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Float, Speculation, and Stock Price: Evidence from the Split Share Structure Reform in China[1]

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Abstract

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The Split Share Structure Reform in China offers a unique opportunity to test whether the supply of tradable shares (i.e. float) has a significant impact on the degree of speculation. After firms completed the reform, their float increased by 31% on average, while turnover and trading volume also increased substantially. We use information from firms' reform plan to derive an estimate of the price premium of tradable shares over non-tradable shares before the reform and find that, after controlling for differences in liquidity and profitability, the price premium is significantly related to proxies for the level of speculative trading in tradable shares. Moreover, firms that were highly speculated before the reform had significantly smaller increase in turnover and trading volume than firms that were less speculated. Overall, our evidence confirms that there is a significant speculative component in the market price of tradable shares in China and a large increase in float dampens speculative trading.

JEL Classification: G12, G18

Keywords: bubble; float; heterogeneous beliefs; Split Share Structure Reform in China; speculative trading

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1. Introduction

Memorable episodes in the recent history of financial markets, such as the internet bubble and the subprime crisis, repeatedly remind all participants and observers of financial markets that market prices of financial assets can deviate from their fundamental values substantially over a long period of time. Brennan (2004) rightfully pointed out in the aftermath of the internet bubble that, "The importance of avoiding episodes of significant mispricing of the aggregate stock market is immense. Not only do such events cause major misallocations of capital, but major market fluctuations disrupt the lives and plans of ordinary citizens who are increasingly being required to venture into the largely unknown and potentially dangerous securities markets in order to provide for their retirement incomes."

A key prerequisite for developing effective policies that keep mispricing under control is to gain a good understanding of the conditions that foster a speculative bubble. Ofek and Richardson (2003) analyze the market conditions during the internet bubble period and identify three key features: (1) internet stocks were subject to substantial short sales restrictions, (2) less sophisticated retail investors actively participated in the trading of internet stocks while institutional investors' participation fell, and (3) publicly tradable shares of internet stocks were in short supply because of lockup agreements. In a theory paper, Hong, Scheinkman, and Xiong (2006) model the speculative value of a tradable share as the value of an option to resell the share in future and prove that, under the three conditions, namely, heterogeneous beliefs among investors, short sale constraints and limited supply of tradable shares, the resale option can become so valuable that the price of a tradable share is much more than the fundamental value of the underlying firm.

The Split Share Structure Reform in China offers a unique opportunity to study the speculative component in the price of tradable shares. On April 29 2005, the China Securities Regulatory

Commission (CSRC) announced a share-structure reform plan that aims to convert all non-tradable shares to be publicly tradable. An important feature of this reform is that non-tradable-share holders must make a payment to tradable-share holders in order to have the latter's approval to gain tradability of their non-tradable holdings.[1] Chinese securities regulators require that these two parties must go through a formal process of negotiations and voting to determine a mutually acceptable payment package. Intuitively, a mutually acceptable payment should depend on the values and proportions of both tradable and non-tradable shares. We develop an analytical model to mathematically formulate the relations between these variables and derive an estimate of the price premium of tradable shares over non-tradable shares. Our estimate of the price premium provides a useful instrument to make inferences about the speculative component in the price of tradable shares.

We expect a significant speculative component in the price of tradable shares in Chinese stock markets because all of the three conditions identified by Ofek and Richardson (2003) and Hong, Scheinkman, and Xiong (2006) existed in China. First, Chinese stock markets are relatively young and populated by individual investors. The Shanghai and Shenzhen Stock Exchanges of China were established in December 1990. Only 14 firms were listed on these two exchanges at the end of 1991. By April 2005, these two exchanges listed 1,353 firms with the total market value of tradable shares equal to RMB 987 billion.[2] Investment funds industry in China has a much shorter history. The first closed-end fund was introduced in March 1998, and the first open-end fund appeared in October 2001. Foreigners were allowed to invest in Chinese market through Qualified Foreign Institutional Investor

[1] Firth et al. (2010) and Li et al. (2011) discuss reasons for such compensation. First, non-tradable-share holders benefit from the reform because their shares gain liquidity. On the other hand, tradable-share holders may suffer from the adverse price impact associated with a large increase in the supply of tradable shares. Second, giving shares to tradable-share holders in exchange for liquidity of their shares, non-tradable-share holders gain from risk sharing and diversification of their investments. Third, the Chinese government effectively controls the majority of non-tradable shares. As the government is eager to complete the reform quickly and smoothly, non-tradable-share holders tend to give generous compensation to tradable-share holders.

[2] The exchange rate was RMB 8.2765 for US$1 in April 2005. At this rate, the total market value is about US$ 119.25 billion. On July 21 2005, Chinese government adjusted the exchange rate to RMB 8.11 for US$1 and allowed it to fluctuate within a ±0.3% band.

(QFII) only in November 2002. Given such a short market history, investors often have diverse views on the fundamental value of listed firms.

Second, there are few means to take advantage of overvalued shares. Short-sale of stocks was strictly prohibited in China before October 2008, and is still partially restricted now. Investors cannot short sell stocks synthetically with options because equity options are almost nonexistent. Listed firms must seek approval from regulatory agencies and meet restrictive criteria in order to issue new equity.[3] The stringent criteria and lengthy approval process severely constrain the ability of firms to increase share supply when their own stocks are overvalued.

Third and last, the supply of tradable shares (i.e., float) is very limited for Chinese listed firms. Before Chinese regulators initiated the Split Share Structure Reform in April 2005, only one third of the shares issued by a listed firm to domestic investors were publicly tradable. The other two thirds, mainly owned by Chinese government agencies or government-linked enterprises, were not publicly tradable. Other than the difference in tradability, these two classes of shares have identical rights and payoff structure. Chen and Xiong (2001) collect transaction prices of non-tradable shares of 258 Chinese firms in auctions and private placements and compare them with the market prices of tradable shares. They report that non-tradable shares were sold at a price discount of 78% for auctions and 86% for private placements.

In this study, we are able to estimate the price premium of tradable shares for a large sample of 722 firms. We use cross-sectional regressions to test whether the price premium of tradable shares is significantly related to variables that proxy for speculation in tradable shares. Our results show that, after controlling for differences in liquidity and profitability, the price premium of tradable shares is positively related to dollar trading volume, negatively related to stock price, and lower for firms with

[3] For example, during the period between 1996 and 1998, listed firms were required to achieve a minimum return on equity of 10 percent in each of the previous three years before they could apply for permission to issue additional shares (Chen and Yuan (2004)).

both A- and B-shares than for firms with only A-shares.[4] The evidence confirms that the price premium of tradable shares over non-tradable shares is partly due to speculation.

We then examine whether the float has a significant impact on speculative trading in tradable shares. One immediate consequence of the Split Share Structure Reform is the increase in the supply of tradable shares; in fact, the supply of tradable shares of our sample firms increased by 31% on average since the first trading day after the reform is completed. The theory of Hong, Scheinkman, and Xiong (2006) predicts that a larger float has a dampening effect on share turnover, and the dampening effect ought to be stronger for firms that were highly speculated before the reform than for those that were subject to less speculation. Consistent with this prediction, our analysis shows that, in the first month after the reform, the average daily share turnover of highly speculated firms increased by 2 times relative to the average turnover in the last month before the reform, whereas the average of less speculated firms increased by 4.5 times. The evidence, together with our findings from the cross-sectional regression analysis of tradable-shares' price premium, supports the hypothesis that the price of tradable shares before the reform contains a speculative component and the increase in float after the reform dampens speculative trading.

Ofek and Richardson (2003) analyze the meltdown period of the Internet stock bubble to understand the market conditions that play an important role in the stock bubble. During this period, the market factor dominated and many high-beta firms (such as growth and technology stocks) that had nothing to do with the Internet also declined precipitously. When investors stampeded to withdraw from the market, poor market return explains most of the internet stock decline and the float has a very small effect. Our study avoids the confounding effect of a market-wide crash and is better able to determine whether float plays a role in the formation and bursting of speculative price bubbles.

