Does information dissemination mitigate bubbles?

Sandro C. Andrade[*] Jiangze Bian[†] Timothy R. Burch[*]

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Abstract

We study how asset price bubbles formed during the 2007 Chinese equity bubble, a time period during which the median Shanghai A-share returned 188% over six months and had a P/E ratio reaching 87. Our unique setting allows for the construction of five different stock-specific measures of bubble intensity. For all five measures, we find significantly smaller bubbles in stocks with greater dissemination of information about fundamentals, as measured by analyst coverage. This finding is robust to including a variety of control variables and addressing the possibility of endogenous analyst coverage. We also find evidence consistent with information dissemination mitigating bubbles by reducing the dispersion of beliefs across investors.

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[*]School of Business Administration, University of Miami.

[†]School of Banking and Finance, University of International Business and Economics.

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"The People's Bank of China, the media, investment bankers. . . and Alan Greenspan...have all warned that it looks like a bubble."

The Economist, May 24, 2007

1 Introduction

Asset pricing bubbles are intriguing, large-scale social phenomena. The distorted prices and potential misallocation of real resources they cause may lead to large societal costs, as the recent experience in the U.S. real estate market demonstrates. Therefore, it is important to understand the factors that influence bubbles in order to inform policy aimed at reducing the incidence and magnitude of such phenomena (Bernanke, 2002). In this paper, we study the role of analyst coverage during China's 2007 equity market bubble in order to assess whether greater dissemination of information about asset fundamentals mitigates price bubbles.

At least two classes of bubble theories suggest that greater information dissemination may mitigate bubbles. In the "resale option" theories of Harrison and Kreps (1978), Scheinkman and Xiong (2003), and Hong, Scheinkman, and Xiong (2006), enhanced information dissemination could mitigate bubbles by reducing the dispersion of beliefs across investors, as investors with heterogenous priors update their beliefs towards the valuation implied by the information being disseminated.[1] In the "market sentiment" theories of Shiller (2005) and Baker and Wurgler (2006, 2007), greater dissemination of fundamentals information may mitigate bubbles by reducing investors' over-optimism.

On the other hand, perhaps information dissemination has little role to play in mitigating bubbles because cognitively-biased investors may disregard any additional information and hence fail to update their private valuations. Indeed, experimental evidence suggests that bubbles may be due to a deeper form of irrationality (Lei, Noussair, and Plott, 2001), as bubbles may form even when all investors are endowed with the same information set (Smith, Suchanek, and Williams, 1988; Haruvy and Noussair, 2006), and even when all investors

[1] In addition to the dynamic resale option theories of bubbles, several static theories feature a positive price bias due to the interaction between the dispersion of beliefs across investors and short-sale constraints, e.g. Miller (1977), Chen, Hong, and Stein (2002), and Hong, Scheinkman, and Xiong (2008). However, as the latter authors note, static models do not capture the speculative trading (i.e., buying in anticipation of capital gains) that is often ascribed to bubbles.

know future dividends with certainty (Porter and Smith, 1995). If bubbles are indeed due to a deeper form of irrationality as the experimental literature suggests, perhaps the key way to mitigate bubbles is through policies that promote financial literacy and experience (Dufwenberg, Lindqvist, and Moore, 2005), rather than through greater dissemination of information about asset fundamentals.[2]

Ultimately, how information dissemination affects the formation of bubbles in real world financial markets is a question that requires empirical investigation. To conduct our investigation, we study the 2007 Chinese stock market. As we argue in Section 2, not only does this market have institutional characteristics that many theories suggest are conducive to asset pricing bubbles, but also displays at least three classic features of a bubble.[3]

An important advantage of this setting is that it allows us to construct five different stock-specific bubble intensity measures. Because our main conclusion obtains regardless of the measure we use, it is much less likely that it is due to error in measuring cross-sectional differences in bubble intensities. Our first two measures are the cumulative returns and the average P/E ratio during a six-month reference period. The reference period, which we define as November 29, 2006 to May 29, 2007, is the six-month period with the highest cumulative return in the last ten years in Shanghai's stock market (Figure 1), and its end coincides with the peak of median P/E ratios and turnover (Figure 2), as well as with the peak of investors' interest in the stock market as suggested by Google searches in China and opening of new individual A-share trading accounts for the Shanghai Stock Exchange (Figure 3).[4]

FIGURES 1, 2, and 3

The end of our six-month reference period also coincides with a sudden tripling of China's security transaction tax from 0.1% to 0.3% on May 30, 2007. As we explain in Section 3,

[2] Blanchard and Watson (1982), Tirole (1985), Allen and Gorton (1993, 2000), Santos and Woodford (1997), and DeMarzo, Kaniel, and Kremer (2008) develop theories in which the formation of bubbles does not depend on the degree of dissemination of information about asset fundamentals.

[3] See Mei, Scheinkman, and Xiong (2009) and Xiong and Yu (2009) for other studies of bubbles in Chinese security markets.

[4] Google Insights for Search compares searches for items to overall search volume on Google. We plot an index of searches in China on the terms "stock" and "stock market" (in Chinese). Google normalizes the index such that its peak is equal to 100 in the sample period.

this tax tripling event allows us to construct an additional cross-sectional measure of bubble intensity, under the premise that more overvalued stocks should react more strongly to the tax increase. Thus, our third cross-sectional measure of bubble intensity is each stock's short-window announcement reaction to the securities transaction tax increase (minus 23.9% on average, with a standard deviation of 10.4%). The fourth measure of bubble intensity, labeled *Composite bubble measure,* is the first principal component of the three aforementioned measures. Our fifth measure of bubble intensity applies to a subsample of 23 stocks listed both in Shanghai and in Hong Kong, and is the exchange-rate adjusted ratio of price in China over price in Hong Kong.

As our measure of information dissemination, we use analyst coverage, which is similarly used by Brennan, Jegadeesh, and Swaminathan (1993), Hong, Lim, and Stein (2000), Hou and Moskovitz (2005), Chan and Hameed (2006), and Duarte, Han, Harford, and Young (2008). We further justify this measure of information dissemination later, but the basic idea is that analysts are specialized professionals who collect information about stocks and disseminate it to market participants in the form of reports, earnings forecasts, and buy/sell/hold recommendations. As Chan and Hameed (2006) argue, the role of security analysts in the dissemination of information may be particularly important in an emerging market like China, because of a relatively low degree of voluntary corporate disclosure and transparency.

FIGURE 4

Figure 4 illustrates our main conclusion. We plot the *Composite bubble measure* against analyst coverage, and observe a strong negative association between each stock's analyst coverage and its *Composite bubble measure* (plots are similar if we use any of the other bubble metrics in our study). The R-squared of the best fit line for Figure 4 is 0.47. On average, stocks with greater analyst coverage developed significantly smaller bubbles, which in turn, suggests that greater information dissemination mitigates bubbles. Figure 4 also shows that our conclusion is not driven by a positive correlation between analyst coverage and firm size. When we plot *Composite bubble measure* against the residuals of a regression of analyst coverage onto log of market capitalization, we continue to observe a negative association between *Composite bubble measure* and analyst coverage orthogonalized with respect to size. The R-squared of the best fit line is 0.24.[5]

Through regression analysis, we show that the strong correlations between the bubble intensity measures and analyst coverage remain after controlling not only for size, but also for industry membership, market and liquidity betas, and measures of liquidity and trading intensity. This finding is also unchanged after addressing the possibility that analyst coverage is endogenous with respect to bubble intensity.[6] Furthermore, these results are robust to using various window lengths to define cumulative returns, average P/E ratios, and announcement returns following the tripling of the security transaction tax.

In further analysis we find that information dissemination (analyst coverage) is negatively associated with trading activity (turnover), which in turn is positively related to the dispersion of beliefs across investors in several theories. We also document that the abating effect of analyst coverage in bubbles and turnover is weaker when there is higher dispersion in analysts' EPS forecasts, i.e., when there is greater disagreement among analysts. These results suggest that, consistent with resale option theories of bubbles, one channel through which information dissemination mitigates bubbles is by reducing the dispersion of beliefs across investors. However, we cannot rule out that information dissemination may also mitigate bubbles by reducing the likelihood that investors become over-optimistic on average.

2 The case for a bubble

The Chinese stock market bubble of 2007 displays at least three classic features of an asset price bubble: a boom followed by a crash in asset prices, a surge in trading activity that is strongly correlated with price levels, and a stampede of new investors entering the market.[7]

[5] Additionally, we sort stocks into deciles based on size, and regress *Composite bubble measure* on analyst coverage within each decile. Using heteroskedasticity robust standard errors, we find that the coefficient on analyst coverage is negative and statistically significant at the 1% level in all but the second smallest decile. For that particular decile, the coefficient is negative and statistically significant at the 5% level.

[6] If anything, one might expect analyst coverage to grow alongside bubble magnitudes due to investor demand for information on "hot" stocks. Although this would predict an association between analyst coverage and bubble magnitudes that is *opposite* to our findings, we nonetheless address endogeneity concerns using two alternative methods.

[7] See Cochrane (2003), Kindleberger and Aliber (2005), and Hong and Stein (2007) for the relation between asset pricing bubbles and trading activity, and Greenwood and Nagel (2009) for evidence that inexperienced investors are drawn into the market during asset pricing bubbles.

Key elements of the bubble are shown in Figure 2, which plots the evolution of the median P/E ratio and the median (annualized) daily turnover across Shanghai A-shares in our sample. During the six-month period from November 29, 2006 to May 29, 2007 the median stock in our sample has a cumulative return of 188%, its P/E ratio increases from 35 to 87, and its annualized daily turnover increases from 234% to 942% per year. As the figure shows, both P/E ratios and annualized turnover decline after May 30, 2007, eventually reaching 20 and 140% , respectively, by October 2008. The correlation between P/E ratios and turnover over the entire January 2005 to December 2008 period is 0.69.

Alongside soaring asset prices and trading activity, a total of 7.8 million new A-share trading accounts were created at brokerages trading on the Shanghai Stock Exchange from December 2006 to May 2007 (see Figure 3). These new accounts represent a 21% increase in the total number of retail A-share accounts in just six months. Because individual investors were not allowed to open equivalent accounts in multiple brokerages (Choi, Jin, and Yan, 2010), the surge in new accounts is overwhelmingly due to new individual investors venturing into a booming equity market.

Our view that China experienced a stock market bubble in 2007 is consistent with that expressed by many observers at the time.[8] Moreover, relative to other large equity markets, the investor base and institutional features of the Chinese equity market create the conditions that many theories suggest are conducive to asset pricing bubbles. Like the U.S. residential real estate market, the Chinese equity market is dominated by retail investors. For example, Bailey, Cai, Cheung, and Wang (2009) document that individual investors accounted for 92% of the trading volume in 198 large Chinese stocks from October 2003 to March 2004. Moreover, also like the U.S. residential real estate market, China's 2007 equity market was subject to short-selling constraints.[9] In fact, short sales were forbidden, and the ability of pessimistic investors to indirectly affect equity prices through a derivatives market was extremely limited.[10]

[8] See "The Great Wall of Money," *The Economist*, May 24, 2007, which references government officials, the People's Bank of China, the media, investment bankers, Hong Kong's richest tycoon, and Alan Greenspan warning that the market appeared to be in a bubble.

[9] Ofek and Richardson (2003) present evidence linking the dot.com bubble of the 90s to short-selling constraints.

[10] Although there was a warrants market during our sample period, it was available for only a small sample of Shangai stocks (32) and was also subject to strict short-selling constraints, as explained by Xiong and Yu (2009). Xiong and Yu (2009) also demonstrate that the warrants market itself experienced a bubble.

3 Data and variables

Our sample consists of the 623 Shanghai A-share stocks that traded in at least 90% of the trading days during the six-month period from November 29, 2006 to May 29, 2007. All of our data are from Resset, Inc., which obtains its stock market data from the exchange.[11] Tables I and II report summary statistics for the main variables in this study.

3.1 The reference period

As discussed in the Introduction, Figures 1 to 3 suggest a reference period ending May 30, 2007 based on six-month cumulative returns, P/E ratios, turnover, and measures of retail investor enthusiasm (Google searches and account openings). Moreover, a clear event (the transaction tax tripling) took place on May 30, 2007 and seemingly marked a regime chance in the Chinese stock market. For completeness, we plot two additional figures in the Appendix.

Appendix Figure 1 shows an index of price levels for our sample of 623 A-shares in the Shanghai Stock Exchange (the sample selection criteria are discussed later). To calculate the price level index, for each stock we first accumulate the gross return since January 2005, normalizing to 1 on November 28 2006, right before our reference period begins. We then either take the median or calculate the value-weighted average across all 623 stocks to compute the level of the index. Although Appendix Figure 1 shows a peak for median price levels on January 2008, it too suggests a regime change on May 30, 2007. Not only did the average rate of price appreciation slow substantially after May 30, 2007, but in addition prices did not display a clear upward trend as they did beforehand.

Appendix Figure 2 plots the value-weighted P/E ratio in the Shanghai Stock Exchange, in addition to the previously shown median P/E ratio. This figure also shows a regime change after May 30, 2007, with both median and value-weighted P/E ratios declining thereafter.[12]

[11] Recent papers using Chinese stock market data include Qian and Tong (2003), Feng and Seasholes (2004, 2005), Allen, Qian, and Qian (2005), Fan, Wong, and Zhang (2007), Chan, Menkveld, and Yang (2007, 2008), Mei, Scheinkman, and Xiong (2009), Calomiris, Fisherman, and Wang (2009), Gul, Kim, and Qiu (2009), Chan, Kot, and Yang (2009), and Xiong and Yu (2009).

[12] One argument for placing greater emphasis on the plots of median (as opposed to value-weighted) prices and valuation ratios is that, as we show later, bubble magnitudes are negatively correlated with firm size. Hence, value-

3.2 Measures of bubble intensity

Cumulative return. This variable is the cumulative stock return during the six-month reference period of November 29, 2006 to May 29, 2007. As previously mentioned, the reference period is the six-month period with the highest cumulative return during the last ten years in Shanghai's stock market, and its end coincides with the peaks of median P/E ratios and median turnover levels. The mean and median of *Cumulative return* are 204.4% and 187.6%, respectively, implying that the average stock roughly tripled in price over the six-month reference period. Of the 623 sample stocks, 567 (91%) have *Cumulative return* exceeding 100%, 275 (44%) have returns exceeding 200%, and 73 (12%) have returns exceeding 300%. The smallest *Cumulative return* is 53%.

TABLE I

P/E ratio. This variable is the average ratio of each stock's price to its earnings during the six-month reference period of November 29, 2006 to May 29, 2007. Each day, we calculate this ratio using the total earnings reported over the four most recent available quarterly earnings prior to the calculation date. We cap daily P/E ratios at 250, and assign a P/E ratio of 250 to stocks with negative earnings.[13] We then compute the average ratio for each stock throughout the reference period. The mean and median *P/E ratio* are 96.7 and 59.7, respectively.

Announcement return. Even though *Cumulative return* and *P/E ratio* are common and intuitive measures that capture cross-sectional differences in bubble intensities, both are noisy. Firms experiencing very positive changes in their fundamentals during the six-month reference period should display higher *Cumulative return* values than firms experiencing less positive changes. Moreover, on average, one would expect riskier firms to experience higher cumulative returns than less risky firms over any given long-term window. Similarly, price-to-earnings ratios may vary across firms because of cross-sectional differences in expected

weighted plots present a somewhat skewed picture in the sense of not being representative of a randomly picked firm.

[13] The capping at 250 affects less than 10% of the daily observations. All of our results are robust to capping daily P/E ratios at 400 rather than at 250.

earnings growth rates, required rates of return, dividend policy, etc.

As an alternative stock-specific measure of bubble intensity, we exploit our unique setting to construct a third stock-specific bubble intensity measure that we label *Announcement return.* We argue that this measure should be less affected by unobservable cross-sectional variation in the evolution of fundamentals and in earnings growth rates.

Announcement return is each stock's five-day cumulative return following the announcement of the tripling of China's security transaction tax on May 30, 2007. This bubble-intensity identification strategy is anchored on Scheinkman and Xiong's (2003) theory of bubbles, which predicts that prices of stocks in larger bubbles will have more negative price reactions to an increase in trading costs.[14] In their theory, asset prices have two components: a fundamental value given by the expected present value of future dividends (averaged across different investors' beliefs) plus the value of the option to resell to potential future investors at greater prices. Scheinkman and Xiong (2003) show that an increase in trading costs instantly decreases the value of the resale option (which depends on expected after-tax cash flows of future stock trading). This implies that stocks in which the resale option is a larger fraction of the stock price should have larger percentage price decreases immediately after the transaction tax increase announcement.[15]

The five-day period in the calculation of *Announcement return* starts on May 30, 2007 as the tax tripling announcement was made early that day before the market opened. We use five-day returns because China has a price change limit of 10% per day, and there are many stocks that hit the limit on one or more of the first four days following the tax increase announcement (results are robust to shorter and longer windows). For example, 122 stocks

[14] Mei, Scheinkman, and Xiong (2009) and Xiong and Yu (2009) find evidence supporting the resale option theory of bubbles in Chinese securities markets. However, our strategy of identifying bubble intensities through *Announcement return* is also consistent with investors viewing the sudden tax tripling as a strong, public signal from the Chinese government that the market was overvalued. In the market sentiment theories of bubbles (Shiller, 2005; Baker and Wurgler, 2006, 2007), presumably such a signal would reduce bubble magnitudes by reducing investors' over-optimism. In Abreu and Brunnermeier's (2003) theory of bubble crashes, the signal could move prices closer to fundamental values by coordinating sales by informed investors. Griffin, Harris, Shu, and Topaloglu (2009) provide evidence consistent with Abreu and Brunnermeier's (2003) theory.

