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Do business relationships affect the accuracy of analyst earnings forecasts? Evidence from China

Article

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Abstract

Supporting the 'conflicts of interest hypothesis', we show that, in China, better-informed analysts issue more optimistically biased forecasts and reputation of financial analysts mitigates the bias. We contribute to literature by showing that such an adverse information effect varies over types of investment banking relationships and a better developed local legal environment reduces forecast bias. Our results call for a better developed market mechanism to discipline analysts so as to issue independent and accurate earnings forecasts in China.

Key Words: Financial analyst; investment banking relationship; forecast bias; reputation; legal environment

JEL classification: G14 G24 M40 M41 M49

1. Introduction

The role played by institutional investors in shareholdings and activism has become more important. For example, the value of institutional shareholding increased from US$16 trillion in 2005 to US$30 trillion in 2011 in U.S and from £2.7 trillion to £3.6 trillion in U.K. Meanwhile, the stock markets in emerging economies have also experienced a very fast development over the last two decades, especially before the financial crisis. The total stock market capitalization in China, for instance, accounted for 53% of GDP in 2007 with a value of US$3.9 trillion and 162 million investors and the institutional shareholding increased from 5% in 2002 to 49% in 2007. Hence, the increasing importance of institutional and individual shareholding has created a strong demand for professional financial analysts who regularly forecast the earnings ability and corporate performance of the target firms (Lonkani and Firth, 2005). Moreover, China, as an emerging market, has an enormous financial market which is not fully developed and therefore, financial analysts could place strong impacts on share prices, further strengthening the institutional investors' incentive to exert pressure on analysts. The pressure from institutional investors is also facilitated by the lack of public scrutiny (Firth et al., 2013; Gu et al., 2013). Hence, the investment banking relationship effects on analysts' bias are likely to be more pre-eminent in China.

It has been widely acknowledged that analysts' earnings forecasts are useful for decision makings and long-term earnings forecast explain more variations in forecasted price than short term forecasts (Bandyopadhyay et al., 1995). Analysts earning expectation has also been found to have a strong impact on the behavior of managers and the average return

associated with more accurate recommendations is greater than that recommended by analysts with lower forecast accuracy, by 1.27% per month (Kross and Suk, 2012), suggesting that, in an imperfectly efficient market, the costly and accurate information collection would be rewarded by market (Loh and Mian, 2006). Because of the important role played by analyst forecasts, the effects of earnings forecasts and guidance have also been investigated both empirically and theoretically such as its effects on market return (Anilowski et al., 2007) and the stock market sensitivity to analyst forecasts (Beyer, 2008).

It is expected that analyst forecasts should be as accurate as possible by fully reflecting all relevant information available so as to provide unbiased guidance to institutional and individual users. However, the accuracy could be adversely affected by various factors, such as the investment banking relation and trading commission motivations. Governing bodies have attempted to regulate the analyst forecasts by, for example, issuing financial penalties to misleading analysts and structurally reforming companies which provide both investment banking services and forecasts at the same time. In June 2003, U.S Securities and Exchange Commission (SEC) alleged firms which had associated analyst financial compensation with their investment banking revenue and promised favorable forecasts, in order to have more underwriting opportunities. The 'Global Settlement', for example, issued a total of US$1.4 billion financial penalties to ten investment banks and required a complete separation of investment banking business from research departments to ensure that there is neither a direct nor an indirect relation between analyst compensation and investment banking revenue. By doing so, analysts are expected to be able to provide independent and third-party research, such as earnings forecasts, to the firm's customers. Similar regulations became effective in

China from 2006. Even though, forecast bias has been widely observed in various markets and it calls for a further investigation on the effects of regulation or legal development in mitigating the forecast bias.

The objective of this paper is to investigate if better-informed analysts provide more accurate earnings forecasts and how the forecast bias is mitigated by the reputation effects and the development of a local legal system in China. By following (Cowen et al., 2006), we define 'better-informed analysts' as those who have developed certain investment banking relationships with the covered firm. Such relationships have been identified as a primary source of conflicts, with privileged access to private information of the covered firm and trading commissions from brokerage businesses (Gu et al., 2013). There has been ample empirical evidence on the various effects of such investment banking relationships (Gu and Xue, 2008; Mehran and Stulz, 2007) but less is understood about how different types of such relationships affect financial analysts' forecasts. This is, however, important because different types of investment banking relationships, such as IPO, SEO and M&A, may contain different set of private information about the business and consequently have different impacts on the accuracy of earnings forecasts after such investment banking activities. Hence, this paper addresses an important issue in earnings forecasts and investigates analysts' incentives and behavioural biases in a setting of investment banking relationships. In addition to existing literature which investigates the impacts of trading commission fees on forecast accuracy, we break down investment banking relationships into IPO, M&A and SEO and our results on IPO point to the source of analyst bias that has been little explored in the literature.

We contribute to literature in the area of financial analyst forecasts from two aspects.

First, it has been widely accepted that analysts who have underwriting or investment banking relations with target firms are more likely to provide optimistic forecasts. In this paper, we break down the underwriting relationships into Initial Public Offering (IPO), Seasonal Equity Offering (SEO) and Mergers and Acquisition (M&A) in order to examine the heterogeneous effects of different investment banking relationships on the accuracy or bias of analyst forecasts. Second, we investigate if a well-developed legal system could mitigate such bias in earnings forecasts to highlight the importance of legal system development in disciplining financial analysts in emerging markets.

Our empirical materials are from Chinese stock markets. Our results show that consistent with existing literature, investment banking relationships drive optimistic earnings forecast errors and such effect is strongest for an IPO relation, followed by a SEO relation and a M&A relation. Second, we find that the optimistic bias could be mitigated by the reputation of a financial analyst and a better developed legal environment. The mitigating effect of reputation is more than 4 times stronger for a 'better-informed' forecast than for a forecast without information advantage. In addition, as far as the authors are aware, for the first time, we show evidence on the disciplinary effects of local legal system on the accuracy of financial analysts' forecasts. The remainder of the paper is organized as follows. In the second section, we review existing literature and focus on the determination of analyst forecast error and its effects. We describe our data and variables in the third section and report the empirical results in the fourth section. Finally, we summarize and conclude in section 5.

