFRS is unlikely to be credibly implemented, the benefits of IFRS adoption tend to be weak or non-existent, consistent with the notion that the effectiveness of high quality accounting standards depends critically on managers' reporting incentives (Fan and Wong, 2002; Ball, 2006; Ball et al., 2003; Leuz, 2003). Characterized by poor investor protection, weak rule of law, and poor audit quality, China's institutional setting creates weak incentives for managers to produce high quality financial statements (DeFond et al., 2000; Chen and Yuan, 2004; Wang et al., 2008; He et al., 2012). In addition, IFRS's principles-based standards and a greater use of fair value accounting provide more opportunities for Chinese managers to misreport (He et al., 2012). Therefore, we predict that IFRS adoption in China is unlikely to result in increased financial reporting quality that will attract greater foreign investment.

We perform our primary analysis using Chinese domestically listed public firms during 2005 through 2008. During the period of our analysis, foreign investors in China's domestic market consist of 50 Qualified Foreign Institutional Investors (QFIIs) from 13 countries.[2] Our primary analysis uses panel data to compare the change in firm-level QFII ownership in each Chinese listed firm from the pre-adoption period (2005 and 2006) to the post adoption period (2007 and 2008).[3] Following Bradshaw et al. (2004), we measure foreign investment using three firm-level measures – a binary variable indicating whether a QFII holds stock in a Chinese listed firm, the number of QFIIs holding stock in a firm, and the percentage of a firm's shares owned by QFIIs. In addition, our multivariate tests control for a number of firm-level characteristics that are potentially associated with changes in foreign investment, including stock returns, return volatility, return on equity, analyst coverage, cross-listings, dividend yield, growth, and others.

We find no evidence of an increase in foreign institutional investment in Chinese domestically listed firms after IFRS adoption. Further, we find a modest but statistically significant decline in foreign investment, using all three measures of foreign institutional investment. We also continue to find these results after limiting our analysis to 2006–2007, suggesting that our results are not driven by the global financial crisis that began in 2008. We then perform cross-sectional tests designed to further identify channels through which IFRS adoption affects foreign investment. As expected, we find that the decline is larger among firms with weaker

[1] As with many IFRS adopters, China's new accounting standards contain modifications to IFRS designed to reflect its unique environment (as discussed in detail later). However, for ease of exposition, we follow prior literature (e.g., He et al., 2012) and refer to the adoption of these new standards simply as IFRS adoption.

[2] Our sample includes Hong Kong, which is a special administrative region of China.

[3] The term "foreign investors" and QFIIs are used interchangeably throughout the text.

incentives to credibly implement IFRS and a greater ability to manipulate IFRS's fair value provisions. This is consistent with foreign investors reducing their investment in Chinese firms after IFRS adoption due to concerns over declining financial reporting quality, including increased earnings manipulation. Finding predictable cross-sectional differences in the reduction in foreign institutional investment due to incentives and opportunities presented by IFRS directly links our results to China's IFRS adoption. This provides comfort that our results are not driven by changes in other macroeconomic factors.

To explore why foreign investment declined following IFRS adoption, we investigate whether IFRS adoption impairs financial reporting quality in China. We find that the association between reported earnings and stock returns declines after IFRS adoption, consistent with IFRS reducing earnings quality. In addition, we find a decline in foreign investors' returns following IFRS adoption, consistent with IFRS making it more difficult for foreign investors to pick high performing stocks.

Finally, we investigate whether foreign investors' home country institutions affect their reaction to IFRS adoption in China. We find that foreign investors from countries with weak legal and economic institutions, similar to those in China, reduce their investment by a greater amount than foreign investors from countries with strong institutions. We also find that home country adoption of IFRS exacerbates the decline in investment from countries with weak institutions, while it attenuates the decline in investment from countries with strong institutions. These findings are consistent with investors from countries with weak institutions having relatively low confidence in IFRS's credible implementation in China and with IFRS adoption being relatively less successful in countries with weak institutions when compared with countries with strong institutions.

Our study contributes to the literature in several ways. First, our evidence suggests that China's weak institutions impair IFRS's ability to attract foreign institutional investment. Prior research primarily studies developed economies and generally finds that IFRS has positive capital market consequences, particularly in countries with strong legal and economic institutions (Covrig et al., 2007; DeFond et al., 2011). We add to the literature by identifying capital market consequences of IFRS adoption in a developing economy with weak institutions. These findings complement and extend He et al. (2012), who find increased earnings management among firms with trading securities and debt restructuring following mandatory IFRS adoption in China.

Second, examining IFRS adoption in China is useful in evaluating whether IFRS achieves its stated objective of fulfilling the financial reporting needs of emerging economies, which include attracting foreign investment. This potentially has implications for other developing economies that have more recently adopted IFRS, such as Brazil, India and The Russian Federation.

Third, we enhance our understanding of the interplay between IFRS and international institutional investors or cross-border investments. De George et al. (2016) suggest that international institutional investors care about IFRS adoption because it helps them familiarize investees at a lower cost, improve the accounting information quality of investees or increase the visibility of long distance investees. While Yu and Wahid (2014) show evidence that familiarity with investees' accounting standards can improve cross-order investments, Florou and Pope (2012) cannot conclude whether investors care about information quality or familiarity. We provide evidence that institutional investors care about the information quality when investing in emerging markets such as China.

Finally, we contribute to the examination of investor background and home country institutions. Florou and Pope (2012) provide evidence that different type of investors, active versus passive, react differently to the IFRS adoption. Yu and Wahid (2014) show that accounting distance between investors' and investees' countries affect global investment decisions. Prior studies also find that economic and legal institutions affect IFRS's impact on financial reporting quality and foreign investment (Armstrong et al., 2010; DeFond et al., 2011), these studies focus primarily on the adopting countries' institutions. We provide new insights into the role of foreign investors' home country institutions on IFRS adoption. We find that foreign investors' home country institutions, and whether they are IFRS adopters, also have consequences.

The remainder of the paper proceeds as follows. Section 2 reviews the literature. Section 3 introduces China's institutional settings. Section 4 develops our hypotheses. Section 5 discusses empirical results on foreign institutional investment after China's IFRS adoption. Section 6 explores firm-level cross-sectional variation of the main results. Section 7 examines the effect of foreign investors' home country institutions

on their investment in China after IFRS adoption. Section 8 section conducts robustness tests. Section 9 summarizes and concludes.

2. Literature review

2.1. Research on mandatory IFRS adoption

Following widespread mandatory IFRS adoption in 2005, researchers have investigated numerous capital market consequences associated with mandatory IFRS adoption.[4] Landsman et al. (2012) find greater abnormal return volatility and abnormal trading volume around earnings announcements after mandatory IFRS adoption relative to firms that use domestic accounting standards. This suggests that IFRS-based earnings have greater information content than earnings based on local standards. Kim and Li (2010) show evidence of a stronger stock market reaction by IFRS firms to earnings releases of other IFRS firms in the same industry after 2005, consistent with greater information transfer and externality gains from mandatory IFRS adoption. Daske et al. (2008) provide weak evidence of a decline in the cost of capital, as well as a decline in market liquidity after IFRS adoption. Using a longer post-adoption period, Li (2010) finds evidence that the cost of capital declines after IFRS adoption in the EU. Byard et al. (2011) demonstrate that analyst forecast errors and variance decline after IFRS adoption in the EU, suggesting that IFRS earnings are more predictable than earnings under local GAAP. Armstrong et al. (2010) find an incrementally positive market reaction to 16 events associated with IFRS adoption in the EU for firms with lower quality pre-adoption information and with higher pre-adoption information asymmetry, consistent with investors expecting net information quality benefits from IFRS adoption. They also find that the market reaction is incrementally negative for firms domiciled in code law countries, consistent with investors' concerns over the implementation of IFRS in those countries. As far as we are aware, this is the only study that finds a negative capital market consequence of IFRS adoption. Finally, and perhaps the most relevant to our study, DeFond et al. (2011) show that foreign mutual fund ownership increases following mandatory IFRS adoption in the EU.[5]

A common finding in the above studies is that the benefits of IFRS adoption accrue primarily to firms where IFRS is likely to be credibly implemented, such as those in countries where legal enforcement is strong. In settings where local institutions are unlikely to result in a credible implementation, IFRS adoption tends to have little or no economic consequences.

2.2. Research on IFRS adoption in China

Research on the economic consequences of China's IFRS adoption is limited, but provides some insight into whether IFRS can successfully attract foreign investment. Prior to IFRS adoption, Chinese firms with A-shares must report using Chinese Accounting Standards (CAS), while Chinese firms with B-shares must report using the international standards. This means that firms with both A and B shares issue financial reports using both CAS and international standards. Using data from 1990 through 2001, Eccher and Healy (2000) and Lin and Chen (2005) exploit this setting by comparing the value relevance of CAS with the value relevance of the International Accounting Standards (IAS), which is the predecessor to IFRS. These studies find that accounting numbers reported using CAS tend to be more value relevant than those reported using IAS. While IAS differs from IFRS in many important respects, these findings are interesting because they suggest that CAS can be better suited to capturing the value of Chinese firms than international standards. More recently, He et al. (2012) examine Chinese firms that adopt IFRS in 2007 and examine the effect of the fair value provisions under IFRS. They find that IFRS results in increased earnings manipulation among Chinese firms with large portfolios of trading securities and debt restructuring. Overall, prior research generally suggests that IFRS adoption in China may not necessarily improve financial reporting quality.

[4] There is also a stream of research that examines firms that voluntarily adopt IFRS (Covrig et al., 2007). However, issues such as self-selection make it difficult to generalize the findings from those studies to mandatory IFRS adoption, such as in China. Thus, we restrict our literature review to mandatory IFRS adoption studies.

[5] See Bruggemann, Hitz and Sellhorn (2013) for a detailed literature review.

3. Institutional background

3.1. Adoption of IFRS in China

China's Ministry of Finance (MOF) declared its intention to converge CAS with IFRS in 2005 (Peng and Smith, 2010). The new standards were released in 2006 with mandatory implementation by public companies as of January 1, 2007. The new standards are designed to converge CAS with IFRS, where "converge" refers to the elimination of current differences between IFRS and CAS, and preventing future differences from arising (Hussey and Ong, 2005, p. 229). With the exception of a few modifications designed to accommodate the local Chinese environment, there is a general agreement that the new standards are substantially equivalent to IFRS (Peng and Smith, 2010; IASB, 2006).[6]

3.2. China's QFII system

While China's stock market is one of the largest in the Asia-Pacific region, foreign institutional investors' share of the market is far below that of more developed foreign stock markets. The Chinese government believes that this limits China's capital market development and as a result has taken measures to boost foreign investment. One such measure is the "Provisional Regulations on Investment from Qualified Foreign Institutional Investors in the Domestic Securities Market" in 2002. This was followed by the formal "Regulations on Investment from QFIIs in the Domestic Securities Market" in 2006. Contents of these two documents are consistent and similar. The QFII system is designed to facilitate and regulate foreign institutional investment in China's domestic securities markets. Among other things, the QFII system uses a strict approval process to vet new entrants, and as a result the QFIIs tend to be well capitalized, with medium or long-term investment philosophies. As of December 31, 2008, 74 QFIIs from 16 countries were approved to buy shares in China's A-share (domestic) market, of which 66 were granted investment quotas allowing them to invest.[7] Fifty of these 66 QFIIs invest in Chinese A-shares during the period of our analysis, while 16 have yet to invest. Eight of these 50 liquidated their investment by the end of 2008, leaving 42 QFIIs from 13 countries at the end of our sample period. Appendix A presents detailed information on these QFIIs, their home countries, approval time, investment quotas and quota approval time.

4. Hypothesis development

4.1. Main hypothesis

Ball (2001) argues that an economically efficient financial reporting and disclosure system requires strong fundamental institutions. This is consistent with prior research which finds that the capital market benefits of IFRS adoption are essentially non-existent in settings where IFRS is unlikely to be credibly implemented (Daske et al., 2008; Li, 2010; Tan et al., 2011; DeFond et al., 2011). China's weak legal and economic institutions provide managers with weak incentives to produce high quality financial statements (DeFond et al., 2000; Chen and Yuan, 2004; Wang et al., 2008; Piotroski and Srinivasan, 2008). Without major changes in its institutional infrastructure, credible implementation of IFRS is unlikely. If QFIIs understand this, IFRS adoption may not increase foreign investment.

Compared with IFRS, CAS can also potentially be better suited to curtailing the earnings management incentives engendered by China's weak institutions. While CAS has evolved to place a strong emphasis on reliability, IFRS is more investor-oriented, with a greater emphasis on value relevance. In the presence of weak institutions, a reduced emphasis on reliability potentially erodes financial reporting quality by creating greater opportunities for earnings manipulation. Further, while CAS tends to be rule-based, IFRS is decidedly

[6] The modifications include the inability to upwardly revalue fixed assets after they have been written down for impairment, and the inability to use the equity method or proportional consolidation for joint ventures. In addition, related party transaction disclosures are modified to take into account the large government holdings in many public firms.

[7] These quotas are determined by initial contributed capital and can be exceeded if market values increase.

principle-based. A shift from CAS to IFRS can further exacerbate managers' ability to report opportunistically. IFRS is also much more fair value-oriented, which provides several new opportunities for earnings management. For example, while trading securities are valued at historical cost under CAS, IFRS values them at fair value, with the corresponding change included in earnings. This allows managers to selectively classify trading securities for the purpose of maximizing reported gains. Another example is gains from debt restructuring, which are credited to equity under CAS (and thus have no effect on earnings), but which flow through the income statement under IFRS. Finally, while investment real estate is recorded at historical cost under CAS, managers are able to record them at fair value under IFRS, with the change in their market value flowing through the income statement. If QFIIs understand these new opportunities for earnings management under IFRS, they are not likely to respond positively to China's IFRS adoption. Based on the above argument, we propose the following hypothesis:

Hypothesis 1. Foreign institutional investment in China's domestic stock market does not increase after China's mandatory IFRS adoption.

Note that we are not arguing that IFRS is necessarily inferior to CAS, but rather that CAS may better fit China's current stage of economic and institutional development than IFRS. While reporting quality is poor under the CAS, it may be even poorer after IFRS adoption if managers have an increased ability to manipulate accounting information.

4.2. Firm-level cross-sectional hypotheses

4.2.1. Management incentives

There is variation across Chinese listed firms in terms of their incentives to credibly implement IFRS. Jiang et al. (2010) argue that the major agency problem for Chinese listed firms is not between shareholders and managers, but between minority shareholders and controlling shareholders. They support this argument by finding pervasive evidence that controlling shareholders of Chinese listed firms tunnel resources from listed firms through intercorporate loans. This is consistent with a large body of literature that suggests that firms with high ownership concentration and entrenched controlling shareholders have incentives to increase financial reporting opacity in order to obfuscate their self-serving behavior (Leuz, Nanda and Wysocki, 2003). Obfuscation can occur, for example, by controlling shareholders withholding or selectively disclosing unfavorable information, or opportunistically timing the release of value-relevant information. In addition, when the controlling shareholder is the Chinese government (i.e., state-owned enterprises), managers are more likely to have goals that are not profit maximizing, and as a result are prone to communicating financial information through private information channels and engaging in related party transactions (Wang et al., 2008; Piotroski and Wong, 2010; He et al., 2012).

Because firms with high ownership concentration or large government ownership lack incentives to supply quality financial information, we expect that they are less likely to credibly implement IFRS. If foreign investors realize this, we expect to find the decline in foreign institutional investment to be more pronounced in firms with high ownership concentration or with large state ownership. We predict the following:

Hypothesis 2a. The decline in foreign institutional investment due to China's mandatory IFRS adoption is greater in firms with high ownership concentration and large state ownership.

4.2.2. Firms prone to fair value manipulation

We also expect the fair value accounting provisions of IFRS to provide managers with greater opportunities for earnings manipulation. While fair value adjustment can go to the income statement, firms can also manage the timing of securities trading to boost earnings. Both trading and available-for-sale securities can provide opportunities for firms to manipulate earnings. This is consistent with He et al. (2012), who find that Chinese firms manage earnings through fair value accounting by selling available-for-sale securities. If QFIIs understand this, we expect the decline in foreign institutional investment to be more pronounced among firms with greater opportunities to manipulate earnings through fair value accounting. We propose the following hypothesis:

Hypothesis 2b. The decline in foreign institutional investment due to China's mandatory IFRS adoption is greater in firms with opportunities to manipulate earnings through fair value accounting.

4.3. Country-level cross-sectional hypothesis

A potential source of cross-sectional variation in foreign investors' response to IFRS adoption in China is the heterogeneous nature of QFIIs. While prior research finds that IFRS adopters' institutional environment affects whether IFRS is credibly implemented (Daske et al., 2008; Li, 2010; Tan et al., 2011; DeFond et al., 2011), we are unaware of research that indicates investor heterogeneity affects investment in IFRS adopters, though we know that institutional investors are not uniform and they differ in style, sophistication and horizon (Bushee, 1998). By the end of 2008, QFIIs investing in China come from thirteen different countries, with large variation in legal origins, investor protection institutions, and accounting systems. Since IFRS implementation tends to be less credible in countries with relationship-based institutions, investors from such countries are likely to be more aware of and familiar with this fact, and thus are more skeptical of IFRS's ability to improve China's financial reporting environment. Further, investors from countries with relationship-based institutions, being used to investing under a weaker institutional environment, have their unique investment styles and methods of processing information. They are more apt at processing information based on relationships, based on historical cost and not information based on fair market value. They are also more likely to doubt the effectiveness of market based information due to their past investment experience in their own countries. In sum, culture and institutions influence institutional investors' decisions. Therefore, we expect a larger decline in QFII investment from countries with relationship-based institutions. We propose the following hypothesis:

Hypothesis 3. The decline in foreign institutional investment due to China's mandatory IFRS adoption is greater for institutional investors from countries with relationship-based institutions.

Specifically, countries with relationship-based institutions tend to have code law origin (La Porta et al., 1997), low anti-director rights (La Porta et al., 1997), government only sources of accounting standards (Alford et al., 1993), continental accounting cluster (Mueller et al., 1994; Hung, 2001), high book-tax conformity (Cooper and Lybrand, 1993; Hung, 2001).

5. Empirical tests

5.1. Data and sample

We test our hypothesis over the period 2005–2008, where 2005 and 2006 are pre-IFRS adoption and 2007 and 2008 are post-adoption. Panel A, Table 1 presents the sample selection process, which begins with all A-share companies on the Shanghai and Shenzhen stock exchanges. We focus on the A-share market because it is the main investment channel through which foreign institutional investors invest in China, and because its total market capitalization is twenty times larger than that of the B-share market.[8,9] We exclude firm-year observations with missing data on monthly return volatility, yearly returns or year-end prices, and delete observations with negative book values. Our final sample contains 5518 firm-year observations. Panel B, Table 1 shows the industry distribution of firm-year observations in our sample. Firms are present in 22 major industries and tend to cluster in petrochemical and machinery industries.

Information on QFIIs' approval years, investment quotas and other details are obtained from the websites of the China Securities Regulatory Commission and China's Foreign Exchange Control Bureau. Information on QFIIs' shareholdings and the number of QFIIs per firm is based on the top 10 shareholders of firms' tradable shares obtained from the WIND Info database (provided by Wind Information Co., Ltd.). Firm-level

[8] Individual QFIIs cannot own more than 10% of a firm's shares and all QFIIs collectively cannot own more than 20%. Actual QFII holdings are far below these numbers (CSRC fund regulation 2006 No. 176). Therefore, the restrictions are not binding.

[9] The B-share market was originally created for foreign investors only. H-shares are shares listed in the Hong Kong Stock Exchange.

Table 1
Sample selection and distribution.

			2005	2006	2007	2008	Total
Panel A: Sample selection process							
Number of year-end Chinese A-share listed firms			1324	1384	1516	1593	5817
Exclude:							
(1) Firms with negative book value of equity			48	58	54	52	212
(2) Firms missing data for monthly stock return volatility, yearly stock return or year-end stock price			0	31	39	17	87
Final sample			1276	1295	1423	1524	5518
CSRC code	CSRC industry name	SIC equivalent	# of Obs.				Percentage (%)
Panel B: Sample distribution by industry							
A	Agriculture, forestry & fishery	01,02,07,08,09	132				2.39
B	Mining	10,12,13,14	100				1.81
C0	Food & Beverage	20	233				4.22
C1	Textiles & Apparel	22,23	260				4.71
C2	Wood & Furnishing	25	15				0.27
C3	Paper & printing	26,27	112				2.03
C4	Petrochemicals	28,29,30	576				10.44
C5	Electronics	36	223				4.04
C6	Metals & Non -metals	32,33,34	508				9.20
C7	Machinery	35,36,37	870				15.76
C8	Pharmaceuticals	38	352				6.38
C9	Other manufacturing	39	72				1.30
D	Utilities	49	250				4.53
E	Construction	15,16,17	120				2.17
F	Transportation	40,41,42,44,45,46,47	233				4.22
G	IT	48	332				6.02
H	Wholesale & retail trade	50,51,52,53,54,55,56,57,58,59	347				6.29
I	Finance	60,61,62,63,64,67	73				1.34
J	Real estate	65	225				4.08
K	Social Services	43,70,80,82,83	168				3.04
L	Broadcasting & culture	78,79,84	35				0.63
M	Conglomerate		282				5.11
Total			5518				100

This table presents the sample selection process by calendar year in Panel A and sample distribution by industry membership in Panel B. # *of obs.* refers to the number of observations from each industry through the entire sample period.

accounting and market numbers are obtained from the WIND Info and CSMAR (China Stock Market and Accounting Research) databases.

5.2. Empirical model

We test our hypothesis by estimating the following regression model:

$$\begin{aligned} D\_QFII_{it}, N\_QFII_{it}, P\_QFII_{it} = {} & \beta_0 + \beta_1 POST_{it} + \beta_2 SIZE_{it} + \beta_3 LEV_{it} + \beta_4 TOP1_{it} + \beta_5 ROE_{it} + \beta_6 DIV_{it} \\ & + \beta_7 STDRET_{it} + \beta_8 BTM_{it} + \beta_9 RETURN_{it} + \beta_{10} XLIST_{it} + \beta_{11} DOWJ_{it} \\ & + \beta_{12} XSALE_{it} + \beta_{13} ANALYST_{it} + \beta_{14} BIG4_{it} + Industry\ dummy + \varepsilon_{it}. \end{aligned} \quad (1)$$

Following prior research (Bradshaw et al., 2004; DeFond et al., 2012), we sequentially test three dependent measures of QFII investment, each of which captures a different aspect of QFII ownership: (1) *D_QFII*, an indicator variable capturing whether any QFII owns stock in the firm at year end, (2) *N_QFII*, the logarithm transformation of one plus the number of QFIIs that own stock in each sample firm at year end, and (3) *P_QFII*, the cumulative percentage of QFII ownership in each sample firm at year end. Our independent variable of interest in Eq. (1) is *POST,* which is coded 1 for years 2007 and 2008, and 0 for years 2005 and 2006. *POST* captures the effect of IFRS adoption on QFII investment. To correct standard errors for possible serial

correlation and heteroskedasticity, we employ Huber-White standard errors clustered by firm throughout our regression analyses. Following Covrig et al. (2007) and DeFond et al. (2011), we include control variables that are defined in Appendix B. All continuous variables are winsorized at the top and bottom one percentile of their distributions.

5.3. Univariate hypothesis tests

Descriptive statistics on QFII ownership, by QFII country and year, are presented in Table 2. Panel A, Table 2 indicates that the US has the largest number of QFIIs, with 9–14 per year. Australia and Norway have the smallest number of QFIIs, with 0–1 per year. The middle four columns in Table 2 report the percentage ownership of total shares for each country-year, averaged across all Chinese listed firms. However, many

Table 2
Number of QFIIs and their shareholdings by home country and year.

Home country	Number of QFIIs				Average percentage ownership of total shares outstanding (%)				Average percentage ownership of total tradable A-shares (%)			
	2005	2006	2007	2008	2005	2006	2007	2008	2005	2006	2007	2008
Panel A: QFII shareholdings												
Australia	0	0	1	1	0.000	0.000	0.001	0.001	0.000	0.000	0.001	0.001
Belgium	1	2	1	1	0.020	0.033	0.009	0.007	0.060	0.073	0.021	0.015
Canada	0	1	2	2	0.000	0.000	0.002	0.002	0.000	0.002	0.003	0.003
France	3	4	4	4	0.003	0.008	0.006	0.013	0.005	0.020	0.013	0.021
Germany	1	1	1	1	0.013	0.020	0.005	0.003	0.041	0.044	0.010	0.006
Hong Kong	2	3	3	3	0.012	0.022	0.016	0.009	0.029	0.047	0.032	0.014
Japan	2	2	3	3	0.013	0.017	0.003	0.004	0.032	0.051	0.007	0.008
Netherlands	1	2	2	2	0.005	0.023	0.023	0.004	0.017	0.060	0.042	0.007
Norway	0	0	0	1	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.001
Singapore	0	2	3	3	0.000	0.004	0.003	0.004	0.000	0.011	0.007	0.006
Switzerland	2	2	3	3	0.030	0.041	0.038	0.018	0.091	0.099	0.073	0.035
UK	2	2	3	4	0.001	0.019	0.018	0.014	0.004	0.038	0.037	0.024
US	9	12	13	14	0.036	0.077	0.059	0.030	0.112	0.199	0.118	0.057

Dep. Variable		*MEAN*	*STD*	*MIN*	*MEDIAN*	*MAX*	Diff.	*POST* = 1 vs. *POST* = 0
Panel B: Descriptive statistics on QFII investments as captured by the three dependent variables measuring QFII investment								
D_QFII	*POST* = 0	0.128	0.334	0.000	0.000	1.000	MEAN	−0.031***
	POST = 1	0.097	0.296	0.000	0.000	1.000	MEDIAN	−0.000***
N_QFII	*POST* = 0	0.124	0.353	0.000	0.000	2.079	MEAN	−0.040***
	POST = 1	0.084	0.275	0.000	0.000	1.946	MEDIAN	−0.000***
P_QFII	*POST* = 0	0.005	0.019	0.000	0.000	0.273	MEAN	−0.002***
	POST = 1	0.003	0.012	0.000	0.000	0.200	MEDIAN	−0.000***

Dep. Variable		*MEAN*	*STD*	*MIN*	*MEDIAN*	*MAX*	Diff.	POST=1 vs. POST=0
Panel C: Descriptive statistics of QFII investment in firms with QFII investment in any year of the sample period								
D_QFII	*POST* = 0	0.467	0.499	0.000	0.000	1.000	MEAN	−0.093***
	POST = 1	0.374	0.484	0.000	0.000	1.000	MEDIAN	−0.000***
N_QFII	*POST* = 0	0.454	0.553	0.000	0.000	2.079	MEAN	−0.129***
	POST = 1	0.325	0.462	0.000	0.000	1.946	MEDIAN	−0.000***
P_QFII	*POST* = 0	0.019	0.032	0.000	0.000	0.273	MEAN	−0.008***
	POST = 1	0.011	0.023	0.000	0.000	0.200	MEDIAN	−0.000***

Number of QFIIs: Number of QFIIs with investments in A-shares at year end for each referenced country.
Average percentage ownership of total shares outstanding: Average percentage share ownership across all Chinese listed firms at year-end, for each referenced country.
Average percentage ownership of total tradable A-shares outstanding: Average percentage tradable A-share ownership across all listed Chinese firms at year end, for each referenced country.
Variable definitions are presented in Appendix B. P-values in Panel B and C are from t-tests of mean differences or Wilcoxon-tests when *POST* = 1 minus *POST* = 0. $N = 5{,}518$ for Panels A and B, and $N = 1466$ for Panel C. $^{**}p < 0.05$, $^{*}p < 0.1$.
*** $p < 0.01$.

Table 3
Descriptive statistics on control variables partitioned on the indicator dependent variable *D_QFII*.

Variables	IFRS adoption	*D_QFII* = 0 (*N* = 4905)		*D_QFII* = 1 (*N* = 613)		*D_QFII* = 0 vs. *D_QFII* = 1	
		Mean	Median	Mean	Median	*t*-test p-values	Wilcoxon p-values
SIZE	*POST* = 0	21.212	21.137	22.219	21.977	0.000	0.000
	POST = 1	21.520	21.359	22.085	21.864	0.000	0.000
LEV	*POST* = 0	0.518	0.538	0.481	0.488	0.001	0.000
	POST = 1	0.502	0.512	0.491	0.485	0.334	0.219
*TOP*1	*POST* = 0	0.378	0.350	0.419	0.427	0.000	0.000
	POST = 1	0.361	0.344	0.386	0.379	0.008	0.005
ROE	*POST* = 0	−0.005	0.043	0.098	0.102	0.000	0.000
	POST = 1	0.051	0.073	0.111	0.109	0.000	0.000
DIV	*POST* = 0	0.009	0.000	0.019	0.015	0.000	0.000
	POST = 1	0.006	0.001	0.008	0.006	0.000	0.000
BTM	*POST* = 0	0.745	0.763	0.657	0.647	0.000	0.000
	POST = 1	0.538	0.505	0.497	0.445	0.011	0.009
RETURN	*POST* = 0	−0.240	−0.215	0.024	−0.022	0.000	0.000
	POST = 1	0.316	0.077	0.401	0.103	0.141	0.205
STDRET	*POST* = 0	0.126	0.116	0.118	0.110	0.010	0.003
	POST = 1	0.204	0.196	0.191	0.187	0.000	0.000
XLIST	*POST* = 0	0.080	0.000	0.146	0.000	0.000	0.000
	POST = 1	0.087	0.000	0.112	0.000	0.151	0.151
DOWJ	*POST* = 0	0.399	0.000	0.823	1.000	0.000	0.000
	POST = 1	0.376	0.000	0.639	1.000	0.000	0.000
ANALYST	*POST* = 0	2.141	0.000	7.802	7.000	0.000	0.000
	POST = 1	6.310	2.000	11.561	8.000	0.000	0.000
*BIG*4	*POST* = 0	0.049	0.000	0.216	0.000	0.000	0.000
	POST = 1	0.065	0.000	0.140	0.000	0.000	0.000

Variable definitions are presented in Appendix B. P-values are from *t*-test of mean difference or Wilcoxon-tests of *D_QFII* = 0 minus *D_QFII* = 1. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Chinese listed firms have a large block of essentially non-tradable shares owned by government entities. Thus, the four right columns of Panel A also report the percentage ownership based on tradable shares. These columns show that the US has the highest percentage ownership of tradable shares, with 0.057–0.112%, and that Australia and Norway have the lowest average percentage ownership, with 0.000–0.001%. While the percentage of tradable shares is larger, the pattern is similar to that computed using the total number of shares.[10]

Panel B, Table 2 compares three measures of QFII ownership before and after mandatory IFRS adoption. Consistent with our hypothesis, Panel B shows that the mean and median value of each of our QFII ownership measures declines significantly after IFRS adoption. One potential issue in this comparison, however, is that some Chinese listed firms may not be in the feasible investment set for foreign investors. Thus, Panel C repeats the analysis in Panel B after restricting the sample to the 1466 A-share firm years with at least one QFII investor. This panel also shows that the mean and median values of each QFII ownership measure declines significantly after IFRS adoption. Thus, our univariate tests support our first hypothesis. However, as many firm-specific factors affect foreign investment, we rely on multivariate analysis to formally test our predictions.

Panel A, Table 3 presents descriptive statistics of control variables in Eq. (1), partitioned based on *D_QFII*, which indicates whether a QFII owns shares in the firm, and on *POST*, which indicates whether the firm has adopted IFRS. Financial statement variables indicate that QFIIs tend to invest in firms that are larger, more highly leveraged, that have high *ROE*, higher dividend yields, higher growth (low book-to-market ratio), and lower stock return volatility. Corporate governance variables show that QFIIs tend to invest in firms with larger ownership by the largest shareholder. Variables capturing the information environment indicate that QFIIs tend to invest in firms included in important market indices, firms with more analysts following, and firms with Big-4 auditors.

[10] The total market capitalization of stock owned by all of the QFIIs ranges from the equivalent of US$1.5 billion to US$5.3 billion during the period analyzed.

Table 4
Pearson correlations.

	D_QFII	*N_QFII*	*P_QFII*	*POST*	*ROE*	*SIZE*	*LEV*	*TOP*1	*DIV*	*BTM*	*RETURN*	*STDRET*	*XLIST*	*DOWJ*	*ANALYST*
N_QFII	0.926														
	(0.00)														
P_QFII	0.693	0.828													
	(0.00)	(0.00)													
POST	−0.049	−0.063	−0.076												
	(0.00)	(0.00)	(0.00)												
ROE	0.107	0.100	0.076	0.106											
	(0.00)	(0.00)	(0.00)	(0.00)											
SIZE	0.206	0.200	0.129	0.099	0.170										
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)										
LEV	−0.040	−0.037	−0.035	−0.032	−0.253	0.295									
	(0.00)	(0.01)	(0.01)	(0.02)	(0.00)	(0.00)									
*TOP*1	0.072	0.069	0.061	−0.066	0.088	0.203	−0.055								
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)								
DIV	0.160	0.168	0.130	−0.154	0.231	0.265	−0.167	0.219							
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)							
BTM	−0.059	−0.046	−0.054	−0.373	−0.113	0.308	0.213	0.046	0.211						
	(0.00)	(0.02)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)						
RETURN	0.051	0.034	0.028	0.311	0.144	0.106	0.063	−0.006	−0.084	−0.358					
	(0.00)	(0.17)	(0.04)	(0.00)	(0.00)	(0.00)	(0.00)	(0.68)	(0.00)	(0.00)					
STDRET	−0.075	−0.084	−0.083	0.577	0.010	−0.047	0.054	−0.085	−0.244	−0.400	0.490				
	(0.00)	(0.00)	(0.00)	(0.00)	(0.44)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)				
XLIST	0.052	0.048	0.054	0.002	0.016	0.281	0.049	0.039	0.046	0.035	−0.010	−0.008			
	(0.00)	(0.00)	(0.00)	(0.90)	(0.22)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.45)	(0.54)			
DOWJ	0.223	0.208	0.141	−0.052	0.196	0.603	−0.003	0.060	0.245	0.015	0.155	−0.093	0.074		
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.85)	(0.00)	(0.00)	(0.27)	(0.00)	(0.00)	(0.00)		
ANALYST	0.185	0.170	0.125	0.226	0.225	0.502	−0.016	0.091	0.240	−0.064	0.055	0.005	0.144	0.372	
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.25)	(0.00)	(0.00)	(0.00)	(0.00)	(0.70)	(0.00)	(0.00)	
*BIG*4	0.151	0.150	0.120	0.004	0.063	0.436	0.023	0.097	0.160	0.061	−0.011	−0.070	0.428	0.215	0.302
	(0.00)	(0.00)	(0.00)	(0.79)	(0.00)	(0.00)	(0.09)	(0.00)	(0.00)	(0.00)	(0.43)	(0.00)	(0.00)	(0.00)	(0.00)

Variable definitions are presented in Appendix B. $N = 5518$. P-values are in parentheses.

Table 5
IFRS Adoption and Foreign Institutional Investment.

	D_QFII	*N_QFII*	*P_QFII*
Panel A: IFRS adoption and QFII investment for total sample			
POST	−0.7535***	−0.0808***	−0.0040***
	(−5.66)	(−7.36)	(−7.55)
SIZE	0.4525***	0.0545***	0.0018***
	(5.39)	(6.33)	(4.04)
LEV	−0.5226	−0.0564**	−0.0019
	(−1.48)	(−2.03)	(−1.40)
*TOP*1	−0.6516*	−0.0493	−0.0012
	(−1.77)	(−1.42)	(−0.70)
ROE	0.7022**	0.0166	0.0007
	(1.98)	(1.52)	(0.89)
DIV	13.7498***	1.9882***	0.0811***
	(3.29)	(3.89)	(3.29)
STDRET	−2.6272***	−0.2231***	−0.0147***
	(−2.62)	(−2.87)	(−3.73)
BTM	−2.0655***	−0.2166***	−0.0100***
	(−7.82)	(−9.68)	(−8.88)
RETURN	0.0496	0.0036	0.0004
	(0.81)	(0.58)	(1.20)
XLIST	−0.4539**	−0.0461**	−0.0006
	(−2.32)	(−2.50)	(−0.58)
DOWJ	0.5085***	0.0181	0.0002
	(3.16)	(1.30)	(0.23)
XSALE	0.1152	0.0066	0.0003
	(0.89)	(0.62)	(0.55)
ANALYST	0.0143**	0.0018**	0.0001**
	(2.40)	(2.37)	(2.22)
*BIG*4	0.3542*	0.0666**	0.0029*
	(1.77)	(2.28)	(1.85)
Constant	−10.1080***	−0.8203***	−0.0225**
	(−6.01)	(−4.84)	(−2.58)
Industry Indicators	yes	yes	yes
Pesudo/Adj-R^2	0.151	0.103	0.064
Panel B: IFRS adoption and QFII investment in firms where the indicator dependent variable D_QFII = 1 in at least one year			
POST	−0.6699***	−0.1888***	−0.0100***
	(−4.11)	(−5.39)	(−5.88)
SIZE	0.0686	0.0398*	0.0003
	(0.81)	(1.84)	(0.24)
LEV	0.1631	0.0269	0.0020
	(0.45)	(0.30)	(0.38)
*TOP*1	−0.6811**	−0.1815*	−0.0015
	(−2.05)	(−1.83)	(−0.25)
ROE	−0.1164	−0.0073	−0.0032
	(−0.28)	(−0.08)	(−0.49)
DIV	11.7385**	3.4629***	0.1319**
	(2.45)	(2.92)	(2.04)
STDRET	0.2090	0.0444	−0.0233*
	(0.18)	(0.17)	(−1.72)
BTM	−1.7179***	−0.4108***	−0.0224***
	(−6.05)	(−6.32)	(−6.52)
RETURN	0.0171	−0.0118	0.0003
	(0.21)	(−0.60)	(0.23)
XLIST	0.0127	−0.0352	0.0041
	(0.07)	(−0.73)	(1.35)
DOWJ	0.1060	−0.0074	−0.0023
	(0.69)	(−0.20)	(−1.05)

Table 5 (*continued*)

	D_QFII	*N_QFII*	*P_QFII*
XSALE	0.0627	0.0217	0.0004
	(0.49)	(0.68)	(0.21)
ANALYST	0.0006	−0.0004	0.0001
	(0.10)	(−0.28)	(0.70)
*BIG*4	0.2464	0.0648	0.0029
	(1.31)	(1.30)	(1.08)
Constant	−0.7772	−0.1361	0.0297
	(−0.47)	(−0.32)	(1.17)
Industry Indicators	yes	yes	yes
Pesudo/Adj-R^2	0.0486	0.052	0.055
Panel C: IFRS adoption and QFII investment after restricting analysis to 2006 (pre-adoption year) and 2007 (post adoption year)			
POST	−0.8534***	−0.1148***	−0.0053***
	(−4.62)	(−5.74)	(−5.60)
SIZE	0.3941***	0.0522***	0.0016**
	(3.45)	(3.90)	(2.53)
LEV	−0.1366	−0.0212	−0.0003
	(−0.32)	(−0.56)	(−0.18)
*TOP*1	−0.7707	−0.0709	−0.0009
	(−1.61)	(−1.31)	(−0.34)
ROE	0.4992	0.0212	0.0004
	(1.39)	(1.25)	(0.48)
DIV	21.3428***	3.6509***	0.1810***
	(3.56)	(3.76)	(3.65)
STDRET	−3.3750***	−0.2225**	−0.0168***
	(−2.61)	(−2.00)	(−2.77)
BTM	−2.3116***	−0.2729***	−0.0130***
	(−4.59)	(−5.19)	(−4.98)
RETURN	0.0687	0.0045	0.0006
	(0.96)	(0.58)	(1.23)
XLIST	−0.6705***	−0.0855***	−0.0027**
	(−2.85)	(−3.47)	(−2.14)
DOWJ	0.3805*	0.0074	−0.0008
	(1.96)	(0.36)	(−0.75)
XSALE	0.0804	−0.0025	−0.0003
	(0.54)	(−0.17)	(−0.45)
ANALYST	0.0226	0.0053**	0.0003***
	(1.54)	(2.48)	(2.77)
*BIG*4	0.5613**	0.0919**	0.0039*
	(2.32)	(2.16)	(1.82)
Constant	−8.8522***	−0.7499***	−0.0182
	(−4.06)	(−3.02)	(−1.50)
Industry Indicators	yes	yes	yes
Pesudo/Adj-R^2	0.148	0.112	0.076

Variable definitions are presented in Appendix B. This table reports regressions of *D_QFII* (existence of QFIIs), *N_QFII* (log of one plus the number of QFIIs) and *P_QFII* (investment scale of QFIIs) on all independent variables. We estimate the regression using a logistic specification in Column 1 and OLS in Columns 2 and 3. Z-statistics (reported in parentheses in Column 1) and t-statistics (reported in parentheses in Columns 2 and 3) are corrected for heteroskedasticity and based standard errors clustered by firm. For all variables, we use observation for a given firm over the entire sample period. $N = 5518$ for Panel A, $N = 1466$ for Panel B and $N = 2718$ for Panel C.

*** $p < 0.01$.

** $p < 0.05$.

* $p < 0.1$.

Table 4 presents Pearson correlation coefficients. Whether QFII investment is measured as the existence of at least one QFII investor (*D_QFII*), the number of QFII investors (*N_QFII*), or the percentage of QFII investors (*P_QFII*), it is positively correlated with firm size (*SIZE*), dividend yield (*DIV*), shareholding of the largest shareholder (*TOP*1), firm visibility (*XLIST*, *DOWJ*), analyst following (*ANALYST*), and Big 4 audit

(*BIG*4). *D_QFII*, *N_QFII* and *P_QFII* are negatively correlated with financial leverage (*LEV*), book-to-market ratio (*BTM*), and return volatility (*STDRET*). These results are consistent with Table 3. *D_QFII*, *N_QFII* and *P_QFII* are also positively correlated with *ROE*, suggesting that QFIIs tend to invest in profitable firms. *D_QFII*, *N_QFII* and *P_QFII* are negatively correlated with *POST*, suggesting that QFIIs reduce investments in Chinese listed firms after IFRS adoption, consistent with our univariate results in Panels B and C, Table 2.

5.4. Multivariate hypothesis tests

Multivariate tests are reported in Panel A, Table 5. The coefficients on *POST* are negative and significant for all QFII investment measures (−0.7535, *z*-statistic = −5.66 using *D_QFII*; −0.0808, *t*-statistic = −7.36 using *N_QFII*; and −0.0040, *t*-statistic = −7.55 using *P_QFII*). Thus, consistent with univariate tests, our multivariate results support our first hypothesis.

A potential concern in Panel A, Table 5 is that the feasible set of Chinese firms suitable for foreign investment is likely limited. Thus, we repeat our analysis in Panel A after restricting the sample to the 1466 A-share firm year observations with at least one QFII investor at the end of the year. The results, reported in Panel B, Table 5, also show that the coefficients on *POST* are negative and significant for all QFII measures (−0.6699, *z*-statistic = −4.11 using *D_QFII*; −0.1888 *t*-statistic = −5.39 using *N_QFII*; and −0.0100, *t*-statistic = −5.88 using *P_QFII*). Thus, Panel B, Table 5 suggests that Panel A results are not driven by firms not in QFIIs' feasible investment set.

Another potential concern is that our results may be explained by an overall decline in investment following the global financial crisis in 2008. We investigate this issue by repeating the analysis in Panel A, Table 5 after restricting the sample to 2006–2007, where *POST* equals 0 for 2006 and 1 for 2007. Panel C again reports that QFII investment significantly declines based on all three ownership measures (−0.8534, *z*-statistics = −4.62 for *D_QFII*; −0.1148, *t*-statistics = −5.74 for *N_QFII*; −0.0053, *t*-statistics = −5.60 for *P_QFII*). Thus, results in Panel C, Table 5 are consistent with the decline in foreign investment being due to China's IFRS adoption, and not to an investment downturn following the financial crisis.

Overall, results in Table 5 support our first hypothesis by showing that China's IFRS adoption is actually followed by reduced foreign institutional investment. We acknowledge, however, that QFIIs' percentage ownership of the China's A-share market is very low, suggesting that the overall capital market consequences of the decline are somewhat limited. Specifically, Table 2, Panel B indicates that among the top 10 shareholders, the mean percentage of QFII ownership was 0.005% pre-IFRS adoption, and 0.003% post-IFRS adoption. Nonetheless, the important implication of our finding is that IFRS adoption in China did not achieve the government's intended goal of increasing foreign institutional investment, and in fact resulted in a modest reduction in foreign investment.

6. Firm-level cross-section analyses

6.1. Management incentives

We test Hypothesis 2a by estimating the following regression

$$\begin{aligned} D\_QFII_{it}, N\_QFII_{it}, P\_QFII_{it} = {} & \beta_0 + \beta_1 POST_{it} + \beta_2 INCENTIVE_{it} + \beta_3 POST_{it} * INCENTIVE_{it} + \beta_4 SIZE_{it} \\ & + \beta_5 LEV_{it} + \beta_6 TOP1_{it} + \beta_7 ROE_{it} + \beta_8 DIV_{it} + \beta_9 STDRET_{it} + \beta_{10} BTM_{it} \\ & + \beta_{11} RETURN_{it} + \beta_{12} XLIST_{it} + \beta_{13} DOWJ_{it} + \beta_{14} XSALE_{it} \\ & + \beta_{15} ANALYST_{it} + \beta_{16} BIG4_{it} + Industry\ dummy + \varepsilon_{it}. \end{aligned} \quad (2)$$

To examine the effect of ownership concentration, *INCENTIVE* equals 1 if the largest shareholder owns more than 50% of a firm's total shares and 0 otherwise. To examine the effect of state ownership, *INCENTIVE* equals 1 if a firm is ultimately controlled by the government and 0 otherwise. Table 6 presents the results of this analysis. When we define *INCENTIVE* based on ownership concentration, all three of the coefficients on *POST*INCENTIVE* are negative and significant (−0.4883, *z*-statistic = −2.13 for *D_QFII*; −0.0656,

Table 6
IFRS adoption, firm incentives, and foreign institutional investment.

	Ownership concentration			State ownership		
	D_QFII	*N_QFII*	*P_QFII*	*D_QFII*	*N_QFII*	*P_QFII*
POST	−0.6367***	−0.0667***	−0.0033***	−0.5555***	−0.0563***	−0.0027***
	(−4.48)	(−5.85)	(−6.35)	(−3.00)	(−4.00)	(−3.72)
INCENTIVE	−0.0583	0.0087	0.0006	0.1431	0.0191*	0.0007
	(−0.39)	(0.50)	(0.57)	(1.33)	(1.75)	(1.17)
*POST*INCENTIVE*	−0.4883**	−0.0656***	−0.0033***	−0.2018	−0.0280**	−0.0015**
	(−2.13)	(−3.13)	(−2.77)	(−1.46)	(−2.31)	(−2.36)
SIZE	0.4580***	0.0556***	0.0019***	0.4515***	0.0546***	0.0018***
	(5.48)	(6.47)	(4.19)	(5.29)	(6.22)	(4.04)
LEV	−0.5423	−0.0577**	−0.0021	−0.5084	−0.0539*	−0.0018
	(−1.53)	(−2.08)	(−1.49)	(−1.43)	(−1.94)	(−1.34)
TOP1				−0.7007*	−0.0557	−0.0013
				(−1.83)	(−1.52)	(−0.70)
ROE	0.7112*	0.0162	0.0006	0.7053**	0.0164	0.0006
	(1.95)	(1.47)	(0.87)	(1.97)	(1.49)	(0.82)
DIV	12.8335***	1.8916***	0.0779***	13.4228***	1.9475***	0.0782***
	(3.07)	(3.73)	(3.20)	(3.20)	(3.82)	(3.18)
STDRET	−2.6370***	−0.2216***	−0.0147***	−2.7353***	−0.2322***	−0.0151***
	(−2.65)	(−2.85)	(−3.71)	(−2.74)	(−3.01)	(−3.84)
BTM	−2.0700***	−0.2190***	−0.0102***	−2.0541***	−0.2159***	−0.0099***
	(−7.81)	(−9.77)	(−8.92)	(−7.76)	(−9.66)	(−8.86)
RETURN	0.0504	0.0031	0.0004	0.0526	0.0037	0.0004
	(0.82)	(0.50)	(1.13)	(0.86)	(0.60)	(1.22)
XLIST	−0.4593**	−0.0452**	−0.0006	−0.4575**	−0.0466**	−0.0006
	(−2.34)	(−2.47)	(−0.57)	(−2.31)	(−2.53)	(−0.55)
DOWJ	0.5086***	0.0173	0.0001	0.5005***	0.0173	0.0001
	(3.17)	(1.25)	(0.07)	(3.09)	(1.24)	(0.19)
XSALE	0.1073	0.0059	0.0003	0.1143	0.0063	0.0003
	(0.83)	(0.56)	(0.50)	(0.88)	(0.59)	(0.53)
ANALYST	0.0154***	0.0020**	0.0001**	0.0147**	0.0019**	0.0001**
	(2.60)	(2.56)	(2.42)	(2.46)	(2.43)	(2.27)
BIG4	0.3582*	0.0656**	0.0028*	0.3529*	0.0661**	0.0029*
	(1.79)	(2.25)	(1.83)	(1.75)	(2.26)	(1.84)
Constant	−10.4569***	−0.8601***	−0.0251***	−10.2034***	−0.8367***	−0.0242***
	(−6.20)	(−5.04)	(−2.80)	(−5.98)	(−4.84)	(−2.69)
Industry Indicators	yes	yes	yes	yes	yes	yes
Adjusted/Pseudo R2	0.153	0.106	0.066	0.152	0.104	0.065

This table reports regressions of *D_QFII* (existence of QFIIs), *N_QFII* (log of one plus the number of QFIIs) and *P_QFII* (investment scale of QFIIs) on all independent variables. We estimate the regression using a logistic specification in Column 1 and OLS in Columns 2 and 3. Z-statistics (reported in parentheses in Column 1) and t-statistics (reported in parentheses in Columns 2 and 3) are corrected for heteroskedasticity and based on error terms clustered by firm. For all variables, we use observations for a given firm over the entire sample period. $N = 5518$. *INCENTIVE* = 1 if the largest shareholder owns more than 50% for the "ownership concentration" columns, or if the firm is ultimately controlled by the government for the "state ownership" columns, and 0 otherwise. The definitions of other variables are presented in Appendix B.

*** $p < 0.01$.
** $p < 0.05$.
* $p < 0.1$.

t-statistic = −3.13 for *N_QFII*; and −0.0033, *t*-statistic = −2.77 for *P_QFII*). When we define *INCENTIVE* based on state ownership, the coefficients on *POST*INCENTIVE* are negative and significant for *N_QFII* (−0.0280, *t*-statistics = −2.31) and *P_QFII* (−0.0015, *t*-statistics = −2.36). Thus, Table 6 suggests that QFIIs are more likely to reduce their investment in Chinese firms that have low incentives to credibly implement IFRS. Importantly, Table 6 finds that the decline in QFII investment is related to IFRS adoption, as opposed to merely a time-trend in foreign investment during the period of our analysis.

Table 7
IFRS adoption and fair value accounting.