[15] Suppose that stocks H and L are priced at $100, and that the fundamental values of H and L are $50 and $90, respectively. Thus, the bubble intensity of stock H is five times larger than the bubble intensity of stock L. A common security transaction tax increase levied on both stocks implies that the value of the option to resell decreases by a similar proportion in both stocks, say, 50%. After the announcement of the tax increase, the new prices of stocks H and L, respectively, would be about $75 and $95, implying announcement returns of -25% for stock H and -5% for stock L. Note that the announcement returns are monotonically related to bubble intensities in this simple example.

have -10% returns on all of the first three days following the tax increase. The mean and median *Announcement return* are -23.9% and -25.2%, respectively. To help put the -23.9% mean *Announcement return* in perspective, we note that the lowest and the highest mean cumulative returns over any five consecutive trading days during the previous year were -8.5% and 13.5%, respectively.[16] Note that, due to *Announcement return* having a standard deviation of 10.4%, this measure has substantial cross-sectional variation that our analysis can explore.

Composite bubble measure. Our fourth bubble intensity measure is the first principal component of *Cumulative return*, *P/E ratio,* and *Announcement return.* We normalize the first principal component to have zero mean and unit variance. *Composite bubble measure* has the same orientation as *Cumulative return* and *P/E ratio*, that is, higher values of *Composite bubble measure* are associated with larger bubble intensities. As reported in Table II, the correlations between *Composite bubble measure* and *Cumulative return*, *P/E ratio,* and *Announcement return* are 0.721, 0.759, and -0.770, respectively.

China-HK premium. Our fifth bubble intensity metric is only available for a subsample of 23 stocks that are dual-listed in Shanghai and Hong Kong. *China-HK premium* is the Chinese stock price divided by the corresponding exchange-rate-adjusted Hong Kong price minus one, averaged across the six-month reference period of November 29, 2006 to May 29, 2007. We argue that because Hong Kong's market is more developed and allows short selling, prices in Hong Kong are relatively less prone to severe pricing bubbles than prices in China. The mean and median *China-HK premium* are 66.2% and 37.7% respectively.

TABLE II

The top left corner of Table II shows that our five cross-sectional measures of bubble intensity are significantly correlated with each other. The signs of all correlations are as expected, as smaller values of *Announcement return,* and larger values of *Cumulative return, P/E ratio, Composite bubble measure*, and *China-HK premium,* signify larger bubbles. All ten

[16] It is hard to attribute the large negative returns to events other than the tax increase. We cannot find other major macroeconomic announcements on May 30, 2007 or the subsequent four trading days, and none of the 623 sample stocks reported earnings during those five days.

correlations among the five bubble intensity metrics are statistically significant.

3.3 Measure of information dissemination

Following Brennan, Jegadeesh, and Swaminathan (1993), Hong, Lim, and Stein (2000), Hou and Moskowitz (2005), and Chan and Hameed (2006), we use *Analyst Coverage* as our firm-level measure of information dissemination. We define *Analyst coverage* as the number of brokerage firms providing earnings per share (EPS) reports during the six-month reference period of November 29, 2006 to May 29, 2007. To the extent that analyst reports are (at least partially) independent and not released on the same dates, it follows that a greater number of analysts will result in a higher rate of information flow to market participants. The data are from Resset Inc., which collects forecasts from a large number of Chinese brokerage firms. As we show later, our results are robust to using the I/B/E/S dataset for China, which is much less comprehensive than the Resset data. The brokerage firms in the Resset data issuing reports and EPS forecasts for our sample stocks are listed in Table A.1 of Appendix A.

In line with Chan and Hameed (2006), we argue that analyst coverage is a particularly good cross-sectional measure of information dissemination in China. Due to China's relatively low degree of voluntary corporate disclosure and transparency, it is presumably more difficult (relative to well-developed capital markets) for investors to observe and analyze relevant firm information on their own. We argue that all else equal, greater analyst coverage increases the likelihood that a Chinese retail investor has access to an analyst report either directly from the investor's own brokerage firm or by other means.[17]

It also appears that Chinese investors react to changes in analyst recommendations. Moshirian, Ng, and Wu (2009) find that between 1996 and 2005, the Chinese stock market reacts positively to upgrades (and negatively to downgrades) in analyst recommendations. In our sample, we find that the average three-day market-adjusted reaction to a strong upward revision (e.g., from hold to strong buy) exceeds that to a strong downgrade by an average

[17] Anecdotal evidence suggests that Chinese investors seek out analyst reports. A March 19, 2007 *Business Week* article titled "Market Mania in China" states that "Many [Chinese investors] try to educate themselves, pouring over analyst reports available free of charge at Web sites such as Hexun and China-stock."

of 2.9%, with the average reaction to an upgrade statistically different than the reaction to a downgrade (p-value = 0.0002).[18] Later in the paper we address the concern that *Analyst coverage* is endogenous. We also present evidence consistent with an information channel explaining the link we find between *Analyst coverage* and bubble intensity.

Table I shows that the mean and median *Analyst coverage* are 6.071 and 3.000, respectively, and Table II shows that *Analyst coverage* is smaller when any of our five bubble intensity metrics imply larger bubbles. The correlations between *Analyst coverage* and *Cumulative return, P/E ratio, Announcement return, Composite bubble measure,* and *China-HK premium* are −0.400, −0.453, 0.679, −0.684, and −0.481, respectively.

3.4 Control variables

Market capitalization is the most important control variable in our analysis, because presumably larger firms are expected to attract more analysts, and yet size may be correlated with stock characteristics that are orthogonal to information dissemination. We use the average market capitalization throughout the six-month reference period of November 29, 2006 to May 29, 2007.[19] The mean and median *Market capitalization* in billions of yuan are 11.92 and 2.84, respectively. We use the log of *Market capitalization* in our empirical work due to the highly skewed nature of raw market capitalization. Our additional control variables are *Turnover, Industry effects, Effective spread, Depth, Market beta, Liquidity beta,* Δ*Turnover,* and Δ*Effective spread.* Some of our control variables are more appropriate to a particular bubble intensity measure than others, but we include all control variables in our empirical analysis using each bubble measure for comparability.[20]

Turnover is the daily number of shares traded divided by the number of tradable shares, averaged across all trading days in the six-month reference period of November 29, 2006 to May 29, 2007. The mean and median *Turnover* are 2.700% and 2.716%, respectively. *Turnover* is an important control variable in regressions explaining *Announcement return*,

[18] If we consider the reaction to *any* upgrade or downgrade, the announcement reaction to upgrades exceeds that to downgrades by 0.9%, on average, and the average reactions to upgrades and downgrades are statistically different with a p-value of 0.010.

[19] Our conclusions are unchanged when we use the log of market capitalization measured at the beginning or at the end of the six-month reference period.

[20] Our results hold regardless of the combination of control variables we use.

because models such as Lo, Mamaysky, and Wang (2004) and Acharya and Pedersen (2005) provide an alternative hypothesis that could potentially explain the negative returns following the sudden tripling of the security tax. These models predict that stock prices decrease following an exogenous increase in transaction costs because of increased illiquidity discounts. That is, stock prices in these models are below the fundamental values that would obtain in a world of zero trading costs, and hence exogenous increases in trading costs further reduce stock prices, with more heavily traded stocks suffering larger price declines.[21]

Industry effects are indicator variables allowing for industry-specific intercept terms. We group the 623 sample stocks are grouped into 13 industries based on China Securities Regulatory Commission (CSRC) industry classifications. In regressions explaining *Cumulative return,* as well as those explaining *Announcement return,* controlling for *Industry effects* helps control for news about fundamental values because such news often has a strong industry structure. In regressions explaining *P/E ratio*, the *Industry effects* indicator variables control for industry-level differences in expected earnings growth rates.

Effective spread and *Depth* are two measures of liquidity calculated from intraday transaction data. *Effective spread,* measured in basis points, is the absolute difference between the transaction price and the corresponding midpoint between the best bid and best ask quotes at the time of the trade, divided by the midpoint. For each stock, we calculate the effective spread for each transaction, then take the daily average across all transactions, and lastly take the mean across all days in the six-month reference period of November 29, 2006 to May 29, 2007. The mean *Effective spread* is 20.65 basis points. *Depth*, measured in millions of yuan, is the best bid and ask monetary quantities at the time of each transaction, averaged first across all transactions at the stock-day level, and then averaged for each stock across the six-month reference period. The mean *Depth* is 0.256.

We use Δ*Turnover* and Δ*Effective spread* to control for changes in trading activity and trading costs.[22] Δ*Turnover* is the average daily turnover during the six-month period immediately following the six-month reference period of November 29, 2006 to May 29, 2007,

[21] In robustness work, we also measure trading activity by the average number of daily transactions in the pre-tax-increase period. Our conclusions remain unchanged when this additional control variable is included in our regressions.

[22] In robustness work we include a Δ*Depth* variable, and our of all conclusions are unchanged. We do not include Δ*Depth* in our baseline specifications because Δ*Depth* is very strongly correlated (-0.95) with the *Depth* variable.

minus the average daily turnover in the reference period. The definition of Δ*Effective spread* is analogous. The mean Δ*Turnover* and Δ*Effective spread* are -0.697% and -1.519 basis points, respectively.

Market beta are *Liquidity beta* are control variables capturing systematic factor loadings. All else equal, stocks with higher betas should have lower P/E ratios, larger values of *Cumulative return*, and more negative values of *Announcement return.* To estimate *Market beta* and *Liquidity beta*, we regress daily stock returns during the six-month reference period of November 29, 2006 to May 29, 2007 against the aggregate value-weighted market return and an aggregate liquidity factor. All of our results are robust to regressing stock returns on the market and liquidity factors separately instead. For the liquidity factor, we use the innovation in the average daily effective spread across all stocks, where each day's innovation is defined as the residual in a regression of the average effective spread across stocks on its lagged value, similar to Acharya and Pedersen (2005). For the market factor, we use the value-weighted return on all tradable Shanghai A-shares. The average *Market beta* is 0.963 and the average *Liquidity beta* is -0.116.[23]

4 The effects of information dissemination on bubbles

In Table III we report ordinary least squares regressions of our four full-sample bubble intensity measures onto *Analyst coverage* and various control variables. Columns (1), (3), (5), and (7) show that bubble measures are strongly correlated with *Analyst coverage*. The signs of the correlations indicate that stocks with larger *Analyst coverage* experienced smaller bubbles, i.e., lower *Cumulative return*, lower *P/E ratio,* higher (less negative) *Announcement return,* and lower *Composite bubble measure*. The adjusted R-squares of these univariate regressions range from 0.16 in Column (1) to 0.46 in Columns (5) and (7).[24]

[23] In robustness work, we address the concern that *Market beta* and *Liquidity beta*, even though theoretically motivated, do not adequately represent true factor loadings in the data (Ross, 1976). We replace *Market beta* and *Liquidity beta* with three empirical factor loadings constructed from a factor analysis of returns. To construct the factor loadings, we perform a factor analysis of the daily returns of the sample stocks in the pre-tax-increase period, and retain loadings on the first three factors (Roll and Ross, 1980). The first factor is overwhelmingly dominant, accounting for 39.4% of the covariation in the data. The second and third factors account for 3.1% and 2.1%, respectively, with additional factors individually accounting for less than 2.1%. Our conclusions are unchanged when we use these empirical factor exposures in place of *Market beta* and *Liquidity beta*.

[24] The lower R-squareds in the regressions using *Cumulative return* and *P/E ratio* compared to *Announcement return* and *Composite bubble measure* are consistent with the former metrics being noisier measures of bubble inten-

TABLE III

Columns (2), (4), (6), and (8) show that the negative association between *Analyst coverage* and bubble intensity remains after we add a battery of control variables. In all cases the coefficient on *Analyst coverage* is statistically significant at the 1% level. The coefficients in Columns (2), (4), (6), and (8) are economically significant as well, as they imply that a one standard deviation increase in *Analyst coverage* is associated with decreases of 0.36, 0.35, 0.51, and 0.54 standard deviations in each of the respective bubble intensity measures. *Analyst coverage* is the most economically relevant explanatory variable in Columns (2), (6), and (8).[25]

4.1 Robustness checks

This subsection describes several tests to verify the robustness of Table III results.

Alternative window lengths. Table A.2 in Appendix A show that our results are robust to the changing the length of the windows over which our bubble intensity measures are constructed. In Panel 1 we change the length of the window used to define *Cumulative return* and *P/E ratio*. Instead of using the baseline 6-month period, we use 3-, 9-, and 12-month windows. We report the results of repeating regression columns (2) and (4) of Table III while using each of these three alternative window lengths. We find that *Analyst coverage* remains strongly statistically significant in all six regressions. In Panel 2 of Table A.2 we vary the length of the window over which *Announcement return* is defined. Instead of the baseline 5 trading days, we use 1, 2, 3, 4, or 10 trading days, as well as 1, 2, and 3 calendar months. We report results of repeating the regression on Columns (6) of Table III while using each of these eight alternative lengths. We find that *Analyst coverage* remains strongly statistically significant in all eight regressions.[26]

sities. As discussed previously, both *Cumulative return* and *P/E ratio* are presumably more affected by unobservable cross-sectional variation in fundamental values than *Announcement return.* The R-squared of a univariate regression explaining the first principal component of *Cumulative return* and *P/E ratio* only is 0.28.

[25] For all bubble intensity measures, *Analyst coverage* is an economically and statistically significant determinant regardless the combination of control variables included in the specification. In Table B.1 of Appendix B we report some of the intermediate specifications that include less than the full set of control variables.

[26] In order to save space, in Table A.2 we do not report the coefficients on the control variables. Please see Tables

I/B/E/S data. In Panel 1 of Table A.3 (Appendix A) we repeat the regressions in Columns (2), (4), (6), and (8) of Table III while replacing the Resset-derived *Analyst coverage* with *I/B/E/S analyst coverage*. We define *I/B/E/S analyst coverage* as the number of analysts issuing reports according to the I/B/E/S Chinese dataset, which is used by Chan and Hameed (2006), among others. Analyst coverage data on I/B/E/S is much less comprehensive than on Resset. Although 250 of our sample stocks have non-zero *I/B/E/S analyst coverage*, fully 453 stocks have non-zero *Analyst coverage.* For firms covered on both datasets, the mean *I/B/E/S analyst coverage* is only 2.76, compared to 12.27 for the Resset-derived *Analyst coverage*. The correlation between *I/B/E/S analyst coverage* and *Analyst coverage* is 0.78, however, and Panel 1 in Table A.3 shows that all of our conclusions are robust to using *I/B/E/S analyst coverage* rather than the more comprehensive *Analyst coverage* variable.

Outliers. Panel 2 of Table A.2 summarizes regressions addressing the concern that our results are driven by outliers in *Analyst coverage*. We repeat the regressions in Columns (2), (4), (6), and (8) of Table III while replacing the *Analyst coverage* variable by two dummy variables based on *Analyst coverage*. We define *Any coverage dummy* as an indicator variable set to one when *Analyst coverage* is greater than zero and set to zero otherwise, and similarly define *Many analysts dummy* based on whether the stock is followed by more than six brokerage firms (which is the median *Analyst coverage* for stocks with non-zero coverage). These two dummies partition firms in three groups: 170 stocks with *Analyst coverage* equal to zero, 227 stocks with *Analyst coverage* between 1 and 6, and 226 stocks with *Analyst coverage* greater than 6. Panel 2 shows that the two dummies are positive and statistically significant in all specifications, which confirms the results reported in Table III.

Alternative control variables. In Panel 3 of Table A.3 we summarize the results of adding a number of explanatory variables to our baseline specification. In the first specification we add the square and the cube of *Log of market capitalization*, as well as interactions between *Log of market capitalization* and the other seven control variables in Table III. These additions address concerns related to the potential nonlinear effect of market capitalization, as well as the possibility that the other control variables after the marginal effect of market capitalization. In the second specification we add *Share Float* (average number of tradable shares in the pre-tax-increase period, in billions). This is motivated by Hong, Scheinkman,

B.2 to B.6 in Appendix B for the full set of coefficients.

and Xiong (2006), who propose a theory in which bubble magnitudes are negatively related to a stock's float. In the third specification we add *Return volatility*, the average pre-tax-increase period daily log return squared. Scheinkman and Xiong's (2003) theory predicts larger bubbles in stocks with more volatile fundamentals, so we wish to control for the possibility that for some reason analysts are less likely to cover more volatile stocks.[27] In the next specification we add *Turnover trend*. This variable is calculated as the slope coefficient on a regression of daily turnover in the pre-tax-increase period on a time trend variable. This addresses the concern that turnover is non-stationary during the six-month reference period (see Figure 2), and hence that its population average is not well defined and may be misrepresented by the sample average. In the fifth specification we add *Number of trades per day*, an alternative measure of trading activity. In the sixth specification we add the loadings of three empirical factors constructed from daily returns, as discussed in footnote 18. In the last specification we include all of the additional explanatory variables. We find that *Analyst coverage* remains highly statistically and economically significant in all of the seven specifications in Panel 3.[28]

4.2 Addressing endogeneity concerns

The previous subsections document positive correlations between bubble intensity measures and *Analyst coverage*, and show that these correlations are robust to including a myriad of control variables. It is possible, however, that *Analyst coverage* is an endogenous regressor in our OLS specifications, which would make the coefficient estimates biased and inconsistent. In this section we address this concern in two different and complementary ways.

[27] There are two downsides to including stock return volatility as an explanatory variable. First, such volatility is mechanically linked to cumulative returns. Second, the volatility of stock returns is comprised of both the volatility of fundamentals and the volatility of the resale option in Scheinkman and Xiong's (2003a) theory of bubbles, and the volatility of the resale option is linked to the size of the bubble.