[4] A total of 90 listed firms in China have issued both A-shares and B-shares. These two classes of shares have identical payoff structure, but only domestic investors and QFII can own and trade A-shares. B-shares were initially issued to foreign investors and denominated in US dollar or Hong Kong dollar. Before the government relaxed the restriction in November 2001, only foreign investors could own and trade B-shares. Since then, both domestic citizens and foreign investors can own and trade B-shares.

Since all Chinese-listed firms must implement the reform and the float of firms in our sample increased by 31.3% on average after the reform was completed, we have a good opportunity to study the impact of float increase on the degree of speculation over a wide range of stocks rather than limited in a specific industry. More importantly, firms completed the reform at different times, thereby avoiding the earlier-mentioned confounding effect. These features make our research setting attractive for analyzing the impact of float on speculative price premium.

The rest of the paper is organized as follows. Section 2 describes the Split Share Structure Reform in China in details. Section 3 develops our research methodology and hypotheses. Section 4 presents our main empirical results. Section 5 shows robustness analysis on the speculation effects. Section 6 concludes the paper.

2. The Split Share Structure Reform in China

2.1. The Split Share Structure Reform of April 2005

Prior to April 2005, only one third of the shares issued by exchange-listed firms in China are publicly tradable. The other two thirds, primarily owned by Chinese government agencies or government-linked enterprises, are prohibited from public trading. This split share structure is the result of partial privatization of state-owned enterprises (SOE). Walter and Howie (2003) and Sun and Tong (2003) include more details of China's share issue privatization.

Over the past years, it becomes clear that the split share structure has severe negative consequences. Non-tradable-share holders have the controlling power to determine corporate policies, but their wealth is unrelated to the market price of tradable shares. As a result, market price and investor behavior neither reflect nor affect fundamental values of listed firms (Allen, Qian, and Qian (2005)). Moreover, since the state owns two-thirds of a listed firm, no other owner can acquire the controlling interests through market transactions. There are few market-driven takeovers and mergers. The state is only a notional controlling owner and unable to supervise corporate actions closely. The rights of minority shareholders are frequently violated. Related party transactions are common that

siphon assets from the company at the expenses of minority shareholders (Cheung, Rau, and Stouraitis (2010)).

Chinese regulators developed a reform plan to change the split share structure and announced it on April 29 2005. An important feature of this plan is that non-tradable-share holders are required to make a payment to tradable-share holders in order to gain tradability of their shares. The objective is to make non-tradable-share holders share their economic gains with tradable-share holders and thus to stabilize stock price.

The reform stipulates a process of negotiations and votings that listed-firms must follow in order to protect the interests of both tradable-share holders and non-tradable-share holders. Figure 1 illustrates a typical restructuring process. The process features two trading suspensions.

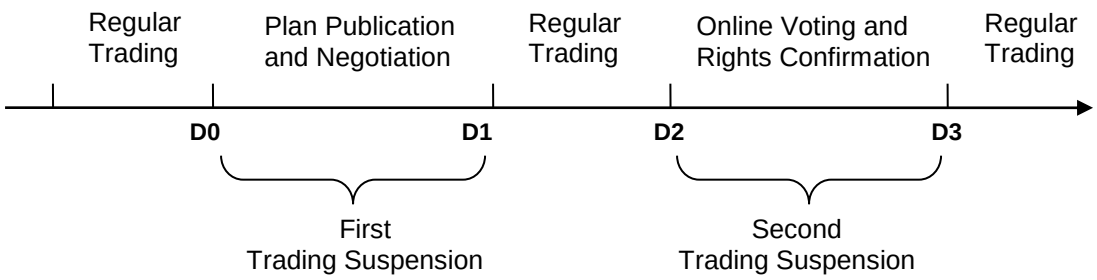

Figure 1
Restructuring Process

Before the first trading suspension, the company invites major non-tradable-share holders to propose how much they are willing to pay to tradable-share holders. Non-tradable-share holders can design a payment package that includes a combination of giving shares, cash and/or options to tradable-share holders. After non-tradable-share holders reach an agreement among themselves on a payment package, the company announces this initial proposal to the public after market trading is closed on day D0, and trading is suspended from the next trading day onward.

During the first trading suspension period, the company invites tradable-share holders to review the proposal and give their feedback. This gives tradable-share holders an opportunity to negotiate with non-tradable-share holders. If tradable-share holders voice strong dissatisfaction of the

initial proposal, non-tradable-share holders are expected to raise their payment, because the final payment package must be approved by tradable-share holders via voting at an extraordinary shareholders meeting. Indeed, for a sample of 722 restructured firms whose payment package involves only giving shares to tradable-share holders, we found that 647 of them changed their initial proposals in this round of negotiation.

After non-tradable-share holders finalize their payment proposal, trading resumes on day D1 and continues until day D2. Tradable-share holders who hold shares at the closing of day D2 have the right to cast a vote for or against the proposal during the second trading suspension period. The proposal is approved only if more than two thirds of the tradable shareholders who participate in the voting support it. If approved, the proposal will be implemented before trading resumes on day D3.

2.2. An Example of the Restructuring Process

Table 1 chronicles the events and changes in share structure that occurred in the restructuring process of Tong Ren Tang, a well-known traditional Chinese medicine company listed on the Shanghai Stock Exchange. Before the reform, the company has 434 million outstanding shares, 64.2% of them are non-tradable and the rest 35.8% tradable. The company's closing price on October 15 2005 is RMB 20.38. After trading is closed on this day (i.e. D0), the company announced that non-tradable-share holders are willing to pay 0.22 shares for every share held by tradable-share holders. Trading is suspended from the next trading day.

[Table 1 is about here.]

During the trading suspension period, tradable-share holders voiced strong dissatisfaction of the proposed payment ratio. In response, non-tradable-share holders increased the ratio to be 0.25 shares for every tradable share.

Trading then resumed on October 27 2005 (i.e. D1) and continued until November 10 2005 (i.e. D2), which is the shareholder registration day. Investors who hold tradable shares at the closing of day D2 are asked to cast their votes on the payment proposal. The proposal was approved by

tradable-share holders who participated in the voting with an approval rate of 98.8%. The plan was implemented on November 25 2005.

At the time when trading is resumed on November 30, the company's share structure has changed. The proportion of shares in the hands of non-tradable-share holders decreased from 64.2% to 55.24%, while the proportion of shares in the hands of tradable-share holders increased from 35.8% to 44.76%. Although shares in the hands of non-tradable-share holders are legally tradable on November 30, non-tradable-share holders often voluntarily promise not to sell them within the first one or two years after the reform. In contrast, all of the 44.76% shares in the hands of tradable-share holders are immediately tradable on November 30, which constitutes a substantial jump in the float of tradable shares. The closing price on November 30 is RMB 15.40, which is much lower than the last closing price of RMB 20.38 before the reform.

3. Methodology and Hypotheses

3.1. Price Premium of Tradable Shares Relative to Non-tradable Shares

It is usually impossible to assess the speculative component in the market price of a stock, because we do not know the fundamental value of the underlying firm. The Split Share Structure Reform in China provides us a unique opportunity to make inferences about the speculative component in the price of tradable shares. The reform requires non-tradable-share holders make a payment to tradable-share holders in order to acquire tradability of their shares. In the process of implementing the reform, non-tradable-share holders and tradable-share holders must go through negotiations and votings to determine a mutually acceptable payment package (see Section 2.2 for the details). Intuitively, the payment amount should depend on the value of non-tradable shares relative to the market price of tradable shares. The larger the difference between the market price of tradable shares and the value of non-tradable shares is, the higher payment tradable-share holders demand from non-tradable-share holders. In the following, we develop a simple mathematical model that relates the

payment to the value of non-tradable shares, the market price of tradable shares, and the share structure of the firm.