2. Literature review and hypothesis development

2.1 Analyst forecast bias and investment banking relationship

With the improvement of stock market efficiency, annual report as the main source of historical information is no longer able to meet the information demands of investors and the forecasts of companies' future earnings are becoming more and more influential. Analysts, as an important information intermediary and the main source of forecast, play a critical role in alleviating the information asymmetry and in enhancing the market efficiency by issuing research reports. This is because, compared with individual investors, analysts have more professional knowledge and more private information about the target companies. They are also more independent and more objective than the management team of companies in the evaluation of corporate performance and earnings ability (Yuan and Huang, 2007; Zhu et al., 2007). Moreover, their characteristics, such as reputation (Gu et al., 2013) and rationality (Löffler, 1998), have been found to play a determinant role in the accuracy of their forecasts, even on leadership transition (Caceres and Malone, 2013) and GDP growth (Ashiya, 2006).

There are a variety of reasons and incentives for financial analysts to issue bias forecasts. First, according to 'information-advantage hypothesis', analysts having less accurate and private information about the firm would issue more biased forecasts (Jacob et al., 2008). Second, because of the trading incentives, investment bank-affiliated analysts are more likely to issue optimistically bias forecasts to impress companies so as to sell more investment banking services to such firms (Bessler and Stanzel, 2009). Third, in order to keep a good relationship with management team of the company to access more private information,

financial analysts are likely to issue more optimistically biased forecasts (Lim, 2001). Fourth, according to the ‘conflicts of interest hypothesis’, analysts have an incentive to generate more trading commissions for the brokerage firms they work for when their monetary compensation is strongly associated with commissions (Karamanou, 2011).

‘Information-advantage hypothesis’ suggests that analysts have more private information about the covered firm when there is inadequate information disclosure from the firm and there is a greater degree of asymmetric information between investors and the firms they invest. Policy-makers have issued relevant information disclosure regulations to ensure market participants to be informed as fully as possible, such as the Dissemination of Price-Sensitive-Information in U.K and Regulation of Fair Disclosure (FD) in U.S. Due to the emerging of information disclosure regulations, the comparative advantage of financial analysts in earnings forecasts has been reduced significantly (Palmon and Yezegel, 2012). Empirical evidence has also shown that since Regulation FD, information production and coverage of financial analysts has reduced (Gomes et al., 2007; Koch et al., 2013) and the informativeness of analyst reports has declined (Gintschel and Markov, 2004). There is also evidence showing that forecast accuracy (dispersion) decreases (increases) around Regulation FD (e.g., Bailey et al., 2003; Heflin et al., 2003)However, what is under studied is to what extent these changes in forecast properties are driven by the regulation itself or other concurrent events (Francis et al., 2006) and how it affects specific optimistic bias, where conflicts of interest may not be altered by the regulation.

Indeed, because of the information advantages, via an investment banking relationship for example, better-informed analysts would have more accurate earnings forecasts (Allen and Faulhaber, 1989; Chen and Martin, 2011; Jacob et al., 2008)than less-informed analysts. The favorable effects of information advantages in forecast accuracy have also been found in China (Yuan and Huang, 2007; Zhu et al., 2007). Therefore, according 'information-advantage hypothesis', we hypothesize

H1_1: *Better-informed financial analysts, who have investment banking relationships with covered firms, would issue more accurate (less biased) earnings forecasts.*

'Conflicts of interests hypothesis' suggests that analyst forecast bias exists because of the gap of interests between analysts themselves and the users of earnings forecasts and the objective of forecast is to pursue self-interests of analysts rather than to provide an accurate forecast for the decision making of users (Lin and McNichols, 1998; Michaely and Womack, 1999). There are three reasons why analysts could benefit from biased, e.g., optimistic, forecasts. Firstly, analysts would impress companies by favorable forecasts in order to sell more investment banking services. Secondly, analysts expect to keep a good relationship with management team in order to access more private information. Thirdly, analysts expect to generate more trading commissions for the brokerage firms they work for when their monetary compensation is strongly associated with the commission (Karamanou, 2011). Supporting empirical evidence has shown that analysts, who have an underwriting relationship with the target firms, are more likely to have optimistic forecasts (Bessler and

Stanzel, 2009; Lin and McNichols, 1998). Similar evidence is also available in Chinese stock market (Firth et al., 2013; Gu et al., 2013; Yuan and Huang, 2007).

Sell-side financial analysts have been criticized for their optimistic reports and failing to detect accounting and over-valuation problems. Their optimism is partially driven by trading incentives and firm reputation reduces such optimism (Cowen et al., 2006). In Japan, it has been found that forecasts from sell-side analysts are more optimistic and less accurate than the forecasts from information-providers who do not make stock recommendations (Conroy and Harris, 1995). Therefore, the optimism generates a demand for forecasts from conservative analysts to improve the overall efficiency of forecasts in the market. Indeed, market actually reacts more strongly to the forecast revision by more conservative analysts (Hugon and Muslu, 2010). Therefore, according to 'conflicts of interests hypothesis', we hypothesize

H1_2: *Better-informed financial analysts, who have investment banking relationships with covered firms, would issue less accurate (more biased) earnings forecasts.*

For example, Beyer (2008) models the costs for managers for falling short of the analyst's forecast and their incentives to report earnings that meet or exceed analysts' earnings forecasts. Financial analysts would be aware of the intention of management to manipulate earnings upwards if earnings fall short of the forecast and they also have an incentive to forecast earnings above the median of reported earnings, which does not minimize the expected absolute value of the forecast error. Business ties, such as investment

banking relationships, would facilitate the private transfer of information between the firm and the analyst's brokerage firm. Existing evidence has shown that underwriting relationships play a substantial role in analyst's behavior (Clarke et al., 2007; O'Brien et al., 2005) and how each type of such relations would affect forecast accuracy is under studied. Therefore, an investigation on the effects of subsequent underwriting business following the IPO (i.e. SEO and M&A) would enable us to better understand the competing theories about the determinants of analyst forecast accuracy.