[28] The correlation between *Share float* and *Analyst coverage* is 0.42, while that between *Share float* and *Log of market capitalization* is 0.64. The correlation between *Daily turnover* and *Turnover trend* is 0.68. The correlation between *Loading on empirical factor 1* and *Market beta* is 0.72, and is the highest correlation between the two betas and the empirical factor loadings.

4.2.1 Lagged *Analyst coverage*

First, we address the possibility of reverse causality, namely, that brokerage firms choose to provide analyst coverage in stocks with lower bubble intensities. To do so, we use analyst coverage measured during 2005 rather than our original *Analyst coverage* variable, which is measured during the six-month reference period of November 29, 2006 to May 29, 2007. Because there were no signs of an asset pricing bubble in 2005 (see Figure 2),[29] using *Analyst coverage in 2005* mitigates concerns about reverse causality. The mean of *Analyst coverage in 2005* is 6.079, and its correlation with *Analyst coverage* measured in the pre-tax-increase period is 0.83. We argue that this high degree of correlation suggests that analyst coverage is not largely driven by the extent to which a stock is in a contemporaneous bubble. The downside of this approach, however, is that *Analyst coverage in 2005* does not as directly reflect the information environment during the bubble period as our original *Analyst coverage* variable.

TABLE IV

The first two specifications of Table IV report the results of regressing *Composite bubble measure*, our main measure of bubble intensity, on *Analyst coverage in 2005* rather than on *Analyst coverage.* The results show that *Analyst coverage in 2005* remains a statistically strong determinant of *Composite bubble measure* (t-statistics $= -8.48$ in the second specification). Even though its economic significance is reduced as expected, *Analyst coverage in 2005* remains the third most economically significant determinant of *Composite bubble measure*: a one SD change in *Analyst coverage in 2005* is associated with a 0.31 SD change in *Composite bubble measure.* Columns (1) through (3) of Table B.6 of Appendix B show that *Analyst coverage in 2005* remains statistically significant at the 1% level in the regressions explaining *Cumulative return, P/E ratio*, and *Announcement return.*

[29] The average return of our sample firms during 2005 was -10.2%.

4.2.2 Instrumental variables

We also use instrumental variable estimation (two-stage least squares) to address the potential endogeneity of *Analyst coverage*. Instrumental variable estimation addresses the possibility that analyst coverage proxies for a slow-moving "bubble-proneness" stock characteristic that is orthogonal to all of our control variables. As is often the case in financial economics, our analysis is subject to the caveat that there are no unequivocally clean sources of exogenous variation in *Analyst coverage*, our potentially endogenous regressor.[30]

We use two instruments for *Analyst coverage*: *Trading volume in 2005,* the average daily trading volume (in monetary terms) during 2005, and *Mutual fund ownership in June 2005*, the fraction of tradable shares owned by Chinese mutual funds in June 30, 2005.[31] Since brokerage firms earn commissions on stock trades, they have incentives to provide analyst services in stocks with higher trading volume in order to attract more trading business. Moreover, Chinese mutual funds are likely to be large clients of brokerage firms, and therefore brokerage firms may have incentives to provide analyst services in stocks more heavily owned by mutual funds. When we regress *Analyst coverage* on *Trading volume in 2005* and *Mutual fund ownership in June 2005,* both separately and in conjunction with all the remaining regressors, we find that the coefficients on both instruments are positive and statistically significant at the 1% level.[32] The strong significance of our instruments in the first stage regressions indicate that our estimation does not suffer from a weak instruments problem.

The last two columns of Table IV report the results of two-stage least squares estimation in which we use *Trading volume in 2005* and *Mutual fund ownership in June 2005* as instruments for *Analyst coverage.* Results in Column (4) show that *Analyst coverage* remains a strongly significant determinant of *Announcement return* in the instrumental variable estimation (t-statistic = -7.42). A one SD change in *Analyst coverage* is associated with a 0.60 SD change in *Announcement return*, which implies that *Analyst coverage* is the most

[30] The best way to address endogeneity concerns is to identify a natural experiment that causes an exogenous variation in analyst coverage, such as in Hong and Kacperczyk (forthcoming) and Kelly and Ljungqvist (2007). We are unaware of a natural experiment during our sample period that would allow us to take such an approach.

[31] Because these variables are measured during 2005, they are relatively unlikely to be economically correlated with 2007 bubble magnitudes. The mean *Trading volume in 2005* is 3.699 million yuan, and the mean *Mutual fund ownership in June 2005* is 7.28%.

[32] The results of the first-stage regressions are reported in Table B.7 of Appendix B.

economically significant cross-sectional determinant of bubble magnitudes in Column (4). The fact that we have two instruments for *Analyst coverage* allows us to perform the Sargan test of overidentifying restrictions. The null hypothesis of the test is that our instruments are uncorrelated with the residuals from the estimation equation, and therefore that the instrumental variable estimation is valid. We find that Sargan chi-square statistic of the regression in Column (4) is equal 1.050, associated to a p-value of 0.31, which is well above conventional significance levels.

Columns (4) through (7) of Table B.6 of Appendix B show that *Analyst coverage* remains statistically significant at the 1% level when instrumented by *Trading volume in 2005* and *Mutual fund ownership in June 2005* in two-stage least square regressions of *Cumulative return, P/E ratio*, and *Announcement return.*[33] Therefore, based on the results of instrumental variable estimations, we conclude that it is unlikely that our results are driven by an omitted, slow-moving bubble-proneness variable with which *Analyst coverage* is endogenously correlated.

4.3 Explaining the China-Hong Kong premium

In this subsection we perform regressions in which we use *China-HK premium* to measure bubble intensity, similar to Mei, Scheinkman, and Xiong (2009) and consistent with Chan, Kot, and Yang (2009). This analysis is limited to only the 23 stocks (from the broader sample of 623) that have twin shares traded in Hong Kong. We note that the small sample size reduces statistical power and reduces our ability to make solid inferences.[34]

Table V reports the results. Column (1) shows that *Analyst coverage* is negatively related to the China-Hong Kong premium, consistent with information dissemination reducing bubble

[33] In the Appendix B tables we present three additional set of results. In Tables B.8 and B.9 we present two-stage least squares regressions of *Cumulative return*, *P/E ratio*, *Announcement return*, and *Composite bubble measure* in which *Analyst coverage* is instrumented by one instrumental variable at a time (either *Trading volume in 2005* or *Mutual fund ownership in June 2005). Analyst coverage* remains statistically significant in all cases, except for the *P/E ratio* regression in which *Trading volume in 2005* is the sole instrumental variable. In Table B.10 we show that neither instrument (*Trading volume in 2005* and *Mutual fund ownership in June 2005*) is statistically significant when added to OLS regressions that include *Analyst coverage*.

[34] In addition to the small sample size concern, it is possible that inferences made with this sample may not be representative of the entire universe of Chinese stocks because the listing of firms in Hong Kong is not likely to be random. Yet another caveat is that the twin share premia may reflect information asymmetry as discussed by Chan, Menkveld, and Yang (2008).

magnitudes. Columns (2) and (3) show that the negative association between *Analyst coverage* and *China-HK premium* is robust to the inclusion of *Log of market capitalization* and *Daily turnover*.

TABLE V

Results in Columns (4) and (5) illustrate the limitations of pursuing statistical inference with a limited sample size. All explanatory variables are insignificant in Columns (4) and (5), and the adjusted R-square decreases from 0.40 in Column (3) to 0.29 in Column (4) and 0.18 in Column (5). However, we compute three formal information criteria (Akaike, Schwartz, and Bozdogan) and all three indicate that the specification in Column (3) is superior to those in Columns (4) and (5). Therefore, we conclude that the China-HK premium analysis is consistent with the analyses of the other bubble intensity metrics.

5 Information dissemination and dispersion of beliefs

Results in the previous section indicate that greater dissemination about asset fundamentals, as measured in our setting by a greater number of analysts following a stock, mitigates the formation of price bubbles. In light of the resale option theories of bubbles (Harrison and Kreps, 1978; Scheinkman and Xiong, 2003; Hong, Scheinkman, and Xiong, 2006), we conjecture that one channel by which information dissemination mitigates bubbles is through a reduction in the dispersion of beliefs across investors. It is not possible to directly test whether information dissemination is negatively related to dispersion of beliefs across investors because the latter is not directly observable. Therefore, in this section we explore two alternative ways to investigate whether the evidence is consistent with this particular bubble-abating channel.

5.1 Analysts' disagreement and bubble mitigation

First, if *Analyst coverage* mitigates bubbles because it reduces the dispersion of beliefs across investors, we should observe less bubble mitigation when there is higher dispersion of beliefs across analysts. To investigate, we construct the variable *Dispersion of analysts' forecasts*, defined as the standard deviation of 2007 earnings-per-share forecasts (scaled by stock prices at the end of the reference period, and normalized to have zero mean and unit variance).[35] The variable is defined only for a subsample of 367 firms with at least two analysts. We then include *Dispersion of analysts' forecasts* as well as its interaction with *Analyst coverage.* A negative coefficient on the interaction between *Analyst coverage* and *Dispersion of analysts' forecasts* would be consistent with *Analyst coverage* being less effective in mitigating bubbles when there is higher dispersion of analysts' forecasts. Table VI reports the results.[36]

TABLE VI

In Column (1) of Table VI, we observe that the strong positive association between *Analyst coverage* and *Composite bubble measure* continues to hold in a regression using the subsample of firms with at least two analysts. Column (2) shows that the coefficient on the interaction between *Analyst coverage* and *Dispersion of analysts' forecasts* is negative and statistically significant (t-statistic = 4.08), consistent with *Analyst coverage* having a weaker effect on bubble magnitudes when analysts' beliefs are less homogenous. The effect is economically significant: the 0.018 coefficient for the interaction term implies that a one standard deviation increase in *Dispersion of analysts' forecasts* reduces the bubble-mitigating impact of *Analyst coverage* from 0.072 to 0.054 (which is 0.072 minus 0.018). Note that *Analyst coverage* remains strongly statistically significant when the analyst dispersion variables are included in the regression. Column (3) shows that the conclusions from Column (2) still hold when all control variables are included in the regression. The t-statistic for the interaction term between *Analyst coverage* and *Dispersion of analysts' forecasts* is 2.95, and the effect remains economically significant, as coefficients imply that a one standard deviation increase in *Dispersion of analysts' forecasts* reduces the bubble-mitigating effect of *Analyst coverage*

[35] For each brokerage firm-stock pair, we use the last earnings forecast made during the pre-tax-increase period, scaled by the stock price at the date at which the forecast was made. We then normalize the dispersion variable (to zero mean and unit variance) in order to facilitate the interpretation of the magnitude of the interaction term that we include in the regression analysis we perform. Before the normalization, *Dispersion of analysts' forecasts* has mean equal to 1.25%, which is on the same order of magnitude as the average earnings per price ratio, and it has a standard deviation equal to 0.94%.

[36] Because we scale EPS forecasts by stock prices, it is possible that *Dispersion of analysts' forecasts* is mechanically related to bubbles, as stocks in larger bubbles would have higher prices (all else equal). However, such an association predicts a positive correlation between *Announcement return* and *Dispersion of analysts' forecasts*, whereas the correlation between these variables is -0.12.

from 0.059 to 0.045.

5.2 Turnover reduction

A second way to investigate whether greater information dissemination mitigates bubbles because it reduces the dispersion of investors' beliefs is by using trading activity (i.e., turnover) as a proxy for the dispersion of investors' beliefs. Trading activity is positively related to belief dispersion not only in Scheinkman and Xiong's (2003) theory of bubbles, but also in several other theories.[37] In Columns (4)-(6) of Table VI we regress *Turnover* on *Analyst coverage* and other explanatory variables.

The results reported in Column (4) show that, consistent with greater information dissemination reducing the dispersion of investors' beliefs, *Analyst coverage* is negatively correlated with *Daily turnover* (t-statistic = -12.02). Following the same logic of our earlier Table VI *Composite bubble measure* regressions, we expect the turnover-reducing effect of *Analyst coverage* to be weaker when there is higher dispersion of analysts' beliefs. Column (5) shows that the coefficient on the interaction term between *Analyst coverage* and *Turnover* is positive as expected, and statistically significant at the 1% level (t-statistic = 2.60). The effect is also economically significant, as the 0.020 coefficient on the interaction term implies that a one standard deviation increase in *Daily turnover* is associated with a reduction in the turnover-abating effect of *Analyst coverage* from 0.083 to 0.063. Note that *Analyst coverage* remains strongly statistically significant.

Column (6) shows that the conclusions hold after including a myriad of control variables in the *Turnover* regression. The coefficients on *Analyst coverage* and its interaction with *Dispersion of analysts' forecasts* remain significant at the 1% level (t-statistics are -4.28 and 2.69, respectively).[38] We also observe that *Analyst coverage* is an economically significant

[37] See, for example, Varian (1989), Harris and Raviv (1993), Shalen (1993), Kandel and Pearson (1995), Odean (1998), Hong and Stein (2003), and Cao and Ou-Yang (2009). However, work by Lo and Wang (2000) implies that cross-sectional differences in turnover do not entirely reflect cross-sectional differences in the dispersion of investors' beliefs. Lo and Wang (2000) show that turnover is identical across securities if and only if two-fund separation holds. If (K+1)-fund separation holds, then turnover satisfies an approximate K-factor linear structure. Cremers and Mei (2007) find four to five systematic factors in the firm-level turnover of U.S. stocks.

[38] As noted before, because of our use of the *Dispersion of analysts' forecasts* variable, this analysis is limited to a subsample of 367 stocks with *Analyst coverage* of 2 or more. In Table B.11 of Appendix B we present *Turnover* regressions for the full sample of 623 stocks. These regressions show that the greater *Analyst coverage* is associated

determinant of *Turnover* in Column (6). Holding *Dispersion of analysts' forecasts* constant at its mean value of zero, a one SD increase in *Analyst coverage* reduces *Daily turnover* by 0.20 SD. The magnitude of the coefficients in Column (6), however, suggest that greater *Analyst coverage* may not reduce turnover when *Dispersion of analysts' forecasts* is extreme (when *Dispersion of analysts' forecasts* is more than $0.035 \div 0.016 = 2.2$ standard deviations above its mean of zero).

In summary, the results in Table VI provide evidence consistent with greater information dissemination reducing bubble intensity through a reduction in the dispersion of beliefs across investors. This is consistent with the resale option theories of Harrison and Kreps (1978), Scheinkman and Xiong (2003), and Hong, Scheinkman, and Xiong (2006). On the basis of these results, however, we cannot rule out the possibility that greater information dissemination about asset fundamentals also mitigates bubbles by reducing investors' over-optimism.

6 Conclusion

We study the role of dissemination about asset fundamentals in the formation of asset price bubbles. We focus on the Chinese stock market of 2007, which offers a unique setting for the study of asset pricing bubbles. As of 2007, the Chinese market not only had institutional characteristics that are conducive to asset pricing bubbles, but also displayed classic features of a bubble, and was said to be in a bubble by several prominent observers at the time. This setting allows us to construct five different firm-specific measures of bubble intensity, including non-standard measures that are less likely to be affected by unobservable cross-sectional variation in fundamental values.

Regardless of the bubble intensity measure we use, we find smaller bubbles in stocks with greater dissemination of information about fundamentals, as measured by the number of professional analysts following the stock. The results are robust to including a myriad of control variables, as well as addressing concerns about analyst coverage being an endogenous regressor. We also present evidence consistent with greater information dissemination

with lower *Turnover*, and the effect is statistically and economically significant.

mitigating bubbles through a reduction in the dispersion of beliefs across investors, which in turn is consistent with resale option theories of bubbles in Harrison and Kreps (1978), Scheinkman and Xiong (2003), and Hong, Scheinkman, and Xiong (2006).

To the extent that dissemination of information about asset fundamentals is a public good and thus tends to be underprovided in a laissez faire setting, our results suggest that policy makers concerned with mitigating asset price bubbles should encourage dissemination of information about asset fundamentals. As argued by Daniel, Hirshleifer, and Teoh (2002), regulating disclosure by firms and by information intermediaries may make asset prices more efficient providers of signals for resource allocation in an economy.

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Figure 1. Cumulative return (%) over previous six months

Uses rolling 6-month windows and value-weighted returns on all stocks in the Shanghai Stock Exchange.

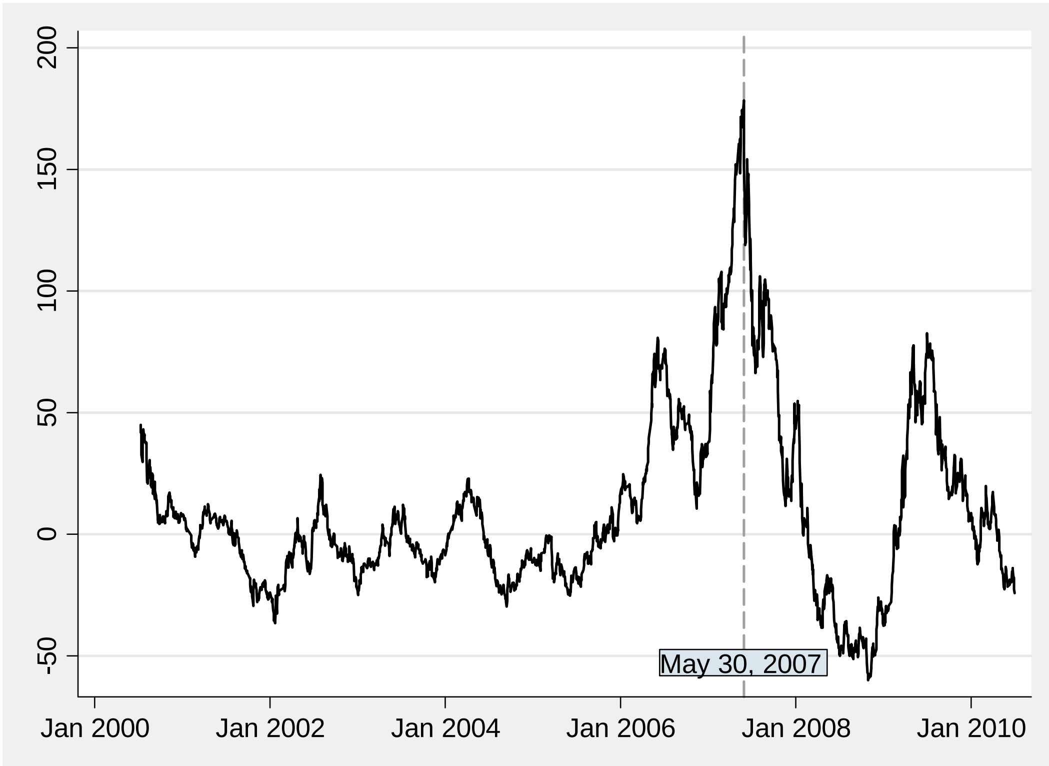


Figure 2. P/E ratio and annualized turnover.