Let N_1 and N_2 represent the number of non-tradable shares and the number of tradable shares before Split Share Structure Reform. Let b represent the bonus share ratio, that is, the number of shares that non-tradable-share holders give to tradable-share holders for every tradable share the latter own before the reform.[5] After share restructuring is completed, the number of shares that remain in the hands of the original non-tradable-share holders will decrease to $N_1 - b \cdot N_2$ and the number of shares that are held by the tradable-share holders will increase to $N_2 + b \cdot N_2$.

Let P_{10} be the unobservable value of non-tradable shares before the reform, and P_{20} be the market price of tradable shares before the reform. Let P represent the price of all shares after share restructuring is completed. We can write the following mathematical equations for the total gain to the firm value after the reform (i.e. Z), the gain to non-tradable-share holders (i.e. Z_1), and the gain to tradable-share holders (i.e. Z_2):

$$Z = (N_1 + N_2) \cdot P - (N_1 \cdot P_{10} + N_2 \cdot P_{20}), \tag{1}$$

$$Z_1 = (N_1 - b \cdot N_2) \cdot P - N_1 \cdot P_{10}, \tag{2}$$

$$Z_2 = (N_2 + b \cdot N_2) \cdot P - N_2 \cdot P_{20}. \tag{3}$$

We assume that non-tradable-share holders and tradable-share holders divide the total gain Z in proportion to the number of shares they own after restructuring. Based on the assumption, we can write the following mathematical equations:

$$Z_1 = \frac{N_1 - b \cdot N_2}{N_1 + N_2} \cdot Z \tag{4}$$

$$Z_2 = \frac{N_2 + b \cdot N_2}{N_1 + N_2} \cdot Z \tag{5}$$

[5] All these figures refer to only A-shares because the reform does not involve B-shares.

By substituting Equations (1) and (2) into Equation (4) and rearranging, we obtain

$$-a\cdot(1-a)\cdot P_{10} = b\cdot a\cdot(1-a)\cdot P_{10} - a\cdot(1-a)\cdot P_{20} + b\cdot(1-a)^2\cdot P_{20} \qquad (6)$$

where $a = \dfrac{N_1}{N_1 + N_2}$ is the proportion of non-tradable shares.

Let L represent the percentage price difference between tradable and non-tradable shares, that is,

$$L = \frac{P_{20} - P_{10}}{P_{10}}. \qquad (7)$$

By combining Equations (6) and (7) and canceling the unobservable value of non-tradable shares P_{10}, we can write L as

$$L = \frac{b}{a - b + a\cdot b}. \qquad (8)$$

According to this formula, the price premium L is positive as long as $b < \dfrac{a}{1-a}$. The proportion of non-tradable shares a is more than 50% for most Chinese listed firms, and thus the upper bound $\dfrac{a}{1-a}$ is larger than 1. At the same time, the bonus share ratio b is always less than 1. Therefore the formula yields positive price premiums for Chinese listed firms.

More importantly, this formula relates the price premium of tradable shares to the bonus share ratio b and the proportion of non-tradable shares a. Since both a and b are observable, we can use this formula to calculate the price premium of tradable shares, and then study whether the price premium contains a speculative component in the market price of tradable shares.

Our model is a simplified representation of the complicated restructuring process that tradable-share and non-tradable-share holders must go through. By focusing on the economic relations between the price premium, the bonus share ratio and the share structure, this model provides a means to estimate the price premium of tradable shares. The cross-sectional regressions in Section

4.2 show that the estimated price premium is significantly and reasonably related to firm-specific variables such as return on equity (ROE), return on assets (ROA), market capitalization, percentage of daily zero return, etc. The evidence suggests that our simple model correctly capture the key economic considerations underlying the restructuring process. Cumming and Hou (2014) argued that the consideration was not systematically underpaid and the reform was fair at the market level. Chen et al. (2011) used similar model to study the agency problems in the reform.

3.2. Speculative Component in the Price of Tradable Shares

Several theoretical and empirical studies indicate that non-tradable shares ought to have a lower value than tradable shares. Longstaff (1995) uses an option pricing framework to show that trading restriction reduces share values. Silber (1991) studies restricted stocks that cannot be traded in the open market in the first year of placement, and finds that the issue price of restricted stocks is set much lower than the prevailing market price at an average discount of 33.75%. In China, although non-tradable shares cannot be publicly traded, they are sometimes allowed to be transferred from one owner to another through private placements and auctions. Chen and Xiong (2001) collect the auction and private placement prices of non-tradable shares of 258 Chinese firms and compare them with the market prices of tradable shares. They report that the price discount of non-tradable shares is 78% for auctions and 86% for private placements. All of these studies attribute the price premium of tradable shares to the lack of liquidity in non-tradable shares.

Recent studies, however, suggest that the price of tradable shares contain a speculative component. The resale option of tradable shares tends to inflate stock prices above its fundamental value because investors anticipate a buyer willing to pay more in the future and thus are willing to pay prices that exceed their own assessment of current fundamental value (Harrison and Kreps (1978); Scheinkman and Xiong (2003)). When investors hold heterogeneous beliefs and there exists short-sale constraints, the pessimistic group lack of means to participate and stock price only reflects the beliefs of the optimistic group, which results in an upward bias in stock price (Miller (1977); Chen, Hong, and

Stein (2002)). Studies of the internet bubble in the U.S. markets, such as Ofek and Richardson (2003) and Hong, Scheinkman, and Xiong (2006), suggest that, in the presence of heterogeneous belief and short-sale constraints, a limited supply of tradable shares magnifies the upward bias associated with the resale option and investor optimism.

Similar to the market conditions during the U.S. internet bubble period, Chinese stock markets are dominated by inexperienced investors who are likely to hold diverse views, do not allow short sales, and have a very limited supply of tradable shares before the Split Share Structure Reform. Therefore, the theory predicts that the price of tradable shares in Chinese stock markets contains a speculative component. Moreover, because non-tradable shares have little speculative value, the speculative component in the price of tradable shares must be part of the price premium of tradable shares over non-tradable shares. In the following, we test whether the price premium is positively related to the degree of speculation.

We use three variables to proxy for the degree of speculation. The first variable is trading volume. The theory of Hong, Scheinkman, and Xiong (2006) shows that speculative trading inflates stock price and increases trading volume. Thus trading volume is a reasonable proxy for the intensity of speculative trading.

A second variable to proxy for speculative trading is a dummy variable that is equal to one if a listed firm has both A- and B-shares and zero otherwise. A large literature documents that A-shares have a higher price than B-shares in China. Various explanations have been put forth to explain the B-share discount. Mei, Scheinkman, and Xiong (2009) suggest that part of the B-share discount is due to intense speculation in A-shares. On the other hand, since the B-share price serves as an anchor that helps to prevent price from deviating too far away from the fundamental value, the influence of speculation on A-share prices is likely to be even greater for firms with only A-shares. We thus expect a lower price premium for firms that have both A- and B-shares.

A third variable to proxy for speculation is the level of stock price. We sort 722 firms in our sample by stock price into three groups and find that funds hold only about 1.70% of tradable-shares

for firms that belong to the lowest price group.[6] This means that low-price stocks are very likely traded by individual investors. In the theory of Hong, Scheinkman, and Xiong (2006), the resale option value is an increasing function of the degree of behavioral bias. Most individual investors in China are inexperienced and are prone to the influence of behavioral bias. We thus expect that low-price stocks are likely to have a larger speculative component.

