The Chinese Stock Market

Marianna Caccavaio
Matriculation Number: 1003888
Università Commerciale Luigi Bocconi
PhD in Economics - XX Cycle

Supervisor: Prof. Andrea Beltratti

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Introduction
Acknowledgments

Chapter 1. Stock Prices in a Speculative Market: The Chinese Split-Share Reform

Abstract
1. Introduction
2. The reform of the Chinese dual-share structure
3. Theoretical price movements without speculation
4. Empirical analysis
    4.1. Methodological issues
    4.2 Data and summary statistics
    4.3. Qualitative characteristics of companies in the various batches of the reform
    4.4 Price reactions
    4.5 Volume and volatility
    4.6 The cross section of abnormal returns
    4.7 Robustness analysis
5. Conclusions
Tables and Figures
References
Footnotes

Chapter 2. The Last Shall be First: The Value of Stock Market Reform in China

Abstract
1. Introduction
2. The Chinese stock market and the NTS reform
3. The NTS reform and fundamentals: theoretical background
    3.1 Shocks and revisions to fundamentals
    3.2 The reform and expected dividends
    3.3 The reform and expected returns
4. The event study
    4.1 Event history
    4.2 Data
    4.3 The testing strategy
    4.4 The relevant characteristics
5. Results
6. Conclusions
References
Tables and figures

Chapter 3. The Lock-Up Period In the Chinese Stock Market Reform: Implication for market efficiency and downward sloping demand curves

Abstract
1. Introduction
2. Estimating the slope of the demand function
3. The Chinese stock market
    3.1. Institutional setting
    3.2. The 2005-2006 reform and the lockup agreements
4. Empirical results
    4.1. Methodological issues
    4.2. Data and summary statistics
    4.3. Price reactions
    4.4. Volume reaction
    4.5. Analysis of the results
5. Conclusions and further analysis
References
Tables and figures

Introduction

In the first chapter of this thesis **"Stock Prices in a Speculative Market: The Chinese Split Share reform"** we study the reaction of stock prices to corporate actions in a speculative market. In 2005-2006 China reformed its stock market by eliminating the distinction between tradable shares and non-tradable shares. The reform was decentralized: the regulator set general guidelines and then assigned responsibility for implementation to each company. We derive relations that should have been followed by the prices of traded stocks and exploit a company-level data set to compare the actual and the theoretical price reactions. We find evidence for abnormal returns both before the beginning of the reform and during the reform. Cross-sectionally, abnormal returns are associated with proxies for governance, volume and volatility. We interpret our findings as consistent with the idea that in a speculative market, investors do not properly set relative prices.

This work suggests that many interesting issues remain to be studied and some of them are explored in this thesis: first, the role of corporate governance in determining returns; second, the slope of the demand function for stocks upon expiration of lock-ups; third, the logic behind Chinese asset pricing and the factors driving the cross-sectional variation in average stock returns. These issues become particularly important in light of recent reforms in the Chinese Financial Markets and given the primary role played by China in the global economy.

The role of corporate governance is explored in the second chapter: **"The last shall be first: The value of Stock Market Reform in China"**. Nontradable shares (NTS) are an unparalleled feature of the ownership structure of Chinese listed companies and represent a major hurdle to domestic financial markets development. After some failed attempts, in 2005 the Chinese authorities have launched a structural reform program aiming at eliminating NTS. This program was completed by the end of 2006. In this paper, we evaluate the stock price effects of this financial reform for Chinese listed companies. Our results show that NTS reform was beneficial for the market as a whole, and especially for those companies with lower fundamentals. Results are

consistent with the expectation of improved corporate governance and liquidity enhancing the value of the firm.

In the third chapter, **"The Lock-Up Period In the Chinese Stock Market Reform: Implication for market efficiency and downward sloping demand curves"**, we investigate volume and price patterns around the lockup expiration in the recent split share structure reform in China. We find that, even though the events are totally anticipated, there is a drop in the stock price, and an increase in volume, when the lockup ends. We discuss our results to the light of the Petajisto (2008) model and we provide supportive evidence to his main implications. Specifically, we find that the slopes of the demand curve are negatively related to firm size and positively related to idiosyncratic risk. These results are interesting and will require further analysis on the price elasticity of demand for stock.

Finally this thesis highlights the necessity to look at the logic in Chinese asset pricing and at the factors that drive the cross-sectional variation in average stock returns. Understand how various unique market imperfections affect asset pricing in China can help us better understand the asset pricing regimes in similar emerging markets around the world, and will offer a benefit of testing the robustness of the important asset pricing factors using emerging market data. This analysis is performed in Caccavaio (2009).

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Stock Prices in a Speculative Market: The Chinese Split-Share Reform

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Andrea Beltratti, Marianna Caccavaio[1]

Abstract

We study the reaction of stock prices to corporate actions in a speculative market. In 2005-2006 China reformed its stock market by eliminating the distinction between tradable shares and non-tradable shares. The reform was decentralized: the regulator set general guidelines and then assigned responsibility for implementation to each company. We derive relations that should have been followed by the prices of traded stocks and exploit a company-level data set to compare the actual and the theoretical price reactions. We find evidence for abnormal returns both before the beginning of the reform and during the reform. Cross-sectionally, abnormal returns are associated mainly with turnover and compensation. We interpret our findings as consistent with the idea that in a speculative market, investors do not properly set relative prices.

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[1] Bocconi University (andrea.beltratti@unibocconi.it); Bocconi University (marianna.caccavaio@unibocconi.it), respectively. We thank Centro Paolo Baffi and Fondazione ENI Enrico Mattei for financial support. We thank Takeshi Inoue of Nomura Institute of Capital Research for kindly providing us with some of the data.

1. Introduction

In efficient markets, stock prices are the present discounted value of fundamentals. Efficient markets signal the relative scarcity of capital, so investors can react to prices and allocate resources to the most productive and desirable uses. However, speculation may spoil the link between prices and fundamentals. Scheinkman and Xiong (2003) and Hong, Scheinkman and Xiong (2004) show that the combination of heterogeneous beliefs and short sale constraints may induce investors to overpay for a stock if they expect to sell it to another investor with an even larger willingness to pay in the future. This model has important implications for asset pricing but is difficult to test due to complex issues associated with estimating the speculative component of the price, either at the aggregate level or at the level of the single stock. Mei, Scheinkman and Xiong (2005) use a panel of 73 Chinese stocks with multiple trading classes. By assuming that one class is fairly priced, they find that stocks with larger overvaluation are also characterized by larger turnover.

Speculation is closely linked with sentiment. Baker and Wurgler (2006) write that "one possible definition of investor sentiment is the propensity to speculate". They notice that shifts in sentiment may carry cross-sectional implications either because some stocks are harder to evaluate in an objective way or because arbitrage is more difficult. Baker and Wurgler (2006) build a monthly sentiment index and show that the cross-section of subsequent returns may be meaningfully conditioned on such a variable. Their interpretation is that markets can make mistakes in relative pricing which depend on the overall level of speculative activity.

We study the relation between speculation and pricing, exploiting a new data set about the Chinese stock market, whose investors are widely regarded as being very speculative, see Mei, Scheinkman and Xiong (2006). Analyses of Chinese markets are therefore very relevant to understand asset pricing with speculation. We consider the reactions of prices to an exogenous market reform implemented through a mechanism working at the level of each company. This allows us to carry out a very rich event study. In 2005-2006, Chinese regulators decided to eliminate the class of non-tradable shares (NTS), that could not be freely traded on the local stock

markets. This reform was achieved through a process by which holders of NTS paid compensation to holders of tradable shares (TS)[1] in exchange for the right to sell their shares in the future. After successful initial experiments with a small number of firms, in August 2005 Chinese authorities publicly declared extension of the process to all companies traded in the Shanghai and Shenzhen markets, and set the end of 2006 as a deadline for the completion of the reform. Each company joining the reform had to respect a schedule implying two trading suspensions and subsequent readmissions. We carry out an event study[2] and measure the abnormal performance of each stock with respect to a variety of factor models to assess the robustness of our results. We also study volume and volatility, which, in some models, for example Baker and Stein (2004) and Hong, Scheinkman and Xiong (2006), are linked to irrational traders and speculative activity. We finally carry out cross sectional analyses connecting price changes, volume, volatility and other relevant variables. Our paper is different from previous studies. Neither we study the relation between bubbles and speculation, as done by Mei, Scheinkman and Xiong (2006), nor we consider the cross section of stock returns from a predictive point of view, as done by Baker and Wurgler (2006). Instead, we consider company-specific event windows, involving periods of trading and non-trading, and examine whether the reaction of prices to well-identified announcements and corporate actions is compatible with market efficiency. We also introduce a bootstrap procedure that is designed to replicate the actual degree of covariance across firms when computing cumulative average abnormal returns.

We are aware of several other papers studying this reform. Lu, Balatbat and Czernkowski (2008) examine the reaction of prices both to the general announcement of the reform and to the company-specific announcements with particular regard to compensation characteristics for a sample of firms. Li, Wang, Cheung and Jiang (2007) study the reform on the basis of a general equilibrium model explaining compensation on the basis of company and shareholders characteristics; Haveman and Wang (2008) also discuss the struggle among different shareholders. Liao, Li, Liu and Wang (2008) study what happens to prices on the day of the lockup expiration.

Our paper is different: we study all Chinese stocks and consider all the different phases of the reform. Moreover we interpret the data as relevant to the study of asset pricing in a speculative market.

Our main findings are as follows. Risk-adjusted stock prices increase both before the first suspension and in the period following the first readmission. Volume increases substantially in all the event periods, with a particularly strong rise after the second readmission. Prices fall after the end of the reform. Cross-sectionally, prices react to the surprise in the compensation assigned to the holders of the TS, to variables that proxy the governance structure and the quality of various companies, as well as to volume and volatility. While the increase in prices before the first suspension might be explained by the existence of a risk premium, we believe that overall our findings are coherent with speculation driving portfolio choices of investors. Our results are generally coherent with the idea that in a speculative market, investors may not price efficiently simple corporate actions.

After this introduction, the plan of the paper is as follows. Section 2 discusses the Chinese stock market, both from the point of view of the papers which are more relevant to our research and from an institutional point of view. The section moreover contains a description of the reform process and of the mechanics by which firms compensate shareholders. Section 3 discusses the theoretical background. Section 4 describes methodological issues, the structure of the event study and the empirical results. Section 5 concludes.

2. The reform of the Chinese dual-share structure

Chinese firms typically issue multiple classes of shares. The existence of multiple classes of shares (A-shares, B-shares, overseas listed shares, legal-person shares, State shares) can be traced back to the restructuring of State-owned enterprises (SOEs) taking place in the 1990s and to the interest on the part of the State not to totally relinquish control of firms. A-shares could be traded only by domestic investors until 2003. Since that date the possibility of trading domestic renminbi-

denominated securities has been extended to Qualified Foreign Institutional Investors (QFII) but only up to a value of 5.65 billion dollars, about 1% of the stock market capitalization. B-shares are denominated in foreign currencies and until February 2001 were reserved to foreign investors[3]. Overseas listed shares are issued by Chinese companies on securities markets outside mainland China (H-shares, for those listed in Hong Kong, N-shares listed in New York, L-shares listed in London and S-shares listed in Singapore). Legal-person shares have been given, in the restructuring process of State-owned enterprises (SOEs), to domestic institutions, most of which are partially owned by the central or local government. State shares are owned by the State Council. Legal-person shares and State shares are together known as nontradeable shares. At the beginning of 2006, NTS accounted for about 63% of the total number of shares outstanding. NTS have the same cashflow and voting rights as TS.

Transfer of NTS has become possible since mid 1990s through irregularly scheduled auctions and over-the-counter transactions. According to Green and Black's (2003) analysis of 840 transactions taking place in the Shenzhen market in the period 1994-2003, such transfers have often involved large blocks affecting the control of the companies. The dominant sellers were State-controlled shareholding companies, and the dominant buyers were private companies. 32% (46%) of the deals were associated with a change in control in 2001 (2002). Chen and Xiong (2001) find a large discount (price of NTS as a ratio of the price of TS) averaging about 80%. The discount is lower for large firms, firms with a high return on equity, firms with high earnings-price or book-price ratios, firms with low debt-equity ratios, firms with low stock return volatility.

On April 29, 2005 the China Securities Regulatory Commission (CSRC) announced a pilot program to transform NTS into TS. In Its final version, the reform involves two suspension periods for each company. During the first suspension period holders of NTS discuss the compensation proposal to be submitted to the holders of TS. The company then publishes a notice to provide full details of the proposal to shareholders. Once the shares resume trading, no further revisions can be made to the proposal to be submitted for shareholders approval. After this first suspension period,

the shares are then suspended for a second time after the closing date of registration for participation in shareholders' meeting. Trading is resumed again after the meeting that ratifies the completion of the reform process and at the same time the compensation is paid. The reform proposal is approved if (a) at least two-thirds of the votes totally cast by holders of NTS and holders of A-shares are in favor (b) at least two-thirds of the vote casts by holders of A-shares who participate in the meeting are in favor.

Compensation to holders of TS can be implemented through various channels: (a) new shares can be offered directly by holders of NTS to holders of TS (b) new shares may be offered by the company to holders of both TS and NTS (c) holders of NTS may cancel part of their shares (d) holders of TS may be offered compensation in cash or a certain assignment of warrants. Offers are usually expressed as a percentage of 10 TS originally held. The typical case (79.1% of the cases) involves a direct transfer of currently NTS to holders of TS. On average holders of TS get 3.12 shares every 10 shares originally held. The second most popular method (8.9%) involves new issues that are assigned only to holders of TS. In this case holders of TS get on average 5.90 shares every 10 shares originally held.

Companies undergoing reform proceed through various batches[4]. The first batch included four companies. On June 17, 2005, the CSRC initiated the second round of the program, involving 42 companies. On August 19, this second round was accomplished. On August 24, the government issued guidelines to extend the reform project to the rest of the stock market, setting a deadline for the end of 2006. Figure 1 shows the timing of the various batches as well as the number of companies included in each batch and highlights that they have been rather regular both in terms of timing (2-3 batches every month) and in terms of number of companies (about twenty in each batch)[5] since October 2005. On February 2007, 1.301 listed companies had either completed or initiated their NTS reform process.

3. Theoretical price movements without speculation

In order to understand the pricing implications of the reform it is useful to analyze the sequence of events at the level of the single firm. Consider a simple case where, before the beginning of the reform, there were 10 TS with a market price of 1 and 20 NTS with a market price of 0.65. Total market value was equal to 23. Assume that there is an announcement that NTS will become tradable in the future and that no compensation will be paid to holders of TS. Also assume that the demand curve is horizontal, expectations of fundamentals are not changed by the announcement and there is no discounting. It follows that the new price of NTS should be equal to the price of TS due to disappearance of the illiquidity discount. Longstaff (2001) shows how large the price discount may be even in a rational market. The market value of the company immediately increases to 30. Assume now that the announcement also states that compensation will involve a transfer of 3 NTS to holders of TS. To allow for compensation, the price of each TS should be equal to 13/10 and the price of each NTS should be equal to 17/20. Before compensation is paid, wealth of both shareholders increase. After compensation is paid, prices readjust to 1, holders of TS have a total wealth of 13 and holders of NTS have a total wealth of 17. Compensation is equivalent to a split from the point of view of holders of TS: they had 10 TS at a unitary price of 13/10 before compensation payment, and they have 13 shares at a unitary price of 1 after the payment.

Consider now a stylized description of the reform that is representative of the true mechanism: (i) the initial announcement takes place at time 0, (ii) trading is suspended at time 1, (iii) at time 2 the company is readmitted to trading, contemporaneously to an announcement about the size of the compensation, (iv) the company is again suspended from trading at time 3, (v) the compensation is paid and the company is readmitted to trading at time 4. The path of rational prices of TS should be the following: (i) prices react to expected compensation as well as to expected changes in fundamentals at time 0, perhaps allowing for an expected supply effect; (ii) between time 0 and time 1, prices react to revisions in expectations of compensation and other fundamentals. Prices have a positive drift to remunerate the compensation risk premium. (iii) At time 2 prices react to any compensation surprise. (iv) Nothing happens between time 2 and time 3 as no new

information is released and there is no more risk. In principle, there is some risk between the day of the public announcement of the compensation and the day when the shareholders meet to formally approve the reform package. However in practice there was no example of shareholders rejecting the proposal. This can be explained on the basis of the high costs of not accepting a proposal that had been discussed and informally approved during the first suspension period. (v) Prices drop by the amount of compensation at time 4. In the literature the split is considered to be a signal of insider information on the part of the managers see McNichols and Dravid (1990). Coherently with the signaling hypothesis, Ikenberry and Ramnath (2002) show that positive abnormal returns after a split are consistent with a positive revision of corporate profitability on the part of investors. In the Chinese case however the split is forced by the reform process and it is unlikely that managers have used it to provide specific information.

4. Empirical analysis

4.1. Methodological issues

The event study uses the residuals from a pricing model. The pricing model is estimated using observations between t_i*-120* and t_i*-10*, where t_i is the day of the first suspension for stock *i.* The estimated parameters are used to compute the cumulative abnormal returns (CAR) in the event windows. In what follows we will consider simple CAPM-adjusted returns. A final section will deal with robustness analysis, allowing for estimation of multi-factor models. For all event windows, cumulative abnormal returns are averaged across companies to obtain the mean cumulative abnormal residuals (MCAR).

We measure the variance of MCAR in three ways. Following Campbell, Lo and MacKinaly (1997), under the assumption of independence across abnormal residuals of different firms, the variance of the *MCAR* is:

$$Var(MCAR_T) = N^{-2} \sum_{i=1}^{N} V_i \; ; \qquad (1)$$

where:

$$V_i = i'\left(\sigma_{\varepsilon_i}^2 I + \sigma_{\varepsilon_i}^2 X_i^* (X_i' X_i)^{-1} X_i^{*'}\right) i; \quad (2)$$

is the variance of the *i*-th company (composed of a first term that accounts for the variance of abnormal returns and a second term that allows for estimation error), X_i (X_i^*) is the matrix of regressors used in the estimation period (the event window) and *i* is a vector of ones. In what follows we define this variance estimate as CLM variance. The null hypothesis of no abnormal returns is tested by means of the statistic:

$$J_t = \frac{MCAR_T}{\sqrt{Var(MCAR_T)}}; \quad (3)$$

which is asymptotically distributed as a standard normal. The disadvantage of this estimator lies in its assuming independence of residuals across firms. Our event periods are sometimes overlapping across firms because the latter are divided in batches of companies going through the reform process over similar time frames. Campbell, Lo and MacKinlay (1997) discuss inference in event windows with clustering and notice that standard methods suffer from lack of power. We therefore compute two other estimators.