The figure plots medians across stocks in a sample 623 A-shares in the Shanghai Stock Exchange. The P/E ratio uses 12-month trailing earnings which are updated when there are earnings announcements. We use the five-day moving average of the annualized turnover.

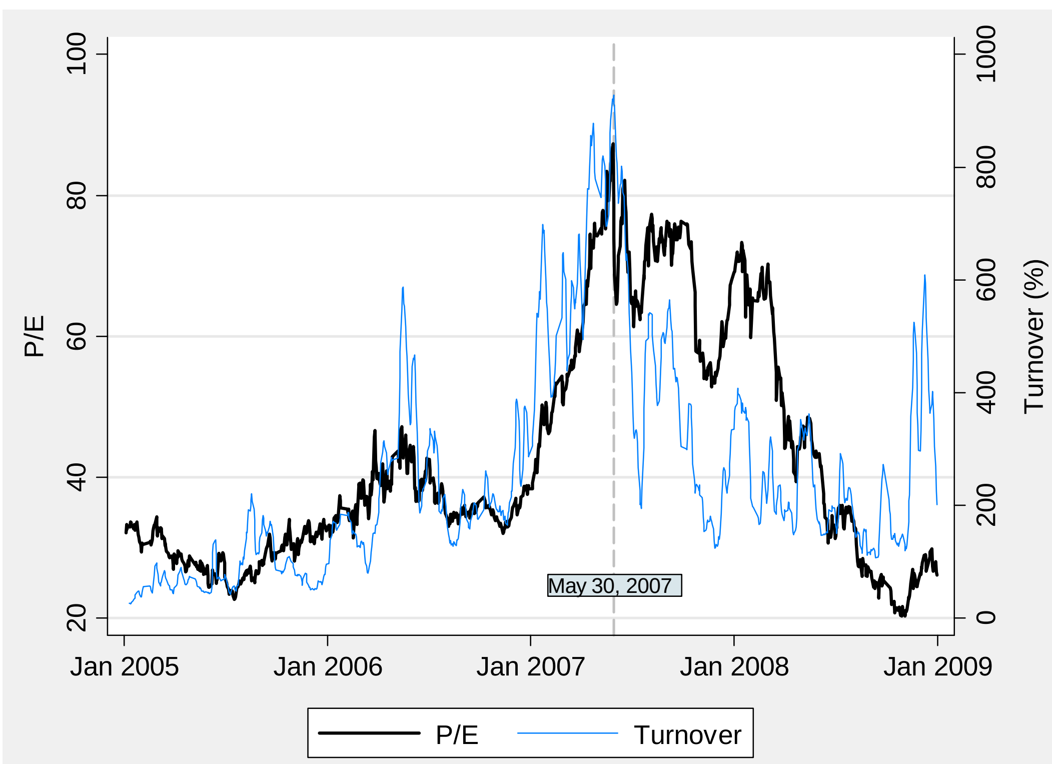


Figure 3. Index of Google searches from China for “stock” or “stock market” (in Chinese) and number of new individual Shanghai A-share trading accounts.
The former has weekly data from Google Insights for Search and the latter has monthly data from the Shanghai Stock Exchange.

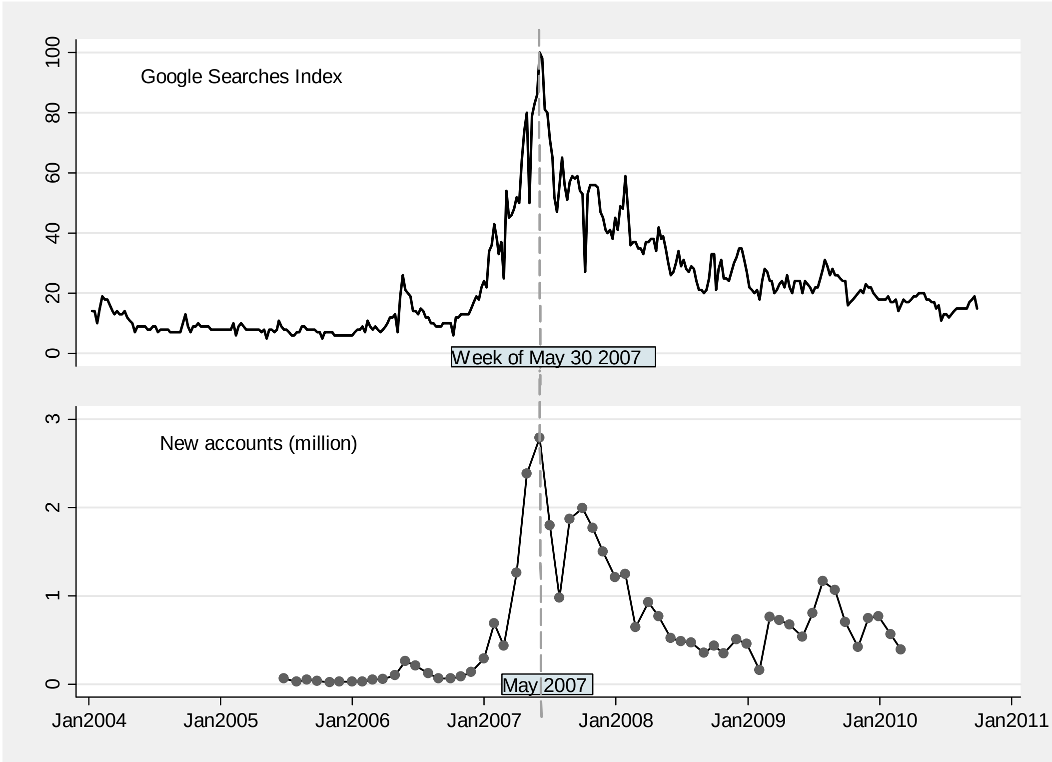
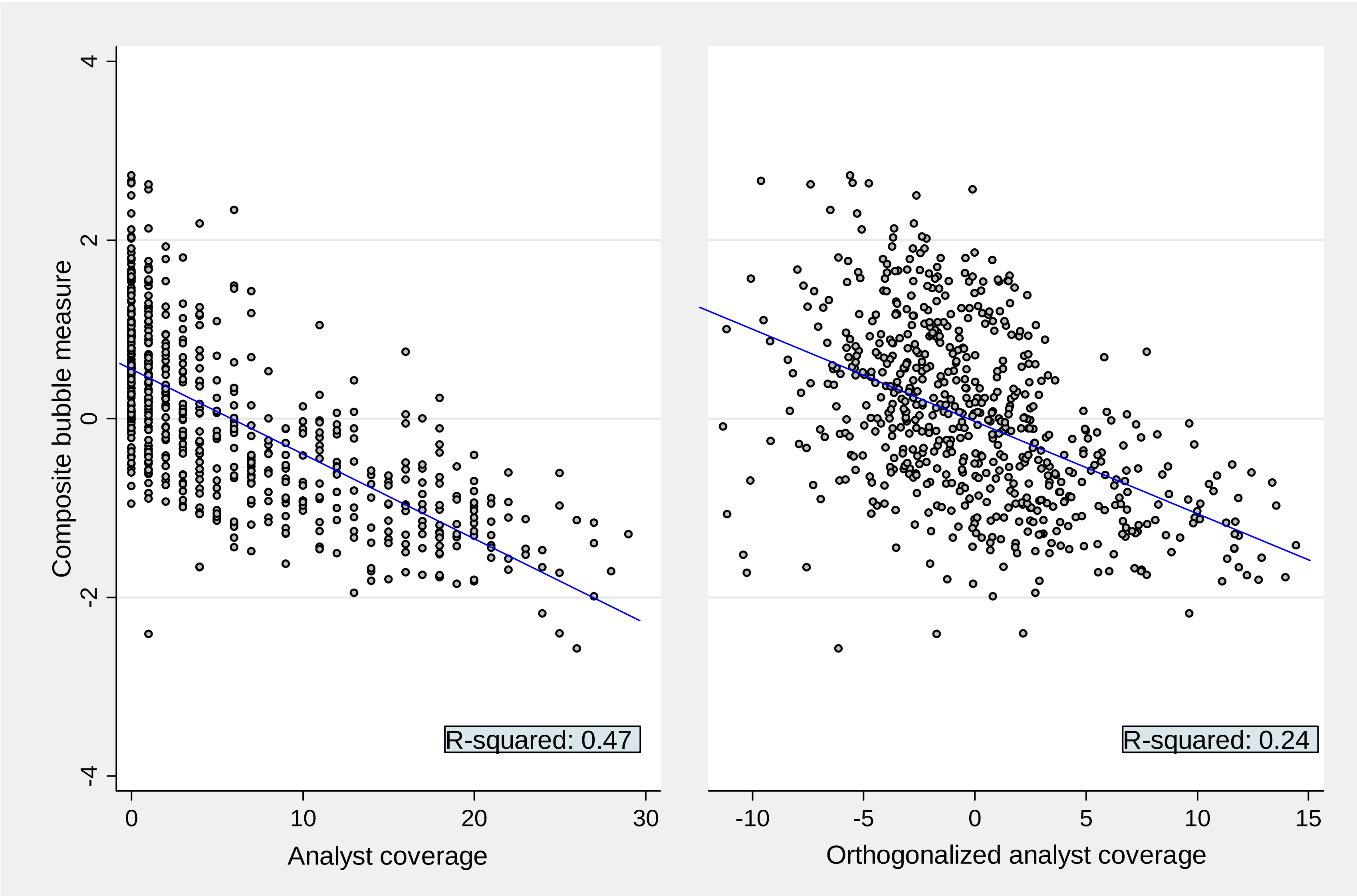


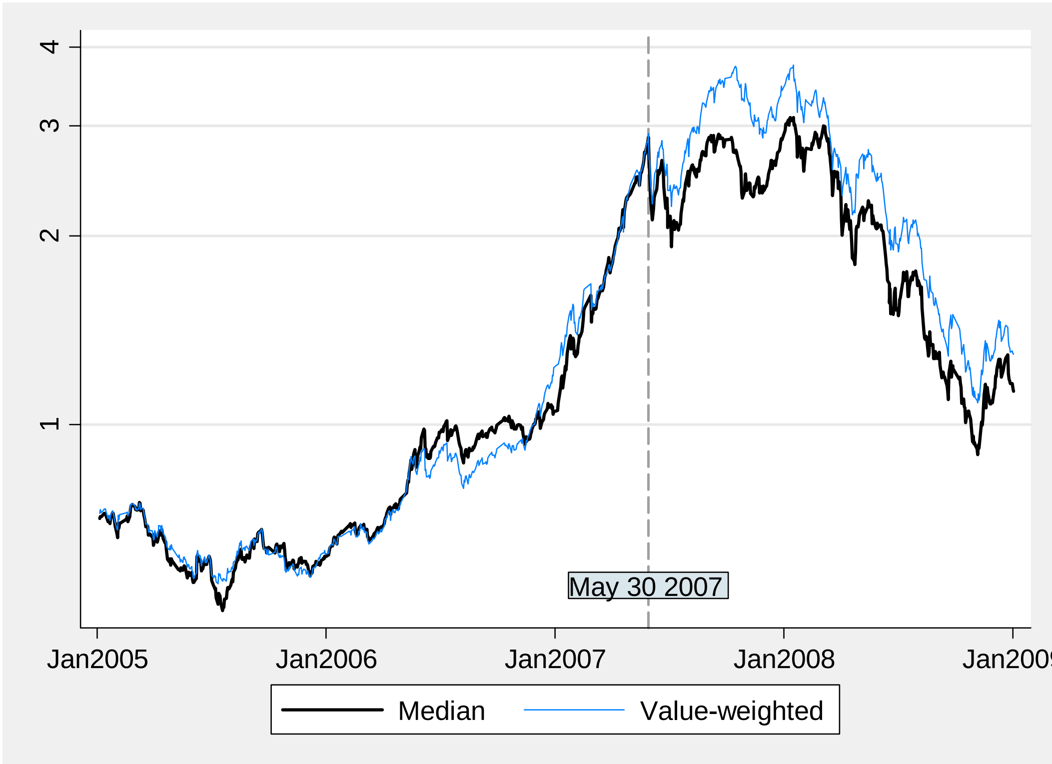
Figure 4. Composite bubble measure vs. Analyst coverage or Analyst coverage orthogonalized with respect to log of market cap

The *Composite bubble measure* is the first principal component of *Cumulative return*, *P/E ratio*, and *Announcement return*. The sample has 623 A-shares in the Shanghai Stock Exchange.



Appendix Figure 1. Price Level Index

The plot shows cumulative returns in the Shanghai Stock Exchange. Returns in each stock are accumulated from January 2005 to January 2009. Both the median and the value-weighted indexes are normalized to 1 in November 28 2006. The graph is in log scale so that distances are proportional to cumulative returns. The figure sample 623 A-shares.



Appendix Figure 2. Price-Earnings ratio

The P/E ratio uses 12-month trailing earnings which are updated when there are earnings announcements. The sample has 623 A-shares in the Shanghai Stock Exchange.

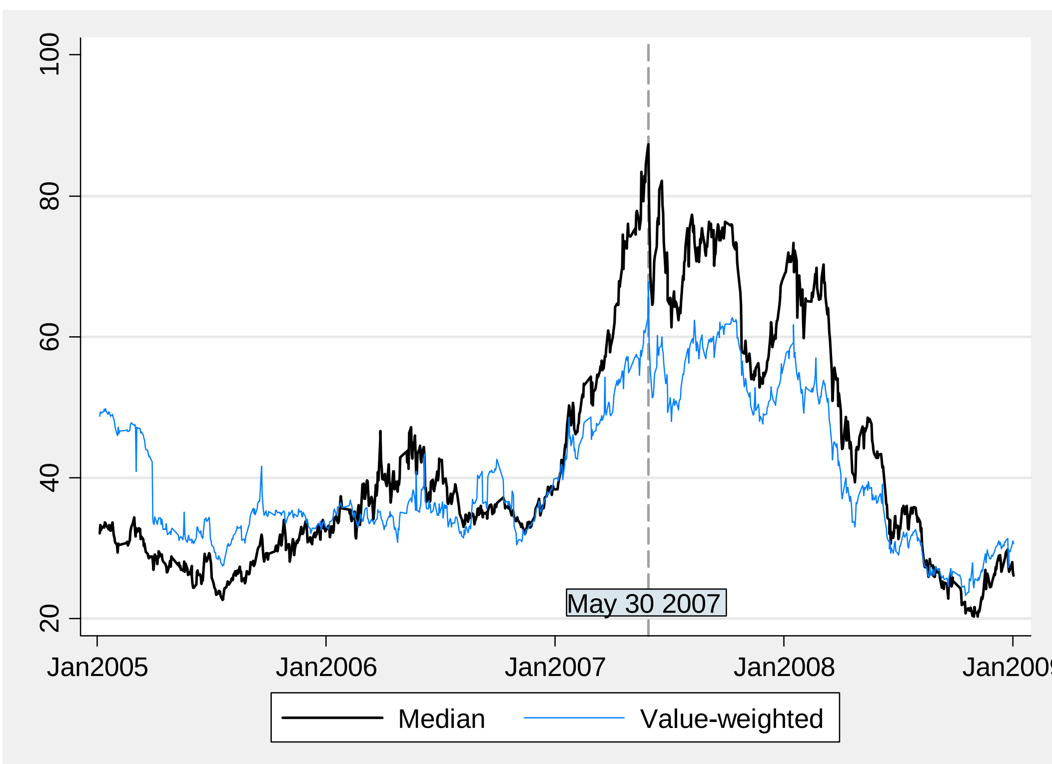


Table I. Summary statistics

This table reports summary statistics for the main variables in the study. The sample consists of 623 Shanghai A-shares, selected by requiring that shares be traded in at least 90% of the trading days in the six-month reference period of November 29, 2006 to May 29, 2007. Unless otherwise noted, all variables are averages across the reference period, calculated from daily data. *Cumulative return* is the cumulative return during the reference period. *P/E ratio* is the price-earnings ratio using quarterly earnings over the most recent 12 months relative to each day's calculation, using only public information. *P/E ratio* is capped at 250, and a P/E ratio equal to 250 is assigned when stocks have negative earnings. *Announcement return* is the five-day cumulative return beginning on the day the security tax change was both announced and enacted (May 30, 2007). *Composite bubble measure* is the first principal component of *Cumulative return*, *P/E ratio*, and *Announcement return,* normalized to have mean zero and variance equal to 1. *China-HK premium* is the ratio of the price in China divided by the exchange-rate-adjusted price in Hong-Kong, minus one, for a subsample of 23 dual-listed stocks. *Analyst coverage* is the number of brokerage firms issuing earnings-per-share forecasts during the reference period. *Market capitalization* is the stock price times the number of tradable shares. *Turnover* is the number of shares traded divided by the total number of tradable shares. *Effective spread* is the average of twice the difference between the transaction price and mid-point, divided by the midpoint. *Depth* is the average of one half times the sum of the monetary quantities associated with the best bid and best ask offers. *ΔTurnover* and *ΔEffective spread* are defined as the averages in the six-month post-tax-increase period of May 31, 2007 to November 30, 2007 minus the average in the six-month pre-tax-increase reference period. *Market beta* and *Liquidity beta*, respectively, are the coefficients on the value-weighted market return and on an aggregate liquidity factor in a regression of daily stock returns, where the aggregate liquidity factor is defined as the daily innovation on the average effective spread across all stocks.