	D_QFII	*N_QFII*	*P_QFII*
Panel A: IFRS adoption, financial assets and QFII investment			
POST	−0.6488***	−0.0708***	−0.0036***
	(−4.23)	(−5.69)	(−5.38)
SMA_FA	−0.1524	−0.0164	−0.0011
	(−0.89)	(−0.99)	(−1.42)
POST SMALL_FA*	−0.1455	0.0030	0.0009
	(−0.56)	(0.14)	(0.87)
LARGE_FA	−0.0437	0.0183	0.0013
	(−0.25)	(0.93)	(1.04)
POST LARGE_FA*	−0.3476	−0.0444**	−0.0024**
	(−1.41)	(−2.04)	(−1.96)
SIZE	0.4726***	0.0555***	0.0018***
	(5.58)	(6.46)	(4.03)
LEV	−0.5509	−0.0540*	−0.0018
	(−1.53)	(−1.94)	(−1.25)
TOP1	−0.7069*	−0.0521	−0.0013
	(−1.92)	(−1.51)	(−0.79)
ROE	0.6909*	0.0172	0.0007
	(1.95)	(1.57)	(0.99)
DIV	13.7228***	1.9668***	0.0798***
	(3.27)	(3.86)	(3.25)
STDRET	−2.5706**	−0.2253***	−0.0148***
	(−2.57)	(−2.91)	(−3.76)
BTM	−2.0439***	−0.2148***	−0.0099***
	(−7.76)	(−9.61)	(−8.84)
RETURN	0.0560	0.0039	0.0005
	(0.92)	(0.64)	(1.25)
XLIST	−0.4178**	−0.0445**	−0.0006
	(−2.10)	(−2.38)	(−0.54)
DOWJ	0.5178***	0.0186	0.0002
	(3.20)	(1.33)	(0.27)
XSALE	0.1369	0.0072	0.0003
	(1.05)	(0.68)	(0.58)
ANALYST	0.0135**	0.0018**	0.0001**
	(2.27)	(2.27)	(2.16)
BIG4	0.3685*	0.0674**	0.0029*
	(1.84)	(2.30)	(1.88)
Constant	−10.4812***	−0.8404***	−0.0230***
	(−6.19)	(−4.96)	(−2.60)
Industry Indicators	yes	yes	yes
Adjusted/Pseudo R2	0.153	0.104	0.065
Panel B: IFRS adoption, fair value accounting and QFII investment			
POST	−0.6567***	−0.0744***	−0.0040***
	(−4.69)	(−6.33)	(−6.22)
FAIR_LOSS	−0.0243	−0.0149	−0.0015*
	(−0.13)	(−0.75)	(−1.74)
*POST*FAIR_LOSS*	−0.1504	0.0113	0.0013
	(−0.56)	(0.46)	(1.26)
FAIR_GAIN	−0.1989	−0.0036	−0.0001
	(−1.00)	(−0.16)	(−0.10)
*POST*FAIR_GAIN*	−0.4567	−0.0471*	−0.0019*
	(−1.55)	(−1.78)	(−1.73)
SIZE	0.4876***	0.0568***	0.0019***
	(5.73)	(6.59)	(4.31)
LEV	−0.5592	−0.0599**	−0.0021
	(−1.56)	(−2.15)	(−1.50)

Table 7 (*continued*)

	D_QFII	*N_QFII*	*P_QFII*
TOP1	−0.7524**	−0.0557	−0.0016
	(−2.05)	(−1.61)	(−0.92)
ROE	0.7108**	0.0168	0.0007
	(1.97)	(1.53)	(0.93)
DIV	13.5471***	1.9774***	0.0813***
	(3.19)	(3.87)	(3.30)
STDRET	−2.5950***	−0.2268***	−0.0149***
	(−2.58)	(−2.92)	(−3.78)
BTM	−2.0638***	−0.2161***	−0.0099***
	(−7.80)	(−9.69)	(−8.88)
RETURN	0.0620	0.0046	0.0005
	(1.01)	(0.75)	(1.36)
XLIST	−0.3844**	−0.0418**	−0.0004
	(−1.97)	(−2.27)	(−0.38)
DOWJ	0.4904***	0.0179	0.0001
	(3.05)	(1.28)	(0.20)
XSALE	0.1377	0.0083	0.0004
	(1.06)	(0.77)	(0.72)
ANALYST	0.0144**	0.0017**	0.0001**
	(2.38)	(2.22)	(2.04)
BIG4	0.3665*	0.0681**	0.0030*
	(1.82)	(2.32)	(1.89)
Constant	−10.7150***	−0.8572***	−0.0241***
	(−6.31)	(−5.07)	(−2.79)
Industry Indicators	yes	yes	yes
Pesudo/Adj-R^2	0.157	0.105	0.066

This table reports regressions of *D_QFII* (existence of QFIIs), *N_QFII* (log of one plus the number of QFIIs) and *P_QFII* (investment scale of QFIIs) on all independent variables. We estimate the regression using a logistic specification in Column 1 and OLS in Columns 2 and 3. Z-statistics (reported in parentheses in Column 1) and t-statistics (reported in parentheses in Columns 2 and 3) are corrected for heteroskedasticity and based on error terms clustered by firm. For all variables, we use observations for a given firm over the entire sample period. N = 5518. In Panel A, *SMALL_FA* = 1 if the firm's financial assets (trading securities and available-for-sale securities) scaled by total assets are among the bottom 50% percentile of sample firms whose average of financial assets at the end of year 2007 and 2008 are non-zero; *LARGE_FA* = 1 if the firms' financial assets (trading securities and available-for-sale securities) scaled by total assets are among the top 50% percentile of sample firms whose average of financial assets at the end of year 2007 and 2008 are non-zero. In Panel B, *FAIR_GAIN* = 1 if a firm has fair value gains in its income statement during 2007 or 2008; *FAIR_LOSS* = 1 if a firm has fair value losses in its income statement during 2007 or 2008. Other variable definitions are presented in Appendix B.

*** $p < 0.01$.

** $p < 0.05$.

* $p < 0.1$.

6.2. Firms prone to fair value manipulation

We test Hypothesis 2b by estimating the following regression:

$$\begin{aligned} D\_QFII_{it}, N\_QFII_{it}, P\_QFII_{it} = {} & \beta_0 + \beta_1 POST_{it} + \beta_2 SMALL\_FA_{it} + \beta_3 POST_{it} * SMALL\_FA_{it} \\ & + \beta_4 LARGE\_FA_{it} + \beta_5 POST_{it} * LARGE\_FA_{it} + \beta_6 SIZE_{it} + \beta_7 LEV_{it} \\ & + \beta_8 TOP1_{it} + \beta_9 ROE_{it} + \beta_{10} DIV_{it} + \beta_{11} STDRET_{it} + \beta_{12} BTM_{it} \\ & + \beta_{13} RETURN_{it} + \beta_{14} XLIST_{it} + \beta_{15} DOWJ_{it} + \beta_{16} XSALE_{it} \\ & + \beta_{17} ANALYST_{it} + \beta_{18} BIG4_{it} + Industry\ dummy + \varepsilon_{it}. \end{aligned} \quad (3)$$

We assume that firms with a high level of financial assets, which include trading securities and available-for-sale securities, have a greater ability to manipulate earnings through fair value accounting after IFRS adoption. Thus, we create two indicator variables to capture the size of financial assets: *SMALL_FA* equals 1 if the

ratio of financial assets scaled by total assets is below the sample median of firms with non-zero financial assets and 0 otherwise; *LARGE_FA* equals 1 if the ratio of financial assets scaled by total assets is above the sample median of firms with non-zero financial assets and 0 otherwise. We interact *SMALL_FA* and *LARGE_FA* with *POST* and expect the coefficient on *POST*LARGE_FA* to be negative if our conjecture is correct.

Panel A, Table 7 shows that the coefficients on *POST*SMALL_FA* are always insignificant, and that the coefficients on *POST*LARGE_FA* are negative and significant for *N_QFII* (−0.0444, *t*-statistics = −2.04) and *P_QFII* (−0.0024, *t*-statistics = −1.96), indicating that QFIIs reduce their investment in firms with large financial assets both in terms of the number of firms and percentage ownership. Overall, these findings are consistent with our expectations.

We further explore this issue by examining whether the decline in investment is larger for firms that report gains from fair value adjustments. This analysis is motivated by the observation that the incentive to manage earnings upward is likely stronger than the incentive to manage downward. Thus, firms reporting fair value gains are more likely to be manipulating earnings than firms reporting fair value losses. If QFIIs understand this, we expect the decline in foreign institutional investment to be more pronounced in firms reporting gains under the fair value provisions of IFRS than firms reporting losses. We test this conjecture by estimating the following regression:

$$\begin{aligned} D\_QFII_{it}, N\_QFII_{it}, P\_QFII_{it} = {} & \beta_0 + \beta_1 POST_{it} + \beta_2 FAIR\_LOSS_{it} + \beta_3 POST_{it} * FAIR\_LOSS_{it} \\ & + \beta_4 FAIR\_GAIN_{it} + \beta_5 POST_{it} * FAIR\_GAIN_{it} + \beta_6 SIZE_{it} + \beta_7 LEV_{it} \\ & + \beta_8 TOP1_{it} + \beta_9 ROE_{it} + \beta_{10} DIV_{it} + \beta_{11} STDRET_{it} + \beta_{12} BTM_{it} \\ & + \beta_{13} RETURN_{it} + \beta_{14} XLIST_{it} + \beta_{15} DOWJ_{it} + \beta_{16} XSALE_{it} \\ & + \beta_{17} ANALYST_{it} + \beta_{18} BIG4_{it} + Industry\ dummy + \varepsilon_{it}. \end{aligned} \tag{4}$$

We define two indicator variables to capture expected fair value manipulation. *FAIR_LOSS* equals 1 if the fair value adjustment results in a loss in the income statement and 0 otherwise. *FAIR_GAIN* equals 1 if the fair value adjustment results in a gain in the income statement and 0 otherwise. We interact *FAIR_LOSS* and *FAIR_GAIN* with *POST* and expect the coefficient on *POST*FAIR_GAIN* to be negative.

Panel B, Table 7 shows that while the coefficients on *POST*FAIR_LOSS* are all insignificant, the coefficients on *POST*FAIR_GAIN* are negative and significant for *N_QFII* (−0.0471, *t*-statistics = −1.78) and *P_QFII* (−0.0019, *t*-statistics = −1.73). This further supports our conjecture that the decline in investment is more pronounced in firms with greater opportunities to manipulate earnings through fair value accounting. It also provides cross-sectional evidence that the decline in QFIIs' investment is not merely due to a time trend as fair value accounting is associated with IFRS adoption.

6.3. Further corroborative analyses

6.3.1. Usefulness of accounting earnings

We test our conjecture that IFRS is likely to impair financial reporting quality in China by comparing the earnings-return association under IFRS versus CAS. This test exploits the fact that the initial 2007 financial reports under IFRS must include restated 2006 financials under IFRS. We estimate the following equation:

$$\begin{aligned} CAR_{it} = {} & \beta_0 + \beta_1 X_{it}/P_{it} + \beta_2 (X_{it} - X_{it-1})/P_{it-1} + \beta_3 IFRS_{it} \\ & + \beta_4 IFRS_{it} * X_{it}/P_{it-1} + \beta_5 IFRS_{it} * (X_{it} - X_{it-1})/P_{it-1} + Industry\ Dummy + e_{it}, \end{aligned} \tag{5}$$

where *CAR* is the fifteen-month (from the first month of the fiscal year to the third month after the end of the fiscal year) cumulative abnormal monthly return for year 2006 using the market model; X_{it} is earnings for 2006 under CAS or earnings for year 2006 restated under IFRS; X_{it-1} is earnings for 2005 computed under CAS; *IFRS* equals 1 for 2006 earnings restated under IFRS and 0 otherwise.[11] If IFRS impairs financial reporting

[11] X_{it-1} is 2005CAS and $(X_{it} - X_{it-1})$ is [2006CAS – 2005CAS]. $IFRS^* X_{it}$ indicates 2006IFRS and $IFRS^*(X_{it} - X_{it-1})$ indicates [2006IFRS – 2005CAS] where 2006IFRS is 2006CAS restated based on IFRS.

quality, we expect the association between CAR_{it} and unexpected earnings $(X_{it} - X_{it-1})/P_{it-1}$ to be lower for IFRS restated earnings when compared to CAS earnings, consistent with a negative coefficient on $IFRS_{it}{}^{*}(X_{it} - X_{it-1})/P_{it-1}$ ($\beta_5 < 0$).

Table 8 reports that while the coefficients on X_{it}/P_{it-1} and $(X_{it} - X_{it-1})/P_{it-1}$ are significantly positive, the coefficient on $IFRS_{it}{}^{*}X_{it}/P_{it-1}$ is insignificant and the coefficient on $IFRS_{it}{}^{*}(X_{it} - X_{it-1})/P_{it-1}$ is significantly negative (−0.1213, t-statistic = −2.02). This suggests that the association between stock returns and earnings is lower under IFRS than under CAS. A limitation of this analysis, however, is that IFRS restated earnings for 2006 are announced in 2007, while stock returns are measured in 2006. Thus, we also perform a test that compares the earnings-return association before and after IFRS adoption using earnings reported in the income statement (i.e., without regards to the restatement of IFRS earnings in 2006). This analysis is based on estimating the following equation:

$$\begin{aligned} CAR_{it} = {} & \beta_0 + \beta_1 X_{it}/P_{it} + \beta_2 (X_{it} - X_{it-1})/P_{it-1} + \beta_3 POST_{it} + \beta_4 POST_{it} * X_{it}/P_{it-1} \\ & + \beta_5 POST_{it} * (X_{it} - X_{it-1})/P_{it-1} + Industry\ Dummy + \varepsilon_{it}, \end{aligned} \tag{6}$$

Table 8
IFRS adoption and the usefulness of accounting earnings.

	CAR_{2006}	$CAR_{2005,\ 2006}$ versus $CAR_{2007,\ 2008}$
X_t/P_{t-1}	0.4696***	0.2084*
	(2.76)	(1.71)
$(X_t - X_{t-1})/P_{t-1}$	0.4288***	0.5351***
	(4.31)	(5.28)
$IFRS_t$	−0.0321***	
	(−3.90)	
$IFRS_t{*}X_t/P_{t-1}$	−0.0092	
	(−0.07)	
$IFRS_t{*}(X_t - X_{t-1})/P_{t-1}$	−0.1213**	
	(−2.02)	
$POST_t$		0.2354***
		(16.30)
$POST_t{*}X_t/P_{t-1}$		0.3605
		(1.57)
$POST_t{}^{*}(X_t - X_{t-1})/P_{t-1}$		−1.6607***
		(−5.31)
Constant	−0.0620	−0.0188
	(−1.04)	(−0.73)
Industry indicators	yes	yes
Observations	2,445	5,098
Adjusted R-squared	0.140	0.107

We estimate the regression using OLS. t-statistics (reported in parentheses) are corrected for heteroskedasticity and are based on error terms clustered by firm. *CAR* is the cumulative abnormal return of firm i in year t over the 15 months extending from the first month of a fiscal year to 3 months after the fiscal-year end, calculated using residuals from a monthly market model $R_{jt} = b_{0t} + b_{1t}$-$R_{mt} + e$, where R_{mt} is the value-weighted market return for month t. This model is estimated over the 36 months prior to the beginning of the fiscal year (Brown et al., 1987; Easton and Harris, 1991). X_t is the earnings per share,P_{t-1} is the beginning-of-period share price. In the first column, the dependent variable *CAR* is the fifteen-month cumulative abnormal monthly return for year 2006, $IFRS_t$ equals 1 for year 2006 earnings restated under *IFRS* and 0 otherwise. In the second column, CAR_t is the annual fifteen-month cumulative abnormal monthly return of firm i in year t, and $POST_t$ equals 1 for years 2007 and 2008 and 0 for years 2005 and 2006.

*** $p < 0.01$.
** $p < 0.05$.
* $p < 0.1$.

where all variables are as defined earlier, and *POST* equals 1 for years 2007 and 2008, and zero for years 2005 and 2006. If IFRS impairs financial reporting quality subsequent to its adoption in 2007, we expect the association between CAR_{it} and unexpected earnings $(X_{it} - X_{it-1})/P_{it-1}$ to be lower during the two years after IFRS adoption, consistent with a negative coefficient on $POST_{it}{}^{*}(X_{it} - X_{it-1})/P_{it-1}$ ($\beta_5 < 0$).

Table 8 reports that while the coefficients on X_{it}/P_{it-1} and $(X_{it} - X_{it-1})/P_{it-1}$ are significantly positive, the coefficient on $POST_{it}{}^{*}X_{it}/P_{it-1}$ is insignificant and the coefficient on $POST_{it}{}^{*}(X_{it} - X_{it-1})/P_{it-1}$ is significantly

Table 9
IFRS adoption and foreign institutional investors' ability to identify good investments.

	Dependent variable: firm's future one year market-adjusted stock return		
POST	0.1204***	0.1140***	0.0971***
	(3.42)	(3.24)	(2.79)
D_QFII	0.2235***		
	(3.31)		
*D_QFII*POST*	−0.3201***		
	(−4.58)		
N_QFII		0.1938***	
		(2.90)	
*N_QFII*POST*		−0.2926***	
		(−4.33)	
P_QFII			2.6156**
			(2.00)
*P_QFII*POST*			−4.0576***
			(−3.07)
SIZE	−0.0209	−0.0198	−0.0165
	(−1.09)	(−1.04)	(−0.87)
LEV	0.2914***	0.2897***	0.2845***
	(3.83)	(3.81)	(3.74)
TOP1	−0.2023**	−0.2029**	−0.2063***
	(−2.54)	(−2.55)	(−2.59)
ROE	0.1998***	0.2000***	0.2006***
	(3.32)	(3.32)	(3.33)
DIV	0.8429	0.8410	1.1359
	(0.70)	(0.70)	(0.96)
STDRET	0.9779***	0.9688***	0.9811***
	(4.08)	(4.04)	(4.08)
BTM	0.3709***	0.3659***	0.3556***
	(6.36)	(6.28)	(6.13)
RETURN	−0.1548***	−0.1538***	−0.1542***
	(−9.93)	(−9.83)	(−9.84)
XLIST	−0.0480	−0.0478	−0.0527
	(−1.04)	(−1.04)	(−1.14)
DOWJ	−0.0049	−0.0046	−0.0044
	(−0.15)	(−0.14)	(−0.13)
XSALE	0.0107	0.0103	0.0099
	(0.40)	(0.39)	(0.37)
ANALYST	−0.0032**	−0.0032**	−0.0034***
	(−2.41)	(−2.44)	(−2.59)
BIG4	−0.1392***	−0.1399***	−0.1388***
	(−3.03)	(−3.04)	(−2.98)
Constant	0.1214	0.1103	0.0560
	(0.33)	(0.30)	(0.15)
Industry Indicators	yes	yes	yes
Adj-R^2	0.049	0.049	0.047

Variable definitions are presented in Appendix B. We estimate the regression using OLS. t-statistics (reported in parentheses) are corrected for heteroskedasticity and are based on error terms clustered by firm. For all variables we use observations for a given firm over the entire sample period. Ten observations are dropped due to missing data on future one year market-adjusted returns. $N = 5508$. * $p < 0.1$.
*** $p < 0.01$.
** $p < 0.05$.

negative (−1.6607, *t*-statistic = −5.31). This again suggests that the association between stock returns and earnings is lower under IFRS than under CAS.

In conclusion, results in Table 8 are consistent with deteriorating earnings quality after IFRS adoption, as reflected in a decline in the association between abnormal earnings and stock returns.

6.3.2. Foreign investors' ability to identify profitable investments

If IFRS provides more opportunities for earnings management (He, Wong and Young, 2012), it will diminish the reliability of accounting information. Poor information quality will hamper the decision usefulness of financial reporting, causing investment efficiency to decline for QFIIs. This can be reflected in an increase in difficulty for QFIIs to identify profitable investments after IFRS adoption. We test this possibility by examining whether QFIIs' ability to identify profitable investments declines after IFRS adoption using the following model:

$$\begin{aligned} ADJRET_{it+1} = {} & \beta_0 + \beta_1 POST_{it} + \beta_2 D\_QFII_{it}(orN\_QFII_{it}, P\_QFII_{it}) + \beta_3 POST_{it} \\ & * D\_QFII_{it}(orN\_QFII_{it}, P\_QFII_{it}) + \beta_4 LEV_{it} + \beta_5 TOP1_{it} + \beta_6 ROE_{it} + \beta_7 DIV_{it} \\ & + \beta_8 STDRET_{it} + \beta_9 BTM_{it} + \beta_{10} RETURN_{it} + \beta_{11} XLIST_{it} + \beta_{12} DOWJ_{it} + \beta_{13} XSALE_{it} \\ & + \beta_{14} ANALYST_{it} + \beta_{15} BIG4_{it} + Industry\ dummy + \varepsilon_{it}. \end{aligned} \quad (7)$$

Our dependent variable is the one-year ahead market-adjusted stock return, an *ex post* measure of profitable investment. If it becomes more difficult for QFIIs to identify profitable investments after IFRS adoption, we expect the coefficients on $POST^*D\_QFII$, $POST^*N\_QFII$ and $POST^*P\_QFII$ to be negative. Table 9 reports that the coefficients on $POST^*D\_QFII$ (−0.3201, *t*-statistics = −4.58), $POST^*N\_QFII$ (−0.2926, *t*-statistics = −4.33) and $POST^*P\_QFII$ (−4.0576, *t*-statistics = −3.07) are all significantly negative. Thus, as expected, China's IFRS adoption appears to compromise QFII's stock picking ability.

7. Effects of foreign investors' home country institutions and IFRS experience

To investigate whether foreign institutional investors' home country institutions affect the association between IFRS adoption and QFII investment, we partition our sample based on whether a QFII is from a country where the legal and financial reporting institutions are market-based or relationship-based, using: legal origins (code law versus common law); anti-director rights (based on the median level of anti-director rights from La Porta et al., 1997); government versus private standard setters (from Ali and Hwang, 2000), accounting clusters (from Mueller et al., 1994; Hung, 2001); and book-tax conformity (from Cooper and Lybrand, 1993; Hung, 2001). Appendix C reports the classifications for each QFII country. Information on QFIIs' home country IFRS adoption experience is from Armstrong et al. (2010) and Daske et al. (2008).

Panel A, Table 10 presents results incorporating QFIIs' home country institutions using *D_QFII* as our dependent variable in regression Eq. (1). For brevity, we only report the coefficients on *POST*. After IFRS adoption, QFII investment significantly declines for QFIIs from both market-based and relationship-based countries. The coefficients on *POST* are negative and significant based on all five measures of market-based or relationship-based orientation. However, the decline is larger for QFIIs from relationship-based countries than for QFIIs from market-based countries in four of the five measures. The difference in the coefficients on *POST* between these two groups is 0.3229 (chi-squared value = 3.84) based on legal origin; 0.3888 (chi-squared value = 5.95) based on source of standards; 0.3978 (chi-squared value = 6.30) based on accounting cluster; or 0.4047 (chi-squared value = 6.56) based on financial tax alignment. This same pattern exists and tends to be statistically stronger when we use *N_QFII* (Panel B) or *P_QFII* (Panel C) as the dependent variable. Specifically, in Panels B and C the decline is larger in magnitude for QFIIs from relationship-based countries than for QFIIs from market-based countries for all five measures (at $p \leq 0.05$). Thus, results in Table 10 support our second hypothesis that the decline in QFII investment after IFRS adoption is stronger among QFIIs from countries with relationship-based institutions.

QFIIs' expectations regarding IFRS are also likely to be a function of whether their home countries have adopted IFRS. IFRS adoption is more likely to have positive consequences in countries with market-based

Table 10
IFRS adoption and foreign institutional investors' home country institutions.

Specific institution of QFII's home country	Market-based institutions		Relationship-based institutions		Diff. in coeffs. on *POST*
	POST	*Pseudo* R^2	*POST*	*Pseudo* R^2	
Panel A: IFRS adoption and QFII indicator (D_QFII) partitioned on QFIIs' home country institutions					
Legal origin	−0.5874***	0.144	−0.9103***	0.144	0.3229
	(−3.57)		(−5.85)		(3.84)**
Anti-director rights	−0.6769***	0.142	−0.7901***	0.144	0.1132
	(−4.08)		(−5.12)		(0.47)
Source of standards	−0.5929***	0.150	−0.9817***	0.137	0.3888
	(−3.72)		(−5.94)		(5.95)**
Accounting cluster	−0.5892***	0.150	−0.9870***	0.137	0.3978
	(−3.72)		(−5.93)		(6.30)**
Book-tax alignment	−0.5862***	0.151	−0.9909***	0.136	0.4047
	(−3.71)		(−5.94)		(6.56)**

Specific institution of QFII's home country	Market-based institutions		Relationship-based institutions		Diff. in coeffs. on *POST*
	POST	*Adj-*R^2	*POST*	*Adj-*R^2	
Panel B: IFRS adoption and number of QFIIs (N_QFII) partitioned on QFIIs' home country institutions					
Legal origin	−0.0029***	0.074	−0.0050***	0.080	0.0021
	(−6.83)		(−7.89)		(26.96)***
Anti-director rights	−0.0031***	0.073	−0.0046***	0.082	0.0015
	(−6.99)		(−7.93)		(10.88)***
Source of standards	−0.0028***	0.070	−0.0055***	0.085	0.0027
	(−6.96)		(−7.98)		(42.50)***
Accounting cluster	−0.0029***	0.071	−0.0053***	0.083	0.0024
	(−7.13)		(−7.61)		(35.34)***
Book-tax alignment	−0.0029***	0.071	−0.0052***	0.082	0.0023
	(−7.19)		(−7.37)		(31.79)***

Specific institution of QFII's home country	Market-based institutions		Relationship-based institutions		Diff. in coeffs. on *POST*
	POST	*Adj-*R^2	*POST*	*Adj-*R^2	
Panel C: IFRS adoption and percentage ownership of QFII (*P_QFII*) partitioned on QFIIs' home country institutions					
Legal origin	−0.0013***	0.039	−0.0027***	0.055	0.0014
	(−4.35)		(−7.12)		(19.66)***
Anti-director rights	−0.0013***	0.037	−0.0027***	0.056	0.0014
	(−4.52)		(−6.99)		(20.75)***
Source of standards	−0.0016***	0.038	−0.0024***	0.057	0.0008
	(−4.81)		(−6.84)		(4.99)**
Accounting cluster	−0.0016***	0.038	−0.0024***	0.056	0.0008
	(−4.79)		(−6.86)		(5.11)**
Book-tax alignment	−0.0016***	0.037	−0.0024***	0.057	0.0008
	(−4.78)		(−6.88)		(5.23)**

Variable definitions are presented in Appendix B. This table reports regressions of the QFII indicator variable (*D_QFII*), log of one plus the number of QFIIs (*N_QFII*), and percentage investment of QFIIs(*P_QFII*) after partitioning on QFIIs' country level institutions. We estimate the regression using a logistic specification in Panel A and OLS in Panels B and C. Z-statistics (reported in parentheses in Panel A except for the last volume) and t-statistics (reported in parentheses in Panels B and C except for the last column) are corrected for heteroskedasticity and are based on error terms clustered by firm. For all variables we use observations for a given firm over the entire sample period. For the last column, Chi-squared values are reported in parentheses of Panel A and F-values are reported in parentheses of Panels B and C. $N = 5518$. $^{*}p < 0.1$.
*** $p < 0.01$.
** $p < 0.05$.

institutions, but not in countries with relationship-based institutions. If QFIIs are from countries with primarily market-based institutions, they are more likely to view IFRS adoption favorably. In contrast, if the QFIIs are from countries with primarily relationship-based institutions, they are less likely to view IFRS adoption

Table 11
IFRS adoption and foreign institutional investors' home country experience with IFRS.

Specific institution of QFII's home country	Market-based institutions		Diff. in coeffs. on *POST*	Relationship-based institutions		Diff. in coeffs. on *POST*
	IFRS experience	*No-IFRS experience*		*IFRS experience*	*No-IFRS experience*	
Panel A: IFRS adoption and QFII indicator (D_QFII) partitioned on QFIIs' home country institutions and IFRS experience						
Legal origin	0.0528	−0.9080***	0.9608	−0.9273***	−1.0411**	0.1138
	(0.23)	(−4.62)	(17.83)***	(−5.70)	(−2.42)	(0.49)
Anti-director rights	−0.1679	−0.9080***	0.7401	−0.7873***	−1.0411**	0.2538
	(−0.74)	(−4.62)	(10.51)***	(−4.86)	(−2.42)	(2.46)
Source of standards	−0.2006	−0.9080***	0.7074	−0.9945***	−1.0411**	0.0466
	(−1.00)	(−4.62)	(12.50)***	(−5.67)	(−2.42)	(0.07)
Accounting cluster	−0.1857	−0.9080***	0.7223	−1.0007***	−1.0411**	0.0404
	(−0.94)	(−4.62)	(13.25)***	(−5.67)	(−2.42)	(0.05)
Book-tax alignment	−0.1693	−0.9080***	0.7387	−1.0049***	−1.0411**	0.0362
	(−0.86)	(−4.62)	(14.04)***	(−5.67)	(−2.42)	(0.04)
Panel B: IFRS adoption and number of QFIIs (N_QFII) partitioned on QFIIs' home country institutions and IFRS experience						
Legal origin	−0.0016***	−0.0039***	0.0023	−0.0055***	−0.0033***	−0.0022
	(−2.86)	(−6.91)	(15.93)***	(−7.34)	(−2.90)	(8.18)***
Anti-director rights	−0.0022***	−0.0039***	0.0017	−0.0050***	−0.0033***	−0.0017
	(−3.17)	(−6.91)	(6.13)**	(−7.46)	(−2.90)	(5.86)**
Source of standards	−0.0021***	−0.0039***	0.0018	−0.0061***	−0.0033***	−0.0028
	(−3.69)	(−6.91)	(10.02)***	(−7.38)	(−2.90)	(11.26)***
Accounting cluster	−0.0023***	−0.0039***	0.0016	−0.0059***	−0.0033***	−0.0026
	(−4.05)	(−6.91)	(8.45)***	(−6.92)	(−2.90)	(8.77)***
Book-tax alignment	−0.0023***	−0.0039***	0.0016	−0.0057***	−0.0033***	−0.0024
	(−4.17)	(−6.91)	(8.03)***	(−6.60)	(−2.90)	(7.30)***
Panel C: IFRS adoption and percentage ownership of QFII (P_QFII) partitioned on QFIIs' home country institutions and IFRS experience						
Legal origin	−0.0001	−0.0012***	0.0011	−0.0022***	−0.0004***	−0.0018
	(−0.74)	(−4.98)	(53.17)***	(−6.53)	(−2.99)	(27.59)***
Anti-director rights	−0.0001	−0.0012***	0.0011	−0.0022***	−0.0004***	−0.0018
	(−0.86)	(−4.98)	(65.05)***	(−6.39)	(−2.99)	(26.38)***
Source of standards	−0.0004**	−0.0012***	0.0008	−0.0019***	−0.0004***	−0.0015
	(−2.14)	(−4.98)	(17.37)***	(−6.13)	(−2.99)	(22.52)***
Accounting cluster	−0.0004**	−0.0012***	0.0008	−0.0019***	−0.0004***	−0.0015
	(−2.11)	(−4.98)	(17.53)***	(−6.15)	(−2.99)	(22.75)***
Book-tax alignment	−0.0004**	−0.0012***	0.0008	−0.0019***	−0.0004***	−0.0015
	(−2.08)	(−4.98)	(17.72)***	(−6.17)	(−2.99)	(22.89)***

Variable definitions are presented in Appendix B. This table reports regressions of the QFII indicator variable (*D_QFII)*, log of one plus the number of QFIIs (*N_QFII*), and percentage investment of QFIIs (*P_QFII*) after partitioning on QFIIs' country level institutions and IFRS experience. We estimate the regression using a logistic specification in Panel A and OLS in Panels B and C. Z-statistics (reported in parentheses in Panel A except for the last column) and t-statistics (reported in parentheses in Panels B and C except for the last volume) are corrected for heteroskedasticity and are based on error terms clustered by firm. For all variables, we use observation for a given firm over the entire sample period. For the column "Diff. in coeffs. on *POST*", Chi-squared values are reported in parentheses in Panel A and F-values are reported in parentheses of Panel B and Panel C. $N = 5518$. *$p < 0.1$. We note that in some columns, the coefficients are identical across different partitions. This is because the partitioned countries are identical across some of the partitioning variables.
*** $p < 0.01$.
** $p < 0.05$.

favorably. Thus, we expect the decline in investment to be relatively small for QFIIs from countries with market-based institutions that have adopted IFRS, as compared with QFIIs from countries with relationship-based institutions that have adopted IFRS.

Table 11 incorporates a partitioning variable that captures whether a QFII's home country has adopted IFRS. Again, we only report coefficients on *POST*. Panel A uses *D_QFII* as the dependent variable and finds that among QFIIs with market-based home countries, QFII investment declines less after IFRS adoption for those with IFRS experience than for those without IFRS experience.[12] The difference in the coefficients on *POST* is significantly positive (0.9608, chi-squared value = 17.83 based on legal origin; 0.7401, chi-squared value = 10.51 based on anti-director rights; 0.7074, chi-squared value = 12.50 based on the source of standards; 0.7223, chi-squared value = 13.25 based on accounting cluster; and 0.7387, chi-squared value = 14.04 based on book-tax alignment). This suggests that home country IFRS experience attenuates the decline in investment for QFIIs from market-based countries. However, Panel A, Table 11 also shows that, among QFIIs with relationship-based home countries, there is no significant difference in the decline in QFII investment for QFIIs with and without IFRS experience.

In Panel B, we use the number of QFIIs, *N_QFII*, as the dependent variable. For QFIIs from market-based countries, we find results similar to those in Panel A. For QFIIs from relationship-based countries, we find that QFIIs investment declines more after IFRS adoption for those from countries with IFRS experience than for those from countries without IFRS experience. The difference in the coefficients on *POST* between QFIIs from countries with and without IFRS experience is significantly negative (−0.0022, *F*-value = 8.18 based on legal origin; −0.0017, *F*-value = 5.86 based on anti-director rights; −0.0028, *F*-value = 11.26 based on source of standards; −0.0026, *F*-value = 8.77 based on accounting cluster; and −0.0024, *F*-value = 7.30 based on book-tax alignment). This suggests that home country IFRS experience exacerbates the decline in investment for QFIIs from relationship-based countries.

Panel C uses the percentage ownership as the dependent variable, *P_QFII*, with qualitatively similar results to those in Panel B. Therefore, results in Table 11 support our conjecture that the decline in foreign institutional investment is smaller for QFIIs from countries with market-based institutions that have adopted IFRS; and greater for QFIIs from countries with relationship-based institutions that have adopted IFRS.

8. Robustness tests

8.1. Investigating whether QFIIs spread their investments more thinly after IFRS adoption

Our data on QFII investors is necessarily restricted to those among the top 10 shareholders of tradable shares, since this is the only information available on QFII ownership.[13] If IFRS actually improves reporting quality in China, QFIIs may spread their investment across more firms, with relatively less invested in each firm. If so, they may end up not being the top 10 shareholders for a specific stock even though they have actually maintained or increased their overall investment in Chinese firms. We emphasize, however, that this seems unlikely given that our analysis in Tables 8 and 9 shows that accounting quality appears to decline after IFRS adoption. Specifically, we find that: (1) the association between earnings and returns is larger under CAS than under IFRS; (2) the association between earnings and returns declines after IFRS adoption; and (3) QFII's investment returns decline following IFRS adoption. These findings are consistent with He et al. (2012), who also find that accounting quality declines after China's IFRS adoption.

Nevertheless, we conduct two additional analyses to determine whether restricting the data on QFIIs to those among the top 10 largest shareholders is likely to bias our results. Our first test is based on the notion that if this restriction results in a bias, the bias will likely become larger as the restriction becomes narrower. For example, if a bias exists, we would expect it to be greater if our data are restricted to QFII investors

[12] We note that the coefficients are identical across some partitions. For example, the coefficients on legal origin and anti-director rights for countries without IFRS experience are identical in Panel A. This is because the legal origin partition and the anti-director rights partition for countries without IFRS experience capture the identical set of countries.

[13] Similar reporting threshold issues exist in the US setting. SEC 13F filing is required only for institutional investors with total investment discretion above USD 100 million and for specific investment above USD 200,000.

among the top 5 shareholders. Thus, we repeat our tests in Panel A, Table 5 after limiting ownership data to the top 9, top 8, top 7, top6 and top 5 shareholders. We continue to find negatively significant coefficients on *POST* ($p < 0.01$) with all successive restrictions. More importantly, we find no evidence that the magnitude of the negative coefficient on *POST* declines as we move from restricting the analysis to the top 5, top 6, 7, 8, 9 and 10 shareholders, which would be the case if the bias is larger when QFII data is restricted to fewer than the top 10 shareholders. In fact, when our dependent variables are *N_QFII* and *P_QFII*, the negative coefficient on *POST* is significantly larger in magnitude when QFIIs are restricted to the top 8, 9, and 10, when compared to the top 5 shareholders. Thus, the results of this analysis are not consistent with a bias resulting from restricting the QFIIs to those among the top 10 shareholders.

Our second analysis repeats our tests in Panel A, Table 5 using *P_QFII* as the dependent variable, after limiting the sample to firms with the same QFIIs among the top 10 shareholders both before and after adoption. By limiting the analysis to firms where a QFII is a top 10 shareholder both before and after IFRS adoption, we are certain that the QFII's investment in those firms did not decline due to the QFII ceasing to be among the top 10 shareholders. We find that the coefficient on *POST* remains significantly negative ($p < 0.01$). Thus, the results of this analysis are not consistent with a bias resulting from restricting our analysis to QFIIs among the top 10 shareholders.

8.2. Dropping US QFIIs

As the US has the largest number of QFIIs, we repeat our tests in Panel A, Table 5 after dropping US QFIIs. The coefficients on *POST* remain significantly negative ($p < 0.01$), suggesting that our results are not driven by US QFIIs.[14]

8.3. Effects of IPOs and SEOs

Since new equity issues may affect our results for the percentage of QFII ownership (*P_QFII*), we repeat our tests in Panel A, Table 5 after dropping the 463 observations with IPOs or SEOs in 2007 or 2008. The coefficients on *POST* remain significantly negative ($p < 0.01$), suggesting that our results are not driven by of SEOs or IPOs.

8.4. Alternative distribution density functions underlying the regression model

We repeat our tests in Panel A, Table 5 using the raw number of QFIIs instead of the logarithm of one plus the number of QFIIs as a measure of our dependent variable *N_QFII*. The raw number of QFIIs range from 0 to 7. Using a Tobit or a Poisson regression model, we find that the coefficients on *POST* remain significantly negative ($p < 0.01$).

8.5. Other data issues

The number of approved QFIIs increased during our sample period, with 22 QFIIs newly granted quotas in 2007 or 2008. When we repeat our tests in Panel A, Table 5 after excluding these newly approved QFIIs, the coefficients on *POST* remains significantly negative ($p < 0.01$) for all three measures of the dependent variable. Also, our tests are performed using annual data. When we use quarterly data, we obtain qualitatively similar results.

9. Conclusion

We examine the effect of China's mandatory IFRS adoption on foreign institutional investment in China's domestic stock market. We hypothesize that due to China's institutional setting, foreign investment is unlikely

[14] Results here and in subsequent analyses are not tabulated for brevity.

to increase after IFRS adoption. We also hypothesize that the association between IFRS adoption and foreign institutional investment should vary with investors' home country institutions and IFRS adoption experience.

Our analysis supports our predictions by finding: (1) foreign institutional investment declines after China's IFRS adoption; (2) the decline is more pronounced for firms with weak incentives to credibly implement IFRS, and for firms with greater opportunities to manipulate earnings through the fair value provisions of IFRS; (3) the association between earnings and returns declines for QFIIs after IFRS adoption; (4) IFRS adoption compromises QFIIs' ability to identify profitable investments; (5) the decline in investment after IFRS adoption is more pronounced for QFIIs from countries with relationship-based institutions than for QFIIs from countries with market-based institutions; and (6) home country IFRS experience attenuates the decline in investment from QFIIs from market-based countries while it exacerbates the decline in investment from QFIIs from relationship-based countries.

Although we likely cannot fully rule out the 2008 financial crisis effect or some other confounding effects on QFII investment, we conclude that mandatory IFRS adoption does not help China achieve its goal of attracting more foreign investments. Further, the effect of IFRS adoption on foreign institutional investment is a function of investors', and therefore financial information users', home country institutions and IFRS adoption experience.

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Appendix A. QFIIs' profiles

QFII name	Home country	Qualification date	Total quota (100 million USD)	Date of initial quota	Initial quota (100 million USD)
AMP Capital Investors Ltd.	Australia	2006.04.10	3.00	2006.08.01	2.00
Platinum Investment Company Ltd.	Australia	2008.06.02	1.50	2008.09.10	1.50
First State Investment Management (UK) Ltd.	Australia	2008.09.11	0.00	2009.06.16	1.20
Fortis Bank SA/NV	Belgium	2004.09.29	5.00	2004.11.21	1.00
KBC Asset Management N.V.	Belgium	2008.06.02	1.50	2008.07.31	1.50
KBC Financial Products UK Ltd.	Belgium	2006.04.10	1.00	2006.06.09	1.00
Caisse de Depot et Placement du Quebec	Canada	2008.08.22	2.00	2008.11.03	2.00
Power Corporation of Canada	Canada	2004.10.15	0.50	2004.11.21	0.50
The Bank of Nova Scotia	Canada	2006.04.10	1.50	2006.06.09	1.50
BNP Paribas	France	2004.09.29	2.00	2004.10.27	0.75
Calyon S.A.	France	2004.10.15	0.75	2005.01.10	0.75
La CompagnieFinancierr Edmond de Rothschild Banque	France	2006.04.10	1.00	2006.07.19	1.00
SocieteGenerale	France	2004.09.02	0.50	2004.09.17	0.50

Appendix A (*continued*)

QFII name	Home country	Qualification date	Total quota (100 million USD)	Date of initial quota	Initial quota (100 million USD)
Allianz Global Investors Luxembourg S.A.	Germany	2008.12.16	0.00	2009.03.04	1.00
Deutsche Bank Aktiengesellschaft	Germany	2003.07.30	4.00	2003.08.26	0.50
Dresdner Bank Aktiengesellschaft	Germany	2004.09.27	0.75	2004.11.08	0.75
Hang Seng Bank Ltd.	Hong Kong	2004.05.10	1.00	2004.06.22	0.50
HSBC Global Asset Management (Hong Kong) Ltd.	Hong Kong	2006.09.05	2.00	2007.02.13	2.00
JF Asset Management Ltd.	Hong Kong	2005.12.28	1.50	2006.04.12	1.50
The Hong Kong and Shanghai Banking Corporation Ltd.	Hong Kong	2003.08.04	4.00	2003.08.26	0.50
DAIWA Asset Management Co.	Japan	2008.09.11	1.00	2008.12.26	1.00
Daiwa Securities SMBC Co., Ltd.	Japan	2004.05.10	0.50	2004.07.05	0.50
Mitsubishi UFJ Securities Co., Ltd.	Japan	2008.12.29	0.00	2009.03.25	1.00
Mizuho Securities Co., Ltd	Japan	2006.09.05	0.50	2007.02.13	0.50
Nikko Asset Management Co., Ltd.	Japan	2003.12.11	4.50	2004.02.09	0.50
Nomura Securities Co., Ltd.	Japan	2003.05.23	3.50	2003.06.04	0.50
Sumitomo Mitsui Asset Management Company, Ltd.	Japan	2006.09.25	3.00	2007.02.13	2.00
The Dai-ichi Mutual Life Insurance Company	Japan	2005.12.28	2.00	2006.02.22	1.00
ABN AMRO Bank N.V.	Netherland	2004.09.02	1.75	2004.09.17	0.75
ING Bank N.V.	Netherland	2003.09.10	4.00	2003.10.16	1.00
Robeco Institutional Asset management B.V.	Netherland	2008.05.05	1.50	2008.06.20	1.50
Shell Asset Management Company B.V.	Netherland	2008.09.12	0.00	2009.12.08	1.00
Norges Bank	Norway	2006.10.24	5.00	2008.01.24	2.00
DBS Bank Ltd.	Singapore	2006.02.13	1.00	2006.04.12	1.00
Government of Singapore Investment Corporation Pte Ltd.	Singapore	2005.10.25	3.00	2005.11.16	1.00
Oversea-Chinese Banking Corporation Ltd.	Singapore	2008.08.28	1.50	2008.11.12	1.50
Temasek Fullerton Alpha Investments Pte Ltd.	Singapore	2005.11.15	1.00	2005.12.12	1.00
United Overseas Bank Ltd.	Singapore	2006.08.05	0.50	2006.11.07	0.50
UOB Asset Management Ltd.	Singapore	2008.11.28	0.00	2009.08.25	0.50

Appendix A (*continued*)

QFII name	Home country	Qualification date	Total quota (100 million USD)	Date of initial quota	Initial quota (100 million USD)
Mirae Asset Global Investments Co., Ltd.	South Korea	2008.07.25	1.50	2008.09.02	1.50
Samsung Investment Trust Management Co., Ltd.	South Korea	2008.08.25	1.50	2008.11.07	1.50
ACE INA International Holdings, Ltd.	Switzerland	2008.08.05	1.50	2008.11.13	1.50
Credit Suisse (Hong Kong) Ltd.	Switzerland	2003.10.24	5.00	2003.11.28	0.50
Pictet Asset Management Ltd.	Switzerland	2006.10.25	1.00	2008.04.01	1.00
UBS Global Asset Management (Singapore) Ltd.	Switzerland	2006.09.25	2.00	2007.01.11	2.00
Credit Suisse	Switzerland	2008.10.14	0.00	2009.05.22	2.00
UBS AG	Switzerland	2003.05.23	8.00	2003.06.04	3.00
ABU Dhabi Investment Authority	UAE	2008.12.03	0.00	2009.01.17	2.00
Barclays Bank PLC	UK	2004.09.15	2.00	2004.10.15	0.75
Martin Currie Investment Management Ltd.	UK	2005.10.25	1.20	2005.11.24	1.20
Prudential Asset Management Co., Ltd.	UK	2008.04.07	0.75	2008.05.04	0.75
Prudential Asset Management (Hong Kong) Ltd.	UK	2006.07.07	3.00	2006.10.12	2.00
Schroder Investment Management Ltd.	UK	2006.08.29	2.00	2006.12.11	2.00
Standard Chartered Bank (Hong Kong) Ltd.	UK	2003.12.11	0.75	2004.05.19	0.75
Alliance Bernstein Ltd.	US	2008.08.28	0.50	2008.11.12	0.50
INVESCO Asset Management Ltd.	US	2004.08.04	2.50	2005.03.08	0.50
Lehman Brothers International (Europe)	US	2004.07.06	2.00	2004.08.16	0.75
Merrill Lynch International	US	2004.04.30	3.00	2004.07.16	0.75
State Street Global Advisors Asia Ltd.	US	2008.05.16	0.50	2008.11.03	0.50
Citigroup Global Markets Ltd.	US	2003.06.05	5.50	2003.06.18	0.75
Goldman Sachs Asset Management International	US	2005.05.09	2.00	2005.11.16	2.00
Morgan Stanley & Co. International Ltd.	US	2003.06.05	4.00	2003.07.01	3.00
AIG Global Investment Corp.	US	2005.11.14	0.50	2005.12.12	0.50
Bill & Melinda Gates Foundation	US	2004.07.19	1.00	2004.08.28	1.00
Capital International, Inc.	US	2008.12.18	0.00	2009.03.31	1.00
GE Asset Management Incorporated	US	2006.08.05	1.88	2007.01.11	2.00
Goldman, Sachs & Co.	US	2003.07.04	3.00	2003.07.24	0.50

(*continued on next page*)

Appendix A (*continued*)

QFII name	Home country	Qualification date	Total quota (100 million USD)	Date of initial quota	Initial quota (100 million USD)
JPMorgan Chase Bank, National Association	US	2003.09.30	1.50	2003.11.04	0.50
Morgan Stanley Investment Management Inc.	US	2006.07.07	2.00	2006.09.05	2.00
President and Fellows of Harvard College	US	2008.08.22	2.00	2008.11.14	2.00
Stanford University	US	2006.08.05	1.00	2006.11.07	0.50
T. Rowe Price International, Inc.	US	2008.09.12	1.10	2008.12.03	1.10
The Trustees of Columbia University in New York	US	2008.03.12	1.00	2008.04.07	1.00
Yale University	US	2006.04.14	1.50	2006.08.01	0.50

Appendix B. Variable definitions

Variable	Definition
Dependent variables	
D_QFII	Indicator variable equal to 1 if a firm has at least one QFII in the top 10 shareholders of tradable A-shares at the end of each year, and 0 otherwise
N_QFII	Log of one plus the number of QFIIs among the top 10 shareholders who own tradable A-shares at the end of each year
P_QFII	The percentage of a firm's A-shares held by the QFIIs among the top 10 shareholders who own tradable shares, divided by the firm's total tradable A-shares at the end of each year
Experimental variables	
POST	Indicator, 1 for years 2007 and 2008 (post-adoption), and 0 for years 2005 and 2006 (pre-adoption)
Control variables	
SIZE	Firm size, computed as the natural logarithm of year-end total assets
LEV	Financial leverage, computed as the ratio between year-end total liabilities and total assets
TOP1	Year-end percentage shareholdings of the largest shareholder
ROE	Return on equity computed as net income scaled by year-end shareholders' equity
DIV	Dividend yields, computed as dividend per share scaled by stock price at the end of each year
STDRET	Standard deviation of a firm's monthly stock returns for each year
BTM	The ratio between a firm's book value and market value of total assets
RETURN	Market-adjusted annual stock return of a firm for each year
XLIST	Indicator variable equal to 1 if a firm issues B-shares or H-shares, and 0 otherwise
DOWJ	Indicator variable equal to 1 if a firm is included in the Dow-Jones 600 index and 0 otherwise
XSALE	Indicator variable equal to 1 if a firm discloses sales from foreign subsidiaries and 0 otherwise
ANALYST	The number of analysts following a firm
BIG4	Indicator variable equal to 1 if a firm is audited by a BIG 4 auditor and 0 otherwise

Appendix C. Institutions of QFIIs' home countries

	Legal system		Accounting system			IFRS adoption
	Legal origin	Anti-director rights	Source of standards	Accounting cluster	Financial tax alignment	
Institutions by QFIIs' home countries						
Australia	1	4	Government-only	British-American	0	1
Belgium	0	0	Government-only	Continental	1	1
Canada	1	4	Government & Private	British-American	0	0
France	0	2	Government-only	Continental	1	1
Germany	0	1	Government-only	Continental	1	1
Hong Kong	1	4	Government & Private	British-American	0	1
Japan	0	3	Government-only	Continental	1	0
Netherlands	0	2	Government & Private	British-American	0	1
Norway	0	3	Government-only	Continental	0	1
Singapore	1	3	Government & Private	British-American	0	1
Switzerland	0	1	Government-only	Continental	1	1
UK	1	4	Government & Private	British-American	0	1
US	1	5	Government & Private	British-American	0	0
Classification of Institutions of QFIIs' home countries						
Market-based	1	>3	Government & Private	British-American	0	NA
Relationship-based	0	<=3	Government-only	Continental	1	NA

Legal origin: 1 for common law countries and 0 for code law countries (La Porta et al., 1997).
Anti-director rights: an index aggregating the shareholder rights, where the index ranges from 0 to 5 (La Porta et al., 1997).
Source of standards: accounting standards set by governmental bodies only or in conjunction with private-sector bodies (Alford et al., 1993).
Accounting cluster: cluster classification according to the country's accounting practices (Mueller et al., 1994; Hung, 2001).
Tax-book conformity: equals 1 for countries with high tax-book conformity, and 0 for countries with low conformity (Cooper and Lybrand, 1993; Hung, 2001).
IFRS adoption: fromDaske et al. (2008) and Armstrong et al. (2010), equals 1 for countries where IFRS is permitted or required, and 0 otherwise.

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Mandatory IFRS adoption and management forecasts: The impact of enforcement changes☆

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ABSTRACT

We examine how concurrent enforcement changes affect the positive relationship between mandatory IFRS adoption and firms' voluntary disclosure. We show that the increase in the issuance of management forecasts after IFRS adoption is smaller for firms from IFRS-mandating countries with concurrent enforcement changes than for those from countries without such changes. We find no difference in the increase of forecast informativeness between firms from IFRS-mandating countries without concurrent enforcement changes and firms from non-IFRS-mandating countries; however, firms domiciled in IFRS-mandating countries with concurrent enforcement changes exhibit a significantly smaller increase in forecast informativeness. Our findings suggest that better IFRS enforcement distinctly weakens (strengthens) the positive effect of IFRS adoption on voluntary (mandatory) disclosure.