The second estimator is the cross-sectional variance (CS variance) across mean cumulative and average abnormal returns of the different companies, see Asquith (1983) and Lynch and Mendenhall (1997). Campbell, Lo and MacKinlay (1997) point out that the use of the CS variance is justified under the weaker assumption of cross sectionally uncorrelated residuals. Brown and Warner (1985) moreover point out that the CS variance is robust to the possibility of increases in the variance of the securities during the event periods.

The third estimator is obtained by bootstrapping abnormal returns in such a way as to preserve their cross-correlation properties. For all the companies involved in the reform process we estimate a multifactor model over a common estimation period (bootstrap estimation period)[13]. The bootstrap estimation period includes 140 observations prior to September 16, 2004. Estimation of the multifactor model over the same period allows us to retrieve a matrix of residual. Define with

$a_i^{(b)}, b_{i,k}^{(b)}$ (for companies $i=1,2\ldots N$ and factors $k=1,2\ldots K$) the parameters of the multifactor model estimated over the bootstrap estimation period:

$$ar_{i,t} = r_{i,t} - a_i^{(b)} - \sum_{k=1}^{K} b_{i,k}^{(b)} r_{k,t} \,. \tag{4}$$

We resample these abnormal returns by respecting their typical correlation properties.

In order to describe our bootstrap assume that there are only three firms, A, B and C, which are readmitted to trading respectively on January 10, January 15 and March 5 of the year 2006. In the event study we analyze their cumulative average abnormal returns respectively over the periods January 10-January 20, January 15-January 25 and March 5-March 15. Firms A and B have a five day overlap. Suppose we have estimated a pricing model for these three companies using data for the year 2005. In order to evaluate whether the cumulative average abnormal residual is significantly different from zero we bootstrap from the 2005 residuals. We extract a (randomly selected) block of 10 consecutive observations from the cumulative abnormal residuals of stock A over the year 2005. We do that by randomly selecting a number between 1 and 241, say number k, from a uniform distribution and by considering the sequence of 10 residuals for firm A between k and $k+9$, selected from the bootstrap estimation period. In order to respect the cross sectional dependence between companies A and B we then consider a sequence of 10 residuals for firm B between $k+5$ and $k+14$. In such a way there is a five day overlap in the bootstrapped residuals, corresponding to the overlap that takes place among the residuals in the event windows. As to firm C, we consider 10 residuals from the bootstrap estimation period between j and $j+9$, where j is another number randomly extracted from a uniform distribution between 1 and 241 (excluding k, k+14), because there is no cross correlation to account for. We now have three artificial time series of abnormal residuals for the three stocks, allowing for cross sectional covariance among them. We repeat the procedure for all the firms and obtain a simulated series of abnormal returns under the null hypothesis. We repeat the procedure 1,000 times and compute an empirical distribution of

mean cumulative and average residuals. The comparison between the empirical distribution and the actual value of the tests is used for statistical inference.

We also apply the same bootstrap methodology for our statistical inference regarding volume and volatility. It is important to allow for cross correlations across stocks also for those variables, whose distributions are moreover empirically highly non-normal.

4.2 Data and summary statistics

We have used three data sets for our empirical work: DataStream, data from Shenzhen GTA Information Technology Co Limited and data kindly provided by Nomura Institute of Capital Market Research[6]. We cannot use the original sample of 1,440 companies for various reasons: (a) 62 companies disappeared before the beginning of the reform process, (b) 17 companies are reported from DataStream to be suspended from trading as of February 2007 for unspecified reasons, (c) 26 companies were born after September 2005, (d) 5 companies did not have NTS before the beginning of the reform process. This leaves us with a sample of 1,330 companies. 1,301 of these have entered the reform process by February 2007; 1,192 have finished the reform by February, 2007. this sample is again reduced: in 94 cases we have had problems in pricing the compensation paid to shareholders and in other 91 cases the data are not fully convincing because of discrepancies across data sets in the percentage of TS before and after the reform. Excluding these 185 companies leave us with a sample of 1,007 completing the reform process between April 2005 and February 2007.

To correct for payment of the compensation we assume that the stock price reacts in such a way that the total wealth of tradeable shareholders does not change when the compensation is paid, i.e. $p_0 QTS = p_1[QTS + QTS \times SH] + QTS \times CASH$, where p_0 is the price before the compensation payment, p_1 is the price after the payment, *QTS* is the number of TS outstanding at the beginning of the reform process, *SH* is the number of shares that are transferred to holders of TS and *CASH* is the cash compensation. This is not inconsistent with compensation-induced increase in wealth of holders of TS. However such a wealth increase takes place when market prices incorporate the

compensation after the formal announcement, several days before the moment of the second readmission. Few companies have paid compensation by assigning warrants. We have computed the theoretical price of the warrants on the basis of the methodology proposed by Galai and Schneller (1978).

4.3. Qualitative characteristics of companies in the various batches of the reform

Table 1 reports some summary statistics for ten groups of companies going through the reform process, roughly corresponding to company deciles. The first group includes 6 batches (first row of the table) and 120 companies (second row), the second group includes 7 batches and 130 companies, and so on. From now on we will refer to these as deciles. Batches usually include a substantial number of companies, except for the first experimental batch, which only included 3 companies, and the last batches of our sample, because in many cases the process was still to be completed in February 2007. As figure 1 shows, the reform process has been going on more or less continuously for the period under consideration.

Rows three to five report some details about the length of the different phases of the reform. The third row shows that the number of suspension days after the first suspension increases with the batch number from nine to sixteen. The first suspension is crucial because shareholders have to agree on the compensation. An increasing length may be the signal of a more problematic process of reaching a consensus among different classes of shareholders.

We analyze several characteristics of the different batches and present them in the remaining rows of the table. First, some information about the governance structure (rows 6-8). The percentage of legal shares decreases almost monotonically across batches. Given evidence of positive correlation between legal shares and firm productivity, see e.g. Sun and Tong (2003), this raises the possibility that the government has tried to start the reform with better quality companies. The percentage of TS does not show much relation with the batches. More revealing is the analysis of compensation characteristics, i.e. the percentage of TS assigned to holders of NTS. The average compensation is large for the first six batches, then decreases slightly and stays constant for a few

batches and then, starting from batch thirty-one, decreases steadily. This also may be interpreted as compensation being a signal of quality (better companies paying larger compensation).

The remaining rows provide information about economic and financial characteristics. In relevant cases we compute the same characteristic both before the beginning of the reform (average value in the year before August 2005) and during the reform period (from August 2005 until the day of the first suspension). Both size and the dividend ratio decrease with the batch number. The pre-reform bid-ask spread, a rough indicator of illiquidity, increases with the batch number. We also compute a second illiquidity indicator, due to Amihud (2002), as $(1/N)\sum_{i=1}^{N} | r_i | / V_i$ the ratio between absolute returns and the renminbi volume. This indicator also increases with the batch number. Interestingly the latter variable shows that illiquidity differentials among companies belonging to early and late batches are very large before the reform but decrease substantially after the reform. This is coherent with the reform having a positive impact on various companies characteristics. The price range (the difference between the maximum and minimum price on a given day) also increases across batches, particularly when computed with data from the reform period. Given our interpretation of the price range as a proxy for volatility, and the hypothesis that volatility is a proxy of speculative behaviour together with trading volume, we find that early (late) batches were composed of firms characterized by less (more) speculation. Similar evidence obtains from the turnover except for the very first 10% of batches that were characterized by extraordinary turnover, mainly due to four companies.

4.4 Price reactions

Figure 2 describes the price of one specific company (Baotou Huazi Intl) before, during and after the reform. In this example the stock price goes up before the first suspension, and again between the first and the second suspension. There is an upward jump on the day of the first readmission and a downward jump on the day of the second readmission. This pattern was frequent across companies.

Table 2 and figure 3 report results of the CAR analysis for the 1,007 companies included in our sample. In the ten days before the first suspension abnormal prices increase by 2.20%, with a concentration in the three days before each announcement. The cumulative returns are statistically significant if evaluated by means of the t-tests but are not significant, except for the last one, if judged on the basis of the bootstrap. This is not consistent with the risk explanation, as one would expect a positive risk premium to hold continuously for all the period before the first readmission. On the contrary, we observe significant abnormal returns only at the very end of the period. This evidence is more consistent with information leakage than a risk story.

On the readmission day there is a further 0.7% abnormal return, associated with 67% of the companies showing an increase in the price. Heterogeneous reactions to the compensation announcements may be explained on the basis of the surprise component implicit in each announcement, with the prices of companies announcing a better-then-expected (worse-than-expected) compensation going up (down).

The 0.7% readmission day abnormal return is the result of +1.9% between the closing price before the first suspension and the opening price on the day of the first readmissions, and -1.2% between the opening and the closing of the readmission day. There is therefore some overreaction at the opening price. Moreover, according to the rules of stock exchanges in China, the price movement of a given stock must be within the range +10% and -10%. Many stocks were indeed suspended on the day of their first readmission because the equilibrium price increase was larger than 10%. Our analysis of volume data suggests that, during the reform period, stocks that were halted did not return to trading on the same day. Suspended companies are not included in the event study concerning the days after the first readmission.

After the initial jump upon readmission, prices tend to increase another 1.7% in the subsequent ten trading days. These abnormal returns are statistically significant. There is therefore no mean reversion, at least after the first readmission, but momentum. If we also consider halted stocks, then the total abnormal return at the end of this period rises to 3.5%. The Merton (1987)

effect, according to which investors limit the securities they hold in their portfolios to those "they are aware of", is consistent with the evidence. Media ad investors are likely to be particularly interested in stocks going through the reform process, particularly those that have been readmitted to trading after the first suspension. This may create an increase in the base of investors. The delayed increase does not depend on halted stocks re-entering the market because these stocks have been excluded from the sample in this event period.

On the day of payment of the compensation, price drops similarly to what happens in the case of a dividend: the average drop is 16.7%. In subsequent cross-sectional analyses we therefore use the compensation-corrected prices, which are on average 0.352% higher than they were when they last traded before the second suspension. Prices then drop 0.733% relatively to the market in the ten following days. The decrease is significant when ignoring clustering but becomes less significant when clustering is allowed and totally insignificant when the bootstrap is used. Overall, not much happens after the second readmission. This is consistent with the split having no real effects. In the literature the split is considered to be a signal of insider information on the part of the managers see McNichols and Dravid (1990). In the Chinese case however the split is forced by the reform process and it is less likely that managers have used it to provide specific information. The size of the compensation was probably a better way to provide signals to investors.

4.5 Volume and volatility

We turn to measuring the proxies for speculative activity suggested by HSX (2006), i.e. volume and idiosyncratic volatility. Our measure of volume is total turnover defined as the number of shares traded on a particular day. We control for the effect of the reform by subtracting from total turnover the number of shares which are given to investors on the day of the second readmission. Figure 4 reports the daily total turnover of the Shanghai and Shenzhen stock markets between March 2004 and February 2007. The increase in total turnover after the beginning of the reform is clearly visible. The average turnover before the reform equals 256 million units, going up to 649 million units after the reform.

Table 3 reports the average turnover for the stocks participating in the reform process, both as an absolute value and as a share with respect to market turnover. The average is reported before, during and after the reform process. For example, the absolute value of the turnover for the stocks joining the reform process one month before suspension (338 million units for the Shanghai market) is the simple average across stocks of the daily turnover in the four weeks preceding the start of the reform process. The number represents 0.10% of the total turnover of the market over the same period. Turnover however increases by 69% in the period after the first readmission (and before the second suspension) with respect to the level before the reform. The increase is 55% for the Shenzhen market and 78% for the two markets together. Volume increases by 116% in the month after the second suspension (with respect to volume before the first suspension) for each single market.

These numbers clearly indicate an increase in turnover after the reform. To study this issue in detail we compute and analyze abnormal volume, using two alternative methodologies. The first follows Brav and Heaton (1999) and Brav and Gompers (2003). We define normal volume as the mean daily volume from day t_i-120 through day t_i -11 relative to the day of the first suspension. Abnormal volume is the percentage difference between actual volume and normal volume. To eliminate the effect of outliers we set observations exceeding the 99th percentile equal to the median observation. Table 4 confirms the large increase in volume. Table 4 shows that ten days before the first suspension actual volume is 13.7% larger than normal volume, an increase reaching 81.5% the day before suspension. On the day of the first readmission, volume is 154.5% higher than normal, an increase reducing to 49.2% after 10 days. On the day of the second readmission volume is 522% higher than normal, an increase reducing to 160% after 10 days.[7] There is therefore a clear increase in volume both during and after the end of the reform.

We also compute abnormal volume following Ajinkya and Jain (1989) and Lynch and Mendenhall (1997). This is based upon the residuals of a regression of the company (capitalization corrected) volume on the market (capitalization corrected) volume $v_{it} = \beta_0 + \beta_1 v_{mt} + \varepsilon_{it}$[7]. The

regression is estimated by means of generalized least squares[8]. The coefficients of the volume regressions are estimated using observations between times t_i-*120* and t_i-*10*, where t_i is the day of the first suspension. The cumulative residual analysis described in table 5 shows that companies entering the reform process have a positive abnormal volume in the period preceding the first suspension. Volume keeps increasing relatively to the market in all sub-periods after the first readmission. A very strong volume increase takes place after the second readmission.

We estimate volatility by using the price range, defined as the percentage spread between the highest and the lowest values of the stock price on any given day. The price range is a very efficient volatility estimator as emphasized by Alizadeh, Brandt and Diebold (2002). Moreover it has the advantage of providing a point estimate of volatility, contrary to what happens with the historical standard deviation, whose estimation requires a time series of observations. Table 6 shows that the increase in volatility is not statistically significant.

4.6 The cross section of abnormal returns

We perform a cross sectional analysis aimed at explaining the abnormal returns of stocks on the basis of several variables: speculation variables (size-corrected turnover, price range as a proxy of current volatility, lagged returns), structural variables (earnings-to-price, size, bid-ask spread), governance variables (the percentage of legal shares, a dummy for B shares, percentage of TS, two concentration variables to be defined later), reform-specific variables (a dummy equal to 1 for companies paying part of all of the compensation in cash, compensation).

Turnover and volatility are included because HSX (2006) show that overvaluation caused by speculative behavior should be associated with large volume and volatility. In that model, volume is a reflection of differences of opinion across traders, induced by disagreement about the true value of the firm. Merton (1987) argues that more noticeable stocks experience price increases due to more investors' attention and Baker and Stein (2004) relate volume to the presence of irrational investors. Also, the empirical literature documents the existence of several interlinkages between volume and returns, see e.g. Lee and Swaminathan (2000) and Griffin, Nardari and Stulz (2007). In particular,

Griffin, Nardari and Stulz (2007) show that past returns may cause future volume. Controlling for lagged returns is therefore important in the regressions. Volatility is a proxy for objective uncertainty about value.

Other variables capture corporate governance. We consider the percentage of legal shares as a proxy for the strength of the local government. Sun and Tong (2003) notice that local government can play a positive role for a firm in PRC because of their limiting state predation, as opposed to central State ownership that does not provide incentives for managers. Their empirical analysis of privatization in PRC confirm that state ownership has negative impact on form performance while legal-person ownership has a positive effect. Xu and Wang (1999) find a positive and significant correlation between profitability and the fraction of legal person shares and a negative correlation between labor productivity and the proportion of state shares. In our empirical analysis, we also consider the percentage of TS held by the largest ten shareholders as a proxy for the strength of ordinary investors. As illustrated by Li et al. (2007) and Haveman and Wang (2008) the reform process can be interpreted as a struggle between the different classes of shareholders. In the regressions, we also control for the Herfindal index that measures concentration among all shareholders (this index is the sum of the squares of the percentages held by the various shareholders).

We finally consider a dummy equal to 1 when the company has issued B shares held by foreign investor, which may be a proxy for good corporate governance, the compensation paid to holders of TS and a dummy equal to 1 when part of the compensation is paid in cash.

All the regressions are run with dummy variables controlling for the batch the company belongs to. While some of these dummy variables are statistically significant, there is no clear picture emerging from the data. We therefore do not report the results relative to these dummy variables, which are however available to interested readers.

We run the cross section six times, to explain the change in prices over different relevant periods: (i) between the end of August 2005 and the initial day of suspension for each company (ii)

ten days before the first suspension (iii) on the day of the first readmission, (iv) between the first readmission and the second suspension, (v) on the day of the second readmission and (vi) ten days after the second readmission. The returns on the two readmission days are measured in terms of percentage difference between the opening price of the readmission day and the last closing price before the suspension period. In theory one would expect all the effects to be absorbed by the opening price due to the information having been released well in advance of the readmission. However price discovery might take several hours so that it is important to evaluate robustness of the results to an alternative definition of returns. We therefore try an alternative specification where the initial return is measured in terms of the percentage difference between the closing price of the readmission day and the last closing price before the suspension period. The results of this second specification are very similar and are not reported for reasons of space.

In the ten days before the first suspension, the only relevant variables are size and volatility, both with a positive coefficient. Larger companies and more volatile companies earned higher returns before the first suspension. It is hard to explain the positive impact of size, as one would expect compensation risk to be concentrated in smaller companies. Volatility may be interpreted as a proxy for speculation, although it is also possible that investors require compensation for idiosyncratic risk. Overall it is hard to explain the cross-sectional heterogeneity in returns in the short period leading to the first suspension. Similar results are obtained on the basis of the analysis that applies to the average return between the official announcement of the extension of the reform to the stock market as a whole (the end of August, 2005) and the day of the first suspension. Importantly, size has now a negative impact, coherently with the risk-based story. The dummy for B shares has a negative and significant sign, also coherently with the risk-based story according to which companies with higher levels of fundamental risk obtain a larger return after the extension of the reform to the market as a whole. Over the longer period under consideration, companies which can be regarded as less risky from the point of view of relevant characteristics (large companies, companies also held by foreign investors, less volatile companies) offer a lower abnormal return.

The day of the first readmission should be dominated by the compensation variables. Indeed the relevant variables are the dummy variable for payment of cash, the compensation variable, turnover, past returns (returns between the end of August 2005 and the beginning of the company-specific reform). They all have the expected sign. The larger the compensation the larger the price increase, while the offer to compensate through cash was not well appreciated by investors. This latter result is in line with previous research of Cheng, Fung and Leung (2006) finding that stock dividends generate positive stock price reactions while higher non-tradable share ownership implies more cash dividends aimed at providing non-tradable shareholders with immediate financial gains. The turnover variable is also relevant with a positive sign, coherent with the idea that the larger the speculation the larger the price increase. Past return is negative and significant, signaling some mean reversion for companies with a greater price increase before the beginning of the reform at the company level.

Interestingly, there is evidence of delayed effects of the same variables in the ten days after the first readmission, when prices seem to be determined by similar considerations. Notice that this cross-section has only included the companies that were not halted during the first readmission and the second suspension.

The price change on the day of the second readmission depends again positively on turnover. The concentration among holders of TS is positive and significant. As pointed out by the literature, this variable may be considered as a proxy for the presence of mutual funds in the equity capital of a company. The result therefore suggests that the larger the role of mutual funds relatively to other holders of TS, the larger the compensation-corrected price. It is hard to explain this on the basis of demand pressure, i.e. the attempt on the part of mutual funds to increase their relative power by holding more shares, because the split did not dilute their ownership, that actually increased relatively to holders of NTS. Volatility and past returns (in the period between the first readmission and the second suspension) are also significant.