For example, while IPO underwriting has been widely documented as a source of conflicts of interest, leading to biased forecasts (O'Brien et al., 2005), there has been little evidence on the effects of other types of underwriting, such as SEO and M&A on forecast accuracy. IPO firms may rely on high-status brokerage firms and analysts to creating a liquid market for their stock (Cowen et al., 2006) and brokerage firms also seek for a long-term business tie with the firm to pursue new underwriting businesses. IPO underwriting is often considered as the biggest contributor of underwriting income of brokerage firms, which provides stronger economic incentives for analysts to forecast more optimistically since their researches are funded by underwriting activities. Moreover, analysts following is of greater importance around IPO because they value the potential for future revenues (Hope, 2003). IPO underwriters are more likely to pressure their analysts to issue favorable forecast, since IPO underwriting is the first step to build a long-term business tie with the firm. Meanwhile, compare to SEO and M&A information asymmetry is more severe at the time of the IPO since there is less publicly available information. Coupled with stronger economic incentive and weaker information advantage, we propose that the effect of IPO underwriting on analyst

forecast accuracy (or bias) is stronger than that of SEO or M&A. Moreover, compared with IPO, SEO involves less complicated process even the underwriter has to negotiate with both the issuer and governing body in China. For related financial analysts, who have developed an investment banking relation by underwriting IPO for instance, would have less pressure to explore future business opportunities and the conflict of interest, therefore, become less. Therefore, we hypothesize

H2. *The effects of investment banking relationships on forecast accuracy (or bias) vary over types of such relationships among IPO, SEO and M&A.*

2.2 Analyst forecast bias and reputation of analysts

Forecast accuracy is also found to be determined by the characteristics of the analysts, such as their firm-specific experience, size of their employer brokerage firms (Hussain, 2002), the number of industries and firms they follow (Kim and Park, 2012), and financial analysts' perception of earnings quality (Barker and Imam, 2008) and etc. In addition, empirical studies have shown that accuracy is associated with forecast immediacy, the speed with which analysts respond to a significant change in publicly available information set (Mozes, 2003) and a consensus of updated forecasts (Stickel, 1993). Reputation of financial analysts has also been found to play an important role in forecast accuracy. This is because star analysts enjoy an immediate and significant boost in compensation and industrial status and their brokerage firms also gain a significant enhancement in publicity in the market (Gu et al., 2013). Because of the mitigating effects of reputation on forecast bias, we hypothesize

H3. *Financial analysts with better reputation would issue more accurate earnings forecasts.*

2.3 Other determinants and legal environments

Equally, the characteristics of the covered firms also matter, such as their intangible information (Higgins, 2013), continuity of capital gains (Jung et al., 2015), product market power and market concentration (Datta et al., 2011), earnings distribution (Clement et al., 2011; Gu and Wu, 2003), return predictability (Chen and Martin, 2011), overconfidence of managers (Hilary and Hsu, 2011), use of corporate non-financial information (Orens and Lybaert, 2010), and accounting information system (Wang, 2013).

The effects of earnings forecast and guidance have also been investigated both empirically and theoretically, such as those on market return (Anilowski et al., 2007), and the stock market sensitivity to the analyst's forecasts (Beyer, 2008). Indeed, it has been acknowledged that sell-side earnings forecasts are useful for decision makings for users of sell-side analyst forecasts and long-term earnings forecasts explain more variations in forecasted price, than short-term earnings forecasts (Bandyopadhyay et al., 1995). Moreover, analyst forecasts also affect management behavior (Athanasakou et al., 2009; Rees and Twedt, 2011). Managers have an incentive to keep a track record of consistently meeting or beating analysts' earnings expectation and firms with such a record are more likely to guide analysts' forecast revisions downward to avoid breaking the consistency (Kross and Suk, 2012; Loh and Mian, 2006). In addition, Loh and Mian (2006) examine the average return associated with different forecast accuracy and find that the average return associated with more

accurate analysts' recommendations is greater than that recommended by analysts with lower forecast accuracy, by 1.27% per month. It suggests that, therefore, in an imperfectly efficient market, the costly and accurate information collection would be rewarded by the market.

Market has the ability to adjust and reduce forecast bias and such ability 'could serve as a proxy for analyst reputation costs' (Karamanou, 2011, pp.3). For example, in the markets with stronger investor protection laws (common-law countries), financial analysts issue more accurate and less dispersed forecasts (Barniv et al., 2005), compared with the markets of civil-law countries. It has also been acknowledged that emerging economies have relatively weak investor protection embedded in their legal system and therefore 'the building of their legal framework is one important task to develop their capital market' (Wu et al., 2009, pp.179-180). China, as an emerging economy with huge territory, has developed its legal system over time but still features heterogeneous legal investor protection across the whole country (Wu et al., 2009). Unlike cross-country comparison studies, the unique data allows us to further investigate how the heterogeneous local legal conditions affect financial analysts' forecasts within one country. Thus, we hypothesize

H4. *With a better developed local legal system, financial analysts would issue more accurate earnings forecasts.*

3. Data and variables

3.1 Data

We collect the empirical information from two sources. Firstly, we collect analysts' earnings forecast between May 2005 and April 2010[1] from Wind Info. Unlike existing empirical studies which also consider the revision of earnings forecasts (Das et al., 1998; Kross and Suk, 2012), we focus on the latest forecast on earnings per share (EPS), i.e. the last forecast before EPS is reported by the firm. This is because the latest forecast should have incorporated all existing public and private information and it should have the least bias on the condition that analysts aim to provide accurate forecasts. By focusing on the latest earnings forecasts, the bias, driven by unpredictability and high earnings volatility in Chinese stock markets (Chen and Martin, 2011), would be minimized. As a result, we are able to investigate the motivation of bias and information-value with less noise. Secondly, we follow existing literature and collect firm level information for the forecasted firms from the same source Wind Info., such as industry, reported EPS, asset tangibility, discretionary accruals and etc. Thirdly, with each firm which is followed by one analyst or a number of analysts, we examine if there has been any 'investment banking relationship' between the firm being followed and the brokerage firm which the analyst works for. We collect 'investment banking relationship' information from China Securities Market and Accounting Research (CSMAR) and an investment banking relation could be that the brokerage firm has been involved in IPO, SEO, and/or M&A of the firm being followed. Fourthly, to control for the 'reputation' effect, we follow (Gu et al., 2013) and collect the rankings of analysts from *New Fortune* which reports such rankings on a regular basis. Finally, we measure the development of local legal

[1] We excluded earnings forecasts before May 2005. This is because first, there were very few analyst forecasting earnings of public companies and second, analysts' forecasts were neither regulated nor standardised before May 2005.

environment by an index[2] derived from (Fan et al., 2011) for the market where the followed firm headquarters.