	Mean	Median	Standard Deviation
Cumulative return (%)	204.4	187.6	95.2
P/E ratio	96.7	59.7	77.7
Announcement return	-23.9	-25.2	10.4
Composite bubble measure	0.000	-0.065	1.000
China-HK premium (%)	66.200	37.7	63.400
Analyst coverage	6.07	3.00	7.07
Market capitalization (billions of yuans)	11.92	2.84	70.54
Log of market capitalization	1.271	1.045	1.077
Turnover (daily, in %)	2.700	2.716	1.239
Effective spread (bp)	20.65	20.00	5.45
Depth (millions of yuans)	0.256	0.172	0.450
Market beta	0.963	0.984	0.218
Liquidity beta	-0.116	-0.129	0.295
ΔTurnover (daily, in %)	-0.697	-0.641	0.638
ΔEffective spread (bp)	-1.519	-1.598	4.306

Table II. Correlation matrix

This table reports correlation coefficients between the main variables of this study. The sample consists of 623 Shanghai A-shares, selected by requiring that shares be traded in at least 90% of the trading days in the six-month reference period of November 29, 2006 to May 29, 2007. Unless otherwise noted, all variables are averages across the reference period, calculated from daily data. *Cumulative return* is the cumulative return during the reference period. *P/E ratio* is the price-earnings ratio using quarterly earnings over the most recent 12 months relative to each day's calculation, using only public information. *P/E ratio* is capped at 250, and a P/E ratio equal to 250 is assigned when stocks have negative earnings. *Announcement return* is the five-day cumulative return beginning on the day the security tax change was both announced and enacted (May 30, 2007). *Composite bubble measure* is the first principal component of *Cumulative return*, *P/E ratio*, and *Announcement return,* normalized to have mean zero and variance equal to 1. *China-HK premium* is the ratio of the price in China divided by the exchange-rate-adjusted price in Hong-Kong, minus one, for a subsample of 23 dual-listed stocks. *Analyst coverage* is the number of brokerage firms issuing earnings-per-share forecasts in the reference period. *Market capitalization* is the stock price times the number of tradable shares. *Turnover* is the number of shares traded divided by the total number of tradable shares. *Effective spread* is the average of twice the difference between the transaction price and mid-point, divided by the midpoint. *Depth* is the average of one half times the sum of the monetary quantities associated with the best bid and best ask offers. *ΔTurnover* and *ΔEffective spread* are defined as the averages in the six-month post-tax-increase period of May 31, 2007 to November 30, 2007 minus the average in the six-month pre-tax-increase reference period. *Market beta* and *Liquidity beta*, respectively, are the coefficients on the value-weighted market return and on an aggregate liquidity factor in a regression of daily stock returns, where the aggregate liquidity factor is defined as the daily innovation on the average effective spread across all stocks.

	Compos. bubble measure	Cumul. return	P/E ratio	Announ. return	China-HK premium	Analyst coverage	Log of market capita-lization	Turnover	Effective spread	Depth	Market beta	Liquidity beta	ΔTurnover	ΔEffect. spread
Composite bubble measure	1													
Cumulative return	0.721	1												
P/E ratio	0.759	0.316	1											
Announcement return	-0.770	-0.338	-0.382	1										
China-HK premium	0.684	0.482	0.679	-0.481	1									
Analyst coverage	-0.684	-0.400	-0.453	0.679	-0.691	1								
Log of market capitalization	-0.484	-0.186	-0.346	0.547	-0.499	0.754	1							
Turnover	0.506	0.353	0.264	-0.518	0.434	-0.514	-0.504	1						
Effective spread	0.516	0.349	0.517	-0.295	0.225	-0.418	-0.443	0.057	1					
Depth	-0.137	-0.056	-0.086	0.163	-0.270	0.342	0.575	-0.097	-0.073	1				
Market beta	-0.047	0.127	-0.237	-0.013	-0.261	0.111	0.195	0.196	-0.349	0.096	1			
Liquidity beta	0.053	0.169	-0.054	-0.012	-0.380	0.099	0.213	0.004	-0.050	0.217	0.529	1		
ΔTurnover	-0.138	-0.071	-0.059	0.179	-0.348	0.116	0.155	-0.632	0.082	-0.015	-0.161	0.030	1	
ΔEffective spread	-0.286	-0.488	-0.114	0.058	0.194	0.029	-0.197	-0.071	-0.323	-0.186	-0.108	-0.157	-0.168	1

Table III. Regressions explaining bubble intensity measures

This table reports ordinary least squares regressions that explain four stock-level bubble intensity measures. The sample consists of 623 Shanghai A-shares, selected by requiring that shares be traded in at least 90% of the trading days in the six-month reference period of November 29, 2006 to May 29, 2007. Unless otherwise noted, all variables are averages across the reference period, calculated from daily data. *Cumulative return* is the cumulative return during the reference period. *P/E ratio* is the price-earnings ratio using quarterly earnings over the most recent 12 months relative to each day's calculation, using only public information. *P/E ratio* is capped at 250, and a P/E ratio equal to 250 is assigned when stocks have negative earnings. *Announcement return* is the five-day cumulative return beginning on the day the security tax change was both announced and enacted (May 30, 2007). *Composite bubble measure* is the first principal component of *Cumulative return*, *P/E ratio*, and *Announcement return,* normalized to have mean zero and variance equal to 1. *Analyst coverage* is the number of brokerage firms issuing earnings-per-share forecasts during the reference period. *Market capitalization* is the stock price times the number of tradable shares. *Turnover* is the number of shares traded divided by the total number of tradable shares. *Effective spread* is the average of twice the difference between the transaction price and mid-point, divided by the midpoint. *Depth* is the average of one half times the sum of the monetary quantities associated with the best bid and best ask offers. *ΔTurnover* and *ΔEffective spread* are defined as the averages in the six-month post-tax-increase period of May 31, 2007 to November 30, 2007 minus the average in the six-month pre-tax-increase reference period. *Market beta* and *Liquidity beta*, respectively, are the coefficients on the value-weighted market return and on an aggregate liquidity factor in a regression of daily stock returns, where the aggregate liquidity factor is defined as the daily innovation on the average effective spread across all stocks. *Industry effects* are dummy variables based on thirteen industries defined by the China Securities Regulatory Commission (CSRC). We report heteroskedasticity-robust t-statistics in parentheses beneath variable coefficients, and ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Dependent Variable							
	Cumulative return		P/E ratio		Announcement return		Composite bubble measure	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Analyst coverage	-5.392 ***	-4.781 ***	-4.986 ***	-3.838 ***	0.997 ***	0.754 ***	-0.097 ***	-0.077 ***
	(-13.37)	(-7.88)	(-15.86)	(-6.60)	(21.46)	(10.19)	(-26.86)	(-12.53)
Log of market capitalization		30.028 ***		33.287 ***		0.551		0.303 ***
		(4.22)		(5.63)		(0.82)		(4.84)
Turnover		23.721 ***		24.582 ***		-2.140 ***		0.342 ***
		(4.87)		(5.79)		(-4.84)		(8.35)
Effective spread		4.425 ***		7.689 ***		-0.101		0.069 ***
		(5.06)		(7.84)		(-1.13)		(6.90)
Depth		-29.301 ***		-24.348 ***		-2.041 ***		-0.182 ***
		(-4.73)		(-4.07)		(-3.23)		(-3.27)
Market beta		21.815		-46.176 ***		-1.257		-0.114
		(1.09)		(-2.91)		(-0.68)		(-0.70)
Liquidity beta		33.532 ***		10.219		-1.806		0.289 **
		(2.60)		(0.99)		(-1.32)		(2.54)
ΔTurnover		5.963		15.316 **		-0.867		0.153 **
		(0.88)		(2.49)		(-1.24)		(2.48)
ΔEffective spread		-6.744 ***		2.947 ***		-0.062		-0.010
		(-6.18)		(2.86)		(-0.64)		(-1.02)
Industry effects	no	yes	no	yes	no	yes	no	yes
Constant	237.1 ***		127.0 ***		-30.0 ***		0.588 ***	
	(47.42)		(30.17)		(-77.13)		(14.24)	
Observations	623	623	623	623	623	623	623	623
Adjusted-R^2	0.16	0.46	0.20	0.41	0.46	0.52	0.46	0.63

Table IV. Robustness regressions addressing endogeneity

This table reports ordinary least squares and two-stage least square (2SLS) regressions that explain *Composite bubble measure* for a sample of 623 Shanghai A-shares. The 2SLS regressions use *Trading volume in 2005* (average daily trading volume in 2005) and *Mutual fund ownership in June/2005* (the percent of tradable shares owned by mutual funds at the end of June/2005) as instruments for *Analyst coverage*. Unless otherwise noted, all variables are averages across the six-month reference period of November 29, 2006 to May 29, 2007, calculated from daily data. *Composite bubble measure* is the first principal component of *Cumulative return*, *P/E ratio*, and *Announcement return,* normalized to have mean zero and variance equal to 1. *Analyst coverage* is the number of brokerage firms issuing earnings-per-share forecasts during the reference period. *Market capitalization* is the stock price times the number of tradable shares. *Turnover* is the number of shares traded divided by the total number of tradable shares. *Effective spread* is the average of twice the difference between the transaction price and mid-point, divided by the midpoint. *Depth* is the average of one half times the sum of the monetary quantities associated with the best bid and best ask offers. *ΔTurnover* and *ΔEffective spread* are defined as the averages in the six-month post-tax-increase period of May 31, 2007 to November 30, 2007 minus the average in the six-month pre-tax-increase reference period. *Market beta* and *Liquidity beta*, respectively, are the coefficients on the value-weighted market return and on an aggregate liquidity factor in a regression of daily stock returns, where the aggregate liquidity factor is defined as the daily innovation on the average effective spread across all stocks. *Industry effects* are dummy variables based on thirteen industries defined by the China Securities Regulatory Commission (CSRC). We report heteroskedasticity-robust t-statistics in parentheses beneath variable coefficients, and ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Ordinary least squares		Two-stage least squares	
Dep. Var.: Composite bubble measure	(1)	(2)	(3)	(4)
Analyst coverage in 2005	-0.082 ***	-0.045 ***		
	(-19.29)	(-8.48)		
Analyst coverage			-0.093 ***	-0.085 ***
			(-18.30)	(-7.42)
Log of market capitalization		0.141 **		0.339 ***
		(2.29)		(4.35)
Turnover		0.413 ***		0.331 ***
		(9.62)		(7.96)
Effective spread		0.070 ***		0.068 ***
		(6.32)		(7.03)
Depth		-0.254 ***		-0.187 ***
		(-3.39)		(-3.38)
Market beta		-0.176		-0.109
		(-0.97)		(-0.69)
Liquidity beta		0.331 ***		0.286 ***
		(2.81)		(2.58)
ΔTurnover		0.211 ***		0.143 **
		(3.31)		(2.33)
ΔEffective spread		-0.021 *		-0.009
		(-1.91)		(-0.89)
Industry effects	no	yes	no	yes
Constant	0.503 ***		0.564 ***	
	(10.65)		(12.32)	
Observations	623	623	623	623
Adjusted-R^2	0.31	0.57	0.46	0.53

Table V. Regressions explaining the China-Hong Kong premium of dual-listed stocks

This table reports ordinary least squares regressions that explain *China-HK premium* for a subsample of 23 stocks with dual trading in Shanghai and in Hong Kong. Unless otherwise noted, all variables are averages across the six-month reference period of November 29, 2006 to May 29, 2007, calculated from daily data. *Cumulative return* is the cumulative return during the reference period. *China-HK premium* is the ratio of the price in China divided by the exchange-rate-adjusted price in Hong-Kong, minus one. *Analyst coverage* is the number of brokerage firms issuing earnings-per-share forecasts during the reference period. *Market capitalization* is the stock price times the number of tradable shares. *Turnover* is the number of shares traded divided by the total number of tradable shares. *Effective spread* is the average of twice the difference between the transaction price and mid-point, divided by the midpoint. *Depth* is the average of one half times the sum of the monetary quantities associated with the best bid and best ask offers. *ΔTurnover* and *ΔEffective spread* are defined as the averages in the six-month post-tax-increase period of May 31, 2007 to November 30, 2007 minus the average in the six-month pre-tax-increase reference period. *Market beta* and *Liquidity beta*, respectively, are the coefficients on the value-weighted market return and on an aggregate liquidity factor in a regression of daily stock returns, where the aggregate liquidity factor is defined as the daily innovation on the average effective spread across all stocks. *Industry effects* are dummy variables based on thirteen industries defined by the China Securities Regulatory Commission (CSRC). We report heteroskedasticity-robust t-statistics in parentheses beneath variable coefficients, and ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Dependent Variable: China-HK premium	(1)	(2)	(3)	(4)	(5)
Analyst coverage	-6.015 ***	-6.182 **	-6.238 *	-4.851	-4.688
	(-4.31)	(-2.71)	(-1.93)	(-0.99)	(-0.91)
Log of market capitalization		0.975	0.846	-6.588	-4.314
		(0.11)	(0.11)	(-0.35)	(-0.17)
Daily turnover			-1.233	12.105	11.351
			(-0.05)	(0.33)	(0.16)
Effective spread				-1.378	-0.629
				(-0.54)	(-0.26)
Depth				2.542	1.275
				(0.24)	(0.10)
Market beta				-98.724	-96.45
				(-1.06)	(-0.88)
Liquidity beta				26.818	23.002
				(0.51)	(0.39)
ΔTurnover					-4.842
					(-0.05)
ΔEffective spread					2.293
					(0.42)
Constant	163.7 ***	163.0 ***	165.6 **	271.4 *	255.4
	(5.55)	(5.47)	(2.29)	(1.82)	(1.42)
Observations	23	23	23	23	23
Adjusted-R^2	0.45	0.43	0.40	0.29	0.18

Table VI. Regressions including interactions with the dispersion of analysts' forecasts

This table reports ordinary least squares regressions that explain *Composite bubble measure* and *Turnover* for a subsample of 367 Shanghai A-shares that are followed by at least two analysts. Unless otherwise noted, all variables are averages across the six-month reference period of November 29, 2006 to May 29, 2007, calculated from daily data*.* *Composite bubble measure* is the first principal component of *Cumulative return*, *P/E ratio*, and *Announcement return,* normalized to have mean zero and variance equal to 1. *Analyst coverage* is the number of brokerage firms issuing earnings-per-share forecasts during the reference period. *Market capitalization* is the stock price times the number of tradable shares. *Turnover* is the number of shares traded divided by the total number of tradable shares. *Effective spread* is the average of twice the difference between the transaction price and mid-point, divided by the midpoint. *Depth* is the average of one half times the sum of the monetary quantities associated with the best bid and best ask offers. *ΔTurnover* and *ΔEffective spread* are defined as the averages in the six-month post-tax-increase period of May 31, 2007 to November 30, 2007 minus the average in the six-month pre-tax-increase reference period. *Market beta* and *Liquidity beta*, respectively, are the coefficients on the value-weighted market return and on an aggregate liquidity factor in a regression of daily stock returns, where the aggregate liquidity factor is defined as the daily innovation on the average effective spread across all stocks. *Industry effects* are dummy variables based on thirteen industries defined by the China Securities Regulatory Commission (CSRC). We report heteroskedasticity-robust t-statistics in parentheses beneath variable coefficients, and ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Dependent Variable					
	Composite bubble measure			Turnover		
	(1)	(2)	(3)	(4)	(5)	(6)
Analyst coverage	-0.074 ***	-0.072 ***	-0.059 ***	-0.085 ***	-0.083 ***	-0.035 ***
	(-15.90)	(-15.61)	(-8.35)	(-12.02)	(-11.53)	(-4.28)
Dispersion of analysts' forecasts		-0.064	-0.085 **		0.089	0.042
		(-1.62)	(-2.28)		(1.43)	(0.77)
Analyst cov. * Dispersion of anal. forec.		0.018 ***	0.014 ***		0.020 ***	0.016 ***
		(4.08)	(2.95)		(2.60)	(2.69)
Log of market capitalization			0.200 ***			-0.742 ***
			(3.14)			(-10.68)
Turnover			0.317 ***			
			(5.21)			
Effective spread			0.034 ***			-0.083 ***
			(3.41)			(-8.93)
Depth			-0.115 **			0.720 ***
			(-2.47)			(3.85)
Market beta			-0.171			0.766 ***
			(-0.77)			(2.69)
Liquidity beta			0.133			0.158
			(1.03)			(0.86)
ΔTurnover			0.050			
			(0.54)			
ΔEffective spread			-0.031 ***			
			(-2.64)			
Industry effects	no	no	yes	no	no	yes
Constant	0.376 ***	0.231 ***		3.181 ***	3.155 ***	
	(3.78)	(3.51)		(32.27)	(32.26)	
Observations	367	367	367	367	367	367
Adjusted-R^2	0.38	0.40	0.56	0.24	0.28	0.54

<u>APPENDIX A</u> Table A.1. Brokerage firms providing EPS forecasts in the Resset database