In summary, we expect the following hypothesis is true:

Hypothesis 1: *The price premium of tradable shares is positively related to trading volume, negatively related to stock price, and lower for firms that have both A- and B-shares.*

We run a cross-sectional regression analysis of the price premium to test this hypothesis. In addition to the three proxies for speculation, we include other variables in the regression to control for factors that potentially have an impact on the price premium. First, a large literature, pioneered by Amihud and Mendelson (1986, 1991), demonstrates that liquidity has a significant impact on the price of tradable shares. To the extent that liquidity affects the cross-sectional variation in the price of tradable shares, it is likely to affect the cross-sectional variation in the price premium. Trading volume, share turnover, and market capitalization are commonly used to proxy for the level of liquidity (See, e.g., Stoll and Whaley (1983), Pagano (1989), and Brennan and Subrahmanyam (1995)). Recently, Lesmond, Ogden, and Trzcinka (1999) find that the percentage of zero return days proxies for liquidity because if transaction costs inhibit more informed investors from trading, more zero returns will be observed. Bekaert, Harvey, and Lundbald (2003) and Lesmond (2005) recommend that the percentage of zero return days be a principal liquidity proxy in emerging markets. Therefore, we include the percentage of zero return days, in addition to trading volume and market capitalization, to control for the effect of liquidity on the price premium.

[6] We obtain funds' holdings of tradable shares in Chinese listed firms from the CSMAR database. The results are not tabulated for the sake of brevity, but available upon request.

Second, Longstaff (1995) analyzes the effect of trading restriction on security values using an option pricing framework. He shows that the value loss due to trading restriction is related to volatility of the share prices. Thus, we include the volatility of the price of tradable shares in the regression.

Last but not least, Silber (1991) and Chen and Xiong (2001) find evidence that the price difference between tradable shares and restricted (or non-tradable) shares is negatively related to firm profitability. The rational is that non-tradable shares of profitable firms tend to have a better chance of finding a potential buyer through private placement and thus are more valuable. Thus, we include the profitability measures, ROE and ROA, in the regression.

3.3. Float and Speculation

One consequence of the Split Share Structure Reform is that the supply of tradable shares increases substantially. For our sample of 722 firms that completed the reform, the supply of tradable shares jumped on average by 31% on the first trading day after the reform is completed. With more tradable shares available, investors would find it easier to complete a trade. Thus we expect share turnover and trading volume to increase after the reform.

On the other hand, an increase in float can have a dampening effect on speculative trading. The theory of Hong, Scheinkman, and Xiong (2006) suggests that the value of the resale option is negatively related to public float. Increases in public float reduce the option value and lower investors' incentives to buy shares, which helps to dampen speculative trading. Ofek and Richardson (2003) argue that concentrated expiration of lockup agreements in early 2000 made a great number of shares available for trading, which significantly reduced trading activities. Thus, although the post-reform increase in float may raise share turnover and trading volume for all firms, we expect firms that were highly speculated before the reform have smaller increase in share turnover and trading volume than those that were less speculated. Our second hypothesis is:

Hypothesis 2: *Share turnover and trading volume increase after the reform. Firms that were highly speculated before the reform have smaller increase than firms that were less speculated.*

4. Empirical Results

4.1. Data Sources and Preliminary Statistics

We collect data about individual firms' share restructuring plan, and all the other firm-specific information, such as return on equity (ROE), return on assets (ROA), daily stock prices, and daily trading volume, total number of tradable shares outstanding, and total number of shares outstanding from the China Stock Market & Accounting Research (CSMAR) database.

A total of 1261 firms completed the Split Share Structure Reform before December 31, 2009. Among them, 804 firms adopted a payment package that simply transfers shares from non-tradable-share holders to tradable-share holders as the only means of payment. Other firms adopted more complicated payment packages that often include giving options to tradable-share holders. Our empirical analysis focuses on firms whose payment package consists of only bonus shares because the methodology we develop in Section 3.1 applies only to such firms. We exclude 29 firms which carried out IPOs after April 28, 2005 and 34 firms with negative earnings for two or three consecutive years. Some firms went through the reform for a long time due to some complicated reasons. For example, Beijing Vantone Real Estate Co., Ltd (stock code: 600246) announced to start the reform on March 20, 2006, but could not finalize the reform proposal until a substantial share restructuring happened on June 2, 2006. We exclude from our sample 19 firms that took more than or equal to 150 days to complete the reform process. We have 722 firms in the final sample. Table 2 describes our sample firms in each batch of reform. It took, on average, 57 days (or 51 days in median) to complete the reform process.

[Table 2 is about here.]

Table 3 summarizes the characteristics of firms in our sample. Our sample firms have an average of 159 million A-shares outstanding before the Split Share Structure Reform. The proportion

of tradable shares before the reform is, on average, 35.8% of all issued A-shares. The average bonus share ratio is 0.31; that is, non-tradable-share holders transferred 0.31 shares to tradable-share holders for every tradable share that the latter owned before the reform. Because these shares are immediately available for public trading, this means the supply of tradable shares increased by 31% on the first trading day after the reform is completed.

[Table 3 is about here.]

Equation (8) in Section 3.1 relates the price premium of tradable shares over non-tradable shares to the proportion of non-tradable shares and the bonus share ratio. We use the equation to calculate the price premium of tradable shares for each firm given the observed proportion of non-tradable shares and the bonus share ratio. The average price premium of tradable shares across our sample firms is 62%; that is, the price of tradable shares is on average 62% higher than the value of non-tradable shares.

4.2. Speculative Component in the Price Premium of Tradable Shares

In this section, we test whether the price premium of tradable shares contains a speculative component. As we discuss in Section 3.2, if part of the price premium is due to speculation, we expect that the price premium is related to three variables that proxy for the extent of speculation, namely the trading volume, the dummy variable that represent firms that have both A-shares and B-shares, and the level of stock price. We include the three variables and some control variables in the cross-sectional regression of the price premium:

- Return on equity (ROE) and return on assets (ROA) for the fiscal year 2004
- Percentage of zero return days in the one-year period before April 29 2005
- Daily return volatility, measured by the standard deviation of daily returns in the one-year period before April 29 2005

- Market capitalization (in million RMB), calculated as the closing price on April 28 2005 multiplied by the number of tradable A-shares before the reform, in natural logarithm
- Average daily trading volume (in million RMB) for the one-year period before April 29 2005, in natural logarithm
- Reciprocal of the closing price (in RMB) on April 28 2005
- A dummy variable that equals one if the company has both A- and B-shares, and zero otherwise. Seventy five firms in our sample have both A- and B-shares.

Table 3 reports summary statistics on these variables. The market price of tradable A-shares ranges from 1.70 RMB to 31.7 RMB at the closing of April 28 2005, which is the day before CSRC announced the reform plan to abolish the split-share structure. The average price is 5.6 RMB. Market capitalization ranges from 56.3 million RMB to 17 billion RMB with the mean of 730.4 million RMB. The average daily dollar volume during the one-year period before April 29, 2005 varies considerably across our sample firms, with the minimum of 0.12 million RMB, the maximum of 236 million RMB and the mean of 9.2 million RMB. The majority of our firms are profitable; the first quartile of ROE is 3.15%, and the first quartile of ROA is 1.47%. The proportion of trading days with a zero return in the one-year period before April 29 2005 ranges from 0 to 12.1% and has an average of 3.74%. The return volatility is the standard deviation of daily returns in the one-year period before April 29 2005, and the average volatility across our sample firms is 2.5%.

Panel A of Table 4 reports correlation coefficients between these variables. Trading volume and market capitalization are highly correlated with a correlation coefficient of 0.76, while ROE and ROA are highly correlated with a correlation coefficient of 0.67. The other correlation coefficients seem reasonable and unlikely to cause multicollinearity problem.

[Table 4 is about here.]

Panel B of Table 4 reports the estimated coefficients from four regressions of the price premium of tradable shares on these variables. Because ROE is highly correlated with ROA and

trading volume is highly correlated with market capitalization, we include them in separate regressions. Consistent with the evidence in Silber (1991) and Chen and Xiong (2001), the profitability measures, ROE and ROA, are significantly negative in all regressions. Volatility is insignificant in all regressions. The coefficient of the percentage of daily zero return days is significantly negative at the 5% level in all four regressions. This is expected as stocks that have high percentage of zero-return days tend to have high transaction costs, and thus lower price premium.

The coefficients of market capitalization are significantly positive at the 5% or 1% level in all regressions. The coefficients of trading volume are significantly positive. This is consistent with our hypothesis that firms of high trading volume tend to be highly speculated and thus have high price premium.