3.2 Variables

The accuracy of analyst forecast could be measured in different ways. Firstly, we measure it by a comparable value *Error1*, which is defined as [(Forecasted EPS_t – Actual EPS_t)/Actual EPS_t] and EPS_t is the earnings per share at time t. In order to capture all relevant information available from the market, we use the most recent forecasted EPS issued by an analyst before an actual EPS is observed. In the robustness tests, we follow Capstaff et al. (1999)[3] and measure the accuracy by *Error2*, [(Forecasted EPS_t – Actual EPS_t)/Share $Price_t$]. *Error3* is a dummy variable measuring the optimism of the analyst forecast where *Error3* = 1 if forecasted EPS is greater than actual EPS; 0 otherwise. *Error4* measures the relative accuracy and is coded as 1 if forecasted EPS is within the range of 0±¼δ where δ is the standard deviation of the forecasted EPS.

We measure the investment banking relationship by four dummies where *IPO*=1 if the brokerage company was involved in the initial public offering of the covered firm; 0 otherwise; *SEO*=1 if the brokerage company was involved in the seasonal equity offering of the covered firm; *M&A*=1 if the brokerage company was involved in the mergers and acquisitions of the covered firm; and *Relation*=1 if the brokerage company was involved in any of IPO, SEO and M&A with the covered firm. Analyst's reputation is measured by a

[2] Legal environment index is derived by considering the percentage of lawyers in population, the efficiency of local courts and the protection of intellectual property.
[3] Capstaff et al. (1999) use the absolute value to measure the magnitude of forecast bias. We use the true value to reflect the optimistic and passive forecasts instead.

dummy *Star* and *Star* = 1 if the forecast is issued by an analyst who is ranked in top 5 in the industry by *New Fortune*; 0 otherwise. Finally, the development of local (province) legal system is measured by an index *Law.* Following existing literature, we consider firm level information as control variables, including size (Bhushan, 1989), diversification (Datta et al., 2011), tangibility (Bhushan, 1989), leverage (Gu et al., 2013), discretionary accruals (Barker and Imam, 2008; Hope, 2003), standard deviation of EPS (Clement et al., 2011), and profitability (Das et al., 1998). Table 1 reports the definition of variables we consider in the following empirical analysis, including control variables and year and industry dummies.

[Insert Table 1 here please]

4. Empirical results

4.1 Descriptive statistics and univariate analysis

Table 2 reports the descriptive statistics of the variables and it shows that the forecasted EPS is significantly deviated from the actual EPS. *Error1*, winsorized at a 1/99th level, ranges from -1.19 to 3.00 with an average of 0.14. Among our samples, 16% of the forecasts are issued by analysts who have investment banking relations with the covered firms, including 14% by IPO, 4% by SEO and 0.3% by M&A, including about 2% with more than one type of such relationships; 28% of the forecasts are issued by *star* analysts. In total, we use 31,175 forecasts in the following analysis, excluding those forecasts on the earnings of financial institutions.

[Insert Table 2 here please]

As one of our research objectives, we examine the development of the local legal system and Table 3 shows that overall, the legal system had become better developed during the period of 2005 and 2009 and the average *Law* index increases from 7.54 in 2005 to 10.40 in 2009. It also shows that the variation of *Law* becomes greater and the standard deviation increases from 2.27 in 2005 to 3.26 in 2009.

[Insert Table 3 here please]

We report the univariate analysis results in Table 4. The upper panel shows that *Error1* and *Error2* are statistically higher among the forecasts issued by analysts who have investment banking relations with the covered firms (better-informed analysts) than those without such relationships (less-informed analysts), supporting ***H1_2*** and rejecting ***H1_1***. It also shows, in the lower panel, that investment banking relationship drives optimistic forecasts. For example, 67.40% of forecasts issued by IPO related analysts are optimistic versus 32.60% of those forecast issued by analysts without an IPO relation, supporting ***H2***. Overall, Table 4 implies a strong relationship between the optimistic forecast bias and the investment banking relation between the analysts and the covered firms.

[Insert Table 4 here please]

4.2 Empirical results

Firstly, we examine the effects of investment banking relationship, reputation and legal environment on the accuracy of analyst forecast. Table 5 shows that, by controlling for the characteristics of covered firm, industry and year, *Error1* would increase by 0.2 if the forecast is issued by an analyst who has an investment banking relationship with the covered firm. It implies that better-informed analysts, by developing an investment banking relationship, provide more biased or less accurate forecasts, supporting the 'conflicts of interests hypothesis' (***H1_2***). The adverse effect of 'information advantage' could be mitigated by a reputation effect and a better developed local legal system. For example, forecasts issued by a star analyst would have a lower *Error1* by around 0.07 and one degree of improvement of the local legal system could reduce *Error1* by 0.003, supporting ***H3*** and ***H4***.

[Insert Table 5 here please]

As mentioned earlier, we aim to examine if such an adverse effect varies among different investment banking relationships, in terms of IPO, SEO and M&A. We then break down *relation* into IPO, SEO and M&A relations respectively and the results are reported in Table 6. It shows that the adverse effect of information advantage is mainly driven by the IPO relation and such effect is statistically insignificant for M&A relations. The marginal effect of IPO relation is nearly 8 times as strong as that of a SEO relation. This result is consistent with the existing literature on the biased and favorable forecasts motivated by creating more underwriting services from the brokerage firm's customers (Karamanou, 2011). The

mitigating effects of reputation and local legal system are still consistent and robust, supporting ***H3*** and ***H4***.