1. Introduction

We examine the impact of substantive enforcement changes on the relationship between the mandatory adoption of International Financial Reporting Standards (IFRS) and firms' voluntary disclosure. Although

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IFRS target—and appear to have achieved—improved mandatory financial reporting quality (e.g., Lang and Stice-Lawrence, 2016), IFRS adoption may also lead to improved voluntary disclosure. For example, the increase in financial reporting comparability due to mandatory IFRS adoption not only facilitates firms' access to foreign capital markets but also increases the diversity of investors, who tend to have higher information demands because of their information disadvantage. In addition, IFRS standards are commonly deemed to be more principles-based than local generally accepted accounting principles (GAAP) in many adopting countries, with more management judgment and discretion in the reporting process (Atwood et al., 2011; Ball, 2005). Managers could thus have greater incentives to increase voluntary disclosure and improve corporate transparency to attract investors and reduce the cost of capital. Furthermore, management is more willing to issue earnings forecasts when investors perceive earnings to be more informative (e.g., Ball et al., 2012; Lennox and Park, 2006). If IFRS are perceived to be of higher quality and to produce more informative earnings, management could also have a greater incentive to issue more earnings forecasts. Consistent with these arguments, Li and Yang (2016) show that the likelihood and frequency of management earnings forecasts significantly increase after mandatory IFRS adoption.

A significant factor in the effectiveness of IFRS adoption (or any regulation) is whether it can be enforced. Indeed, some countries have enhanced enforcement regimes accompanying mandatory IFRS adoption. Studies generally find that the capital market benefits related to IFRS adoption appear to accrue mainly to countries that make concurrent and substantive enforcement changes (e.g., Daske et al., 2008; Leuz and Wysocki, 2008; Holthausen, 2009; Landsman et al., 2012; Christensen et al., 2013). A natural question then arises: how does better enforcement affect the positive relationship between IFRS adoption and voluntary disclosure? At an intuitive level, one might conjecture that better enforcement would strengthen this relationship. The positive relationship itself indicates complementarity between mandatory and voluntary disclosures, as argued by Lennox and Park (2006) and Ball et al. (2012), because IFRS adoption has been found to be associated with higher quality mandatory and voluntary disclosures. If better enforcement concurrent with IFRS adoption further increases the quality of mandatory financial reporting, then voluntary disclosure could increase even more for firms domiciled in IFRS countries with heightened enforcement.

However, an alternative hypothesis on the moderating effect of enforcement changes can also be argued. First, more stringent enforcement could constrain management's opportunistic use of the discretion afforded by IFRS and limit its flexibility to manipulate the mandated earnings numbers, which would reduce investors' demand for additional information. In addition, the risk of earnings not meeting the forecasts would be higher, lowering managers' willingness to provide earnings forecasts (Feng and Koch, 2010). Reduced earnings manipulation due to more stringent enforcement could also weaken the disciplinary role of voluntarily disclosed earnings (Dutta and Gigler, 2002). Second, the complementary effect of mandatory and voluntary disclosures may not hold ubiquitously. The marginal benefit of additional information decreases as better enforcement enhances the information environment, possibly to the extent of being lower than the proprietary cost of voluntary disclosure (Verrecchia, 1983). In some countries with large controlling shareholders, the enforcement changes and improved transparency from IFRS adoption may already constrain firms' ability to expropriate from minority shareholders, and controlling shareholders may not want to be further constrained by additional voluntary disclosure. Lastly, if countries increase legal enforcement with IFRS adoption, the legal liability for providing earnings guidance that is subsequently not realized could increase, reducing managers' willingness to provide earnings forecasts (Rogers et al., 2011).

Overall, whether better enforcement would strengthen or weaken the positive relationship between IFRS adoption and voluntary disclosure is an empirical question. In our opinion, the findings in the large body of literature lean toward a strengthening effect due to the positive relationship itself and because better enforcement has been found to further improve the effectiveness of IFRS adoption.

We directly examine the impact of enforcement changes and conclude that better enforcement significantly weakens the positive relationship between IFRS adoption and voluntary disclosure. We also examine several quality attributes of management earnings forecasts, including a measure that captures how the disclosures matter to the ultimate users of the disclosed information, i.e., the informativeness of management earnings forecasts to investors. We provide a comprehensive and robust set of results that point to a weakening effect of enforcement changes. This weakening effect is somewhat surprising or at least not obvious in light of the literature, as we are aware of no study making such an argument or prediction.

We use a large sample of firm-year observations and management forecasts collected from 30 countries (17 of which mandated IFRS in 2005) and a difference-in-difference methodology to control for time-series variation across IFRS-adoption and non-IFRS-adoption countries. We first provide results consistent with Li and Yang (2016) that firms from IFRS-mandating countries increase their voluntary disclosure (measured by both management forecast likelihood and frequency) more after IFRS adoption than those from non-IFRS-mandating countries. We then introduce changes in countries' enforcement regimes into management forecast decisions. Using the empirical proxy for enforcement changes from Christensen et al. (2013), we find that the increases in management forecast likelihood and frequency following IFRS adoption are significantly smaller for firms from IFRS-mandating countries with concurrent enforcement changes than for those without enforcement changes. Thus, while IFRS adoption may increase firms' incentives to provide management forecasts, our findings suggest that changes in enforcement coupled with IFRS adoption attenuate these incentives.

Next, we examine the quality of management forecasts in terms of informativeness as measured by the market reaction to management forecasts (Chen et al. 2006). We find that although forecasts generally become more informative over time, those issued by firms from IFRS-mandating countries have smaller improvements in informativeness after IFRS adoption. Importantly, we find that these smaller improvements are driven by firms from IFRS-mandating countries with concurrent changes in enforcement; those from IFRS-mandating countries without concurrent changes exhibit similar degrees of improvement in informativeness to firms from non-IFRS-mandating countries. In other words, our results show that following mandatory IFRS adoption, management forecasts issued by firms domiciled in IFRS-mandating countries with concurrent enforcement changes show significantly reduced informativeness relative to management forecasts issued by firms from both non-IFRS-mandating countries and IFRS-mandating countries without enforcement changes.

We also examine several management forecast properties, including forecast precision (how specific a forecast is), forecast attribution (whether a firm provides any explanation for its forecasts), forecast disaggregation (the total number of performance measures forecasted), forecast accuracy (the absolute error in forecasts) and forecast timeliness. These attributes provide a rich source of variation in disclosure quality. In general, we do not find that changes in enforcement concurrent with IFRS adoption have significant effects on these forecast properties. At a minimum, our results do not indicate a strengthening effect of enforcement changes on the positive relationship between IFRS adoption and the quality of voluntary disclosure. Rather, they indicate a weakening effect between IFRS adoption and the market-perceived quality of voluntary disclosure.

Because different studies differ in terms of the samples used, in additional analyses, we confirm that in our sample, enforcement changes have distinct and opposite effects on mandatory and voluntary disclosures by investigating how enforcement changes affect the quality of mandatory financial reporting and the external information environment (Landsman et al., 2012; Tan et al., 2011). We find that firms from IFRS-mandating countries experience larger increases in the informativeness of earnings announcements and the number of analysts following after IFRS adoption than those from non-IFRS-mandating countries. The larger increase is primarily driven by firms from IFRS-mandating countries with concurrent changes in enforcement. These findings, together with the earlier main findings, are consistent with the notion that changes in enforcement can reinforce the positive effect of IFRS adoption on mandatory reporting, although they increase the cost of voluntary disclosure and mitigate the positive effect of IFRS adoption on voluntary disclosure.

Our study contributes to the literature on the effect of legal and regulatory environments on voluntary disclosure. It is well recognized that enforcement is an important component of a country's financial reporting infrastructure (Ball, 2001). International accounting studies thus investigate the effects of various institutional features on voluntary disclosure.[1] Both academics and regulators have emphasized the importance of considering the effect of enforcement changes on corporate disclosure behavior, especially voluntary disclosure such as manage-

[1] Most of these studies focus on the effect of the pre-existing level of enforcement or regulatory quality on voluntary disclosure rather than a change in the legal regime, making it difficult to establish any causal inference. For example, Francis et al. (2005) argue that the capital market consequences of voluntary disclosure are affected by cross-country variations in the legal and information environments. Lang et al. (2012) show that the importance of firm-level transparency is conditional on the country-level institutional environment. More recently, Cao et al. (2017) find significant variation in the association between management forecasts and firms' cost of equity capital across countries with different enforcement regimes.

ment forecasts (e.g., Baginski et al., 2002; Kasznik and Lev, 1995; Rogers and Van Buskirk, 2009). However, capturing the across-country enforcement effect has traditionally been difficult, as it could be related to many country-specific factors (Ball, 2001). More importantly, even if the level of enforcement across countries can be measured, inferring causality is difficult (Holthausen, 2009). Given that the mandatory adoption of IFRS is an exogenous event that leads to changing accounting standards in many countries, the substantive changes in financial reporting enforcement regimes alongside mandatory IFRS adoption in some countries provide a unique setting in which to examine the effect of enforcement change on financial reporting outcomes.

Following the wide adoption of IFRS, many international organizations, such as the International Accounting Standards Board (IASB), the International Organization of Securities Commissions (IOSCO) and the World Federation of Exchanges (WFE), have actively promoted greater disclosure by firms and increased financial information transparency. The effects of mandatory IFRS adoption on financial markets and on managerial behavior have thus been studied extensively in the international accounting literature (e.g., Marra et al., 2011; Houqe et al., 2012; Houqe and Monem, 2016). Our findings that better enforcement of IFRS and voluntary disclosure have negative impacts highlights the importance of considering changes in both accounting standards and in countries' enforcement regimes when evaluating firms' voluntary disclosure and financial transparency, which should be of importance to international organizations and accounting regulators around the world. Ultimately, corporate financial reporting and disclosure practices are shaped by both firms' disclosing incentives and capital markets' demand and constraints (Beyer et al., 2010). In addition, because mandatory and voluntary disclosure decisions are endogenous, examining the intertwining relation between mandatory and voluntary disclosures will provide a more complete picture and will improve our understanding of the important relations among IFRS adoption, changes in enforcement and disclosure.

2. Related literature and hypothesis development

2.1. Related literature

The widespread adoption of IFRS is one of the most important developments in recent accounting history and it has spawned a growing body of research. Proponents of IFRS argue that a single set of high-quality accounting standards facilitates international comparability and significantly improves the information environment of IFRS-adopting firms (European Commission, 2002). Many studies show that IFRS adoption leads to increased analyst following (Tan et al., 2011), higher earnings informativeness (Landsman et al., 2012), an improved analyst information environment (Byard et al., 2013; Hodgdon et al., 2008; Horton et al., 2013) and increased cross-country information transfers (Kim and Li, 2010).[2] As firms' mandatory and voluntary disclosures are often intertwined (Beyer et al., 2010; Dutta and Gigler, 2002; Lennox and Park, 2006), IFRS adoption can affect the external information environment both directly through improved mandatory disclosure (Lang and Stice-Lawrence, 2016) and indirectly through improved voluntary disclosure (Hirst et al., 2008). As Li and Yang (2016) show, voluntary disclosure increases following IFRS adoption alongside improved mandatory reporting quality.

Research also suggests that changes in accounting standards alone may not lead to substantive changes in financial reporting outcomes because these standards may be less important than other institutional features of the reporting and legal environments (Ball and Shivakumar, 2005; Burgstahler et al., 2006). Holthausen (2009) and Leuz and Wysocki (2008) suggest that enforcement plays an important role in how changes in accounting standards, such as IFRS adoption, affect financial reporting outcomes. Consistent with this line of research, past research finds that better enforcement significantly affects various capital market consequences of IFRS adoption. For example, Daske et al. (2008) find that liquidity improvements around IFRS adoption are concentrated in countries with strong legal enforcement. Byard et al. (2013) show that while IFRS adoption improves analysts' information environment, this improvement is more pronounced when the changes mandated by IFRS are rigorously enforced. In a similar vein, Landsman et al. (2012) find that

[2] Other studies examine the various economic consequences of mandatory IFRS adoption, such as lowered cost of capital (Li, 2010), increased institutional holdings and higher levels of foreign investment (Covrig et al., 2007; DeFond et al., 2011; Florou and Pope, 2012) and improved liquidity (Christensen et al., 2013).

increases in the information content of earnings announcements tend to be concentrated in IFRS countries with sufficient legal enforcement. Recent research thus increasingly emphasizes the importance of disentangling the confounding effects of concurrent changes in enforcement from mandatory IFRS adoption (Christensen et al., 2013).

A key message of these studies is that mandated accounting standards, such as IFRS adoption, should not be examined in isolation because standards may have limited effects without substantive changes in other institutional factors that also affect firms' reporting incentives (Ball, 2001; Holthausen, 2009; Leuz and Wysocki, 2008). This consideration should also be salient for voluntary disclosures because changes in the legal and regulatory environment play an equally, if not more, important role in firms' voluntary disclosure decisions (Hirst et al., 2008). In the next section, we develop our hypotheses and discuss the possible effects of changes in enforcement alongside mandatory IFRS adoption on voluntary disclosure.

2.2. Hypothesis development

Many recent studies have examined whether voluntary and mandatory disclosures are substitutes or complements (e.g., Bagnoli and Watts, 2007; Ball et al., 2012; Bertomeu and Magee, 2015; Francis et al., 2008; Lang et al., 2012; Lennox and Park, 2006). Lennox and Park (2006) argue that management has stronger incentives to issue earnings forecasts when earnings are perceived to be more informative. Similarly, Ball et al. (2012) argue that mandatory financial reporting and voluntary disclosure are complementary because improved mandatory financial reporting quality could lend credibility to and improve the reliability of firms' voluntary disclosure.[3] Thus, if mandatory and voluntary disclosures are complements, findings that mandatory IFRS adoption increases the quality of mandated financial reporting (Ashbaugh and Pincus, 2001; Barth et al., 2008; Hong et al., 2014; Landsman et al., 2012; Lang and Stice-Lawrence, 2016) suggest an increase in voluntary disclosure following IFRS adoption, which is consistent with the research of Li and Yang (2016). More importantly, if substantive changes in reporting enforcement concurrent with IFRS adoption further increase the quality of mandatory financial reporting, as discussed earlier, we expect the level of voluntary disclosure to increase even more for firms domiciled in IFRS countries with concurrent enforcement changes.

However, it can also be argued that better enforcement could reduce firms' voluntary disclosure in the context of IFRS adoption for several reasons. First, increased financial reporting comparability due to IFRS adoption could draw a more diverse set of domestic and foreign investors with higher information demands. More principle-based IFRS that allows more management judgment and discretion may also increase investors' information demand for transparency. However, more stringent enforcement constrains managers' ability to manipulate the mandated earnings numbers, which investors can compare with the earlier voluntarily disclosed earnings forecasts. Thus, the risk of earnings missing the forecasts would be higher, which would lower managers' willingness to provide earnings forecasts (Feng and Koch, 2010). This is consistent with the theory of Dutta and Gigler (2002), who argue that providing earnings forecasts voluntarily could prevent managers from earnings manipulation. In addition, because more stringent enforcement of mandatory earnings disclosures directly plays a stronger disciplinary role, the need for earnings forecasts to play this role would become smaller. Thus, IFRS adoption could increase voluntary disclosure, and improved enforcement could attenuate this increase.

Second, the complementary effect of mandatory and voluntary disclosures may hold at certain levels of disclosure or in certain countries, but not ubiquitously. Outside the relevant range or in other countries, a substitution effect could emerge.[4] If IFRS adoption leads to a better external information environment that is further enhanced by increased enforcement, the marginal benefit of additional information can become sufficiently small compared to the proprietary cost of voluntary disclosure (Verrecchia, 1983). In response, managers may reduce the level or the quality of voluntary disclosure. In countries outside the U.S., large controlling shareholders are commonplace. Hope et al. (2011) show that financial transparency can limit the ability of controlling shareholders to consume private benefits. Given that IFRS adoption increases mandatory

[3] Ball et al. (2012) find a greater stock market reaction to firms' voluntary disclosures for firms with a higher level of commitment to financial statement verification (i.e., a proxy for mandatory financial reporting quality), which supports the confirmation hypothesis.

[4] Consistent with this argument, Atiase et al. (2005) find that U.S. investors tend to have a strong preference for reliability (measured by earnings announcement) over relevance (measured by management forecasts) when a tradeoff between the two must be made.

financial reporting quality and that enhanced enforcement around IFRS adoption further constrains controlling shareholders' ability to expropriate from outsiders, controlling shareholders may not want further voluntary disclosure added to the other constraints that they face. Ultimately, incentives for additional disclosures to reduce information asymmetry between corporate insiders and market participants depend on the firms' overall information environment (Yohn, 1998).

Lastly, the enforcement changes that we measure could be correlated with overall enforcement changes that target not only IFRS adoption but also other capital market aspects, including voluntary disclosure itself. For example, more stringent enforcement may increase not only legal liability for failing to disclose material information to the market (Skinner, 1994) but also legal liability for providing misleading information to the market (Rogers et al., 2011). The net effect is unclear, and it may reduce voluntary disclosure given the already higher level of information transparency resulting from IFRS adoption.

To summarize, *ex ante*, it is unclear whether enforcement changes concurrent with mandatory IFRS adoption strengthen or weaken the positive relationship between IFRS adoption and voluntary disclosure. The resolution of the question lies in the empirical outcome. Following the discussion above, we formally state our two hypotheses, one concerning the quantity and the other concerning the quality of voluntary disclosures (both in null form), as follows:

H1. Following mandatory IFRS adoption, there is no change in the quantity (likelihood and frequency) of management forecasts in countries in which there are concurrent changes in enforcement.

H2. Following mandatory IFRS adoption, there is no change in the quality (informativeness and other properties) of management forecasts in countries in which there are concurrent changes in enforcement.

3. Data and methodology

3.1. Data and sample selection

We collect international management forecast data from Standard & Poor's Capital IQ database.[5] As in DeFond and Hung (2004), we first restrict our sample to countries with 100 or more observations during the final year of our sample period to ensure that each country has an adequate level of firm coverage. We further remove countries that are missing the country-level institutional variables used in the empirical tests. We exclude Japan, which effectively mandates management forecasts (Kato et al., 2009), and Singapore, which adopted IFRS in 2003 (PWC 2008). These data requirements result in a sample of 30 countries, 17 of which mandated IFRS in 2005, that constitute our treatment countries. To further examine the possible variation among IFRS-mandating countries, we further classify these 17 IFRS-mandating countries into IFRS countries with and without concurrent changes in enforcement.

The other 13 countries had not adopted IFRS by the end of our sample period of 2009 (i.e., non-IFRS-mandating countries), and they serve as our control group. We exclude 2005, the mandatory IFRS adoption year, from the sample period, as the effect of IFRS on management forecasts in the transition year could be less clear. We further remove all of the observations associated with firms that voluntarily adopt IFRS in the control countries by considering the actual accounting standards used by each firm in each year.

To reduce sample loss, we obtain all of the firm- and industry-level control variables from Capital IQ except for the analyst following data, which are obtained from the IBES database. Our final sample consists of 131,844 firm-year observations spanning 2004–2009.[6] Among these observations, managers issue at least one forecast per year in 22,766 firm-years and issue a total of 54,912 forecasts during our sample period.

[5] Capital IQ provides the original texts of management forecasts aggregated from newspapers, filings, subscriptions and other similar sources for firms in about 100 countries and regions. These data are provided in its Key Developments section.

[6] Our sample starts from 2004 because Capital IQ indicates that its coverage for the Key Development data is more systematic and complete for the years after 2004 following its acquisition by Standard & Poor's. Additional (untabulated) results show that the number of management forecasts provided by firms before 2004 is indeed substantially smaller. For robustness, we also conduct additional tests with data from 2003 included and find results consistent with our findings.

3.2. Empirical methodology

We test hypothesis H1 by estimating the following regression model:

$$Forecast = \alpha_0 + \alpha_1 IFRS + \alpha_2 IFRS\_ENF + \alpha_3 POST + \alpha_4 IFRS \times POST + \alpha_5 IFRS\_ENF \times POST + \text{controls} + \varepsilon \quad (1)$$

where the dependent variable, *Forecast*, is alternately measured with either *FOCR*, an indicator variable that takes a value of one if a firm issues a management forecast during a given year and zero otherwise, or *FFREQ*, a count variable of the number of management forecasts issued by a firm during a given year. Accordingly, Eq. (1) is estimated using logistic (ordered probit) regressions when the dependent variable is *FOCR* (*FFREQ*).

In Eq. (1), *IFRS* is an indicator variable that takes a value of one if a firm is from one of the 17 sample countries that mandated IFRS in 2005. *IFRS_ENF* is an indicator variable that takes a value of one if the IFRS adoption in a country is accompanied by a concurrent and substantive change in financial reporting enforcement as identified by Christensen et al. (2013), and zero otherwise. Countries with $IFRS\_ENF = 1$ include Finland, Germany, the Netherlands, Norway and the U.K. *POST* is an indicator variable that is equal to one for the post-mandatory-adoption window (i.e., 2006–2009), and zero otherwise. Thus, the coefficient on *POST*, α_3, gauges the change in the informativeness of management forecasts surrounding year 2005 in non-IFRS-mandating countries. The coefficients on the interaction terms $IFRS\_ENF \times POST$ and $IFRS \times POST$, our variables of interest, measure the change in the informativeness of management forecasts from pre-2005 to post-2005 in IFRS-mandating countries with and without a concurrent and substantive change in enforcement, respectively, relative to the change in the informativeness of management forecasts in non-IFRS-mandating countries over the same period.

In addition, following past studies, we control for an array of forecast-, firm- and industry-level variables identified in the literature as determinants of management forecast issuance (refer to the Appendix A for detailed definitions). We include scaled accruals (*ACCRUAL*) to control for potential earnings management (Dechow et al., 1995) and firms' opacity in mandatory financial reporting (Bhattacharya et al., 2003), as firms could have greater incentives to supply more voluntary disclosures when their mandatory reporting is of higher quality (Lennox and Park, 2006). Analyst following (*ANALYST*) and the proportion of institutional ownership (*INSTITUTION*) control for investors' demand for more voluntary disclosures (Lang and Lundholm, 1993, 1996). The indicator *BIG4*, which measures whether a firm is audited by a Big 4 auditor, controls for auditor quality (Lang and Lundholm, 1993; Ball et al., 2012). Firms with better quality auditors are likely to have higher quality financial information and hence to be more forthright in making voluntary disclosures. The book-to-market ratio (*BM*) serves as a control for a firm's growth opportunity set. Firms in the growth stage have more uncertainty and higher information asymmetry, and investors may thus have higher demand for voluntary disclosure (Coller and Yohn, 1997). We also include earnings volatility (*EARNVOL*) and the number of business segments reported by firms (*SEGMENT*) to control for information uncertainty and demands. Presumably, investors facing greater information uncertainty demand more voluntary disclosure, such as management forecasts of future earnings.

The proportion of equity owned by insiders (*INSIDER*) controls for the effect of agency problems on firms' information disclosure policies. A high level of insider ownership weakens a firm's incentive to voluntarily disclose information to its common shareholders, as lower disclosure makes monitoring more costly, which benefits mangers (Shleifer and Vishny, 1989). The natural log of total assets (*LNASSET*) controls for firm size, which is likely to influence corporate transparency (Kasznik and Lev, 1995). The indicator assessing whether a firm reports a loss, *LOSS*, controls for the difference in value relevance and the persistence of negative earnings (Hayn, 1995). The indicator variable *NEWS*, which measures whether the current-period EPS is greater than or equal to the prior-period EPS, controls for managers' incentive to preempt earnings surprises (Kasznik and Lev, 1995). The issuance of option grants during a particular year (*OPTGRANT*) controls for management's incentive to accelerate bad news disclosures when granting options (Aboody et al. 2004). The number of stock exchanges on which a firm is listed (*STKEXCH*) each year controls for the amount of information that the firm is required to provide for its cross-listings on various foreign stock exchanges.

Our industry-level controls include the industry-median dependence on external finance (*EXTFIN*) because firms that depend more on external capital are more likely to issue forecasts (Frankel et al., 1995). We also include industry concentration measured using the Herfindahl Index multiplied by (−1) (*HERF*), industry-median research and development intensity (*RD*), and whether the firm is in a high tech industry (*HITECH*) to control for firms' business environments. Firms facing greater business competition and firms in high tech industries with large R&D expenditures are likely to face greater competition for capital and hence to have greater incentives to improve transparency to reduce capital costs. We also include industry fixed effects in all of the regressions.

Finally, we include two country-level factors that could affect management forecasts: *CAPMKT*, which measures the relative size of the equity market over a country's GDP for each country-year as a proxy for the level of development of each country's equity market in each year, and *RULELAW*, a country-year measure of the rule of law index obtained from "Economic Freedom of the World" published by the Fraser Institute.

We test hypothesis H2 in two ways. First, we examine the relation between IFRS adoption concurrent with enforcement changes and the informativeness of management forecasts by estimating the following OLS regression model:

$$FCAR = \beta_0 + \beta_1 IFRS + \beta_2 IFRS\_ENF + \beta_3 POST + \beta_4 IFRS \times POST + \beta_5 IFRS\_ENF \times POST + \text{controls} + \varepsilon \quad (2)$$

where the dependent variable, *FCAR*, is the absolute value of the two-day cumulative market-adjusted abnormal return (in percentage) during the trading-day window [0, +1] with day 0 as the management forecast date. *IFRS*, *IFRS_ENF* and *POST* are defined as in Eq. (1). Our primary variable of interest is *IFRS_ENF* × *POST*, and the coefficient β_5 captures the effect of the change in enforcement concurrent with IFRS adoption on the informativeness of management forecasts based on our difference-in-difference research design.

Second, we examine the relation between IFRS adoption concurrent with enforcement changes and the quality of management forecasts by estimating the following regression model:

$$\begin{aligned} Forecast\ Property = {} & \beta_0 + \beta_1 IFRS + \beta_2 IFRS\_ENF + \beta_3 POST + \beta_4 IFRS \times POST \\ & + \beta_5 IFRS\_ENF \times POST + \text{controls} + \varepsilon \end{aligned} \quad (3)$$

where we use five management forecast properties to estimate any change in quality following IFRS adoption. In particular, we examine whether forecasts exhibit differences in precision (*FPREC*), attribution (*FATTR*), the number of items included (*FITEM*), the forecast error (*FERR*) and timeliness (*FTIME*). Regression estimates with *FPREC*, *FATTR* or *FITEM* (*FERR* or *FTIME*) as the dependent variable are based on Ordered Probit (OLS) models.

4. Empirical results

4.1. Descriptive statistics

Table 1 Panels A and B present summary statistics for management forecast informativeness (*FCAR*), forecast likelihood (*FOCR*), forecast frequency (*FFREQ*) and various forecast properties by country. Panel A reports these statistics for IFRS adoption countries and Panel B reports the statistics for non-IFRS adoption countries. The results indicate that the management forecasts made by firms in IFRS adoption countries are generally less informative, as indicated by the average *FCAR* of 5.28% for IFRS countries vs. 6.59% for non-IFRS adoption countries. However, the result also indicates that firms in IFRS adoption countries are more likely to provide management forecasts in general (*FOCR:* IFRS 20.73% vs. non-IFRS 15.90%) but tend to make less frequent forecasts (*FFREQ*: IFRS 1.90 vs. non-IFRS 2.71). However, this pattern, which is inconsistent compared to the forecast likelihood, is largely driven by the observations from the U.S., where firms have an average forecast frequency of 3.14, while firms from all of the other countries in the non-IFRS adoption group have an average forecast frequency of only 1.79. Firms in IFRS adoption countries also appear to make less quantitatively specific forecasts than firms in non-IFRS adoption countries (*FPREC*: 1.98 vs. 2.46).

Table 1
Descriptive statistics.

Panel A IFRS adoption countries

	Country	N (Obs)	N (MF)	*FCAR (%)*	*FOCR (%)*	*FFREQ*	*FPREC*	*FATTR (%)*	*FLOSS (%)*	*FITEM*	*FHORI*	*FERR*	*FTIME*	*EACAR (%)*
1	Australia	6879	1504	6.56	21.86	1.94	2.19	19.48	6.85	1.51	0.51	25.79	97.35	2.51
2	Belgium	541	134	4.61	24.77	1.89	2.07	13.43	3.73	1.65	0.10	43.65	101.11	1.89
3	Denmark	714	398	4.58	55.74	2.71	2.61	25.88	8.79	1.75	0.26	25.77	81.30	2.07
4	Finland	524	363	4.89	69.27	2.35	1.84	32.23	4.96	1.83	0.06	47.58	95.57	1.51
5	France	3075	764	3.85	24.85	2.07	1.97	12.70	4.19	1.56	0.22	36.14	101.15	1.77
6	Germany	3176	1087	4.25	34.23	2.43	2.10	21.53	6.53	1.86	0.26	34.21	106.76	1.78
7	Greece	912	103	3.27	11.29	1.35	1.74	12.62	1.94	2.40	0.24	41.86	154.63	2.04
8	Hong Kong	5462	571	6.39	10.45	1.31	1.43	35.73	29.95	1.29	0.09	17.86	134.22	2.65
9	Italy	1259	343	3.02	27.24	1.75	1.97	13.12	4.37	1.90	0.40	41.32	119.29	1.48
10	Netherlands	618	228	5.82	36.89	2.08	2.10	20.61	4.82	1.67	0.13	24.49	124.24	2.06
11	Norway	953	95	6.75	9.97	1.41	2.01	22.11	5.26	1.60	0.21	19.70	93.00	1.99
12	Philippines	1045	140	3.34	13.40	1.71	1.64	12.86	3.57	1.44	0.14	34.70	110.75	1.69
13	Poland	1652	226	4.24	13.68	1.73	1.47	15.49	2.65	2.11	0.29	26.90	100.52	1.80
14	South Africa	1365	202	3.61	14.80	1.29	2.33	11.88	4.46	1.67	0.17	34.09	102.09	2.23
15	Spain	779	177	2.43	22.72	1.55	1.83	8.47	2.82	2.11	0.32	40.73	133.29	1.31
16	Sweden	1970	194	5.00	9.85	1.68	1.75	12.37	6.70	1.52	0.14	32.72	122.83	1.98
17	United Kingdom	6429	1213	7.14	18.87	1.50	1.86	13.93	4.95	1.53	0.20	20.74	110.80	2.26
	Sum/Mean	*37,353*	*7742*	*5.28*	*20.73*	*1.90*	*1.98*	*19.08*	*7.31*	*1.66*	*0.27*	*29.89*	*102.98*	*2.08*

Panel B Non-IFRS adoption countries

	Country	N (Obs)	N (MF)	*FCAR (%)*	*FOCR (%)*	*FFREQ*	*FPREC*	*FATTR (%)*	*FLOSS (%)*	*FITEM*	*FHORI*	*FERR*	*FTIME*	*EACAR (%)*
1	Brazil	1600	92	3.20	5.75	1.26	1.63	14.13	2.17	1.59	0.30	24.41	59.08	1.86
2	Canada	15,089	873	6.49	5.79	2.02	2.16	21.76	4.35	1.65	0.33	20.32	92.21	2.72
3	China	11,063	1269	7.03	11.47	1.99	1.97	30.42	7.72	1.55	0.12	28.91	89.94	2.80
4	India	12,159	530	4.04	4.36	1.40	2.19	5.85	2.08	1.53	0.74	13.36	151.83	2.17
5	Indonesia	1330	218	3.37	16.39	1.56	1.34	11.01	0.00	1.66	0.23	35.12	60.67	1.61
6	Malaysia	4409	415	3.47	9.41	1.25	1.69	22.17	2.41	1.53	0.37	42.73	118.86	1.98
7	Mexico	560	54	3.69	9.64	1.76	2.04	27.78	1.85	1.90	0.30	21.58	23.67	1.84
8	Peru	469	11	2.49	2.35	1.09	1.55	18.18	0.00	1.72	0.27	50.00	225.67	1.34
9	Russia	809	211	4.60	26.08	2.08	1.54	14.22	3.32	1.95	0.28	20.98	56.72	2.28
10	South Korea	7359	228	3.40	3.10	1.64	1.28	13.60	3.95	2.06	0.17	37.82	62.57	1.61
11	Switzerland	884	235	4.73	26.58	1.89	2.11	12.34	4.68	1.69	0.30	26.17	111.92	1.86
12	Thailand	2369	621	2.68	26.21	1.90	1.58	34.94	5.15	2.25	0.38	28.28	104.10	1.49
13	United States	36,391	10,267	7.32	28.21	3.14	2.73	26.25	9.62	1.92	0.39	16.59	97.19	2.97
	Sum/Mean	*94,491*	*15,024*	*6.59*	*15.90*	2.71	*2.46*	*24.99*	*8.03*	*1.86*	*0.36*	*17.86*	*100.17*	*2.61*

This table reports the descriptive statistics of our forecast variables. N (Obs) is the total number of observations; N (MF) is the total number of observations with management forecasts; *FCAR* (%) is the average absolute value of the two-day cumulative market-adjusted abnormal return in the trading-day window [0, +1]; *FOCR* (%) is the percentage of observations with management forecasts; *FFREQ* is the average forecast frequency; *FPREC* is the average forecast precision; *FATTR* (%) is the percentage of management forecasts with attribution (i.e., explanations); *FLOSS* (%) is the percentage of loss forecasts; *FITEM* is the average number of accounting/performance items forecasted; *FHORI* is the average forecast horizon; *FERR* is the average forecast accuracy; *FTIME* is the average forecast timeliness. *EACAR* is defined as the absolute value of the two-day cumulative market-adjusted return during the [0, 1] earnings announcement window with day 0 equal to the earnings announcement date. Refer to the Appendix A for more detailed variable definitions. Panel A (B) reports the statistics by country for each IFRS-mandating (non-IFRS-mandating) country.

Again, this relationship is reversed when we exclude U.S. firms, with *FPREC* averaging only 1.86 in the other non-IFRS adoption countries. On average, firms in IFRS adoption countries are less likely to provide explanations for management forecasts (*FATTR*: 19.08% vs. 24.99%) and are slightly less likely to forecast future losses (*FLOSS*: 7.31% vs. 8.03%) than firms from non-IFRS adoption countries. The numbers of items included in each forecast (*FITEM*), forecast horizon (*FHORI*) and forecast timeliness (*FTIME*) are not statistically different across IFRS and non-IFRS adoption countries, but the forecasts made by firms in IFRS adoption countries tend to exhibit greater forecast error (*FERR*: 29.89% vs. 17.86%).

Table 2
Management forecast before and after IFRS adoption.

Panel A IFRS adoption countries

Country		FCAR			FOCR			FFREQ		
		Pre	Post	Diff (Post – Pre)	Pre	Post	Diff (Post – Pre)	Pre	Post	Diff (Post – Pre)
1	Australia	4.21	6.88	2.67***	16.18	22.95	6.77***	1.84	1.95	0.11
2	Belgium	3.82	4.68	0.86	11.65	27.85	16.20***	2.00	1.88	−0.123
3	Denmark	3.36	4.73	1.38***	31.65	61.57	29.91***	2.00	2.80	0.80***
4	Finland	4.68	4.94	0.26	58.82	71.80	12.98*	1.93	2.43	0.50***
5	France	2.63	4.00	1.37***	14.58	27.28	12.71***	1.92	2.09	0.17
6	Germany	3.65	4.35	0.71**	24.80	36.53	11.73***	2.30	2.46	0.15
7	Greece	1.95	3.38	1.43*	5.37	12.45	7.08***	1.38	1.35	−0.03
8	Hong Kong	4.37	6.51	2.15*	3.21	12.13	8.92***	1.45	1.30	−0.16
9	Italy	1.75	3.23	1.49***	20.76	28.74	7.98***	1.53	1.78	0.25**
10	Netherlands	6.43	5.70	−0.73	32.76	37.85	5.09	1.97	2.11	0.13**
11	Norway	4.48	7.04	2.56	7.19	10.50	3.31*	1.18	1.44	0.26*
12	Philippines	2.35	3.63	1.28**	15.69	12.84	−2.84	1.84	1.68	−0.17
13	Poland	2.25	4.42	2.18***	7.45	14.82	7.37***	2.00	1.71	−0.29
14	South Africa	4.61	3.40	−1.21	14.53	14.85	0.32	1.32	1.29	−0.04
15	Spain	1.59	2.68	1.09***	26.85	21.75	−5.10	1.48	1.57	0.09
16	Sweden	4.29	5.12	0.83	8.70	10.07	1.38	1.71	1.67	−0.04
17	United Kingdom	6.81	7.19	0.39	15.85	19.52	3.67***	1.47	1.50	0.04
	Mean	4.21	5.44	1.23***	15.16	21.93	6.77***	1.80	1.92	0.12***

Panel B Non-IFRS adoption countries

Country		FCAR			FOCR			FFREQ		
		Pre	Post	Diff (Post – Pre)	Pre	Post	Diff (Post – Pre)	Pre	Post	Diff (Post – Pre)
1	Brazil	2.10	3.40	1.30**	4.76	5.97	1.21	1.36	1.24	−0.11
2	Canada	5.50	6.66	1.15*	4.70	6.02	1.32***	2.09	2.01	−0.08
3	China	5.14	7.12	1.98***	9.87	11.56	1.70	2.00	1.99	−0.01
4	India	2.74	4.17	1.43***	2.29	4.81	2.52***	1.56	1.38	−0.18
5	Indonesia	3.29	3.39	0.10	19.52	15.80	−3.72	1.98	1.47	−0.51***
6	Malaysia	2.74	3.66	0.92**	10.65	9.13	−1.52	1.20	1.27	0.07
7	Mexico	2.07	3.82	1.75	3.92	10.92	7.00***	2.00	1.74	−0.26
8	Peru	1.21	3.23	2.02	4.65	1.83	−2.82	1.00	1.14	0.14
9	Russia	3.13	4.70	1.57	9.85	29.25	19.40***	1.92	2.09	0.16
10	South Korea	3.40	3.40	0.00	8.79	2.42	−6.37***	1.90	1.53	−0.36***
11	Switzerland	2.38	5.12	2.73***	20.89	27.82	6.94**	2.09	1.85	−0.24
12	Thailand	2.56	2.71	0.15	30.14	25.32	−4.81**	2.36	1.77	−0.59***
13	United States	6.23	7.55	1.32***	25.85	28.79	2.94***	3.06	3.15	0.09**
	Mean	5.55	6.80	1.25***	15.82	15.92	0.10	2.77	2.70	−0.07*

This table reports forecast informativeness (*FCAR*), forecast likelihood (*FOCR*) and forecast frequency (*FFREQ*) by country for two groups of firms. Panel A (Panel B) reports statistics for countries that adopted (did not adopt) IFRS in 2005. Pre reports year 2004, and Post reports averages for years 2006–2009. ***, ** and * indicate that the difference is statistically significant at the 1%, 5% and 10% levels, respectively.

Table 2 tabulates more detailed descriptive statistics for management forecast informativeness (*FCAR*), forecast likelihood (*FOCR*) and forecast frequency (*FFREQ*) by country and by the pre- and post-IFRS adoption periods. Table 2 also reports the differences in *FCAR*, *FOCR* and *FFREQ* between the pre- and post-IFRS periods and whether these differences are statistically significant. We again separate our sample into IFRS countries (Panel A) and non-IFRS adoption countries (Panel B). The results in Panel A of Table 2 indicate a substantial increase in all three forecast variables in IFRS adoption countries following mandatory IFRS adoption. In contrast, Panel B shows that for non-IFRS adoption countries, while the magnitude of the increase in forecast informativeness from the pre- to post-IFRS periods is similar and comparable with that of the IFRS countries (1.25% for non-IFRS vs. 1.23% for IFRS countries), there are substantial differences in the changes in the likelihood and frequency of management forecasts across the pre- and post-IFRS periods for these two groups of countries. Specifically, in contrast to the non-IFRS adoption countries, in which we observe no significant increases in management forecast activities, the IFRS adoption countries appear to have significantly increased likelihood and frequency of forecasts after mandatory IFRS adoption.

Table 3 reports summary statistics for our major control variables. On average, our sample firms are followed by 3.18 analysts, have a 38 percent likelihood of being audited by a Big 4 accounting firm, and have assets of US$58 million. The standard deviations of these variables are relatively large, which suggests that substantial variation exists across our sample firms. As our sample covers a wide range of countries, this is not surprising.

4.2. IFRS, changes in enforcement and management forecast issuance

4.2.1. Base model

We first establish the relationship between IFRS adoption and the changes in the likelihood and frequency of management forecasts, and we reconcile these with the results of Li and Yang (2016). We report the results in Table 4. Across all of our specifications, we find that firms from IFRS-mandating countries tend to be less likely to issue management forecasts before IFRS adoption but significantly increase issuance after adoption relative to those from non-IFRS-mandating countries (Panel A). Likewise, firms from IFRS-mandating countries issue management forecasts with higher frequency following IFRS adoption than those from countries that do not adopt IFRS (Panel B). These results are consistent with those of past studies.

Table 3
Summary statistics.

Variable	Mean	Std. Dev.	25%	Median	75%
ACCRUAL	0.00	0.45	−0.06	0.00	0.09
ANALYST	3.18	8.13	0.00	0.00	2.00
BIG4	0.38	0.49	0.00	0.00	1.00
BM	0.75	0.90	0.37	0.57	0.86
EARNVOL	0.80	1.15	0.02	0.16	1.01
INSIDER	13.89	21.16	0.00	1.57	20.28
INSTITUTION	26.17	29.67	0.00	11.08	48.03
LNASSET	4.07	3.07	2.46	4.29	6.00
LOSS	0.35	0.48	0.00	0.00	1.00
NEWS	0.50	0.50	0.00	0.00	1.00
OPTGRANT	0.16	0.37	0.00	0.00	0.00
SEGMENT	2.08	1.82	1.00	1.00	3.00
STKEXCH	1.30	0.75	1.00	1.00	1.00
EXTFIN	−3.80	5.69	−4.81	−1.66	−0.42
HERF	−0.20	0.20	−0.27	−0.13	−0.07
HITECH	0.17	0.38	0.00	0.00	0.00
RD	0.04	0.09	0.00	0.00	0.03

This table presents the summary statistics for the control variables. Refer to the Appendix A for more detailed variable definitions. N = 131,844.

Table 4
Mandatory IFRS adoption and management forecast likelihood and frequency.

Panel A Mandatory IFRS adoption and management forecast likelihood

Dep. Var. = Model	1 Full sample *FOCR* Logistic		2 Exclude U.S. *FOCR* Logistic		3 Exclude E.U. *FOCR* Logistic		4 2004 & 2006 only *FOCR* Logistic		5 Constant sample *FOCR* Logistic	
	Coef	SE	Coef	SE	Coef	SE	Coef	SE	Coef	SE
IFRS	−0.415***	0.04	0.207***	0.05	−0.379***	0.06	−0.662***	0.05	−0.413***	0.04
POST	−0.438***	0.03	−0.255***	0.05	−0.474***	0.03	−0.479***	0.04	−0.251***	0.03
IFRS × POST	**0.586*** **	**0.05**	**0.565*** **	**0.06**	**0.486*** **	**0.06**	**0.739*** **	**0.06**	**0.540*** **	**0.05**
ACCRUAL	0.070**	0.03	−0.095**	0.05	0.111***	0.03	0.050	0.05	0.096***	0.04
ANALYST	0.032***	0.00	0.026***	0.00	0.032***	0.00	0.033***	0.00	0.029***	0.00
BIG4	0.293***	0.02	0.222***	0.02	0.314***	0.02	0.392***	0.04	0.328***	0.02
BM	−0.260***	0.01	−0.216***	0.02	−0.258***	0.01	−0.450***	0.03	−0.273***	0.01
EARNVOL	−0.015	0.01	−0.060***	0.02	−0.009	0.01	−0.007	0.02	−0.031***	0.01
INSIDER	−0.074***	0.03	0.136***	0.03	−0.113***	0.03	−0.126***	0.05	−0.107***	0.03
INSTITUTION	0.008***	0.00	0.007***	0.00	0.008***	0.00	0.010***	0.00	0.006***	0.00
LNASSET	0.316***	0.01	0.301***	0.01	0.315***	0.01	0.312***	0.01	0.309***	0.01
LOSS	−0.021	0.02	−0.069**	0.03	−0.002	0.03	−0.079**	0.04	−0.012	0.02
NEWS	0.034**	0.02	0.012	0.02	0.049***	0.02	−0.032	0.03	0.069***	0.02
OPTGRANT	0.816***	0.02	0.648***	0.04	0.853***	0.03	0.644***	0.05	0.751***	0.02
SEGMENT	0.054***	0.00	0.040***	0.01	0.070***	0.01	0.056***	0.01	0.049***	0.01
STKEXCH	0.045***	0.01	0.061***	0.01	0.045***	0.02	0.096***	0.02	0.021*	0.01
EXTFIN	0.004**	0.00	0.010***	0.00	−0.004*	0.00	0.001	0.00	0.005***	0.00
HERF	0.133***	0.05	−0.474***	0.05	0.339***	0.06	0.152*	0.09	0.074	0.05
HITECH	0.514***	0.07	0.254***	0.10	0.560***	0.08	0.476***	0.12	0.545***	0.07
RD	2.627***	0.62	−0.430	0.81	3.005***	0.69	2.787***	1.08	4.573***	0.68
RULELAW	0.431***	0.01	0.120***	0.02	0.376***	0.02	0.614***	0.03	0.414***	0.02
CAPMKT	−0.001***	0.00	−0.001***	0.00	−0.001***	0.00	−0.005***	0.00	−0.001***	0.00
Intercept	−4.348***	0.05	−4.422***	0.07	−4.381***	0.06	−4.099***	0.08	−4.273***	0.06
N	131,844		95,453		110,195		49,392		100,248	
N (*FOCR* = 1)	22,766		12,499		17,536		7,649		20,900	
Pseudo R-sqr (%)	36.41		29.07		37.02		37.79		36.04	

Panel B Mandatory IFRS adoption and management forecast frequency

Dep. Var. = Model	1 Full sample *FFREQ* Ordered probit		2 Exclude U.S. *FFREQ* Ordered probit		3 Exclude E.U. *FFREQ* Ordered probit		4 2004 and 2006 only *FFREQ* Ordered probit		5 Constant sample *FFREQ* Ordered probit	
	Coef	SE	Coef	SE	Coef	SE	Coef	SE	Coef	SE
IFRS	−1.198***	0.05	−0.256***	0.05	−0.924***	0.08	−1.210***	0.05	−1.191***	0.05
POST	−0.185***	0.03	−0.032	0.04	−0.147***	0.03	−0.149***	0.04	−0.156***	0.03
IFRS × POST	**0.395*** **	**0.05**	**0.245*** **	**0.05**	**0.131***	**0.08**	**0.267*** **	**0.06**	**0.367*** **	**0.05**
ACCRUAL	0.158***	0.04	0.078*	0.05	0.155***	0.04	0.187***	0.06	0.191***	0.04
ANALYST	0.006***	0.00	0.008***	0.00	0.001	0.00	0.006***	0.00	0.005***	0.00
BIG4	0.272***	0.02	0.108***	0.02	0.351***	0.02	0.310***	0.04	0.264***	0.02
BM	−0.130***	0.01	−0.035***	0.01	−0.163***	0.01	−0.212***	0.03	−0.147***	0.01
EARNVOL	−0.040***	0.01	−0.002	0.01	−0.046***	0.01	−0.035*	0.02	−0.056***	0.01
INSIDER	−0.061**	0.03	0.067***	0.03	−0.111***	0.03	−0.052	0.05	−0.079***	0.03
INSTITUTION	−0.001	0.00	−0.001***	0.00	−0.001	0.00	−0.001	0.00	−0.001	0.00
LNASSET	0.122***	0.01	0.068***	0.01	0.128***	0.01	0.111***	0.01	0.118***	0.01
LOSS	−0.146***	0.02	−0.008	0.02	−0.182***	0.02	−0.236***	0.04	−0.151***	0.02
NEWS	−0.021	0.02	0.008	0.02	−0.021	0.02	0.008	0.03	−0.007	0.02
OPTGRANT	0.383***	0.02	0.216***	0.03	0.345***	0.02	0.358***	0.04	0.367***	0.02
SEGMENT	−0.001	0.00	−0.005	0.00	0.002	0.00	0.006	0.01	−0.001	0.00
STKEXCH	0.010	0.01	0.071***	0.01	−0.015	0.01	0.024	0.02	0.013	0.01

Table 4 (*continued*)

Panel B Mandatory IFRS adoption and management forecast frequency

Dep. Var. = Model	1 Full sample *FFREQ* Ordered probit		2 Exclude U.S. *FFREQ* Ordered probit		3 Exclude E.U. *FFREQ* Ordered probit		4 2004 and 2006 only *FFREQ* Ordered probit		5 Constant sample *FFREQ* Ordered probit	
	Coef	SE	Coef	SE	Coef	SE	Coef	SE	Coef	SE
EXTFIN	0.009***	0.00	0.005***	0.00	0.006***	0.00	0.010***	0.00	0.010***	0.00
HERF	0.127***	0.05	−0.223***	0.04	0.371***	0.06	0.245***	0.08	0.124***	0.05
HITECH	0.131**	0.06	−0.080	0.07	0.229***	0.07	0.043	0.11	0.068***	0.06
RD	3.561***	0.51	1.091**	0.55	4.518***	0.57	3.055***	0.87	3.477***	0.54
RULELAW	0.491***	0.01	0.106***	0.01	0.480***	0.02	0.522***	0.03	0.496***	0.02
CAPMKT	−0.001***	0.00	−0.001***	0.00	−0.001***	0.00	−0.002***	0.00	−0.001***	0.00
Intercept	1.083***	0.05	0.881***	0.06	1.080***	0.06	1.242***	0.09	1.113***	0.05
N	22,766		12,499		17,536		7,649		20,900	
Adj. R-sqr (%)	27.15		13.45		27.48		27.10		26.77	

This table reports the regression estimates of our base difference-in-difference models that test the relations between mandatory IFRS adoption and forecast likelihood (*FOCR*, Panel A) and forecast frequency (*FFREQ*, Panel B). All of the firm-level continuous variables are winsorized at the 1st and 99th percentiles. All of the regressions include industry fixed effects and robust standard errors clustered by firm. ***, ** and * indicate that the estimated coefficients are statistically significant at the 1%, 5% and 10% levels, respectively. Refer to the Appendix A for more detailed variable definitions.

The bolded rows include our main variable(s) of interest for each regression.

4.2.2. Univariate results

Table 5 reports the results on the changes in the likelihood and frequency of management forecasts following IFRS adoption across IFRS adoption countries with and without a concurrent change in enforcement. Univariate tests of the difference in the likelihood and frequency of management forecasts are reported in Panel A. On average, we find that firms tend to increase the likelihood of issuing management forecasts over time regardless of whether their home country experiences a concurrent change in enforcement.

4.2.3. Regression results

We report the regression results from our formal tests of H1 in Panels B and C of Table 5. We consistently find a positive and significant coefficient on the variable $IFRS \times POST$, which suggests that IFRS adoption is associated with an increase in the likelihood and frequency of management forecasts. However, the coefficient on $IFRS\_ENF \times POST$ is negative and significant in our primary test in model 1. In Table 5, we also test the robustness of our results against several other specifications. First, we examine whether the change in management forecast likelihood differs across firms that experience *Good News* (*Bad News*), an indicator variable that takes a value of one if a firm's EPS increases (decreases or experiences no change) over its EPS in the previous years. We also examine another specification where we directly test the effect of enforcement changes on the mandatory IFRS adoption subsample. In all three tests, we find that substantive changes in enforcement and forecast likelihood have negative effects, while the combined effect of $IFRS \times POST$ and $IFRS\_ENF \times POST$ remains positive. Together, these results suggest that while firms from the IFRS adoption countries show increased likelihood and frequency of issuing management forecasts post-IFRS adoption, concurrent and substantive changes in enforcement attenuate these increases.

Most of the control variables also have the expected loading. For example, a higher analyst following (*ANALYST*) and a larger institutional holding (*INSTITUTION*) are associated with a greater likelihood of forecasting. Larger firms (*LNASSET*), firms audited by a Big 4 auditor (*BIG4*) and firms with greater growth opportunities (lower *BM*) are also more likely to issue forecasts. Moreover, as predicted, the likelihood of forecasting is positively associated with firms' option-granting activities (*OPTGRANT*), number of business segments (*SEGMENT*), number of stock listings (*STKEXCH*), dependence on external financing (*EXTFIN*), membership of a high tech industry (*HITECH*) and R&D expenditure (*RD*).

Table 5
IFRS, changes in enforcement and management forecast likelihood and frequency.