More importantly, the last two variables in the regression help to identify the impact of speculative trading. In Section 3.1, we define the price premium as the price of tradable shares before reform divided by the value of non-tradable shares before reform, minus 1. The price premium would be negatively related to the reciprocal of share price if the value of non-tradable shares before reform was fixed across all firms. However, we find that the correlation coefficient between the price premium and the reciprocal of share price is positive, and the coefficient of the reciprocal of share price is significantly positive at 1% level in all four regressions. This supports our hypothesis that low-price stocks are populated by individual investors, are subject to stronger speculation, and thus have higher price of tradable shares. On the contrary, the liquidity effect would predict a negative coefficient of this variable because low-price stocks tend to have higher transaction costs, higher required return, and thus lower price of tradable shares.

The last variable is the dummy variable that equals one for firms that have both A- and B-shares. The variable is significantly negative in all four regressions, which means a smaller price premium for firms that have both A- and B-shares. The result supports our hypothesis that B-share prices serve as an anchor that helps to curb speculation and prevent A-share prices from deviating too far. Thus speculation has a stronger effect on the price premium of firms that does not have B-shares.

This effect cannot be explained by liquidity, especially after we control for liquidity-related variables such as the percentage of zero-return days, trading volume, and market capitalization. Mei, Scheinkman, and Xiong (2009) find that, for firms that have both A- and B-shares, the price difference between A-shares and B-shares is partly due to speculation. Our evidence here suggests that speculation has a stronger effect on stock price for firms that have only A-shares.

In summary, we find that tradable shares of Chinese listed firms have an average price premium of 62% over non-tradable shares. The price premium is significantly related to variables that measure firm profitability, liquidity and transaction costs. This reassures that our model in Section 3 provides reasonable estimates of the price premium. More importantly, the price premium is significantly related to the three variables we use to proxy for speculation in stock market, namely the trading volume, the price level and the existence of B-shares. Based on the evidence, we conclude that there is a speculative component in the price of tradable shares in Chinese stock markets.

4.3. Float and Speculative Trading

The average bonus share ratio in Table 3 is 0.31 for firms in our sample. This means, the supply of tradable shares (i.e. the float) of these firms jumped by 31% on the first trading day after the reform is completed. In Section 3, we hypothesize that share turnover and trading volume increase after the reform, and firms that were highly speculated before the reform have smaller increase than firms that were less speculated.

First, we examine the evidence on share turnover. We calculate the change in daily share turnover of a restructured firm as the average daily turnover after reform divided by the average daily turnover before reform, minus 1. We calculate daily turnover as the number of A-shares traded in a day divided by the total number of outstanding tradable A-shares. The average daily turnover *before reform* is for the 30 trading days just before the China Securities Regulatory Commission (CSRC) announced the new reform plan on April 29 2005. We choose this pre-reform period to avoid the

impact of the announcement on trading activities after April 29 2005. The average daily turnover *after reform* is for the first 30 trading days immediately after the reform is completed.

To test the impact on speculative trading, we separate firms that were highly speculated before the reform from those that were less speculated. Our sample reduces to 676 restructured firms after we select control firms for each restructured firm. We delete those restructured firms which do not have enough control firms according to some rules. We will introduce the rules soon later. Since trading volume is a commonly used proxy for the extent of speculation, we rank firms by the average daily trading volume[7] (in million RMB) for the one-year period before April 29 2005. We classify firms that are ranked above the median as the highly speculated ones, and firms below the median as the less speculated ones. Because speculative trading is more intense for highly speculated firms than for less speculated ones, our hypothesis predicts a smaller increase in share turnover for highly speculated firms.

Panel A of Table 5 reports the summary statistics of the changes in share turnover for these two groups of firms. Firms have much greater trading activities after the reform than before the reform. Share turnover of highly speculated firms, on average, increased by a factor of 2.0, while share turnover of less speculated firms, on average, increased by a much larger factor of 4.5. The conventional *t* and Wilcoxon tests show that the differences in mean and median between these two groups are statistically significant at 1% level.

[Table 5 is about here.]

However, the outcome from these conventional tests may be unreliable because the changes in share turnover are potentially correlated across our sample firms. The correlation arises because we measure the change in share turnover for all restructured firms based on the same pre-reform period (i.e. the 30 trading days just before April 29 2005). Bernard (1987) and MacKinlay (1997) suggest

[7] We also use turnover as a proxy for the extent of speculation. We rank firms by the average daily turnover for the one-year period before April 29 2005. We classify firms that are ranked above the median as the highly speculated ones, and firms below the median as the less speculated ones. We find similar results. Relevant tables can be provided upon request.

that randomization tests can be used to overcome potential biases caused by the correlation between sample observations. Thus, we conduct the following randomization test on the difference between highly speculated and less speculated firms.

For each of the 676 restructured firms in our sample, we find three control firms that are in the same industry as the restructured firm, started the reform after the restructured firm completed the reform, and have the closest market capitalization. We calculate the change in share turnover of each control firm in the same way as we calculate the change for the restructured firm.

We then simulate an empirical distribution of the mean difference between highly speculated and less speculated restructured firms, using the changes in share turnover of the control firms. Specifically, we randomly select one out of the three control firms to replace each restructured firm in our sample. This generates a pseudo sample of 676 control firms. This sample is then divided into highly speculated and less speculated groups based on the classification of the respective restructured firms. We calculate the mean of the changes in share turnover for these two groups, and record the difference between these two means. We repeat this process 200 times.[8] The 200 differences we obtained constitute an empirical distribution of the difference in the average change of share turnover, against which we can test the significance of the actually observed difference between highly speculated firms and less speculated ones. If the actual difference is below the 1% percentile of the empirical distribution, we conclude that these two groups are significantly different at the 1% level. We also conducted a randomization test on the difference in the median change of share turnover in the same way. In the last three columns of Table 5, we report the 1st, 5th and 10th percentiles of this empirical distribution. The results show that both mean and median differences are significant at the 1% level under this randomization test.

We are not aware of any events or factors concurrently with the form that led to sharp increase in share turnover. Other than increasing the supply of tradable shares, the reform

[8] We also repeat the process 500 times and obtain qualitatively the same results.

does not change firm characteristics that attract investors to speculate on such stocks. Highly speculated firms should have a larger increase in share turnover. The fact that these firms have a much smaller increase in turnover is strong evidence that speculative trading declined in such firms after the reform.

Now, we examine the evidence on trading volume. For every restructured firm, we calculate the change in daily trading volume as the average daily trading volume after reform divided by the average daily trading volume before reform, minus 1. The average daily dollar volume before reform is based on the 30 trading days just before April 29 2005. The average daily dollar volume after reform is based on the first 30 trading days immediately after the reform is completed. Panel B of Table 5 reports the summary statistics of the change in trading volume. We observe the same pattern as in Panel A of the same table. The mean (median) change in trading volume of highly speculated firms is 3.2 (2. 0), whereas the mean (median) change in trading volume of less speculated firms is 6.7 (4.0). The difference between these two groups is statistically significant under both conventional and randomization tests.

In summary, firms that completed share restructuring experience a significant increase in share turnover and trading volume. But highly speculated firms have significantly smaller increase in turnover and trading volume than less speculated ones. The evidence supports our hypothesis that an increase in the float of tradable shares dampens speculative trading.

5. Robustness of the Speculation Effect

5.1. Liquidity and size subsamples

In this subsection, we conduct a robustness study by examining liquidity sub-samples of restructured firms. In particular, we are interested to know whether the difference between highly speculated firms and less speculated ones is significant regardless the liquidity level of tradable shares. We follow Bekaert, Harvey, and Lundbald (2003) and Lesmond (2005) to use the percentage of zero

return days as a measure of liquidity. We rank all firms in our sample by the percentage of zero return days. We classify firms that are ranked above the median as low liquidity firms, and firms below the median as high liquidity ones. We then replicate our analysis in Section 4.3 for these two liquidity subsamples separately.