Finally, in the period following the second readmission, turnover and volatility are significant, as well as concentration among shareholders (positive), dummy for B shares and earnings to price (negative). While the positive impact of turnover and volatility may be associated with speculation, it is hard to understand why the other characteristics should affect returns after the end of the reform.

4.7 Robustness analysis

We consider various robustness tests regarding the definition of the market index and the risk model to be used to compute excess returns. Our previous tests have used the Shanghai and Shenzhen market indices, depending on the trading location of each stock In order to evaluate the sensitivity of our results to the definition of the market, we have computed a unique float-weighted market index. This is also important in view of the large difference between float and capitalization caused by the existence of NTS. A capitalization index would include the quantity of both TS and NTS to compute the weights assigned to the various stocks and would provide a measure not reflecting actual market conditions. Wang and Xu (2004) also compute a float-weighted market index. We use the Shenzhen GTA Information Technology Co Limited data in order to build a float-weighted market index and float-weighted risk factors. In what follows we will compare summary statistics for our float-weighted market index with those for the Shanghai Composite Index and the Shenzhen Composite Index. Both indices are also weighted by float.

As to risk factors, we follow Fama and French (1996), Wang and Xu (2004), Pastor and Stambaugh (2003) and consider the market, a size factor, a floating ratio factor and a liquidity factor. Wang and Xu (2004) propose including a floating ratio portfolio as a proxy for risk of bad governance and expropriation of holders of TS. For each company, the floating ratio is estimated by the percentage of TS. Wang and Xu (2004) also suggest that book-to-market is unlikely to play an important pricing role because of poor accounting quality in the Chinese stock market.

The size and floating ratio factors have been built following the methodology described by Fama and French (1996). At the beginning of each month, Shanghai (SSE) and Shenzhen (ZSE)

stocks are allocated to two groups (small or big, S or B) based on whether their market value (MV) during the previous month is below or above the median MV for the specific market. Then the stocks are sorted in three float ratio groups (low, medium, or high: L, M, H) based on the bottom 30 percent, middle 40 percent and top 30 percent of the floating ratio[12]. Value-weighted portfolio returns are then computed for each portfolio. FR is the difference between the average returns of the two high-FR portfolios and the average returns of the two low-FR. Theoretically, the average return of FR should be negative as it represents a portfolio long good governance companies and short bad governance companies. However, Wang and Xu (2004) themselves find that the average return of FR is negative, explaining this result on the basis of the better performance offered by companies with more efficient governance. It is therefore unclear whether FR is a true proxy for a non-diversificable risk factor.

Similarly, we build a liquidity portfolio (HLIQMLLIQ) after ranking stocks on the basis of the liquidity indicator of Pastor and Stambaugh (2003). The liquidity measure for stock *i* in month *t* is the estimate $\gamma_{i,t}$ from the regression $r^{e}_{i,d+1,t} = \theta_{i,t} + \phi_{i,t} r_{i,d,t} + \gamma_{i,t} sign(r^{e}_{i,d,t}) \times v_{i,d,t} + \varepsilon_{i,d,t+1}$, where the dependent variable is the excess return on the stock on day *d* in month *t* and the regressors are respectively the return on the stock in the previous day of the month and a variable obtained from the multiplication of the sign of the excess return and the volume of the stock. The indicator proxies liquidity by an estimate of the return reversal[10]. The portfolio is long high liquidity stocks and short low liquidity stocks.

Table 8 reports summary statistics about the indices and the risk factors for two sub-periods: 1998-2005 and 2005-2007. The correlation between our own index and the Shanghai and Shenzhen indices are always above 93%. There is some difference in the mean and the median returns in the first sub-period but the various summary statistics are almost identical in the most relevant 2005-2007 period. As a result of this, we do not repeat the tests. The risk factors are not very correlated among themselves. The largest correlation is equal to 0.491 between the size and the floating factors. Average returns are negative in 2005-2007. While this is inconsistent with the identification

of these portfolios as risk factors, we notice that two years is a short sample and the actual return may well not be a good proxy of the expected return. In the previous sub-sample average returns are positive, except for the liquidity factor, that is essentially zero. The pre-after factor is strongly positive.

Table 9 reports the event study derived from the factor model abnormal returns. The results are very similar to those of table 2, except that the positive cumulative abnormal returns are significant for the four days before the first suspension from trading and the total decrease after the second readmission is about half as large as the estimate we had before. Basic conclusions do not change, as a four day increase in prices is more likely to be associated with information about the identity of the companies to be suspended than with a risk premium.

Table 10 reports the results of the cross sectional analysis. Accounting for systematic risk factors therefore reduces the cross-sectional impacts of several variables. The main differences are the following: the B-share dummy and size are not significant before the first suspension. The only relevant variable is volatility. This further weakens the risk-based story. The other main difference is that the concentration variable and the earnings to price lose statistical significance after the second readmission. Volatility and turnover are the only variables to be significant in most event periods. Compensation is very significant on the day of the first readmission.

5. Conclusions

We have used evidence from a speculative market in order to analyze differences between actual prices and theoretical prices in the context of a structural reform of the Chinese stock market. The reform consisted of the elimination of a class of non-tradable shares, accounting for about two thirds of the market, and was based on a decentralized bargaining process, involving two suspensions and two readmissions to trading for each company. We compute abnormal returns around event dates and consider cross-sectional regressions involving variables related to speculation and fundamentals. We also study abnormal volume and volatility.

Our main results are the following: (i) abnormal returns are positive both before the first suspension and after the first readmission. Positive abnormal returns cannot be justified by new information arising after the first readmission. One possibility is that they are due to a delayed reaction to the compensation surprise. This explanation would not exclude large unexploited profit opportunities. The increase in prices before the first suspension may have been due to a premium for the non-diversifiable compensation risk or to speculation. We are inclined to favor the latter explanation as the positive cumulative abnormal returns arise only in the few days before the suspension; moreover the strong comovement between volume and abnormal returns that is obtained from the cross-section is compatible with speculative activity. (ii) Prices drop after the second readmission, even though the evidence is not very strong from a statistical point of view. The new information seems therefore to have been incorporated completely during the reform, even though cross-sectionally there is still a strong link between turnover and returns. (iii) Volume increases to record levels during and after the reform, even accounting for the increase in the supply of shares assigned as compensation. The increase in turnover raises the possibility that investors particularly increase the demand for securitires they were not familiar with before the reform. (iv) Most of the cross-section of average returns is explained by variables linked with speculation, especially volume, even though there is some role for variables associated with fundamentals in the period between the general beginning of the reform and the first day of company-specific suspension. However this latter evidence is not robust with respect to the factors included in the equation for the abnormal returns.

Overall, consistently with previous results of analyses of the Chinese stock market, speculation seems to dominate relative pricing. Moreover, speculation is, cross-sectionally, strongly associated with abnormal returns, also during periods that have no new information about the value of companies going through the reform process. Investors pushed up prices of companies that were actively traded. Moreover, prices reacted strongly to compensation and this may be associated with inefficient models for forecasting company choices. Finally, there was delayed price reaction after

the first readmission. It is puzzling that so many inefficiencies have been found in the context of a widely followed structural reform. Substantial amount of money seems to have been left on the table during the reform of the Chinese stock market.

Institutional investors in the Chinese stock market are small but not irrelevant. Finance says that prices are determined by marginal investors. Among the best known limitations to arbitrage is short selling, which is indeed prohibited in China. However the inefficiencies we document cannot be explained by the impossibility to short stocks. Buying stocks of companies going through the reform after their first readmission would have been a very simple (and profitable) strategy, as would have been buying stocks of companies that had still to begin the reform process. It would be interesting in future research to look at data on the main portfolio holdings of Chinese mutual funds to understand why such simple strategies were not widely followed by institutional investors.

	1	2	3	4	5	6	7	8	9	10
Batches	1-6	7-13	14-19	20-23	24-26	27-30	31-35	36-40	41-53	54-59
Number of Companies	120	130	123	145	121	131	131	125	121	63
Lenght of first suspension	9	9	9	11	16	16	13	12	14	16
Lenght between halting periods	7	8	6	7	7	11	10	14	14	4
Lenght of second suspension	17	23	21	20	21	21	24	25	19	6
Legal Shares %	24%	16%	12%	12%	10%	12%	8%	8%	8%	5%
State Shares %	24%	19%	18%	17%	18%	15%	12%	16%	12%	15%
Tradable Shares %	35%	35%	36%	37%	37%	38%	40%	41%	38%	39%
Compensation %	32%	29%	28%	27%	28%	29%	26%	26%	16%	11%
LnSize	6.22	6.34	6.33	6.43	6.36	6.13	6.01	6.06	5.96	5.87
Dividend	2.01	1.61	1.72	1.63	1.56	1.54	1.10	0.86	0.88	0.53
Bid/Ask (before)	0.34%	0.38%	0.38%	0.38%	0.40%	0.40%	0.41%	0.43%	0.45%	0.44%
Bid/Ask (during)	0.28%	0.34%	0.36%	0.36%	0.36%	0.38%	0.39%	0.40%	0.40%	0.40%
Illiquidity (before)	0.040	0.066	0.064	0.061	0.064	0.077	0.100	0.091	0.124	0.117
Illiquidity (during)	0.017	0.033	0.037	0.034	0.038	0.038	0.044	0.041	0.049	0.049
Price Range (before)	4.10%	3.89%	4.04%	3.88%	3.92%	4.07%	4.11%	4.21%	4.18%	4.44%
Price Range (during)	3.69%	3.82%	3.69%	3.48%	3.55%	3.56%	3.84%	4.29%	4.18%	4.45%
Turnover (before)	1.479	0.561	0.593	0.586	0.571	0.595	0.611	0.580	0.616	0.655
Turnover (during)	1.573	0.785	0.699	0.747	0.789	0.841	0.933	1.037	0.978	1.067

Table 1. Summary Statistics. The table contains summary statistics for ten groups of companies going through the reform process. Each group includes about 10% of the companies which joined the reform. The first row reports the number of the batches and second row reports the number of the companies in each deciles. Rows three to five report some details about the length of the different phases of the reform. Rows six to ten report information about the governance structure: the percentage of legal shares, the percentage of State shares, the percentage of TS, the average compensation. The remaining rows provide information about economic and financial characteristics computed both before the beginning of the reform (average value in the year before August 2005) and during the reform period (from August 2005 until the day of the first suspension). Characteristics are: size (in logarithms of market value), the dividend ratio, the price, the bid-ask spread, the Amihud (2002) illiquidity indicator, the price range (the difference between the maximum and minimum price on a given day), and the turnover.

Before First Suspension					Aftern First Suspension					After Second Suspension				
Day	MCAR	CLM variance t-stat	CS variance t-stat	P-value	Day	MCAR	CLM variance t-stat	CS variance t-stat	P-value	Day	MCAR	CLM variance t-stat	CS variance t-stat	P-value
-10	-0.027	-0.370	-0.931	0.524	0	0.696	5.566	3.337	0.017	0	0.352	3.095	0.947	0.106
-9	0.039	0.379	0.955	0.449	1	0.517	3.427	2.111	0.147	1	-0.081	-0.607	-0.207	0.533
-8	0.217	1.640	4.352	0.347	2	0.698	3.982	2.602	0.112	2	-0.425	-2.803	-1.059	0.681
-7	0.291	1.880	5.068	0.353	3	1.027	5.278	3.478	0.066	3	-0.573	-3.408	-1.409	0.713
-6	0.312	1.835	4.859	0.366	4	1.251	6.000	3.980	0.049	4	-0.598	-3.256	-1.426	0.700
-5	0.270	1.426	3.841	0.416	5	1.425	6.492	4.473	0.027	5	-0.692	-3.483	-1.653	0.714
-4	0.442	2.202	5.814	0.382	6	1.521	6.677	4.640	0.011	6	-0.700	-3.298	-1.634	0.687
-3	0.807	3.795	9.933	0.295	7	1.659	7.103	4.981	0.005	7	-0.737	-3.263	-1.697	0.684
-2	1.387	5.768	16.090	0.103	8	1.734	7.292	5.140	0.004	8	-0.574	-2.397	-1.299	0.648
-1	2.204	8.284	24.260	0.008	9	1.758	7.286	5.193	0.003	9	-0.733	-2.900	-1.639	0.653

Table 2. Event Study Conducted on the Residuals from the Market Model. The table reports results of the mean cumulative abnormal returns and the mean average abnormal returns for the 1,007 companies included in the sample. The event study is performed on the residuals from a market model. For each company *i* the model is estimated over a period including observation between t_i-120 and t_i -10 where t_i is the day of the first suspension. The estimated parameters are used to compute the abnormal returns over the event windows: 10 days before the first suspension, 10 days after the first suspension and 10 days after the second suspension. Abnormal returns are summed to form cumulative abnormal returns (CAR). CARs are then averaged across companies to obtain the mean cumulative abnormal residuals (MCAR). The null hypothesis of no abnormal returns is tested under the assumption of independence across abnormal residuals of different firms following Campbell, Lo and MacKinlay (1997) (CLM variance) and under the assumption of no correlation across abnormal residuals (CS variance) see Asquith (1983) and Lynch and Mendenhall (1997). The table presents the t-stat for all the procedures as well as bootstrap p-values obtained from the methodology described in the text.

	Before first suspension		After first readmission			After second readmission		
	Turnover	Percentage	Turnover	Percentage	Percentage change	Turnover	Percentage	Percentage change
Shanghai	338	0.10%	600	0.17%	78%	737	0.19%	118%
Shenzhen	320	0.16%	495	0.23%	55%	677	0.32%	111%
Total	331	0.06%	560	0.10%	69%	714	0.12%	116%

Table 3. Turnover. The table reports the simple average turnover (millions of shares traded for a stock on a particular day) for the stocks participating in the reform process. The average is reported for the month before the reform process, for the period between the two suspensions and for the month after the reform process. The table reports the absolute value of turnover, its share with respect to the total turnover of the market (Percentage) and its increment (Percentage change) with respect to the average value computed over the month before the first suspension.

ABNORMAL VOLUME %	Day	Mean	Median	St. Dev.	P-value	Percentage Positive	Number of obs
BEFORE FIRST SUSPENSION	-10	13.7%	-13.6%	0.03	0.105	41%	1007
	-9	17.2%	-7.8%	0.03	0.075	44%	1007
	-8	30.0%	0.0%	0.04	0.054	49%	1007
	-7	36.7%	2.8%	0.04	0.037	53%	1007
	-6	34.8%	2.7%	0.04	0.023	53%	1007
	-5	24.8%	-9.2%	0.04	0.053	42%	1007
	-4	30.8%	-2.3%	0.04	0.037	47%	1007
	-3	39.3%	0.4%	0.04	0.017	52%	1007
	-2	53.3%	7.9%	0.04	0.005	56%	1007
	-1	81.5%	21.9%	0.05	0.000	60%	1007
AFTER FIRST READMISSION	0	195.2%	116.5%	0.10	0.000	87%	681
	1	69.7%	27.1%	0.05	0.005	62%	657
	2	48.5%	6.9%	0.06	0.009	52%	620
	3	42.3%	3.9%	0.05	0.011	52%	571
	4	33.6%	-0.8%	0.06	0.011	49%	447
	5	29.5%	-4.9%	0.06	0.009	47%	333
	6	14.2%	-8.2%	0.06	0.017	43%	238
	7	14.9%	-15.5%	0.07	0.011	42%	177
	8	14.0%	-15.8%	0.09	0.006	41%	135
	9	21.0%	-14.6%	0.10	0.005	42%	109
AFTER SECOND READMISSION	0	522.2%	383.2%	0.17	0.000	98%	1007
	1	306.6%	205.8%	0.12	0.000	91%	1007
	2	224.1%	139.2%	0.10	0.000	83%	1007
	3	203.7%	119.4%	0.10	0.000	82%	1007
	4	201.1%	108.9%	0.15	0.000	80%	1007
	5	186.2%	96.3%	0.11	0.000	79%	1007
	6	177.5%	94.2%	0.10	0.000	77%	1007
	7	168.8%	90.2%	0.09	0.000	77%	1007
	8	163.0%	78.4%	0.09	0.000	74%	1007
	9	160.5%	71.2%	0.09	0.000	74%	1007

Table 4. Percentage Abnormal Volume. The table presents the abnormal volume computed following Brav and Heaton (1999) and Brav and Gompers (2003). The sample is composed of 1,007 companies involved in the reform process form April 2005 through February 2007. Abnormal volume is the percentage difference between actual volume and normal volume. Normal volume for company *i* is defined as the mean daily volume between t_i -120 and t_i -11 where t_i is the day of the first suspension. Volume is the number of shares traded for a stock on a particular day. The periods considered are: ten days before the first suspension, ten days after first suspension and ten days after the second readmission. The table presents the mean, the median, the standard deviation, the bootstrap p-value, the percentage of positive abnormal volume, and the number of observations.

Before First Suspension					Aftern First Suspension					After Second Suspension				
Day	MCAV	CLM variance t-stat	CS variance t-stat	P-value	Day	MCAV	CLM variance t-stat	CS variance t-stat	P-value	Day	MCAV	CLM variance t-stat	CS variance t-stat	P-value
-10	0.016	4.131	10.350	0.023	0	0.077	40.461	19.851	0.000	0	0.110	56.561	28.263	0.000
-9	0.030	5.076	14.252	0.010	1	0.122	26.147	21.865	0.000	1	0.176	31.055	31.283	0.000
-8	0.057	7.658	21.875	0.000	2	0.159	21.919	22.367	0.000	2	0.229	27.911	32.774	0.000
-7	0.076	8.097	25.153	0.000	3	0.195	20.710	22.454	0.000	3	0.280	27.405	34.122	0.000
-6	0.100	9.203	29.882	0.000	4	0.222	16.601	19.954	0.000	4	0.325	26.554	34.842	0.000
-5	0.116	9.253	31.513	0.000	5	0.250	15.396	17.600	0.000	5	0.367	25.172	35.293	0.000
-4	0.136	9.566	34.352	0.000	6	0.263	11.702	14.215	0.000	6	0.413	24.865	36.222	0.000
-3	0.167	11.173	39.364	0.000	7	0.289	10.037	12.362	0.000	7	0.454	24.071	36.588	0.000
-2	0.200	12.721	44.412	0.000	8	0.332	9.521	11.484	0.000	8	0.492	23.153	36.812	0.000
-1	0.246	14.649	51.758	0.000	9	0.362	8.280	10.658	0.000	9	0.530	23.029	37.090	0.000

Table 5. Abnormal Volume from the Ajinkya and Jian (1989) Model. The table reports results of the mean cumulative and average abnormal volume analyses for the 1,007 companies included in the sample. The event study is performed on the residuals from the Ajinkya and Jian (1989) model. For each company involved in the stock reform process the model is estimated over a period including observations between t_i-120 and t_i -10, where t_i is the day of the first suspension. The estimated parameters are used to compute the abnormal volumes over the event windows: 10 days before the first suspension, 10 days after the first suspension and 10 days after the second suspension. The estimated parameters are then used to compute the abnormal volume over the event windows. Abnormal volumes are summed to form cumulative abnormal volume and then averaged across companies to obtain the mean cumulative abnormal volume residuals (MCAV). The null hypothesis of no abnormal volume is tested under the assumption of independence across abnormal residuals of different firms following Campbell, Lo and MacKinlay (1997) (CLM variance) and under the assumption of no correlation across abnormal residuals (CS variance) see Asquith (1983) and Lynch and Mendenhall (1997). The table presents the t-stat for all the procedures as well as bootstrap p-values obtained from the methodology described in the text.