Panel A – Univariate statistics

	IFRS adoption countries without enforcement change			IFRS adoption countries with enforcement change		
	Pre	Post	*Diff*	Pre	Post	*Diff*
FOCR	12.49	19.83	7.34***	20.83	26.57	5.74***
FFREQ	1.75	1.86	0.11**	1.86	2.01	0.15*

Panel B Change in enforcement and management forecast likelihood

	1		2		3		4	
Dep. Var. =	*FOCR*		*Good News FOCR*		*Bad News FOCR*		*IFRS Only FOCR*	
Model	Logistic		Logistic		Logistic		Logistic	
	Coef	SE	Coef	SE	Coef	SE	Coef	SE
IFRS	−0.787***	0.06	−0.792***	0.08	−0.772***	0.08		
IFRS_ENF	0.444***	0.08	0.390***	0.12	0.482***	0.11	0.416***	0.08
POST	−0.504***	0.03	−0.447***	0.04	−0.567***	0.04		
IFRS × *POST*	0.908***	0.06	0.822***	0.09	0.978***	0.09	0.521***	0.05
IFRS_ENF* × *POST	**−0.356*** **	**0.09**	**−0.334*** **	**0.13**	**−0.370*** **	**0.12**	**−0.331*** **	**0.08**
ACCRUAL	0.063**	0.03	0.050	0.04	0.077	0.05	−0.079	0.06
ANALYST	0.033***	0.00	0.030***	0.00	0.036***	0.00	0.029***	0.00
BIG4	0.330***	0.02	0.301***	0.03	0.352***	0.03	0.150***	0.03
BM	−0.266***	0.01	−0.253***	0.02	−0.284***	0.02	−0.121***	0.02
EARNVOL	−0.011	0.01	0.019	0.02	−0.034**	0.02	−0.098***	0.02
INSIDER	−0.068***	0.03	−0.092**	0.04	−0.046	0.04	0.112***	0.04
INSTITUTION	0.008***	0.00	0.008***	0.00	0.008***	0.00	0.003***	0.00
LNASSET	0.311***	0.01	0.303***	0.01	0.316***	0.01	0.269***	0.01
LOSS	−0.027	0.02	−0.240***	0.04	0.110***	0.03	0.269***	0.01
NEWS	0.041**	0.02					−0.170***	0.04
OPTGRANT	0.837***	0.02	0.858***	0.03	0.823***	0.03	0.497***	0.04
SEGMENT	0.053***	0.00	0.052***	0.01	0.052***	0.01	0.017**	0.01
STKEXCH	0.043***	0.01	0.100***	0.02	0.002	0.02	0.020	0.02
EXTFIN	0.020***	0.00	0.013***	0.00	0.026***	0.00	0.022***	0.00
HERF	−0.074	0.05	−0.155**	0.07	0.030	0.07	−0.574***	0.07
HITECH	0.406***	0.07	0.350***	0.10	0.464***	0.10	0.260**	0.13
RD	0.002	0.62	−1.358	0.90	1.336	0.87	1.512	0.94
RULELAW	0.426***	0.01	0.431***	0.02	0.434***	0.02	0.469***	0.03
CAPMKT	−0.001***	0.00	−0.001***	0.00	−0.001***	0.00	−0.001***	0.00
Intercept	−3.996***	0.05	−3.940***	0.07	−4.011***	0.07	−4.388***	0.09
N	131,844		65,630		66,214		37,353	
N (*FOCR* =1)	22,766		10,650		12,116		7,742	
Pseudo R-sqr (%)	35.84		33.91		37.82		27.84	

Panel C Changes in enforcement (*IFRS_ENF*) and forecast frequency (*FFREQ*)

	1	
Dep. Var. =	*FFREQ*	
Model	Ordered probit	
	Coef	SE
IFRS	−1.166***	0.06
IFRS_ENF	−0.115	0.07
POST	−0.181***	0.03
IFRS × *POST*	0.408***	0.06
IFRS_ENF* × *POST	**−0.064**	**0.08**
ACCRUAL	0.162***	0.04
ANALYST	0.006***	0.00
BIG4	0.276***	0.02

Table 5 (*continued*)

Panel C Changes in enforcement (*IFRS_ENF*) and forecast frequency (*FFREQ*)		
	1	
Dep. Var. =	*FFREQ*	
Model	Ordered probit	
	Coef	SE
BM	−0.136***	0.01
EARNVOL	−0.044***	0.01
INSIDER	−0.056**	0.03
INSTITUTION	−0.001	0.00
LNASSET	0.127***	0.01
LOSS	−0.145***	0.02
NEWS	−0.024	0.02
OPTGRANT	0.374***	0.02
SEGMENT	0.001	0.00
STKEXCH	0.011	0.01
EXTFIN	0.010***	0.00
HERF	0.166***	0.05
HITECH	0.149***	0.06
RD	3.633***	0.50
RULELAW	0.518***	0.01
CAPMKT	−0.001***	0.00
Intercept	1.026***	0.05
N	22,766	
Adj. R-sqr (%)	27.22	

This table reports the estimates of the relation between enforcement changes coupled with mandatory IFRS adoption and management forecast likelihood (*FOCR*) and forecast frequency (*FFREQ*). Panel A reports univariate tests of the differences in *FOCR* and *FFREQ* from the Pre to Post IFRS adoption periods across whether the IFRS adoption country also undertakes an enforcement change. Five countries mandate IFRS adoption along with a concurrent and substantive change in financial reporting enforcement (including Finland, Germany, Netherlands, Norway and the U.K.), as identified by Christensen et al. (2013). Panel B (Panel C) reports the multivariate regression estimates of model (1): $Forecast = \alpha_0 + \alpha_1 IFRS + \alpha_2 IFRS\_ENF + \alpha_3 POST + \alpha_4 IFRS \times POST + \alpha_5 IFRS\_ENF \times POST + \text{controls} + \varepsilon$, where *Forecast* is measured using *FOCR* (*FFREQ*). All firm-level continuous variables are winsorized at the 1st and the 99th percentiles. All of the regressions include industry fixed effects and robust standard errors clustered by firm. ***, ** and * indicate that the estimated coefficients are statistically significant at the 1%, 5% and 10% levels, respectively. Refer to the Appendix A for more detailed variable definitions.

The bolded rows include our main variable(s) of interest for each regression.

4.3. IFRS, changes in enforcement and management forecast informativeness

4.3.1. Base model

Similar to our tests of the relationship between IFRS adoption, changes in enforcement and management forecast issuance, we first examine the possible effect of mandatory IFRS adoption on the change in the average informativeness of management forecasts before formally testing our hypothesis H2. We estimate the base model, which regresses *FCAR* on *IFRS, POST* and the interaction term between *IFRS* and *POST* (i.e., $FCAR = \alpha_0 + \alpha_1 IFRS + \alpha_2 POST + \alpha_3 IFRS \times POST + \text{controls} + \varepsilon$).

The results are tabulated in Table 6. In three of our six models (columns 1–3), we find a significantly negative coefficient on $IFRS \times POST$, and we find an insignificant coefficient on the remaining three models (columns 4–6). These results provide weak evidence that relative to firms from non-IFRS adoption countries, firms from IFRS adoption countries experience smaller increases in forecast informativeness after IFRS adoption. Specifically, we find a negative relation between *FCAR* and $IFRS \times POST$ for our full sample (column 1) and for two alternate specifications: excluding U.S. firms (column 2) and using a relatively short event window focusing on only one year preceding and one year following the mandatory IFRS adoption to reduce the potential effects of concurrent confounding events (column 3). Among our other specifications—using a constant sample that only includes firms that issue at least one forecast both before and after IFRS adoption (column 4), excluding forecasts bundled with earnings announcements (column 5) and including the forecast error as an additional control (column 6)—we do not find a significant relation between *FCAR* and $IFRS \times POST$.

Table 6
IFRS and management forecast informativeness.

	1 All forecasts		2 Exclude U.S.		3 2004 & 2006 only		4 Constant sample		5 Exclude bundled forecasts		6 Include *FERR t−1*	
Dep. Var.	*FCAR*		*FCAR*		*FCAR*		*FCAR*		*FCAR*		*FCAR*	
Model	OLS		OLS		OLS		OLS		OLS		OLS	
	Coef	SE	Coef	SE	Coef	SE	Coef	SE	Coef	SE	Coef	SE
IFRS	−0.465***	0.13	0.174	0.14	−0.497***	0.14	−0.858***	0.13	−0.647***	0.21	−1.019***	0.20
POST	0.919***	0.08	1.04	0.14	0.367***	0.10	0.803***	0.08	0.683***	0.14	0.895***	0.10
IFRS* × *POST	**−0.361*** **	**0.14**	**−0.372****	**0.16**	**−0.464*** **	**0.16**	**−0.131**	**0.14**	**0.192**	**0.22**	**−0.112**	**0.21**
FFREQ	0.146***	0.02	0.224***	0.03	0.106***	0.03	0.079***	0.02	0.093***	0.03	0.071***	0.03
FPREC	0.169***	0.02	0.275***	0.03	0.182***	0.03	0.165***	0.03	0.234***	0.04	0.041	0.03
FATTR	0.177***	0.05	0.204***	0.07	−0.061	0.08	0.058	0.06	0.496***	0.09	0.115	0.06
FLOSS	−0.211***	0.09	−0.252*	0.13	0.172	0.13	0.087	0.10	−0.393***	0.15	−0.090	0.10
FITEM	0.211***	0.03	−0.046	0.04	0.049	0.04	0.142***	0.03	0.127**	0.05	0.257***	0.03
FHOR	−0.128***	0.04	−0.158***	0.05	−0.062	0.06	−0.098**	0.05	−0.297***	0.07	−0.083*	0.05
FTIME	−0.001	0.00	−0.001	0.00	0.001	0.00	0.001	0.00	0.001	0.00	−0.001	0.00
FERR											−0.004***	0.00
ACCRUAL	0.296**	0.13	0.183	0.19	0.201	0.17	0.446***	0.16	−0.093	0.20	0.322*	0.17
ANALYST	−0.008***	0.00	−0.008***	0.00	0.006**	0.00	−0.005**	0.00	−0.017***	0.00	−0.002	0.00
BIG4	0.047	0.06	−0.044	0.08	0.043	0.09	0.143*	0.08	−0.013	0.11	0.299***	0.08
BM	0.287***	0.04	0.173***	0.05	−0.205**	0.09	0.289***	0.06	0.307***	0.07	0.456***	0.06
EARNVOL	0.032	0.04	0.010	0.05	−0.071	0.05	0.021	0.05	0.417***	0.07	−0.083*	0.05
INSIDER	0.007	0.09	0.249***	0.10	0.350***	0.14	−0.049	0.12	−0.122	0.16	0.169	0.13
INSTITUTION	−0.001	0.00	−0.002**	0.00	−0.004**	0.00	−0.004***	0.00	−0.003	0.00	−0.002	0.00
LNASSET	−0.359***	0.02	−0.237***	0.02	−0.433***	0.03	−0.379***	0.02	−0.367***	0.03	−0.448***	0.02
LOSS	0.918***	0.06	0.948***	0.09	0.731***	0.10	0.756***	0.07	1.253***	0.11	0.746***	0.08
NEWS	−0.089**	0.05	−0.245***	0.06	−0.009	0.07	−0.046	0.05	−0.140*	0.08	−0.081	0.06
OPTGRANT	0.210***	0.06	0.284***	0.09	0.057	0.10	0.216***	0.07	0.086	0.11	0.104	0.07
SEGMENT	−0.040***	0.01	−0.017	0.01	−0.020	0.02	−0.038***	0.01	−0.043**	0.02	−0.043***	0.02
STKEXCH	0.116***	0.02	0.059**	0.03	−0.001	0.04	0.076***	0.02	0.082883**	0.04	0.109***	0.03
EXTFIN	−0.009	0.01	−0.013**	0.01	−0.018**	0.01	−0.009	0.01	−0.014	0.01	−0.002	0.01
HERF	1.328***	0.14	0.823***	0.14	0.618***	0.21	0.876***	0.16	1.369***	0.24	1.286***	0.20
HITECH	0.504***	0.17	0.705***	0.25	−0.049	0.24	0.516***	0.18	0.622*	0.33	0.389**	0.19
RD	5.217***	1.34	5.486***	1.76	7.643***	1.91	2.628**	1.36	2.551	2.08	4.750***	1.43
RULELAW1	0.486***	0.04	0.151***	0.05	0.589***	0.07	0.821***	0.06	0.664***	0.07	0.289***	0.06
CAPMKT	−0.001***	0.00	0.001	0.00	0.002*	0.00	−0.005***	0.00	−0.001***	0.00	−0.006***	0.00
Intercept	5.282***	0.19	3.957***	0.24	5.094***	0.27	5.583***	0.23	5.863***	0.31	7.362***	0.27
N	54,912		22,565		18,328		36,960		19,882		37,513	
Adj. R-sqr (%)	6.31		5.30		10.86		8.55		7.88		7.16	

This table reports the regression estimates of our base difference-in-difference models that test the relation between mandatory IFRS adoption and forecast informativeness (*FCAR*). All of the firm-level continuous variables are winsorized at the 1st and 99th percentiles. All of the regressions include industry fixed effects and robust standard errors clustered by firm. ***, ** and * indicate that the estimated coefficients are statistically significant at the 1%, 5% and 10% levels, respectively. Refer to the Appendix A for more detailed variable definitions.
The bolded rows include our main variable(s) of interest for each regression.

4.3.2. Univariate results

Table 7 reports our results on the change in forecast informativeness following IFRS adoption across IFRS adoption countries with and without concurrent changes in enforcement. First, in Panel A of Table 7, we separately tabulate the univariate forecast informativeness (*FCAR*) by whether a country's IFRS adoption is bundled with a concurrent change in enforcement (*IFRS_ENF*). We tabulate the average *FCAR* in the pre-IFRS and post-IFRS periods and the difference in *FCAR* between the two periods. The results in Panel A of Table 7 indicate that across both groups of IFRS adopting countries (i.e., IFRS countries with or without concurrent changes in enforcement), forecast informativeness increases from the pre- to the post-IFRS period on average. More importantly, the results show that the increases in forecast informativeness for firms from IFRS countries without concurrent changes in enforcement appear to be of a higher magnitude. Thus, this finding pro-

Table 7
IFRS, changes in enforcement and management forecast informativeness.

Panel A – Univariate statistics

	IFRS adoption countries without enforcement change			IFRS adoption countries with enforcement change		
	Pre	Post	*Diff*	Pre	Post	*Diff*
FCAR=	3.29	5.19	1.90***	4.57	5.52	0.95***

Panel B Changes in enforcement, good news, bad news and IFRS only tests

	1		2 *Good News*		3 *Bad News*		4 *IFRS Only*	
Dep. Var. =	*FCAR*		*FCAR*		*FCAR*		*FCAR*	
Model	OLS		OLS		OLS		OLS	
	Coef	SE	Coef	SE	Coef	SE	Coef	SE
IFRS	−0.846***	0.17	−0.845***	0.26	−0.780***	0.22		
IFRS_ENF	0.515**	0.23	0.345	0.36	0.548*	0.30	0.455**	0.19
POST	0.843***	0.08	0.773***	0.12	0.912***	0.10		
IFRS × *POST*	0.090	0.18	−0.139	0.27	0.217	0.23	0.999***	0.14
IFRS_ENF* × *POST	**−0.559****	**0.25**	**−0.309**	**0.38**	**−0.617****	**0.29**	**−0.375***	**0.20**
FFREQ	0.147***	0.02	0.144***	0.03	0.138***	0.02	0.089***	0.03
FPREC	0.146***	0.02	0.149***	0.03	0.137***	0.03	0.121***	0.04
FATTR	0.113**	0.05	0.098	0.07	0.085	0.06	0.053	0.08
FLOSS	−0.127	0.08	−0.174	0.13	−0.131	0.10	−0.149	0.14
FITEM	0.189***	0.03	0.144***	0.04	0.234***	0.04	−0.056	0.05
FHOR	−0.124***	0.04	−0.069	0.06	−0.130***	0.05	0.097	0.06
FTIME	0.001	0.00	0.001***	0.00	−0.001**	0.00	0.001	0.00
ACCRUAL	0.355***	0.12	0.267	0.18	0.295*	0.16	0.103	0.22
ANALYST	−0.007***	0.00	−0.013***	0.00	−0.003	0.00	−0.004	0.00
BIG4	0.075	0.06	−0.105	0.09	0.208***	0.08	0.067	0.09
BM	0.231***	0.04	0.331***	0.06	0.149***	0.05	0.391***	0.06
EARNVOL	0.026	0.03	0.012	0.05	0.037	0.05	−0.253***	0.05
INSIDER	0.031	0.09	−0.090	0.13	0.166	0.11	0.322***	0.11
INSTITUTION	−0.001	0.00	0.003**	0.00	−0.005***	0.00	−0.005***	0.00
LNASSET	−0.335***	0.02	−0.345***	0.03	−0.319***	0.02	−0.294***	0.03
LOSS	0.826***	0.06	1.006***	0.10	0.759***	0.07	0.683***	0.10
NEWS	−0.076*	0.04					−0.212***	0.07
OPTGRANT	0.243***	0.06	0.256***	0.08	0.182**	0.08	0.195**	0.10
SEGMENT	−0.036***	0.01	−0.051***	0.02	−0.024*	0.01	0.007	0.02
STKEXCH	0.098***	0.02	0.133***	0.04	0.061**	0.03	0.108***	0.03
EXTFIN	−0.008	0.01	−0.012	0.01	−0.007	0.01	−0.001	0.01
HERF	1.138***	0.14	1.246***	0.21	1.112***	0.18	0.685***	0.16
HITECH	0.434***	0.16	−0.024	0.25	0.721***	0.20	0.088	0.28
RD	4.351***	1.26	2.359	2.00	6.888***	1.61	2.088	1.76
RULELAW	0.493***	0.04	0.513***	0.06	0.458***	0.06	0.663***	0.08
CAPMKT	−0.001***	0.00	−0.001	0.00	−0.002***	0.00	−0.001	0.00
Intercept	5.018***	0.17	4.955	0.26	5.001***	0.23	3.511***	0.28
N	54,912		25,006		29,906		14,808	
Adj. R-sqr (%)	6.31		5.89		7.23		6.04	

This table reports the estimates of the relation between enforcement changes coupled with mandatory IFRS adoption and management forecast informativeness (*FCAR*). Panel A reports univariate tests of differences in FCAR from the Pre to Post periods across whether an IFRS mandating country also undertakes an enforcement change. Five countries mandate IFRS adoption along with a concurrent and substantive change in financial reporting enforcement (including Finland, Germany, Netherlands, Norway and the U.K.), as identified by Christensen et al. (2013). Panel B reports multivariate regression estimates of model (2): $FCAR = \beta_0 + \beta_1 IFRS + \beta_2 IFRS\_ENF + \beta_3 POST + \beta_4 IFRS \times POST + \beta_5 IFRS\_ENF \times POST +$ controls $+ \varepsilon$. All of the continuous variables are winsorized at the 1st and 99th percentiles. All of the regressions include industry fixed effects and robust standard errors clustered by firm. All of the regressions include industry fixed effects and robust standard errors clustered by firm.
The bolded rows include our main variable(s) of interest for each regression.

vides preliminary evidence rejecting H2 that enforcement changes do not affect the informativeness of management forecasts following IFRS adoption.

4.3.3. Regression results

Table 7, Panel B reports the regression results for our first set of tests of hypothesis H2. In model 1, we include the full sample and use the existence of a concurrent and substantive change in financial reporting enforcement (Christensen et al. 2013) to proxy for a change in enforcement. In models 2 and 3, we separately estimate the relation between a change in enforcement and forecast informativeness for *Good News* and *Bad News* firms. Column 1 shows a significantly negative coefficient on *IFRS* and on the sum of the coefficients on *IFRS* and *IFRS_ENF*, which suggests that in the pre-IFRS period, the management forecasts made by firms in countries that mandatorily adopt IFRS later (during our sample period) are less informative than management forecasts made by firms in non-IFRS adoption countries. This finding is consistent with the univariate differences presented in Table 2. The significantly positive coefficient on *POST* indicates that it is important to use a difference-in-difference research design to examine the effect of IFRS adoption on the informativeness of management forecasts, as management forecasts appear to be more informative after 2006, even in non-IFRS countries.

The generally insignificant coefficient on $IFRS \times POST$ suggests that on average, there is no significant change in forecast informativeness following IFRS adoption in the IFRS adoption countries without a concurrent change in enforcement. Our test of H2 is estimated by the coefficients on $IFRS\_ENF \times POST$. The insignificant coefficient on $IFRS \times POST$ and the significantly negative coefficient on $IFRS\_ENF \times POST$ indicate that the lower forecast informativeness for firms from IFRS-mandating countries compared to those from non-IFRS-mandating countries documented in Table 6 is primarily driven by those from IFRS-mandating countries with concurrent enforcement changes. In terms of economic significance, a coefficient on $IFRS\_ENF \times POST$ of -0.559 translates to a 10.3% reduction in forecast likelihood compared with the mean *FCAR* of 5.44% for firms in IFRS adoption countries in the *POST* period. This value is both economically and statistically significant. When we separately analyze the effect of concurrent enforcement change with IFRS adoption on FCAR for firms that report *Good News* and *Bad News*, we find that the negative relation between *FCAR* and $IFRS\_ENF \times POST$ derives primarily from firms that experience a decrease in EPS from the previous year. Together, our results suggest that an increase in enforcement appears to have a negative impact on forecast informativeness, rejecting H2.[7]

To sum up, the empirical evidence in Table 7 rejects hypothesis H2. That is, a substantive change in enforcement concurrent with IFRS adoption is associated with a decrease in the informativeness of management forecasts relative to other firms, whereas firms from non-IFRS adoption countries and from IFRS adoption countries with no concurrent enforcement changes show no significant difference. These findings suggest a reduction in the value relevance of voluntary disclosure for firms from IFRS-mandating countries that experience changes in enforcement.

4.4. Other forecast properties

In addition to the informativeness of management forecasts, we also examine whether changes in enforcement coupled with IFRS adoption could be related to the quality of management forecasts measured by other properties of the forecasts in hypothesis H2. We examine this question using Eq. (3). More specifically, we estimate the effect of a concurrent enforcement change with IFRS adoption on forecast precision (*FPREC*), forecast attribution (*FATTR*), the number of items included in a forecast (*FITEM*), forecast error (*FERR*) and the timeliness of a forecast (*FTIME*).

These results are reported in Table 8. Overall, we find no significant change in any of these forecast properties between firms from IFRS adoption countries with an enforcement change and firms from IFRS adoption countries without such a change, except that the forecasts appear to be more timely—that is, issued earlier

[7] The estimation of the other control variables is generally consistent with expectations. For example, we find that management forecasts are more informative if they occur more frequently (*FFREQ*), are more precise (*FPREC*), include an explanation (*FATTR*) or include more forecast items (*FITEM*). However, forecasts are less informative if they forecast a loss (*FLOSS*) or are of a longer horizon (*FHOR*). We explicitly test for changes in these forecast properties in the next section.

Table 8
IFRS, Changes in enforcement and other management forecast properties.

Dep. Var. =	1 *FPREC*		2 *FATTR*		3 *FITEM*		4 *FERR*		5 *FTIME*	
Model	Ordered Probit		Ordered Probit		Ordered Probit		OLS		OLS	
	Coef	SE	Coef	SE	Coef	SE	Coef	SE	Coef	SE
IFRS	−0.303***	0.05	−0.473***	0.17	−0.109***	0.03	6.986***	1.24	−10.355***	3.87
IFRS_ENF	−0.201***	0.06	0.318	0.23	0.106***	0.04	−0.987	2.09	−34.597***	5.14
POST	−0.047*	0.02	0.561***	0.07	−0.133***	0.02	−0.588	0.49	2.497	2.00
IFRS × *POST*	0.057	0.05	0.268	0.17	0.037	0.03	−1.090	1.28	6.268	4.06
IFRS_ENF* × *POST	**−0.043**	**0.07**	**−0.048**	**0.23**	**−0.059**	**0.04**	**1.243**	**2.22**	**19.406*** **	**5.50**
FFREQ	0.208***	0.01	0.421***	0.01	0.115***	0.00	−0.589***	0.11	−4.620***	0.43
ACCRUAL	0.018	0.03	−0.158*	0.09	0.107***	0.02	−2.970***	0.80	−0.003	2.81
ANALYST	−0.005***	0.00	−0.003*	0.00	0.006***	0.00	0.004	0.02	0.471***	0.06
BIG4	0.150***	0.02	0.116***	0.04	0.040***	0.01	−0.983***	0.38	−3.001**	1.35
BM	−0.062***	0.01	0.083***	0.03	0.011	0.01	1.170***	0.30	1.572*	0.91
EARNVOL	−0.002	0.01	−0.101***	0.03	−0.002	0.01	−0.423**	0.22	−5.017***	0.80
INSIDER	−0.059**	0.02	−0.082	0.07	0.016	0.01	−1.385**	0.60	−6.120***	1.97
INSTITUTION	−0.001	0.00	0.002**	0.00	0.003***	0.00	0.028***	0.01	−0.068***	0.02
LNASSET	0.006	0.00	−0.008	0.01	−0.039***	0.00	−0.085	0.11	−1.341***	0.38
LOSS	−0.045***	0.02	0.207***	0.04	−0.060***	0.01	3.094***	0.36	−0.618	1.38
NEWS	−0.031**	0.01	−0.051	0.04	−0.004	0.01	0.496*	0.29	3.816***	1.10
OPTGRANT	0.105***	0.02	−0.026	0.04	0.080***	0.01	−0.749**	0.35	−0.634	1.43
SEGMENT	−0.006*	0.00	0.016*	0.01	0.001	0.00	0.063	0.08	−0.191	0.28
STKEXCH	−0.022***	0.01	0.003	0.02	0.003	0.00	0.441***	0.16	−3.044***	0.57
EXTFIN	0.001	0.00	−0.001	0.00	0.007***	0.00	0.071*	0.04	−0.021	0.12
HERF	0.161***	0.04	−0.203**	0.10	−0.105***	0.02	−1.366	1.02	7.042**	3.13
HITECH	−0.031	0.05	−0.064	0.13	−0.020	0.03	−3.285***	0.98	−0.547	4.11
RD	−0.994**	0.45	1.589	1.05	−0.909***	0.27	24.872***	7.68	−112.547***	34.66
RULELAW1	0.333***	0.01	−0.171***	0.03	−0.006	0.01	−2.033***	0.29	4.357***	0.98
CAPMKT	−0.001***	0.00	0.001***	0.00	−0.001***	0.00	−0.013***	0.00	−0.022***	0.00
Intercept	1.581***	0.04	−2.899***	0.12	1.539***	0.03	18.462***	1.05	231.487***	3.52
N	22,766		22,766		22,766		11,665		22,766	
N (Dep Var = 1)			5232							
Adj. R-sqr (%)	17.38		11.08		9.32		6.64		2.66	

This table reports the regression estimates of the relation between enforcement changes coupled with mandatory IFRS adoption and a number of management forecast properties, including forecast precision (*FPREC*), forecast attribution (*FATTR*), the number of items included in each forecast (*FITEM*), forecast error (*FERR*) and forecast timeliness (*FTIME*). The test of *FERR* is conducted on a limited sample with available data with which to calculate forecast errors. Five countries mandate IFRS adoption along with a concurrent and substantive change in financial reporting enforcement (including Finland, Germany, Netherlands, Norway and the U.K.), as identified by Christensen et al. (2013). All of the firm-level continuous variables are winsorized at the 1st and 99th percentiles. All of the regressions include industry fixed effects and robust standard errors clustered by firm. ***, ** and * indicate that the estimated coefficients are statistically significant at the 1%, 5% and 10% levels, respectively. Refer to the Appendix A for more detailed variable definitions.
The bolded rows include our main variable(s) of interest for each regression.

in a period—for firms from IFRS adoption countries with enforcement changes. These results suggest that the reduction in forecast informativeness following IFRS adoption for firms from IFRS adoption countries with concurrent changes in enforcement reflects market perception but is not due to reductions in the other quality measures of management forecasts. At a minimum, we do not find consistent evidence that better enforcement strengthens the positive relationship between IFRS adoption and the quality of management forecasts.

4.5. Additional analysis

4.5.1. IFRS adoption, changes in enforcement and earnings informativeness

In our results of the tests of hypothesis 2 reported in Table 7, we find a decrease in management forecast informativeness only for firms from IFRS-mandating countries with concurrent changes in enforcement. There may be changes in the information environment for such firms in general and for mandatorily reported

earnings in particular. We explicitly test whether IFRS adoption with concurrent enforcement changes is associated with a change in the informativeness of earnings announcements in Table 9. We find that the informativeness of mandatorily reported earnings becomes higher for firms from IFRS adoption countries with concurrent changes in enforcement (column 2). In terms of economic significance, the 0.130 increase in *EACAR* for firms in countries that impose substantive enforcement changes along with IFRS adoption is 6.25% higher relative to the average *EACAR* of 2.08% for earnings announcements made by firms in IFRS adopting countries.

When we separately examine the potential effect of substantive enforcement changes along with IFRS adoption on EACAR separately for firm-years that include a management forecast (FOCR = 1) and those that do not (FOCR = 0), we find that the positive relation is driven by firms that do not issue a forecast. This finding is intuitive because investors have less information on which to rely when firms do not issue an earnings forecast, so earnings announcements are more informative. This result is consistent with previous findings and indicates that better enforcement has distinct opposite effects on voluntary and mandatory disclosures.

4.5.2. IFRS adoption, changes in enforcement and analyst following

We further examine the possible effect that IFRS adoption and change in enforcement may have on firms' information environment measured by analyst following. These results, tabulated in Table 10, show that among the three types of firms (i.e., firms from non-IFRS adoption countries and firms from IFRS adoption countries with and without enforcement changes), firms from countries with enforcement changes experience the highest increase in the number of analysts following relative to firms from the other countries. These results are again consistent with past findings that IFRS adoption coupled with substantive changes in

Table 9
IFRS, Change in Enforcement and the Informativeness of Earnings Announcements.

Dep. Var. =	1 *EACAR*		2		3		4		5		6	
					FOCR = 1		FOCR = 0		High FCAR		Low FCAR	
	Coef	SE	Coef	SE	Coef	SE	Coef	SE	Coef	SE	Coef	SE
IFRS	−0.413***	0.04	−0.344***	0.04	−0.430***	0.07	−0.243***	0.06	−0.782***	0.19	−0.160***	0.06
IFRS_ENF			−0.182***	0.06	−0.276***	0.10	−0.103	0.09	−0.469*	0.25	−0.140*	0.08
POST	0.279***	0.02	0.278***	0.02	0.267***	0.03	0.282***	0.03	−0.052	0.06	0.233***	0.03
IFRS × *POST*	0.088**	0.04	0.033	0.05	0.036	0.08	−0.020	0.06	0.349*	0.20	−0.055	0.07
IFRS_ENF* × *POST			**0.130***	**0.07**	0.064	0.11	0.215**	0.10	0.104	0.26	0.086	0.09
|*UE*|	0.030***	0.01	0.029***	0.01	0.071***	0.02	0.015	0.01	0.045**	0.02	0.096***	0.02
LOSS	0.228***	0.02	0.227***	0.02	0.262***	0.03	0.207***	0.02	0.216***	0.04	0.132***	0.03
REPLAG	0.001***	0.00	0.001***	0.00	−0.001***	0.00	0.001***	0.00	−0.001***	0.00	0.001	0.00
LNASSET	−0.015***	0.00	−0.015***	0.00	−0.035***	0.01	−0.035***	0.01	−0.024**	0.01	−0.015**	0.01
ANALYST	−0.001	0.00	−0.001	0.00	−0.001	0.00	0.001	0.00	0.001	0.00	0.001	0.00
STKEXCH	0.022***	0.01	0.024***	0.01	0.013	0.01	0.063***	0.01	0.014	0.02	0.010	0.01
RULELAW	0.093***	0.01	0.099***	0.01	0.192***	0.02	0.021*	0.01	0.100***	0.03	0.090***	0.02
CAPMKT	0.001***	0.00	0.001***	0.00	0.001	0.00	0.001***	0.00	0.001	0.00	0.001**	0.00
Intercept	1.473***	0.03	1.469***	0.03	1.780***	0.06	1.465***	0.05	2.686***	0.12	1.248***	0.06
N	135,318		135,318		53,459		81,859		27,043		26,416	
Adj. R-sqr (%)	3.36		3.38		3.29		1.23		3.38		3.43	

This table reports the estimates of the relation between enforcement changes coupled with mandatory IFRS adoption and the informativeness of earnings announcements (*EACAR*). *EACAR* is defined as the absolute value of the two-day cumulative market-adjusted return during the [0,1] earnings announcement window, with day 0 equal to the earnings announcement date. ***, ** and * indicate that the estimated coefficients are statistically significant at the 1%, 5% and 10% levels, respectively. All of the variables are defined in the Appendix A. All of the continuous variables are winsorized at the 1st and 99th percentiles. Five countries mandate IFRS adoption along with a concurrent and substantive change in financial reporting enforcement (including Finland, Germany, Netherlands, Norway and the U.K.), as identified by Christensen et al. (2013). All of the regressions include industry fixed effects and robust standard errors clustered by firm.

The bolded rows include our main variable(s) of interest for each regression.

Table 10
IFRS, Change in enforcement and analysts following.

Dep. Var. =	1 *Analyst*		2		3		4		5		6	
					FOCR = 1		FOCR = 0		High FCAR		Low FCAR	
	Coef	SE	Coef	SE	Coef	SE	Coef	SE	Coef	SE	Coef	SE
IFRS	−0.702***	0.04	−0.294***	0.04	1.673***	0.20	0.013	0.03	0.848**	0.36	2.113***	0.26
IFRS_ENF			−1.407***	0.07	−2.963***	0.29	−0.746***	0.04	−1.962***	0.47	−3.334***	0.38
POST	0.103***	0.02	0.109***	0.02	0.999***	0.10	0.101***	0.02	1.148***	0.14	0.900***	0.16
IFRS × *POST*	0.402***	0.04	0.192***	0.05	−1.296***	0.23	0.039	0.03	−0.696*	0.39	−1.428***	0.31
IFRS_ENF* × *POST			**0.723*** **	**0.08**	2.719***	0.33	0.483***	0.05	2.255***	0.51	2.634***	0.44
LNASSET	0.801***	0.00	0.802***	0.00	2.278***	0.02	0.368***	0.00	2.209***	0.03	2.332***	0.03
EARNVOL	−0.106***	0.01	−0.113***	0.01	−0.105*	0.06	−0.042***	0.01	−0.157**	0.07	−0.098***	0.09
ROA	−0.008***	0.00	−0.008***	0.00	−0.019***	0.00	−0.003***	0.00	−0.020***	0.00	−0.014***	0.00
RD	17.418***	0.69	17.400***	0.69	5.228**	2.34	6.730***	0.46	4.421	2.81	6.862***	3.93
BM	−0.505***	0.01	−0.508***	0.01	−1.662***	0.06	−0.233***	0.01	−1.494***	0.07	−1.874***	0.10
RULELAW	0.774***	0.01	0.831***	0.01	0.847***	0.06	0.281***	0.01	1.038***	0.08	0.649***	0.09
CAPMKT	−0.001***	0.00	−0.002***	0.00	−0.002***	0.00	−0.001***	0.00	−0.002***	0.00	−0.001***	0.00
Intercept	−2.399***	0.04	−2.393***	0.04	−9.044***	0.20	−0.912***	0.02	−8.503***	0.28	−9.607***	0.30
N	124,502		124,502		23,968		100,534		11,840		12,128	
Adj. R-sqr (%)	33.44		33.55		39.76		23.36		39.56		40.09	

This table reports the estimates of the relation between enforcement changes coupled with mandatory IFRS adoption and number of analysts following (*ANALYST*). ***, ** and * indicate that the estimated coefficients are statistically significant at the 1%, 5% and 10% levels, respectively. All of the variables are defined in the Appendix A. All of the continuous variables are winsorized at the 1st and 99th percentiles. Five countries mandate IFRS adoption along with a concurrent and substantive change in financial reporting enforcement (including Finland, Germany, Netherlands, Norway and the U.K.), as identified by Christensen et al. (2013). All of the regressions include industry fixed effects and robust standard errors clustered by firm.
The bolded rows include our main variable(s) of interest for each regression.

enforcement is associated with greater improvement in firms' external information environment, in contrast to the effect on voluntary disclosure.

4.5.3. Sensitivity analysis

We conduct several tests for sensitivity analysis to ensure that our results are not unduly driven by research design choices. First, we test whether our results change when we introduce country and year fixed effects into our regression models. Our main results are based on regression estimates with firm, industry and country control variables and with industry fixed effects. Past research does not appear to provide a consensus on how best to implement the difference-in-difference research design following IFRS adoption. For example, Bae et al. (2008) and Hong et al. (2014) include industry fixed effects in their main analyses as we do, sometimes also with year indicators. The working paper version of Hong et al. (2014) also includes country fixed effects when country-level controls are excluded in the regression estimates, but these analyses were dropped from the published version (2014). Christensen et al. (2013) and Li and Yang (2016) include industry, year and country fixed effects, but both specifically only include firm-level control variables and use country fixed effects to control for other country-invariant effects. We test the robustness of our results to the inclusion of country and year fixed effects in addition to the industry fixed effects. For completeness, we also control for European Union (EU) membership because EU and non-EU members potentially exhibit different institutional and economic characteristics and levels of regulatory quality. Finally, as Christensen et al. (2013) document an improvement in liquidity for firms domiciled in IFRS-mandating countries with a substantive enforcement change, we control for lagged liquidity. Our regression estimates with all of these controls are reported in Table 11. The results in Table 11 are consistent with our primary results for both forecast likelihood (Panel A) and forecast informativeness (Panel B), and the robustness of these results to the different specifications indicate that our results are not driven by research design choices.

Table 11
Sensitivity analysis.

Panel A Changes in enforcement (*IFRS_ENF*), forecast likelihood and alternate controls

	1		2		3		4	
	IFRS only, Ctry and year FE		Controlling for EU identity		Controlling for level of regulatory quality		Controlling for lagged liquidity	
Dep. Var. =	*FOCR*		*FOCR*		*FOCR*		*FOCR*	
Model	OLS		OLS		OLS		OLS	
	Coef	SE	Coef	SE	Coef	SE	Coef	SE
IFRS			−0.755***	0.07	−0.659***	0.05	−0.680***	0.06
CTRL			-0.072	0.09	0.653***	0.06		
IFRS_ENF	1.492***	0.09	0.481***	0.09	0.334***	0.03	0.332***	0.09
POST			−0.507***	0.03	−0.372***	0.05	−0.689***	0.03
IFRS × *POST*	0.746***	0.06	0.827***	0.08	0.706***	0.05	0.953***	0.07
CTRL × *POST*			0.161*	0.10	0.066*	0.04		
IFRS_ENF* × *POST	**−0.211****	**0.09**	**−0.420*****	**0.10**	**−0.108***	**0.06**	**−0.381*****	**0.10**
ACCRUAL	−0.099	0.06	0.062**	0.03	0.061**	0.03	0.129***	0.04
ANALYST	0.031***	0.00	0.033***	0.00	0.033***	0.00	0.035***	0.00
BIG4	0.148***	0.03	0.331***	0.02	0.336***	0.02	0.407***	0.02
BM	−0.171***	0.02	−0.265***	0.01	−0.254***	0.01	−0.388***	0.02
EARNVOL	−0.001	0.02	−0.013	0.01	−0.024***	0.01	−0.015	0.01
INSIDER	0.143***	0.04	−0.069***	0.03	−0.060**	0.03	0.038	0.03
INSTITUTION	0.004***	0.00	0.008***	0.00	0.008***	0.00	0.005***	0.00
LNASSET	0.334***	0.01	0.309***	0.01	0.306***	0.01	0.262***	0.01
LOSS	−0.240***	0.04	−0.026	0.02	−0.025	0.02	−0.183***	0.03
NEWS	−0.085***	0.03	0.041**	0.02	0.049***	0.02	0.033	0.02
OPTGRANT	0.132***	0.05	0.846***	0.02	0.787***	0.02	0.823***	0.03
SEGMENT	0.012*	0.01	0.053***	0.00	0.057***	0.00	0.063***	0.01
STKEXCH	0.015	0.02	0.042***	0.01	0.056***	0.01	0.025*	0.01
EXTFIN	0.027***	0.00	0.019***	0.00	0.020***	0.00	0.016***	0.00
HERF	−0.454***	0.07	−0.079	0.05	−0.049	0.05	−0.005	0.06
HITECH	0.231*	0.13	0.403***	0.07	0.423	0.07	0.377***	0.08
RD	1.087	0.95	0.021	0.62	−0.063	0.62	1.627**	0.74
RULELAW	−0.434***	0.04	0.424***	0.01	0.127***	0.02	0.414***	0.02
CAPMKT	0.001***	0.00	−0.001***	0.00	−0.001***	0.00	−0.003***	0.00
$Liquidity_{t-1}$							**2.692*****	**0.53**
Intercept	−4.504***	0.10	−3.996***	0.05	−4.211***	0.06	−3.190***	0.06
Fixed Effect	Ind, Ctry and Year		Industry		Industry		Industry	
N	37,353		131,844		131,844		79,426	
N (*FOCR* = 1)	7742		22,766		22,766		15,548	
Adj. R-sqr (%)	8.36		35.84		36.16		35.66	

Panel B Changes in enforcement (*IFRS_ENF*)

	1		2		3		4	
	IFRS Only, Ctry and year FE		Controlling for EU identity		Controlling for level of regulatory quality		Controlling for lagged liquidity	
IFRS_ENF =	*ENF_IND*		*ENF_IND*		*ENF_IND*		*ENF_IND*	
Dep Var =	*FCAR*		*FCAR*		*FCAR*		*FCAR*	
Model	OLS		OLS		OLS		OLS	
	Coef	SE	Coef	SE	Coef	SE	Coef	SE
IFRS			−0.782***	0.22	−0.194	0.15	−0.464***	0.17
CTRL			−0.144	0.30	1.372***	0.19		
IFRS_ENF	0.934***	0.35	0.525*	0.28	−0.478***	0.09	0.332	0.22
POST			0.867***	0.08	1.255***	0.17	0.582***	0.08
IFRS × *POST*	1.523***	0.16	0.475**	0.24	−0.101	0.15	0.119	0.17
CTRL × *POST*			−0.297	0.29	−0.230**	0.10		
IFRS_ENF* × *POST	**−0.362***	**0.21**	**−0.445****	**0.21**	**−0.418****	**0.18**	**−0.431***	**0.24**

Table 11 (*continued*)

Panel B Changes in enforcement (*IFRS_ENF*)

	1		2		3		4	
	IFRS Only, Ctry and year FE		Controlling for EU identity		Controlling for level of regulatory quality		Controlling for lagged liquidity	
IFRS_ENF =	*ENF_IND*		*ENF_IND*		*ENF_IND*		*ENF_IND*	
Dep Var =	*FCAR*		*FCAR*		*FCAR*		*FCAR*	
Model	OLS		OLS		OLS		OLS	
	Coef	SE	Coef	SE	Coef	SE	Coef	SE
FFREQ	0.107***	0.03	0.151***	0.02	0.141***	0.02	0.104***	0.02
FPREC	0.137***	0.04	0.141***	0.02	0.142***	0.02	0.141***	0.02
FATTR	−0.002	0.08	0.101**	0.05	0.115**	0.05	0.069	0.05
FLOSS	−0.129	0.14	−0.130	0.08	−0.125	0.08	−0.158*	0.10
FITEM	0.010	0.05	0.196***	0.03	0.183***	0.03	0.137***	0.03
FHOR	0.083	0.06	−0.146**	0.04	−0.106***	0.04	−0.076*	0.04
FTIME	0.001	0.00	0.001	0.00	0.001	0.00	−0.001	0.00
ACCRUAL	0.156	0.22	0.351***	0.12	0.332***	0.12	0.362***	0.13
ANALYST	−0.011***	0.00	−0.007***	0.00	−0.004**	0.00	−0.008***	0.00
BIG4	−0.048	0.09	0.068	0.06	0.047	0.06	−0.029	0.07
BM	0.336***	0.06	0.232***	0.04	0.278***	0.04	0.017	0.05
EARNVOL	−0.041	0.05	0.063*	0.03	0.013	0.03	−0.043	0.04
INSIDER	0.480***	0.11	0.023	0.09	0.056	0.09	0.294***	0.09
INSTITUTION	−0.007***	0.00	−0.001	0.00	−0.001	0.00	0.003***	0.00
LNASSET	−0.254***	0.03	−0.318***	0.02	−0.352***	0.02	−0.356***	0.02
LOSS	0.594**	0.10	0.830***	0.06	0.816***	0.06	0.715***	0.07
NEWS	0.017	0.08	−0.086**	0.04	−0.055	0.04	−0.279***	0.05
OPTGRANT	0.086	0.10	0.185	0.06	0.232***	0.06	0.104*	0.06
SEGMENT	−0.012	0.02	−0.042***	0.01	−0.036***	0.01	−0.030**	0.01
STKEXCH	0.025	0.03	0.103***	0.02	0.111***	0.02	0.071***	0.02
EXTFIN	0.005	0.01	−0.005	0.01	−0.005	0.01	−0.022***	0.01
HERF	0.421**	0.18	1.118***	0.14	1.189***	0.14	0.557***	0.15
HITECH	0.061	0.28	0.436***	0.16	0.415***	0.16	0.222	0.17
RD	1.172	1.75	4.105***	1.26	3.928***	1.26	6.416***	1.39
RULELAW	−0.356	0.85	0.498***	0.04	0.026	0.07	0.501***	0.05
CAPMKT	−0.002***	0.00	−0.001***	0.00	−0.001***	0.00	−0.002***	0.00
$Liquidity_{t-1}$							0.952***	3.04
Intercept	5.369***	1.67	4.983***	0.17	4.535***	0.22	4.776***	0.20
Fixed effect	Ind, Ctry and Year		Industry		Industry		Industry	
N	14,808		14,808		14,808		38,450	
Adj. R-sqr (%)	8.36		8.29		8.23		9.49	

Panel C Changes in enforcement (Δ*ENF)* and forecast informativeness

	1		2	
Δ*ENF* =	Δ*RULELAW*		Δ*REGQUA*	
Dep Var =	*FCAR*		*FCAR*	
Model	OLS		OLS	
	Coef	SE	Coef	SE
Δ*ENF*	−0.108	0.20	3.312***	1.08
IFRS	−0.488***	0.14	−0.459***	0.16
IFRS × Δ*ENF*	−0.481	0.30	−2.140*	1.21
POST	1.112***	0.09	0.851***	0.10
POST × Δ*ENF*	0.940***	0.20	0.960	1.22
IFRS × *POST*	−0.571***	0.14	−0.247	0.16
IFRS* × *POST* × Δ*ENF	**−0.703****	**0.32**	**−3.970*****	**1.35**
FFREQ	0.157***	0.02	0.145***	0.02
FPREC	0.153***	0.02	0.136***	0.02

(*continued on next page*)

Table 11 (*continued*)

Panel C Changes in enforcement (ΔENF) and forecast informativeness				
ΔENF =	1 $\Delta RULELAW$		2 $\Delta REGQUA$	
Dep Var =	*FCAR*		*FCAR*	
Model	OLS		OLS	
	Coef	SE	Coef	SE
FATTR	0.116**	0.05	0.139***	0.05
FLOSS	−0.154*	0.08	−0.155*	0.08
FITEM	0.201***	0.03	0.211***	0.03
FHOR	−0.111***	0.04	−0.129***	0.04
FTIME	−0.001	0.00	0.001	0.00
ACCRUAL	0.365***	0.12	0.339***	0.12
ANALYST	−0.005**	0.00	−0.008***	0.00
BIG4	0.031	0.06	0.105*	0.06
BM	0.282***	0.04	0.280***	0.04
EARNVOL	0.041	0.04	0.050	0.04
INSIDER	−0.029	0.09	0.001	0.09
INSTITUTION	−0.001	0.00	−0.002*	0.00
LNASSET	−0.342***	0.02	−0.335***	0.02
LOSS	0.884***	0.06	0.874***	0.06
NEWS	−0.076*	0.04	−0.074*	0.04
OPTGRANT	0.286***	0.06	0.194***	0.06
SEGMENT	−0.037***	0.01	−0.039***	0.01
STKEXCH	0.089***	0.02	0.107***	0.02
EXTFIN	−0.008	0.01	−0.009	0.01
HERF	1.296***	0.14	1.126***	0.14
HITECH	0.492***	0.16	0.437***	0.16
RD	4.207***	1.29	4.637***	1.28
RULELAW	0.783***	0.07	0.593***	0.04
CAPMKT	−0.001***	0.00	−0.001***	0.00
Intercept	4.570***	0.19	4.718***	0.19
N	54,912		54,912	
Adj. R-sqr (%)	6.46		6.34	

The bolded rows include our main variable(s) of interest for each regression.

In addition to the *IFRS_ENF* variable based on Christensen et al. (2013), we estimate a continuous variable that captures the changes in rule of law ($\Delta RULELAW$) and regulatory quality ($\Delta REGQUA$) from the pre- to the post-IFRS adoption period to proxy for the change in enforcement with IFRS adoption. These results are reported in Panel C of Table 11 and are consistent with our main results.

5. Summary and conclusion

One of the primary reasons that the European Union and many countries have adopted IFRS and that many international organizations (e.g., IASB, IOSCO and WFE) have actively promoted IFRS adoption is to improve the information environment and financial transparency of firms. Presumably, greater financial transparency can be achieved by improving either firms' mandatory financial reporting or voluntary disclosures, or both. The main purpose of this study is to examine whether the improvements in mandatory financial reporting brought about by concurrent changes in financial reporting enforcement during IFRS adoption complement or substitute for firms' voluntary disclosure.

Our results show that following mandatory IFRS adoption, the management forecasts issued by firms from IFRS-mandating countries that are coupled with concurrent and substantive enforcement changes are associated with reduced informativeness. Further supporting this finding, our results show that the likelihood and

frequency of management forecasts tend to increase less in such countries relative to firms in countries without any concurrent enforcement changes. Additional evidence on the relationship between the informativeness of earnings announcements/analysts following and better-enforced IFRS adoption supports the conjecture that better enforcement of IFRS has distinct opposite impacts on voluntary and mandatory disclosures. Using the changes in enforcement concurrent with IFRS adoption that serve as a natural exogenous shock to firms, this study provides stronger evidence of the causal effect of changes in the legal and regulatory environments on changes in firms' voluntary disclosure.

Appendix A. Variable definition

Variable	Definition
Management forecast variables	
FOCR	Forecast occurrence – an indicator variable equal to 1 if a firm issues a forecast in a given year and 0 otherwise.
FFREQ	Forecast frequency – the total number of forecasts issued by a firm in a given year.
FCAR	Forecast informativeness – the absolute value of the two-day cumulative market-adjusted return during the [0, 1] forecast window with day 0 equal to the management forecast date.
FPREC	Forecast precision – a precision score equal to 1, 2, 3 or 4 assigned to a qualitative, min or max, closed range or point forecast, respectively. For a firm-year with multiple forecasts, *FPREC* is the mean forecast precision score for all forecasts issued by a firm in the given year.
FATTR	Forecast attribution – an indicator variable equal to 1 if a forecast issued by a firm is accompanied by an explanation and 0 otherwise. For a firm-year with multiple forecasts, *FATTR* is equal to 1 if any of the forecasts made in the given year is accompanied by an explanation and 0 otherwise.
FLOSS	Loss forecast – an indicator variable equal to 1 if a forecast predicts *negative* earnings or a *loss* and 0 otherwise. For a firm-year with multiple forecasts, *FLOSS* is equal to 1 if any of the forecasts made in the given year predicts negative earnings or a loss and 0 otherwise.
FITEM	Forecast items – the total number of accounting performance measures forecasted [e.g., *SALES* (total sales), *EBITDA* (operating income before interest, income taxes, depreciation and amortization), *OPINC* (operating income before income taxes), *IBTAX* (income before income taxes), *IBXIDO* (income before extraordinary items and discontinued operations) and *NI* (net income)]. For a firm-year with multiple forecasts, *FITEM* is the mean forecast items for all forecasts issued by a firm in the given year.
FHORI	Forecast horizon – a categorical variable equal to 0, 1 or 2 if the forecast is for the current fiscal year, for the next fiscal year or for 2 years after the current fiscal year, respectively. For a firm-year with multiple forecasts, *FHORI* is the mean forecast horizon for all forecasts issued by a firm in the given year.
FERR	Forecast error – the absolute difference between the forecasts and the actual performance of the item forecasted divided by the actual performance (in percentage). For a firm-year with multiple forecasts, *FERR* takes the mean of all forecasts issued by a firm in the given year.
FTIME	Forecast timeliness – the number of days between when a forecast is released and the earnings realization date (i.e., annual report filing date). For a firm-year with multiple forecasts, *FTIME* is the mean forecast timeliness score for all forecasts issued by a firm in the given year.