Panel A of Table 6 report the results for the subsample of high liquidity firms. There are 338 high liquidity firms, out of which 200 are highly speculated before the reform and 138 are less speculated. On average, share turnover of highly speculated firms increased by a factor of 1.8, while share turnover of less speculated firms increased by a much larger factor of 3.5. Similarly, trading volume of highly speculated firms on average increased by a factor of 2.8, while trading volume of less speculated firms increased by a much larger factor of 5.1. The randomization test shows that the differences between highly speculated firms and less speculated ones are statistically significant at the 1% level.

[Table 6 is about here.]

Panel B of Table 6 reports the results for the subsample of low liquidity firms. There are 338 low liquidity firms, out of which 138 are highly speculated before the reform and 200 are less speculated. On average, share turnover of highly speculated firms increased by a factor of 2.0, while share turnover of less speculated firms increased by a much larger factor of 4.4. Similarly, trading volume of highly speculated firms on average increased by a factor of 3.0, while trading volume of less speculated firms increased by a much larger factor of 6.5. The randomization test shows that the differences between highly speculated firms and less speculated ones are statistically significant at the 1% level.

Next, we use trading volume to classify all firms into highly speculated ones and less speculated ones in Table 5. Because trading volume is closely correlated with size, it is important to know whether the difference between highly speculated firms and less speculated ones is significant after controlling for the size effect. We conduct a robustness study by examining size sub-samples of restructured firms as we do for liquidity subsamples. We use market capitalization, calculated as the

closing price on April 28 2005 multiplied by the number of tradable A-shares before the reform, as a measure of size. Table 7 reports the results. The evidence shows that the difference between highly speculated firms and less speculated ones is significant within each size group. The difference we observed between highly speculated firms and less speculated ones is not due to the difference in size of the two groups of firms.

[Table 7 is about here.]

In summary, the evidence shows that the difference between highly speculated firms and less speculated ones is significant within each liquidity and size group. The changes in share turnover and trading volume after the reform are consistent with the prediction of Hong, Scheinkman, and Xiong (2006) that an increase in public float reduces speculation-induced trading.

5.2. Regression analysis

In this subsection, we conduct a multivariate regression analysis to control for additional factors that may affect the changes of turnover and trading volume after the reform. The factors include return on equity (ROE), volatility, percentage of zero return days, and bonus ratio. They are measured in the same way as in Table 3.

Table 8 reports the regression results for eight models. The dependent variable in the first four models is the change in turnover after the reform, while the dependent variable in the other four models is the change in trading volume. We use two independent variables to proxy for the degree of speculation before the reform: the logarithm of the average daily trading volume and the average daily turnover, both of which are measured over the one year period before April 29, 2005. Since firm size is highly correlated with trading volume (or turnover), we estimate both models with and without the variable of size. The results show that the changes in turnover and trading volume are significantly negatively related to the pre-reform degree of speculation after we control for these influential factors. The evidence is consistent with our hypothesis in Section 3.3.

[Table 8 is about here.]

6. Conclusion

Studies of the internet stock bubble, in particular, Ofek and Richardson (2003), Scheinkman and Xiong (2003), and Hong, Scheinkman, and Xiong (2006), identify a set of market conditions under which a speculative bubble can develop. These conditions include short sale constraints, heterogeneous beliefs among investors, and limited supply of tradable shares. This paper documents strong evidence that, in Chinese stock markets, where all these conditions are met, the price of tradable shares contained a significant speculative component.

Our analysis takes advantage of the unique research setting provided by the Split Share Structure Reform in China. The reform was initiated by Chinese regulators on April 29 2005 in order to convert non-tradable shares of all Chinese listed firms to be publicly tradable. After firms completed the reform, the supply of their tradable shares increased by 31% on average, while share turnover and trading volume also increased substantially. Firms that were highly speculated before the reform had significantly smaller increase in turnover and trading volume than firms that were less speculated. Overall, the evidence supports our hypothesis that a large increase in float dampens speculative trading.

This paper is unique in that we are able to make inferences about the speculative component in the price of tradable shares before the bubble bursts. Our research methodology avoids the potential biases associated with the meltdown of a collapsed bubble. As a result, we provide new evidence on the impact of float on speculative trading and stock price.

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Table 1
Share restructuring process of a Chinese listed firm

Full Name	BEIJING TONGRENTANG CO., LTD
Security Short Name	Tong Ren Tang
Security Code	600085
List Exchange	Shanghai Stock Exchange
Major Products	Traditional Chinese medicine and cosmetic

Restructuring Process

	Date	Milestone	Share Price (RMB)
Start of restructuring (D0)	2005-10-15	• Split Share Structure Reform announced • Non-tradable- and tradable-share holders held 64.19% (state-owned) and 35.81% of total shares respectively	20.38
First trading suspension period	2005-10-17	• Share trading suspended • Draft reform plan published • Non-tradable-share holders promised to pay tradable-share holders 0.22 shares for every share held by tradable-share holders	
	2005-10-26	• Revised reform plan confirmed • Non-tradable-share holders promised to pay tradable-share holders 0.25 shares for every share held by tradable-share holders	
D1	2005-10-27	• Share trading resumed	19.90
D2	2005-11-10	• Rights of receiving the bonus shares recorded	19.92
Second trading suspension period	2005-11-11	• Share trading suspended	
	2005-11-18	• Online voting starting	
	2005-11-22	• Online voting ending	
	2005-11-25	• Plan implemented • Non-tradable- and tradable-share holders held 55.24% (state-owned) and 44.76% of total shares	
End of restructuring (D3)	2005-11-30	• Share trading resumed • All shares held by tradable-share holders, including the bonus shares, are publicly tradable • Non-tradable-share holders promised not to sell their holdings within a year	15.40

Table 2
Sample description

A total of 1261 firms completed the Split Share Structure Reform before December 31, 2009. Among them, 804 firms adopted a payment package that simply transfers shares from non-tradable-share holders to tradable-share holders as the only means of payment. We delete 29 firms which carried out IPOs after April 28, 2005, 34 firms with negative earnings for two or three consecutive years, and 19 firms who took more than or equal to 150 days to complete the reform process. We have 722 firms in the final ample. For each batch, this table reports the date when firms in the batch make a public announcement to start their restructuring process, the number of sample firms in the batch, and the mean, median, smallest, and largest number of days that firms in the batch took to complete the process.

Batch	Announcement Date	# of sample firms in the batch	Mean # of days between Announcement and Completion	Median # of days between Announcement and Completion	Smallest # of days between Announcement and Completion	Largest # of days between Announcement and Completion
1	2005-5-9	25	58	58	46	81
2	2005-9-12	15	47	43	39	77
3	2005-9-19	14	45	44	38	60
4	2005-9-26	17	46	45	39	56
5	2005-10-10	18	50	50	38	66
6	2005-10-17	17	51	49	44	73
7	2005-10-24	13	51	49	42	81
8	2005-10-31	8	59	57	45	84
9	2005-11-7	17	56	53	42	73
10	2005-11-14	18	49	46	38	70
11	2005-11-21	15	55	51	38	88
12	2005-11-28	14	60	49	42	143
13	2005-12-5	15	54	49	42	73
14	2005-12-12	17	55	56	39	81
15	2005-12-19	21	57	57	36	80
16	2005-12-23	29	61	55	46	119
17	2005-12-31	14	65	59	44	104
18	2006-1-9	9	56	53	43	78
19	2006-1-16	16	61	51	43	100
20	2006-1-23	32	58	53	39	119
21	2006-2-13	31	46	43	30	92
22	2006-2-20	29	52	45	35	116
23	2006-2-27	31	59	50	37	105
24	2006-3-6	31	55	49	32	147
25	2006-3-13	13	56	43	32	135
26	2006-3-20	19	57	57	37	92
27	2006-3-27	24	67	58	30	149