The table lists the 48 Chinese brokerage firms providing earnings-per-share forecasts for the sample stocks during the six-month reference period (November 29, 2006 to May 29, 2007), according to the Resset database. We report the total number of sample firms covered by each brokerage firm. The total number of covered firms across all brokerage firms is 3,782, and hence the sample average of the variable *Analyst coverage* used in the study is 3,782/623=6.071

Brokerage firm	Number of covered firms
Anxin Securities	24
BOC International	90
Bohai Securities	16
Capitalcare Securities	1
Central China Securities Holdings	54
Century Securities	14
Changjiang Securities	140
China Galaxy Securities	78
China International Capital Corporation	144
China Merchants Securities	220
China Minzu Securities	8
China National Investment	193
China Southwest Securities	42
Citic Construction Securities	181
Citic Securities Company	193
Dongguan Securities	14
Everbright Securities	160
Firstcapital Securities	9
Fortune Securities	16
Gaohua Securities	3
Gf Securities	101
Golden Sun Securities	3
Goldstate Securities	26
Gongdong Securities	1
Great Wall Securities	87
Guodu Securities	106
Guojin Securities	95
Guolian Securities	9
Guotai Junan Securities	204
Guoxin Securities	136
Guoyuan Securities	10
Haitong Securities Company	164
Huatai Securities	131
Huaxi Securities	48
Industrial Securities	129
Jiangnan Securities	3
Kaiji Securities	38
Masterlink Securities	16
Nanjing Securities	1
Northeastern Securities	8
Orient Securities Company	134
Ping An Securities Company	140
Sealand Securities	33
Shandong Qilu Securities Broking	14
Shanghai Securities	169
Shenyin & Wanguo Securities	236
United Securities	122
Zhejiang Securities	18

APPENDIX A Table A.2. Using different time windows

This table summarizes results of regressions using different time windows to define *Cumulative return*, *P/E ratio*, and *Announcement return*. Panel A reports regressions of *Cumulative return* and *P/E ratio* defined over 3-, 9-, and 12-month windows ending in May 29, 2007, as opposed to the 6-month window of our baseline results in Table III. Panel B reports regressions of *Announcement return* calculated over windows consisting of one, two, three, four, and ten trading days, as well as one, two, and three calendar months following the May 30, 2007 tax increase announcement, as opposed to the 5-trading day window of our baseline results in Table III. We use Tobit regressions for short windows (4 days or less), and OLS regressions for longer windows. The sample consists of 623 Shanghai A-shares, selected by requiring that shares be traded in at least 90% of the trading days in the six-month reference period of November 29, 2006 to May 29, 2007. *Analyst coverage* is the number of brokerage firms issuing earnings-per-share forecasts during the reference period. The regressions include, but we do not report below, all of the other explanatory variables included in Table III. We report heteroskedasticity-robust t-statistics in parentheses beneath variable coef ficients, and ***, **, * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel 1: Define Announcement return using different windows

	Measurement Window					
	3 months		9 months		12 months	
	Dep. Var.		Dep. Var.		Dep. Var.	
	Cum. return	P/E ratio	Cum. return	P/E ratio	Cum. return	P/E ratio
Analyst coverage	-2.762 ***	-4.077 ***	-3.830 ***	-3.924 ***	-3.998 ***	-3.827 ***
	(-7.52)	(-7.28)	(-5.35)	(-6.49)	(-3.30)	(-6.35)
Other expl. variables in Table III	yes	yes	yes	yes	yes	yes
Observations	367	367	367	367	367	367
Adjusted-R^2	0.42	0.45	0.35	0.40	0.29	0.39

Panel 2: Define *Announcement return* using different windows

	Announcement return window							
Dep. Var.: Announcement return	1 day	2 days	3 days	4 days	10 days	1 month	2 months	3 months
Analyst coverage	0.320 ***	0.500 ***	0.690 ***	0.706 ***	1.004 ***	1.249 ***	1.083 ***	1.388 ***
	(3.71)	(7.05)	(8.10)	(8.72)	(8.28)	(9.31)	(7.06)	(6.48)
Other expl. variables in Table III	yes	yes	yes	yes	yes	yes	yes	yes
Observations	623	623	623	623	623	623	623	623
Lower limit (censoring)	-10%	-19%	-27.1%	-34.4%	- -	- -	- -	-
Censored observations	449	132	122	109	- -	- -	- -	-
Adjusted-R^2	- -	- -	- -	-	0.44	0.44	0.36	0.35

APPENDIX A Table A.3. Robustness regressions explaining announcement returns

This table summarizes key results from robustness regressions for Table III specifications that explain bubble intensity measures in a sample of 623 Shanghai A-shares. Unless otherwise noted, all variables are averages across the six-month reference period of November 29, 2006 to May 29, 2007, calculated from daily data. The regressions include, but we do not report below, all of the other variables included in the Table III model to which each panel. *I/B/E/S Analyst coverage* is the number of brokerage firms issuing earnings-per-share forecasts during the reference period according to I/B/E/S. *Any coverage dummy* equals 1 if the Resset-derived *Analyst coverage* exceeds 0 (and equals 0 otherwise), while *Many analysts dummy* equals 1 if *Analyst coverage* exceeds 6 (and equals 0 otherwise). *Log of market cap.: Higher order and interactions* denotes the inclusion of nine additional control variables: the square and the cube of *Log of market capitalization*, and interactions between *Log of market capitalization* and the other seven control variables in Table III. *Share float* is the number of tradable shares (in billions). *Return volatility* is the (annualized) standard deviation of daily stock returns in the reference period. *Turnover trend* is the slope coefficient of a regression of daily turnover on a time trend and a constant, during the reference period. *Number of traders per day* is the number of recorded trades per day. *Loading on empirical factors 1* (or *2* or *3*) are coefficients on regressions of daily returns in the pre-tax-increase reference period onto the first three factors obtained from a factor analysis of returns during the reference period. We report heteroskedasticity-robust t-statistics in parentheses beneath variable coefficients, and ***, **, * denote statistical significance at the 1%, 5%, and 10% levels, respectively. All regressions have 623 observations.

Panel 1: Define analyst coverage according to the the number of analysts issuing EPS forecasts as reported in the I/B/E/S dataset for China.

	Dependent Variable			
	Cumul. return	P/E ratio	Ann. Return	Comp. bubble meas.
I/B/E/S Analyst coverage	-7.174 ***	-5.648 ***	0.932 ***	-0.106 ***
	(-3.90)	(-3.69)	(3.44)	(-5.12)
Other explanatory variables in Tabl	yes	yes	yes	yes
Adjusted-R^2	0.43	0.38	0.44	0.55

Panel 2: Use analyst coverage indicator variables for the Resett-derived analyst coverage to address outlier concerns. *Any coverage dummy* = 1 when at least one analyst issues coverage (and = 0 otherwise), and *Many analysts dummy* = 1 when more then six analysts isssue coverage (and = 0 otherwise).

	Dependent Variable			
	Cumul. return	P/E ratio	Ann. Return	Comp. bubble meas.
Any coverage dummy	-11.512	-28.553 ***	2.969 ***	-0.347 ***
	(-1.35)	(-3.67)	(3.76)	(-4.64)
Many analysts dummy	-43.523 ***	-36.288 ***	6.596 ***	-0.695 ***
	(-5.19)	(-5.41)	(7.38)	(-9.21)
Other expl. variables in Table III	yes	yes	yes	yes
Adjusted-R^2	0.45	0.42	0.49	0.61

Table A.3
(continued)

Panel 3: Include additional control variables (below, coefficients and t-statistics for *Analyst coverage* as well as for the additional control variables are shown).

Dep. var: Comp. bubble measure	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Analyst coverage	-0.078 ***	-0.077 ***	-0.071 ***	-0.077 ***	-0.066 ***	-0.063 ***	-0.047 ***
	(-12.34)	(-12.61)	(-11.91)	(-12.53)	(-10.10)	(-10.27)	(-7.88)
Log of market cap: Higher-order and interactions	yes						yes
Share float		0.115 *					0.052
		(1.85)					(0.70)
Return volatility			0.053 ***				0.069 ***
			(7.77)				(10.25)
Turnover trend				-4.154 *			0.944
				(-1.74)			(0.40)
Number of trades per day					1.058 ***		1.343 ***
					(5.64)		(5.77)
Loading on Empirical Factor 1						-0.174	-0.757 **
						(-0.64)	(-2.17)
Loading on Empirical Factor 2						-1.164 ***	-0.880 ***
						(-5.19)	(-3.77)
Loading on Empirical Factor 3						-0.601 **	-0.237
						(-2.47)	(-1.07)
Other expl. variables in Table III	yes	yes	yes	yes	yes	yes	yes
Adjusted-R^2	0.65	0.64	0.69	0.64	0.66	0.66	0.73

<u>APPENDIX B</u> Table B.1
Explaining bubble intensity measures with additional specifications from Table III

This table is related to Table III in the main paper, and reports ordinary least squares regressions that explain four different measures of bubble intensity for a sample of 623 Shanghai A-shares. Unless otherwise noted, all variables are averages across the reference period of November 29, 2006 to May 29, 2007, calculated from daily data. *Cumulative return* is the cumulative return during the reference period. *P/E ratio* is the price-earnings ratio using quarterly earnings over the most recent 12 months relative to each day's calculation, using only public information. *P/E ratio* is capped at 250, and a P/E ratio equal to 250 is assigned when stocks have negative earnings. *Announcement return* is the five-day cumulative return beginning on the day the security tax change was both announced and enacted (May 30, 2007). *Composite bubble measure* is the first principal component of *Cumulative return*, *P/E ratio*, and *Announcement return,* normalized to have mean zero and variance equal to 1. *Analyst coverage* is the number of brokerage firms issuing earnings-per-share forecasts during the reference period. *Market capitalization* is the stock price times the number of tradable shares. *Turnover* is the number of shares traded divided by the total number of tradable shares. *Effective spread* is the average of twice the difference between the transaction price and mid-point, divided by the midpoint. *Depth* is the average of one half times the sum of the monetary quantities associated with the best bid and best ask offers. *ΔTurnover* and *ΔEffective spread* are defined as the averages in the six-month post-tax-increase period of May 31, 2007 to November 30, 2007 minus the average in the six-month pre-tax-increase reference period. *Market beta* and *Liquidity beta*, respectively, are the coefficients on the value-weighted market return and on an aggregate liquidity factor in a regression of daily stock returns, where the aggregate liquidity factor is defined as the daily innovation on the average effective spread across all stocks. *Industry effects* are dummy variables based on thirteen industries defined by the China Securities Regulatory Commission (CSRC). We report heteroskedasticity-robust t-statistics in parentheses beneath variable coefficients, and ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel 1: Dependent variable is *Cumulative return*

Dependent Variable: Cumulative return	(1)	(2)	(3)	(4)	(5)
Analyst coverage	-5.392 ***	-8.124 ***	-7.173 ***	-5.825 ***	-4.781 ***
	(-13.37)	(-10.38)	(-10.17)	(-8.57)	(-7.88)
Log of market capitalization		23.788 ***	35.107 ***	54.164 ***	30.028 ***
		(4.26)	(5.81)	(8.56)	(4.22)
Turnover			20.360 ***	29.386 ***	23.721 ***
			(5.71)	(8.56)	(4.87)
Effective Spread				7.836 ***	4.425 ***
				(9.27)	(5.06)
Depth				-38.662 ***	-29.301 ***
				(-5.37)	(-4.73)
Market beta				39.863 *	21.815
				(1.94)	(1.09)
Liquidity beta				31.687 **	33.532 ***
				(2.33)	(2.60)
ΔTurnover					5.963
					(0.88)
ΔEffective spread					-6.744 ***
					(-6.18)
Industry effects	no	no	yes	yes	yes
Constant	237.1 ***	223.4 ***			
	(47.42)	(44.13)			
Observations	623	623	623	623	623
Adjusted-R^2	0.16	0.19	0.26	0.40	0.46

Table B.1
(continued)

Panel 2: Dependent variable is *P/E ratio*

Dep. Variable: P/E ratio	(1)	(2)	(3)	(4)	(5)
Analyst coverage	-4.986 ***	-4.913 ***	-5.018 ***	-3.759 **	-3.838 ***
	(-15.86)	(-9.81)	(-9.36)	(-6.91)	(-6.60)
Log of market capitalization		-0.631	2.389	21.426 ***	33.287 ***
		(-0.18)	(0.58)	(4.59)	(5.63)
Turnover			1.811	14.635 ***	24.582 ***
			(0.61)	(5.08)	(5.79)
Effective spread				6.133 ***	7.689 ***
				(9.05)	(7.84)
Depth				-19.028 ***	-24.348 ***
				(-3.63)	(-4.07)
Market beta				-54.426 ***	-46.176 ***
				(-3.54)	(-2.91)
Liquidity beta				13.692	10.219
				(1.32)	(0.99)
ΔTurnover					15.316 **
					(2.49)
ΔEffective spread					2.947 ***
					(2.86)
Industry effects	no	no	yes	yes	yes
Constant	127.0 ***	127.4 ***			
	(30.17)	(27.37)			
Observations	623	623	623	623	623
Adjusted-R^2	0.20	0.20	0.25	0.40	0.41

Table B.1
(continued)

Panel 3: Dependent variable is *Announcement return*

Dep. Variable: Announcement return	(1)	(2)	(3)	(4)	(5)
Analyst coverage	0.997 ***	0.908 ***	0.796 ***	0.764 ***	0.754 ***
	(21.46)	(13.27)	(11.25)	(10.50)	(10.19)
Log of market capitalization		0.779 *	0.111	0.842	0.551
		(1.73)	(0.24)	(1.57)	(0.82)
Turnover			-1.930 ***	-1.703 ***	-2.140 ***
			(-7.23)	(-5.46)	(-4.84)
Effective spread				-0.066	-0.101
				(-0.93)	(-1.13)
Depth				-2.190 ***	-2.041 ***
				(-3.52)	(-3.23)
Market beta				-1.072	-1.257
				(-0.58)	(-0.68)
Liquidity beta				-1.960	-1.806
				(-1.45)	(-1.32)
ΔTurnover					-0.867
					(-1.24)
ΔEffective spread					-0.062
					(-0.64)
Industry effects	no	no	yes	yes	yes
Constant	-30.0 ***	-30.4 ***			
	(-77.13)	(-64.77)			
Observations	623	623	623	623	623
Adjusted-R^2	0.46	0.46	0.51	0.52	0.52

Table B.1
(continued)

Panel 4: Dependent variable is *Composite bubble measure*

Dep. Variable: Composite bubble measure	(1)	(2)	(3)	(4)	(5)
Analyst coverage	-0.097 ***	-0.105 ***	-0.096 ***	-0.081 ***	-0.077 ***
	(-26.86)	(-17.43)	(-16.15)	(-13.05)	(-12.53)
Log of market capitalization		0.069 *	0.166 ***	0.330 ***	0.303 ***
		(1.73)	(3.67)	(6.54)	(4.84)
Turmover			0.187 ***	0.291 ***	0.342 ***
			(6.34)	(10.30)	(8.35)
Effective spread				0.073 ***	0.069 ***
				(9.30)	(6.90)
Depth				-0.187 ***	-0.182 ***
				(-3.35)	(-3.27)
Market beta				-0.089	-0.114
				(-0.55)	(-0.70)
Liquidity beta				0.307 ***	0.289 **
				(2.72)	(2.54)
ΔTurnover					0.153 **
					(2.48)
ΔEffective spread					-0.010
					(-1.02)
Industry effects	no	no	yes	yes	yes
Constant	0.588 ***	0.548 ***			
	(14.24)	(12.64)			
Observations	623	623	623	623	623
Adjusted-R^2	0.46	0.46	0.51	0.62	0.63

APPENDIX B Table B.2 Using different time windows (full results)

This table is related to Table A.2 in the main paper, and summarizes results of regressions using different time windows to define *Cumulative return*, *P/E ratio*, and *Announcement return*. Panel A reports regressions of *Cumulative return* and *P/E ratio* defined over 3-, 9-, and 12-month windows ending in May 29, 2007, as opposed to the 6-month window of our baseline results in Table III. Panel B reports regressions of *Announcement return* calculated over windows consisting of one, two, three, four, and ten trading days, as well as one, two, and three calendar months following the May 30, 2007 tax increase announcement, as opposed to the 5-trading day window of our baseline results in Table III. We use Tobit regressions for short windows (4 days or less), and OLS regressions for longer windows. The sample consists of 623 Shanghai A-shares, selected by requiring that shares be traded in at least 90% of the trading days in the six-month reference period of November 29, 2006 to May 29, 2007. *Analyst coverage* is the number of brokerage firms issuing earnings-per-share forecasts during the reference period. The regressions include, but we do not report all of the below, all of the other explanatory variables included in Table III. Please see Table III for definitions of the other variables. We report heteroskedasticity-robust t-statistics in parentheses beneath variable coefficients , and ***, **, * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel 1: Redefine window lengths for *Cumulative return* and *P/E ratio*