[Insert Table 6 here please]

Secondly, by using interaction terms, we examine how the information issue and reputation effects vary in different legal systems and the results are reported in Table 7. It shows that the mitigating effect of reputation (Model 1) and that of legal system (Model 2) is stronger for forecasts issued by 'better-informed' analysts and those 'better-informed' analysts self-discipline themselves to issue more accurate forecasts in a better developed legal system, again supporting ***H3*** and ***H4***.

[Insert Table 7 here please]

To further investigate the different mitigating effects of reputation and legal environment, we break down our samples into two groups, one having investment banking relationship with the covered firm (*Relation*=1) and one without (*Relation*=0). The results are reported in Table 8. Consistent with the results in Table 7, Table 8 shows that the mitigating effect of reputation for 'related' forecasts is four times as big as that for 'unrelated' forecasts and the mitigating effect of law is only statistically significant for 'related' forecasts but not for 'unrelated' forecasts. It highlights the self-disciplinary behavior of 'better-informed' analysts in a better developed legal environment, again supporting both ***H3*** and ***H4***.

[Insert Table 8 here]

4.3 Robustness tests

In the previous sections, we show that forecasts issued by better informed analysts who have investment banking relationships with the covered firms are more biased and less accurate (**H1_2**) and the bias is more significant for forecasts issued by analysts who have an IPO relation than SEO and M&A relations (**H2**). In addition, the forecast bias could be mitigated by a reputation effect (**H3**) and the development of local legal environment (**H4**). To check the robustness of our results, we use *Error2* to measure the forecast accuracy and follow the same regression approach used in Tables 5 and 6. Our results, not reported by available on request, are consistent and all earlier identified effects are significant and robust.

Optimistic forecasts have been widely reported in existing literature (e.g. Karamanou, 2011) and we also examine the propensity of a forecast being optimistic, i.e. forecasted EPS > actual EPS. *Error3* is defined as a dummy, where *Error3*=1 if the forecast is optimistically biased and the results are reported in Table 9. It shows that a 'related' forecast is more likely to be optimistically biased than an 'unrelated' forecast. For example, the probability of a related forecast being optimistically biased is 24% ($=e^{0.2178}-1$) higher than that of an 'unrelated' forecast being optimistic (Model 1). Meanwhile, the probability of being optimistic is 14% ($=1-e^{-0.1499}$) lower for a forecast issued by a star analyst (Model 2). Every one degree of improvement of the local legal system could reduce the probability of forecast being optimistically biased by 1% ($=1-e^{-0.0085}$) (Model 3).

[Insert Table 9 here please]

Finally[4], we examine the above effects on the probability of a forecast being accurate. We use *Error4* to measure the relative accuracy and *Error4* =1 if *Error1* [(forecasted EPS – actual EPS)/actual EPS] is between -0.14 and 0.14, i.e. 0±¼δ where δ (=0.54) is the standard deviation of the forecasted EPS. The results (Table 10) are consistent and robust. For example, it shows that the probability of a 'related' forecast being accurate is 46% (=1-$e^{-0.6164}$) lower than that of an 'unrelated' forecast (Model 1) (**H1_2**). Meanwhile, the probability of being accurate by a star analyst is 14% (=$e^{0.1270}$ -1) higher (Model 2) (**H3**) and one degree of improvement of local legal system increases the probability of being accurate by 1% (Model 3) (**H4**).

[Insert Table 10 here please]

5. Summary and conclusion

To overcome the problem of asymmetric information between corporate insiders and outside investors, regulators have attempted to implement information disclosure mechanisms

[4] As an additional robustness test for the reputation effect, we replace the reputation of a financial analyst (*Star*) by the annual revenue-based ranking of the securities company which a financial analyst works for. Our results partially support **H3**, where company's ranking decreases forecast errors for related firms but such a mitigating effect is not statistically significant for non-related firms. We also consider the interaction effects between each relation with *star* and *law* and our key results are still hold. Results are available from the authors on request and we appreciate an anonymous referee for raising this point.

(Chang et al., 2013) and to completely separate research and investment banking businesses from brokerage firms so that analysts could provide unbiased, independent and third party forecasts. However, biased, especially optimistically biased, analyst forecasts have been widely identified in empirical studies and the bias is found to be driven by trading, commission and transaction motivations behind financial analyst forecasts. Existing empirical studies from western developed countries have shown that affiliated analysts (analysts with investment banking ties) issue more optimistic earnings forecasts and more favorable recommendations (Cowen et al., 2006; Lin and McNichols, 1998; Mehran and Stulz, 2007; Michaely and Womack, 1999). However, these studies mostly focus on IPO underwriting and take IPO relation as a one-off transaction. We extend existing literature by breakdown the investment banking relationships into IPO, SEO and M&A and examine how each relation affects forecast bias in a theoretical framework of conflicts of interests. Specially, we investigate how the investment banking relationship with covered firms affect the accuracy of analyst forecasts and how the reputation effects and local legal system could mitigate the possible bias in China.

By using hand-collected data from China stock markets, we show that investment banking relationships drive optimistic earnings forecast errors and such effect is strongest for an IPO relation, followed by a SEO relation and M&A relation. In other words, forecasts issued by better informed analysts are less accurate and more optimistically biased, supporting ‘conflict of interests hypothesis’ in China. Secondly, our results show that the optimistic bias could be mitigated by the reputation of financial analysts and a better developed legal environment. The mitigating effect of reputation is more than 4 times

stronger for a ‘related’ forecast than for an ‘unrelated’ one. For the first time, we show evidence on the disciplinary effects of local legal system on the accuracy of financial analyst forecast. This is especially important for emerging economies where legal system could be less developed and investor’s interests are less protected.