IFRS & POST variables

IFRS	An indicator variable equal to 1 if a country has mandated IFRS adoption and 0 otherwise.
IFRS_ENF	An indicator variable that takes the value of one if the IFRS-mandating country in which a firm is domiciled also experiences a concurrent and substantive change in enforcement during the IFRS adoption period, and zero otherwise, provided by Christensen et al. (2013).
POST	An indicator variable equal to 1 for fiscal years ending on or after December 2015.

Other firm- and industry-level variables

ACCRUAL	A measure of firm-level financial opacity measured by country-, industry- and year-adjusted total scaled accruals based on Bhattacharya et al. (2003). Scaled accruals are computed using balance sheet and income statement information: $ACCRUAL = (\Delta CA - \Delta CL - \Delta CASH + \Delta STD - DEP + \Delta TP)/lag(TA)$, where ΔCA is the change in total current assets; ΔCL is the change in total current liabilities; $\Delta CASH$ is the change in cash; ΔSTD is the change in the current portion of long-term debt included in total current liabilities; DEP is depreciation and amortization expense; ΔTP is the change in income taxes payable; and $lag(TA)$ is total assets at the end of the previous year.
ANALYST	The total number of analysts following obtained from IBES.
BIG4	An indicator variable equal to 1 if a firm's auditor is a Big 4 auditor and 0 otherwise.
BM	The ratio of the book value of equity to the market value of equity at the beginning of the fiscal year.
EARNVOL	The standard deviation of annual EPS over the sample period divided by the average total assets for the sample period.
INSIDER	The percentage of the firm's common stock held by insiders.
INSTITUTION	Percentage of shares (end-of-year) held by all types of institutional investors obtained from FactSet Ownership Data in WRDS.
LNASSET	The natural logarithm of total assets in millions of U.S. dollars.
LOSS	An indicator variable equal to 1 if a firm reports a loss in the current period and 0 otherwise.
NEWS	An indicator variable equal to 1 if the current-period EPS is greater than or equal to the EPS in the previous period and 0 otherwise.
OPTGRANT	An indicator variable equal to 1 if a firm grants stock options to its directors in a given year and 0 otherwise.
SEGMENT	The total number of business segments reported by a firm.
STKEXCH	The total number of actively traded stock exchanges on which a firm is listed.
EXTFIN	A measure of the dependence on external finance for firms in each two-digit SIC industry, calculated as the industry-level median of the ratio of capital expenditures minus cash flow from operations over capital expenditure for each country. Following Rajan and Zingales (1998), the numerator and denominator are summed over all years for each firm before dividing.
HERF	A measure of competition defined as the Herfindahl index × (−1), where the Herfindahl index is calculated as the sum of the squares of fractional market shares of firms within each two-digit SIC industry for each country year.
HITECH	An indicator variable equal to 1 if a firm is in a high-tech industry (SIC 2833–2836, 8731–8734, 7371–7379, 3570–3577 and 3600–3674) and 0 otherwise.

RD	A measures of firms' dependence on research and development, calculated as the industry-level median of the ratio of R&D expense to total sales. The numerator and denominator are summed over all years for each firm before dividing. We compute this measure for each two-digit SIC industry using U.S. data for the period of 2004–2009.
Country-level variables	
CAPMKT	Total stock market capitalization of listed companies as a percentage of GDP for each country-year, obtained from the World Bank.
RULELAW (*ΔRULELAW*)	A country-year measure of the rule of law index (change in rule of law) obtained from "Economic Freedom of the World" by the Fraser Institute available at http://www.freetheworld.com/datasets_efw.html. The index measures the "Legal Structure and Property Rights" including judicial independence, impartial courts, protection of property rights, military interference in rule of law and politics, integrity of the legal system, legal enforcement of contracts, regulatory restrictions on the sale of real property, reliability of police and business costs of crime. The data sources include the World Bank's "Worldwide Governance Indicators" and "Doing Business," and the World Economic Forum's "Global Competiveness Report."
REGQUA (*ΔREGQUA*)	A country-year measure of regulatory quality (change in regulatory quality) obtained from the World Bank "Worldwide Governance Indicators," available at http://info.worldbank.org/governance/wgi/index.aspx#reports. This index captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.

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Quality of information disclosure, property rights, and bank loans: A bank heterogeneity perspective

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ABSTRACT

Using the context of the financial reform and the development of the non-state sector in China in the past decade, we examine the roles that the quality of information disclosure and property rights play in the allocation of different types of bank credit. We find that foreign banks and policy banks exercise "financial discrimination," and that local commercial banks, large state-owned commercial banks, national joint-stock banks, local city commercial banks, and rural commercial banks not only exercise financial discrimination but also provide significant "financial support" to non-state-owned enterprises by providing more lending opportunities and larger loans. However, when enterprises commit information disclosure violations, the local commercial banks, national joint-stock banks, local city commercial banks, and rural commercial banks reverse their credit decisions and begin to exercise financial discrimination against non-state-owned enterprises. At the same time, large state-owned commercial banks continue to provide financial support to non-state-owned enterprises. We also find that the quality of the information disclosed by enterprises has a moderating effect rather than an intermediary effect on the relationship between property rights and bank loans. Overall, the results of this paper shine new light on the market-oriented reform of the banking industry, and provide new empirical evidence for the presence of financial discrimination in the supply of bank credit. Our findings also have practical implications for solving the financing difficulties of non-state-owned enterprises.

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1. Introduction

Because finance provides the basis for economic growth, the economic growth of transition economies is closely related to the availability of bank loans. In China, the majority of companies, including listed companies, obtain their medium and long-term debt financing from banks, and their external financing is mainly in the form of bank loans.[1] The allocation of bank credit has naturally aroused the attention of many scholars: (Allen et al., 2005; Sun et al., 2006; Fang, 2007; Yu and Pan, 2008; Lu et al., 2009; Liu and Chen, 2018). However, the empirical literature on the allocation of bank credit has produced mixed findings and explanations. From a credit supply perspective, some scholars believe that bank credit is mainly invested in state-owned enterprises, that is, bank loans are subject to "financial discrimination" (Lin and Li, 2004; Lu et al., 2009). Alternatively, from a credit demand perspective, some scholars have found that the lack of loans to non-state-owned enterprises is due to the worse information disclosure and smaller financing demand of non-state-owned enterprises rather than the banks' financial discrimination. Bai et al. (2005) propose that non-state-owned enterprises can alleviate their financing difficulties by improving the quality of the information they disclose. Moreover, Fang (2010) argues that the lack of loans to non-state-owned enterprises is due to their small demand for bank loans and preferences for stock market financing after listing.

We believe that excluding the financing needs of listed companies and including the property rights and information disclosure quality of listed companies in the same framework will help to provide an empirical solution to the credit allocation problem. We use the bank loan approval documents of listed companies to eliminate the financing needs of listed companies. The approval documents represent the listed companies' applications for bank loans, and thus indicate the demand for bank loans. The final approval of the applications is a unilateral decision of the bank, and is not determined by the relationship between the bank credit supply and the financing demands of the listed companies. In the case that state-owned and non-state-owned enterprises both have financing needs, the phenomenon of financial discrimination in the supply of bank credit is tested by observing the opportunities for obtaining bank loans and the differences in the scale of the new bank loans issued to the two types of enterprises.

The financial discrimination of the state-owned banks stems from their natural affiliation with state-owned enterprises. However, little is known about whether national joint-stock banks, local city commercial banks, and rural commercial banks also engage in financial discrimination. Because most of the studies on bank credit decision-making examine all types of banks, few studies have separately examined the large state-owned commercial banks and national joint-stock banks to determine the differences between the credit decisions of the different types of banks. In fact, in China, foreign banks, policy banks, large state-owned commercial banks, national joint-stock banks, local city commercial banks, and rural commercial banks have been competing with each other since 2006. Thus, it is imperative to separate the different types of banks.

Many studies assume that information asymmetry is the main reason for the bank credit mismatch. Although Sun et al. (2006) and Zhengfei (2008) examined the role of accounting information in bank credit decision-making, their investigation concentrated on the period before 2006 and focused on the institutional setting rather than the financial industry. In addition, Lu et al. (2009) found that under certain conditions (when monetary policy is tight), banks exercise financial discrimination in granting loans. Chen et al. (2015) found that financial development promoted the marketization of banks and weakened the level of financial discrimination. However, enterprises have difficulty managing macro-factors such as monetary policy and financial development, and although the non-state-owned sector is developing and expanding, non-state-owned enterprises may need to independently improve the quality of their information disclosure to avoid financing difficulties.

Therefore, taking all A-share listed companies from 2007 to 2016 as a sample, we investigate the roles that property rights and the quality of information disclosure play in the credit decision-making of different types

[1] According to a monetary policy implementation report disclosed by the People's Bank of China, during the 2007–2012 period, the proportion of foreign currency loans, entrustment loans, trust loans, non-discounted bank drafts, corporate bonds, and equity financing in the real economy from the financial system was 65.82%, 7.01%, 6.44%, 7.86%, 9.46%, 3.42%, respectively. In the data collection for this paper, we found that the amount of bank loan finance issued to listed companies was much greater than the amount of equity financing. That is, in addition to IPO financing, the external financing of listed companies in China is still dominated by bank borrowing.

of banks after the market-oriented reform of the financial sector. Our research period covers the important reform and development of China's financial industry over the past 10 years. To reduce the noise of factors other than property rights and the quality of information disclosure, we treat state-owned enterprises and non-state enterprises with propensity score matching (PSM), which is different from the existing research. We find that foreign banks exhibit significant financial discrimination in their credit decisions and that policy banks exercise significant financial discrimination in granting loans to non-state-owned enterprises. Moreover, local commercial banks, large state-owned commercial banks, national joint-stock banks, local city commercial banks, and rural commercial banks do not only not financially discriminate against non-state-owned enterprises but also provide significant financial support to the enterprises. Overall, non-state-owned enterprises have more opportunities for obtaining bank loans. However, when these enterprises make information disclosure violations, the credit decisions of the national joint-stock banks, local city commercial banks, and rural commercial banks reverse, and the banks begin to engage in financial discrimination against the non-state-owned enterprises. At the same time, the large state-owned commercial banks continue to provide financial support to the non-state-owned enterprises.

Our paper makes three main contributions to the literature. First, we provide new empirical evidence of the financial discrimination in the supply of bank credit. By controlling the financing demand of enterprises and treating the PSM of state-owned and non-state-owned enterprises, this paper examines the relationship between property rights and bank loans. We find that the banks act heterogeneously, with only foreign banks and policy banks exercising financial discrimination. In addition to providing significant financial support, the local commercial banks, large state-owned commercial banks, national joint-stock banks, local city commercial banks, and rural commercial banks do not engage in financial discrimination. Overall, non-state-owned enterprises have more opportunities for obtaining bank loans. Second, we provide empirical evidence of how the different types of banks allocate their credit resources after the market-oriented reform of the financial industry. Although a large body of research has examined the subject of bank loans, little empirical evidence has been collected in relation to the development of the financial system over the past decade. Moreover, most studies regard banks as a whole, and it is not clear whether the credit decisions of different types of banks are different. Based on the background of the financial reform and the development of non-state-owned enterprises, this paper comprehensively examines the credit decisions of different types of banks and the different developmental paths of the different types of banks. Finally, the findings of this paper have practical significance in helping solve the financing difficulties of non-state-owned enterprises. Most of the studies on the financing of non-state-owned enterprises in China focus on the financial system, and analyze the necessity of reforming the financial system and developing private financial institutions (Bin and Manlu, 2002; Feng and Yang, 2004). Starting with the characteristics of non-state-owned enterprises, we find that the information disclosure violations of non-state-owned enterprises trigger the financial discrimination of the national joint-stock banks, local city commercial banks, and rural commercial banks. This indicates that the quality of the information disclosed by non-state-owned enterprises plays an important role in determining their access to bank credit resources. Specifically, non-state-owned enterprises tend to use their initiative to actively resolve the information asymmetry between banks and enterprises, which is conducive to easing their financing constraints.

The remainder of this paper is organized as follows. In section two, we present the institutional background, theoretical analysis, and research hypothesis. Section three introduces the research design. In section four, we provide the empirical results and analyses. The final section concludes the paper and discusses the policy implications of the findings.

2. Institutional background, theoretical analysis, and research assumptions

2.1. Reform of China's financial sector

The reform of China's financial industry began with the introduction of a "unified" system under the traditional planned economy. During the transition process, the banks underwent a number of long-term, phased changes. In 1979, the state began to change the financial allocation in the field of fixed asset investment and introduced a pilot project for bank loans (which was implemented nationwide in 1985), which opened the way

for the financial reform. In 1984, the People's Bank of China was designated as the Central Bank, and the Industrial and Commercial Bank of China, Agricultural Bank of China, Bank of China, and China Construction Bank were transformed into national professional banks, thereby forming a dual banking system under government control. In 1994, the China Development Bank, Import and Export Bank of China, and Agricultural Development Bank of China were established. Since then, the policy finance and commercial finance sectors have operated as separate systems, and the national specialized banks have become increasingly commercial. On July 1, 1995, the Commercial Bank Law was put into effect, and the national professional banks became independent legal entities that were responsible for their own profits and losses. As a result, the Industrial and Commercial Bank of China, Agricultural Bank of China, Bank of China, and China Construction Bank began taking formal steps towards becoming commercial banks. In 1996, with the emergence of joint-stock banks, a series of local commercial banks were established. At the same time, approval was given for foreign banks to participate in a pilot scheme in Shanghai. In November 1997, at the inaugural National Conference on Financial Work, it was proposed that steps should be taken to: "further deepen the financial reform, rectify the financial order, and prevent and defuse the accumulated risks in the banking sector. It will take about three years to establish a financial institution system, a financial market system, and a financial regulation and control system that are compatible with the development of the socialist market economy, so as to achieve a remarkable improvement in the level of management and management of the financial industry. Basically, the national financial order has improved markedly".[2]

In 2000, China joined the WTO, and began promoting the development of the banking industry, stating that it would "allow foreign banks to start RMB business with domestic enterprises within two years," adding that, "Within five years, foreign banks will be allowed to have full market access, and RMB retail businesses will be allowed to enjoy national treatment in designated areas." In February 2002, faced with the inevitable impact of foreign banks entering the domestic banking market, the Central Committee held the second National Financial Work Conference, during which it was proposed that "banks must be turned into modern financial enterprises." Overall, the financial reform focused on the comprehensive reform of the wholly state-owned commercial banks. The Committee announced that it was determined to promote the reform of the wholly state-owned commercial banks to reduce the financial risk in the banking sector, stating that "fully qualified solely state-owned commercial banks may be reorganized into state-controlled joint-stock commercial banks and may be listed if the conditions are ripe." The reform of the large-scale state-owned commercial banks opened the way for the subsequent "three steps" reforms that aimed "to reduce the bad assets and to implement an accounting system based on prudent principles and to implement the joint-stock system of listing.[3]" In 2003, the government introduced a new round of financial reforms, which focused on external decentralization and the introduction of economic incentives, to establish a modern enterprise system and regulate the corporate governance of property incentives. These reforms included the increased use of public listings to strengthen the external market constraints and social supervision, the reform of the banking regulatory system, and the establishment of the China Banking Regulatory Commission under the jurisdiction of the State Council in April of the same year. In October, a resolution of the third plenary session of the 16th CPC Central Committee further clarified that the state-owned commercial banks should oversee the transformation of the share-holding system to speed up the disposal of non-performing assets, increase capital, and create the conditions for listing on the market. On December 27, the Banking Regulatory Act was promulgated. At the end of 2006, China abolished the regional and customer restrictions on the management and operation of RMB and foreign exchange by foreign banks, and all of the non-prudential measures restricting the ownership, operation, and establishment of foreign banks. On April 23, 2007, HSBC, Citibank, and Standard Chartered Bank were among the first foreign corporate banks in China to provide comprehensive RMB business to Chinese residents. As a result, through the integration of government and private enterprises, China's banking sector gradually changed from a monopoly industry to commercial banking sector comprising institutions with legal personalities. These banking institutions were further commercialized through the reform of the stock market and the transformation of the urban and rural credit cooperatives. The foreign banks, policy

[2] Source:Communist Party of China News Network.
[3] Excerpt from: Review of the main points of successive national financial work meetings.

banks, large state-owned commercial banks, national joint-stock banks, local city commercial banks, and rural commercial banks then gradually formed a pattern of competition. Under the pressure of customer competition, the state-owned banks were forced to address their governance problems, such as unclear property rights and a lack of incentive and restraint mechanisms, and all banks were encouraged to collect information on and identify high quality customers. As the bank competition intensified, the competition for major customers reduced the banks' profit margins, forcing them to lower the bar and focus instead on the credit needs and worthiness of non-state-owned enterprises.

An important feature of China's banking industry is that the concentrated state-owned bank sector occupies a dominant position in the market. Thus, market restructuring has become one of the main areas of banking reform in China (Liu, 2009). As an important part of the adjustment of the market structure, non-state-owned commercial banks, represented by joint-stock commercial banks and city commercial banks, are considered to be effective means of addressing the excessive concentration of the industry (Weixing and Cheng, 2012). In April 2009, the CBRC issued the Adjustment of Market Access Policy for Branches of Small and Medium-sized Commercial Banks (try out), which relaxed the restrictions on new branches of joint-stock banks and urban commercial banks. As a result of these measures, the market concentration of China's banking industry gradually decreased, and the overall market share of the five state-owned commercial banks, the Industrial and Commercial Bank of China, Agricultural Bank of China, Bank of China, China Construction Bank, and Bank of Communications of China, began to decline. At the same time, the overall market share of the non-state-owned commercial banks (including national joint-stock banks, city commercial banks, rural commercial banks, and foreign banks) began to rise. Although China has a fairly sound banking system, the total assets, deposits, and loans of the large state-owned banks account for more than half of the banking sector. As a result, the development of small and medium-sized banks with comparative advantages in serving small and medium-sized enterprises has lagged behind, which may be the direct cause of the financing difficulties of Chinese enterprises (Yifu et al., 2009). Therefore, further opening up of the banking industry, increased competition, and the development of the non-state-owned commercial banks should improve the financing difficulties of the non-state-owned enterprises in China.

In 1997, the People's Bank of China issued the Circular on Improving the Management of the Loan Size of State-owned Commercial Banks, which abolished the controls on the scale of loans provided by the state-owned commercial banks. In 2004, the lower limit of the bank deposit interest rate and the upper limit of the loan interest rate were liberalized, leading to interest rate marketization. In 2012, the central bank adjusted the floating range of the deposit and loan rates twice. In July 2013, the People's Bank of China officially announced the full liberalization of interest rate controls on loans from financial institutions. The deregulation of the deposit and loan interest rates of financial institutions was a milestone event that deepened the reform of the financial system, leading to a business model based on independent pricing and the principle of supply and demand. In addition to facilitating the optimal allocation of financial resources, the resulting differential pricing strategies and customer agreement on the price of credit have helped financial institutions to improve their financial service levels, play a better role in supporting the real economy, and support economic restructuring and upgrading.

2.2. The development of non-state-owned enterprises and the demise of financial discrimination

In reality, asymmetric information leads to adverse selection and moral hazard problems in the credit market. In an asymmetric information environment, banks, as outsiders of enterprises, cannot effectively monitor the use of their loans through ex post supervision, and thus effectively solve their moral hazard problems as lenders. Accordingly, mitigating the risk and the loss of adverse selection have become the focus of attention of banks. An important way for banks to overcome adverse selection is to select high quality customers. Thus, the customer screening mechanisms based on existing information determine the degree to which banks can overcome their adverse selection problems, and consequently control the flow of credit funds.

Due to China's unique institutional background, the property attributes of state-owned enterprises and non-state-owned enterprises are often regarded as a stable and signaling screening mechanism by banks. Studies have found significant differences in the access to bank credit between non-state-owned enterprises and

state-owned enterprises in China. Chinese banks provide most of their credit to relatively inefficient state-owned enterprises, while the more profitable private companies struggle to access bank loans (Brandt and Li, 2003; Allen et al., 2005). Gamaut et al. (2000) have shown that although non-state-owned enterprises contribute more than 70% of China's GDP, they account for less than 20% of the formal bank loans, with the remaining 80% going to state-owned enterprises. An important reason for this is that banks and other formal financial institutions (especially state-owned financial institutions) engage in obvious financial discrimination against non-state-owned enterprises (Brandt and Li, 2003). Due to the natural affinity between state-owned enterprises and state-owned banks, the state-owned enterprises receive more support from the government and thus have a relatively small operating risk (Yu and Pan, 2008; Sun et al., 2005). In the product and factor markets, state-owned enterprises receive more "preferential treatment," even when in financial difficulty, and can easily obtain government relief. The expectation of soft budget constraints and implicit government guarantees for state-owned enterprises means the banks are happy to provide credit and reduce their regulatory and liability incentives. In contrast, non-state-owned enterprises face more risks than state-owned enterprises because of the lack of an implicit government guarantee, financial subsidies, and preferential policies. Moreover, the operating history of non-state-owned enterprises is relatively short, the financial system of small and medium-sized enterprises is not transparent, the credibility of financial reporting is low, and the bank credit decision-making faces higher costs and risks (Lin and Li, 2004). Thus, banks naturally prefer state-owned enterprises.

However, this situation may improve with the development of the finance sector and the growth of non-state enterprises. Scholars have explored the impact of financial development on bank credit behavior, and suggested that financial development can be promoted by improving the information asymmetries between banks and borrowing firms and reducing the banks' information collection, supervision, and ex post default costs (La Porta et al., 2002; Jigao et al., 2012). Sun and Liu (2011) believe that the process of banking reform and regional marketization has successfully promoted the commercialization of the allocation of bank credit. Zhijun et al. (2011) proposed that with the further deepening of the commercial banking reforms and the orderly opening of the financial market, the management of credit resources by banks has become increasingly standardized and thus greater attention is being paid to the quality of the information disclosed in the credit decision-making process. Chen et al. (2015) have suggested that the reform of China's market economy has led to major changes in the market structure, operating mechanism, participant composition, competition level, and openness of China's financial system (including formal and informal finance), and that the level of financial development has continued to improve. Financial development not only brings about the diversification of social financing channels, but also improves the marketization of the financial system and weakens the financial discrimination that has long existed in the financial sector. Overall, financial development has led to banks becoming more market-oriented and following their credit terms and enterprise risk relations more closely, the private enterprise loan term structure gradually lengthening, and a reduction in the difference between state-owned and non-state-owned enterprises.

As a result of the recent financial development, non-state-owned enterprises have rapidly emerged as a dynamic economic force, and have gradually become the engine of economic growth and industrial transformation. According to the statistics of the All-China Federation of Industry and Commerce, private enterprises contributed 60% of GDP, 75% of technological innovation, 90% of new employment, and 80% of the tax revenue accounted in 2012. The state has also issued a series of important policies and measures to guide and standardize the provision of bank credit and support the development of the non-state-owned economy. For example, in early 2005, the State Council issued "Some opinions on encouraging and guiding the development of the non-public economy, such as individual and private sector," which specifically mentioned the need to increase the financial and tax support for the non-public sector of the economy. Article 31 of the "Opinions of the State Council on encouraging and guiding the healthy development of private investment" issued on May 13, 2010 also stipulates that "all types of financial institutions shall, on the basis of risk prevention, make innovative and flexible use of a variety of financial instruments, increase private investment financing support, strengthen private investment in financial services." Compared with developed countries, China's credit market has two remarkable characteristics. First, the banking industry is in the stage of oligo-

poly competition. Second, the loan market is still a seller's market, because the available bank credit exceeds the demand. As a result, the banks' credit decision-making tends to involve financial discrimination based on property rights. However, we should not assume that the enterprises are passive recipients of the external environment, and thus ignore the active moves that the enterprises take in the face of the external environment. Non-state-owned enterprises faced with credit rationing also have a strong motivation to obtain resources by catering to the needs of banks and actively strengthening the exchange of information with banks. Liu and Jiang (2015) found that from 2006 to 2013, 14.68% of the private listed companies held 2% or more of the shares of banks and were the top 10 shareholders. With the development of the non-state-owned economy, the information costs and risks for banks in obtaining non-state-owned enterprises have gradually reduced.

2.3. Quality of information disclosure and bank loans

Lu et al. (2009) have shown that private listed companies suffer from increased financial discrimination during periods of monetary austerity and that this form of financial discrimination damages the interests of the investors in private listed companies. Rao and Jiang (2013) examined the interaction between monetary policy and bank credit and commercial trust and found that during the periods of monetary policy tightening, non-state-owned enterprises were affected more by limited bank credit than state-owned enterprises. However, the non-state-owned enterprises used commercial credit as a substitute for bank credit financing to make up for the funding gap. Chen et al. (2013a, 2013b) analyzed the impact of industrial policies on bank credit decisions and found that state-owned enterprises received more loans from state-owned banks and that these loans were at the cost of squeezing out loans from non-state-owned enterprises. Chen et al. (2015) found that financial development weakens financial discrimination, gradually extends the borrowing term structure of private enterprises, and reduces the difference between private enterprises and state-owned enterprises.

Aside from the influence of these macro factors, non-state-owned enterprises can take the initiative in addressing the information asymmetry with their banks and actively overcome financial discrimination. According to information asymmetry theory, adverse selection and moral hazard problems arise when the information held by both parties in a transaction is asymmetric. The "bad money drives out good" effect caused by adverse selection results in capital flowing to the low-quality companies, and the function of optimizing the allocation of resources in the capital market is gradually weakened. The agency problems caused by moral hazards also increase the supervision costs of investors. Therefore, it is necessary to unblock the information channels to give full play to the function of optimizing the allocation of resources in the market. Although each bank's judgment criteria and decision-making processes for issuing loans are not known to the outside world, it is certain that a bank will use the financial statements of an enterprise to comprehensively analyze its financial situation and operating results. Overall, accounting information comprehensively reflects the financial situation and operations of enterprises, is an important source of information for banks to evaluate the solvency of enterprises, and helps to reduce the cost of supervision and execution of debt contracts.

Asymmetric information is the main cause of the credit mismatches in the bank credit market. Thus, enhancing the information transparency can reduce the financing constraints (Zhang and Lu, 2007) and corporate borrowing costs (Sengupta, 1998). Some classic studies have examined the usefulness of debt contracts in providing accounting information. Watts and Zimmerman (1986) found that many of the restrictive clauses in debt contracts are based on accounting information and are used to prevent shareholders or managers from encroaching on the creditors' interests by issuing liquidation dividends or investing in high-risk projects. Sun et al. (2006) examined the role of accounting information and the nature of ownership in the loan decisions of Chinese commercial banks. They found that accounting information had a significant impact on the corporate lending behavior of both state-owned and private enterprises, and that the accounting information had a greater impact on private enterprises than state-owned enterprises. Lu et al. (2008) examined the effect of earnings management on the usefulness of the accounting information in debt contracts, and found that enterprises used earnings management to whitewash their financial situation, which in turn affected the creditors' decisions on the debt financing costs. Hu et al. (2008) used corporate financial information to examine the supervisory role of banks as major lenders and found a significantly positive relationship between bank loan interest rates and the financial situation of borrowers. That is, the better the corporate performance, the

lower the interest rate on bank loans. Sun and Liu (2011) found that the scale of new loans provided by banks and the required rate of return were highly related to the historical financial performance of enterprises.

However, we still lack empirical evidence on whether the credit allocation of different types of banks is different. Sun et al. (2013) observed that the efficiency of the credit allocation of commercial banks improved after the reform of the joint-stock system in the banking sector, and the improved financial performance helped the enterprises to obtain more long-term loans. They also found that the credit screening and risk pricing of joint-stock commercial banks were stronger than those of other types of banks. However, their observation period is 2004–2011, during which time the interest rate controls of banks had not been completely liberalized, and their sample only contains a small proportion of city commercial, agricultural, and foreign banks. Therefore, given the institutional and financial reforms over the past 10 years, it is still necessary to analyze the differences in the allocation of credit by different types of banks by using more detailed bank loan application documents.

Sun et al. (2013) proposed that the efficiency of the credit allocation and pricing of different types of banks is one of the most important criteria for determining the achievements of the banking reforms. We propose that after nearly a decade of financial reform and the development of the non-state-owned enterprise sector, if banks allocate credit according to the quality of the information disclosed by enterprises, then this will reflect the marketization of the banks to some extent. In terms of the development of the banking industry, the banking reforms implemented in China, such as the stripping of non-performing loans, the reform of the shareholding system, the introduction of strategic investors, public listings, and the marketization of interest rates, have provided banks with low-cost financing tools that have enabled state-owned enterprises to develop into self-financing business entities. If the market-oriented reform of the banking industry has been effective, the loan contracts between banks and enterprises should tend to be optimal contracts (Sun and Liu, 2011). That is, the banks dynamically adjust the allocation of credit in accordance with the quality of the information disclosed by the enterprises. Enterprises that disclose good quality information can obtain more bank loans, whereas those with poor information disclosure cannot obtain bank loans. Therefore, by examining the allocation of credit by different types of banks and thus the quality of information the enterprises disclose, we should be able to reveal the effects of the market-oriented reform process on different types of banks.

In view of the above, we put forward the following hypothesis:

Hypothesis one: *With the improvement of the institutional environment, the difference in the levels of financial discrimination between state-owned and non-state-owned enterprises becomes less significant.*

Hypothesis two: *Following the market-oriented reform of the financial industry, the quality of the information disclosed by enterprises becomes an important basis for the credit decision-making of commercial banks in China.*

3. Research and design

3.1. Sample selection and data collection

We selected all of the A-share listed companies from 2007 to 2016 as the initial sample. Then, according to the needs of the study, we excluded the following observations from the sample: (1) financial companies and ST and PT companies; (2) companies with debt ratios greater than 100 and insolvent companies; and (3) all companies with missing data. We also excluded the outliers by winsorizing the continuous variables at the 1% and 99% levels. The relevant data come from the CSMAR database and Wind information.

The sample starts in 2007 because by the end of 2006, China's banking industry had been open to the outside world for five years and the banking industry had entered a new era. Most of the studies on banks in China regard the banking sector as a whole. Although a few studies have taken large state-owned commercial banks and national joint-stock banks as sub-samples, little attention has been paid to the differences between the credit decisions of different types of banks. In fact, in recent years, the foreign, local city commercial, and

rural commercial banking sectors have also shown strong development. China's banking reforms have introduced competition between the foreign banks, policy banks, large state-owned commercial banks, national joint-stock banks, local city commercial banks, agricultural banks, and other types of banks. Thus, it is imperative to include foreign banks, local city commercial banks, and agricultural firms in the analysis. According to the classification of the banks in China by the CBRC, and with reference to Chen et al. (2010), the classification of the banks examined in this paper is shown in Table 1.

Our sample includes 71 foreign banks with branches in China, 3 policy banks, and 6 large state-owned commercial banks. China Post Savings Bank is also included, along with 12 national joint-stock banks and 233 local city commercial banks, local rural commercial banks, agricultural union banks, and rural credit cooperatives (according to the characteristics of the system, village and town banks are not easily classified). Overall, the sample covers the vast majority of Chinese banks, and is thus highly representative.

1. Dependent variables

According to Yeàn (2005), the credit decisions of a bank mainly focus on whether to extend a loan, the size of the loan, and the credit term structure. Based on the bank loan application documents collected from the listed companies, we use the bank loan signing rates and new bank loan scales as indicators to investigate the credit decisions of banks. These two indicators reflect the financing needs of the enterprises. The data for the indexes of bank loans and the size of new bank loans were obtained manually.

2. Independent variables

(I) Nature of property rights

Following Shaojia et al. (2003), we take the nature of the ultimate controller as the standard for defining the property rights of listed companies, and divide the sample companies into state-owned enterprises and non-state-owned enterprises.

(II) Quality of information disclosure

The quality of the information disclosed by enterprises is determined based on the overt negative event of enterprise information disclosure violation. The quality of information disclosure is set as a virtual variable that accords enterprise information disclosure violations the value of 1, and 0 otherwise.

We individually checked the punishments of listed companies recorded in the "China listed companies illegal handling database" and the CSRC punishment notices. According to the provisions of the Supreme People's Court on hearing civil compensation cases related to the publication of false statements in the securities market issued in January 2003 (Article 17), and following Xin et al. (2013), in this paper, "delay disclosures," "false statements," and "material omissions" are considered to be "information disclosure violations." The actions of the CSRC, stock exchanges, and local securities regulatory bureaus are used as the standards for determining the punishment for violating the regulations. The punishments can be divided into four types: order rectification, notification and criticism, public condemnation, and warning or fine (confiscation of illegal income). If a company has several violations of the same level in the same year, only the first punishment is recorded.

In addition to information disclosure violations, the violations of listed companies can include the illegal purchase of stocks, unauthorized use of funds, occupation of listed company assets by large shareholders, manipulation of stock prices, fraudulent listing, and illegal guarantees. Because these violations may also affect the banks' credit decisions, we remove them to keep the sample clean. Therefore, our experimental sample comprises the occurrence of delayed disclosure, false statements, material omissions, and other information disclosure violations, and our control sample comprises the observations with no information disclosure violations. There are no "innocent" observations of illegal purchases of stocks, unauthorized changes in the use of funds, major shareholders' occupation of assets of listed companies, manipulation of stock prices, fraudulent listing, illegal guarantee, and other securities violations.

Table 1
Classification of different types of banks.

Foreign Banks	(71)		HSBC (China) Co., Ltd., Standard Chartered Bank, Citibank, etc.
Local banks	Policy banks (3)		China Development Bank, Agricultural Development Bank of China, Export-import Bank of China
	Local commercial banks	Large state-owned commercial Banks (6)	Industrial and Commercial Bank of China, Agricultural Bank of China, Bank of China, China Construction Bank, Bank of Communications, China Postal Savings Bank
		National Joint-stock Banks (12)	CITIC Bank, China Everbright Bank, Huaxia Bank, Guangfa Bank, Shenzhen Development Bank (Ping An bank), China Merchants Bank, Shanghai Pudong Development Bank, Industrial Bank, Minsheng Bank, Hengfeng Bank, Zhejiang Merchants Bank, Bohai Bank
		Local city commercial banks and rural commercial banks (2 3 3)	Beijing Bank and the other 110 local city comptoirs, Chongqing Rural Commercial Bank and the other 65 agricultural comptoirs, Anhui Qingyang Rural Cooperative Bank, and the other 31 agricultural companies, Xiamen Rural Credit Cooperation Association and the other 27 agricultural credit societies

We collected the bank loan approval documents of listed companies. After matching the observations of information disclosure violations, the experimental group comprised 332 company annual observations, and the control group comprised 12,856 company annual observations. The ratio of observed values between the experimental and control samples is about 1:39.

3. Control variables

Following Sun et al. (2006), Zhengfei (2008) and Xing (2018), we use the following control variables: (1) financing demand; (2) solvency; (3) tangible asset ratio; (4) company size; (5) profitability; (6) growth opportunity; (7) equity balance; (8) monetary policy; (9) economic cycle; (10) annual fictitious variable; and (11) industry virtual variable. The specific variable definitions are shown in Table 2.

3.2. Test model

In China, non-state-owned enterprises and state-owned enterprises differ in terms of scale and property rights. The size of an enterprise and its ability to obtain credit may be highly related. To control the influence of these kinds of factors, we first deal with state-owned enterprises and non-state-owned enterprises separately using PSM with the following matching variables: (1) financing demand; (2) solvency; (3) tangible asset ratio; (4) company size; (5) profitability; (6) growth opportunities; and (7) equity checks and balances. The matching method is the 1:4 nearest neighbor matching method.

After the PSM processing, we use model (1) to test hypothesis 1, add the quality of information disclosure and its intersection with property rights to model (1) to obtain model (2), and test hypothesis 2 using model (2).

$$\begin{aligned} Contractrate_{i,t}/Loan_{i,t} = {} & \beta_0 + \beta_1 State_{i,t} + \beta_2 Fcfi_{i,t} + \beta_3 Lev_{i,t} + \beta_4 \mathrm{Tan}\ g_{i,t} + \beta_5 Size_{i,t} + \beta_6 Roe_{i,t} \\ & + \beta_7 Tbq_{i,t} + \beta_8 Shrz_{i,t} + \beta_9 M2_{i,t} + \beta_{10} GDP_{i,t} + \beta_{11} Year_{i,t} + \beta_{12} Industry_{i,t} + \varepsilon \end{aligned} \tag{1}$$

$$\begin{aligned} Contractrate_{i,t}/Loan_{i,t} = {} & \mu_0 + \mu_1 Info_{i,t} * State_{i,t} + \mu_2 Info_{i,t} + \mu_3 State_{i,t} + \mu_4 Fcfi_{i,t} + \mu_5 Lev_{i,t} \\ & + \mu_6 \mathrm{Tan}\ g_{i,t} + \mu_7 Size_{i,t} + \mu_8 Roe_{i,t} + \mu_9 Tbq_{i,t} + \mu_{10} Shrz_{i,t} + \mu_{11} M2_{i,t} \\ & + \mu_{12} GDP_{i,t} + \mu_{13} Weiglx_{i,t} + \mu_{14} Chufly_{i,t} + \mu_{15} Chuffs_{i,t} + \mu_{16} Year_{i,t} \\ & + \mu_{17} Industry_{i,t} + \varepsilon \end{aligned} \tag{2}$$

The models indicate the signing rate of bank loans and the size of new bank loans, respectively. Considering the dependent variables and the characteristics of the data with left truncation (0 at truncation), the Tobit regression method is used to test the models. We also construct a model to further examine whether regulation has an intermediary effect in the relationship between property rights and bank loans. The first step of the intermediary effect model is to investigate the relationship between property rights and bank loans by directly applying model (1). The second step of the intermediary effect model is to investigate the relationship between property rights and the quality of information disclosure using model (3). The third step of the intermediary effect model is to investigate the relationship between property rights, the quality of information disclosure, and bank loans using model (4).

$$\begin{aligned} Info_{i,t} = {} & \alpha_0 + \alpha_1 State_{i,t-1} + \alpha_2 Fcfi_{i,t-1} + \alpha_3 Lev_{i,t-1} + \alpha_4 \mathrm{Tan}\ g_{i,t-1} + \alpha_5 Size_{i,t-1} + \alpha_6 Roe_{i,t-1} + \alpha_7 Shrz_{i,t-1} \\ & + \alpha_8 Audit_{i,t-1} + \alpha_9 Year_{i,t} + \alpha_{10} Industry_{i,t} + \varepsilon \end{aligned} \tag{3}$$

$$\begin{aligned} Contractrate_{i,t}/Loan_{i,t} = {} & \lambda_0 + \lambda_1 State_{i,t} + \lambda_2 Info_{i,t} + \lambda_3 Fcfi_{i,t} + \lambda_4 Lev_{i,t} + \lambda_5 \mathrm{Tan}\ g_{i,t} + \lambda_6 Size_{i,t} \\ & + \lambda_7 Roe_{i,t} + \lambda_8 Tbq_{i,t} + \lambda_9 Shrz_{i,t} + \lambda_{10} M2_{i,t} + \lambda_{11} GDP_{i,t} + \lambda_{12} Year_{i,t} \\ & + \lambda_{13} Industry_{i,t} + \varepsilon \end{aligned} \tag{4}$$

3.3. Definitions of the variables

Table 2

Table 2
Variable definitions.

Variable	Name	Definition and calculation
Dependent variable		
Signing rate of foreign bank loans	Wzcontractrate	Number of successful contracts with foreign banks/Number of applications for loans from foreign banks
The size of new loans from foreign banks	Wzloan	Total loans granted by foreign banks/Total assets at the end of the period
The signing rate of policy bank loans	Zccontractrate	Number of successful contracts with policy banks/Number of applications for loans from policy banks
The size of new loans from policy banks	Zcloan	Total loans granted by policy banks/Total assets at the end of the period
Loan signing rate of local commercial banks	Sycontractrate	Number of successful contracts with local commercial banks/Number of applications for loans from local commercial banks
New loan scale of local commercial banks	Syloan	Total loans granted by local commercial banks/Total assets at the end of the period
Loan signing rate of large state-owned commercial banks	Gysycontractrate	Number of successful contracts with large state-owned commercial banks/Number of applications for loans from large state-owned commercial banks
New loan scale of large state-owned commercial banks	Gysyloan	Total loans granted by large state-owned commercial banks/Total assets at the end of the period
National joint-Stock bank loan signing rate	Gfzcontractrate	Number of successful contracts with national joint-stock banks/Number of applications for loans from national joint-stock banks
New loan scale of national joint-stock bank	Gfzloan	Total loans granted by national joint-stock banks/Total assets at the end of the period
Loan signing rate of local city commercial banks and rural commercial banks	Dfcncontractrate	Number of successful contracts with local city commercial banks and rural commercial banks/Number of applications for loans from local city commercial banks and rural commercial banks
New loan scale of local city commercial banks and rural commercial banks	Dfcnloan	Total loans granted by local city commercial banks and rural commercial banks/Total assets at the end of the period
Independent variables		
Property right	State	According to the nature of the ultimate controller, non-state-owned enterprises take 1, otherwise 0
Quality of information disclosure	Info	Virtual variables, when an enterprise commits an information disclosure violation, the quality of information disclosure takes the value of 1, otherwise 0
Control Variables		
Financing	Fcfi	(Net operating cash flow-net investment cash flow)/end total assets
Debt paying ability	Lev	Total liabilities at end of period/total assets at end of period
Tangible assets	Tang	NET fixed assets at end/total assets at end of period
The company size	Size	Natural logarithm of total assets at the end of the period
Earn profit	Roe	End-of-tax profit/average owner's equity
Grow up	Tbq	End market value/book value
Equity checks and balances	Shrz	Z index, the ratio of the shareholding ratio of the largest shareholder and the second largest shareholder of a company
Audit	Audit	The standard unqualified opinion is 0, otherwise it is 1
Monetary policy	M2	The annual ending value of M2
Economic cycle	GDP	Real GDP growth rate
Violation type	Weiglx	Dummy variables, major omissions, false statements (fictitious profits, false disclosure), delayed disclosure, or improper general accounting treatment falling into three categories
Source of punishment	Chufly	The virtual variables include CSRC, Shanghai stock exchange, Shenzhen stock exchange, and local securities regulatory bureau, a total of three classes
Punishment	Chuffs	Virtual variable, warning, fine (with respect to illicit gains), denounced and criticized, and other (order rectification), a total of four classes
Year	Year	Virtual variables that take 1 when they belong to the year, otherwise 0
Industry	Industry	The dummy variables are divided into 21 industries according to the industry codes and classification of the CSRC in 2001.

4. Empirical results and analysis

4.1. Descriptive statistics

Table 3 reports the distribution of the information disclosure violations of the listed companies. Overall, the information disclosure violations of listed companies are increasing year by year. The local securities and exchange bureaus issued the most punishments, accounting for 49% of the total sample. With respect to the type of punishment, public condemnations and warnings, fines, and confiscation of illegal gains accounted for 12 percent of the total sample, whereas the remaining 88 percent were criticized and ordered to rectify. In terms of the type of violation, there is no significant difference in the proportions of the three violations in the total sample, namely delayed disclosures (improper accounting treatment), false statements, and material omissions.

Because more private enterprises are directly listed on the small and medium board and the growth enterprise board, we cover the sample of the small and medium board and the growth enterprise board. The results of the analysis of the company-annual sample structure are shown in Table 4. Table 4 shows that there are 6196 annual observations of state-owned enterprises and 7172 of non-state-owned enterprises. The probability of violation of information disclosure in both types of enterprises is 2.5%. State-owned enterprises are listed most frequently on the main board of the Shanghai stock market, and non-state-owned enterprises are listed most frequently on the small and medium boards. The largest number of violations of information disclosure is for non-state-owned enterprises listed on the Shenzhen main board, with an annual average of 3.5 percent, followed by state-owned enterprises listed on the small and medium board, with an annual average of 3.4 percent.

To further analyze the differences in the allocation of credit by the different types of banks, we analyze the bank loan application documents in detail. The results of the analysis are shown in Tables 5–8. According to Panel A of Table 5, enterprises apply for loans from national joint-stock banks, large state-owned commercial banks, local city commercial banks, rural commercial banks, foreign banks, and policy banks, with the first three categories belonging to local commercial banks. According to Table 7, state-owned enterprises apply for loans from large state-owned commercial banks, national joint-stock banks, local city commercial banks,

Table 3
Sample distribution of information disclosure violations of listed companies.

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Source of punishment:											
CSRC	0	1	1	0	2	3	1	0	4	4	16
Shanghai stock exchange	1	0	0	1	0	2	5	5	24	19	57
Shenzhen stock exchange	3	3	6	2	4	13	17	10	16	22	96
Local securities regulatory bureau	0	0	1	2	4	20	40	29	30	37	163
Total	**4**	**4**	**8**	**5**	**10**	**38**	**63**	**44**	**74**	**82**	**332**
Punishment way:											
Warning, fine (illicit gains)	0	1	1	0	1	2	0	3	6	10	24
Denounced	2	1	0	2	1	2	2	1	1	3	15
Criticized	2	2	6	1	3	7	7	9	7	9	53
Others (order rectification)	0	0	1	2	5	27	54	31	60	60	240
Total	**4**	**4**	**8**	**5**	**10**	**38**	**63**	**44**	**74**	**82**	**332**
Violate compasses type:											
Major omissions	1	3	6	2	5	18	22	15	26	32	130
False statement (fictitious profit, false disclosure)	1	0	0	2	3	7	19	12	23	19	86
Delayed disclosure or improper general accounting treatment	2	1	2	1	2	13	22	17	25	31	116
Total	**4**	**4**	**8**	**5**	**10**	**38**	**63**	**44**	**74**	**82**	**332**

Note: Some of the bank loan approval documents of listed companies are missing, and the sample of information disclosure violations is small. This table shows the statistical results of the sample after data merging, so the sample size is not large. However, according to the listed company single bank loan data classification regression, the regression model retains numerous observed values.

Table 4
Corporate-annual sample structure analysis.

Property rights	Plate	Quality of information disclosure		Sample book	Information disclosure violation ratio
		Info = 0	Info = 1		
State = 0	Shenzhen	2195	44	2239	0.020
	Small and medium board	470	16	486	0.034
	The gem	70	0	70	0.000
	Shanghai	3309	92	3401	0.028
	Total	6044	152	6196	0.025
State = 1	Shenzhen	768	28	796	0.035
	Small and medium board	3087	82	3169	0.026
	The gem	1659	26	1685	0.015
	Shanghai	1478	44	1522	0.029
	Total	6992	180	7172	0.025

Note: The total sample comprises 9411 observations because some of the same companies make repeated violations in different years, and the property rights of a small number of samples cannot be determined. Because of these two factors, there is a slight difference between this sample and the total sample.

Table 5
Sample analysis of bank loan applications.

Panel A: Annual descriptive statistics of the bank loan application sample

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	**Total**
Foreign banks	28	51	57	73	99	164	266	370	435	518	2061
Policy banks	22	42	37	36	56	115	166	204	200	237	1115
Local commercial banks	278	604	681	651	704	1175	1814	2086	2331	2434	12,758
Large state-owned commercial banks	186	368	414	387	413	673	1051	1277	1410	1419	7598
National joint-stock banks	128	309	357	360	397	670	1124	1315	1497	1668	7825
Local city commercial banks and rural commercial banks	37	91	139	147	184	298	461	639	794	909	3699

Panel B: Descriptive statistics of the bank loan application sample by industry

Industry code	A	B	C0	C1	C2	C3	C4	C5	C6	C7	C8
Foreign banks	30	57	83	55	7	61	202	122	183	323	119
Policy banks	86	35	60	14	8	25	91	108	125	202	51
Local commercial banks	252	375	379	270	38	257	1203	746	1062	2007	722
Large state-owned commercial banks	155	221	254	176	27	154	787	459	701	1214	427
National joint-stock banks	143	233	186	149	20	164	689	492	644	1262	393
Local city commercial banks and rural commercial banks	96	88	102	61	7	71	355	213	305	526	193
Industry code	D	E	F	G	H	I	J	K	L	M	**Total**
Foreign banks	36	37	36	177	131	0	161	60	19	77	1976
Policy banks	46	32	31	57	35	0	13	22	9	29	1079
Local commercial banks	340	318	251	1163	850	0	1036	421	177	405	12,272
Large state-owned commercial banks	211	181	197	561	522	0	521	221	75	244	7308
National joint-stock banks	189	208	111	821	568	0	602	250	108	266	7498
Local city commercial banks and rural commercial banks	62	84	27	427	302	0	320	143	57	116	3555

Note: Although the numbers of the Panel A and Panel B samples are slightly different because of the lack of industry codes, this does not affect the subsequent test conclusions. The financial and insurance sector (I) was eliminated, so the industry sample is 0.

Table 6
Comparison of different types of bank loans.

Bank loan	Variable	Obs	Mean	Std. Dev.	Min	Max
Bank loan signing rate	Wzcontractrate	2061	0.042	0.199	0	1.000
	Zccontractrate	1115	0.054	0.222	0	1.000
	Sycontractrate	12,758	0.067	0.240	0	1.000
	Gysycontractrate	7598	0.067	0.245	0	1.000
	Gfzcontractrate	7825	0.054	0.220	0	1.000
	Dfcncontractrate	3699	0.042	0.196	0	1.000
New bank loans	Wzloan	2061	0.001	0.019	0	0.782
	Zcloan	1115	0.012	0.240	0	7.895
	Syloan	12,758	0.004	0.027	0	0.793
	Gysyloan	7598	0.003	0.026	0	0.793
	Gfzloan	7825	0.002	0.019	0	0.556
	Dfcnloan	3699	0.001	0.011	0	0.440

rural commercial banks, foreign banks, and policy banks, whereas non-state-owned enterprises apply for loans from national joint-stock banks, large state-owned commercial banks, local city commercial banks, rural commercial banks, foreign banks, and policy banks. It can be seen that state-owned enterprises and non-state-owned enterprises prefer national joint-stock banks and large state-owned commercial banks.

According to Panel B of Table 5, the sectors that make the most applications for loans by industry are machinery, equipment, and instrumentation (C7), followed by petroleum, chemistry, and plastics (C4), and metals and non-metals (C6). The industries that make the least applications for loans are timber and furniture (C2) and the communications and culture industry (L).

Table 7
Property rights and the T Tests for different types of bank loans.

Variable	State-owned enterprises		Non-state-owned enterprises		
	G1(0)	Mean1	G2(1)	Mean2	Mean difference test
Wzcontractrate	877	0.0591	1102	0.0305	0.0286***
Zccontractrate	624	0.0688	459	0.0349	0.0339**
Sycontractrate	5735	0.0733	6573	0.0615	0.0119***
Gysycontractrate	3584	0.0747	3757	0.0607	0.0140**
Gfzcontractrate	3302	0.0627	4215	0.0483	0.0144***
Dfcncontractrate	1619	0.0387	1928	0.0441	−0.0055
Wzloan	877	0.0022	1102	0.0004	0.0018**
Zcloan	624	0.0199	459	0.0014	0.0185
Syloan	5735	0.0038	6573	0.004	−0.0002
Gysyloan	3584	0.0036	3757	0.0033	0.0003
Gfzloan	3302	0.0021	4215	0.0027	−0.0005
Dfcnloan	1619	0.0011	1928	0.0015	−0.0004

Note: The sample in Table 7 excludes observations in which the property rights cannot be determined and is therefore smaller than the sample in Table 6.

Table 8
Quality of information disclosure and T Tests of different types of bank loans.