	Measurement Window					
	3 months		6 months		12 months	
	Dep. Var.		Dep. Var.		Dep. Var.	
	Cumulat. return	P/E ratio	Cumulat. Return	P/E ratio	Cumulat. Return	P/E ratio
Analyst coverage	-2.762 ***	-4.077 ***	-3.830 ***	-3.924 ***	-3.998 ***	-3.827 ***
	(-7.52)	(-7.28)	(-5.35)	(-6.49)	(-3.30)	(-6.35)
Log of market capitalization	5.563	34.890 ***	48.251 ***	32.425 ***	54.123 ***	30.490 ***
	(1.51)	(6.15)	(5.61)	(5.26)	(4.63)	(5.18)
Daily turnover	8.969 ***	28.273 ***	19.248 ***	22.337 ***	17.276 **	20.757 ***
	(3.34)	(6.92)	(3.20)	(5.15)	(2.19)	(4.79)
Effective spread	1.511 ***	7.837 ***	5.759 ***	7.585 ***	7.738 ***	7.494 ***
	(3.09)	(8.12)	(5.49)	(7.56)	(5.35)	(7.82)
Depth	-6.214 **	-27.326 ***	-45.736 ***	-21.980 ***	-58.121 ***	-21.614 ***
	(-2.29)	(-4.27)	(-5.53)	(-3.59)	(-5.20)	(-3.77)
Market beta	12.304	-36.635 **	47.214 **	-49.822 ***	55.594 *	-46.002 ***
	(1.11)	(-2.39)	(2.18)	(-3.12)	(1.88)	(-2.93)
Liquidity beta	4.917	6.277	11.941	12.901	1.067	12.242
	(0.71)	(0.63)	(0.79)	(1.20)	(0.05)	(1.13)
ΔDaily turnover	2.894	18.057	-2.333	12.542 **	-8.759	10.524 *
	(0.72)	(3.04)	(-0.28)	(2.01)	(-0.81)	(1.70)
ΔEffective spread	-3.268 ***	3.392 ***	-7.062 ***	2.778 ***	-8.054 ***	2.811 ***
	(-5.20)	(3.45)	(-5.14)	(2.65)	(-4.58)	(2.85)
Industry effects	yes	yes	yes	yes	yes	yes
Observations	623	623	623	623	623	623
Adjusted-R^2	0.42	0.45	0.35	0.40	0.29	0.39

Table B.2
(continued)

Panel 2: Redefine window lengths for *Announcement return*

	Announcement return window							
Dep. Var.: *Announcement return*	1 day	2 days	3 days	4 days	10 days	1 month	2 months	3 months
Analyst coverage	0.320 ***	0.500 ***	0.690 ***	0.706 ***	1.003 ***	1.249 ***	1.083 ***	1.388 ***
	(3.71)	(7.05)	(8.10)	(8.72)	(8.285)	(9.31)	(7.06)	(6.48)
Log of market capitalization	0.735	-0.072	0.694	0.561	-1.151	-0.221	-1.438	2.544
	(0.93)	(-0.11)	(0.90)	(0.78)	(-0.98)	(-0.15)	(-0.89)	(1.19)
Turnover	-0.770	-2.228 ***	-2.242 ***	-2.141 ***	-3.279 ***	-3.298 ***	-2.885 **	-0.139
	(-1.14)	(-4.46)	(-3.87)	(-3.96)	(-3.99)	(-3.40)	(-2.48)	(-0.09)
Effective spread	0.136	-0.043	-0.040	0.046	-0.637 ***	-0.418 **	-0.609 ***	-0.263
	(1.33)	(-0.53)	(-0.39)	(0.50)	(-4.00)	(-2.08)	(-2.99)	(-0.92)
Depth	-0.637	-0.805	-1.677 **	-2.057 ***	-3.105 ***	-4.421 **	-3.808 **	-7.247 ***
	(-1.04)	(-1.42)	(-2.54)	(-2.90)	(-2.65)	(-2.50)	(-2.12)	(-2.64)
Market beta	-7.243 ***	-1.041	-3.319	-3.837 *	6.173 **	-0.025	4.018	6.865
	(-3.16)	(-0.57)	(-1.48)	(-1.77)	(2.04)	(-0.01)	(1.03)	(1.29)
Liquidity beta	-1.000	-2.959 **	-2.244	-2.207	-3.367	1.387	-0.085	-2.472
	(-0.55)	(-2.24)	(-1.39)	(-1.42)	(-1.58)	(0.51)	(-0.03)	(-0.63)
ΔTurnover	-0.429	-1.586 **	-0.814	-0.575	1.376	1.204	2.744	5.088 **
	(-0.36)	(-2.05)	(-0.93)	(-0.69)	(0.97)	(0.72)	(1.26)	(2.05)
ΔEffective spread	-0.007	-0.101	-0.086	-0.032	-0.273	-0.012	-0.155	0.670 **
	(-0.06)	(-1.12)	(-0.78)	(-0.30)	(-1.56)	(-0.05)	(-0.62)	(1.98)
Industry effects	yes	yes	yes	yes	yes	yes	yes	yes
Observations	623	623	623	623	623	623	623	623
Lower limit (censoring)	-10%	-19%	-27.1%	-34.4%	-	-	-	-
Censored observations	449	132	122	109	-	-	-	-
Adjusted-R^2	-	-	-	-	0.44	0.44	0.36	0.35

<u>APPENDIX B</u> Table B.3. Explaining *Composite bubble measure* using I/B/E/S data (full results)

This table is related to Table A.3 in the main paper, and reports ordinary least squares regressions that explain *Composite bubble measure* for a sample of 623 Shanghai A-shares. Unless otherwise noted, all variables are averages across the reference period of November 29, 2006 to May 29, 2007, calculated from daily data. *Composite bubble measure* is the first principal component of *Cumulative return*, *P/E ratio*, and *Announcement return,* normalized to have mean zero and variance equal to 1. *I/B/E/S Analyst coverage* is the number of brokerage firms issuing earnings-per-share forecasts during the reference period according to I/B/E/S. *Market capitalization* is the stock price times the number of tradable shares. *Turnover* is the number of shares traded divided by the total number of tradable shares. *Effective spread* is the average of twice the difference between the transaction price and mid-point, divided by the midpoint. *Depth* is the average of one half times the sum of the monetary quantities associated with the best bid and best ask offers. *ΔTurnover* and *ΔEffective spread* are defined as the averages in the six-month post-tax-increase period of May 31, 2007 to November 30, 2007 minus the average in the six-month pre-tax-increase reference period. *Market beta* and *Liquidity beta*, respectively, are the coefficients on the value-weighted market return and on an aggregate liquidity factor in a regression of daily stock returns, where the aggregate liquidity factor is defined as the daily innovation on the average effective spread across all stocks. *Industry effects* are dummy variables based on thirteen industries defined by the China Securities Regulatory Commission (CSRC). We report heteroskedasticity-robust t-statistics in parentheses beneath variable coefficients, and ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Dep. variable: Composite bubble measure	(1)	(2)	(3)	(4)	(5)
I/B/E/S Analyst coverage	-0.239 ***	-0.148 ***	-0.140 ***	-0.115 ***	-0.106 ***
	(-12.97)	(-6.06)	(-5.83)	(-5.30)	(-5.12)
Log of market capitalization		-0.248 ***	-0.102 **	0.127 **	0.109
		(-5.78)	(-2.12)	(2.23)	(1.51)
Turnover			0.257 ***	0.366 ***	0.447 ***
			(7.56)	(11.59)	(10.13)
Effective spread				0.084 ***	0.076 ***
				(8.52)	(6.09)
Depth				-0.183 ***	-0.178 ***
				(-2.93)	(-2.85)
Market beta				-0.169	-0.201
				(-0.90)	(-1.07)
Liquidity beta				0.366 ***	0.329 ***
				(2.99)	(2.74)
ΔDaily turnover					0.259 ***
					(3.86)
ΔEffective spread					-0.016
					(-1.37)
Industry effects	no	no	yes	yes	yes
Constant	0.264 ***	0.479 ***			
	(6.39)	(9.58)			
Observations	623	623	623	623	623
Adjusted-R^2	0.24	0.27	0.37	0.52	0.55

<u>APPENDIX B</u> Table B.4. Explaining *Composite bubble measure* using analyst coverage dummies (full results)

This table is related to Table A.3 in the main paper, and table reports ordinary least squares regressions that explain *Composite bubble measure* for a sample of 623 Shanghai A-shares. Unless otherwise noted, all variables are averages across the reference period of November 29, 2006 to May 29, 2007, calculated from daily data. *Composite bubble measure* is the first principal component of *Cumulative return*, *P/E ratio*, and *Announcement return,* normalized to have mean zero and variance equal to 1. *Analyst coverage* is the number of brokerage firms issuing earnings-per-share forecasts during the reference period. *Any coverage dummy* equals 1 if *Analyst coverage* exceeds 0 (and equals 0 otherwise), while *Many analysts dummy* equals 1 if *Analyst coverage* exceeds 6 (and equals 0 otherwise). *Market capitalization* is the stock price times the number of tradable shares. *Turnover* is the number of shares traded divided by the total number of tradable shares. *Effective spread* is the average of twice the difference between the transaction price and mid-point, divided by the midpoint. *Depth* is the average of one half times the sum of the monetary quantities associated with the best bid and best ask offers. *ΔTurnover* and *ΔEffective spread* are defined as the averages in the six-month post-tax-increase period of May 31, 2007 to November 30, 2007 minus the average in the six-month pre-tax-increase reference period. *Market beta* and *Liquidity beta*, respectively, are the coefficients on the value-weighted market return and on an aggregate liquidity factor in a regression of daily stock returns, where the aggregate liquidity factor is defined as the daily innovation on the average effective spread across all stocks. *Industry effects* are dummy variables based on thirteen industries defined by the China Securities Regulatory Commission (CSRC). We report heteroskedasticity-robust t-statistics in parentheses beneath variable coefficients, and ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Dep. variable: Composite bubble measure	(1)	(2)	(3)	(4)	(5)
Any coverage dummy	-0.606 ***	-0.554 ***	-0.559 ***	-0.367 ***	-0.347 ***
	(-7.61)	(-6.77)	(-6.81)	(-4.91)	(-4.64)
Many analysts dummy	-1.050 ***	-0.932 ***	-0.834 ***	-0.741 ***	-0.695 ***
	(-15.20)	(-11.74)	(-10.73)	(-9.74)	(-9.21)
Log of market capitalization		-0.104 ***	0.032	0.206 ***	0.141 **
		(-3.07)	(0.77)	(4.25)	(2.41)
Turnover			0.200 ***	0.298 ***	0.308 ***
			(6.68)	(10.15)	(6.87)
Effective spread				0.073 ***	0.062 ***
				(8.52)	(5.90)
Depth				-0.235 **	-0.207 ***
				(-3.41)	(-3.06)
Market beta				0.039	-0.024
				(0.23)	(-0.14)
Liquidity beta				0.265 **	0.264 ***
				(2.29)	(2.29)
ΔTurnover					0.084
					(1.25)
ΔEffective spread					-0.021 **
					(-2.11)
Industry effects	no	no	yes	yes	yes
Constant	0.81 ***	0.860 ***			
	(13.98)	(14.51)			
Observations	623	623	623	623	623
Adjusted-R^2	0.44	0.45	0.50	0.60	0.61

APPENDIX B Table B.5. Explaining bubble intensity measures using additional control variables

This table is related to Table A.2 in the main paper, and reports ordinary least squares regressions that explain bubble intensity measures for a sample of 623 Shanghai A-shares. Unless otherwise noted, all variables are averages across the six-month reference period of November 29, 2007 to May 29, 2007, calculated from daily data. *Cumulative return* is the cumulative return during the reference period. *P/E ratio* is the price-earnings ratio using quarterly earnings over the most recent 12 months relative to each day's calculation, using only public information*.* *P/E ratio* is capped at 250, and a P/E ratio equal to 250 is assigned when stocks have negative earnings. *Announcement return* is the five-day cumulative return beginning on the day the security tax change was both announced and enacted (May 30, 2007). *Composite bubble measure* is the first principal component of *Cumulative return*, *P/E ratio*, and *Announcement return,* normalized to have mean zero and variance equal to 1. *Analyst coverage* is the number of brokerage firms issuing earnings-per-share forecasts during the reference period. In addition to the control variables already described in Table III, the following variables are added. *Share float* is the average number of tradable shares during the pre-tax-increase period (in billions). *Return volatility* is the average squared log return during the pre-tax-increase period. *Turnover trend* is the slope coefficient of a regression of daily turnover on a time trend and a constant, during the pre-tax-increase period. *ΔTurnover trend* is the difference between turnover trends in the post minus the pre-tax-increase period. *Number of traders per day* is the average number of recorded trades per day over the period. *ΔNumber of trades per day* are defined as the corresponding averages during the post-tax-increase period minus the corresponding averages during the pre-tax-increase period. *Loading in empirical factors 1* (or *2* or *3*) are coefficients on regressions of daily returns in the pre-tax-increase period onto the first three factors obtained from a factor analysis of returns during the pre-tax-increase period. We report heteroskedasticity-robust t-statistics in parentheses beneath variable coefficients, and ***, **, * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Dependent Variable			
	Cumulative return	P/E ratio	Announc. return	Composite bubble measure
Analyst coverage	-3.232 ***	-2.129 ***	0.493 ***	-0.048 ***
	(-4.90)	(-3.79)	(6.67)	(-8.27)
Log of market capitalization	-6.316	-10.547	4.147 ***	-0.272 ***
	(-0.60)	(-1.15)	(3.77)	(-3.04)
Turnover	13.722 *	2.722	1.383 **	0.016
	(1.94)	(0.44)	(2.05)	(0.29)
Effective spread	1.650 *	6.939 ***	-0.191 **	0.056 ***
	(1.80)	(6.41)	(-2.06)	(5.95)
Depth	-7.736	-16.795 **	-0.454	-0.112
	(-1.02)	(-2.14)	(-0.43)	(-1.38)
ΔTurnover	9.779	19.495 ***	-0.391	0.174 ***
	(1.42)	(3.17)	(-0.57)	(2.79)
ΔEffective spread	-7.572 ***	3.333 ***	-0.230 **	-0.005
	(-7.22)	(3.49)	(-2.39)	(-0.55)
Share float	2.435	0.802	-0.741	0.048
	(0.40)	(0.13)	(-1.03)	(0.80)
Return volatility	8.236 ***	4.691 ***	-0.010	0.068 ***
	(9.00)	(7.03)	(-1.26)	(9.69)
Turnover trend	-472.92	-276.83	-112.85 ***	1.245
	(-1.59)	(-1.14)	(-4.24)	(0.53)
Number of trades per day	28.635	95.992 ***	-11.236 ***	1.177 ***
	(1.19)	(4.43)	(-4.44)	(5.82)
Loading in Empirical Factor 1	-114.45 ***	-162.35 ***	1.258	-1.507 ***
	(-2.99)	(-6.08)	(0.38)	(-5.69)
Loading in Empirical Factor 2	-37.067	-74.324 ***	9.934 ***	-1.032 ***
	(-1.31)	(-2.95)	(3.75)	(-4.21)
Loading in Empirical Factor 3	-46.585	53.630 ***	4.679 **	-0.093
	(-1.49)	(2.75)	(1.99)	(-0.44)
Industry effects	yes	yes	yes	yes
Observations	623	623	623	623
Adjusted-R^2	0.57	0.48	0.58	0.72

<u>APPENDIX B</u> Table B.6 Robustness regressions addressing endogeneity: other bubble measures

This table is related to Table IV in the main paper, and reports ordinary least squares and two-stage least square (2SLS) regressions that explain *Cumulative return*, *P/E ratio*, and *Announcement return* for a sample of 623 Shanghai A-shares. The 2SLS regressions use *Trading volume in 2005* (average daily trading volume in 2005) and *Mutual fund ownership in June/2005* (the percent of tradable shares owned by mutual funds at the end of June/2005) as instruments for *Analyst coverage*. Unless otherwise noted, all variables are averages across the six-month reference period of November 29, 2006 to May 29, 2007, calculated from daily data. *Analyst coverage* is the number of brokerage firms issuing earnings-per-share forecasts during the reference period. *Market capitalization* is the stock price times the number of tradable shares. *Turnover* is the number of shares traded divided by the total number of tradable shares. *Effective spread* is the average of twice the difference between the transaction price and mid-point, divided by the midpoint. *Depth* is the average of one half times the sum of the monetary quantities associated with the best bid and best ask offers. *ΔTurnover* and *ΔEffective spread* are defined as the averages in the six-month post-tax-increase period of May 31, 2007 to November 30, 2007 minus the average in the six-month pre-tax-increase reference period. *Market beta* and *Liquidity beta*, respectively, are the coefficients on the value-weighted market return and on an aggregate liquidity factor in a regression of daily stock returns, where the aggregate liquidity factor is defined as the daily innovation on the average effective spread across all stocks. *Industry effects* are dummy variables based on thirteen industries defined by the China Securities Regulatory Commission (CSRC). We report heteroskedasticity-robust t-statistics in parentheses beneath variable coefficients, and ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Ordinary least squares			Two-stage least squares		
	Dependent Variable			Dependent Variable		
	Cum. ret. (1)	P/E ratio (2)	Ann. ret. (3)	Cum. ret. (4)	P/E ratio (5)	Ann. ret. (6)
Analyst coverage in 2005	-3.291 ***	-2.769 ***	0.317 ***			
	(-6.18)	(-6.21)	(4.76)			
Analyst coverage				-6.419 ***	-4.360 ***	0.704 ***
				(-5.18)	(-4.96)	(5.55)
Log of market capitalization	22.013 ***	27.367 ***	2.638 ***	37.356 ***	35.628 ***	0.777
	(3.20)	(4.87)	(4.12)	(4.34)	(5.21)	(0.97)
Turnover	27.709 ***	27.687 ***	-2.923 ***	21.429 ***	23.871 ***	-2.208 ***
	(5.48)	(6.64)	(-6.33)	(4.38)	(5.59)	(-4.78)
Effective spread	4.458 ***	7.701 ***	-0.130	4.279 ***	7.643 ***	-0.105
	(4.80)	(7.55)	(-1.32)	(4.98)	(8.01)	(-1.19)
Depth	-35.104 ***	-29.343 ***	-1.663 **	-30.314 ***	-24.671 ***	-2.072 ***
	(-4.67)	(-3.93)	(-2.32)	(-4.77)	(-4.11)	(-3.27)
Market beta	17.758	-49.480 ***	-0.691	22.795	-45.864 ***	-1.227
	(0.87)	(-3.01)	(-0.35)	(1.17)	(-2.96)	(-0.68)
Liquidity beta	36.341 ***	12.517	-2.181	32.946 ***	10.032	-1.823
	(2.83)	(1.22)	(-1.49)	(2.58)	(0.99)	(-1.36)
ΔTurnover	9.078	17.696 ***	-1.552 **	3.812	14.631 **	-0.933
	(1.33)	(2.92)	(-2.12)	(0.57)	(2.41)	(-1.33)
ΔEffective spread	-7.381	2.439 **	0.043	-6.497 ***	3.026 ***	-0.055
	(-6.54)	(2.34)	(0.43)	(-5.99)	(2.94)	(-0.56)
Industry effects	yes	yes	yes	yes	yes	yes
Observations	623	623	623	623	623	623
Adjusted-R^2	0.44	0.40	0.45	0.47	0.41	0.52