Our empirical results highlight the important role played by a well-developed legal system and call for the improvement of legal environment in China stock markets. A better developed legal system could work well as a mitigating factor for biased forecasts and this is because in a better developed legal system, misleading analysts may face higher costs of being sued and the asymmetric information problem is less serious. The biased forecasts identified in our paper would not weaken the favorable effects of the legal system improvement because the forecast bias could have been even greater without the improvement of legal environment. To further investigate such favorable effects, more information should be collected and a switching regression approach should be applied. We leave this for future research.

This paper also offers implications for future research. First, with the development of internet infrastructure and more widely use of social media, existing research has examined the economic value of social media investment and shown that firm value increases with social media use (Hitt et al., 2015). This would significantly increase the transparency of corporate performance and reduce the costs for potential investors to make decisions. Therefore, the information hypothesis could be altered by the use of social media which overcomes the problem of asymmetric information. Future research could investigate empirically how the use of social media could affect the accuracy of financial analyst’s

forecast. Second, as one of the weaknesses of this paper, we are not able to further investigate the role of affiliation[5] on forecast bias. This is because the financial analysts in our data are all 'sell-side' and affiliated with securities companies which provide a full package of services, such as underwriting, brokerage and investment. It is possible, however, the affiliated company may provide different sets of services or could even be an independent research institution. Future research could look into such heterogeneity of financial analyst's affiliation and their impacts on the accuracy of earnings forecasts so as to expand existing theories. Finally, there could be endogeneity issue where firms having an existing relation (e.g. IPO) with an investment bank are more likely to develop another relation (e.g. SEO or M&A). Due to the limited information from our data, we would leave this for future researchers.

[5] We thank an anonymous referee for raising this point.

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Table 1: Definition of variables

Category	Variable	Definition
Forecast accuracy	*Error1*	(forecasted EPS_t – actual EPS_t)/actual EPS_t
	Error2	(forecasted EPS_t – actual EPS_t)/actual share $price_t$
	Error3	=1 if forecasted EPS_t >actual EPS_t; 0 otherwise
	Error4	=1 if *Error1* is between 0±¼δ where δ is the standard deviation of the forecasted EPS; 0 otherwise
Key determinants	*IPO*	=1 if there is an IPO relation between the securities firm and the forecasted firm; 0 otherwise
	SEO	=1 if there is an SEO relation between the securities firm and the forecasted firm; 0 otherwise
	M&A	=1 if there is an M&A relation between the securities firm and the forecasted firm; 0 otherwise
	Relation	=1 if there is an IPO, SEO, and/or M&A relation between the securities firm and the forecasted firm; 0 otherwise
	Star	= 1 if the forecast is issued by an analyst who is ranked as the top 5 in a specific industry; 0 otherwise
	Law	Legal environment index
Control Variables	*Size*	The natural log value of the forecasted company's total assets
	Div	The number of the forecasted company's cross-industries
	Tang	Intangible assets / total assets of the forecasted company
	Lev	Total liabilities / assets of the forecasted company
	DisAcc	Discretionary accruals of the forecasted company
	EV	The standard deviation of EPS in the past three to six years of the forecasted company
	Profit	Absolute value of the operating profit divided by total profit of the forecasted company
	EM	=1 if the forecasted company has a big loss（EPS<-0.2）or a small profit（0<EPS<0.05）; 0 otherwise
	$Year_i$	Year dummies
	Ind_i	Industry dummies

Table 2: Descriptive statistics

	mean	std dev	median	min	max
Error1	0.1360	0.5384	0.0241	-1.1875	3.0000
Error2	0.0040	0.0171	0.0009	-0.0354	0.0988
Error3	0.5558	0.4969	1.0000	0.0000	1.0000
Error4	0.5498	0.4975	1.0000	0.0000	1.0000
Relation	0.1604	0.3670	0.0000	0.0000	1.0000
IPO	0.1400	0.3470	0.0000	0.0000	1.0000
SEO	0.0437	0.2045	0.0000	0.0000	1.0000
M&A	0.0028	0.0531	0.0000	0.0000	1.0000
Star	0.2848	0.4513	0.0000	0.0000	1.0000
Law	9.3212	3.2670	10.0552	4.2984	13.0912
Size	22.1879	1.3510	22.0480	19.2418	27.4872
Div	1.4822	0.7788	1.0000	1.0000	8.0000
Tang	0.0397	0.0636	0.0251	0.0000	0.8400
Lev	0.4704	0.1858	0.4809	0.0178	0.9988
Disacc	-0.0109	0.1536	-0.0013	-2.3286	2.5003
Ev	0.2940	0.2547	0.2276	0.0000	5.5158
Profit	0.5254	3.6975	0.0505	-0.0083	69.0725
Em	0.0254	0.1573	0.0000	0.0000	1.0000

Note: The total number of observation is 37,175.

Table 3: The development of legal environment in China by a measure of legal index

Standard deviation is reported in parentheses.

	2005	2006	2007	2008	2009	Avg.
Law	7.54	7.97	9.20	9.83	10.40	9.32
	(2.27)	(2.59)	(3.02)	(3.23)	(3.49)	(3.26)

Table 4: Univariate analysis

This table reports the univariate analysis results. The upper panel examines the variation of *Error1* and *Error2* across forecasts issued by analysts with different investment banking relationships. The lower panel examines the proportion of forecasts being optimistic (*Error3*=1) and being pessimistic (*Error1*<0). 'Yes' means there is a specific investment banking relation, such as IPO and 'No' means there is not such an investment banking relation. ***, **, and * stand for a statistical significant level of 1%, 5% and 10% respectively.