Variable	Clean group		Information disclosure violation group		
	G1(0)	Mean1	G2(1)	Mean2	Mean difference test
Wzcontractrate	2010	0.0425	51	0.0196	0.0229
Zccontractrate	1089	0.0541	26	0.0385	0.0156
Sycontractrate	12,449	0.0669	309	0.0601	0.0068
Gysycontractrate	7440	0.0673	158	0.0422	0.0251
Gfzcontractrate	7635	0.0545	190	0.049	0.0055
Dfcncontractrate	3591	0.0401	108	0.1049	−0.0649***
Wzloan	2010	0.0012	51	0	0.0011
Zcloan	1089	0.0048	26	0.3036	−0.2988***
Syloan	12,449	0.0039	309	0.003	0.0009
Gysyloan	7440	0.0034	158	0.001	0.0024
Gfzloan	7635	0.0024	190	0.0017	0.0007
Dfcnloan	3591	0.0013	108	0.0041	−0.0028**

Table 6 shows that the largest state-owned commercial banks have the highest probability of successful loan applications, followed by joint-stock banks and policy banks in second place, and local city commercial banks, rural commercial banks, and foreign banks in third place. The largest new bank loans are from policy banks, followed by large state-owned commercial banks, national joint-stock banks, local commercial banks, and rural commercial banks and foreign banks, which are tied for fourth. Table 7 shows that the probability of a state-owned enterprise making a successful loan application is the highest for large state-owned commercial banks, followed by policy banks, national joint-stock banks, foreign banks, local city commercial banks, and rural commercial banks. The policy banks provide the largest new bank loans to state-owned enterprises, followed by large state-owned commercial banks, foreign banks, national joint-stock banks, local city commercial banks, and rural commercial banks. Non-state-owned enterprise banks have the highest probability of successful loan applications, followed by national joint-stock banks, local city commercial banks, rural commercial banks, policy banks, and foreign banks. The largest new bank loans to non-state-owned enterprises are provided by the large state-owned commercial banks, followed by the full joint-stock banks, local city commercial banks, agricultural banks, policy banks, and foreign banks. Thus, it can be seen that large state-owned commercial banks and policy banks are relatively "friendly" in offering loans to state-owned

enterprises, whereas the large state-owned commercial banks and all-joint-stock banks are relatively friendly in offering loans to non-state-owned enterprises.

According to our statistics, on average, state-owned enterprises submit 37 bank loan applications per year to all types of banks. Moreover, during the 10 year sample period, private enterprises mostly apply for loans from large state-owned banks. The above analysis also shows that in terms of their loan applications to different types of banks, the rankings for state-owned enterprises and non-state-owned enterprises are basically the same. Large state-owned commercial banks and all joint-stock banks are ranked first, followed by local city commercial banks, rural commercial banks, foreign banks, and policy banks. However, this ranking does not directly correspond with the probability of a successful bank loan application and the scale of new bank loans. Although state-owned and non-state-owned enterprises have basically the same ranking for loan applications to different types of banks, the probability of successful bank loan applications and the scale of new bank loans vary greatly among enterprises with different property rights (see Table 7). To a certain extent, this shows that rather than reflecting the independent choices of the enterprises, the findings are determined by the decisions of the banks based on property rights.

Table 7 shows that foreign banks and policy banks exercise financial discrimination, in that they provide more and larger loans to non-state-owned enterprises. Although local commercial banks, large state-owned commercial banks, and national joint-stock banks exercise significant financial discrimination in approving bank loans, there is no significant financial discrimination in the scale of new bank loans issued. Moreover, there is evidence suggesting these banks provide financial support to enterprises, but it is not statistically significant. Table 7 shows the differences in the allocation of credit among the different types of banks.

Table 8 shows the T test results for the bank loans that the different types of banks provide to enterprises with different levels of information disclosure quality. According to Table 8, most banks pay attention to the quality of the information disclosed by enterprises, except for policy banks and local city commercial and agricultural banks. Overall, the banks provide more and larger loans to the "innocent" firms that disclose better quality information, and fewer and smaller loans to the "illegal" firms that disclose poor quality information. Table 8 shows that the quality of information disclosure is an important factor in the credit decisions of most banks in China, and that the distribution of bank credit is market-oriented. The specific reasons why policy banks, local city commercial banks, and rural commercial banks give more loans to the poor quality of information disclosure violation sample will be examined in a future study.

Table 9 gives the descriptive statistics of the main variables. From Table 9, we can see that the non-state-owned enterprises account for 53 percent of the total sample, and that 2.5 percent of enterprises disclose poor quality information. The ratio of tangible assets to total company assets is 23.1, the ratio of assets to liabilities is 50 percent, and the average return on net assets is 4 percent.

Table 10 shows the Spearman correlation coefficients between bank loans and corporate characteristics. According to Table 10, there are significant correlations between bank loans and the characteristic variables of the companies, with the maximum correlation coefficient between the variables being 0.402, and the correlation between the variables being more reasonable.

Table 9
Descriptive statistics of the major variables.

Variable	Mean	N	sd	min	p25	p50	p75	max
State	0.53	13,188	0.499	0	0	1	1	1
Info	0.025	13,188	0.154	0	0	0	0	1
Fcfi	0.048	13,188	0.099	−0.232	−0.01	0.035	0.099	0.394
Tang	0.213	13,188	0.163	0.002	0.083	0.181	0.31	0.742
Size	22.105	13,188	1.18	18.891	21.254	21.976	22.821	25.916
Shrz	11.748	13,188	18.711	1.004	2.149	5.724	14.358	150.116
Tbq	2.609	13,188	1.834	0.899	1.431	2.04	3.111	13.159
Lev	0.5	13,188	0.206	0.043	0.345	0.5	0.652	1
Roe	0.04	13,188	0.085	−0.425	0.009	0.033	0.074	0.358
M2	971275.9	13,188	357358.1	364093.7	885,224	1,154,640	1,356,308	1,550,067
GDP	0.015	13,188	0.036	−0.13	0.015	0.023	0.03	0.037

Table 10
Spearman correlation coefficients.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
(1) Wzcontractrate	1															
(2) Wzloan	0.902***	1														
(3) Zccontractrate	0.596***	0.592***	1													
(4) Zcloan	0.669***	0.665***	0.950***	1												
(5) Sycontractrate	0.570***	0.507***	0.652***	0.582***	1											
(6) Syloan	0.530***	0.555***	0.597***	0.601***	0.948***	1										
(7) State	−0.067***	−0.066***	−0.080***	−0.088***	−0.023**	−0.021**	1									
(8) State*Info	−0.00400	−0.00100	−0.0290	−0.0270	−0.00900	−0.00500	0.101***	1								
(9) Info	−0.0190	−0.0140	−0.0130	−0.00900	0	0.00200	0.015***	0.746***	1							
(10) Fcfi	0.0160	0.0110	0.054*	0.055*	0.015*	0.00700	0.030***	−0.00400	−0.018***	1						
(11) Tang	0.051**	0.0300	0.0190	0.0370	0.0120	0.00900	−0.181***	−0.014***	0.00100	0.247***	1					
(12) Size	−0.00800	0.0250	0.111***	0.084***	0.053***	0.053***	−0.317***	−0.030***	−0.013***	0.090***	0.039***	1				
(13) Shrz	0.059***	0.066***	0.066**	0.068**	0.058***	0.051***	−0.275***	−0.038***	−0.023***	−0.061***	0.087***	0.108***	1			
(14) Tbq	−0.063***	−0.068***	−0.140***	−0.124***	−0.095***	−0.092***	0.286***	0.031***	0.010***	0.020***	−0.131***	−0.581***	−0.162***	1		
(15) Lev	0.086***	0.087***	0.067**	0.061**	0.095***	0.095***	−0.305***	0.007*	0.044***	−0.122***	0.085***	0.402***	0.170***	−0.415***	1	
(16) Roe	−0.0310	−0.0270	0.0220	0.00300	0.041***	0.034***	0.057***	−0.023***	−0.039***	0.347***	−0.108***	0.135***	−0.058***	0.115***	−0.088***	1

Note: *, *, and * represent significance at the 1%, 5%, and 10% level, respectively.

4.2. Property rights and different types of bank loans

Because the property rights of state-owned and non-state-owned enterprises differ, their company characteristics may also affect their bank loan applications. To make the results more "clean," we carried out PSM for state-owned enterprises and non-state-owned enterprises using the 1:4 nearest neighbor matching method. Fig. 1 intuitively shows that most of the samples are in the common value range (On support).

Table 11 reports the distribution of a pair of four-nearest neighbor matched samples. Out of a total of 13,188 observations, 29 are excluded from non-state-owned enterprises and 15 from state-owned enterprises, leaving 13,144 valid observations: 6963 for non-state-owned enterprises and 6181 for state-owned enterprises. After matching, the sample loss is reduced, with the absolute value of the standardized deviation of each variable being controlled within 10%. The T test results show that the difference between the groups is not significant (significance level of 5%), which meets the balance assumption of the PSM method.

Table 12 reports the T-test results for bank loans to state-owned and non-state-owned enterprises by the different types of banks after PSM treatment. According to Table 12, foreign banks and policy banks exercise significant financial discrimination in terms of bank loan opportunities and the scale of bank loans. Local commercial banks, especially large state-owned commercial banks and national joint-stock banks, show no significant financial discrimination. Moreover, the local city commercial banks and rural commercial banks not only exercise no financial discrimination, but also provide financial support in giving non-state-owned enterprises more bank loan opportunities and larger bank loans. The T-test results after the PSM treatment preliminarily support Hypothesis 1.

Then, based on model (1), after controlling the influence of other relevant factors, we test the existence of financial discrimination in different types of banks. The results are shown in Tables 13 and 14. As can be seen from Tables 13 and 14, financing demand, tangible asset ratio, firm size, profitability, growth opportunities, equity checks and balances, monetary policy, and economic cycle are all important factors influencing banks' credit decision-making. After controlling these factors, foreign banks show significant financial discrimination, and policy banks show significant financial discrimination in terms of loan scale. Local commercial banks, large state-owned commercial banks, national joint-stock banks, local city commercial banks, and

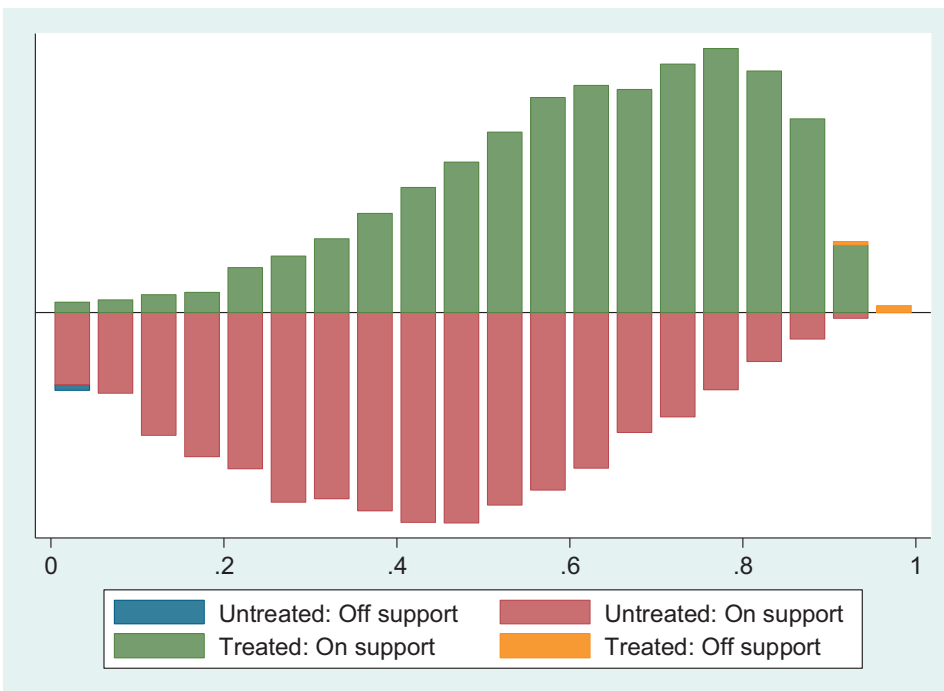

Fig. 1. Common value range diagram of the tendency scores.

Table 11
Nearest neighbor matching sample distribution.

Sample distribution	Unpaired sample	Paired samples	The total sample
State = 0	15	6181	6196
State = 1	29	6963	6992
The total sample	44	13,144	13,188

Table 12
T-test of bank loans to state-owned and non-state-owned enterprises by different types of banks (after PSM treatment).

Bank loans	State-owned		Non-state-owned		The mean test
	N	Means	N	Means	T test
Wzcontractrate	814	0.06	906	0.035	0.025**
Wzloan	814	0.002	906	0	0.002*
Zccontractrate	528	0.072	436	0.047	0.025*
Zcloan	528	0.022	436	0.004	0.018
Sycontractrate	5017	0.073	5278	0.068	0.005
Syloan	5017	0.005	5278	0.005	0
Gysycontractrate	3071	0.07	3120	0.069	0.002
Gysyloan	3071	0.005	3120	0.004	0.001
Gfzcontractrate	2978	0.063	3389	0.054	0.009
Gfzloan	2978	0.002	3389	0.003	−0.001
Dfcncontractrate	1425	0.036	1564	0.048	−0.013*
Dfcnloan	1425	0.001	1564	0.003	−0.002

Note: (1) this table is a statistical analysis of the treatment of PSM in state-owned and non-state-owned enterprises; (2) * and ** indicate significance at the 5% and 10% level, respectively.

rural commercial banks not only do not exercise financial discrimination, but also show financial support in giving non-state-owned enterprises more bank loan opportunities and larger bank loans. The test results are consistent with the expectations of Hypothesis 1.

The results show that foreign banks exercise significant financial discrimination against non-state-owned enterprises. State-owned enterprises have a longer operating history, have more assets that can be used for mortgages, and can easily provide more "hard" information to banks, whereas non-state-owned enterprises are still growing, have fewer assets that can be used for mortgages, and have a comparative disadvantage in providing hard information to banks. Moreover, the newly entered foreign banks have accumulated less "soft" information (such as entrepreneurs' management abilities) on local enterprises, and have to rely more on the hard information on enterprises to make credit decisions. Therefore, foreign banks give priority to state-owned enterprises with hard information advantages, which are regarded as high-quality customers, and exclude non-state-owned enterprises. Other studies verify this conclusion. Xin et al. (2003) and Zhendong et al. (2003) analyzed the phenomenon of "cherry picking" in foreign banks, and found that foreign banks target the host countries of multinational companies, local large companies, and wealthy families and individuals. Chen et al. (2007) found that 35% of the foreign banks interviewed believed that it was worth their best efforts trying to maintain large state-owned enterprises as customers.

The Spearman correlation coefficients in Table 10 show a negative correlation between foreign bank loans and enterprise size. In Table 13, the coefficient of enterprise size is significantly negative in the regression model of foreign bank loans, possibly because foreign banks place more emphasis on corporate mortgage assets than on corporate size when "picking cherries." In Table 13, the regression coefficient of the ratio of loan opportunities to tangible assets of foreign banks is significantly positive at the level of 0.01 (the regression coefficient is 1.689).

Although the policy banks provide more loan opportunities to non-state-owned enterprises, they exercise significant financial discrimination in terms of the scale of loans, which may be related to the function of policy banks, which mainly undertake policy credit business. Xiaochuan (2006) proposed that China's policy banks have made great achievements in supporting the national key construction programs, promoting the export of

Table 13
Property rights and loans from foreign banks, policy banks, and local commercial banks.

	(1) Wzcontractrate	(2) Wzloan	(3) Zccontractrate	(4) Zcloan	(5) Sycontractrate	(6) Syloan
State	−0.167**	−0.018***	0.010	−0.215***	0.283***	0.029***
	(−2.02)	(−2.91)	(0.14)	(−3.32)	(2.63)	(2.72)
Fcfi	3.379***	0.265***	−0.612*	−0.180	−0.019	−0.008
	(9.30)	(10.58)	(−1.78)	(−0.71)	(−0.05)	(−0.20)
Tang	1.689***	0.021	−1.084***	−0.621***	0.577	0.039
	(6.84)	(1.17)	(−4.70)	(−3.44)	(1.47)	(1.07)
Size	−0.254***	−0.010***	0.282***	0.135***	0.049	−0.000
	(−52.00)	(−30.23)	(68.04)	(37.88)	(0.84)	(−0.04)
Shrz	−0.012***	−0.000**	0.002	−0.000	0.002	0.000
	(−4.28)	(−2.16)	(0.65)	(−0.18)	(0.88)	(0.63)
Tbq	−0.182***	−0.004	−0.269***	−0.038	−0.014	0.002
	(−4.71)	(−1.60)	(−6.52)	(−1.18)	(−0.37)	(0.51)
Lev	1.751***	0.082***	0.192	0.850***	0.839***	0.104***
	(10.87)	(7.29)	(1.35)	(7.14)	(2.88)	(3.06)
Roe	−1.978***	−0.179***	−1.653***	−1.216***	0.833*	0.035
	(−11.43)	(−12.63)	(−5.08)	(−4.93)	(1.73)	(0.70)
M2	0.000***	0.000***	0.000***	0.000***	0.000	0.000
	(53.18)	(20.81)	(60.80)	(31.44)	(1.41)	(1.27)
GDP	−156.795***	−18.906***	334.616***	214.952***	106.681**	10.178*
	(−113.67)	(−215.20)	(343.62)	(296.64)	(2.04)	(1.87)
_cons	−12.269***	−0.734***	−23.935***	−15.104***	−7.536***	−0.661***
	(−111.77)	(−94.14)	(−250.09)	(−184.00)	(−3.39)	(−3.01)
Year	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes
N	1625	1625	898	898	9858	9858
PseudoR^2	0.144	0.306	0.189	0.207	0.067	0.155

Note: (1) *, **, and *** indicate significance at the 1%, 5%, and 10% level, respectively; (2) the robust t-values adjusted for heteroscedasticity are shown in parentheses.

products, and protecting and stabilizing the market. Because policy banks are more policy-oriented than the commercial banks, and state-owned enterprises are often more closely linked with national policies than non-state-owned enterprises, policy banks tend to give state-owned enterprises larger bank loans.

However, the state-owned enterprises supported by foreign banks and policy banks do not perform better than non-state-owned enterprises, because the bank loans of foreign banks and policy banks are negatively correlated with financial performance (Roe).

Table 14 shows that large state-owned commercial banks, national joint-stock banks, local city commercial banks, and rural commercial banks provide significant financial support to non-state-owned enterprises. The bank loans of national joint-stock banks, local city commercial banks, and agribusiness banks are positively correlated with financial performance (Roe), and are significantly positive in terms of the regression coefficient of the ratio of tangible assets to enterprises (Tang). These banks also place more emphasis on the mortgaged assets of the enterprises than on the size of the enterprises when making credit decisions.

4.3. The quality of information disclosure, the nature of property rights, and the different types of bank loans

Because foreign banks and policy banks exercise significant financial discrimination, and the sample of foreign banks and policy banks is relatively small, in this part we only examine the reaction of local commercial banks to the information disclosure violations by listed companies. The results are shown in Tables 15–18. For convenience, we present the property rights together with the test results for bank loans.

Table 15 shows that although the local commercial banks do not exercise financial discrimination, they do provide significant financial support. However, the local commercial banks provide significantly fewer bank loan opportunities and smaller bank loans to non-state-owned enterprises that commit information disclosure

Table 14
Property rights and loans from large state-owned commercial banks, national joint-stock banks, local city commercial banks, and rural commercial banks.

	(1) Gysycontractrate	(2) Gysyloan	(3) Gfzcontractrate	(4) Gfzloan	(5) Dfcncontractrate	(6) Dfcnloan
State	0.251*	0.022*	0.235***	0.019***	0.478***	0.024***
	(1.83)	(1.80)	(5.83)	(6.35)	(7.48)	(7.86)
Fcfi	0.917	0.068	−0.464***	−0.033***	0.006	−0.023**
	(1.58)	(1.31)	(−3.28)	(−3.38)	(0.03)	(−2.35)
Tang	0.801	0.050	0.408***	0.021**	0.810***	0.022**
	(1.60)	(1.15)	(3.06)	(2.16)	(3.47)	(2.03)
Size	0.042	−0.000	0.044***	−0.002***	−0.038***	−0.003***
	(0.60)	(−0.07)	(18.51)	(−9.20)	(−9.81)	(−16.01)
Shrz	0.004	0.000	0.000	−0.000	0.002	0.000
	(1.37)	(1.29)	(0.07)	(−0.80)	(1.31)	(0.61)
Tbq	−0.077	−0.004	0.020	0.006***	−0.017	0.001
	(−1.15)	(−0.59)	(1.36)	(5.88)	(−0.73)	(1.12)
Lev	0.458	0.057	1.034***	0.103***	1.447***	0.075***
	(1.08)	(1.47)	(13.16)	(18.08)	(11.53)	(12.44)
Roe	1.051	0.055	0.862***	0.017	1.256***	0.034***
	(1.45)	(0.76)	(4.90)	(1.47)	(5.98)	(3.67)
M2	0.000	0.000	0.000***	0.000***	0.000***	0.000***
	(0.59)	(0.58)	(48.70)	(41.35)	(65.80)	(85.83)
GDP	88.828	8.591	155.062***	10.161***	273.773***	16.531***
	(1.11)	(1.11)	(408.38)	(337.49)	(369.68)	(462.16)
_cons	−6.357**	−0.527*	−16.942***	−1.101***	−19.878***	−1.048***
	(−2.00)	(−1.79)	(−315.95)	(−278.17)	(−231.34)	(−253.01)
Year	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes
N	5946	5946	5993	5993	2861	2861
PseudoR^2	0.080	0.179	0.090	0.222	0.076	0.186

Note: (1) *, **, and *** indicate significance at the 1%, 5%, and 10% level, respectively; (2) the robust t-values adjusted for heteroscedasticity are shown in parentheses.

violations. Thus, the information disclosure violations of non-state-owned enterprises trigger the financial discrimination of local commercial banks. The test results in Table 15 are consistent with the expectations of Hypothesis 2.

Table 16 shows that although large state-owned commercial banks do not exercise financial discrimination, they do provide significant financial support. Moreover, large state-owned commercial banks do not financially discriminate against non-state-owned enterprises that commit information disclosure violations, and provide significantly more bank loan opportunities and larger bank loans to non-state-owned enterprises. The test results in Table 16 are contrary to Hypothesis 2, which may be due to listed companies being restricted from engaging in stock and bond refinancing due to securities market irregularities. (The securities market sanctions for Chinese listed companies are bound to refinancing. For example, when listed companies are publicly reprimanded by exchanges, the companies are banned from refinancing securities for the next 12 months.) Thus, bank borrowing provides a lifeline for these listed companies, and the large state-owned commercial banks provide the ultimate financing channel for listed companies that commit information disclosure violations.

Table 17 shows that although national joint-stock banks do not exercise financial discrimination, they do offer significant financial support. However, the national joint-stock banks provide non-state-owned enterprises that commit information disclosure violations few opportunities for bank loans, although there is no significant difference in the scale of bank loans. To a certain extent, the information disclosure of non-state-owned enterprises triggers the financial discrimination of the national joint-stock banks. The test results in Table 17 are consistent with the expectations of Hypothesis 2.

Table 15
Quality of information disclosure, property rights, and local commercial bank loans.

	(1) Gysycontractrate	(2) Gysycontractrate	(3) Gysyloan	(4) Gysyloan
State* Info		−0.669***		−0.047***
		(−7.40)		(−5.23)
Info		−7.374***		−1.429***
		(−68.64)		(−135.12)
State	0.283***	0.297***	0.029***	0.029***
	(2.63)	(9.83)	(2.72)	(10.23)
Fcfi	−0.019	−0.040	−0.008	−0.011
	(−0.05)	(−0.35)	(−0.20)	(−1.04)
Tang	0.577	0.555***	0.039	0.037***
	(1.47)	(5.71)	(1.07)	(4.05)
Size	0.049	0.050***	−0.000	−0.000
	(0.84)	(27.52)	(−0.04)	(−1.44)
Shrz	0.002	0.002***	0.000	0.000*
	(0.88)	(2.95)	(0.63)	(1.95)
Tbq	−0.014	−0.014	0.002	0.002*
	(−0.37)	(−1.25)	(0.51)	(1.82)
Lev	0.839***	0.834***	0.104***	0.102***
	(2.88)	(13.96)	(3.06)	(18.19)
Roe	0.833*	0.859***	0.035	0.038***
	(1.73)	(7.06)	(0.70)	(3.49)
M2	0.000	0.000***	0.000	0.000***
	(1.41)	(40.47)	(1.27)	(39.23)
GDP	106.681**	102.191***	10.178*	9.898***
	(2.04)	(402.30)	(1.87)	(376.87)
_cons	−7.536***	−7.383***	−0.661***	−0.649***
	(−3.39)	(−183.24)	(−3.01)	(−169.54)
Weiglx	Yes	Yes	Yes	Yes
Chufly	Yes	Yes	Yes	Yes
Chuffs	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes
N	9858	9858	9858	9858
PseudoR^2	0.067	0.070	0.155	0.160

Note: (1) *, **, and *** indicate significance at the 1%, 5%, and 10% level, respectively; (2) the robust t-values adjusted for heteroscedasticity are shown in parentheses.

From Table 18, we can see that although the local commercial banks and agribusiness firms do not exercise financial discrimination, they do offer significant financial support. However, local city commercial banks and rural commercial banks provide significantly fewer bank loan opportunities and smaller bank loans to non-state-owned enterprises that commit information disclosure violations. The information disclosure violations of non-state-owned enterprises trigger the financial discrimination of local city commercial banks and agricultural firms. Compared with large state-owned commercial banks and national joint-stock banks, local city commercial banks and rural commercial banks have the strongest response to the information disclosure violations of non-state-owned enterprises. The test results in Table 18 are consistent with the expectations of Hypothesis 2.

4.4. Extensibility test

To further examine the relationship between property rights and bank loans, and whether there are regulation or intermediary effects, we also construct a model of the intermediary effect. The test results of the mediation model are shown in Tables 19–22. The results show that the quality of enterprise information disclosure does not play an intermediary role in the relationship between property rights and bank loans.

Table 16
Quality of information disclosure, property rights, and loans from large state-owned commercial banks.

	(1) Sycontractrate	(2) Sycontractrate	(3) Syloan	(4) Syloan
State* Info		0.271*		0.006
		(1.71)		(0.42)
Info		−8.979***		−1.316***
		(−50.57)		(−82.98)
State	0.251*	0.255***	0.022*	0.022***
	(1.83)	(6.62)	(1.80)	(6.58)
Fcfi	0.917	0.910***	0.068	0.068***
	(1.58)	(5.64)	(1.31)	(4.69)
Tang	0.801	0.807***	0.050	0.050***
	(1.60)	(6.77)	(1.15)	(4.66)
Size	0.042	0.041***	−0.000	−0.001**
	(0.60)	(18.30)	(−0.07)	(−2.54)
Shrz	0.004	0.004***	0.000	0.000***
	(1.37)	(4.20)	(1.29)	(4.09)
Tbq	−0.077	−0.074***	−0.004	−0.004***
	(−1.15)	(−4.87)	(−0.59)	(−2.79)
Lev	0.458	0.477***	0.057	0.057***
	(1.08)	(6.28)	(1.47)	(8.59)
Roe	1.051	1.062***	0.055	0.056***
	(1.45)	(5.96)	(0.76)	(3.72)
M2	0.000	0.000***	0.000	0.000***
	(0.59)	(20.94)	(0.58)	(20.92)
GDP	88.828	86.987***	8.591	8.346***
	(1.11)	(256.42)	(1.11)	(257.37)
_cons	−6.357**	−6.290***	−0.527*	−0.518***
	(−2.00)	(−124.50)	(−1.79)	(−115.25)
Weiglx	Yes	Yes	Yes	Yes
Chufly	Yes	Yes	Yes	Yes
Chuffs	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes
N	5946	5946	5946	5946
PseudoR^2	0.080	0.084	0.179	0.185

Note: (1) *, **, and *** indicate significance at the 1%, 5%, and 10% level, respectively; (2) the robust t-values adjusted for heteroscedasticity are shown in parentheses.

Table 19 shows the test results for the relationship between property rights, information disclosure quality, and the loan intermediary effect for large state-owned commercial banks. The first step of Table 19 tests the relationship between property rights and bank loans. The coefficient of property rights (State) is significantly positive at the 10% level, which shows that large state-owned commercial banks provide financial support to non-state-owned enterprises. In step two, the property rights (Statet-1) and enterprise information disclosure quality (Info) are significantly positively correlated at the 5% level, indicating that under the same conditions, the non-state-owned enterprises disclose lower quality information. In step three, after adding the quality variable of enterprise information disclosure to the model of the relationship between property rights and bank loans, the coefficient of property rights is significantly positive, the coefficient of enterprise information disclosure quality is not significant, and compared with regressions (1) and (2), the coefficient of property rights in regressions (4) and (5) does not change, which indicates that the quality of enterprise information disclosure does not have an intermediary effect on the relationship between property rights and the loans of large state-owned commercial banks.

Table 20 shows the test results for the relationship between property rights, the quality of information disclosure, and the intermediary effect of loans for local city commercial banks and agricultural commercial banks. The first regression (1) tests the relationship between property rights and the probability of being

Table 17
Quality of information disclosure, nature of property rights, and loans from national joint-stock commercial banks.

	(1) Gfzcontractrate	(2) Gfzcontractrate	(3) Gfzloan	(4) Gfzloan
State* Info		−0.225		0.004
		(−1.56)		(0.41)
Info		−16.219***		−1.179***
		(−100.91)		(−101.53)
State	0.235***	0.231***	0.019***	0.018***
	(5.83)	(5.71)	(6.35)	(6.08)
Fcfi	−0.464***	−0.561***	−0.033***	−0.040***
	(−3.28)	(−3.91)	(−3.38)	(−4.05)
Tang	0.408***	0.417***	0.021**	0.021**
	(3.06)	(3.13)	(2.16)	(2.18)
Size	0.044***	0.043***	−0.002***	−0.002***
	(18.51)	(18.02)	(−9.20)	(−9.88)
Shrz	0.000	−0.000	−0.000	−0.000
	(0.07)	(−0.18)	(−0.80)	(−1.04)
Tbq	0.020	0.018	0.006***	0.006***
	(1.36)	(1.24)	(5.88)	(5.72)
Lev	1.034***	1.017***	0.103***	0.102***
	(13.16)	(12.94)	(18.08)	(17.89)
Roe	0.862***	0.910***	0.017	0.019
	(4.90)	(5.12)	(1.47)	(1.59)
M2	0.000***	0.000***	0.000***	0.000***
	(48.70)	(48.75)	(41.35)	(42.35)
GDP	155.062***	155.014***	10.161***	10.351***
	(408.38)	(409.57)	(337.49)	(344.05)
_cons	−16.942***	−16.590***	−1.101***	−1.106***
	(−315.95)	(−309.80)	(−278.17)	(−279.14)
Weiglx	Yes	Yes	Yes	Yes
Chufly	Yes	Yes	Yes	Yes
Chuffs	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes
N	5993	5993	5993	5993
PseudoR^2	0.090	0.094	0.222	0.229

Note: (1) *, **, and *** indicate significance at the 1%, 5%, and 10% level, respectively; (2) the robust t-values adjusted for heteroscedasticity are shown in parentheses.

granted a loan from local city commercial banks and agricultural commercial banks. The regression coefficient is significantly positive, which indicates that the local city commercial banks and agricultural commercial banks provide financial support to non-state-owned enterprises. Regression (3) tests the relationship between property rights (State t-1) and the quality of information disclosure. The regression coefficient is significantly positive, which indicates that the quality of the information disclosed by non-state-owned enterprises is worse under the same conditions. In regression (4), the coefficient of property rights and information disclosure quality is significantly positive after the information disclosure quality variable is added to property rights and the loan signing rates of local city commercial banks and rural commercial banks. Moreover, the regression coefficient of property rights is reduced from 0.478 to 0.466, which indicates that the quality of information disclosure plays a partial intermediary role, and the value of the intermediary effect is 0.3629.[4] This is consistent with the conclusion of Table 18, that the local city commercial banks and agricultural banks have the strongest responses to enterprises that commit information disclosure violations.

[4] Calculation method: (Info-regression coefficient in regression(3)) *(Info-regression coefficient in regression(4))/[(state regression coefficient in regression(4)) + (Info regression coefficient in regression(3)) *(Info regression coefficient in regression(4)), IE 0.242 * 1.097/(0.466 + 0.242 * 1.097) = 0.3629.

Table 18
Quality of information disclosure, nature of property rights, and loans from local city commercial banks and agricultural commercial banks.

	(1) Dfcncontractrate	(2) Dfcncontractrate	(3) Dfcnloan	(4) Dfcnloan
State* Info		−0.783***		−0.032***
		(−3.90)		(−3.28)
Info		−8.074***		−0.378***
		(−35.04)		(−33.70)
State	0.478***	0.486***	0.024***	0.024***
	(7.48)	(7.53)	(7.86)	(7.72)
Fcfi	0.006	−0.196	−0.023**	−0.035***
	(0.03)	(−0.87)	(−2.35)	(−3.50)
Tang	0.810***	0.640***	0.022**	0.014
	(3.47)	(2.72)	(2.03)	(1.24)
Size	−0.038***	−0.036***	−0.003***	−0.003***
	(−9.81)	(−9.47)	(−16.01)	(−15.91)
Shrz	0.002	0.002	0.000	0.000
	(1.31)	(1.06)	(0.61)	(0.30)
Tbq	−0.017	−0.025	0.001	0.001
	(−0.73)	(−1.05)	(1.12)	(0.84)
Lev	1.447***	1.240***	0.075***	0.065***
	(11.53)	(9.80)	(12.44)	(10.69)
Roe	1.256***	1.595***	0.034***	0.049***
	(5.98)	(7.01)	(3.67)	(4.88)
M2	0.000***	0.000***	0.000***	0.000***
	(65.80)	(50.09)	(85.83)	(69.65)
GDP	273.773***	222.837***	16.531***	14.073***
	(369.68)	(308.84)	(462.16)	(402.05)
_cons	−19.878***	−17.698***	−1.048***	−0.935***
	(−231.34)	(−205.51)	(−253.01)	(−224.29)
Weiglx	Yes	Yes	Yes	Yes
Chufly	Yes	Yes	Yes	Yes
Chuffs	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes
N	2861	2861	2861	2861
PseudoR^2	0.076	0.099	0.186	0.253

Note: (1) *, **, and *** indicate significance at the 1%, 5%, and 10% level, respectively; (2) the robust t-values adjusted for heteroscedasticity are shown in parentheses.

Similar to the test results in Table 19, Tables 21 and 22 show the test results for the relationship between property rights, the loan intermediary effects of local commercial banks and national joint-stock banks, and the quality of information disclosure. The results show that the quality of information disclosure does not play an intermediary role in the relationship between property rights and bank loans.

4.5. Robustness test

Because the main reasons for the differences between state-owned enterprises and non-state-owned enterprises are profitability and the ratio of tangible assets, we changed the order of the matching variables. We entered the profitability, tangible assets ratio, firm size, Tobin Q, asset-liability ratio, financing demand, and equity balance variables in turn, and repeated the main test using the nearest neighbor method after 1:1 matching. There is no substantial difference between the results of the robustness test and the previous tests. To test the robustness of our conclusions, we conducted the following tests. First, to consider the composition of the credit contracts, we controlled the interaction between the two dependent variables. For example, when we tested the relationship between property rights and bank loan opportunities, we also included the

Table 19
Quality of property rights tested by information disclosure quality and the loan intermediary effect of large state-owned commercial banks.

Step one	(1) Gysycontractrate	(2) Gysyloan	Step two	(3) Info	Step three	(4) Gysycontractrate	(5) Gysyloan
State	0.251*	0.022*	$State_{t-1}$	0.242**	State	0.251*	0.022*
	(1.83)	(1.80)		(2.00)		(1.82)	(1.80)
Fcfi	0.917	0.068	$Fcfi_{t-1}$	−0.823	Info	0.049	−0.004
	(1.58)	(1.31)		(−1.46)		(0.17)	(−0.16)
Tang	0.801	0.050	$Tang_{t-1}$	−0.403	Fcfi	0.919	0.068
	(1.60)	(1.15)		(−1.12)		(1.59)	(1.31)
Size	0.042	−0.000	$Size_{t-1}$	−0.086*	Tang	0.801	0.050
	(0.60)	(−0.07)		(−1.75)		(1.60)	(1.15)
Shrz	0.004	0.000	$Shrz_{t-1}$	−0.000	Size	0.042	−0.000
	(1.37)	(1.29)		(−0.08)		(0.60)	(−0.07)
Tbq	−0.077	−0.004	Lev_{t-1}	0.711***	Shrz	0.004	0.000
	(−1.15)	(−0.59)		(3.22)		(1.37)	(1.29)
Lev	0.458	0.057	Roe_{t-1}	−0.865*	Tbq	−0.077	−0.004
	(1.08)	(1.47)		(−1.76)		(−1.15)	(−0.59)
Roe	1.051	0.055	$Audit_{t-1}$	1.086***	Lev	0.457	0.058
	(1.45)	(0.76)		(5.38)		(1.07)	(1.48)
M2	0.000	0.000	_cons	−1.842	Roe	1.055	0.054
	(0.59)	(0.58)		(−1.62)		(1.45)	(0.75)
GDP	88.828	8.591			M2	0.000	0.000
	(1.11)	(1.11)				(0.58)	(0.59)
_cons	−6.357**	−0.527*			GDP	88.105	8.659
	(−2.00)	(−1.79)				(1.09)	(1.11)
					_cons	−6.334**	−0.530*
						(−1.99)	(−1.80)
Year	Yes	Yes	Year	Yes	Year	Yes	Yes
Industry	Yes	Yes	Industry	Yes	Industry	Yes	Yes
N	5946	5946	N	18,841	N	5946	5946
$PseudoR^2$	0.080	0.179	$PseudoR^2$	0.058	$PseudoR^2$	0.080	0.179

Note: (1) *, **, and *** indicate significance at the 1%, 5%, and 10% level, respectively; (2) the robust t-values adjusted for heteroscedasticity are shown in parentheses.

bank loan scale as the control variable. The test results are consistent with our earlier findings. Second, to consider the decision-making lags for different types of bank credit, we used quarterly data and repeated the above test. The test results are consistent with our earlier findings. Due to the space limitations, we do not show the results of the robustness test here.

5. Conclusions and policy implications

Using a sample of all A-share listed companies from 2007 to 2016, we investigate the roles that property rights and the quality of information disclosure play in the credit decisions of different types of banks after the market-oriented reform of the financial sector. After resolving the self-selection problem in relation to the financing demand of listed companies, we find that foreign banks exercise significant financial discrimination in granting loans and policy banks exercise significant financial discrimination in determining the scale of the bank loans provided to non-state-owned enterprises. However, the banks also provide a remarkable level of financial support to enterprises. Specifically, local commercial banks, large state-owned commercial banks, national joint-stock banks, local city commercial banks, and rural commercial banks, not only exercise no financial discrimination against non-state-owned enterprises, but also provide significant financial support in providing non-state-owned enterprises more bank loan opportunities and larger bank loans. However, for enterprises that commit information disclosure violations, the credit decisions of the national joint-stock banks and local city commercial and rural commercial banks reverse, and these banks begin to exercise financial discrimination against non-state-owned enterprises. Nevertheless, large state-owned commercial

Table 20
Quality of property rights tested by information disclosure quality and the loan intermediary effect for local city commercial banks and agricultural commercial banks.

Step one	(1) Dfcncontractrate	(2) Dfcnloan	Step two	(3) Info	Step three	(4) Dfcncontractrate	(5) Dfcnloan
State	0.478***	0.024***	State $_{t-1}$	0.242**	State	0.466***	0.024***
	(7.48)	(7.86)		(2.00)		(7.27)	(7.64)
Fcfi	0.006	−0.023**	Fcfi $_{t-1}$	−0.823	Info	1.097***	0.054***
	(0.03)	(−2.35)		(−1.46)		(20.43)	(21.18)
Tang	0.810***	0.022**	Tang $_{t-1}$	−0.403	Fcfi	−0.071	−0.027***
	(3.47)	(2.03)		(−1.12)		(−0.33)	(−2.77)
Size	−0.038***	−0.003***	Size $_{t-1}$	−0.086*	Tang	0.743***	0.019*
	(−9.81)	(−16.01)		(−1.75)		(3.16)	(1.71)
Shrz	0.002	0.000	Shrz $_{t-1}$	−0.000	Size	−0.025***	−0.002***
	(1.31)	(0.61)		(−0.08)		(−6.55)	(−12.59)
Tbq	−0.017	0.001	Lev $_{t-1}$	0.711***	Shrz	0.002	0.000
	(−0.73)	(1.12)		(3.22)		(1.44)	(0.74)
Lev	1.447***	0.075***	Roe $_{t-1}$	−0.865*	Tbq	−0.020	0.001
	(11.53)	(12.44)		(−1.76)		(−0.84)	(1.09)
Roe	1.256***	0.034***	Audit $_{t-1}$	1.086***	Lev	1.207***	0.063***
	(5.98)	(3.67)		(5.38)		(9.55)	(10.40)
M2	0.000***	0.000***	_cons	−1.842	Roe	1.433***	0.042***
	(65.80)	(85.83)		(−1.62)		(6.59)	(4.39)
GDP	273.773***	16.531***			M2	0.000***	0.000***
	(369.68)	(462.16)				(55.22)	(74.25)
_cons	−19.878***	−1.048***			GDP	242.526***	14.937***
	(−231.34)	(−253.01)				(330.29)	(419.43)
					_cons	−19.237***	−1.021***
						(–222.93)	(−244.62)
Year	Yes	Yes	Year	Yes	Year	Yes	Yes
Industry	Yes	Yes	Industry	Yes	Industry	Yes	Yes
N	2861	2861	N	18,841	N	2861	2861
PseudoR^2	0.076	0.186	PseudoR^2	0.058	PseudoR^2	0.084	0.210

Note: (1) *, **, and *** indicate significance at the 1%, 5%, and 10% level, respectively; (2) the robust t-values adjusted for heteroscedasticity are shown in parentheses.

Table 21
The nature of property rights tested by the quality of information disclosure and the intermediary effect of local commercial bank loans (Summary Table).

Step one	(1) Sycontractrate	(2) Syloan	Step two	(3) Info	Step three	(4) Sycontractrate	(5) Syloan
State	0.283***	0.029***	State $_{t-1}$	0.242**	State	0.283***	0.029***
	(2.63)	(2.72)		(2.00)		(2.63)	(2.72)
_cons	−7.536***	−0.661***	_cons	−1.842	Info	0.218	0.015
	(−3.39)	(−3.01)		(−1.62)		(1.23)	(0.86)
					_cons	−7.422***	−0.653***
						(−3.34)	(−2.98)
Firm	Yes	Yes	Firm	Yes	Firm	Yes	Yes
Year	Yes	Yes	Year	Yes	Year	Yes	Yes
Industry	Yes	Yes	Industry	Yes	Industry	Yes	Yes
N	9858	9858	N	18,841	N	9858	9858
PseudoR^2	0.067	0.155	PseudoR^2	0.058	PseudoR^2	0.067	0.155

Note: (1) *, **, and *** indicate significance at the 1%, 5%, and 10% level, respectively; (2) the robust t-values adjusted for heteroscedasticity are shown in parentheses.

Table 22
Property rights, the quality of information disclosure, and the intermediary effect of loans for national shareholding banks (Summary Table).

Step one	(1) Gfzcontractrate	(2) Gfzloan	Step two	(3) Info	Step three	(4) Gfzcontractrate	(5) Gfzloan
State	0.235***	0.019***	State $_{t-1}$	0.242**	State	0.236***	0.019***
	(5.83)	(6.35)		(2.00)		(5.84)	(6.35)
_cons	−16.942***	−1.101***	_cons	−1.842	Info	0.130***	0.001
	(−315.95)	(−278.17)		(−1.62)		(4.01)	(0.23)
					_cons	−16.880***	−1.101***
						(−314.64)	(−278.13)
Firm	Yes	Yes	Firm	Yes	Firm	Yes	Yes
Year	Yes	Yes	Year	Yes	Year	Yes	Yes
Industry	Yes	Yes	Industry	Yes	Industry	Yes	Yes
N	5993	5993	N	18,841	N	5993	5993
PseudoR^2	0.090	0.222	PseudoR^2	0.058	PseudoR^2	0.090	0.222

Note: (1) *, **, and *** indicate significance at the 1%, 5%, and 10% level, respectively; (2) the robust t-values adjusted for heteroscedasticity are shown in parentheses.

banks continue to provide financial support to non-state-owned enterprises. Overall, the quality of the information disclosure by enterprises has a moderating effect rather than an intermediary effect on the relationship between property rights and bank loans.

With respect to the reform of the banking industry, measures such as the divestiture of non-performing loans, reform of the stock system, introduction of strategic investors, public listing, and market-oriented interest rates have transformed banks from low-cost financing vehicles for state-owned enterprises to self-financing business entities. We find that after nearly a decade of financial reform, foreign banks, national joint-stock banks, and local city commercial and agricultural banks dynamically adjust their allocation of credit according to the quality of the information disclosed by enterprises. To some extent, this reflects the market-oriented behavior of these types of banks. We also test the achievements of the banking marketization reform in relation to the quality of the information disclosed by enterprises and find that the market-oriented reform has had different effects on different types of banks.

We further examine the allocation of bank credit in relation to the credit supply and demand. We use the bank loan approval documents of listed companies to eliminate the financing needs of listed companies. After conducting PSM between state-owned enterprises and non-state-owned enterprises, we reexamine the relationship between property rights and bank loans. Our findings provide new empirical evidence supporting the existence of financial discrimination in the supply of bank credit. With the development of the finance sector, property rights are no longer the only basis for determining bank credit decisions. In particular, we find that the national joint-stock banks, local city commercial banks, and rural commercial banks attach great importance to the quality of the information disclosed by enterprises. In addition to the influence of macro factors, such as monetary policy, industrial policy, and financial development, which are difficult for enterprises to control, non-state-owned enterprises can use their own initiative by actively improving the quality of the information they disclose, and thus help alleviate the information asymmetry between banks and enterprises. This approach would help enterprises to overcome the financial discrimination present in the banking sector.

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Foreign residency rights and companies' auditor choice

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ABSTRACT

Recently, with the migration of wealthy Chinese elites becoming increasingly prevalent, the market has come to believe that firms with controlling persons with foreign residency rights have serious agency problems. We study the impact of controlling persons with foreign residency rights on corporate audit perspective. We find that firms whose controlling persons have foreign residency rights are more likely to use high-quality auditing services, and that this behavior is more obvious in regions with lower marketization and in firms with higher separation of ownership and control. We further study the effect of firms whose controlling persons have foreign residency rights that use high-quality Big 4 auditors and find that such firms have better corporate governance and accounting performance.

1. Introduction

Since China's reform and opening up, the country has experienced two waves of migration: the bottom-level labor migration at the end of the 1970s and the wave of people studying abroad in the 1990s. If these two waves of migration were the result of China's economic backwardness, why has a third wave of migration come about in the 21st century, when China's economic development has been remarkable and continues to grow rapidly? A difference is the new class of rich people who are obtaining residency overseas while still living in China.[1] After obtaining foreign residency rights, they continue to conduct business or work in China (Li, 2014). Many of these new rich people are controllers of listed companies in China, which means that their

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[1] According to the 2011 China Private Wealth Report issued by China Merchants Bank, "nearly 60% of the multi-millionaires surveyed have completed investment immigration or have relevant considerations. In the case of billionaires (their investable assets are more than 100 million yuan), about 27% of them have completed investment immigration."

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migration not only caused a large capital outflow, but also resulted in the loss of elite talent, which directly affects the sustainability of China's economic development.

The traditional view is that increasing income and obtaining a comfortable living environment are the main reasons for migration (Freeman, 1993; Ebmer, 1994). However, Chen et al. (2013) point out that these traditional viewpoints are difficult to explain to the current wave of new migrants. The main motive of China's new rich class for obtaining foreign residency rights is to be able to flee abroad more easily to escape sanctions from domestic law after corporate violations. Since 2003, CSRC has required listed companies to disclose information on controlling shareholders' foreign residency rights to allow market investors to pay special attention to the risks of such companies. *People's Daily Online*, *China News Service*, *Phoenix Net* and *Southern Weekend* have reported news about newly wealthy immigrants and pointed out that many such new immigrants are prepared to flee the government or the market for "after-autumn accounts." Skepticism from regulators and unfavorable speculation by the media reflect external stakeholders' fear that the controller's foreign residency status will reduce the cost of encroaching on the interests of shareholders and creditors and their belief that such companies have more serious agency problems. This article focuses on how a company for which the controller has foreign residency rights addresses these concerns.

When external stakeholders suspect that company managers have agency problems, managers will actively seek a monitoring or binding mechanism to constrain their behavior. External independent auditing is one of the most important monitoring mechanisms (Jensen and Meckling, 1976). Fan and Wong (2005) show that the more serious the company's agency problems are, the more likely the company is to hire high-quality auditing services to signal to the market that it has good corporate governance. According to agency theory, the agency of a company with a controller with foreign residency rights would be widely questioned by the government and the market, motivating the company to seek a binding mechanism to signal to the market that it has good corporate governance. We examine this issue from the perspective of an external independent audit and find that companies with controllers with foreign residency rights are more likely than other companies to hire high-quality auditing services. The results still hold after we take endogenous effects into account. The group regression reveals a significant phenomenon: in regions with lower degrees of marketization and in companies with higher levels of separation of the cash flow and voting rights, companies with controllers with foreign residency rights are more likely than other companies to hire high-quality auditing services. However, when accounting irregularities occur, companies whose controllers have foreign residency rights are not more likely than other companies to hire high-quality auditing services. Most of the results above apply to countries with which China has not signed an extradition clause. Listed companies whose controllers obtained foreign residency rights before listing are more likely to choose Big 4 auditors than those whose controllers obtained foreign residency rights after listing. On this basis, we further examine the influence of such companies hiring Big 4 auditors on their corporate governance and accounting performance. The results show that those companies had better corporate governance and higher accounting performance and that they paid higher audit fees.

This is the first study of how controllers' foreign residency rights influence company audits. It enriches the literature on migration and audits and provides reference value for entrepreneurial corporate management and investors' investment decisions. First, the literature on migration phenomena mainly examines the motives behind migration, and it lacks studies of the influence of corporate controllers' migration on corporate behavior. Chen et al. (2013) find that having a controller with foreign residency rights is related to more corporate fraud, but it is also important to know how such companies respond to distrust from external markets and regulations in the face of growing migration by the wealthy elite. The results of this paper show that companies with controllers with foreign residency rights are more likely than other companies to choose Big 4 auditors to mitigate distrust from the external market. Thus, this article fills this gap in the migration literature. Second, there has been controversy regarding whether independent audits can provide sufficient corporate governance. As wealth migration is attracting increasing social attention, this paper examines the relationship between whether the company's controllers with foreign residency rights and the company's independent audit. From this new perspective, we validate the governance function of independent audits in emerging markets, based on the work of Watts and Zimmerman (1983) and Fan and Wong (2005) on audit governance roles. Third, wealthy elite migration has increased, and their trust costs in domestic entrepreneurship have

increased as their identities have changed. This article provides a way to reduce the trust cost for such entrepreneurs from the perspective of auditor choice, and provides a reference value for investors to evaluate such companies.

2. Literature review and theoretical analysis

2.1. Literature review

Furnham (1990) believes that the motives of immigrants are mainly divided into two categories. One is the desire for a better living environment, such as a better climate or cultural environment, in new countries, and the other is the desire to avoid political risk or discrimination in the original country. The former is an external force that attracts migrants, and the latter is an internal force that encourages emigration. Freeman (1993) and Ebmer (1994) point out that foreign countries' higher income is an important incentive for migrants. Hanson and McIntosh (2009) use the data for Mexican immigrants in the United States and find that the main reason for their migration is high employment pressure due to the Mexican job market's labor supply outgrowing labor demand. The number of immigrants from Mexico to the United States thus increased significantly. Boustan, Kahn and Rhode (2012) point out that residents may migrate to escape frequent local tornadoes. Chen et al. (2013) find that apart from these traditional immigration motives, the main motivation for Chinese businessmen's migration is to be able to flee abroad to avoid sanctions for corporate violations. Thus, controllers obtaining foreign residency rights presents an agency problem.