ABNORMAL PRICE RANGE %	Day	Mean	Median	St. Dev.	P-value	Percentage Positive	Number of obs
BEFORE FIRST SUSPENSION	-10	4.6%	-4.4%	0.02	0.281	45%	1007
	-9	4.6%	-7.0%	0.02	0.297	43%	1007
	-8	11.7%	-9.4%	0.02	0.269	42%	1007
	-7	13.8%	-0.5%	0.02	0.247	48%	1007
	-6	8.4%	-5.5%	0.02	0.240	43%	1007
	-5	6.4%	-7.5%	0.02	0.255	43%	1007
	-4	12.3%	-2.3%	0.02	0.232	47%	1007
	-3	13.4%	-3.6%	0.02	0.248	46%	1007
	-2	15.3%	0.0%	0.02	0.231	49%	1007
	-1	23.4%	4.1%	0.02	0.218	54%	1007
AFTER FIRST READMISSION	0	74.2%	55.9%	0.03	0.142	88%	681
	1	14.6%	4.3%	0.02	0.232	53%	657
	2	5.3%	-9.0%	0.02	0.237	42%	620
	3	1.5%	-11.4%	0.02	0.228	39%	571
	4	-5.5%	-17.5%	0.02	0.525	35%	447
	5	-5.5%	-16.3%	0.02	0.633	38%	333
	6	-6.2%	-13.5%	0.03	0.722	35%	238
	7	-10.1%	-19.8%	0.03	0.798	31%	177
	8	-6.6%	-17.7%	0.04	0.822	32%	135
	9	-12.3%	-20.6%	0.03	0.864	30%	109
AFTER SECOND READMISSION	0	172.7%	131.8%	0.05	0.053	96%	1007
	1	59.1%	38.2%	0.03	0.162	72%	1007
	2	40.3%	17.7%	0.03	0.195	61%	1007
	3	30.6%	12.8%	0.02	0.208	59%	1007
	4	30.3%	11.2%	0.03	0.215	59%	1007
	5	27.0%	7.6%	0.02	0.224	56%	1007
	6	25.8%	6.4%	0.02	0.205	57%	1007
	7	24.4%	3.5%	0.02	0.211	54%	1007
	8	20.1%	2.7%	0.02	0.232	53%	1007
	9	24.6%	6.1%	0.02	0.228	55%	1007

Table 6. Percentage Abnormal Price Range. The table presents the abnormal price range. The sample is composed of 1,007 companies involved in the reform process between April 2005 and February 2007. The abnormal price range is the percentage difference between the actual and the normal price range. The price range is defined as the percentage difference between the highest and the lowest price for a particular day. The normal price range is the mean daily price range between day t_i -120 and day t_i -11, where t_i is the day of the first suspension. The periods considered are: ten days before the first suspension, ten days after first suspension, and ten days after the second readmission. The Table presents the mean, the median, the standard deviation, the bootstrap p-value, the percentage of positive abnormal price range and the number of observations.

Change in prices	(i)	(ii)	(iii)	(iv)	(v)	(vi)
Legal Person Shares	-0.001	-0.001	-0.011	-0.008	-0.002	0.001
	(0.001)	(0.009)	(0.010)	(0.013)	(0.010)	(0.015)
Concentration (ALL)	-0.016	0.043	-0.034	-0.041	-0.018	-0.028
	(0.012)	(0.030)	(0.037)	(0.046)	(0.038)	(0.066)
Concentration (TSH)	0.002	-0.019	0.031	0.044	0.137**	0.163*
	(0.006)	(0.038)	(0.040)	(0.059)	(0.066)	(0.088)
Dummy B shares	-0.436*	0.843	-1.768	(1.268)	-1.097	-4.547**
	(0.251)	(1.109)	(1.138)	(1.715)	(1.466)	(2.172)
Earning to price	-0.027	0.297	0.17	-0.69	-0.472	-2.179**
	(0.047)	(0.537)	(0.568)	(0.862)	(0.770)	(1.058)
Bid/Ask Spread	0.069	0.827	-0.343	2.51	0.105	2.555
	(0.141)	(1.853)	(1.586)	(2.566)	(2.233)	(2.891)
LnPastMarketValue	-0.072*	1.271***	0.363	0.744	-0.072	0.404
	(0.038)	(0.340)	(0.409)	(0.535)	(0.464)	(0.596)
% Tradable shares	-1.659	0.304	-3.429	-5.041	-6.129	2.622
	(1.077)	(3.242)	(3.303)	(4.681)	(4.245)	(7.139)
Price Range	0.139***	2.009***	(0.023)	(0.087)	0.157**	1.485***
	(0.046)	(0.309)	(0.093)	(0.326)	(0.075)	(0.329)
Turnover	0.111*	0.510	0.453***	1.821***	0.610***	1.785***
	(0.058)	(0.375)	(0.114)	(0.398)	(0.096)	(0.304)
Past Return			-0.753**	-0.691	0.068**	0.064
			(0.354)	(0.443)	(0.035)	(0.043)
Compensation			24.202***	24.296**	-4.131	3.392
			(8.043)	(9.671)	(4.837)	(6.950)
Dummy cash			-7.575***	-6.547**	-1.826	-2.000
			(2.808)	(2.944)	(1.292)	(1.762)
Constant	2.391*	-17.409***	-3.505	-0.355	0.157	-16.550**
	(1.241)	(3.713)	(4.448)	(6.060)	(5.130)	(8.184)
Observations	997	997	672	672	997	997
R-sq	0.23	0.34	0.28	0.34	0.33	0.30

Table 7. Cross Sectional Analysis conducted on the Residuals from the Market Model. The table presents the results of cross sectional analyses where the independent variables are: speculation variables (turnover, price range as a proxy of current volatility, lagged returns), structural variables (earnings-to-price, size), governance variables (the percentage of legal shares, a dummy for B shares, and various concentration variables), reform-specific variables (a dummy equal to 1 for companies giving cash compensation, compensation). The cross section is run six times, to explain the change in prices (i) days between august 2005 and ten days before the first suspension, (ii) ten days before the first suspension (iii) on the day of the first readmission, (iv) between the first readmission and the second suspension, (v) on the day of the second readmission and (vi) ten days after the second readmission. Abnormal returns are obtained from the market model. Robust Standard Errors are reported in parentheses. Significance levels are denoted by (*) for 10 percent, (**) for 5 percent and (***) for 1 percent.

Panel A: From January 1998 to January 2005

	CHSCOMP	CHZCOMP	Market	Size	Floating	Liquidity	Pre-After
CHSCOMP	1.000	0.975	0.987	0.142	0.030	-0.010	
CHZCOMP		1.000	0.990	0.208	0.109	-0.032	
Market			1.000	0.186	0.086	-0.025	
Size				1.000	0.363	-0.332	
Floating					1.000	-0.177	
Liquidity						1.000	
Pre-Post							
mean	0.00%	-0.01%	0.00%	0.04%	0.00%	-0.01%	
median	0.00%	0.00%	0.03%	0.05%	0.00%	0.00%	
Minimum	-8.73%	-8.68%	-8.96%	-3.36%	-2.69%	-1.64%	
Maximum	9.40%	9.24%	8.95%	2.68%	2.54%	1.69%	
Annual St.Dev.	22.24	23.53	23.01	8.96	5.81	4.61	
Annual Return	1.01%	-3.37%	1.07%	10.14%	0.09%	-1.42%	
Total Performance	5.97%	-21.79%	5.94%	94.13%	-0.38%	-9.87%	

Panel B: From January 2005 to February 2007

	CHSCOMP	CHZCOMP	Market	Size	Floating	Liquidity	Pre-After
CHSCOMP	1.000	0.927	0.941	-0.022	0.168	0.028	-0.033
CHZCOMP		1.000	0.987	0.150	0.353	-0.009	0.017
Market			1.000	0.101	0.318	0.010	-0.009
Size				1.000	0.491	-0.318	0.365
Floating					1.000	-0.053	-0.019
Liquidity						1.000	-0.148
Pre-Post							1.000
mean	0.16%	0.16%	0.15%	-0.01%	-0.02%	-0.02%	0.25%
median	0.14%	0.25%	0.21%	-0.01%	-0.02%	-0.01%	0.18%
Minimum	-9.26%	-8.93%	-10.27%	-2.46%	-1.99%	-1.34%	-5.06%
Maximum	7.89%	7.62%	7.48%	3.16%	2.15%	0.81%	4.64%
Annual St.Dev.	24.16	25.41	25.69	12.58	7.16	4.65	16.48
Annual Return	39.67%	40.89%	38.02%	-3.32%	-5.25%	-5.86%	62.85%
Total Performance	131.83%	137.21%	123.25%	-8.56%	-11.16%	-11.81%	163.27%

Table 8. Risk Factors. The table contains summary statistics about the risk factors. The factors are: the Shanghai Composite market index, the Shenzhen Composite market index, our float-weighted market index, a size portfolio, a floating ratio portfolio, a liquidity portfolio, and a Pre-Post portfolio. Panel A reports correlations and summary statistics (mean, median, minimum, maximum, standard deviation, total performance) over the period 1998-2005. The data refer to daily percentage returns except for the total performance which refers to the return over the whole sub-sample. Panel B reports correlations and summary statistics over the period 2005 -2007

Before First Suspension					Aftern First Suspension					After Second Suspension				
Day	MCAR	CLM variance t-stat	CS variance t-stat	P-value	Day	MCAR	CLM variance t-stat	CS variance t-stat	P-value	Day	MCAR	CLM variance t-stat	CS variance t-stat	P-value
-10	0.096	1.432	3.376	0.200	0	0.513	3.295	1.952	0.003	0	0.416	2.697	1.054	0.018
-9	0.121	1.084	3.006	0.252	1	0.361	1.976	1.175	0.077	1	-0.022	-0.127	-0.053	0.424
-8	0.318	2.297	6.426	0.185	2	0.519	2.580	1.520	0.070	2	-0.320	-1.724	-0.759	0.870
-7	0.455	2.836	7.954	0.160	3	0.792	3.613	2.249	0.037	3	-0.434	-2.150	-1.008	0.900
-6	0.573	3.194	8.970	0.135	4	1.046	4.425	2.874	0.018	4	-0.482	-2.224	-1.087	0.901
-5	0.645	3.265	9.218	0.123	5	1.232	4.903	3.273	0.008	5	-0.575	-2.464	-1.284	0.920
-4	0.828	3.996	10.950	0.093	6	1.349	5.171	3.499	0.005	6	-0.504	-2.030	-1.106	0.832
-3	1.254	5.774	15.517	0.047	7	1.480	5.606	3.853	0.001	7	-0.511	-1.961	-1.110	0.816
-2	1.818	7.693	21.198	0.004	8	1.594	5.942	4.112	0.000	8	-0.334	-1.217	-0.714	0.587
-1	2.738	10.431	30.288	0.000	9	1.648	6.075	4.199	0.003	9	-0.472	-1.640	-1.004	0.690

Table 9. Event Study Conducted on the Residuals from the Wang-Xu Model with Liquidity Replicating Portfolio and a PrePost Portfolio. The table reports results of the mean cumulative abnormal returns and the mean average abnormal returns for the 1,007 companies included in the sample. The event study is performed on the residuals from a market model. For company *i* the model is estimated over a period including observation between t_i -120 and t_i -10 where t_i is the day of the first suspension. The estimated parameters are used to compute the abnormal returns over the event windows: 10 days before the first suspension, 10 days after the first suspension and 10 days after the second suspension. Abnormal returns are summed to form cumulative abnormal returns (CAR). CARs are then averaged across companies to obtain the mean cumulative abnormal residuals (MCAR). The null hypothesis of no abnormal returns is tested under the assumption of independence across abnormal residuals of different firms following Campbell, Lo and MacKinlay (1997) (CLM variance) and under the assumption of no correlation across abnormal residuals (CS variance) see Asquith (1983) and Lynch and Mendenhall (1997). The table presents the t-stat for all the procedures as well as bootstrap p-values obtained from the methodology described in the text.

Change in prices	(i)	(ii)	(iii)	(iv)	(v)	(vi)
Legal Person Shares	-0.001	0.001	-0.009	-0.007	-0.004	0
	(0.001)	(0.009)	(0.012)	(0.016)	(0.011)	(0.015)
Concentration (ALL)	0.001	0.022	0.009	0.001	0.002	-0.013
	(0.003)	(0.028)	(0.042)	(0.058)	(0.045)	(0.063)
Concentration (TSH)	-0.002	-0.015	0.038	0.03	0.027	0.022
	(0.003)	(0.039)	(0.045)	(0.065)	(0.072)	(0.099)
Dummy B shares	(0.095)	0.841	-0.862	0.459	-0.685	-4.027*
	(0.086)	(1.129)	(1.206)	(1.790)	(1.545)	(2.127)
Earning to price	-0.057	0.446	-0.168	0.212	0.569	-0.368
	(0.047)	(0.590)	(0.868)	(1.128)	(0.731)	(1.006)
Bid/Ask Spread	0.088	-0.718	-0.925	4.299	-1.549	1.581
	(0.129)	(1.878)	(1.990)	(2.652)	(2.278)	(2.988)
LnPastMarketValue	0.019	0.362	-0.024	0.19	-0.072	0.007
	(0.039)	(0.320)	(0.456)	(0.548)	(0.489)	(0.618)
% Tradable shares	-0.228	-1.129	2.158	-0.32	-7.551	0.927
	(0.328)	(3.010)	(4.120)	(5.975)	(5.137)	(7.003)
Price Range	0.097**	2.108***	(0.063)	(0.032)	0.203***	1.774***
	(0.043)	(0.284)	(0.108)	(0.360)	(0.072)	(0.314)
Turnover	0.106*	0.469	0.363**	1.419***	0.624***	1.608***
	(0.062)	(0.357)	(0.143)	(0.466)	(0.101)	(0.315)
Past Return			-0.945	-1.890**	0.121***	0.159***
			(0.707)	(0.861)	(0.033)	(0.047)
Compensation			27.377***	27.919***	-9.881*	-3.978
			(7.408)	(9.014)	(5.370)	(6.967)
Dummy cash			-8.754***	-7.419**	-1.578	-1.311
			(2.833)	(3.075)	(1.390)	(1.854)
Constant	0.122	-10.788***	-5.927	-7.462	-2.3	-18.806**
	(0.416)	(3.385)	(5.483)	(7.433)	(5.798)	(7.868)
Observations	997	997	672	672	997	997
R-sq	0.15	0.30	0.25	0.24	0.36	0.32

Table 10. Cross Sectional Analysis conducted on residuals from the Wang-Xu Model with Liquidity Replicating Portfolio and a PrePost Portfolio. The table presents the results of cross sectional analyses where the independent variables are: speculation variables (turnover, price range as a proxy of current volatility, past returns), structural variables (earnings-to-price, size), governance variables (the percentage of legal shares, a dummy for B shares, and various concentration variables), reform-specific variables (a dummy equal to 1 for companies giving cash compensation, compensation). The cross section six times, to explain the change in prices (i) days between august 2005 and ten days before the first suspension, (ii) ten days before the first suspension (iii) on the day of the first readmission, (iv) between the first readmission and the second suspension, (v) on the day of the second readmission and (vi) ten days after the second readmission. Abnormal returns are obtained from the Wang-Xu model with liquidity-replicating portfolio and the pre minus after portfolio. Robust Standard Errors are reported in parentheses. Significance levels are denoted by (*) for 10 percent, (**) for 5 percent and (***) for 1 percent.

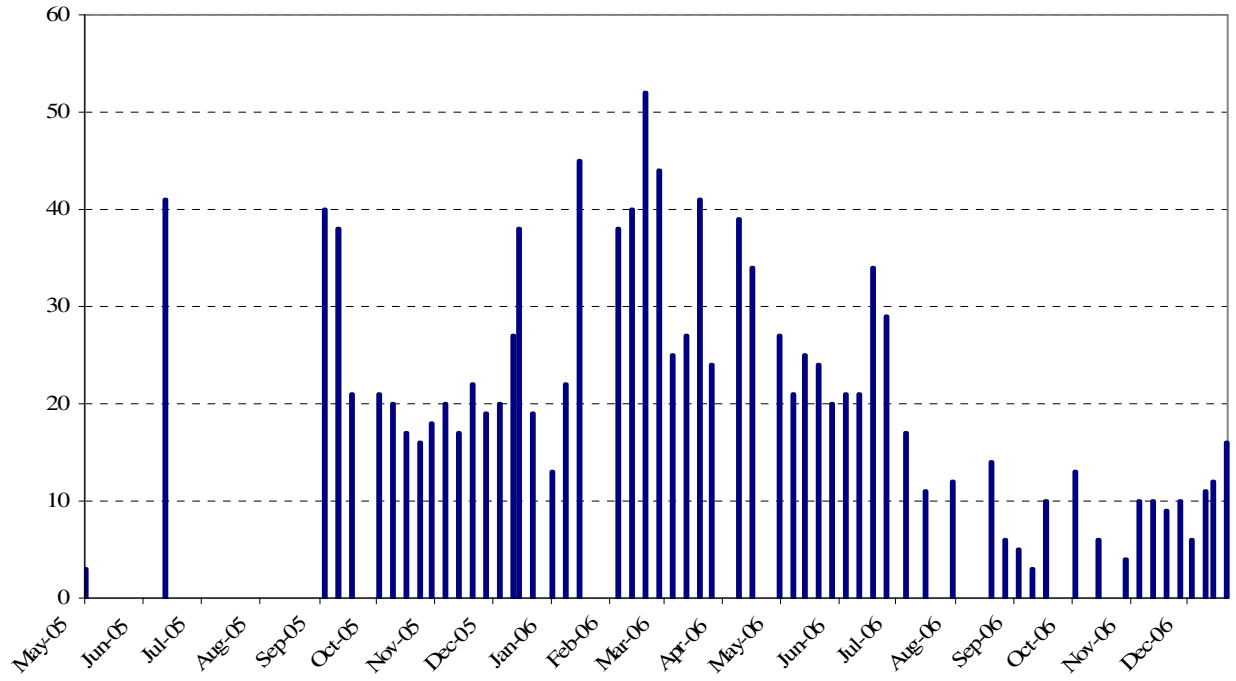

Figure 1. Batches of Companies. The figure reports the timing of the various batches and the number of companies entering each batch.