	Error1			*Error2*		
	Yes	No	t value	Yes	No	t value
IPO	0.2951	0.1100	23.16***	0.0144	0.0023	48.81***
SEO	0.1833	0.1338	3.63***	0.0076	0.0038	8.73***
M&A	0.2217	0.1357	1.63	0.0076	0.0040	2.17**
relation	0.2702	0.1103	21.14***	0.0134	0.0022	48.14***
	Optimistic forecast（%）			*Pessimistic forecast（%）*		
	Yes	No	z value	Yes	No	z value
IPO	67.40	32.60	22.48***	30.39	69.61	-22.99***
SEO	58.12	41.88	2.99***	36.96	63.04	-0.42
M&A	62.86	37.14	0.83	34.29	65.71	-0.62
relation	65.72	34.28	20.89***	31.59	68.41	-21.79***

Table 5: The effects of investment banking relation, reputation and legal system

The regression approach applied here is OLS and the dependent variable is *Error1*. Not reported here, but available upon request, are the effects of year dummies and industry dummies. Standard errors are reported in parentheses. ***, **, and * stand for a statistical significant level of 1%, 5% and 10% respectively.

$$Error1 = \beta_0 + \beta_1\, relation + \beta_2\, star + \beta_3\, law + \beta_4\, div + \beta_5\, tang + \beta_6\, lev + \beta_7\, disacc + \beta_8\, EV + \beta_9\, profit + \beta_{10}\, EM + \beta_{11}\, profit + Year + Industry + \varepsilon$$

	Model 1	Model 2	Model 3	Model 4
Constant	0.4783***	0.4339***	0.4084***	0.5158***
	(0.0586)	(0.0591)	(0.0590)	(0.0585)
relation	0.1980***			0.2008***
	(0.0088)			(0.0088)
star		-0.0715***		-0.0763***
		(0.0048)		(0.0048)
law			-0.0032***	-0.0030***
			(0.0009)	(0.0009)
size	-0.0287***	-0.0245***	-0.0237***	-0.0279***
	(0.0027)	(0.0027)	(0.0028)	(0.0027)
div	0.0647***	0.0647***	0.0657***	0.0652***
	(0.0037)	(0.0038)	(0.0038)	(0.0037)
tang	-0.3217***	-0.3090***	-0.3046***	-0.3363***
	(0.0287)	(0.0285)	(0.0283)	(0.0290)
lev	0.4087***	0.4300***	0.4246***	0.4010***
	(0.0191)	(0.0192)	(0.0194)	(0.0192)
disacc	0.0322*	0.0335*	0.0332*	0.0320*
	(0.0186)	(0.0189)	(0.0189)	(0.0186)
EV	-0.0971***	-0.0987***	-0.1025***	-0.0966***
	(0.0105)	(0.0107)	(0.0107)	(0.0105)
profit	0.0079***	0.0072***	0.0072***	0.0078***
	(0.0012)	(0.0012)	(0.0012)	(0.0011)
EM	-1.0982***	-1.0469***	-1.0486***	-1.0948***
	(0.0208)	(0.0196)	(0.0196)	(0.0209)
Year	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes
No. of observations	37,175	37,175	37,175	37,175
Adj R^2	0.1540	0.1398	0.1366	0.1582

Table 6: The break-down effects of investment banking relation

The regression approach applied here is OLS and the dependent variable is *Error1*. Not reported here, but available upon request, are the effects of year dummies and industry dummies. Standard errors are reported in parentheses. ***, **, and * stand for a statistical significant level of 1%, 5% and 10% respectively.

$$Error1 = \beta_0 + \beta_1\, relation + \beta_2\, star + \beta_3\, law + \beta_4\, div + \beta_5\, tang + \beta_6\, lev + \beta_7\, disacc + \beta_8\, EV + \beta_9\, profit + \beta_{10}\, EM + \beta_{11}\, profit + Year + Industry + \varepsilon$$

	Model 1	Model 2	Model 3
Constant	0.5069***	0.4452***	0.4384***
	(0.0584)	(0.0584)	(0.0590)
IPO	0.2316***		
	(0.0096)		
SEO		0.0294**	
		(0.0142)	
M&A			0.0655
			(0.0514)
Star	-0.0730***	-0.0720***	-0.0716***
	(0.0048)	(0.0048)	(0.0048)
Law	-0.0031***	-0.0031***	-0.0031***
	(0.0009)	(0.0009)	(0.0009)
size	-0.0277***	-0.0240***	-0.0237***
	(0.0027)	(0.0027)	(0.0028)
div	0.0660***	0.0654***	0.0654***
	(0.0037)	(0.0038)	(0.0038)
tang	-0.3374***	-0.3169***	-0.3133***
	(0.0290)	(0.0287)	(0.0285)
lev	0.4007***	0.4236***	0.4233***
	(0.0191)	(0.0194)	(0.0193)
disacc	0.0327*	0.0330*	0.0333*
	(0.0186)	(0.0189)	(0.0189)
EV	-0.0975***	-0.0995***	-0.1004***
	(0.0105)	(0.0107)	(0.0107)
profit	0.0079***	0.0071***	0.0071***
	(0.0011)	(0.0012)	(0.0012)
EM	-1.1025***	-1.0457***	-1.0457***
	(0.0210)	(0.0196)	(0.0196)
Year	Yes	Yes	Yes
Industry	Yes	Yes	Yes
No. of observations	37,175	37,175	37,175
Adj R^2	0.1617	0.1402	0.1401

Table 7: The interaction effects of investment banking relation, reputation and legal system

The regression approach applied here is OLS and the dependent variable is *Error1*. Not reported here, but available upon request, are the effects of year dummies and industry dummies. Standard errors are reported in parentheses. ***, **, and * stand for a statistical significant level of 1%, 5% and 10% respectively.

	Model 1	Model 2
Constant	0.5081***	0.4769***
	(0.0585)	(0.0584)
relation	0.2488***	0.3919***
	(0.0119)	(0.0286)
star	-0.0500***	-0.0758***
	(0.0049)	(0.0048)
law	-0.0030***	0.0002
	(0.0009)	(0.0009)
*relation*star*	-0.1546***	
	(0.0149)	
*relation*law*		-0.0206***
		(0.0027)
size	-0.0279***	-0.0274***
	(0.0027)	(0.0027)
div	0.0655***	0.0650***
	(0.0037)	(0.0037)
tang	-0.3410***	-0.3229***
	(0.0292)	(0.0288)
lev	0.3977***	0.3993***
	(0.0192)	(0.0192)
disacc	0.0302	0.0313*
	(0.0186)	(0.0187)
EV	-0.0954***	-0.0963***
	(0.0105)	(0.0105)
profit	0.0078***	0.0079***
	(0.0011)	(0.0011)
EM	-1.0966***	-1.0980***
	(0.0209)	(0.0210)
Year	Yes	Yes
Industry	Yes	Yes
No. of observations	37,175	37,175
Adj R^2	0.1606	0.1603

Table 8: The effects of reputation and legal system

The regression approach applied here is OLS and the dependent variable is *Error1*. Not reported here, but available upon request, are the effects of year dummies and industry dummies. Standard errors are reported in parentheses. ***, **, and * stand for a statistical significant level of 1%, 5% and 10% respectively.