In summary, the literature mainly examines the motivations for individuals to obtain foreign residency rights from the perspectives of climate, culture, political risks, labor income and agency problems. Few studies examine the economic consequences of the controllers of companies obtaining foreign residency rights. Chen et al. (2013) find that companies whose controllers have foreign residency rights are more likely to violate regulations than other companies, and this article further examines how the controllers who have these rights influence companies' choice of auditor.

2.2. Institutional background and theoretical analysis

The 2010 "Global Politics and Security" report of the Chinese Academy of Social Sciences shows that China is becoming the world's largest exporter of migrants. At present, there are about 45 million Chinese scattered around the world, and China has the most elite expatriates in the world. The 2012 "International Chinese Immigration Report" report states, "Among entrepreneurs whose personal assets exceed 100 million yuan, 27% have already emigrated, 47% are considering immigrating. As for high-net-worth individuals with personal assets exceeding 10 million yuan, nearly 60% have completed investment immigration or had related considerations." This survey suggests that unlike the labor migration of the 1970s and the skilled migration of the 1990s, most of this migration is occurring among the new rich class, and the entrepreneurial migration discussed in this paper makes up a considerable proportion. There are profound institutional reasons for the emergence of such large-scale migration by entrepreneurs.

First, China's institutional environment enables migrating entrepreneurs to achieve greater efficiency in their enterprises' overseas investment. With the integration of the global economy, the demand for foreign operations and investment has increased significantly. However, China's Overseas Investment Management Measures (henceforth "the Measures") has severely limited Chinese enterprises' foreign investment. The Measures stipulate that central enterprises' foreign investment must be examined and approved by the provincial commercial authority and then the Ministry of Commerce, and it may even require the opinions of overseas embassies or consulates (business offices). After these procedures, it is also necessary for the enterprise to obtain certificate of approval for foreign exchange, banking, customs, foreign affairs and other related procedures. In addition to the long waiting time for each procedure, there is considerable risk that the applications will be denied. Although China's government control over foreign investment by domestic companies has eased, there are still many obstacles. If entrepreneurs migrate, they can invest in those countries as citizens to avoid this tedious process. Although certain procedures are required for migrating entrepreneurs obtaining

nationality to invest, it is still much easier than investing as a Chinese citizen.[2] Receiving countries could consider adopting high-quality immigration to bring in capital and promote their own economic growth. Thus, loose and preferential incentive policies have been generally implemented for entrepreneur and investment migration.[3]

Second, China's institutional environment enables entrepreneurs to enjoy better policies after migrating, as the government gives foreign-invested enterprises more preferential policies than domestic-funded enterprises. After entrepreneurs emigrate, they are more likely to turn their company into a foreign-invested enterprise, which makes it easier to obtain more preferential policies than domestic-funded enterprises in terms of taxation, land use rights and bank loans. China's Ministry of Commerce issued guidelines in China's Foreign Investment Policy: "Foreign-invested enterprises may enjoy the benefit of two years' exempting and three years' half reduction of corporate income tax from the profit-making year; for foreign-invested enterprises encouraged by countries and locating in the central and western regions, they may extend the half reduction of income tax for three years after the expiration of the five-year tax exemption period; for export-oriented enterprises, in addition to enjoying the above two-year exemption and three-year half reduction, they can also enjoy a half reduction of income tax as long as the annual export value accounts more than 70% for the total sales of the enterprise." Each province, municipality and special economic zone has specific preferential policies for foreign investment in accordance with guidance from the central government, while the degrees of preferential policies differ by region. To attract foreign investment, local governments have much more support and more preferential policies for foreign-invested enterprises in terms of land use and bank loans than domestic-funded enterprises to attract foreign investment.

Third, a number of other factors also play roles. Chinese society believes that European and American educations are superior to China's exam-oriented education, and compared with studying abroad, the cost of sending children to school by acquiring citizenship from migration is much lower. Furthermore, China has created a great deal of pollution because of industrial development, and the environmental problems and food safety problems caused by air, water and land pollution in recent years have made the domestic ecological environment more difficult to live in.

Entrepreneurs' migration is thus related to both government-to-business control and to personal and family factors. Chinese culture has always had a tendency to show contempt for merchants and wealth, as evidenced by the community's attention to the Hurun Rich List. The public not only pays great attention to the wealth of the richest people but also speculates about how their wealth was accumulated, often assuming that wealthy entrepreneurs became successful because of illegal activities. How does the public understand private entrepreneurs' foreign residency rights in this society and culture, and how do such companies respond to this understanding? The following theoretical analysis thus incorporates the institutional background of Chinese enterprises.

2.3. Theoretical analysis

An emerging market in transition, China's capital market is poorly regulated, its law enforcement is inefficient and its financial system is imperfect. However, China has nevertheless experienced rapid economic growth. One important reason for this growth is the social relationship contract under China's Confucian culture, which compensates for the imperfections of the legal and financial systems and promotes the development of the private economic sector (Allen et al., 2005). What kind of relationship is this social contract? According to Kornai et al. (2003), paternalism theory, state-owned enterprises are more likely to be allocated resources in a government-controlled economy, which greatly increases the cost of private enterprises' access to resources. Private enterprises will thus establish political relationships with the government as part of their business strategy (Choi et al., 1999). Xin and Pearce (1996) and Luo and Tang (2009) find that China's low

[2] According to Djankov's survey, the establishment of a company in China requires 12 approvals, more than the average of the sample countries (10), and it requires 92 days, which is much higher than the sample average (47). In Canada, by comparison, the establishment of a company requires only two approvals and two days.

[3] Although after 2016, European countries and the United States tightened their immigration policies toward China, they are still very welcoming to high-quality immigrants such as entrepreneurs.

level of legal protection, such relationships can help private enterprises obtain policy support and reduce the acquisition cost of important resources. Private firms will typically do everything possible to establish political relations with government departments to obtain privilege, resources and political protection.

China's government has concentrated power and can seek rent from enterprises (Shleifer and Vishny, 1994). When establishing political relations with the government, private enterprises will inevitably engage with rent-seeking government officials who have the power to allocate resources (Claessens et al., 2008). Herman and Wang (2002) use the findings from the World Bank and European Development Bank's 1999 survey of 3000 companies in 25 transition countries to examine the trading relationship between the government and companies in transition countries. To obtain policy support and political protection, enterprises have to pay large bribes to the government (Yu et al., 2010). The low efficiency of law enforcement leads companies to succumb to competitive pressure or greed and to engage in unethical behaviors such as rent seeking, transfer of assets and tax evasion (Cai and Liu, 2009). Such unethical behaviors by private entrepreneurs have drawn society's ire and resulted in allegations that their success is due to their "original sin."

Controllers who obtain foreign residency rights can reduce the cost of their illegal actions, as they can more easily flee from China and evade punishment after illegally transferring assets or infringing on the interests of shareholders (Chen et al., 2013). As the gap between rich and poor continues to widen and legal system has improved, social hatred toward private entrepreneurs has increased. Private entrepreneurs who have been labelled guilty of "original sin" are often treated with suspicion and are increasingly expected by the public to be targets of future punishment. Because such entrepreneurs are more likely to evade Chinese law or have lower illegal costs and are thus more likely to infringe on the interests of shareholders and to commit corporate fraud, the agency problem can be serious. Chen et al. (2013) shows that companies whose controllers have foreign residency rights are more likely to commit illegal acts than other companies. As the most important rational economic actors in the construction of the market economy, they must respond to negative evaluations and unfavorable speculation from the market. Jensen and Meckling (1976) point out that, following rational expectation theory, the agency costs from managers' opportunistic behavior are ultimately borne by agents. Therefore, when external stakeholders suspect that the company has agency problems, managers will actively look for a monitoring or binding mechanism to restrict their own behavior. External independent auditing is one of the most important monitoring mechanisms.

Since the middle of the 19th century, auditing has played an important role in relieving companies' agency problems in the U.K. and U.S. (Lee, 1971). For the audit to reduce the agency cost, the auditor must be able to find and report the manager's violation of the contract and to guarantee the independence of the audit (Watts and Zimmerman, 1983). Research shows that the independence of the audit is closely related to the size of the audit firm. The larger the firm is, the less the influence of a single customer on the firm will be, and the less likely the firm is to compromise with customers; thus, it will have a higher level of independence. A firm's size is thus representative of its professional standards and can be used as an alternative to audit quality (a common result of independence and professional competence) (DeAngelo, 1981). Francis and Wang (2008) and Wang et al. (2009) show that the use of Big 4 audit firms, international organizations with good reputations, can send high-quality audit signals to the market. Thus, from a rational economic perspective, a company whose controller has foreign residency rights has greater incentives than other companies to hire a Big 4 auditor to signal low agency costs to the market. We thus propose the following hypothesis.

Hypothesis 1. Other things being equal, companies whose controllers have foreign residency rights are more likely than others to hire a Big 4 auditor.

In addition to examining the relationship between foreign residency rights and the choice of auditor, this article further examines the influence of foreign residency rights on company audit fees. Companies whose controllers have foreign residency rights are more likely to violate the law than other companies (Chen et al., 2013). Moreover, since the third wave of wealth migration began, market investors and regulators have begun to pay special attention to companies whose controllers have foreign residency rights. Auditors must spend more energy and time assessing such companies' control risks, and the high litigation risk of such

companies also increases the auditor's litigation risk. According to audit theory, the greater the litigation risk, the more time and effort are required for auditing, and the higher the audit fees (Simunic, 1980; Simunic and Stein, 1996; Fan and Wong, 2005). Hence, we propose the following hypothesis.

Hypothesis 2. Other things being equal, companies whose controllers have foreign residency rights pay higher audit fees.

3. Research design

Based on Fan and Wong (2005) and the empirical model of Tang (2011), we use the following model (1) to test Hypothesis 1 and model (2) to test Hypothesis 2.

$$Bigfour_{it} = \beta_0 + \beta_1 Residy_{it} + \beta_2 Cv_{it} + \beta_3 Size_{it} + \beta_4 Lev_{it} + \beta_5 Roa_{it} + \beta_6 Central_{it} + \beta_6 Indboard_{it} + \beta_7 Receivalbes_{it} + \beta_8 Inventory_{it} + \sum Industry + \sum Year + \mu_{it} \quad (1)$$

$$Auditfee_{it} = \beta_0 + \beta_1 Residy_{it} + \beta_2 Cv_{it} + \beta_3 Size_{it} + \beta_4 Lev_{it} + \beta_5 Roa_{it} + \beta_6 Central_{it} + \beta_6 Indboard_{it} + \beta_7 Receivalbes_{it} + \beta_8 Inventory_{it} + \beta_9 Mar_{it} + \beta_{10} Bigfour_{it} + \sum Industry + \sum Year + \mu_{it} \quad (2)$$

Based on the above theoretical analysis, we establish model (1) to test whether a company's controller has foreign residency rights is related to the company's choice of auditor. The explained variable is whether to hire a Big 4 auditor (*Bigfour*), and the main explanatory variable is whether the company's controller has foreign residency rights (*Residy*).

The data on whether the controllers of companies have foreign residency rights come from the companies' annual financial reports. In 2003, the China Securities Regulatory Commission promulgated the "Guidelines for Contents and Formats of Information Disclosure by Enterprises that Publicly Issue Securities, No. 2 – Contents and Formats of Annual Reports," which requires listed companies to disclose the controllers' foreign residency rights in the current year. We manually read companies' annual financial reports to obtain data on whether each company's controller has foreign residency rights. *Residy* equals one if the annual report indicates that the controller has foreign residency rights and zero otherwise.

Referring to the literature on company auditor choice (such as Fan and Wong, 2005; Tang, 2011), we use company size (*Size*), financial leverage (*Lev*), return on assets (*Roa*), separation of cash flow and voting rights (*Cv*), centralization of shareholding (*Central*) and board independence (*Indboard*) as control variables. In company auditing, accounts receivable and inventory require auditors with high professional qualifications to make accounting estimates and judgments (Li and Song, 2010). We believe these two factors are likely to affect whether a company chooses a Big 4 auditor. Therefore, in model (1), we control accounts receivable (*Receivables*) and inventory (*Inventory*), respectively. Considering the influence of industry and annual differences on companies' auditor choice, we also control two dummy variables, industry (*Industry*) and year (*Year*), in model (1).

We also establish model (2) to test whether a company controller having foreign residency rights is related to company audit fees. The explained variable is the audit fee (*Auditfee*), and the main explanatory variable is *Residy*, as in model (1). Two control variables are added to model (2): auditor choice (*Bigfour*) and market environment (*Mar*). Definitions of each model variable are given in Table 1.

4. Sample selection, data sources and descriptive statistics

4.1. Sample selection and data sources

This article uses non-financial listed companies whose controllers in Shanghai and Shenzhen were naturalized persons from 2005 to 2013 as the research object. The data for each company's controller come directly from the CSMAR database. After eliminating the observations with asset–liability ratios greater than 1 and those lacking data, the total number of valid observations in the final sample was 7725. Panel A of Table 2 lists

Table 1
Variable definitions.

Variables	Definitions
Bigfour	Auditor choice: Indicator that equals one if the company's auditor is Deloitte, PWC, KPMG or EY, and zero otherwise
Auditfee	Audit fee: Measured as the natural logarithm of the company's audit fees
Em	Earnings management: Indicator calculated by the Jones model
Residy	Foreign residency right: Indicator that equals one if the company's controller has foreign residency rights, and zero otherwise
Deverisdy	Category of foreign residency right: Indicator that equals one if the company's controller has foreign residency rights in a developed country, and zero otherwise
Residylist	Category of foreign residency right: Indicator that equals one if the company's controller has foreign residency rights at the beginning of the company's listing, and zero otherwise
Size	Company size: Measured as the natural logarithm of the company's total assets
Lev	Financial leverage: Measured as the company's asset–liability ratio
Roa	Profitability: Measured as net profit divided by total assets
Tobinq	Tobin's Q: Measured as market value divided by total assets
Cv	Separation of two rights: Separation of cash flow and voting rights, with indicators from the CSMAR database
Central	Centralization of shareholding: Measured as the shareholding ratio of the largest shareholder
Indboard	Independence of board: Measured as the ratio of the number of independent directors to the total number of directors
Receivables	The proportion of accounts receivable in total assets: Measured as the accounts receivable balance divided by total assets
Inventory	The proportion of inventory to total assets: Measured as the inventory balance divided by total assets
Mar	Measurement of the market environment: Indicator that equals one if the company is located in Beijing, Shanghai, Tianjin, Guangdong Province, Zhejiang Province or Jiangsu Province, and zero otherwise
Export	Dummy variable: Indicator that equals one if the company has overseas business in a certain year, and zero otherwise
Fict	Measured as the natural logarithm of the number of new contracts signed by China's economic groups with foreign businessmen in certain years in the region in which the company is located
Fraud	Dummy variable: Indicator that equals one if the company has accounting irregularities, and zero otherwise
Industry	Industry dummy variable
Year	Annual dummy variable

the specific distribution of samples from an annual perspective: For 2005–2013, there are 442, 460, 526, 604, 680, 996, 1231, 1397, and 1389 samples, respectively. The observed values increase annually, which is consistent with the development trend of China's capital market. Panel B of Table 2 lists the distribution of the samples in various industries. In our sample, companies from the manufacturing industry account for the largest proportion, 66.25%, followed by the information technology industry and the real estate industry, which account for 9.42% and 5.46%, respectively. Overall, these characteristics are consistent with the distribution of listed companies in China. Panel C of Table 2 lists the distribution of foreign residency rights of the controllers of the sample companies: 9.94% of company controllers have foreign residency rights, while 90.06% do not. Of the 768 controllers who have the rights, 45.96% obtained the rights before their companies were listed, while 54.04% obtained them afterward. This article also uses winsorization (1%) to deal with extreme values of the relevant variables. The company's financial data and corporate governance structure data are taken from the CSMAR database. Since 2003, the China Securities Regulatory Commission has asked companies to disclose whether their controllers have foreign residency rights. Hence, by reading the relevant information in the sample companies' annual reports, we obtain data for *Residy*.

Table 3 shows the distribution of overseas residences of the controllers of private listed companies in China. As the table shows, during 2005–2013, Hong Kong, Canada, Australia and the U.S. had relatively large number of controllers who had obtained foreign residency rights. As of 2013, the Philippines and Australia had signed extradition clauses with China (in 2001 and 2007, respectively).

4.2. Descriptive statistics

Table 4 reports the descriptive statistics of the variables, and Table 4A presents the descriptive statistics for all of the samples. The average value of the auditor choice variable (*Bigfour*) is 0.019, which means that among the companies whose controllers are naturalized persons, fewer than 2% selected a Big 4 auditor. We divide the

Table 2
Sample distribution.

Panel A: Year

	2005	2006	2007	2008	2009	2010	2011	2012	2013	Total
Quantity	442	460	526	604	680	996	1231	1397	1389	7725
Percentage	5.72%	5.95%	6.81%	7.82%	8.80%	12.89%	15.94%	18.08%	17.98%	100%

Panel B: Industry

	Quantity	Percentage
Mining	82	1.06%
Electricity, Heat, Gas and Water Production and Supply	78	1.01%
Electronic	516	6.68%
Real Estate	422	5.46%
Textile, Clothing, Fur	368	4.76%
Machinery, Equipment, Instruments	1591	20.60%
Construction	165	2.14%
Transportation, Storage, Postal Service	74	0.96%
Metal, Non-metal	586	7.59%
Wood, Furniture	66	0.85%
Agriculture, Forestry, Animal Husbandry, Fishery	162	2.10%
Wholesale and Retail	358	4.63%
Other Manufacturing	117	1.51%
Petroleum, Chemical, Plastic	823	10.65%
Food Manufacturing	290	3.75%
Water Conservancy, Environmental and Public Facilities Management	200	2.59%
Culture, Sports, Entertainment	58	0.75%
Information Transmission, Software and Information Technology Services	728	9.42%
Pharmaceutical and Biological Products	567	7.34%
Paper and Printing	195	2.52%
Miscellaneous	279	3.61%
Total	7725	100.00%

Panel C: Foreign residency rights

	Quantity	Percentage
Company whose controller has foreign residency rights (*Residy* = 1)	768	9.94%
Company whose controller does not have foreign residency rights (*Residy* = 0)	6957	90.06%
Controller obtained the rights before the company's listing (*Residylist* = 0)	353	45.96%
Controller obtained the rights after the company's listing (*Residylist* = 1)	415	54.04%

entire sample into a group of companies for which the controller has foreign residency rights (Table 4B) and a group of companies for which the controller does not (Table 4C). Comparing and analyzing the difference between auditors selected by the two groups (Table 4D), we find that 4.2% of the former chose a Big 4 auditor, while 1.6% of the latter chose a Big 4 auditor. As the comparison and analysis in Table 4D indicate, this difference is significant. That companies whose controllers have foreign residency rights are more inclined to choose a Big 4 auditor than other companies is consistent with the above theoretical expectations. The audit fee variable (*Auditfee*) is the natural logarithm of the actual audit fees. From Table 4D, we can see that whether comparing the average or the median of audit fees, companies whose controllers have foreign residency rights pay significantly more audit fees than other companies, which is also consistent with the above theoretical expectations. As Table 4A shows, the average asset–liability ratio (*Lev*) of all of the sample companies is 40.7%, and the median is 57.5%. The index suggests that the asset–liability ratios of China's companies are generally high.

We find that the average and median asset–liability ratios of the companies whose controllers have foreign residency rights are 38.4% and 35.1%, respectively, while those of the companies whose controllers do not are 40.9% and 40.7%, respectively (Table 4B). There are significant differences in the average and median

Table 3
Nationality distribution of foreign residency rights.

Nationality	Quantity	Percentage	Has signed an extradition clause with China?
Argentina	4	0.52	No
Australia	72	9.38	Yes (2007-9-6)
Macao	13	1.69	No
Belize	14	1.82	No
Germany	5	0.65	No
The Philippines	8	1.04	Yes (2001-10-30)
Gambia	2	0.26	No
Guinea-Bissau	3	0.39	No
Canada	116	15.10	No
Malaysia	2	0.26	No
America	66	8.59	No
Taiwan	65	8.46	No
Hong Kong	206	26.82	No
Singapore	36	4.69	No
New Zealand	19	2.47	No
Indonesia	14	1.82	No
England	4	0.52	No
Others	119	15.49	No
Total	768	100.00	

asset–liability ratios between the two groups, indicating that the asset–liability ratios of companies whose controllers have foreign residency rights are significantly lower than those of the other companies. In Table 4A, the average return on assets (*Roa*) for all of the companies is 4.3%, and the median is 7.3%. In Table 4B, the average and median returns on assets of companies whose controllers have foreign residency rights are 5.0% and 4.8%, respectively, while those of the other group are 4.2% and 4.3%, respectively. Table 4D also shows significant differences in the means and medians of *Roa* for both groups, which means that the *Roa* values of companies whose controllers have foreign residency rights are significantly higher than those of other companies. Company size (*Size*) is measured as the natural logarithm of a company's total assets. From the values and comparisons of the means and medians in Table 4D, we find no significant difference in company size between the two groups. We select three important indicators of corporate governance: centralization of shareholding (*Central*), board independence (*Indboard*) and separation of cash flow and voting rights (*Cv*). Table 4A indicates that the average for *Central* for all of the companies is 34.1% and the median is 43.5%, which suggests that companies' centralization of shareholding is relatively high and that many companies have controllers who are large shareholders. From Table 4B, the average and median of *Central* for companies whose controllers have foreign residency rights are 36.5% and 33.7%, respectively, while those for companies that do not are 33.8% and 30.9%, respectively. These differences are significant (Table 4D), indicating that the centralization of shareholding by companies whose controllers have foreign residency rights is significantly higher than that of the other group. As shown in Table 4A, the average and median of board independence (*Indboard*) for all of the companies are 36.8% and 40.0%, respectively, which is consistent with the rule that at least one third of the members of the board of a listed company should be independent. Table 4B shows that the average and median of *Indboard* for companies whose controllers have foreign residency rights are 36.9% and 33.3%, respectively, while those of the other group are 36.8% and 33.3%, respectively. The differences in *Indboard* and *Cv* for the two groups are not significant. The descriptive statistics for company size (*Size*), accounts receivable (*Receivables*) and inventory (*Inventory*) variables are also reported in Table 4. The differences in these variables between the two groups are not significant.

5. Empirical analysis

First, we analyze the correlation coefficient of each variable and then examine the relationship between whether the company's controller has the foreign residency rights and the company's auditor choice from a

Table 4
Descriptive statistics.

	Mean	Variance	Minimum	Median	Maximum
Panel A: All samples					
Bigfour	0.019	0.018	0.000	0.000	1.000
Auditfee	13.167	0.249	9.210	13.459	16.098
Cv	6.745	66.117	0.000	12.412	28.834
Size	21.185	1.041	14.937	21.777	25.133
Lev	0.407	0.049	0.000	0.575	0.999
Roa	0.043	0.004	−0.372	0.073	0.209
Central	0.341	0.021	0.090	0.435	0.770
Indboard	0.368	0.003	0.111	0.400	0.556
Receivables	0.117	0.010	0.000	0.170	0.528
Inventory	0.170	0.024	0.000	0.214	0.721
Mar	0.592	0.242	0.000	1.000	1.000
Panel B: Companies whose controllers have foreign residency rights (Residy = 1)					
Bigfour	0.042	0.040	0.000	0.000	1.000
Auditfee	13.317	0.236	11.918	13.305	15.239
Cv	6.694	72.217	0.000	1.952	28.834
Size	21.171	1.158	15.577	21.072	24.686
Lev	0.384	0.057	0.016	0.351	0.999
Roa	0.050	0.004	−0.372	0.048	0.209
Central	0.365	0.025	0.090	0.337	0.770
Indboard	0.369	0.003	0.111	0.333	0.556
Receivables	0.117	0.011	0.000	0.094	0.528
Inventory	0.190	0.036	0.000	0.129	0.721
Mar	0.781	0.171	0.000	1.000	1.000
Panel C: Companies whose controllers do not have foreign residency rights (Residy = 0)					
Bigfour	0.016	0.016	0.000	0.000	1.000
Auditfee	13.150	0.248	9.210	13.122	16.098
Cv	6.751	65.453	0.000	2.961	28.834
Size	21.186	1.028	14.937	21.092	25.133
Lev	0.409	0.048	0.000	0.407	0.994
Roa	0.042	0.004	−0.372	0.043	0.209
Central	0.338	0.021	0.090	0.309	0.770
Indboard	0.368	0.003	0.111	0.333	0.556
Receivables	0.117	0.010	0.000	0.097	0.528
Inventory	0.168	0.023	0.000	0.130	0.721
Mar	0.571	0.245	0.000	1.000	1.000
	ΔMean = B – C	**T-value**	**ΔMedian = B – C**	**Z-value**	
Panel D: Differences in the average and median					
Bigfour	0.026***	5.024	0.000***	5.016	
Auditfee	0.167***	8.338	0.182***	8.509	
Cv	−0.057	−0.186	−1.009	−0.601	
Size	−0.015	−0.394	−0.020	−0.134	
Lev	−0.026***	−3.032	−0.056***	−3.484	
Roa	0.008***	3.3305	0.005***	3.563	
Central	0.026***	4.751	0.028***	3.871	
Indboard	0.000	0.192	0.000	0.248	
Receivables	0.000	0.078	−0.004	−0.900	
Inventory	0.022***	3.743	−0.001	−0.627	
Mar	0.210	11.338	0.000***	11.246	

Note: *, ** and *** indicate significance levels of 10%, 5% and 1%, respectively.

holistic perspective, considering the seriousness of the agency problem, the nations for which foreign residency rights have been obtained and the time of obtaining foreign residency rights. We also examine the additional audit costs related to the company controller's foreign residency rights. Finally, we examine

the effects of these companies' hiring of Big 4 auditors on their corporate governance and accounting performance.

5.1. Correlation coefficient analysis

Appendix A reports the results of the correlation coefficient analysis of each variable. The correlation coefficient between the foreign residency right variable (*Residy*) and the company's auditor choice variable (*Bigfour*) is positively correlated at the 1% level of significance. This preliminarily verifies Hypothesis 1, which states that companies whose controllers have foreign residency rights are more likely than others to hire Big 4 auditors. The correlation coefficient between the foreign residency right variable (*Residy*) and the audit fee variable (*Auditfee*) is positively correlated at the 1% level of significance, which means that Hypothesis 2, which states that companies whose controllers have foreign residency rights pay higher audit fees, has been initially verified. Appendix A also shows that many control variables are significantly related to auditor choice or audit fee (*Bigfour* or *Auditfee*); moreover, almost all of the correlation coefficients between them are less than 0.5. These results suggest that our regression model to control these variables produces reliable empirical conclusions, and serious multicollinearity is unlikely to affect the results.

5.2. Regression analysis

5.2.1. Foreign residency rights and auditor choice: A holistic perspective

Table 5 reports the regression results for the relationship between whether the company's controller has foreign residency rights and auditor choice. In regression (1), the coefficient of the foreign residency right variable (*Residy*) is significantly positive, which means that a company whose controller has foreign residency rights is more likely to choose a Big 4 auditor than other companies. To check the robustness of the conclusion, regression (2), for which the year, industry and assets are closest to each other, pairs each company whose controller has foreign residency rights with a company whose controller does not, and then uses a paired sample for the regression analysis. The coefficient of the variable *Residy* is still significantly positive, which is consistent with the result of regression (1). This suggests that the empirical results in Table 5 verify the theoretical expectations that companies whose controllers have foreign residency rights are more likely than others to hire Big 4 auditors.

Table 5
Foreign residency rights and auditor choice: A holistic perspective.

Variable	(1) Whole sample Bigfour		(2) Paired sample Bigfour	
Intercept	−55.122***	(−9.17)	−52.002***	(−4.60)
Residy	**0.909****	**(2.02)**	**1.884*****	**(2.87)**
Cv	−0.014	(−0.59)	−0.048*	(−1.66)
Size	1.571***	(6.50)	1.393***	(2.86)
Lev	−1.352	(−1.41)	0.105	(0.06)
Roa	7.270*	(1.88)	19.894***	(3.86)
Central	2.487**	(2.23)	1.656	(1.02)
Indboard	1.673	(0.43)	−2.664	(−0.44)
Receivables	2.991*	(1.90)	0.690	(0.25)
Inventory	−3.036**	(−2.34)	−2.345	(−1.49)
Industry	Yes		Yes	
Year	Yes		Yes	
Pseudo. R^2	0.282		0.436	
N	7725		1536	

Note: (1) The values reported in brackets are T-statistics; (2) *, ** and *** indicate significance levels of 10%, 5% and 1% respectively; (3) Standard errors are adjusted by heteroskedasticity and company clusters.
Bold values in Table is to highlight the main explanatory variables.

Table 6
Foreign residency rights and auditor choice: An agency cost perspective.

Variable	(1) Mar = 1 Bigfour	(2) Mar = 0 Bigfour	(3) Cv = 0 Bigfour	(4) Cv > 0 Bigfour	(5) Fraud = 0 Bigfour	(6) Fraud = 1 Bigfour
Intercept	−49.880*** (−7.69)	−83.655*** (−7.18)	−66.222*** (−7.17)	−52.300*** (−7.25)	−53.899*** (−8.74)	−63.740*** (−6.39)
Residy	**0.353 (0.61)**	**1.305* (1.72)**	**0.854 (0.98)**	**0.982* (1.88)**	1.045** (2.13)	0.701 (1.12)
Cv	0.014 (0.49)	−0.089** (−1.97)			−0.006 (−0.25)	−0.028 (−0.70)
Size	1.217*** (4.31)	3.048*** (5.72)	2.778*** (6.22)	1.361*** (4.83)	1.496*** (6.04)	1.978*** (4.87)
Lev	−0.497 (−0.41)	−4.943** (−2.41)	−4.463*** (−2.95)	−1.206 (−1.16)	−1.041 (−0.90)	−2.070 (−1.58)
Roa	3.609 (1.51)	8.817 (0.77)	8.943* (1.86)	7.758* (1.87)	8.201* (1.91)	4.596 (0.86)
Central	3.317** (2.34)	1.918 (0.98)	1.945 (1.21)	3.134** (2.31)	2.422** (2.21)	3.325* (1.89)
Indboard	5.757* (1.68)	−16.035*** (−3.09)	3.092 (0.56)	2.395 (0.53)	3.648 (0.92)	−4.992 (−1.00)
Receivables	3.395 (1.56)	3.034 (1.10)	6.168** (2.13)	3.217* (1.77)	2.959 (1.47)	3.556* (1.88)
Inventory	−5.113*** (−2.88)	0.502 (0.30)	−3.915 (−1.42)	−3.196** (−2.13)	−3.886*** (−2.72)	−1.193 (−0.82)
Industry	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo. R^2	0.251	0.588	0.412	0.292	0.277	0.391
N	4291	3434	1875	4605	5216	2509

Note: (1) The values reported in brackets are T-statistics; (2) *, ** and *** indicate significance levels of 10%, 5% and 1%, respectively; (3) Standard errors are adjusted by heteroskedasticity and company clusters.
Bold values in Table is to highlight the main explanatory variables.

Table 7
Foreign residency rights and auditor choice: Extradition clauses and time of obtaining foreign residency rights.

Variables	(1) Countries with an extradition clause	(2) Countries without an extradition clause	(3) Company whose controllers have foreign residency rights
	Bigfour	Bigfour	Bigfour
Intercept	−54.595***	−56.901***	−55.845***
	(−9.14)	(−9.43)	(−3.33)
Reisdy	**0.941****	**0.885**	
	(1.97)	**(0.79)**	
Residylist			**1.931***
			(1.66)
Cv	−0.015	−0.009	−0.066*
	(−0.62)	(−0.32)	(−1.69)
Size	1.564***	1.591***	1.691**
	(6.49)	(6.53)	(2.06)
Lev	−1.285	−1.957*	1.833
	(−1.32)	(−1.87)	(0.64)
Roa	6.925*	4.758	26.846***
	(1.77)	(1.06)	(4.23)
Central	2.424**	3.400***	−0.208
	(2.13)	(2.83)	(−0.09)
Indboard	1.718	1.912	−5.010
	(0.44)	(0.43)	(−0.61)
Receivables	2.862*	3.649*	−3.130
	(1.79)	(1.88)	(−0.91)
Inventory	−3.000**	−3.140*	−1.823
	(−2.29)	(−1.91)	(−0.94)
Industry	Yes	Yes	Yes
Year	Yes	Yes	Yes
Pseudo. R^2	0.282	0.273	0.509
N	7652	7030	768

Note: (1) The values reported in brackets are T-statistics; (2) *, ** and *** indicate significance levels of 10%, 5% and 1%, respectively; (3) Standard errors are adjusted by heteroskedasticity and company clusters.
Bold values in Table is to highlight the main explanatory variables.

5.2.2. Foreign residency rights and auditor choice: An agency cost perspective

We divide the samples into two groups according to the degree of marketization (Table 6): the group in regression (1) has a high degree of marketization ($Mar = 1$) and less serious agency problems, while the group in regression (2) has a low degree of marketization ($Mar = 0$) and more serious agency problems. The results show that the coefficient of the variable *Residy* is significantly positive for the group with low marketization but is not significant for the group with high marketization. We next divide the sample into two groups according to the degree of separation of voting and cash flow rights (Table 6): the group in regression (3) has a low degree of separation ($Cv = 0$) and less serious agency problems, while the group in regression (4) has a high degree of separation ($Cv > 0$) and more serious agency problems. The coefficient of the variable *Residy* is significantly positive in the group with a high degree of rights separation, but that for the group with low separation is not significant. Then, we divide the sample into two groups according to whether there are violations in the company's year (Table 6): the group in regression (5) has violations (Fraud = 1) and the group in regression (6) does not (Fraud = 0). The results show that the coefficient of the variable *Residy* is significantly positive in the group with no violations but not significant in the group with violations, which suggests that when companies already have serious agency problems, companies with controllers with foreign residency rights are more likely to hire a Big 4 auditor, and only companies that have not violated regulations will send signals of good governance to the public by hiring a Big 4 auditor.

5.2.3. Foreign residency rights and auditor choice: Extradition clauses and the time foreign residency rights were obtained

The Philippines signed an extradition clause with China in October 2001, and Australia signed in September 2007. Regression (1) of Table 7 excludes the observations for companies whose controllers obtained foreign residency rights from the Philippines and Australia. The regression result shows that the coefficient of the variable *Residy* is significantly positive, and regression (2) of Table 7 excludes the observations for companies whose controllers obtained foreign residency rights from countries that did not sign extradition clauses with China. The regression results show that the coefficient of the variable *Residy* is not significant, which indicates that the various regions in which companies' controllers obtained foreign residency rights affect companies' auditor choices in different ways. If the countries in which company controllers obtained foreign residency rights have extradition clauses with China, market participants believe that these companies' cost of illegality is almost as high as that of domestic entrepreneurs, so whether they have such foreign residency rights does not significantly affect the companies' auditor choice. In contrast, when countries in which companies' controllers obtained foreign residency rights do not have extradition clauses with China, market participants believe that such companies' cost of illegality is significantly lower than that of domestic companies, which prompts such companies to hire high-quality auditors to signal good corporate governance to the market. Regression (3) of Table 7 includes the sample companies whose controllers have foreign residency rights and distinguishes between whether these rights were obtained before or after the company was listed. The coefficient of *Residylist* is significantly positive, which indicates that companies whose controllers

Table 8
Foreign residency rights and auditor choice: Overseas business.

Variables	(1) Bigfour	(2) Bigfour	(3) Bigfour	(4) Bigfour
CONSTANT	−55.070***	−30.350***	−57.982***	−55.320***
	(−9.14)	(−3.07)	(−9.41)	(−9.20)
Residy	**0.918****	**2.370****	**0.830***	**0.850***
	(2.04)	**(2.29)**	**(1.78)**	**(1.85)**
Export	**0.454**			**0.350**
	(1.29)			**(0.98)**
Residy* × *Export				**0.678**
				(0.69)
Cv	−0.014	−0.063	−0.008	−0.014
	(−0.58)	(−0.81)	(−0.35)	(−0.57)
Size	1.568***	0.618	1.690***	1.569***
	(6.47)	(1.44)	(6.82)	(6.50)
Lev	−1.382	1.052	−1.656	−1.397
	(−1.44)	(0.40)	(−1.59)	(−1.45)
Roa	7.129*	4.693	6.498	7.093*
	(1.83)	(0.59)	(1.55)	(1.82)
Central	2.517**	4.290	2.432**	2.569**
	(2.25)	(1.33)	(2.11)	(2.27)
Indboard	1.703	−15.920***	2.567	1.663
	(0.44)	(−2.67)	(0.63)	(0.43)
Receivables	3.064*	−6.253	3.573**	3.082*
	(1.95)	(−0.88)	(2.21)	(1.95)
Inventory	−3.075**	−5.409	−2.828**	−3.081**
	(−2.34)	(−1.53)	(−2.08)	(−2.34)
Industry	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Adj. R^2				
N	7725	537	7188	7725

Note: (1) The values reported in brackets are T-statistics; (2) *, ** and *** indicate significance levels of 10%, 5% and 1%, respectively; (3) Standard errors are adjusted by heteroskedasticity and company clusters.
Bold values in Table is to highlight the main explanatory variables.

obtained foreign residency rights before listing are more likely to choose a Big 4 auditor than those whose controllers obtained such rights after listing.

5.2.4. Foreign residency right and auditor choice: Overseas business

Controllers of private enterprises may also pursue overseas identities to expand their overseas business, and their companies may employ Big 4 auditors to reduce information asymmetry in overseas transactions. That is, companies' overseas business may contribute to the empirical results presented above. To eliminate this concern, we control the export business variable (*Export*) in regression (1) of Table 8 and find that the coefficient of the variable *Residy* remains significantly positive. We then divide the entire sample into two groups: companies with overseas business groups in regression (2) and companies without overseas business groups in regression (3) (Table 8). The results show that the coefficients of the variable *Residy* of the two groups are both significantly positive. Regression (4) in Table 8 includes an interaction between the overseas business variable and the foreign residency rights variable (*Residy* * *Export*), and the results show that the interaction item is not significant. The results thus suggest that there is a significant positive correlation between foreign residency rights and a company's likelihood of hiring a Big 4 auditor regardless of whether the company has an overseas business. That is, whether the company has an overseas business or not does not affect the above conclusions.

Table 9
Foreign residency rights and auditor choice: Endogenous analysis.

Variable	(1) Residy	(2) Bigfour
CONSTANT	−1.628	−56.560***
	(−0.77)	(−8.89)
RESIHAT		**8.321*** **
		(3.08)
Fict	**0.136****	
	(2.17)	
Export	**−0.272**	
	(−0.94)	
Gov	1.295***	
	(3.89)	
Cv	0.006	0.001
	(0.49)	(0.02)
Size	−0.158*	1.567***
	(−1.83)	(6.36)
Lev	−0.213	−0.901
	(−0.47)	(−0.85)
Roa	0.903	5.487
	(0.75)	(1.28)
Central	0.866	2.394**
	(1.30)	(2.03)
Indboard	−1.792	1.777
	(−1.20)	(0.37)
Receivables		2.259
		(1.12)
Inventory		−4.479***
		(−3.07)
IND	Yes	Yes
YEAR	Yes	Yes
Adj. R^2	0.101	0.310
N	6395	6395

Note: (1) The values reported in brackets are T-statistics; (2) *, ** and *** indicate significance levels of 10%, 5% and 1%, respectively; (3) Standard errors are adjusted by heteroskedasticity and company clusters.
Bold values in Table is to highlight the main explanatory variables.

5.2.5. Foreign residency rights and auditor choice: Endogenous analysis

Considering that our empirical results may be endogenous to the needs of the company's overseas business, we perform a regression test in Table 9 using an instrumental variable, which is the natural logarithm of the number of new contracts signed by China's economic groups with foreign businessmen in a certain year in the region in which the company is located. Regression (1) in Table 9 uses the instrumental variable of the natural logarithm of the number of new contracts signed by China's economic groups with foreign businessmen in a certain year (*FICT*) and other control variables to test the variable *Residy*. The results show that the coefficient of the instrumental variable (*FICT*) is significantly positive. We then use the fitted value of the variable *Residyhat* from regression (1) to regress auditor choice in regression (2), and we find that the coefficient of *Residyhat* is significantly positive after the influence of this endogeneity has been controlled, which suggests that the companies whose controllers have foreign residency rights are more likely to choose a Big 4 auditor than other companies.

5.2.6. Foreign residency rights and auditor fees

Table 10 reports the regression results on the relationship between whether a company's controller has foreign residency rights and audit fees. Regression (1) tests the entire sample and shows that the coefficient of the variable *Residy* is significantly positive. Regression (2) excludes the observations for companies whose controllers obtained foreign residency rights after listing and shows that the coefficient of the variable *Residy* is significantly positive. Regression (3) excludes observations for companies whose controllers obtained foreign residency rights before listing and shows that the coefficient of the variable *Residy* is significantly positive. We then divide the sample into two groups according to the degree of separation of two rights: the group in regres-

Table 10
Foreign residency rights and auditor fees: Multivariate regression analysis.

Variable	(1) Auditfee	(2) Auditfee	(3) Auditfee	(4) Auditfee	(5) Auditfee
Intercept	7.185***	6.951***	7.213***	8.148***	6.714***
	(29.77)	(25.59)	(27.65)	(20.34)	(23.76)
Residy	**0.129*** **	**0.123*** **	**0.160*** **	**0.130*** **	**0.125*** **
	(4.94)	**(3.93)**	**(4.19)**	**(3.41)**	**(3.87)**
Bigfour	0.680***	0.679***	0.714***	0.505***	0.723***
	(8.33)	(8.10)	(7.94)	(2.92)	(8.37)
Cv	0.001	0.001	0.000		
	(0.62)	(0.73)	(0.40)		
Size	0.272***	0.277***	0.271***	0.234***	0.290***
	(23.54)	(23.07)	(23.03)	(13.40)	(21.81)
Lev	0.141***	0.143***	0.137***	0.103	0.165***
	(3.08)	(2.98)	(2.91)	(1.34)	(3.02)
Roa	0.032	0.074	0.049	−0.086	0.079
	(0.29)	(0.64)	(0.43)	(−0.49)	(0.60)
Central	0.034	0.032	0.067	0.114	−0.038
	(0.57)	(0.52)	(1.08)	(1.35)	(−0.50)
Indboard	−0.078	−0.093	−0.063	−0.109	−0.094
	(−0.55)	(−0.64)	(−0.43)	(−0.56)	(−0.52)
Receivables	0.149	0.154*	0.159*	−0.058	0.308***
	(1.64)	(1.68)	(1.72)	(−0.42)	(2.78)
Inventory	−0.113*	−0.113	−0.115*	−0.082	−0.088
	(−1.68)	(−1.55)	(−1.70)	(−0.73)	(−1.12)
Industry	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.482	0.482	0.485	0.383	0.543
N	6786	6354	6404	2700	14086

Note: (1) The values reported in brackets are T-statistics; (2) *, ** and *** indicate significance levels of 10%, 5% and 1%, respectively; (3) Standard errors are adjusted by heteroskedasticity and company clusters.
Bold values in Table is to highlight the main explanatory variables.

Table 11
The economic consequences of hiring a Big 4 auditor for companies with foreign residency rights: Earnings management and accounting performance.

Variables	(1) Em[a]	(2) Roa
Intercept	0.175***	−0.348***
	(6.36)	(−11.62)
Bigfour	0.004	0.004
	(0.66)	(0.53)
Residy	−0.004	0.001
	(−1.33)	(0.36)
Bigfour * Residy	**−0.022****	**0.028****
	(−2.38)	**(2.31)**
Size	−0.005***	0.020***
	(−4.57)	(14.07)
Lev	0.042***	−0.129***
	(7.69)	(−21.15)
Tobinq	0.002**	0.011***
	(2.43)	(8.19)
Central	0.028***	0.038***
	(4.24)	(5.45)
Indboard	0.011	−0.025
	(0.70)	(−1.40)
Industry	Yes	Yes
Year	Yes	Yes
Adj. R^2	0.076	0.244
N	6789	7600

Note: (1) The values reported in brackets are T-statistics; (2) *, ** and *** indicate significance levels of 10%, 5%, and 1%, respectively; (3) Standard errors are adjusted by heteroskedasticity and company clusters.

[a] When earnings management calculated by the modified Jones model is used as the dependent variable, the results still hold.

sion (4) with a high degree of separation and serious agency problems and the group in regression (5) with a low degree of separation and less serious agency problems. The regression analysis indicates that the coefficients of the variable *Residy* for both groups are significantly positive. The regressions above consistently indicate that companies whose controllers have foreign residency rights pay higher audit fees than other companies.

5.2.7 The economic consequences of hiring a Big 4 auditor for companies whose controller have foreign residency rights: Earnings management and accounting performance

Regression (1) in Table 11 examines the impact of hiring a Big 4 auditor on corporate governance (earnings management) for companies whose controllers have foreign residency rights. The results show that the coefficient of the variable *Residy* is negative, while the interaction term between the variable *Residy* and the variable *Bigfour* is significantly negative. These findings indicate that hiring a Big 4 auditor enables companies whose controllers have foreign residency rights to reduce earnings management and show better corporate governance. Regression (2) in Table 11 examines the impact of hiring a Big 4 auditor on the accounting performance of companies whose controllers have foreign residency rights. The results show that the coefficient of the variable *Residy* is positive and that the coefficient of the interaction term between the variable *Residy* and the variable *Bigfour* is significantly positive, which indicates that hiring a Big 4 firm motivates companies whose controllers have foreign residency rights to perform better.

6. Conclusions and implications

China's rapid economic growth since the reform and opening up has brought about many wealth-creation opportunities. At the same time, the lack of protections for property rights and the deterioration

of the ecological environment have led to an increase in the outflow of elites who create wealth. These positive and negative effects have altogether led many wealthy elites to work in China while obtaining the foreign residency rights. Considering the current environment of wealthy migrants in Chinese society, this paper focuses on controllers of Chinese listed companies who have obtained foreign residency rights, examining the relationship between these foreign residency rights and the companies' audits. The result shows that companies whose controllers have foreign residency rights are more likely to hire Big Four auditors than other companies, and this result remains valid after endogenous effects are considered. According to the degree of marketization and the degree of separation of voting and cash flow rights, we divide companies into two groups. We find that companies whose controllers have foreign residency rights are more likely than other companies to hire Big 4 auditors when they have serious agency problems; however, when companies already have accounting irregularities, companies whose controllers have foreign residency rights are not more inclined to hire Big 4 auditors. This means that only companies without irregularities will signal good corporate governance to the public by hiring Big 4 auditors. Market participants believe that companies whose controllers have foreign residency rights in countries with extradition clauses with China have a cost of illegality that is almost as high as that of domestic entrepreneurs, so whether they have such foreign residency rights does not significantly affect their companies' auditor choice. However, market participants believe that the cost of illegality for companies whose controllers have foreign residency rights in countries that do not have extradition clauses with China is significantly lower than that of domestic companies, and such companies therefore hire high-quality auditors to signal good corporate governance to the market. Companies whose controllers obtained foreign residency rights are more likely to choose a Big 4 auditor than those who obtain such rights after listing. We also examine the cost of using an external independent auditor as a binding mechanism to send signals, and we find that companies whose controllers have foreign residency rights paid higher audit fees than other companies. Finally, we examine the impact of hiring Big 4 auditors on corporate governance and the accounting performance of companies whose controllers have foreign residency rights, and we find that firms hiring Big 4 auditors show better corporate governance and higher accounting performance than firms that do not.

Our findings have a number of implications. The lack of protection mechanisms for property rights and the deterioration of the ecological environment have led to an increase in the outflow of wealth elites, resulting in not only a loss of important talent from China's developing market economy but also a huge loss of capital. Chen et al. (2013) find that companies whose controllers have foreign residency rights are more likely to defraud investors, and we find that such companies will pay higher audit fees to enhance their reputation. Although we find that hiring external independent auditors can alleviate the agency problems of such companies, the regulatory authorities should address the root of the problem, strengthening the legal system to protect private property rights, improving the law enforcement of the securities market and strengthening the protection of the ecological environment.

Finally, because the number of people who have foreign residency rights but work or operate a business in China is growing, as is their influence on China's economic development, a number of issues should be addressed in future research. For example, it would be interesting to learn how such companies finance themselves and make investment decisions. It would also be worthwhile to study how market investors and creditors evaluate the accounting quality of such companies and how they price such companies' assets.

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Appendix A. Correlation analysis

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Bigfour	1												
2. Residy	0.057***	1											
3. Cv	0.041***	−0.002	1										
4. Mar	0.053***	0.128***	−0.056***	1									
5. Size	0.159***	−0.004	0.173***	0.018	1								
6. Lev	0.033***	−0.034***	0.171****	−0.121***	0.328***	1							
7. Roa	0.054***	0.038***	−0.027**	0.112***	0.062***	−0.356***	1						
8. Central	0.075***	0.054***	0.219***	0.079***	0.163***	−0.032***	0.133***	1					
9. Indboard	0.003	0.002	−0.098***	0.027**	−0.027**	−0.066***	0.014	0.063***	1				
10. Receivables	0.003	−0.001	−0.08***	0.131***	−0.129***	0.019*	−0.038***	−0.011	0.002	1			
11. Inventory	−0.008	0.043***	0.091***	0.003	0.27***	0.4***	−0.064***	0.103***	−0.011	−0.167***	1		
12. Opinion_2	−0.013	−0.002	−0.009	−0.071***	−0.188***	0.179***	−0.294***	−0.091***	−0.031***	0.015	−0.07***	1	
13. Auditfee	0.279***	0.101***	0.105***	0.181***	0.636***	0.196***	0.065***	0.133***	−0.003	−0.052***	0.133***	−0.069	1

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Anti-corruption, government subsidies, and investment efficiency

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ABSTRACT

The problem of corruption in socio-economic development has long been a focus of academics and practitioners. To address this concern in China, the 18th National Congress of the Communist Party of China instituted a new anti-corruption policy. In this paper, we examine the impact of this recently enacted anti-corruption policy on the investment efficiency of subsidized enterprises from the perspective of government subsidies. We conclude that government subsidies have a significant positive impact on the overinvestment behavior of enterprises and that the anti-corruption work done by the government has effectively restrained the excessive investment behavior of government-subsidized enterprises. Further, we find that the anti-corruption policy is more effective in restricting overinvestment in subsidized state-owned enterprises than in non-state-owned enterprises. We examine the impact of the anti-corruption policy on excessive investment caused by government subsidies and enrich the body of research related to investment efficiency. We also provide empirical support for further research on the anti-corruption policy at the macro-market and micro-enterprise levels. The findings highlight the need to establish new cooperation between government and enterprises, to rationalize the distribution of administrative resources, and to promote the sustained and healthy development of the national economy.

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1. Introduction

Government subsidies, in which the government provides financial aid to microeconomic individuals to achieve certain political and economic goals, are an important part of fiscal expenditures common to all countries. Subsidies have been particularly important during China's economic transition as a means for the government to provide a "helping hand" (Frye and Shleifer, 1997). In recent years, the scale of Chinese government subsidies has gradually expanded, and both the number of companies receiving subsidies and the amounts of the subsidies have increased sharply. However, China's current weak judicial environment, extensive corruption, and opaque subsidy process have led to many problems, which have aroused widespread concern in practical and economic circles regarding the efficiency of China's government subsidy policies.

Many scholars have questioned the distribution and allocation of Chinese government subsidies. For example, Yu et al. (2010) find that companies receive more financial subsidies if they establish political connections. Moreover, such rent-seeking behavior is more prevalent in areas in which the institutional environment is backward. This kind of spending tilt distorts the effective allocation of scarce resources and reduces the overall welfare of society. Similarly, Guo and Du (2011) reveal that political connections change the flow of government subsidies and reduce their efficiency.

The report of the 18th National Congress of the Communist Party of China, dated November 8, 2012, sought to promote the dual goals of government integrity and efficiency. The report stated that political integrity would be promoted because the system would prevent and punish corruption. It indicated that cadres (the civil service) should be non-corrupt and politically transparent. The anti-corruption policy of the 18th National Congress was a major exogenous shock to the government's operational pattern. Officials with the power to allocate subsidies lost the conditions necessary for renting and came under pressure to make the subsidy process transparent. Consequently, officials became more likely to allocate more funds based on corporate efficiency or social benefits. They are also more likely to promote particular fiscal policies by tracking and regulating the use of subsidies. For enterprises, the new policy blocks their rent-seeking channels, and they cannot obtain additional financial support by establishing political connections. Therefore, they have incentives to use their existing resources more efficiently.