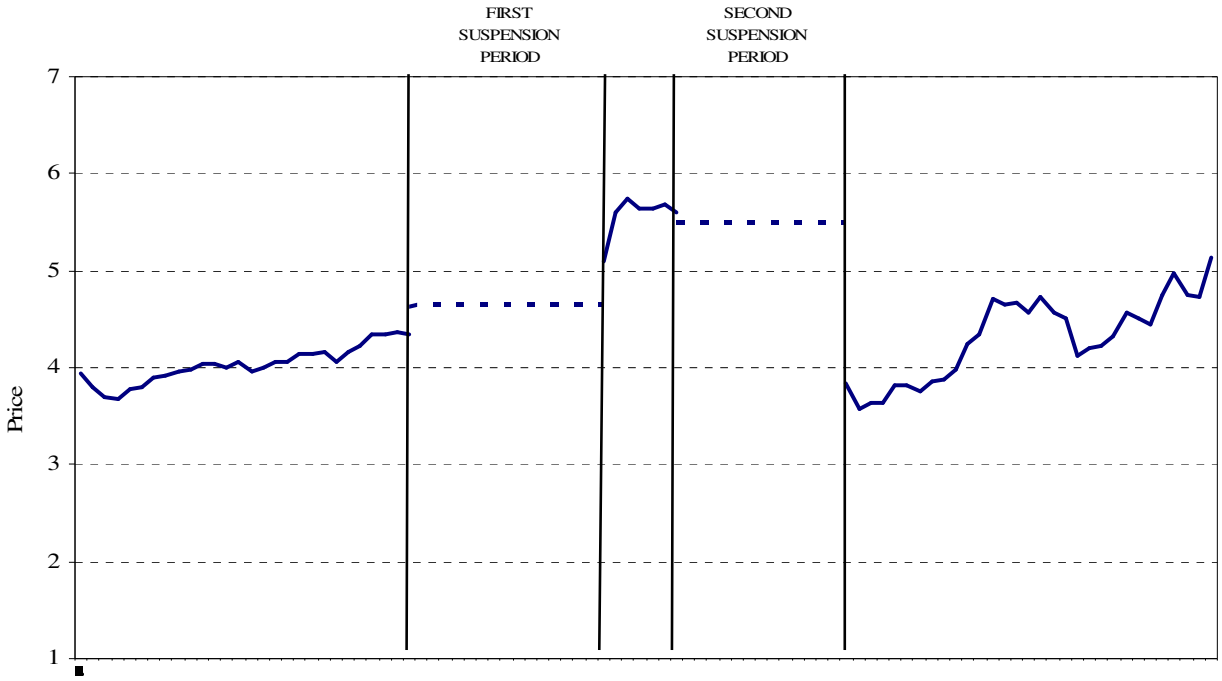

Figure 2. Baotou Huazi International Price. The figure shows the price for Baotou Huazi International during the reform process.

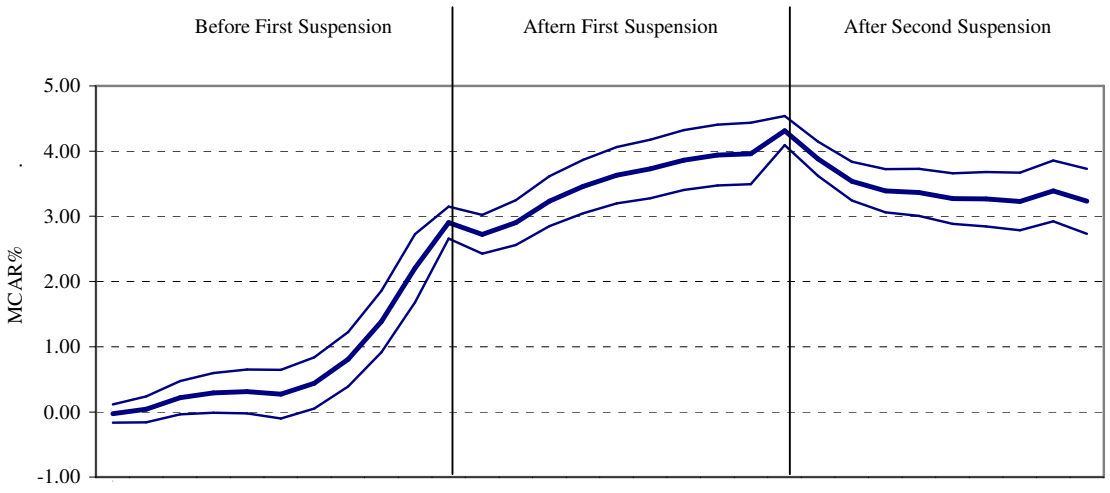

Figure 3. Mean Cumulative Abnormal Returns. The figure reports result of the MCAR analysis for the 1,007 companies included in our sample and their 95% confidence interval. Residuals are computed from the market model. The cumulative residuals are computed starting ten days before the beginning of the reform process. The first interval (referred to as "before first suspension" in the picture) covers ten days before the first suspension. The second interval ("after first suspension") covers ten days after the first readmission. The third interval ("after second readmission") covers ten days after the second readmission.

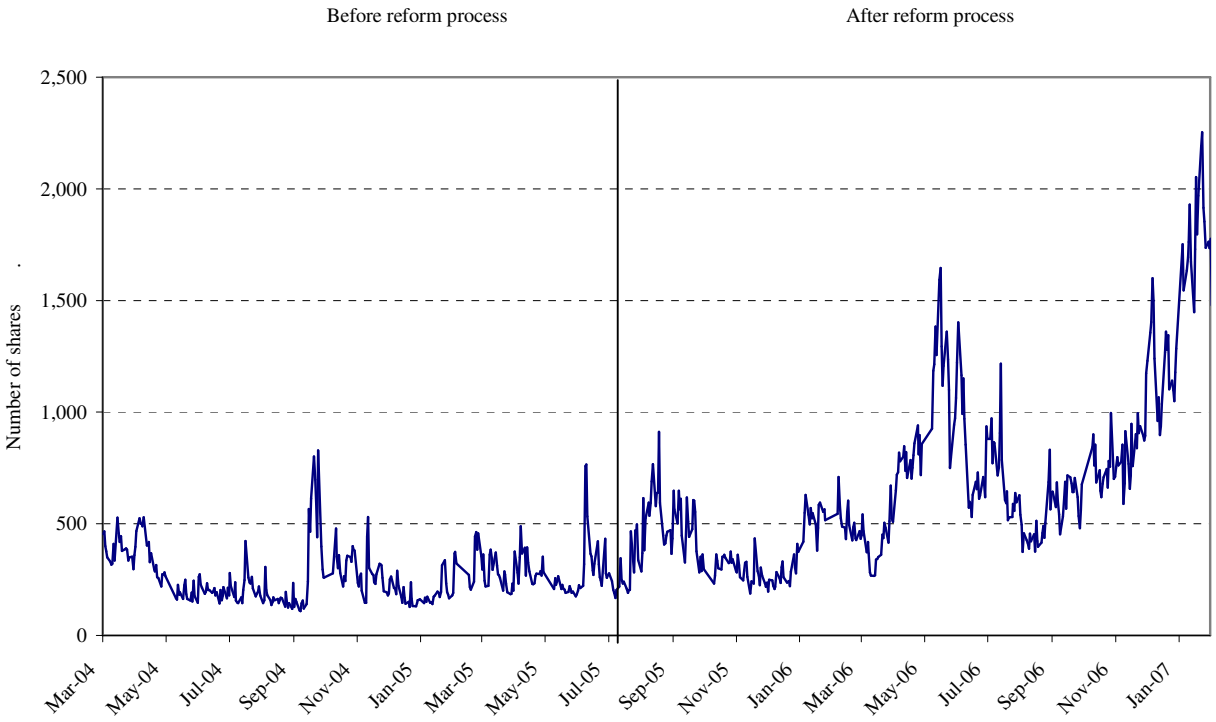

Figure 4. Daily Turnover. The figure reports the daily total turnover (million of shares traded on a given day) of the Shanghai and Shenzhen stock markets between March 2004 and February 2007.

REFERENCES

Acharya, Viral and Lasse Pedersen, 2005, Asset pricing with liquidity risk, *Journal of Financial Economics* 77, 375-410.

Ajinkya, Bipin and Prem Jain, 1989, The behavior of daily stock market volume, *Journal of Accounting and Economics* 11, 331-359.

Alizadeh, Sassan, Michael Brandt and Francis Diebold, 2002, Range-based estimation of stochastic volatility models, *Journal of Finance* 57, 1047-1092.

Allen, F., Jun Qian and Meijun Qian, 2007, China's financial system: Past, present and future, in L. Brandt and T. Rawski, eds.: *China's economic transition: Origins, mechanisms and consequences*, forthcoming.

Amihud, Yakov, Haim Mendelson and Jun Uno, 1999, Number of shareholders and stock prices: Evidence from Japan, *Journal of Finance*, 54, 1169-1184.

Amihud, Yakov, 2002, Illiquidity and stock returns: Cross-section and time-series effects, *Journal of Financial Markets* 5, 31-56.

Arouri, Mohamed El Hedi and Chen Xiang Liu, 2008, Stock craze: An empirical analysis of PER in Chinese equity market, *Economics Bulletin*, 14, 1-17.

Asness, Cliff, Robert Krail and John Liew, 2001, Do hedge funds hedge?, *Journal of Portfolio Management* 28, 6-19.

Asquith, Paul, 1983, Merger bids, uncertainty and stockholder returns, *Journal of Financial Economics* 11, 51-83.

Baker, Malcolm and Jeremy C. Stain, 2004, Market liquidity as a sentiment indicator, *Journal of Financial Markets*, 7, 271-299.

Baker, Malcolm and Jeffrey Wurgler, 2006, Investor sentiment and the cross-section of stock returns, *Journal of Finance* 61, 1645-1680.

Barberis, Nicholas and Richard Thaler, 2003, A survey of behavioral finance, in *Handbook of the economics of finance*, edited by G.M. Constantinides, M. Harris and R. Stulz, Elsevier Science.

Brav, Alon and Jonathan Heaton, 1999, Did ERISA's prudent man rule change the pricing of dividend omitting firms?, unpublished working paper, Duke University.

Brav, Alon and Paul Gompers, 2003, The role of lockups in initial public offerings, *Review of Financial Studies* 16, 1-29.

Brown, Stephen J. and Jerold B. Warner, 1985, Using daily stock returns. The case of event studies, *Journal of Financial Economics* 14, 3-31.

Campbell, John Y. and Robert J. Shiller, 1988, The dividend-price ratio and expectations of future dividends and discount factors, *Review of Financial Studies*, 1, 195-228.

Campbell, John, Andrew Lo, and MacKinlay, 1997, *The Econometrics of financial markets*, Princeton University Press.

Campbell, John Y. and Motohiro Yogo, 2006, Efficient tests of stock returns predictability, *Journal of Financial Economics*, 81, 27-60.

Cha, Heung-Joo and Bong-Soo Lee, 2001, The market demand curve for common stocks: evidence from equity mutual fund flows, *Journal of Financial and Quantitative Analysis* 36, 195-220.

Chen, Zhiwu, and Peng Xiong, 2001, Discounts on illiquid stocks: Evidence from China, Yale ICF Working Paper, n. 00-56.

Chordia Tarun, Richard Roll and Avanidhar Subrahmanyam, 2007, Liquidity and Market Efficiency, forthcoming *Journal of Financial Economics.*

Cochrane, John, 2006, *Asset pricing*, Princeton University Press, Princeton and Oxford.

Collins, Daniel, and Warren Dent, 1984, A comparison of alternative testing methodologies used in capital market research, *Journal of Accounting Research* 22, 48-84.

Dimson, Elroy, 1979, Risk Measurement when Shares are Subject to Infrequent Trading, *Journal of Financial Economics* 7, 197-226.

Dunaway, Steven and Vivek Arora, 2007, Pension reform in China: The need for a new approach, International Monetary Fund working paper, WP/07/109
Fama, Eugene, and Kenneth French, 1996, Multifactor explanations of asset pricing anomalies, *Journal of Finance* 51, 55-84.
Fama, Eugene, 1998, Market efficiency, long-term returns and behavioral finance, *Journal of Financial Economics*, 49, 283-306.
Feng, Lei and Mark S. Seasholes, 2004, Correlated trading and location, *Journal of Finance*, 59, 2117-2144
Galai, Dan, and Meir I. Schneller, 1978, Pricing of warrants and the value of the firm, *Journal of Finance* 33, 1333-1342.
Gibbons, Michael, Stephen Ross and Jay Shanken, 1989, A test of the efficiency of a given portfolio, *Econometrica* 57, 1121-1152.
Goyenko, Ruslan Y., Craig W. Holden and Andrey D. Ukhov, 2006, Do stock splits improve liquidity? mimeo
Green, Stephen and Alissa Black, 2003, A market in control: non-tradeable shares deals in companies listed at the Shenzen Stock Exchange, Asia programme working paper no. 11, The Royal Institute of International Affairs.
Green Stephen, 2004, The development of China's stock market, 1984-2002.
Griffin, John M., Federico Nardari and Renè M. Stulz, 2007, Do investors trade more when stocks have performed well? Evidence from 46 countries, *Review of Financial Studies*, forthcoming.
Harris, Lawrence, and Eitan Gurel, 1986, Price and volume effects associated with changes in the S&P list: New evidence for the existcne of price pressures, *Journal of Finance* 41, 815-829
Haveman, Heather A., and Yongxiang Wang, 2008, *Going (more) public: Ownership reform among Chinese firms*, mimeo
Hong, Harrison, José Scheinkman, and Wei Xiong, 2006, Asset float and speculative bubbles, *Journal of Finance* 61, 1073-1117.
Inoue, Takeshi, 2005, Reform of China's split-share structure takes shape, *Nomura Capital Market Review*, 8, no. 3.
Ikenberry, david L. and Sundaresh Ramnath, 2002, Underreaction to self-selected news events: The case of stock splits, *Review of Financial Studies*, 15, 489-526.
Jingu, Takeshi, 2006, Reforms to Chinese nontradeable shares, Nomura Securities, Economic Research.
Kaul, Aditya, Vikas Mehrotra, and Randall Morck, 2000, Demand curves for stocks do slope down: New evidence from an index weights adjustment, *Journal of Finance* 55, 893-912.
Lee, Charles M., and Bhaskaran Swaminathan, 2000, Price momentum and trading volume, *Journal of Finance* 55, 2017-2069.
Li, Kai, Tan Wang, Yan-Leung Cheung, and Ping Jiang, 2007, *Privatisation with negotiation: Evidence from the split share structure reform in China*, mimeo.
Liao, Li, Jinliang Li, Bibo Liu and Hao Wang, 2008, *Price discovery and market efficiency: Evidence from the split-share structure reform in China*, mimeo.
Loderer, Claudio, John. W. Cooney, and Leonard D. Van Drunen, 1991, The price elasticity of demand for common stock, *Journal of Finance* 46, 621-651.
Longstaff, Francis, A., 2001, Optimal portfolio choice and the valuation of illiquid securities, *Review of Financial Studies*, 14, 407-431.
Lu, Fei, Maria Balatbat and Robert Czernkowski, 2008, *The role of consideration in China's split share structure reform*, mimeo.
Lynch, Anthony W., and Richard R. Mendenhall, 1997, New evidence on stock price effects associated with changes in the S&P500 index, *Journal of Business* 70, 351-383.
Mei, Jianping, José Scheinkman, and Wei Xiong, 2005, Speculative trading and stock prices: An analysis of Chinese AB share premia, Working paper, NYU and Princeton University.

Merton, Robert C., 1987, A simple model of capital market equilibrium with incomplete information, *Journal of Finance* 42, 483-510.
Mikkelson, Wayne H., and Megan Partch, 1985, Stock price effects and costs of secondary distributions, *Journal of Financial Economics* 14, 165-194.
Mitchell, Jason, and Li Lian Ong, 2006, Seasonalities in China's stock market: Cultural or structural?, International Monetary Fund working paper 06/4
Pastor, Lubos, and Robert Stambaugh, 2003, Liquidity risk and expected stock returns, *Journal of Political Economy* 113, 642-685.
Petajisto, Antti, 2008, Why do demand curves slope down?, *Journal of Financial and Quantitative Analysis*, forthcoming
Scheinkman, Jose and Wei Xiong, 2003, Overconfidence and speculative bubbles, *Journal of Political Economy* 111, 1183-1219.
Scholes, Myron, 1972, The market for securities: Substitution versus price pressure and the effect of information on share price, *Journal of Business* 45, 179-211.
Scholes, Myron and J. Williams, 1977, Estimating betas from nonsynchronous data, *Journal of Financial Economics* 5, 309-328.
Schultz, P., 2000, Stock splits, tick size and sponsorship, *Journal of Finance*, 55, 429-450.
Shiller, Robert, J., 1981, Do stock prices move too much to be justified by subsequent changes in dividends? *American Economic Review*, 71, 421-436.
Shleifer, Andrei, 1986, Do demand curves for stocks slope down?, *Journal of Finance* 41, 579-590.
Sun, Qian, and Wilson H.S. Tong, 2003, China share issue privatization: The extent of its success, *Journal of Financial Economics*, 70, 183-222
Xu, Xiaonian and Yan Wang, 1999, Ownership structure and corporate governance in Chinese stock companies, *China Economic Review*, 10, 75-98
Wan, Gary, Cheng Yuan and Simon Ha, 2005, Non-tradeable to tradeable – reforming the stock markets in the PRC, Linklaters, September.
Wang, Fenghua and Yexiao Xu, 2004, What determines Chinese stock returns?, *Financial Analysts Journal* 60, 65-77.
Wang, Xin, 2004, China's pension reform and capital market development, *China & World Economy*, 3-6, vol. 12, no. 3, pp. 3-16
Wong, Woon K., Dijun Tan and Yixiang Tian, 2008, Informed trading and liquidity in the Shanghai stock exchange, mimeo.
Wurgler, Jeffrey and Ekaterina Zhuravskaya, 2002, Does arbitrage flatten demand curves for stocks?, *Journal of Businss*, 75, pp. 583-608

FOOTNOTES

[1]Such compensation is consistent with the idea that the transformation of NTS into TS may damage the current holders of TS, who in the past decided to hold shares under the assumption that NTS would have never been turned into TS, see Chen and Xiong (2001).

[2]The results of several event studies have been interpreted as producing "anomalies", especially in the long-term reactions of prices. Fama (1998) disputes the robustness of long-term return event studies, but recognizes the usefulness of short-term return event studies.