28	2006-4-3	11	56	51	37	108
29	2006-4-10	11	50	51	35	63
30	2006-4-17	15	59	56	35	108
31	2006-4-24	20	57	54	43	95
32	2006-5-8	12	73	69	30	137
33	2006-5-15	10	61	54	38	135
34	2006-5-22	11	54	56	30	92
35	2006-5-29	12	52	43	35	114
36	2006-6-5	8	47	43	36	78
37	2006-6-12	10	44	39	32	88
38	2006-6-19	13	51	43	31	147
39	2006-6-26	13	61	51	30	140
40	2006-7-3	8	73	61	36	137
41	2006-7-10	1	64	64	64	64
42	2006-7-17	4	84	80	45	129
43	2006-7-24	3	77	81	65	84
44	2006-7-31	2	44	44	42	45
45	2006-8-7	2	47	47	44	50
46	2006-8-14	2	75	75	44	105
47	2006-8-21	2	57	57	50	64
48	2006-8-28	2	85	85	29	140
49	2006-9-4	1	137	137	137	137
50	2006-9-11	1	74	74	74	74
51	2006-9-18	1	109	109	109	109
52	2006-9-25	4	75	73	49	106
54	2006-10-16	2	57	57	51	63
56	2006-10-30	1	128	128	128	128
58	2006-11-13	4	50	45	43	66
59	2006-11-20	3	49	53	38	56
60	2006-11-27	2	55	55	44	66
61	2006-12-4	1	74	74	74	74
63	2006-12-18	2	86	86	52	120
64	2006-12-25	2	98	98	88	107
65	2006-12-30	4	84	73	48	144
Whole sample		722	57	51	29	149

Table 3
Descriptive statistics

Our sample consists of the 722 firms that are described in Table 2. Share Price (in RMB) is the closing price of April 28 2005, which is the day before the CSRC announced the initiation of the Split Share Structure Reform. Trading Volume (in million RMB) is the average daily dollar volume for the one-year period before April 29 2005. Market Capitalization (in million RMB) is equal to the closing price of April 28 2005 multiplied by the number of tradable A-shares before the reform. Tradable Proportion is the proportion of tradable A-shares to the total number of A-shares before the reform. Bonus Ratio is the number of shares paid by non-tradable-share holders to tradable-share holders for each tradable share. Price Premium of tradable shares is, by definition, the price of tradable shares divided by the price of non-tradable shares minus one, which is estimated by using Equation (8). Return on Equity (ROE) and Return on Assets (ROA) are for the fiscal year ending on December 31 2004. Percentage of Zero Return Days is the percentage of zero return trading days in the one-year period before April 29 2005. Return Volatility is the standard deviation of daily returns in the one-year period before April 29 2005. We collect data from the CSMAR database. This table reports descriptive statistics of these variables.

	# of tradable A-shares (in million)	Tradable Proportion	Bonus ratio	Price Premium	Share Price (in RMB)	Trading Volume (in million RMB)	Market Cap (in million RMB)	ROE	ROA	Percentage of Zero Return Days	Return Volatility
Mean	159.15	35.80%	0.31	0.62	5.55	9.16	730.35	6.25%	3.54%	3.74%	2.53%
Median	98.68	35.85%	0.32	0.59	4.53	4.96	443.33	6.45%	3.11%	3.72%	2.43%
Std. Dev.	325.15	11.10%	0.07	0.23	3.42	15.04	1105.5	21.17%	4.98%	1.76%	0.96%
Min.	8.35	3.54%	0.06	0.11	1.70	0.12	56.27	-490.9%	-40.12%	0.00%	0.98%
Q1	60.00	29.09%	0.28	0.49	3.51	2.75	268.20	3.15%	1.47%	2.49%	2.14%
Q3	169.00	42.47%	0.35	0.71	6.42	9.86	746.95	10.30%	5.29%	4.96%	2.80%
Max.	6500.0	76.12%	0.70	3.25	31.72	236.0	16965	93.68%	45.73%	12.08%	22.7%

Table 4
Speculative component in the price premium of tradable shares

This table reports evidence on the speculative component in the price premium of tradable shares. Price Premium of tradable shares is, by definition, the price of tradable shares divided by the price of non-tradable shares minus one, which is estimated by using Equation (8). We regress the price premium on the following variables: the reciprocal of Share Price, the logarithm of Trading Volume, the logarithm of Market Capitalization, ROE, ROA, the Percentage of Zero Return Days, and Return Volatility. Share Price (in RMB) is the closing price of April 28 2005, which is the day before the CSRC announced the initiation of the Split Share Structure Reform. Trading Volume (in million RMB) is the average daily dollar volume for the one-year period before April 29 2005. Market Capitalization (in million RMB) is equal to the closing price of April 28 2005 multiplied by the number of tradable A-shares before the reform. Return on Equity (ROE) and Return on Assets (ROA) are for the fiscal year ending on December 31 2004. Percentage of Zero Return Days equals the percentage of zero return trading days in the one-year period before April 29 2005. Return Volatility is the standard deviation of daily returns in the one-year period before April 29 2005. Our sample consists of the 722 firms that are described in Table 2. We collect data from the CSMAR database.

Panel A: Correlation coefficients

	1/Price	Ln (Volume)	Ln (Market Cap)	ROE	ROA	Percentage of Zero Return Days	Return Volatility
Price Premium	0.20***	-0.02	-0.01	-0.04	-0.12***	-0.02	0.01
1/Price	1.00	-0.18***	-0.27***	-0.26***	-0.44***	0.33***	0.03
Ln (Volume)		1.00	0.76***	0.12***	0.19***	-0.23***	0.13***
Ln (Market Cap)			1.00	0.19***	0.28***	0.04	-0.08**
ROE				1.00	0.67***	-0.01	-0.07**
ROA					1.00	-0.05	-0.12***
Percentage of Zero Return						1.00	-0.17***
Volatility							1.00

***, **, * Correlation is significant at the 0.01, 0.05 and 0.10 levels (2-tailed).

Panel B. Regressions

The dependent variable is the price premium of tradable shares. Because ROE is highly correlated with ROA and Ln(Volume) is highly correlated with Ln(Market Cap), we include them in separate regressions. The dummy variable equals one if the company has both A- and B-shares, and zero otherwise. Seventy five firms in our sample have both A- and B-shares.

Model	1	2	3	4
Intercept	0.45*** (3.47)	0.13 (0.60)	0.46*** (3.45)	0.14 (0.64)
ROE	-0.41*** (-4.06)	-0.43*** (-4.18)		
ROA			-0.70*** (-3.38)	-0.73*** (-3.55)
Return Volatility	-2.61 (-1.60)	-1.41 (-0.91)	-2.52 (-1.51)	-1.39 (-0.88)
Percentage of Zero-return Days	-0.95** (-2.06)	-1.08** (-2.36)	-0.97** (-2.09)	-1.09** (-2.38)
ln(Volume)	0.01* (1.65)		0.01 (1.55)	
ln(Market Cap)		0.03*** (2.46)		0.02** (2.32)
1/Price	0.43*** (4.15)	0.46*** (4.35)	0.45*** (4.36)	0.48*** (4.55)
Dummy	-0.14*** (-8.21)	-0.14*** (-8.08)	-0.13*** (-7.84)	-0.13*** (-7.72)
Adj. R^2	0.117	0.122	0.111	0.116
# of firms	722	722	722	722

***, **, * Coefficient is significant at the 1%, 5% and 10% levels.

Table 5
Change in share turnover and trading volume

This table reports evidence on the change in share turnover and trading volume after the Split Share Structure Reform is completed. Our sample consists of 676 firms. We deleted 46 firms from the sample of 722 firms that are described in Table 2 because they do not have three control firms. We measure the change in share turnover as (Average daily turnover after reform) / (Average daily turnover before reform) -1. Daily turnover is equal to the daily number of A-shares traded divided by the total number of tradable A-shares. The average daily turnover before reform is based on the 30 trading days just before April 29 2005. The average daily turnover after reform is based on the first 30 trading days immediately after the reform is completed. We rank firms by the average daily trading volume (in million RMB) for the one-year period before April 29 2005, and classify firms that are ranked above the median as "highly speculated firms", and firms below the median as "less speculated firms". We test the difference between highly speculated and less speculated firms by the conventional t and Wilcoxon tests and by a randomization test with control firms. Section 4.3 includes the details on the randomization test. The last three columns give the 1st, 5th, and 10th percentiles of the empirical distribution of the mean (median) difference generated by the randomization test.