	Relation=1	*Relation=0*
star	-0.2115***	-0.0498***
	(0.0144)	(0.0049)
law	-0.0157***	-0.0002
	(0.0030)	(0.0009)
size	-0.0343***	-0.0268***
	(0.0079)	(0.0028)
div	0.0881***	0.0605***
	(0.0106)	(0.0039)
tang	-0.4817***	-0.2751***
	(0.0692)	(0.0314)
lev	0.6232***	0.3621***
	(0.0589)	(0.0201)
disacc	0.0295	0.0328*
	(0.0573)	(0.0189)
EV	-0.1466***	-0.0859***
	(0.0260)	(0.0116)
profit	0.0289***	0.0049***
	(0.0070)	(0.0012)
EM	-1.4387***	-0.9094***
	(0.0320)	(0.0277)
Constant	1.0389***	0.4651***
	(0.1668)	(0.0603)
Year	Yes	Yes
Industry	Yes	Yes
No. of observations	5,963	31,212
Adj-R^2	0.3002	0.1078

Table 9: The effects on being an optimistic forecast

The regression approach applied here is Logit and the dependent variable is *Error3*. *Error3* is coded as 1 if the forecasted EPS is greater than actual EPS, i.e. an optimistic forecast. Not reported here, but available upon request, are the effects of year dummies and industry dummies. Standard errors are reported in parentheses. ***, **, and * stand for a statistical significant level of 1%, 5% and 10% respectively.

	Model 1	Model 2	Model 3	Model 4
Constant	0.9488***	0.9184***	0.8650***	1.0424***
	(0.0968)	(0.0973)	(0.0969)	(0.0964)
relation	0.2178***			0.2205***
	(0.0134)			(0.0132)
star		-0.1499***		-0.1529***
		(0.0076)		(0.0076)
law			-0.0085***	-0.0083***
			(0.0016)	(0.0016)
size	-0.0484***	-0.0425***	-0.0399***	-0.0468***
	(0.0044)	(0.0044)	(0.0045)	(0.0045)
div	0.0791***	0.0768***	0.0799***	0.0794***
	(0.0059)	(0.0059)	(0.0060)	(0.0058)
tang	-0.4106***	-0.4007***	-0.3834***	-0.4339***
	(0.0408)	(0.0400)	(0.0394)	(0.0414)
lev	0.7099***	0.7355***	0.7225***	0.6926***
	(0.0315)	(0.0314)	(0.0318)	(0.0314)
disacc	0.0873***	0.0768**	0.0804**	0.0792**
	(0.0325)	(0.0325)	(0.0330)	(0.0323)
EV	0.0047	0.0124	-0.0037	0.0037
	(0.0206)	(0.0204)	(0.0206)	(0.0208)
profit	0.0221***	0.0216***	0.0217***	0.0219***
	(0.0029)	(0.0029)	(0.0029)	(0.0028)
EM	-0.2306***	-0.2396***	-0.2472***	-0.2043***
	(0.0652)	(0.0648)	(0.0646)	(0.0644)
Year	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes
No. of observations	20,661	20,661	20,661	20,661
Psuedo R^2	0.1150	0.1090	0.1006	0.1266

Table 10: The effects on being an accurate forecast

The regression approach applied here is Logit and the dependent variable is *Error4*. *Error4* is coded as 1 if *Error1* has a value between -0.14 and 0.14, i.e. 0±¼δ where δ is the standard deviation of forecasted EPS with a value of 0.54. Not reported here, but available upon request, are the effects of year dummies and industry dummies. Standard errors are reported in parentheses. ***, **, and * stand for a statistical significant level of 1%, 5% and 10% respectively.

	Model 1	Model 2	Model 3	Model 4
Constant	-0.5460**	-0.3616	-0.2914	-0.5979***
	(0.2272)	(0.2243)	(0.2246)	(0.2282)
relation	-0.6164***			-0.6246***
	(0.0299)			(0.0299)
star		0.1270***		0.1450***
		(0.0243)		(0.0245)
law			0.0100***	0.0108***
			(0.0029)	(0.0030)
size	0.1003***	0.0858***	0.0820***	0.0966***
	(0.0104)	(0.0103)	(0.0104)	(0.0105)
div	-0.1736***	-0.1707***	-0.1738***	-0.1760***
	(0.0144)	(0.0144)	(0.0144)	(0.0145)
tang	1.1002***	1.0316***	1.0295***	1.1432***
	(0.1991)	(0.1973)	(0.1966)	(0.1999)
lev	-1.3934***	-1.4327***	-1.3950***	-1.3494***
	(0.0763)	(0.0758)	(0.0770)	(0.0775)
disacc	0.3912***	0.3866***	0.4003***	0.4043***
	(0.0819)	(0.0803)	(0.0807)	(0.0824)
EV	-0.1147**	-0.1046**	-0.0994**	-0.1182**
	(0.0463)	(0.0457)	(0.0455)	(0.0463)
profit	-0.0650***	-0.0644***	-0.0656***	-0.0658***
	(0.0142)	(0.0144)	(0.0149)	(0.0145)
EM	-1.8709***	-2.0139***	-2.0081***	-1.8834***
	(0.1058)	(0.1069)	(0.1070)	(0.1056)
Year	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes
No. of observations	37,175	37,175	37,175	37,175
Psuedo R^2	0.0540	0.0540	0.0540	0.0540