[3]Chinese investors have to use the foreign exchange reserve in their banking accounts to buy B-shares. Overall, the market capitalization of B-shares was about 3% of the capitalization of A-shares in 2005

[4]See Wan, Yuan and Ha (2005), Inoue (2005) and Jingu (2006) for detailed accounts of the institutional aspects of the reform process.

[5]In order to provide further incentives for companies to join the reform, the CSRC stated that reform-compliant companies would be given priority to raise new capital (new issues of shares and IPOs had been frozen since April 2005). To facilitate the reform, the Chinese government has also taken a series of measures to help stabilize the stock market. The legislative department also amended the Company Law and the Securities Law to perfect the legal framework concerning the capital market. At the end of January, 2006, there was a further rule change making it easier for strategic investors to buy stakes in listed companies; under the new rules the purchase of A-shares is not reserved anymore to the small group of qualified investors but is extended to all the investors willing to buy a minimum stake of 10% of the company and hold the shares for longer than three years.

[6]We also repeat the computations for a modified abnormal volume which takes into account the increase in the float after the second readmission, but the results are very similar.

[7]The measure of volume is defined as: $\upsilon_{it} = \log[1 + V_{it}] / \log[1 + MV_{it}]$, where V_{it} is money volume on day *t* for stock *i*, and MV_{it} is the market value of the outstanding shares on stock *i* on day *t*.

[8]The equation is estimated on the basis of OLS to retrieve the residuals. The residual is then regressed on its own lag and the slope coefficient is used as an estimate of the AR(1) coefficient to transform the original data as in the Cochrane-Orcutt procedure. Finally, OLS is applied to the transformed data.

[9]In our estimation, most of the estimated coefficients are negative, coherently with the intuitive meaning of the measure which associates liquidity with stock reversals.

[10]We have also experimented with other estimation periods like *t-150/t-10* and *t-90/t-10* but results are not affected.

[11] We have followed Wang and Xu (2004) and have used the part of floating ratio that is orthogonal to size measured as the log of the market value.

The Last Shall be First: The Value of Stock Market Reform in China[2]

Andrea Beltratti (*), Bernardo Bortolotti (**) and Marianna Caccavaio(***)

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Abstract

Nontradable shares (NTS) are an unparalleled feature of the ownership structure of Chinese listed companies and represent a major hurdle to domestic financial markets development. After some failed attempts, in 2005 the Chinese authorities have launched a structural reform program aiming at eliminating NTS. This program was completed by the end of 2006. In this paper, we evaluate the stock price effects of this financial reform for Chinese listed companies. Our results show that NTS reform was beneficial for the market as a whole, and especially for those companies with lower fundamentals. Results are consistent with the expectation of improved corporate governance and liquidity enhancing the value of the firm.

Keywords: Chinese equity market, financial market development, corporate governance

JEL Ns: G14, G28, G32

[2] (*) Bocconi University, address: Department of Finance, Via Roentgen 1, 20100, Milan, Italy, email: andrea.beltratti@unibocconi.it, (**) University of Torino and FEEM, address: Fondazione ENI Enrico Mattei, Corso Magenta 23, 20100 Milan, Italy, email: bernardo.bortolotti@feem.it. (***) Bocconi University, address: Department of Economics, Via Roentgen 1, 20100, Milan, Italy, email: marianna.caccavaio@unibocconi.it. The paper has been presented at GCGF-AICG Conference on "Corporate governance in emerging markets", Istanbul 16 November 2007 and at Fondazione ENI Enrico Mattei. We thank Kai Li for comments. We thank Fondazione ENI Enrico Mattei and Centro Paolo Baffi for financial help.

1. Introduction

Academic scholars have been intrigued by the economic consequences of financial reforms at least since Stigler's (1964) seminal contribution, followed by the Jarrell (1981) and Simon (1989) in-depth analyses of the effects of 1933 Security Act in the US stock market.

Recently, a fundamental reform took place in one of the most active emerging markets of the world: during the 2005-2006 period, Chinese regulators eliminated, through a decentralized process, *non tradable shares* (henceforth NTS) in the capital of listed firms. NTS are a special class of shares entitling the holders to exactly the same rights as holders of ordinary shares but which cannot be publicly traded. Typically, these shares belong to the State or to domestic financial institutions ultimately owned by central or local governments, see Sun and Tong (2003) for a detailed explanation.

The reform marks a topical moment in the history of the Chinese stock market, being NTS long recognized by investors as one of the major hurdles for domestic financial development. We conjecture that elimination of NTS should improve fundamentals and be beneficial to market valuation. In this paper we study the reaction of individual stock prices to news about the implementation of the reform, using variables that may proxy for sensitivity to fundamentals. Expectations of dividends should increase due to efficiency improvements associated with better corporate governance, since the reform paves the way to a substantial dilution of government's ownership in firms, to an enhanced role for minority investors, and to a vibrant market for corporate control. Expectations of risk premia should decrease due to the effects of the reform in reducing illiquidity.

We do not estimate a structural model for the determination of stock prices. Rather, we consider returns, that may be thought of as the sum of expected returns and a surprise. Expected returns are determined by the compensation due to the sensitivity to non diversifiable risk factors, but are not quantitatively important over short horizons like the ones we consider in our analyses. The surprise should be associated with new information regarding fundamentals. We therefore exploit various

announcements regarding the implementation of the NTS reform to study the empirical relevance of several variables on the surprise component. We isolate four event periods: the first three are common to all the stocks and follow the announcements of critical steps of the reform by official authorities. These periods should capture the early price reaction to the news incorporating changes in fundamentals. The fourth is based on the dates of the actual implementation of the reform for each individual company. In theory this period should not be relevant to study the link between returns and surprises, as any surprise (except for the compensation surprise to be discussed later) should have been incorporated into stock prices long before the beginning of the reform for each company. By analyzing the cross section of abnormal returns around these dates, we try to understand the drivers of the reaction of stock prices to the reform process.

Analyzing the role of fundamentals in the Chinese stock market is certainly an ambitious task. Mei, Scheinkman and Xiong (2006) argue that the differential between the prices of domestically traded A shares and the prices of B shares, which can be traded only by foreign investors, is so large and pervasive to suggest the presence of a bubble. It is thus not clear whether Chinese investors discount fundamentals when pricing stocks. We acknowledge that the presence of a bubble may somewhat reduce the importance of fundamentals, but if the total price is equal to the fundamental price plus a bubble, then fluctuations in the bubble in general will weaken, but not eliminate, the relation between fundamentals and prices. The existence of a bubble would make it more difficult to obtain results from our empirical exercise. There are two more elements that make our analysis robust to the presence of a bubble: (a) we consider returns and not prices, the former being less affected by the presence of a bubble, (b) the reform implies an increase in the supply of shares and this may be associated with a bursting of the bubble, as suggested by the theoretical model of Hong, Scheinkman and Xiong (2006). It is therefore unlikely that the results found with our methodology are the spurious effects of a bubble.

Our results can be summarized as follows. The NTS reform had a difficult start. The announcement of the pilot programs was not well received by investors: the market lost more than 5 percent and

more than 15 percent in the month after the announcement of the first and the second pilot program, respectively. After the successful completion of the two pilot programs, the official authorities announced the extension of the NTS program to the entire market by the end of 2006. The market reacted positively to this news, and gained more than 6 percent in the month following this announcement. Our results suggest that at this stage investors revised their expectations on fundamentals. Companies gaining the most at the announcement were those with worse governance structures and lower liquidity. As predicted by theory, results are broadly consistent with the expectation of improved corporate governance and enhanced liquidity increasing the value of the firm. We do not observe any major effects on fundamentals at the time of implementation of the reform at the company level, suggesting that the most part of the structural effects of the reform took place around the periods of the early announcements.

After this introduction, the second section describes some key institutional features of the Chinese stock market and the mechanics of the NTS reform, the third section presents the theoretical model driving the empirical analysis, the fourth describes the event study, the fifth section comments the results. The sixth section concludes.

2. The Chinese stock market and the NTS reform

The Chinese equity market has several distinct characteristics and segmentation is certainly one of the most prominent. Chinese listed firms have multiple classes of shares: shares which can be traded by domestic investors (A-shares), shares denominated in foreign currencies and reserved to foreign investors (B-shares), and shares of companies listed or cross-listed overseas (H-shares, for those listed in Honk Kong).[3]

Split-share structures are common around the world and typically warrant owners different rights (Faccio and Lang, 2002). An unparalleled feature of ownership structures in China is the existence

[3] Market segmentation is relevant for pricing. Mei, Scheinkman and Xiong (2005) compare the performance of A and B shares for 75 companies for the period 1993-2001, finding a 421.8% premium for A shares over B shares, regardless of equal property rights on dividends.

of NTS entitling the holders to exactly the same voting and cash flow rights assigned to the holders of tradable shares but which cannot traded publicly even if the company is listed. Typically these shares belong to the State or to domestic financial institutions ultimately owned by central or local governments.

Transfer of NTS has become possible since mid 1990s through irregularly scheduled auctions and over-the-counter transactions. According to Green and Black's (2003) analysis of 840 transactions taking place in the Shenzhen market in the period 1994-2003, such transfers have often involved large blocks affecting the control of companies. The predominant sellers were State-controlled shareholding companies, and the dominant buyers were private companies. 32% (46%) of the deals were associated with a change in control in 2001 (2002). Chen and Xiong (2001) study the irregularly scheduled auctions and OTC transactions of restricted institutional shares for the period August 2000-July 2001 and find a large liquidity discount averaging 79% (86%) with respect to their floating counterpart when sale takes place through auctions (private transfers). The discount varies with some characteristics of the company: the discount is lower for large firms, firms with a high return on equity, firms with high earnings-price or book-price ratios, firms with low debt-equity ratios, firms with low stock return volatility.

NTS shares have been issued to the founders of a corporation, business partners or employees and served two main purposes: to keep firmly in government's hands the control of State-owned enterprises that were floated in the market, and to maximize IPO proceeds. Indeed, a fraction of capital was suppressed, reducing supply and pushing up the price of tradable shares. As figure 1 shows, NTS turned out to be overwhelmingly important in Chinese stock markets. As of February 2006, they account for 63% of the total number of shares outstanding, most of the NTS being represented by state-owned shares.

Regulatory authorities soon recognized that the predominance of NTS constituted a problem for the market from several points of view. First, NTS hindered the functioning of an active market for corporate control: holders of tradable shares (TS) are typically minority shareholders with limited

power to affect management decisions. Second, NTS made the major shareholders relatively indifferent to stock price movements due to the impossibility to sell the shares. Third, the limited free float available made the domestic market extremely illiquid, volatile and thus prone to market manipulation and insider trading. Fourth, the inefficiency of the domestic market induced many valuable Chinese companies to list overseas, Hong Kong being one of the most preferred destinations. This adversely affected domestic investors who, prevented to invest in the best companies, were stuck with holdings the less performing local companies.

The Chinese government tried to deal with the problem of NTS on several occasions, particularly in 1999 and 2001. In the first attempt, two companies were selected to sell their state shares to the floating shareholders. The experiment was not well received by the investors and within 15 days from the announcement of the transfer program the share price of the two companies fell about 40 percent. The second attempt failed badly in 2001 because the proposal envisaged an equal pricing for tradable and non-tradable shares.

In January 2004, the Chinese government mentioned officially NTS as a major hurdle for domestic financial development and stated its commitment to face it in the immediate future. On April 29 2005, the China Securities Regulatory Commission (CSRC) announced a new pilot program, inviting a first batch of four companies to transform NTS into TS by compensating existing shareholders through various instruments like bonus shares, cash compensation, and options. The main difference between the 2005 pilot program and the 1999 and 2001 attempts is that in the last reform the price of NTS is negotiated by the companies and their floating shareholders.

Amongst the four original pilot companies, only Tsinghua Tongfang failed to pass its reform proposal due to floating shareholders' discontent about compensation. On June 2005, the CSRC initiated the second round of the pilot program involving 42 companies accounting for 10% of overall stock market value. On August 19, this second round was accomplished, with the last two companies transferring entirely their NTS to the market. On August 24, 2005 the government issued guidelines to extend the reform share project to the rest of the stock market, setting the end of 2006

as the deadline of the process. In order to provide further incentives to the companies, the CSRC encouraged all mainland-listed companies to turn nontradable into tradable shares and stated that reform-compliant companies would be given priority to raise new capital (primary issues of shares and IPOs have been frozen since April 2005).

To facilitate the reform, the Chinese government also took a series of measures to help stabilize the stock market. As we will see in detail, regulators addressed the issue of price volatility by requiring the suspension of trading around the critical dates of the implementation of the reform. In order to dilute the effect of a possible stock overhang, due to a possible massive future sale of shares, a 12 month lockup period is established for the holders of NTS. Furthermore, in the two years after expiration of the lock-up, a holder of NTS with more than 5% of the total issued share capital of the listed company was further prohibited from trading on the stock exchange more than 5% (10%) of the company's total share capital within 12 (24) months. Furthermore, the company and the controlling shareholder are entitled to stabilize the market price of the shares for example through buy-backs (Wan, Yuan and Ha, 2005).

The legislative department amended the Company Law and the Securities Law to perfect the legal framework concerning the capital market. At the end of January, 2006, there was a further rule change making it easier for strategic investors to buy stakes in listed companies; under the new rules the purchase of A-shares is not reserved anymore to the small group of qualified investors but is extended to all the investors willing to buy a minimum stake of 10% of the company and hold the shares for longer than three years.[4]

By the end of 2006, and thus within announced deadline, the restructuring process was virtually completed: as Figure 2 shows, the overwhelming majority of listed companies eliminated NTS.

[4] Capital market legislation, first amended in 2001 to allow domestic Chinese investors to trade B-shares and qualified foreign institutional investors (QFII) to invest in A-shares, was further amended at the end of January, 2006. Under the new legislation, it easier for strategic investors to buy stakes in listed companies. Under the new rules the purchase of A-shares is not reserved anymore to the small group of qualified investors but is extended to all the investors willing to buy a minimum stake of 10% of the company and hold the shares longer than three years.

3. The NTS reform and fundamentals: theoretical background

3.1 Shocks and revisions to fundamentals

In the introduction, we argued that the Chinese stock market provides us with an interesting laboratory to analyze the impact of reform-induced structural changes on the value of the firm. In the standard model, see e.g. Ferson and Harvey (1999), excess returns are equal to an expected component plus a surprise:

$$r_{i,t+1} - r_{f,t} = E_t(r_{i,t+1} - r_{f,t}) + \beta_i' F_{t+1} + \varepsilon_{i,t+1} \tag{1}$$

where $r_{i,t+1}$ is the rate of return of stock *i*, $r_{f,t}$ is the risk-free rate, F_{t+1} is a vector of shocks to common factors and $\varepsilon_{i,t+1}$ is an idiosyncratic shock to the rate of return. The surprise elements usually create unwanted noise that makes any analyses of the risk premium more difficult. In this study however we are mainly interested in the surprise component, because we intend to use the rate of return over a specific event period as a proxy of the surprise component of the reform.

In order to provide a structural interpretation to shocks, and to identify the channels linking the reform to risk premia and expected dividends, we use the log-linear dividend-price ratio model introduced by Campbell and Shiller (1988) in the surprise version developed by Campbell and Ammer (1993). According to the model, the log dividend-price ratio of the *i-th* stock is the expectation of future discount rates minus dividend growth:

$$\log(D_{i,t} / P_{i,t}) = E_t \sum_{j=1}^{\infty} \rho^j (r_{i,t+j} - \Delta d_{i,t+j}) + k \tag{2}$$

where $D_{i,t}$ is the dividend paid by the *i-th* stock during time *t*, $P_{i,t}$ is the price at the end of time *t*, ρ is a linearization constant equal to one minus the average log dividend-price ratio, $\Delta d_{i,t+j}$ is the rate of growth of dividends, *k* is another linearization constant. Campbell and Ammer (1993) decompose the unexpected return into the sum of revisions to dividends and returns:

$$\begin{aligned} &E_{t+1}(\textstyle\sum_{j=0}^{\infty} \rho^j \Delta d_{i,t+1+j}) - E_t(\textstyle\sum_{j=0}^{\infty} \rho^j \Delta d_{i,t+1+j}) - \\ &- E_{t+1}(\textstyle\sum_{j=1}^{\infty} \rho^j r_{i,t+1+j}) + E_t(\textstyle\sum_{j=1}^{\infty} \rho^j r_{i,t+1+j}) \end{aligned} \tag{3}$$

The unexpected excess rate of return of each stock in a period dominated by new information about the reform process is therefore the sum of revisions to expectations of future profitability and returns. Our hypothesis is that the reform of the Chinese stock market has had heterogeneous effects on different companies.

Before discussing how the reform has affected fundamentals, it is useful to understand how relevant the effects of changes in expected fundamentals on prices can be. Consider a two-phase present discounted value model, where the price incorporates expectations of future fundamentals for ten years plus the expectation of the terminal value derived from the Gordon model. Assume that the initial dividend is equal to 100 and the rate of growth of dividends stays at 10% for the first 3 years, reduces to 9% for the following 2 years, and then further reduces linearly to 4% between year 6 and year 10. Assume a real interest rate which increases linearly from 1% to 2% over the 10 year horizon and assume a risk premium equal to 5%. A reduction of 100 basis points in expected returns, due for example to liquidity effects, has a strong 51% impact on the price. An improving expectation of future dividends, associated for example with a better corporate governance, described by a positive impact on dividend growth of 100 basis points from year 4 on (to allow for a delayed effect) has a comparable impact of 45%.[5] Campbell, Lo and MacKinley (1997) also highlight the role of persistence in expected returns on the determination of stock prices.

3.2 The reform and expected dividends

Dividends depend on the profitability of the firm, which in turn is a function of technical, organizational and corporate governance characteristics. The reform has no immediate impact on the technology and organization of the firm, but it may deeply affect incentives and corporate governance. In particular: the reform paves the way to (i) "real" privatization, namely the possibility that public shareholders – at least in non strategic sectors - will eventually float a substantial amount

[5] One could claim that the presence of a bubble may invalidate our empirical results. On the contrary, a bubble will just introduce bias against us, given that it may induce fluctuations in prices which are not associated with fundamentals.

of secondary shares on the market, enhancing the role of minority investors in management decisions; (ii) the possibility that an enhanced stock trading will create an active market for corporate control, with mergers and acquisitions financed through shares rather than only cash. Both (i) and (ii) may induce managers to more efficient actions leading to improved profitability. Investors allowing for such improvement in governance should therefore have revised upwards the market value of the firm.

In developed economies, one of the most prominent policy experiment in the field has been the enactment of the Sarbanes-Oxley Act (SOX) of 2002 aimed at improving the corporate governance of US listed firms, severely hit by high profile scandals over the 2001-2002 crisis. Several papers have studied the effects of SOX on firm value, providing mixed evidence about the costs and benefits of the reform (Jain and Rezaee, 2006; Zhang, 2006). Interestingly, Chhaochharia and Grinsten (2007) have shown that the announcement of these new rules had a significant impact on firm value, with special benefit accruing to firms which were less complaint with the rules. Gompers, Ishii and Metrick (2003) determine the existence of a positive relation between improvement in governance and equity prices for the US market. We expect a similar channel to be relevant to understand the reform of the Chinese stock market.