	Highly speculated firms	Less speculated firms	Diff.	t and Wilcoxon tests	Distribution based on randomized control samples		
					1%	5%	10%
# of firms	338	338					
A. Change in share turnover after the reform is completed							
Mean	1.995	4.495	-2.500	-6.52***	-0.620	-0.443	-0.420
Median	1.505	3.045	-1.540	-8.64***	-0.430	-0.378	-0.331
B. Change in trading volume after the reform is completed							
Mean	3.219	6.693	-3.474	-6.02***	-1.517	-1.154	-1.034
Median	2.048	3.986	-1.938	-7.63***	-0.677	-0.586	-0.528

***, **, * Coefficient is significant at the 1%, 5% and 10% levels.

Table 6
Analysis of liquidity subsamples

Our sample consists of 676 firms. We deleted 46 firms from the sample of 722 firms that are described in Table 2 because they do not have three control firms. We sort the 676 firms by the percentage of zero return trading days in the one-year period before April 29 2005, and classify firms that are ranked above the median as "low liquidity firms", and firms below the median as "high liquidity firms". We replicate the analysis in Table 5 for each of these two liquidity subsamples separately. Panel A reports the results for high liquidity firms, and Panel B for low liquidity firms.

Panel A. Subsample of high liquidity firms

	Highly speculated firms	Less speculated firms	Diff.	t and Wilcoxon tests	Distribution based on randomized control samples		
					1%	5%	10%
# of firms	200	138					
A.1. Change in share turnover after the reform is completed							
Mean	1.822	3.471	-1.649	-6.05***	-0.891	-0.728	-0.602
Median	1.410	2.848	-1.438	-5.63***	-0.669	-0.581	-0.501
A.2. Change in trading volume after the reform is completed							
Mean	2.802	5.108	-2.306	-5.25***	-2.093	-1.609	-1.492
Median	1.971	3.824	-1.853	-5.13***	-0.721	-0.590	-0.530

Panel B. Subsample of low liquidity firms

	Highly speculated firms	Less speculated firms	Diff.	t and Wilcoxon tests	Distribution based on randomized control samples		
					1%	5%	10%
# of firms	138	200					
B.1. Change in share turnover after the reform is completed							
Mean	1.996	4.373	-2.377	-7.50***	-0.588	-0.440	-0.347
Median	1.641	3.198	-1.556	-6.28***	-0.426	-0.303	-0.237
B.2. Change in trading volume after the reform is completed							
Mean	2.998	6.492	-3.493	-6.53***	-1.441	-0.977	-0.814
Median	2.136	4.243	-2.108	-5.72***	-0.928	-0.715	-0.607

***, **, * Coefficient is significant at the 1%, 5% and 10% levels.

Table 7
Analysis of size subsamples

Our sample consists of 676 firms. We deleted 46 firms from the sample of 722 firms that are described in Table 2 because they do not have three control firms. We sort the 676 firms by their market capitalization, calculated as the closing price on April 28 2005 multiplied by the number of tradable A-shares before the reform, and classify firms that are ranked above the median as "large firms", and firms below the median as "small firms". We replicate the analysis in Table 5 for each of these two size subsamples separately. Panel A reports the results for large firms, and Panel B for small firms.

Panel A. Subsample of large firms

	Highly speculated firms	Less speculated firms	Diff.	t and Wilcoxon tests	Empirical percentiles for randomization test		
					1%	5%	10%
# of firms	261	77					
A.1. Change in share turnover after the reform is completed							
Mean	1.849	4.747	-2.898	-5.81***	-1.102	-0.901	-0.762
Median	1.398	3.181	-1.783	-5.57***	-0.751	-0.500	-0.461
A.2. Change in trading volume after the reform is completed							
Mean	2.794	6.971	-4.177	-4.99***	-1.522	-1.156	-1.028
Median	1.935	4.267	-2.332	-4.91***	-1.149	-0.700	-0.602

Panel B. Subsample of small firms

	Highly speculated firms	Less speculated firms	Diff.	t and Wilcoxon tests	Empirical percentiles for randomization test		
					1%	5%	10%
# of firms	77	261					
B.1. Change in share turnover after the reform is completed							
Mean	2.044	3.786	-1.742	-6.17***	-0.589	-0.428	-0.324
Median	1.806	3.036	-1.230	-4.47***	-0.554	-0.445	-0.389
B.2. Change in trading volume after the reform is completed							
Mean	3.181	5.619	-2.438	-5.11***	-1.636	-1.350	-1.214
Median	2.291	3.935	-1.644	-3.83***	-0.876	-0.776	-0.660

***, **, * Coefficient is significant at the 1%, 5% and 10% levels.

Table 8
Regressions on changes in share turnover and trading volume

This table reports evidence on the change in share turnover and trading volume based on eight multivariate regression models. Our sample consists of the 722 firms that are described in Table 2. Trading Volume (in million RMB) is the average daily dollar volume for the one-year period before April 29 2005. Market Capitalization (in million RMB) is equal to the closing price of April 28 2005 multiplied by the number of tradable A-shares before the reform. Bonus Ratio is the number of shares paid by non-tradable-share holders to tradable-share holders for each tradable share. Return on Equity (ROE) is for the fiscal year ending on December 31 2004. Percentage of Zero Return Days is the percentage of zero return trading days in the one-year period before April 29 2005. Return Volatility is the standard deviation of daily returns in the one-year period before April 29 2005. We collect data from the CSMAR database.

Dependant Variable	Change in share turnover				Change in trading volume			
Model	1	2	3	4	5	6	7	8
Intercept	10.88*** (2.61)	19.33*** (4.80)	24.19*** (8.65)	4.51*** (3.44)	23.40*** (3.13)	36.19*** (4.98)	42.16*** (7.58)	11.01*** (3.99)
ROE	-2.88 (-1.44)	-1.93 (-0.95)	-2.44 (-1.22)	-3.90** (-1.97)	-13.15** (-2.46)	-11.74** (-2.20)	-12.53** (-2.37)	-15.09*** (-2.85)
Return Volatility	36.52 (1.06)	20.55 (0.56)	-42.35 (-1.40)	44.46 (1.25)	39.99 (0.66)	14.31 (0.22)	-71.22 (-1.32)	54.94 (0.85)
Percentage of Zero-return Days	9.45 (1.12)	10.56 (1.29)	14.99* (1.79)	11.13 (1.32)	5.42 (0.30)	7.25 (0.42)	13.24 (0.76)	8.22 (0.46)
Bonus ratio	-2.50 (-1.22)	-2.50 (-1.24)	-3.12 (-1.54)	-1.21 (-0.61)	-11.83*** (-2.75)	-11.84*** (-2.74)	-12.71*** (-2.95)	-9.64** (-2.26)
ln(Market Cap)	1.31*** (3.89)	-0.70*** (-4.01)			1.84*** (3.05)	-1.19*** (-3.80)		
ln(Trading Volume)	-2.20*** (-7.22)		-1.25*** (-7.73)		-3.32*** (-5.83)		-1.98*** (-6.55)	
Average daily turnover		-203.0*** (-8.14)		-212.0*** (-8.52)		-304.4*** (-7.12)		-319.8*** (-7.26)
Adj. R^2	0.160	0.156	0.141	0.137	0.112	0.109	0.104	0.097
# of firms	722	722	722	722	722	722	722	722

***, **, * Coefficient is significant at the 1%, 5% and 10% levels.