We use A-share non-financial listed companies from 2007 to 2015 as a research sample to examine the impact of anti-corruption policy on government subsidy efficiency from the perspective of overinvestment. The results show that the anti-corruption policy effectively suppresses excessive investment caused by government subsidies and improves the efficiency of subsidy allocation. Moreover, this efficiency improvement is mainly concentrated in state-owned enterprises. We also conduct a series of robustness tests, and the main findings remain unchanged.

This paper contributes to the literature in several ways. First, the current research on government subsidies in China and abroad focuses mainly on subsidy motives (Chen and Li, 2001; Chen et al., 2008), influencing factors (Chen, 2003; Yu et al., 2010), and economic consequences (Lee, 1996; Girma et al., 2007; Tang and Luo, 2007); relatively few works explore the determinants of the efficiency of government subsidies. In this paper, we analyze and evaluate the economic effects of local government fiscal policy from the perspective of institutional government corruption, which helps us comprehensively explore the deeper reasons for the resource allocation effect of financial subsidies. Second, anti-corruption policy has an exogenous effect on the quality of the government and the institutional environment, which has led many scholars to consider the policy's economic consequences. For example, Zhong et al. (2016) find that the anti-corruption policy will ultimately affect the performance of enterprises by accelerating production, shortening business cycles, and improving asset turnover, and Wang and Kong (2016) analyze anti-corruption's effect on the corporate governance environment. Our study comprehensively analyzes the impact of anti-corruption on microeconomic entities from the new research perspective of government subsidies and supplements the research on the economic effects based on anti-corruption from a horizontal perspective. Third, because investment is a major decision for an enterprise, it is a core channel that affects the value of the enterprise and directly relates to its future operation and development. This study examines the impact of the anti-corruption policy on excessive investment caused by government subsidies, expands the research on the determinants of investment efficiency, and provides important implications for guiding the non-efficiency investment of enterprises at the macro level.

The rest of the paper is organized as follows. Section 2 contains the literature review. Section 3 provides the theoretical analysis and research hypothesis. Section 4 discusses the research design and descriptive statistics. Section 5 addresses the empirical result, and Section 6 contains the robustness tests. Section 7 concludes the paper.

2. Literature review

2.1. Research on government subsidy policy

Government subsidies, which are the free transfer of funds from the government to microeconomic entities, are an important part of fiscal expenditure. Subsidies are a means for the government to directly intervene in the market and in the operation of enterprises (Frye and Shleifer, 1997). Recently, the scale of subsidies by the Chinese government has increased year by year, and more than 50% of listed companies in China have received some level of subsidy. This phenomenon has attracted the attention of scholars in China and abroad. Most of the research on government subsidy policies focuses on two aspects: (1) subsidy motivation and influencing factors and (2) economic consequences.

2.1.1. Subsidy motivation and influencing factors

Subsidy income given to a listed company can increase the amount of money held by the company. Local governments seek subsidies to improve the performance of local listed companies. Researchers find that to obtain resources in the capital market, local governments actively participate in the earnings management of listed companies and procure large-scale tax incentives and financial subsidies for listed companies. Local governments provide financial subsidies to help listed companies obtain qualifications for rights offerings or to retain listings, especially companies with poor performance and instability (Chen and Li, 2001). Local government officials, who are driven by work performance and a desire for promotion, are willing to help companies in these ways (Guo and Hu, 2002; Wang et al., 2009; Zhong et al., 2010; Xu and Luo, 2011). Other studies have shown that subsidy funds tend to flow into companies that are at the margin of loss and allotment, enabling such listed companies to manage their earnings, meet hardline requirements set by regulators, and make the turnarounds necessary for continued listing (Aharony et al., 2000; Chen et al., 2008; Zhang, 2006; Zhu and Chen, 2009). Another branch of literature analyzes the motives of the company's stakeholder groups and finds that the management boards of companies, especially those with poor performance, overly depend on government subsidies. At the same time, listed company executives seek subsidies to establish government relations to obtain protection and strengthen internal controls toward the goals of securing positions and promotions and increasing their political ties (Xue and Bai, 2008; Chen et al., 2010). Therefore, no matter which motivation is distorted, the result is a corruption of the purpose of government subsidies, which can seriously hinder marketization and even reduce overall social welfare (Yu and Zhao, 2009; Yu et al., 2010; Geng et al., 2011).

The literature regarding the influencing factors of government subsidy allocation mainly uses the perspectives of government–enterprise linkage and property rights (Chen, 2003; Shao and Bao, 2011; Guo and Du, 2011; Bu and Yu, 2012). These studies show that government subsidies are significantly skewed toward state-owned enterprises or private enterprises with political connections. Further, research indicates that private enterprises that establish political ties with local governments can obtain more financial subsidies, and that in areas with poor institutional environments, the subsidy acquisition effect of political connections is stronger (Yu et al., 2010).

2.1.2. Economic consequences

Both the domestic and foreign literature discuss the issue of subsidies primarily from the perspective of economic and social effects. Beason and Weinstein (1996) argue that subsidies can lead to low growth and diminishing returns to scale. Subsequent studies test that argument by using data from different countries and regions and find evidence supporting the views of Beason and Weinstein. Among them, Lee (1996), using empirical data from 38 industrial enterprises in South Korea from 1963 to 1983, finds that political intervention reduces the growth rate of labor productivity and total factor productivity and that industrial policies,

such as tax incentives and subsidies, have no correlation with the growth of total factor productivity. Tongeren (1998), in an investment subsidy study in the Netherlands, finds that an investment subsidy improperly changes the investment decision of enterprises. Tzelepis and Skuras (2004) confirm this view in a study of Greek companies, finding that investment subsidies provide large cash flows into the company but do not help the company's efficiency or profitability. In a study conducted using Irish data, Girma et al. (2007) analyzes whether government subsidies stimulate productivity growth. They find that only a special subsidy that supports productivity increases overall factor productivity, and that companies with financing constraints will benefit most from government subsidies.

In China, the literature has not reached consistent conclusions regarding the effect of government subsidy resource allocation. For example, Tang and Luo (2007) propose that although there is no direct evidence that government subsidies enhance the economic benefits of listed companies, they may help motivate listed companies to focus on social benefits and corporate responsibility. However, Yu et al. (2010) find that the financial subsidies obtained by private enterprises that have political relations with local governments are negatively correlated with corporate and social performance. Additionally, there are disagreements in the academic literature as to whether subsidies are effective in strengthening a company's innovative research and development, improving profitability, and urging enterprises to assume more social responsibilities.

In sum, relatively few studies explore the effect of macroeconomic changes on the resource allocation efficiency of government subsidies. This study analyzes and evaluates the economic effects of local government financial subsidy policies in terms of the institutional factor of external corruption, which helps us to more comprehensively explore the deeper reasons for the resource allocation effect of financial subsidies.

2.2. Research on the effect of the anti-corruption policy

In recent years, there has been a great deal of discussion in academia about the relation between the political environment and economic efficiency. A number of domestic and foreign scholars address this from the perspective of the theory of the effectiveness of corruption, which argues that corruption has improved economic efficiency. This literature argues that corruption serves as a lubricant of inefficient mechanisms, and that corruption contributes to economic growth (Leff, 1964; Huntington, 1968; Li, 2001). Similarly, Rock and Bonnett (2004) and Wu and Rui (2010) empirically examine the positive impact of corruption. However, other evidence refutes the theory of the effectiveness of corruption, arguing that corruption leads to high costs and ultimately reduces the efficiency of economic operations. From a macro perspective, such scholars believe that it is difficult to develop a healthy overall national economy in a corrupt environment. Because corruption leads to distortions in the allocation of market resources, people will engage in more rent-seeking activities, which will reduce investment in and R&D for social productivity, increase the scale of the informal economy, and inhibit national innovation and even financial and foreign trade transactions: in the long term, economic growth would be suppressed (Gould and Amaroreyes, 1983; Mauro, 1995; Shen and Zhao, 2016). The literature also explores the link between corruption and corporate governance at the micro level. Porta et al. (1999) find that corporate governance in highly corrupt areas is often worse, for a number of reasons. First, corruption can exacerbate agency problems. Acting in their own interests, companies' management boards collude with government officials, and that collusion brings risks to enterprises and harms their interests (Wu, 2005). Serious commercial collusion and corruption strengthens internal control tendencies and weakens the relevant supervisory utility of external governance mechanisms. Second, companies that prevail in a culture of corruption will also have a "bad money drives out of good money" effect when selecting management, which can change the corporate governance ecosystem (Mironov, 2015). In addition, corruption motivates people to shift their talents and energy from productive activities to political capital (Lui, 2010), which results in an inefficient allocation of human resources (Murphy et al., 1991). Corruption weakens the enthusiasm of corporate managers to invest in innovation and R&D activities (Murphy et al., 1993), which ultimately reduces the efficiency of corporate investment and financing and undermines the long-term sustainability of the business.

From this review, we can see that the literature has examined the relation between economic growth and corruption from a macro perspective and examined the effect of corruption on corporate governance at the micro level. However, few scholars have provided a specific method to analyze the ways in which the

advantages and disadvantages of mitigating corruption affect the specific factors of corporate governance and ultimately affect the operation of enterprises.

Within China, scholars' explorations of anti-corruption effects on the macro and micro economies was carried out before the 18th National Congress instituted its policy against corruption. The literature discusses the increasingly prominent issues of corruption and commercial collusion in China's economic reform from the perspectives of mechanism constraints and the legal environment. At the administrative level, corruption leads to unfair political connections that siphon hidden profits, inducing government officials to set rents and reduce administrative efficiency (Zhou and Tao, 2009). Because of local political pressure, subsidies will be distributed to meet the needs of the companies in the jurisdiction, and enterprises will be overexploited and expanded in the pursuit of short-term benefits (Li, 2015; Xu and Li, 2016). At the enterprise level, the research finds that high transaction costs caused by corruption hinder normal business and R&D activities (Yang, 2011; Huang and Li, 2013).

In November 2012, the 18th National Congress of the Communist Party of China was convened. At the Congress, the Central Committee set forth the goal of "anti-corruption and building a clean government," and afterward, the new anti-corruption policy was officially launched. This anti-corruption policy is an exogenous shock on the quality of government and the institutional environment, and many scholars have considered its economic consequences. The literature concentrates on two areas: (1) the impact of the anti-corruption policy on the company's own value and performance and (2) the Central Committee's "No. 18 ban," which suppressed the "revolving door of commercial and political power." Regarding the impact of the anti-corruption policy on companies' value and performance, Ying et al. (2015) find that the implementation of the anti-corruption policy has curbed corporate rent-seeking behavior, cut off the non-market administrative resources that such behavior relied on in the past, and caused the market value of enterprises to decline in the short term. Simultaneously, the literature regarding the No. 18 ban finds that the fluctuation of corporate value led to the resignation of a large number of "independent directors" with political status; this is a supplementary reason for the short-term decline in value following the implementation of the new anti-corruption policy (Tang and Lin, 2016; Ye et al., 2016). Scholars also believe that the implementation of the anti-corruption policy has substantially purified the market environment and inhibited the private transmission of large amounts of public resources. It is reasonable to expect the value of enterprises to rise in the long run (Yan, 2016; Ye et al., 2016). In exploring how anti-corruption policies affect corporate performance, Zhong et al. (2016) find that the anti-corruption policy ultimately affects the performance of enterprises by accelerating production, shortening business cycles, and improving asset turnover. Wang and Kong (2016) analyze the impact of the anti-corruption policy on the corporate governance environment, and the academic community also observes and analyzes the behavioral motives and decision-making changes of various stakeholders, mainly from the behavioral motives of managers, and discusses the changes and adjustments of corporate management decisions brought about by the anti-corruption mechanism. Among them, Dang et al. (2015) believe that the implementation of the anti-corruption policy may shift managers' focus from seeking political connections to improving their ability to innovate so that they can better adapt to the current situation and seek enterprise development. Jin et al. (2016) discuss how the senior executives of state-owned enterprises can balance their promotional appeal and risk aversion in the context of anti-corruption to ultimately determine whether it leads to the passive capture of investment opportunities or the active expansion of investment scale.

No study offers an in-depth investigation of how the anti-corruption policy affects the investment efficiency of government-subsidized enterprises. Investment, which is a major decision for the enterprise, substantially affects the value of the enterprise and thus directly reflects the resource allocation efficiency of government subsidies. This study comprehensively analyzes the impact of the anti-corruption policy on microeconomic entities from the new perspective of government subsidies and supplements the research on the economic effects of the anti-corruption policy from a horizontal perspective.

3. Theoretical analysis and research hypotheses

Government subsidies obtained by a listed company increase the money held by the company. This free cash flow is an important factor in managers' investment decisions (Jensen, 1976). Therefore, the acquisition

of government subsidies by listed companies may affect their investment efficiency and may lead to erroneous judgments and decisions by a company's management. In the face of crisis and the ever-changing market environment, management will rely more on seeking help rather than innovating, which leads to the inefficient flow of capital and the mismatch of social resources. Government subsidies may contribute to the inertia of production and the operation of enterprises to a certain extent, leading to the inefficiency of enterprises. In addition, in China, government subsidies often offset a company's poor performance to guarantee its listed qualification and reduce losses. Local governments and officials also use subsidies to enhance their work performance. In summary, in the context of rent-seeking, the relationship between the company and the government will affect the company's access to government subsidies, which further affect the company's investment decisions. That is, rent-seeking and rent-holding between enterprises and the government gives enterprises the opportunity to obtain and use low-cost subsidies. Based on the free cash flow hypothesis, given sufficient internal funds, the resources directly controlled by managers will increase accordingly, bringing them more benefits or prestige. To maximize their own interests, managers tend to heedlessly expand the size of the company and invest in projects with negative net present values (Modigliani and Miller, 1958; Blanchard et al., 1994; Hubbard, 1997; Klock and Thies, 2010; Zhang and Lu, 2012). Investment decisions made in pursuit of their own interests cause excessive investment. Based on the above analysis, we propose research hypothesis 1:

Hypothesis 1. There is a significant positive correlation between the level of government subsidies received by enterprises and the excessive investment of enterprises.

The macroeconomic or political environment can have a significant impact on a company's micro-behavior. From the perspective of the macro environment, since the 18th National Congress, the implementation of anti-corruption policies has eased the possible rent-seeking relationship between the government and enterprises (Manion, 2016; Wang et al., 2017). Specifically, the implementation of anti-corruption policies is a major exogenous shock to the government's operational pattern that helps the administration better meet public goals and results in more efficient and honest use of government power (Overholt, 2015; Keliher, 2016; Chen and Lu, 2017; Pan and Guo, 2018). Concerning fiscal fund allocation, officials who have the right to finance subsidies have previously been encouraged by the policy of controlling and intervening in the large-scale capital accumulation and overinvestment of local state-owned enterprises to pursue economic growth (Tang et al., 2010; Li and Wang, 2007; Cheng et al., 2008; Zhang and Wang, 2010; Ji et al., 2012), but that policy ended after the anti-corruption policy was implemented. Conditions are now unfavorable for renting, and officials have been pressured to make the subsidy process transparent. The new policy may result in subsidy funds being more equitably allocated based on corporate efficiency or social benefits (Kong et al., 2013; Wu et al., 2015; Wang and Kong, 2016), and it may also increase the economic efficiency of fiscal policy by tracking the use of financial subsidies (Fan et al., 2007). Correspondingly, from the perspective of corporate behavior, in view of the deterrent effect of anti-corruption policies, the risks faced by enterprises that misuse subsidies from the policy supervision level are greater, so senior management should be more cautious about using subsidies. We therefore speculate that anti-corruption policies will help build a more honest and fair market environment and enhance the government's ability to help society. With such macroeconomic environment changes and increased policy risks, the value of political connections is reduced, which will make corporate managers comply with market competition rules when they govern companies and will force them to change their business philosophy from political rent-seeking to following market rules (Jin et al., 2016). Corporate executives will thus use subsidies more cautiously and invest them more effectively. Based on the above analysis, we propose research hypothesis 2:

Hypothesis 2. The implementation of the anti-corruption policy will significantly inhibit overinvestment by government-subsidized enterprises

In the context of China's system, state-owned listed companies have more significant overinvestment tendencies than non-state-owned companies due to the lack of private owners, inadequate supervision mechanisms, and soft budget constraints (Huang et al., 2005; Wei and Liu, 2007). In addition, the political appeals of state-owned enterprise executives and the political connection between state-owned enterprises and the government are important factors that breed corruption issues such as interest transfer (Shleifer and Vishny, 1994; Pan et al., 2008; Wu et al., 2009; Yu et al., 2010). However, the anti-corruption campaign

implemented after the 18th National Congress has improved China's market environment. The anti-corruption policy imposes stricter restrictions on senior management within state-owned enterprises (Zheng et al., 2012; Ying et al., 2015) and forces the relevant regulatory agencies or stakeholder groups to pay more attention to the financial conditions of state-owned enterprises, which tend to have more serious agency problems (Nelson and Goel, 2007; Huang and Zhao, 2015). At the enterprise level, because state-owned enterprise executives pay more attention to promotion incentives, they will be more likely to avoid the policy risks of using subsidies after the implementation of the anti-corruption policy. Accordingly, the managers of state-owned enterprises will tend to choose more stable development programs and to use government subsidy funds cautiously (Lu et al., 2012; Jin et al., 2016). Therefore, after the implementation of the anti-corruption policy, the investment efficiency of state-owned enterprises that receive government subsidies improves more obviously than that of non-state-owned enterprises. Based on the above analysis, we propose research hypothesis 3:

Hypothesis 3. The anti-corruption policy has a stronger impact on overinvestment in state-owned enterprises that receive government subsidies than on non-state-owned companies that receive subsidies.

4. Research design and descriptive statistics

4.1. Sample selection

This study takes 2012 as the initial year of the implementation of the anti-corruption policy, selects the companies listed on the Shanghai and Shenzhen Stock Exchanges as the research object, and collects the financial data of A-share listed companies in non-financial industries from 2007 to 2015 for empirical analysis. The financial data are from the CSMAR and WIND databases. The list of government-subsidized income companies comes from the announcements published by the official websites of the Shanghai Stock Exchange and the Shenzhen Stock Exchange. To review the quality of the data, the random sample data from the two databases are compared. The differences are resolved using the statements disclosed by the Shanghai Stock Exchange and the Shenzhen Stock Exchange. All of the financial indicators are 1–99% tailed (winsorized).

In addition, we classify and process the samples according to the level of government subsidies obtained by the company, as follows. First, we select the current government subsidy amount disclosed in the notes of the financial statements of listed companies as a direct measure of the company's government subsidy for the year and use it to determine the median amount of government subsidies received by listed companies as a classification basis. We then classify companies with subsidies higher than the median in the current period as the high-government-subsidy group. We also select the listed companies that have not received government subsidies from 2007 to 2015 for the regression comparison of the control group to test the effects of the anti-

Table 1
Sample statistics according to the level of government subsidies obtained by the company.

Years	Total	Number of government-subsidized companies	Number of companies not receiving government subsidies	Number of companies entering the high subsidy group	Proportion
2007	1159	869	290	290	25.02%
2008	1272	1049	223	470	36.95%
2009	1403	1246	157	587	41.84%
2010	1520	1371	149	706	46.45%
2011	1830	1705	125	912	49.84%
2012	2110	1988	122	1140	54.03%
2013	2236	2098	138	1206	53.94%
2014	2125	2019	106	1233	58.02%
2015	2191	2098	93	1374	62.71%

corruption policy on the investment efficiency of these two types of enterprises. The sample statistics of the listed companies used for empirical research after eliminating financial companies, special treatment companies, and incomplete data companies are as follows (see Table 1).

4.2. Models

4.2.1. Estimation model of investment efficiency

We first predict the normal investment amount of the enterprise according to the Richardson (2006) investment measurement model and then use the residual generated by the model to measure the investment level. If the residual is greater than 0, it is considered overinvestment, and if the residual is less than 0, it is considered insufficient investment. The model is as follows:

$$\begin{aligned} \mathrm{INV}_{i,t} = {} & \alpha + \beta_1 \mathrm{Size}_{i,t-1} + \beta_2 \mathrm{Lev}_{i,t-1} + \beta_3 \mathrm{Growth}_{i,t-1} + \beta_4 \mathrm{Ret}_{i,t-1} + \beta_5 \mathrm{Age}_{i,t-1} + \beta_6 \mathrm{Cash}_{i,t-1} \\ & + \beta_7 \mathrm{INV}_{i,t-1} + \sum \mathrm{Industry} + \sum \mathrm{Year} + \varepsilon \end{aligned} \quad (1)$$

The dependent variable $INV_{i,t}$ represents the investment level of company i in year t. The independent variables $Size_{i,t-1}$, $Lev_{i,t-1}$, $Growth_{i,t-1}$, $Cash_{i,t-1}$, $Age_{i,t-1}$, $Ret_{i,t-1}$, and $INV_{i,t-1}$ are, respectively, company i's corporate

Table 2
Variable definitions and calculations.

Variable Name	Meaning	Calculation
Inv	Investment level	(Construction of fixed assets, intangible assets, and other long-term assets paid cash – disposal of fixed assets, intangible assets, and other long-term assets recovered net cash)/total assets
Sub	Government subsidies	Subsidy income/total assets
Post	Whether anti-corruption policy is implemented	The dummy variable, where the year of the implementation of the anti-corruption policy is 1 (i.e., the value of the year after 2012, including 2012), otherwise it is 0
Lev	Leverage level	Total liabilities/total assets
Cash	Cash holding level	(Cash + short-term investment or trading financial assets)/total assets
Growth	Operating income growth rate	(Operating income for the current year - the amount of operating income for the same period of the previous year)/(the amount of operating income for the same period of the previous year)
Age	Listing period	Years between financial reporting year and IPO year
Size	Asset size	Natural logarithm of total assets
Ret	Market return	Annual cumulative rate of return
EXP	Management expense ratio	Management fee/operating income
Fcf	Free cash flow	(Net cash flow from operating activities – expected normal investment level)/total assets
Topratio	Equity structure	The shareholding ratio of the largest shareholder
Idratio	External supervision	Ratio of independent directors
Duality	The duality of the president of the board and general manager	The dummy variable, whether the president of the board and general manager are the same person; 1 if so and 0 otherwise.
Otac	Proportion of major shareholders' occupation	Other receivables/total assets
Industry	Industry dummy variable	Excluding the financial industry, there are 20 industry dummy variables in the specific classification of manufacturing
Year	Annual dummy variable	10 annual dummy variables
Soe	Ownership property of business	State-owned enterprises are 1, and non-state-owned enterprises are 0
Subhigh	Classify companies with government subsidies obtained	Classify companies with subsidies higher than the median in the current period as the high-government-subsidy group, (set *Subhigh* = 1), and 0 otherwise
Overinv	Overinvestment level	Model 1 (Richardson model) generates residuals that measure the level of over-investment
Overgroup	Classify companies by investment efficiency	Grouped by residual quartiles, the group with the largest value is defined as the overinvestment group, with a value of 1 (*Overgroup* = 1); the middle two groups are set as a control group with a value of 0

size, leverage level, growth, cash holdings, time to market, stock returns rate, and investment levels in year $t-1$. To enhance the accuracy of the estimation results, the model also controls the annual variable year and the industry variable industry. Table 2 shows the specific variable definition and calculations.

In model (1), *INV* represents the company's capital expenditure level. We use the cash flow statement item to calculate the indicator: capital expenditure level = (constructed fixed assets, intangible assets, and other long-term assets to pay cash – disposal of fixed assets, intangible assets, and net cash recovered from other long-term assets)/total assets (Biddle et al., 2009). We use the growth rate (*Growth*) to measure the company's potential investment opportunities. To estimate investment efficiency, we look at the level of residuals (*Overinv*). We use a definition similar to that of Wang (2009) in that the residual value obtained by regression estimation directly measures the level of excessive investment of enterprises. We set the dummy variable (*overgroup*) to represent investment efficiency. Grouped by residual quartiles, the group with the largest value is defined as the overinvestment group with a value of 1, while the middle two groups are set as a control group with a value of 0 (Biddle et al., 2009; Zhang et al., 2012).

The specific variable definitions and calculations are shown in Table 2.

4.2.2. Government subsidy and investment efficiency model

To verify Hypothesis 1, we draw on the research of Bergstrom (2000) and Li (2015) and use the residual generated by the model regression results as the dependent variable for regression analysis to test the impact of government subsidies on the investment efficiency of enterprises as follows:

$$\begin{aligned}\mathrm{OverInv}_{i,t} = {} & \alpha + \beta_1 \mathrm{Sub}_{i,t} + \beta_2 \mathrm{fcf}_{i,t} + \beta_3 \mathrm{Topratio}_{i,t} + \beta_4 \mathrm{Idratio}_{i,t} + \beta_5 \mathrm{Dual}_{i,t} + \beta_6 \mathrm{Otac}_{i,t} + \beta_7 \mathrm{EXP}_{i,t} \\ & + \beta_8 \mathrm{Cash}_{i,t} + \sum \mathrm{Year} + \sum \mathrm{Industry} \end{aligned} \tag{2}$$

The residual value estimated by model (1) is the level of overinvestment of company i in period t. $Sub_{i,t}$ indicates that company i received government subsidies in period t. According to Hypothesis 1, we expect the regression coefficient of *Sub* to be significantly positive due to the free cash flow (*Fcf*). The top shareholder's share proportion (*Topratio*), dual rights separation (*Dual*), major shareholders' occupation (*Otac*), external supervision (*Idratio*), and management fees (*Exp*) affect investment spending (Richardson, 2006; Xia and Zhang, 2008), and these variables are controlled in the model.

4.2.3. Anti-corruption, government subsidies, and overinvestment models

To verify Hypothesis 2, whether the implementation of anti-corruption improved the efficiency of government-subsidized enterprises, we draw on Bertrand et al. (2004) and Xiao and Kong (2014) to design the model as follows:

$$\begin{aligned}\mathrm{Overinv}_{i,t} = {} & \alpha + \beta_1 post_{i,t} * Sub_{i,t} + \beta_2 Sub_{i,t} + \beta_3 post_{i,t} + \beta_4 \mathrm{fcf}_{i,t} + \beta_5 \mathrm{Topratio}_{i,t} + \beta_6 \mathrm{Idratio}_{i,t} \\ & + \beta_7 \mathrm{Dual}_{i,t} + \beta_8 \mathrm{Otac}_{i,t} + \beta_9 \mathrm{EXP}_{i,t} + \sum \mathrm{Year} + \sum \mathrm{Industry} \end{aligned} \tag{3}$$

Overinv is the residual level value estimated by model (1). $Overinv_{i,t} > 0$ indicates that company i has excessive investment in period t. *Sub* measures the amount of government subsidy obtained by the company, and *Post* is a dummy variable for the time of the implementation of the anti-corruption policy. According to Hypothesis 2, we expect the regression coefficient of the interaction term *post*sub* to be significantly negative—that is, the anti-corruption policy restricts the ability of the government to subsidize enterprises, and thus the level of excessive investment of the government-subsidized enterprise is significantly reduced. As above, the model controls the relevant factors that affect corporate investment.

In addition, to investigate how the anti-corruption policy affects government subsidies and the investment efficiency of different equity companies, we divide the companies into state-owned and non-state-owned subsamples based on model 3. By Hypothesis 3, we anticipate that anti-corruption policies have a more pronounced effect on the state-owned enterprise group.

Table 3
Descriptive statistics of variables.

Variable	Obs	Mean	Std. Dev.	Min	Max	Median
Overinv	14,385	0.0000	0.0400	−0.1968	0.2489	−0.0061
Growth	15,717	0.1903	0.5248	−0.6201	3.7051	0.1078
Ret	15,717	0.2178	0.6045	−0.4961	2.6206	0.0264
Lev	15,717	0.4741	0.2198	0.0530	1.0361	0.4765
Cash	15,717	0.1576	0.1393	0	0.6192	0.1252
Age	15,717	9.6749	5.9145	0	25	10
Size	15,717	21.9532	1.3185	19.2859	26.1661	21.7739
Inv	15,717	0.0532	0.0547	−0.0463	0.2564	0.0386
fcf	15,717	0.0039	0.1415	−1.7083	6.25	−0.0148
Duality	15,717	0.2068	0.4051	0	1	0
Topratio	15,717	36.1028	15.5093	0.29	89.99	34.26
Idratio	15,717	0.3690	0.0543	0.0909	0.8000	0.3333
Otac	15,717	0.0190	0.0335	0.0000	0.8182	0.0084
Exp	15,717	0.0948	0.0089	0.0036	0.6339	0.0740
Soe	15,717	0.6227	0.4847	0	1	1

4.3. Descriptive statistics of variables

Table 3 reports the means, medians, and standard deviations of the main variables. According to the descriptive statistics, the values of the main research variables are within a reasonable range, indicating that the results are less affected by extreme values.

Table 4 shows the descriptive statistics for the high-subsidy group and the control group. We find that the highly subsidized listed companies have more serious overinvestment than the control group. The *t*-test indicates that the difference between the two is significant at the 1% level. On the whole, companies that receive high government subsidies have problems with inefficient scale expansion.

Table 5 shows the descriptive statistics of the relevant data for the high-subsidy group before and after the anti-corruption campaign. The table shows that the probability of overinvestment in the high-subsidy group after the anti-corruption event (0.3524) is significantly lower than before the start of the anti-corruption policy

Table 4
Descriptive statistics for the high-subsidy group and the control group.

Variable	Mean		*t* test
	Subhigh group	Control company	
Overgroup	0.8026	0.7632	5.1230***
Overinv	0.0013	−0.0020	4.8396***
Growth	0.1935	0.1857	0.9454
Ret	0.2072	0.2329	−2.6226***
Lev	0.5017	0.4347	19.0944***
Cash	0.1452	0.1743	−13.3704***
Age	10.2462	8.8585	14.6323***
Size	22.3247	21.4224	45.0192***
Inv	0.0540	0.0520	2.2147***
fcf	0.0096	0.0014	2.8770***
Duality	0.1918	0.2284	−5.6009***
Topratio	36.6106	35.3776	4.9282***
Idratio	0.3696	0.3662	1.6997*
Otac	0.0187	0.0194	−1.4181
Exp	0.0975	0.0928	3.2830***
Soe	0.6678	0.5582	14.0985***

* indicates significance at the 10% level.
** Indicates significance at the 5% level.
*** Indicate significance at the 1% level.

Table 5
Descriptive statistics of the high subsidy group before and after the anti-corruption campaign.

Variable	Mean		*t* test
	Before anti-corruption	After anti-corruption	
Overgroup	0.4895	0.3524	15.4511***
Overinv	0.0000	0.0000	−0.0000
Growth	0.2407	0.1511	9.4802***
Ret	0.0465	0.3335	−28.7687***
Lev	0.4979	0.4862	3.0416***
Cash	0.1797	0.1261	22.4077***
Size	21.7394	22.5020	–32.3531***
Inv	0.0583	0.0499	8.4597***
fcf	0.0113	−0.0022	5.9500***
Duality	0.1697	0.2157	−6.5317***
Topratio	36.4525	36.3132	0.4926
Idratio	0.3644	0.3723	−8.1388***
Otac	0.0216	0.0167	8.2035***
Exp	0.0885	0.0958	−4.6002***
Soe	0.6864	0.6235	7.3776***

* Indicate significance at the 10% level.
** Indicate significance at the 5% level.
*** Indicate significance at the 1% level.

(0.4985). This difference is significant at the 1% level, which shows that after the implementation of the anti-corruption policy, the possibility of overinvestment by high-government subsidy companies decreased significantly. Thus, we preliminarily confirm our expected research findings. The finding that the non-significant difference for the *Overinv* variable may be explained by the fact that the variable is the residual of the annual and industry regression estimates, so the mean residual value of the annual comparison tends toward zero.

We further analyze the descriptive statistics of the data on state-owned and non-state-owned enterprises (Table 6). Table 6 shows that from the average value of *Overgroup*, the ratio of overinvestment in the state-owned enterprise group (0.4669) is significantly higher than that in non-state-owned enterprises

Table 6
Descriptive statistics for state-owned and non-state-owned enterprises.

Variable	Mean		*t* test
	State-owned	Non-state-owned	
Overgroup	0.4669	0.3808	9.3929***
Overinv	0.0003	−0.0006	1.2445
Growth	0.1814	0.2051	−2.7589***
Ret	0.1857	0.2713	−8.6122***
Lev	0.5177	0.4021	33.1648***
Cash	0.1550	0.1784	−14.7507***
Age	11.2583	7.0619	46.1038***
Size	22.2185	21.5154	33.6795***
Inv	0.0502	0.0580	−8.6917***
fcf	0.0020	0.0070	−2.1708**
Duality	0.1370	0.3321	−28.5891***
Topratio	37.3915	33.9775	13.5063***
Idratio	0.3662	0.3736	−8.3851***
Otac	0.0187	0.0194	−1.2600
Exp	0.0889	0.1045	−10.7483***
Sub	0.3865	0.1739	16.5756***

* Indicate significance at the 10% level.
** Indicate significance at the 5% level.
*** Indicate significance at the 1% level.

(0.3808); that is, overall, state-owned enterprises are more inclined to overinvest. The *t*-test results show significant differences at the 1% level. Although the statistical test of the variable *Overinv* is not significant, the value of overinvestment of state-owned enterprises is positive (overinvestment), while the level of overinvestment in non-state-owned enterprises is negative (insufficient investment).

5. Empirical results

5.1. Estimation of investment level

The results reported in Table 7 show that there are significant positive correlations between a company's investment level (*INV*) and its asset size (*Size*), growth (*Growth*), market return (*Ret*), cash holding level (*Cash*), and initial investment scale (INV_{t-1}), and significant negative correlations between the liabilities level (*Lev*) and listing age (*Age*). The regression results in Table 7 show that the relations between all of the variables and investment levels are consistent with the principal–agent theory and the results of similar studies (Xin et al., 2007; Zhong et al., 2010; Zhang and Lu, 2012).

5.2. Impact of government subsidies on investment levels

The regression results in Table 8 show that the coefficient of *Sub* is significantly positive at the 1% significance level. The results show that the more government subsidies a listed company receives, the more likely its overinvestment will increase, which verifies Hypothesis 1. The coefficients of the remaining major control variables, such as the free cash flow level (*Fcf*) and the duality of the president of the board and general manager (*Duality*), are significantly positive. That is, the higher the level of free cash flow, the more likely the company will overinvest, and when the president of the board and general manager are the same person, their more concentrated power means overinvestment will be more serious. The ratio of occupation (*Otac*) and the management expense (*Exp*) are significantly negatively correlated with the level of overinvestment of the enterprise, indicating that the occupation and management expenses will reduce the available investment funds of the enterprise. Furthermore, the coefficient of the ratio of independent directors (*Idratio*) is significantly negative, which means that the more independent directors there are on the board of directors, the less likely the company is to overinvest, which indicates that independent directors can play a supervisory role and improve corporate governance to some extent. The above results are consistent with the conclusions of the literature (e.g., Bai et al., 2005; Xin et al., 2007).

Table 7
Estimation of investment level.

Variable	Coefficients	Std. Err.	t-value	P > |t|
$Size_{t-1}$	0.0016***	0.0003	5.08	0.0000
$Growth_{t-1}$	0.0022***	0.0006	3.55	0.0000
Ret_{t-1}	0.0036***	0.0006	5.67	0.0000
Lev_{t-1}	−0.0081***	0.0020	−4.13	0.0000
$Cash_{t-1}$	0.0293***	0.0029	10.24	0.0000
Age_{t-1}	−0.0004***	0.0001	−5.88	0.0000
Inv_{t-1}	0.5424***	0.0066	81.62	0.0000
Year	Control	Control	Control	Control
Industry	Control	Control	Control	Control
Observations		14,385		
R-squared		0.4285		

* Indicate significance at the 10% level.
** Indicate significance at the 5% level.
*** Indicate significance at the 1% level.

Table 8
Effects of government subsidies on investment levels.

Variable	Coefficients	Std. Err.	t-value	P > |t|
Sub	0.0109***	0.00197	5.01	0.000
Fcf	0.0541***	0.00286	18.93	0.000
Topratio	−0.00001	0.00002	−0.39	0.697
Duality	0.0026***	0.00087	3.03	0.002
Otac	−0.0865***	0.0122	−7.12	0.000
Exp	−0.0130***	0.00483	−2.69	0.007
Idratio	−0.0149**	0.00635	−2.34	0.019
Cash	−0.0412***	0.00318	−12.96	0.000
Year	Control	Control	Control	Control
Industry	Control	Control	Control	Control
Observations		14,365		
R-squared		0.042		

* Indicate significance at the 10% level.
** Indicate significance at the 5% level.
*** Indicate significance at the 1% level.

Table 9
The impact of anti-corruption policies on investment efficiency.

Var.	Overall sample group *Overinv*	Overinvestment sample group *Overgroup*
*Sub*post*	−0.00824**	−0.0507
	(0.00387)	(0.0510)
Sub	0.0147***	0.00435
	(0.00294)	(0.0387)
Post	0.0116*	−0.121
	(0.00631)	(0.0837)
Fcf	0.0540***	0.501***
	(0.00286)	(0.0351)
Topratio	−0.00001	−0.00041
	(0.00002)	(0.000304)
Duality	0.00265***	0.0733***
	(0.00087)	(0.0111)
Otac	−0.0863***	−1.091***
	(0.0122)	(0.163)
Exp	−0.0128***	−0.0800
	(0.00484)	(0.0666)
Idratio	−0.0148**	−0.0245
	(0.00635)	(0.0835)
Cash	−0.0414***	0.281***
	(0.00318)	(0.0395)
Year	Control	Control
Industry	Control	Control
Observations	14,365	11,125
R-squared	0.042	0.106

Note: The numbers in parentheses are standard errors.
* Indicate significance at the 10% level.
** Indicate significance at the 5% level.
*** Indicate significance at the 1% level.

5.3. The impact of anti-corruption policies on investment efficiency

Table 9 reports the full sample regression results that take the estimated residuals as the dependent variable and show the regression results for the overinvestment sample group. The data show that the *Sub*post* coef-

ficient of the main variable interaction term of the overall sample group is significantly negative at the 5% significance level. The results show that since the implementation of the anti-corruption policy in China, the overinvestment of listed companies receiving government subsidies has decreased and the overall non-efficient investment level of listed companies has been reduced significantly. That is, the implementation of the anti-corruption policy can rationalize government subsidies to a certain extent, prevent managers from conducting expansion responsibly, and improve the company's efficient use subsidies and investment efficiency. Hence, Hypothesis 2 is supported. The regression results of the main control variables show that the level of free cash flow significantly affects the company's excessive investment behavior. First, the higher the shareholding ratio of the largest shareholder, the more serious the short-selling of the listed company by the superior shareholders will be. Second, the higher the proportion of independent directors of the listed company, the lower the overinvestment level of the company will be. The above results are basically consistent with the findings of prior research. Although the regression coefficient of *Sub*post* in the second column is not significant, the interaction term symbol is still negative. Therefore, overall, the regression results in Table 9 support Hypothesis 2; that is, the anti-corruption policy inhibits the excessive investment behavior by enterprises that receive government subsidies.

Table 10 reports the changes in investment efficiency of enterprises with different equity characteristics after the implementation of the anti-corruption policy in China. The regression results of the overall sample group show that the main interaction item *Sub*post* of government-subsidized state-owned enterprises is significantly negative at the 1% level, indicating that the anti-corruption policy has a significant correction effect on the investment efficiency of government-subsidized state-owned enterprises; the main interaction variable in

Table 10
The anti-corruption policy effects on investment efficiency of state-owned enterprises and non-state-owned enterprises.

Var.	Overall sample group *Overinv*		Overinvestment sample group *Overgroup*	
	Soe = 1	*Soe = 0*	*Soe = 1*	*Soe = 0*
*Sub*post*	−0.0123***	0.00025	−0.138**	0.109
	(0.00453)	(0.00762)	(0.0612)	(0.0948)
Sub	0.0149***	0.0162***	0.0797*	−0.0468
	(0.00336)	(0.00608)	(0.0456)	(0.0747)
Post	0.0175**	−0.000119	0.0221	−0.398***
	(0.00751)	(0.0121)	(0.102)	(0.152)
Fcf	0.0585***	0.0477***	0.572***	0.435***
	(0.00359)	(0.00473)	(0.0472)	(0.0522)
Topratio	−0.00008***	0.00012***	−0.00010	0.00150***
	(0.00003)	(0.00004)	(0.00038)	(0.000499)
Duality	0.00318**	0.00139	0.0763***	0.0312**
	(0.00124)	(0.00129)	(0.0163)	(0.0155)
Otac	−0.0761***	−0.109***	−0.983***	−1.352***
	(0.0152)	(0.0207)	(0.203)	(0.275)
Exp	−0.0156**	−0.0122	0.0294	0.101
	(0.00607)	(0.00819)	(0.0831)	(0.112)
Idratio	−0.0224**	−0.00151	−0.0311	−0.0984
	(0.00778)	(0.0111)	(0.105)	(0.137)
Cash	−0.0464***	−0.0381***	0.0288	0.375***
	(0.00413)	(0.00517)	(0.0557)	(0.0584)
Year	Control	Control	Control	Control
Industry	Control	Control	Control	Control
P value for difference (Sub*post)	0.0000***		0.0000***	
Observations	9225	5140	6927	4198
R-squared/ Pseudo R-squared	0.046	0.042	0.088	0.147

Note: The numbers in parentheses are standard errors.
* Indicate significance at the 10% level.
** Indicate significance at the 5% level.
*** Indicate significance at the 1% level.

non-state-owned enterprises is not significant. Further test results show that the *Sub*post* coefficient of the interaction term between the state-owned and non-state-owned enterprise sample groups is significant at the 1% level. The regression of the overinvestment sample group has similar results: the *Sub*Post* of government-subsidized state-owned enterprises is significantly negative at 5% but is not significant in non-state-owned enterprises, and further testing of the interaction coefficient of the two groups shows that there are significant differences at the 1% level. The above results all support Hypothesis 3: the anti-corruption policy has a more significant effect on inhibiting excessive investment by state-owned enterprises that receive government subsidies than non-state-owned enterprises that receive subsidies.

6. Robustness tests

To test the robustness of the main conclusion, we carried out the following various tests.

6.1. Change in the definition of post

The 18th National Congress was held in November 2012, which may affect the observations for that year. Therefore, in the robustness tests, we change the classification criterion of 2012 and use the years 2013–2015 (after the implementation of the anti-corruption policy) as the sample (*post* = 1, and 0 otherwise). Hypotheses 2 and 3 still hold; Table 11 shows the empirical results (*Overinv* is taken as an example, and the results are similar to *Overgroup*).

Table 11
Change in the definition of *Post*.

Var.	Full sample	Soe = 1	Soe = 0
*Sub*post*	−0.00325**	−0.0584***	−0.00038
	(0.00153)	(0.00183)	(0.00282)
Sub	0.00319***	0.00297***	0.00412***
	(0.00088)	(0.00101)	(0.00174)
Post	0.00389	0.00892***	−0.00207
	(0.00257)	(0.00314)	(0.00458)
Fcf	0.0424***	0.0543***	0.0307***
	(0.00242)	(0.00332)	(0.00359)
Topratio	−0.00001	−0.00008***	0.00010***
	(0.00002)	(0.00003)	(0.00004)
Duality	0.00215**	0.00298**	0.00111
	(0.00085)	(0.00120)	(0.00126)
Otac	−0.0658***	−0.0598***	−0.0716***
	(0.0103)	(0.0153)	(0.0160)
Exp	−0.0126***	−0.0154***	−0.00708
	(0.00405)	(0.00513)	(0.00669)
Idratio	−0.0135**	−0.0171**	−0.00404
	(0.00613)	(0.00748)	(0.0108)
Cash	−0.0397***	−0.0455***	−0.0343***
	(0.00298)	(0.00383)	(0.00490)
*P value for difference (Sub*post)*	–	0.0000***	
Year	Control	Control	Control
Industry	Control	Control	Control
Observations	14,365	9225	5140
R-squared	0.032	0.042	0.027

Note: The numbers in parentheses are standard errors.
* Indicate significance at the 10% level.
** Indicate significance at the 5% level.
*** Indicate significance at the 1% level.

6.2. Change in the estimation method for the level of overinvestment

To examine the sensitivity of the overinvestment measurement methods on the conclusions, we use Biddle et al. (2009) as a reference and adopt the following methods to estimate the normal investment level of enterprises. The investment level of enterprises is indicated as a function of the initial phase of growth of the enterprises, and the normal investment level of each enterprise is then estimated according to the annual and industrial regressions. The regression residuals are used to measure the overinvestment level.

$$Inv_{i,t} = \alpha_0 + \beta\ Growth_{i,t-1} + \varepsilon_{i,t}$$

We divide the residuals into different groups based on quartile using the same method as Biddle et al. (2009). The largest group is taken as the overinvestment group, and the intermediate group is the reference group. We then use a probit model to replace the original model to test the robustness of Hypotheses 2 and 3. The results in Table 12 show that the anti-corruption policy has had a significant negative impact on the overinvestment level of government-subsidized enterprises at the 10% significance level. Compared with the impact on non-state-owned enterprises, the overinvestment restriction function of the anti-corruption policy on government-subsidized enterprises for the state-owned enterprises is more significant (the interaction term coefficient is negative at the 10% significance level), and the statistical test shows that the interaction term coefficients are significantly different between the two groups. Our main conclusions remain valid.

6.3. Evidence of the effects of anti-corruption policies in the cross-section

To further confirm the impact of the anti-corruption policy on the investment efficiency of government subsidies (Hypothesis 2), we introduce the anti-corruption variable *deep* in each region to measure the influence of the anti-corruption measures on different regions. Specifically, we compile a list of officials who were removed

Table 12
Change in the estimation method for the level of overinvestment.

Var.	Full sample	*Soe = 1*	*Soe = 0*
*Sub*post*	−0.0242*	−0.0293*	−0.00153
	(0.0124)	(0.0150)	(0.0235)
Sub	−0.0167*	−0.00166	−0.0293
	(0.00934)	(0.0110)	(0.0187)
Post	−0.424**	−0.265	−0.966**
	(0.204)	(0.251)	(0.377)
Fcf	−0.966***	−1.022***	−0.950***
	(0.0907)	(0.121)	(0.141)
Topratio	0.00093	0.00015	0.00321***
	(0.00074)	(0.00094)	(0.00124)
Duality	0.157***	0.135***	0.0611
	(0.0272)	(0.0403)	(0.0386)
Otac	−2.420***	−2.025***	−3.192***
	(0.396)	(0.506)	(0.650)
Exp	0.612***	0.371*	0.849***
	(0.156)	(0.203)	(0.256)
Idratio	0.275	0.401	−0.155
	(0.202)	(0.256)	(0.338)
Year	Control	Control	Control
Industry	Control	Control	Control
P value for difference (Sub*post)	–	0.0000***	
Observations	14,429	8903	5526
Pseudo R-squared	0.0729	0.0727	0.0851

Note: The numbers in parentheses are standard errors.
* Indicate significance at the 10% level.
** Indicate significance at the 5% level.
*** Indicate significance at the 1% level.

from office due to corruption from various provinces since the 18th National Congress and summarize the specific implementation of anti-corruption actions. We further examine whether there are significant differences in the government-subsided investment efficiency among enterprises that were influenced by the anti-corruption policy at different levels. In particular, we consider whether the provinces with higher anti-corruption intensity have more obvious improvements in the efficient use of government subsidies. After compiling the list of corrupt officials at the provincial and ministerial levels, we divided them into different groups based on quintile. The groups in the two largest quantiles are defined as the high intensity group and assigned a value of 1, while the group with fewest corrupt officials removed from their posts is set as the control group and assigned a value of 0. We use the groups' *deep* to describe the intensity of the effect of the anti-corruption policy. The regression results in Table 13 show that in areas in which the anti-corruption policy had the most impact, the main variable interaction term—the *Sub*post* coefficient—is negative at the 10% significance level, while the main observation variable interaction coefficient is not significant in areas in which the intensity is weak. This result provides cross-sectional evidence for Hypothesis 2, that regional intensity has a significant differential impact on the investment efficiency of corporate financial subsidies following the anti-corruption policy.

6.4. Separate investigations of overinvestment and underinvestment

Following prior research, we classify the enterprise group whose residual was estimated to be more than 0 at the normal investment level as the overinvestment group and the group whose residual was less than 0 as the underinvestment group. We repeat the regression to examine the possible different effects of the anti-corruption policy on the overinvestment and underinvestment groups. As Table 14 shows, the interaction term *Sub*post* is significant in the overinvestment group but not in the underinvestment group, although it is positive. Therefore, the anti-corruption policy mainly relies on the deterrent effect of the policy to affect how

Table 13
Evidence of the effects of anti-corruption policies in the cross-section.

Var.	Deep = 1		Deep = 0
*Sub*post*	−0.0293*		−0.00153
	(0.0150)		(0.0235)
Sub	−0.00166		−0.0293
	(0.0110)		(0.0187)
Post	−0.265		−0.966**
	(0.251)		(0.377)
Fcf	−1.022***		−0.950***
	(0.121)		(0.141)
Topratio	0.00015		0.00321***
	(0.00094)		(0.00124)
Duality	0.135***		0.0611
	(0.0403)		(0.0386)
Otac	−2.025***		−3.192***
	(0.506)		(0.650)
Exp	0.371*		0.849***
	(0.203)		(0.256)
Idratio	0.401		−0.155
	(0.256)		(0.338)
Year	Control		Control
Industry	Control		Control
P value for difference (Sub*post)		0.0000***	
Observations	2614		1214
Pseudo R-squared	0.0961		0.1311

Note: The numbers in parentheses are standard errors.
* Indicate significance at the 10% level.
** Indicate significance at the 5% level.
*** Indicate significance at the 1% level.

Table 14
Separate investigation of overinvestment and underinvestment.

Var.	Overinv > 0 (Overinvestment group)		Overinv < 0 (Underinvestment group)
*Sub*post*	−0.00471*		0.00038
	(0.00346)		(0.00210)
Sub	−0.00446**		0.00246***
	(0.00176)		(0.00088)
Post	0.00335		0.00208
	(0.00580)		(0.00341)
Fcf	0.0644***		−0.00857***
	(0.00456)		(0.00217)
Topratio	0.00006		0.00001
	(0.00004)		(0.00002)
Duality	0.00528***		−0.00103
	(0.00161)		(0.00088)
Otac	−0.0938***		−0.0145
	(0.0215)		(0.0109)
Exp	0.0133		−0.0126***
	(0.00898)		(0.00395)
Idratio	−0.00153		0.00767
	(0.0125)		(0.00631)
Cash	−0.0252***		0.00614**
	(0.00672)		(0.00262)
Year	Control		Control
Industry	Control		Control
P value for difference (sub*post)		0.0000***	
Observations	5737		8626
R-squared	0.073		0.027

Note: The numbers in parentheses are standard errors.
* Indicate significance at the 10% level.
** Indicate significance at the 5% level.
*** Indicate significance at the 1% level.

enterprises invest subsidies, which alleviates the agency costs when using subsidies within the enterprise, but has a less significant effect on insufficiently invested enterprises.

7. Conclusion

In this paper, we examine the effect of China's recently enacted anti-corruption policy on the government subsidy efficiency from the perspective of overinvestment. The findings reveal that government subsidies have a significant positive impact on the overinvestment behavior of enterprises and that the anti-corruption work done by the government has effectively restrained the excessive investment behavior of government-subsidized enterprises. Further, we find that the implementation of anti-corruption policies has a stronger inhibitory effect on the overinvestment behavior in subsidized state-owned enterprises than in non-state-owned enterprises.

We analyze and evaluate the resource allocation efficiency of local government fiscal policy in terms of the institutional factor of government corruption level, and thus explore the deeper reasons for the resource allocation effect of financial subsidies. From the new perspective of government subsidies, we comprehensively analyze the impact of anti-corruption on microeconomic entities and supplement the research by considering the anti-corruption policy's economic effects from a horizontal perspective. The conclusion highlights that new cooperation between the government and enterprises after the anti-corruption policy was implemented has rationalized administrative resources and will ultimately promote the sustained and healthy development of the national economy. Our research also enriches the literature related to investment efficiency.

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