Johnson and Simon (1999) provide an interesting tale of two transition countries (Poland and the Czech Republic) about the effects security legislation enhancing investor protection, showing that ceteris paribus these rules fostered financial market development. In emerging countries, several event studies have been conducted to evaluate the economic implication of financial liberalizations, using the first issue dates of American Depositary Receipts (ADR) programs (see for example Bekaert and Harvey, 1998). Albeit related to corporate governance improvements in terms of compliance to stricter regulatory standards, ADR programs are in most cases initiated by the issuer rather than by legislative action. Furthermore, the positive effects of these improvements tend to affect domestic listed firms only indirectly, while financial reforms should have first order effects on the market as a whole.

A caveat is in order. The reform was associated with the presence of lock-ups for the newly created TS. In most cases holders of previously NTS had to wait two years before being free to sell their shares in the open market. The presence of tight lock-up positions for the sale of newly created TS suggests that major changes in the corporate governance will not materialize immediately after the end of the reform process. Indeed, policy guidelines stated that the official objective of the reform is not to reduce state holdings, but just to eliminate NTS, and that in enterprises deemed strategic control will remain tightly in the hands of the government (Mattlin, 2007). Yet, the reform changed expectations about the corporate governance of the typical Chinese listed firm, and these changes in fundamentals may produce real effects on the stocks according to the initial conditions in terms of corporate governance. The present value model illustrated in (1) highlights the importance of long run expectations of fundamentals in determining current market prices.

Different stocks would react differently to the implementation of the reform if they are heterogeneous in terms of disclosure, transparency, and protection of minority investors. In that respect, the Chinese stock market provides an interesting environment to investigate the relation between corporate governance and the value of the firm in an emerging market. We are going to consider several proxies for corporate governance, based on multiple classes of shares and on the existence of an international auditor.

Among the dividend-related information, we should of course mention the compensation promised to holders of TS during the reform process. One of the main differences between this reform and previous reforms lies exactly in the compensation assigned to holders of TS on the part of holders of NTS. The compensation was usually paid in the form of assignment of new shares. The announcement of the compensation scheme behind the reform should therefore have induced investors to also consider a one-off payment, equivalent to an extraordinary dividend. It follows that variables related to the size of the possible compensation should also be helpful to explain the cross section of abnormal stock returns after the announcement.

3.3 The reform and expected returns

In terms of risk premia, a reform increasing the quantity of TS is likely to increase the liquidity of the shares because of the compensation paid to holders of TS which immediately increases the number of floating shares[6]. When lock-ups expire, the increase in the floating is even larger. Therefore investors can plausibly expect a relevant increase in liquidity in the short run and an even larger increase in the long run. Several contributions highlight the role of liquidity on expected stock returns. Amihud (2002) stresses the component of expected returns associated with the average illiquidity. Pastor and Stambaugh (2003) and Acharya and Pedersen (2005), discuss the crucial role of the sensitivity of company-specific liquidity shocks to market-wide liquidity shocks. The reform impacts both aspects of liquidity. By increasing the proportion of shares that can be actively traded, it increases liquidity and decreases the illiquidity premium. Moreover, the reform may be interpreted as a huge market-wide liquidity shock and this implies that stocks with a larger sensitivity to market-wide liquidity will benefit most from the reform. Therefore, the main beneficiaries will be those stocks that were particularly illiquid before the reform, i.e. stocks characterized by a higher proportion of NTS, thinly traded stocks and stocks with a high liquidity beta. Cross-sectionally, we expect that the positive return surprise after the announcement will positively depend on the initial proportion of NTS, on the bid-ask spread, on the liquidity beta.

There is a second element of the reform that may be important for determination of expected returns. Past attempts to tackle NTS witnessed the commitment on the part of Chinese authorities, but their failures had left investors with one additional source of risk. Anecdotal evidence suggests that investors have attached high relevance to the structural reform, even though they have been swayed back and forth by the fear that the reform process may adversely affect the stock market due to stock overhang and by the belief that the process may eventually be beneficial. These observations suggest that such non-diversifiable uncertainty should have been incorporated into a higher expected return. As a consequence, the elimination of such an uncertainty associated with a

[6] On average, the supply of shares have gone up 30% simply due to compensation to holders of TS.

credible announcement of the reform should have decreased the risk premium and, ceteris paribus, increased market valuation. Also in this case the effect is likely to be heterogeneous across stocks, depending on the quantity of outstanding NTS.

A third potentially relevant element has to do with supply effects. Indeed, this has historically been the main risk element mentioned in informal discussions. It was felt that a massive increase in supply following the reform could have depressed prices. While this worry does not make sense when the demand curve for stocks is horizontal, there are various cases that may be relevant and may imply an effect of supply. Wurgler and Zhuravskaya (2002) and Petajisto (2008) highlight the importance of short selling as a necessary condition for effective arbitrage. The impossibility of short selling in the Chinese stock market therefore certainly produces negatively sloped demand curves, see Shleifer (1986) for a general discussion and Hong, Scheinkman and Xiong (2006) for a model assuming negatively sloped demand functions for stocks. As a result, Chinese investors were completely rational when worrying about potential supply effects associated with the reform. When demand curves slope down, an increase in per capita risk, associated with a supply increase in a closed financial market, causes a larger expected return that is discounted back and immediately has an impact on the price. China is indeed a financially closed country: international investors have not been freely allowed to enter the stock market[7] so that the domestic population had to hold the undiversifiable risk of stocks.

A fourth element has to do with corporate governance. The improvement in corporate governance associated with the elimination of NTS may decrease an important element of non-diversifiable risk and therefore may reduce the risk premium

[7] The Qualified Foreign Institutional Investors Scheme (QFII) was promulgated in 2002 and allowed a restricted number of large offshore financial institutions to exploit some predefined investment quotas. Overall, in 2004 the QFII program involved approximately $2.8 billion against a capitalization of $500 billion while in 2006 the overall value of the program was about $7.8 billion (State Administration of Foreign Exchange, www.safe.gov.cn). At the beginning of 2006 Chinese regulators opened the market by allowing a larger number of foreign investors to acquire A-shares of a PRC company listed on the Chinese stock markets (provided that the company had completed the reform of the split equity structure or was listed after the Reform) without any specific quota. The investment can be regarded as "strategic" if the foreign investor buys no less than 10% of the Chinese company and the shares are held for at least three years.

4. The event study

4.1 Event history

The anecdotal evidence reported above suggests that the market reacted to the announcement and implementation of the reform process. Something new and interesting about the fundamentals of the Chinese stock market may thus be learnt from the price reactions of the various stocks to the NTS program. But when exactly has this critical information been released?

The first critical window is represented by the period immediately following the first announcement of the pilot program, i.e. April 29th, 2005. At the time, a real concern was that a bad market reaction could scrap the reform entirely. Moreover, there were other sources of uncertainty, among which the timing of extension of the reform to the whole market, the choice of the compensation mechanism devised by the government, and the size of the potential overhang associated with the supply increase. However, at that stage the credibility of commitment by public authorities to eliminate NTS was weak given that after the first failed attempts the government quickly halted the program.

Not surprisingly, the early reaction by the market was negative. The date of April 29th, 2005, corresponds to the beginning of an extended period of weakness bringing the index from 1,169 on April 28th to 1,013 on June 3rd. This period includes May 9th, the day of the first suspension of trading of the four pilot companies included in the first batch. The China Daily, on the basis of interviews with Chinese security analysts, reported on May 10th that "some investors worried that they may not get sufficient compensation…but some investors also bought actively on stocks that market rumors said might become the next pilot firms to try the nontradable share sell-off scheme. The short-term impact of the news of the nontradable share flotation could be limited as regulators will not allow all nontradable shares to flood the market in one go…But in the long run, the flotation of these shares may push down average price/earnings ratios and further polarize share prices".

The second fundamental event window starts on June 20th, the announcement date of the extension of the reform process to a large and representative second batch of 42 companies. This second announcement is particularly important as it is evidence of the increased credibility and momentum gained by the NTS reform. By confirming the negotiation mechanism tested in the first batch, this announcement provided clues on the compensation for tradable shareholders. Yet at this stage the timing of the extension of the process to the whole listing was still completely uncertain. On June 21st, Dow Jones Newswires reports that "investors have reacted warmly to a large expansion in China's trial program to float NTS, interpreting the bigger-than-expected size and scope of the second batch of firms tapped to participate as a sign of the government's commitment to, and confidence in, the reform process". The market went up almost 3% on June 20th, after the announcement about the second batch made over the previous week-end of the 18th and 19th of June. But then the market lost about 10% between the end of June and early July.

The third important date is August 24th, 2005, when investors learnt that the initial experiments had been successful and that the government was planning to extend the NTS reform gradually to the entire market and to accomplish it by the end of 2006. This is in our opinion the fundamental event date to study the reaction of companies to the reform. Two sources of uncertainty remained, but were of minor importance. The first concerned the exact dates of implementation of the reform for each company; however investors knew that all firms were to be involved in a relatively short time span (16 months). The second was related to the fact that some companies could fail to restructure the split capital structure lacking resources to compensate holders of tradable shares. However, most companies were able to successfully finish the reform.

Finally, one possibility is that investors reacted on a case-by-case basis, updating expectations on fundamentals when each company entered the NTS process, and when detailed information about the compensation was available. To consider this possibility, one has to refer to the complex

guidelines outlined by the CSRC and released on September 5th, 2005 (CSRC, 2005). The conversion of NTS should follow the following procedure:[8]

1. holders of NTS request the board of directors to start the reform process;
2. the board must seek for the cooperation of an external sponsoring institution and of a law firm to draft the proposal. The sponsor must consult the stock exchange about the feasibility of the proposal[9] and arrange a meeting with the relevant market shareholders;
3. date t_0: the board of directors then publicizes the date of the shareholders' meeting, a description of the reform proposal as well as the opinions of the recommending institution and the law office. Trading in the shares of the stock is immediately suspended;
4. within date $t_0 + 10$ the board of directors and holders of NTS interact with holders of TS to receive comments and suggestions and form an opinion about the overall evaluation of the proposal;
5. if no change is carried out then there is a public announcement and trading is resumed (date t_1), otherwise changes may be made to the original proposal and some more days may pass before resumption of trading. Importantly, proposals cannot be modified again after trading is restarted;
6. registration starts for the shareholders' meeting (date t_2) and trading is suspended for the second time;
7. the shareholders' meeting is held. The proposal needs a qualified majority of two-thirds of the participants. If the proposal is accepted the board must publicize the timetable for actual implementation of the reform. Trading is restarted after completion of the reform (date t_3).

The reform process is organized around two periods of trading suspension which differ greatly in terms of length and amount of price sensitive information produced. In particular, the first period

[8] See Jingu (2006) and Wan, Yuan and Ha (2005) for more detailed descriptions of the process.
[9] The stock exchange neither "approves" the proposal nor provides any judgment on the amount of the proposed compensation, but just advises the company on the technical aspects of the proposal.

includes all the negotiations between tradable and non tradable shareholders, and ends with the first disclosure of the compensation required. The second period only includes the formal approval of the plans on the part of the shareholders which can generally be taken for granted: in fact, no change to the agreed proposal can be made during the second period. In the empirical analysis, we will thus focus on the first period.

To summarize, our event study will be based on four windows, based on the following critical dates: i) the announcement date of the first pilot program; ii) the announcement date of the second pilot program; iii) the announcement date of the extension of the NTS reform to the entire market; iv) the company-specific announcement date of implementation of the reform.

4.2 Data

We have used three data sets for our empirical work. We have collected from DataStream daily data for the 1,440 companies listed in the Shanghai Stock Exchange and in the Shenzhen Stock Exchange regarding market value, price to book, opening and closing price, higher and lower price, return index, turnover by volume. In order to build risk factors based on float (rather than on capitalization) we have also purchased data about the time-series of the number of tradable shares of each company from Shenzhen GTA Information Technology Co Limited. Finally, Nomura Institute of Capital Market Research provided us with detailed information about the compensation plan of each company.

We cannot completely use the original sample of 1,440 companies for various reasons: (a) some companies disappeared before the beginning of the reform process, (b) some companies are reported from DataStream to be suspended from trading as of February 2007 for unspecified reasons, (c) some companies were listed after September 2005 so they are not used because of their short trading history, (d) 5 companies did not have nontradable shares even before the beginning of the reform process, (e) in some cases the data are not fully convincing due to discrepancies across data sets in the percentage of tradable shares before and after the reform. These considerations leave

us with a sample of 1,209 companies for the cross sectional analyses carried out in April, June and August 2005. The sample for the cross-sectional analyses of the abnormal return upon readmission is further reduced because of two reasons: (i) a small number of companies have paid compensation in cash and we have eliminated those companies (ii) the price of some companies is halted upon readmission because of a return in excess of 10%. We therefore exclude these companies from the cross-sectional analysis of the abnormal return upon readmission.

We choose as interest rate the middle rate of the three-month time deposit rate. We compute a market index by considering the actual float of each company. This is important in view of the large difference between float and capitalization caused by the existence of NTS. A capitalization index would include the quantity of both TS and NTS to compute the weights assigned to the various stocks and would provide a measure not reflecting current market conditions. Wang and Xu (2004) also compute a float-weighted market index. We use the Shenzhen GTA Information Technology Co Limited data in order to build a float-weighted market index and float-weighted risk factors.

Table 1 presents the timing of the implementation and the size of the NTS reform, which kicked off on May 9, 2005 with the four companies of the first batch (Tsingua Tongfang, Hebei Jinniu Energy Resources, Shanghai Zi Jiang Enterprise Group, and Sany Heavy Industry). Three out of four companies accomplished successfully the transfer program in 37 days on average. They were followed by a second batch involving 42 companies. The duration of the programs of this batch ranged from 35 to 60 days, with an average of approximately of 47 days. The program then spread out gradually to the entire market. As of February 2007, 67 batches has been launched involving a total of companies (more than a half of listed companies), and 1,301 out of these have successfully completed the reform. On average, there are 19 companies per batch and the average duration of process is 44 days.

The percentage of TS before the reform was equal to 36% on average, with a minimum of 3.54% and a maximum of 79%.[10] The standard deviation across firms was 11.61%. After the reform the average proportion of TS is about 46%. NTS thus still have a substantial role because of the presence of various lock-up periods which expire 1-2 years after the end of the reform for each company. Our statistics of 46% refers to the proportion of shares that can be freely traded in the market. The remaining 54% in represented by shares which will become fully tradeable at the end of their respective lock-up periods.

We have been able to find detailed information about the compensation plan for the companies which have begun the reform process by the end of February, 2007.[11] In 1124 cases, compensation took the form of free distribution of bonus shares. In other 52 cases, compensation was supplemented by payment of cash. In the remaining cases, it took the form of stock splits, options or pure cash payment. We can thus conclude that in the large majority of cases TS shareholders have been compensated by means of bonus shares. Table 1 reports the average bonus ratio per batch. Companies in the first batch transferred on average 3 shares per 10 shares to tradable shareholders in order to make all their shares tradable, while those involved in the second 3.49 distributed shares per 10 shares. In the subsequent batches, the bonus ratio remained quite close to the values established in the two pilot programs, with an average per batch of 2.95.

4.3 The testing strategy

Our analysis aims at explaining the cross section of returns in the various event periods by use of some explanatory variables capturing variations in fundamentals. Our theoretical model implies we should explain the shock to returns while controlling for risk premia. Which variables are relevant of course depends on the pricing model and on how risk is accounted for by Chinese investors.

The literature on empirical asset pricing in China is not well developed. Wang and Xu (2004) propose a model including the market, size and a floating ratio factor, which is a portfolio built by

[10] The summary statistics are obtained from the data for each individual company.

[11] We thank Takeshi Inoue (Nomura Institute of Capital Market Research) for kindly providing us with these data.

buying firms with a high floating ratio (a high ratio between tradable and nontradable shares) and selling short firms with a low floating ratio.[12] Beltratti and Caccavaio (2008) augment this model with a liquidity factor of the Pastor-Stambaugh (2003) type. Liquidity seems logically to be a relevant risk factor for the Chinese stock market characterized by many illiquid stocks.

Our empirical strategy resembles that of Brennan, Chordia and Subrahmanyam (2006): (a) run time series regression of the excess return of each company on the risk factors in order to estimate excess returns (b) run a cross sectional regression of excess returns on the characteristics in order to verify whether they have been priced in our event periods. However, the goal of Brennan, Chordia and Subrahmanyam (2006) is to test whether non-risk characteristics have marginal exploratory power relative to the arbitrage pricing theory benchmark and therefore they run a time series of cross sectional regressions. Our goal is instead to verify whether in specific episodes some particular characteristics associated with fundamentals have had a particular role in explaining abnormal stock returns. Therefore we run cross sectional regressions for specific event periods.

In the first step, we compute abnormal returns. In a first version, abnormal returns are the residuals from the simple market model:

$$r_{i,t} - r_{f,t} = \alpha_i + \beta_{i,M}(r_{M,t} - r_{f,t}) + \varepsilon_{i,t} \tag{4}$$

In a second version, abnormal returns are the residuals from a regression also allowing for other risk factors like a size factor, a float factor and a liquidity factor:

$$r_{i,t} - r_{f,t} = \alpha_i + \beta_{i,M}(r_{M,t} - r_{f,t}) + \beta_{i,S} r_{S,t} + \beta_{i,F} r_{F,t} + \beta_{i,L} r_{L,t} + \varepsilon_{i,t} \tag{5}$$

The model is consistent with the findings of Wang and Xu (2003) and Beltratti and Caccavaio (2008). We follow Beltratti and Caccavaio (2008) in building the risk factors[13]. At the beginning of each month, Shanghai (SSE) and Shenzhen (ZSE) stocks are allocated to two groups (small or big, S or B) based on whether their market value (MV) during the previous month is below or above the

[12] Wang and Xu (2004) interpret it as a proxy for corporate governance. However from an ex ante point of view good governance should be associated with lower expected returns but from an ex post view good governance may be associated with higher realized average returns if investors are positively surprised by improvements in governance.

[13] Importantly, all the risk factors are built starting from the actual float of the companies and not from the capitalization. This is particularly important in China given the widespread use of NTS.

median MV for the specific market. Then the stocks are sorted in three float ratio groups (low, medium, or high: L, M, H) based on the bottom 30 percent, middle 40 percent and top 30 percent of the floating ratio[12]. Value-weighted portfolio returns are then computed for each portfolio. FR is the difference between the average returns of the two high-FR portfolios and the average returns of the two low-FR. Theoretically, the expected return of FR should be negative as it represents a portfolio long good governance companies and short bad governance companies. However, Wang and Xu (2004) themselves find that the average return of FR is positive, explaining this result on the basis of the better performance offered by companies with more efficient governance. It is therefore unclear whether FR is a true proxy for a non-diversificable risk factor, stressing the ex ante relation between risk and expected return or the ex post relation between risk and average return here the latter is positive due to continuous positive surprises on good governance companies.