APPENDIX B Table B.7. First stage partial regression for *Analyst coverage* and its instruments

This table is related to Table IV in the main paper, and reports ordinary least squares regressions that explain *Analyst coverage* for a sample of 623 Shanghai A-shares. *Analyst coverage* is the number of brokerage firms issuing earnings-per-share forecasts during the six-month reference period of November 29, 2006 to May 29, 2007. *Trading volume in 2005* is the average daily trading volume during 2005, in millions of yuans. *Mutual fund ownership in June/2005* is the fraction of tradable shares owned by Chinese mutual funds on June 30, 2005. See Table III for other variables. We report heteroskedasticity-robust t-statistics in parentheses beneath variable coefficients, and ***, **, * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Dep. Variable: Analyst coverage	(1)	(2)
Trading volume in 2005	0.303 ***	0.091 ***
	(7.96)	(3.28)
Mutual fund ownership in June 2005	0.274 ***	0.163 ***
	(16.02)	(10.94)
Log of market capitalization		2.995 ***
		(8.56)
Turnover		-1.289 ***
		(-5.67)
Effective spread		-0.076
		(-1.31)
Depth		0.177
		(0.52)
Market beta		1.772 **
		(2.04)
Liquidity beta		-0.724
		(-1.15)
ΔTurnover		-1.091 ***
		(-3.49)
ΔEffective spread		0.126 **
		(2.26)
Industry effects	no	yes
Constant	2.951 ***	
	(12.66)	
Observations	623	623
Adjusted-R^2	0.48	0.71

APPENDIX B **Table B.8 Addressing endogeneity concerns using *Trading volume* as the unique instrument**

This table is related to Table IV in the main paper, and reports two-stage least square (2SLS) regressions that explain bubble intensity measures for a sample of 623 Shanghai A-shares. The 2SLS regressions use *Trading volume in 2005* (average daily trading volume in 2005) as instrument for *Analyst coverage*. Unless otherwise noted, all variables are averages across the six-month reference period of November 29, 2006 to May 29, 2007, calculated from daily data. *Composite bubble measure* is the first principal component of *Cumulative return*, *P/E ratio*, and *Announcement return,* normalized to have mean zero and variance equal to 1. *Analyst coverage* is the number of brokerage firms issuing earnings-per-share forecasts during the reference period. *Market capitalization* is the stock price times the number of tradable shares. *Turnover* is the number of shares traded divided by the total number of tradable shares. *Effective spread* is the average of twice the difference between the transaction price and mid-point, divided by the midpoint. *Depth* is the average of one half times the sum of the monetary quantities associated with the best bid and best ask offers. *ΔTurnover* and *ΔEffective spread* are defined as the averages in the six-month post-tax-increase period of May 31, 2007 to November 30, 2007 minus the average in the six-month pre-tax-increase reference period. *Market beta* and *Liquidity beta*, respectively, are the coefficients on the value-weighted market return and on an aggregate liquidity factor in a regression of daily stock returns, where the aggregate liquidity factor is defined as the daily innovation on the average effective spread across all stocks. *Industry effects* are dummy variables based on thirteen industries defined by the China Securities Regulatory Commission (CSRC). We report heteroskedasticity-robust t-statistics in parentheses beneath variable coefficients, and ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Dependent Variable							
	Cumulative return		P/E ratio		Announcement return		Composite bubble measure	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Analyst coverage	-3.172 ***	-5.302 **	-3.576 ***	-1.375	0.829 ***	0.781 ***	-0.071 ***	-0.066 ***
	(-3.55)	(-2.35)	(-6.96)	(-0.73)	(8.10)	(2.59)	(-10.47)	(-3.40)
Log of market capitalization		32.366 ***		22.242 **		0.432		0.255 **
		(2.61)		(2.21)		(0.30)		(2.34)
Turnover		23.012 ***		27.932 ***		-2.103 ***		0.357 ***
		(4.24)		(5.62)		(-3.59)		(7.76)
Effective spread		4.378 ***		7.908 ***		-0.099		0.070 ***
		(4.94)		(7.63)		(-1.08)		(6.90)
Depth		-29.623 ***		-22.826 ***		-2.024 ***		-0.176 ***
		(-4.65)		(-4.01)		(-3.17)		(-3.14)
Market beta		22.127		-47.649 ***		-1.273		-0.121
		(1.13)		(-2.92)		(-0.70)		(-0.74)
Liquidity beta		33.346 ***		11.099		-1.796		0.293 ***
		(2.63)		(1.09)		(-1.33)		(2.65)
ΔTurnover		5.279		18.549 ***		-0.832		0.167 **
		(0.74)		(2.81)		(-1.08)		(2.56)
ΔEffective spread		-6.665 ***		2.575 **		-0.066		-0.012
		(-6.01)		(2.45)		(-0.63)		(-1.15)
Industry effects	no	yes	no	yes	no	yes	no	yes
Constant	223.6 ***		118.4 ***		-29.0 ***		0.433 ***	
	(33.53)		(25.05)		(-42.12)		(7.88)	
Observations	623	623	623	623	623	623	623	623
Adjusted-R^2	0.13	0.45	0.18	0.39	0.45	0.51	0.43	0.63

<u>APPENDIX B</u> Table B.9 Addressing endogeneity concerns using *Mutual fund ownership June/2005* as the unique instrument

This table is related to Table IV in the main paper, and reports two-stage least square (2SLS) regressions that explain bubble intensity measures for a sample of 623 Shanghai A-shares. The 2SLS regressions use *Mutual Fund Ownership in June/2005* (percent of tradable shares owned by mutual funds at the end of June/2005) as instrument for *Analyst coverage*. Unless otherwise noted, all variables are averages across the six-month reference period of November 29, 2006 to May 29, 2007, calculated from daily data. *Composite bubble measure* is the first principal component of *Cumulative return*, *P/E ratio*, and *Announcement return,* normalized to have mean zero and variance equal to 1. *Analyst coverage* is the number of brokerage firms issuing earnings-per-share forecasts during the reference period. *Market capitalization* is the stock price times the number of tradable shares. *Turnover* is the number of shares traded divided by the total number of tradable shares. *Effective spread* is the average of twice the difference between the transaction price and mid-point, divided by the midpoint. *Depth* is the average of one half times the sum of the monetary quantities associated with the best bid and best ask offers. *ΔTurnover* and *ΔEffective spread* are defined as the averages in the six-month post-tax-increase period of May 31, 2007 to November 30, 2007 minus the average in the six-month pre-tax-increase reference period. *Market beta* and *Liquidity beta*, respectively, are the coefficients on the value-weighted market return and on an aggregate liquidity factor in a regression of daily stock returns, where the aggregate liquidity factor is defined as the daily innovation on the average effective spread across all stocks. *Industry effects* are dummy variables based on thirteen industries defined by the China Securities Regulatory Commission (CSRC). We report heteroskedasticity-robust t-statistics in parentheses beneath variable coefficients, and ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Dependent Variable							
	Cumulative return		P/E ratio		Announcement return		Composite bubble measure	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Analyst coverage	-5.597 ***	-6.526 ***	-5.248 ***	-4.647 ***	0.992 ***	0.696 ***	-0.099 ***	-0.087 ***
	(-10.40)	(-5.10)	(-13.26)	(-5.14)	(14.50)	(5.53)	(-18.95)	(-7.38)
Log of market capitalization		37.856 ***		36.912 ***		0.810 ***		0.347 ***
		(4.36)		(5.33)		(1.01)		(4.42)
Daily turnover		21.346 ***		23.481 ***		-2.218 ***		0.329 ***
		(4.32)		(5.50)		(-4.79)		(7.86)
Effective spread		4.269 ***		7.617 ***		-0.106 ***		0.068 ***
		(4.97)		(8.03)		(-1.19)		(7.03)
Depth		-30.381 ***		-24.848 ***		-2.076 ***		-0.189 ***
		(-4.77)		(-4.10)		(-3.27)		(-3.39)
Market beta		22.859		-45.693 ***		-1.223 **		-0.108
		(1.17)		(-2.96)		(-0.68)		(-0.68)
Liquidity beta		32.908 **		9.930		-1.826		0.285 ***
		(2.57)		(0.98)		(-1.36)		(2.57)
ΔDaily turnover		3.672		14.254 **		-0.943		0.140 **
		(0.55)		(2.35)		(-1.34)		(2.29)
ΔEffective spread		-6.481 ***		3.069 ***		-0.054 ***		-0.009
		(-5.96)		(2.98)		(-0.55)		(-0.87)
Industry effects	no	yes	no	yes	no	yes	no	yes
Constant	238.4 ***		128.6 ***		-30.0 ***		0.601 ***	
	(44.45)		(29.16)		(-59.73)		(13.03)	
Observations	623	623	623	623	623	623	623	623
Adjusted-R^2	0.16	0.45	0.20	0.42	0.46	0.51	0.46	0.63

<u>APPENDIX B</u> Table B.10 Including *Analyst coverage* instruments in OLS regression

This table is related to Table IV in the main paper, and reports ordinary least squares regressions explaining four different measures of bubble intensity for a sample of 623 Shanghai A-shares. The variables used as instruments for *Analyst coverage* in Table 4 are added as explanatory variables in the regressions explaining bubble intensity measures. These variables are *Trading volume in 2005* (average daily trading volume in 2005) and *Mutual Fund Ownership in June/2005* (percent of tradable shares owned by mutual funds at the end of June/2005). *Analyst coverage* is the number of brokerage firms issuing earnings-per-share forecasts during the six-month reference period of November 29, 2006 to May 29, 2007. Unless otherwise noted, all variables are averages across the six-month reference period of November 29, 2006 to May 29, 2007, calculated from daily data. Definitions of other explanatory variables can be found in Table 3. We report heteroskedasticity-robust t-statistics in parentheses beneath variable coefficients, and ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Dependent Variable			
	Cumulat. return	P/E ratio	Announc. return	Composite bubble meas.
Analyst coverage	-4.225 ***	-3.661 ***	-0.771 ***	-0.074 ***
	(-6.12)	(-5.49)	(9.15)	(-10.56)
Mutual fund ownership in June 2005	-0.043	-0.024	-0.014	-0.003
	(-1.63)	(-1.33)	(-0.56)	(-1.11)
Trading Volume in 2005	0.073	0.663	0.013	0.004
	(0.15)	(1.48)	(0.19)	(0.87)
Log of market capitalization	30.248 ***	32.045 ***	0.536	0.297 ***
	(4.14)	(5.39)	(0.78)	(4.62)
Turnover	23.869 ***	25.583 ***	-2.152 ***	0.338 ***
	(4.76)	(5.51)	(-4.70)	(8.01)
Effective spread	4.456 ***	7.725 ***	-0.099	0.069 ***
	(5.06)	(7.85)	(-1.11)	(6.90)
Depth	-30.929 ***	-25.402 ***	-2.099 ***	-0.193 ***
	(-4.88)	(-4.51)	(-3.30)	(-3.52)
Market beta	19.003	-46.848 **	-1.340	-0.127
	(0.94)	(-2.94)	(-0.73)	(-0.78)
Liquidity beta	34.315 ***	9.950	-1.790	0.290 ***
	(2.67)	(0.96)	(-1.32)	(2.60)
ΔTurnover	6.008	14.867 **	-0.873	0.151 **
	(0.89)	(2.43)	(-1.24)	(2.44)
ΔEffective spread	-6.784 ***	2.909 ***	-0.064	-0.011
	(-6.21)	(2.83)	(-0.66)	(-1.05)
Industry effects	yes	yes	yes	yes
Observations	623	623	623	623
Adjusted-R^2	0.46	0.41	0.52	0.63

<u>APPENDIX B</u> Table B.11. Regressions explaining turnover (full sample of stocks)

This table is related to Table VI in the main paper, and reports ordinary least squares regressions that explain *Turnover* for a sample of 623 Shanghai A-shares. *Turnover* is the average number of shares traded divided by total number of tradable shares during the reference period (November 29, 2006 to May 29, 2007). *Analyst coverage* is the number of brokerage firms issuing earnings-per-share forecasts during the reference period. *Market capitalization* is the average of stock price times the number of tradable shares during the reference period. *Effective spread* is the average of twice the difference between the transaction price and mid-point, divided by the midpoint. *Depth* is the average of one half times the sum of the monetary quantities associated with the best bid and best ask offers. *Market beta* and *Liquidity beta* are, respectively, the coefficients on the value-weighted market return and on an aggregate liquidity factor in a regression of daily stock returns; where the aggregate liquidity factor is defined as the daily innovation on the average effective spread across all stocks. *Industry effects* are dummy variables based on thirteen industries defined by the China Securities Regulatory Commission (CSRC). We report heteroskedasticity-robust t-statistics in parentheses beneath variable coefficients, and ***, **, * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Dep. Variable: Turnover	(1)	(2)	(3)
Analyst coverage	-0.090 ***	-0.054 ***	-0.044 ***
	(-17.05)	(-5.86)	(-5.76)
Log of market capitalization		-0.312 ***	-0.696 ***
		(-5.34)	(-9.70)
Effective spread			-0.052 ***
			(-5.70)
Depth			0.913 ***
			(3.22)
Market beta			1.495 ***
			(6.69)
Liquidity beta			-0.203
			(-1.27)
Industry effects	no	no	yes
Constant	3.25 ***	3.43 ***	
	(56.84)	(57.54)	
Observations	623	623	623
Adjusted-R^2	0.26	0.29	0.48

APPENDIX B Table B.12. Interactions individual regressions

This table is related to Table VI in the main paper, and reports ordinary least squares regressions that *Cumulative return*, *P/E ratio*, and *Announcement return* for a subsample of 367 Shanghai A-shares that are followed by at least two analysts. Unless otherwise noted, all variables are averages across the six-month reference period of November 29, 2006 to May 29, 2007, calculated from daily data. *Analyst coverage* is the number of brokerage firms issuing earnings-per-share forecasts during the reference period. *Market capitalization* is the stock price times the number of tradable shares. *Turnover* is the number of shares traded divided by the total number of tradable shares. *Effective spread* is the average of twice the difference between the transaction price and mid-point, divided by the midpoint. *Depth* is the average of one half times the sum of the monetary quantities associated with the best bid and best ask offers. *ΔTurnover* and *ΔEffective spread* are defined as the averages in the six-month post-tax-increase period of May 31, 2007 to November 30, 2007 minus the average in the six-month pre-tax-increase reference period. *Market beta* and *Liquidity beta*, respectively, are the coefficients on the value-weighted market return and on an aggregate liquidity factor in a regression of daily stock returns, where the aggregate liquidity factor is defined as the daily innovation on the average effective spread across all stocks. *Industry effects* are dummy variables based on thirteen industries defined by the China Securities Regulatory Commission (CSRC). We report heteroskedasticity-robust t-statistics in parentheses beneath variable coefficients, and ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Dependent Variable								
	Cumulative return			P/E ratio			Announcement return		
	(1)	(2)	(3)	(4)	(6)	(7)	(8)	(10)	(11)
Analyst coverage	-4.887 ***	-4.632 ***	-4.911 ***	-2.437 ***	-2.444 ***	-1.881 ***	0.857 ***	0.835 ***	0.590 ***
	(-9.03)	(-8.50)	(-6.31)	(-7.18)	(-7.22)	(-3.67)	(13.44)	(13.40)	(6.48)
Dispersion of analysts' forecasts		0.154	0.038		-10.443 ***	-12.192 ***		0.102	0.345
		(0.03)	(0.01)		(-2.70)	(-3.11)		(0.21)	(0.72)
Analyst cov. * Disp. of anal. forec.		1.986 ***	0.843 *		0.224	0.664		-0.176 ***	-0.139 **
		(3.51)	(1.66)		(0.61)	(1.56)		(-3.00)	(-2.33)
Log of market capitalization			24.925 ***			21.790 ***			0.864
			(3.13)			(4.17)			(1.05)
Turnover			14.700 **			25.238 ***			-2.396 ***
			(2.14)			(4.34)			(-3.56)
Effective spread			2.170 **			3.701 ***			-0.062
			(2.12)			(3.90)			(-0.55)
Depth			-23.165 ***			-17.577 ***			-2.061 ***
			(-3.77)			(-3.62)			(-3.00)
Market beta			24.903			-33.323			2.047
			(0.96)			(-1.59)			(0.74)
Liquidity beta			28.729 *			-11.013			-1.549
			(1.82)			(-0.95)			(-0.82)
ΔTurnover			-14.459						-0.195
			(-1.35)						(-0.17)
ΔEffective spread			-6.568 ***						0.129
			(-5.22)						(1.00)
Industry effects	no	no	yes	no	no	yes	no	no	yes
Constant	229.9 ***	216.8 ***		89.5 ***	89.6 ***		-27.9 ***	-27.747 ***	
	(28.35)	(27.57)		(16.55)	(16.85)		(-38.32)	(-38.31)	
Observations	367	367	367	367	367	367	367	367	367
Adjusted-R^2	0.15	0.19	0.44	0.10	0.12	0.29	0.35	0.38	0.47