Similarly, we build a liquidity portfolio (HLIQMLLIQ) after ranking stocks on the basis of the liquidity indicator of Pastor and Stambaugh (2003). The liquidity measure for stock *i* in month *t* is the estimate $\gamma_{i,t}$ from the regression:

$$r^{e}_{i,d+1,t} = \theta_{i,t} + \phi_{i,t} r_{i,d,t} + \gamma_{i,t} sign(r^{e}_{i,d,t}) \times v_{i,d,t} + \varepsilon_{i,d,t+1}; \quad (6)$$

where the dependent variable is the excess return on the stock on day *d* in month *t* and the regressors are respectively the return on the stock in the previous day of the month and a variable obtained from the multiplication of the sign of the excess return and the volume of the stock. The indicator proxies liquidity by an estimate of the return reversal. Our liquidity factor is long high liquidity stocks and short low liquidity stocks. An investor holding this portfolio would therefore expect a *low* rate of return due to the portfolio amounting to buying liquidity. The equation is estimated using daily data, allowing for Dimson (1979) correction, for the year preceding the event period.

In the second step, we use these residuals in a cross sectional regression on various characteristics:

$$\varepsilon_{i,t+1} = \gamma_0 + \gamma' X_{it} + \varepsilon_{i,t+1} \quad (7)$$

where X_{it} represents a vector of variables proxying for the possible reactions of long run fundamentals to the reform. The cross section is run for the four different periods discussed above. Each time we run the cross section with weekly data for the four weeks following the announcement date.

Before discussing the choice of the characteristics, it is worth commenting on what differences we expect from the market model and the factor model. If corporate governance and liquidity are relevant risk factors at the aggregate level, then the reform should have an impact on the factor-replicating portfolios. The value of such factor-replicating portfolios should jump on the announcement of the reform. For example the portfolio that is long companies with good governance and short companies with bad governance should decrease in value due to the expectation of a relative improvement of the latter companies. Under this scenario, the market model should produce results that differ from the factor model. Residuals from the factor model should be less correlated with characteristics because the surprise should have been explained by the shock to the factor-replicating portfolio and the sensitivity of the stock to such a portfolio. We do not wish to over-emphasize the difference between the market model and the factor model given existing uncertainty about the structure of the risk model for the Chinese stock market. While aggregate risk has been long studied in the US stock market, there are very few studies for China. The short history of the Chinese stock market and its frequent structural breaks are further elements that complicate the discovery of a stable risk structure.

4.4 The relevant characteristics

Concentration of tradeable shares is the proportion of TS held by the ten largest holders. It measures potential coordination among tradeable shareholders. One may believe that a higher level of concentration facilitates coordination among relevant shareholders and may increase their bargaining power, extracting a larger compensation. On the other hand it is also possible that higher concentration makes life easier for holders of NTS who may convince a limited but relevant number

of holders of TS to accept a lower compensation. The empirical analysis of Haveman and Wang (2008) is favorable to the second hypothesis. Noting that large concentration of holders of TS usually implies large holdings on the part of mutual funds, they hypothesize that "non-tradable shareholders could have made side-payments to mutual-fund managers to persuade them to accept, on behalf of private investors, less compensation than they would otherwise have demanded". From this point of view, concentration may represent a risk factor.

We include as regressors the percentage of legal shares. Xu and Wang (1999) find a positive and significant correlation between profitability and the fraction of legal person shares and a negative correlation between labor productivity and the proportion of state shares.

A possible proxy for heterogeneity in corporate governance is given by a dummy which identifies firms which have accounts certified by a Big Four firm. The firms may be more likely to ensure transparency because they have a greater reputation to uphold, because they may be more independent than local firms, or because they face greater legal liability and recognizability (Michaely and Shaw, 1995; Dye, 1993). Importantly, previous research in emerging countries has shown that significantly better stock price performance is associated with firms that had indicators of higher disclosure quality, such as a Big Four auditor (Mitton, 2002). In the Chinese stock market, we found 33 listed firms audited by Ernst & Young, 15 by KPMG, 43 by PricewaterhouseCoopers, and 19 by Deloitte &Touche. Another international firm who takes a big share in auditing service is the BDO international: they provide CPA service to 50 listed firms in China. We also identified 72 listed firms who are audited by certified public accountants affiliated of Hong Kong. We will attach to this group of 232 firms a Big 4 dummy which should capture sensitivity to higher corporate governance standards.

Other proxies for corporate governance are provided by the existence of shares traded in international markets. Some listed companies are very large and enjoy a strong international reputation being traded also in major foreign exchanges such as Hong Kong, New York and London. On the contrary, other companies have a small or medium sized more, display operating

activities in mainland China small and are virtually unknown to international investors. We have included a dummy equal to 1 when the company also has B shares (shares used by international investors) and a dummy equal to 1 when the company has shares traded in Hong Kong. In the original sample of 1440 firms, 85 have also issued B-shares and 29 have H-shares. There is some overlap, in the sense that some firms have issued both B-shares and H-shares: 11 companies have issued either B-shares or H-shares. Moreover these two dummy variables commove with the Big 4 dummy: the company with a Big Four certified accounts have all issued either B-shares or H-shares or both. However, there are 55 companies with a Big Four certified accounts without either B-shares or H-shares.

The proportion of NTS may be taken as a proxy for governance. In particular, a company with a higher proportion of NTS may be regarded by investors as a company with a worse governance. The percentage of NTS may be relevant also from the point of view of supply effects. However the proportion of NTS does not change on the day of the announcements that we consider in our empirical work, as the new supply will increase only at the end of the reform process for each company, when bonus shares are actually distributed after conversion. One should therefore not expect any relation between prices and the proportion of NTS as an indicator of supply effects. However investors may anticipate a larger future supply and discount back to the present the future pressure on the price.

The characteristics associated with liquidity are the liquidity beta and the bid-ask spread. For a given company, the liquidity beta is the sensitivity of the return of the company with respect to the rate of return of the liquidity factor described in section 4.3. The bid-ask spread is mainly associated with specific liquidity conditions. Finally, turnover is the ratio between the total number of shares traded in a given day and the total number of tradable shares. Volatility is the standard deviation of the residuals from the regression used to compute the abnormal returns. We also include dummy variables for relevant sectors.

5. Results

Table 2 presents summary statistics about the (equally weighted, across company) mean returns of several portfolios. The first column reports the average excess return for all the companies with a positive Big4 dummy, the second column reports the average excess return for all the companies with a positive B-share dummy, the third column reports the average excess return for all the companies with a positive H-share dummy, the fourth column reports the average return for a portfolio long the securities belonging to the decile with the largest sensitivity to liquidity shocks (a high beta with respect to the Pastor-Stambaugh liquidity factor) and short securities belonging to the decile with the lowest sensitivity to liquidity shocks, the final column the average return for a portfolio long the securities belonging to the decile with the largest bid-ask spread and short the securities belonging to the decile with the lowest bid-ask spread. The portfolios built on the basis of governance (Big4, B-shares, H-shares) are formed in such a way that one would expect a negative excess return on the news of a market reform, the portfolios built on the basis of liquidity are such that one would expect a positive excess return on the news of a market reform.

Several interesting results emerge from this table. The Big4 portfolios do indeed underperform in the first period and in the third period. We will later claim that the third period is the most relevant from the point of view of interpreting the reaction to the reform. The H-share portfolio behaves similarly to the Big4 portfolio. The B-share portfolio does not show any clear pattern. From this preliminary evidence, the Big4 and the H-share dummies seem to be more relevant in understanding the value of corporate governance. The evidence coming from the two liquidity portfolios is more mixed even though in many cases they tend to have positive excess returns.

Table 3 presents the first results of our event study. In panels A, B and C the regressions are repeated for abnormal returns obtained with three models: the market model excluding size, the market model including size, the factor model. Including size is an important robustness test because there is a possibility that governance variables may simply be a proxy for the size of the company. The average log size (as measured by market capitalization of tradeable shares in the year before April 2005, the beginning of the reform) in our sample is 6.27 but the average log size of

companies with a Big Four auditor is a much larger 102.26. The average log size of companies with B-shares outstanding is not very different from the general mean, 7.92. The average log size of companies with H-shares is 23.99. The Big Four and the H-share dummies could therefore appear significant in the regressions just because of their being a proxy of dimension.

Panel A refers to the first announcement of the pilot program of the NTS reform on April 29, 2005. Due to holidays, Chinese stock markets were closed until the week starting on May 9th. Revealingly, the market return was negative in the four weeks following the announcement (respectively -3.1%, -2.2%, -1.0%, -2.4%). At the aggregate level, either the beneficial effects of the reform were not perceived or the investors were skeptical about the possibility that the reform would actually go through. This is understandable in view of the market crashes following the previous reform attempts and given lack of information about the practical implementation of the new rules. We are therefore very skeptical that these cross-sectional results may provide useful information.

In the week between May 16th and May 9th the cross section of stock (market) abnormal returns is significantly affected by the concentration of tradable shares (negative sign), the dummy for the existence of H shares (positive), size (negative sign), the liquidity beta (positive sign). The Big4 dummy is significant but only when size is excluded from the regression. Results are similar when using factor abnormal returns except that turnover and volatility are also significant with, respectively, a positive and negative sign. In the second week the B and H dummies are significantly positive, the percentage of NTS and size are negative. However only turnover and volatility are relevant when accounting for factors in the regression. The sector dummies are significant and the Big4 dummy is significant only if size is excluded from the regression. In the third week there are many relevant variables: concentration (negative), B and H dummies (positive), NTS (negative), volatility (positive), size (negative), liquidity beta and bid-ask spread (positive). The results are less significant as far as the governance variables are concerned when factors are included in the regression. In the fourth week the results are similar.

Overall, the variables that appear to be important in at least three weeks are: the concentration of TS (negative), the H-share dummy (positive), the Big Four dummy (negative, but only when size is not included in the regression), turnover (positive). The liquidity beta and the bid-ask spread are important two weeks out of four. Prices of companies with a larger concentration of TS may plausibly have increased less than others if investors anticipate the agreement between mutual fund managers and holders of NTS that will decrease the compensation. Finding that illiquidity is positively associated with the price jump is plausible. However, it is hard to understand why the prices of companies with H shares should have increased more: those companies were likely to have better governance before the reform and should have benefited relatively less than other stocks. We are inclined to attach less weight to this evidence also on the basis of the overall market behavior of this period.

The second analysis is about the periods following June 20th, the day when the second batch of 42 companies was announced by the CSRC (see table 3, panel B). It is reported in table 4. The weekly market returns have been respectively 1.5%, -4.2%, -3.6% and 0.8%. Investors were therefore still showing skepticism about the reform. This may well have been justified by the reform experience of the first batch, that, as shown by Bengtsson (2005), was not particularly attractive to investors. The price of Sany Heavy Industry (one of the three companies included in the pilot project) dropped 30% on the day of the payment of the compensation and kept falling thereafter, forcing the managers to revise the original offer. The capitalization of Shanghai Zijiang Enterprise Group, a second company included in the pilot project, also decreased importantly around the event date.

In the first week, the concentration variable has a positive impact, the H-share dummy is negative, the percentage of NTS is positive, turnover is positive, historical volatility is negative but is not robust to factor inclusion. The liquidity beta is positive and relevant but only when factors are ignored. Similar results hold for the second and third weeks, when also the B-dummy is negative, the Big Four dummy is significant and positive only when size is excluded, turnover is positive. Differently from the first week, the liquidity beta is not significant. Only turnover and volatility are

significant in the fourth week, but nothing is significant when factors are included. Overall, this period also does not provide strong results. It is highly plausible that this is a learning period for investors who observe the implementation of the reform on an important batch, including companies weighting about 10% of the overall market capitalization.

The third analysis (Table 5) is about the extension of the reform to the rest of the market. On August 26th the CSRC announced a set of rules that would have been used for the application of the reform to all the remaining companies. On September 4th the third batch of 40 companies started the reform. Our analysis includes the weeks starting August 22nd, August 29th, September 5th and September 12th. During these weeks, the market returns were respectively -0.4%, 3.6%, -0.1% and 2.7%. The overall increase in the market is consistent with the expectation of reform implementation. The returns of the size and liquidity factor-replicating portfolios are also coherent with this interpretation: SMB goes up 9.2% and HLIQMLLIQ decreases by 3% over the month. The FR portfolio goes up 3%. This latter piece of evidence is not coherent with our hypothesis according to which investors should react to the reform by bidding especially for companies with a poor governance structure. However we have already noticed that in Wang and Xu (2004) the average return of the FR portfolio is not coherent with its interpretation as a risk factor. We are therefore inclined to downplay this piece of evidence and to believe, on the basis of the values of the other risk factors, that the August-September period, particularly the sub-period after August 26th, is the most relevant from the point of view of studying reactions to fundamentals.

As shown by panel C, in the first week the significant variables are: concentration (negative sign), H-dummy (positive), Big Four dummy (negative) when size is ignored, volatility (positive), liquidity beta (negative) and bid-ask spread (positive). All the variables associated with corporate governance are not relevant when factors are included. In the second week turnover, volatility and the bid-ask spread are significant, also when allowing for factors. Concentration and the two dummies for B- and H-shares are also relevant in the factor model. In the third week the relevant variables are concentration of TS, turnover, liquidity beta, bid-ask spread. The results are robust to

factors, except for liquidity. In the fourth week the Big Four variable is negative but is not robust to the inclusion of size, turnover is also positive. When factors are allowed, concentration is positive, the H dummy is negative, volatility is negative, liquidity beta is negative.

Overall, in the factor model the variables with a positive effect are concentration and turnover while the variables with a negative effect are the H-share dummy, volatility and liquidity beta. The signs of turnover, H-share dummy and liquidity betas are consistent with the theory. Without factors, the liquidity beta and the bid-ask spread have the most relevant effects, consistent with the theory. Turnover is positive and size is negative.

Table 6 analyzes the cross section of abnormal returns after the company-specific date of readmission following the first suspension. The analyses are implemented for the market model (with and without size) and the factor model. The results are consistent across risk models and for both horizons. Considering the opening price of the readmission day, the relevant variables are the percentage of legal shares (negative), the percentage of NTS (positive), compensation (positive), turnover (positive). The rate of return during the first day of readmission (closing price minus opening price) depends mainly on turnover. Over the following ten days, volatility and turnover remain the crucial variables. Governance and liquidity variables are not relevant. This is coherent with the idea of a forward-looking price adjustment taking place before the company-specific suspension. Also the bid-ask spread is not relevant and this is coherent with the lock-ups.

Overall, our econometric results provide some support to the claim that Chinese investors altered company valuation to take into account the possible long run effect of the reform of the stock market. There are several compelling results in favor of this hypothesis. First, the market went up in the period of announcement of extension of the reform to the market as a whole. Moreover, positive returns were concentrated in small stocks and illiquid stocks. Second, the abnormal returns of companies whose accounts are revised by a Big Four company are lower than the abnormal returns of other companies, even though this impact is obscured by size.

Fourth, the H-dummy is negative, except for April, consistent with the hypothesis that location in an international stock market is an indicator of good governance. The evidence from the B-share dummy is less strong. Fifth, the concentration among holders of TS is an important force in understanding the cross-section of stock returns. Like in other previous cases, its sign changes, being negative in April and positive in June and August. A positive impact of the concentration of TS on abnormal returns is consistent with the idea that this variable favors discrimination against minority shareholders. We find that the larger the concentration the larger the abnormal return. This is compatible with the results of Haveman and Wang (2008), according to which concentration among holders of TS is a proxy for the possibility of such shareholders striking informal deals with owners of NTS, accepting lower compensations in exchange for personal benefits. News of structural reform may have motivated investors to especially bid up the prices of companies with a large concentration among tradable shareholders because of expectations of a future change in ownership and break-up of the ties between company managers and mutual funds.

Sixth, the liquidity beta has a negative effect and the bid-ask spread has a positive effect. Stocks that are particularly exposed to market-wide liquidity shocks and illiquid stocks have increased more than other stocks. Finally, our results show that another crucial variable to understand the cross-section of unexpected returns is turnover. Turnover is usually significant and positive, consistently with the hypothesis of Hong, Scheinkman and Xiong (2006) of speculative behavior among Chinese investors. The sector dummies are sometimes significant but their sign changes across different weeks. If we take August as the most likely period to reveal the reaction to the reform, we observe that the dummy for the Mining sector is often relevant, however its sign changes and the same happens to the dummy for the financial sector and the manufacturing sector.

6. Conclusions

The NTS reform marked a turning point in the financial landscape in China. The effect on the stock market has been impressive. Market dynamics had been negative or stagnating for several years but it has started to improve strongly throughout the implementation of the reform and thereafter. Prices has risen so much that many observers were concerned about the existence of a bubble. Yet, the Chinese stock market is almost completely closed to foreign investors: only a small number of qualified buyers are allowed to buy shares in negligible quantities. Moreover, before 2007 domestic investors were not allowed to invest abroad. The large increase in prices in the presence of an increase in (current and expected) supply due to the compensation paid to holders of tradable shares suggests a large shift in the domestic demand for stocks. Such a move would have not materialized if investors did not trust in the beneficial effects injected by the reform.

In this paper, we have tried to assess the reaction of stock prices to the NTS reform, with particular regard with periods following important announcements on the part of the Chinese authorities. We documented that despite a difficult start, the reform gained momentum after the most important announcement, namely the one about extension of the reform to the market as a whole.

We have used a company level data set to study the cross sectional reaction of the prices of the Chinese companies. We have accounted for risk premia using state-of-the art models for the Chinese market trying to understand the link between the company-level unexpected return and variables related to fundamentals. Some key variables have to do with proxies for governance: the percentage of NTS for each company before the reform, the presence of an international auditor, the existence of H-shares, concentration of shares among holders of TS. Other variables are a proxy for liquidity: the sensitivity to market shocks and the bid-ask spread. Some of these variables have shown to be significantly connected with the unexpected returns: companies with worse governance and lower liquidity have had the larger unexpected positive returns after the announcement.

References

Acharya, V. and L.H. Pedersen (2005), Asset Pricing with Liquidity Risk, *Journal of Financial Economics,* 77, 375-410

Allayannis, G. and Ihrig J. (2001), Exposure and Markups, *Review of Financial Studies,* 14, 805-835

Amihud, Y. (2002), Illiquidity and Stock Returns: Cross-Section and Time-Series Effects, *Journal of Financial Markets*, 5, 31-56.

Beltratti, A and M. Caccavaio (2008), Stock prices in speculative markets: The Chinese split-share reform, mimeo

Bengtsson, Anna (2005), China's privatization reform, Bachelor Thesis, Lund University

Brennan, M.J., T. Chordia and A. Subrahmanyam (1998), Alternative factor specifications, security characteristics, and the cross-section of expected stock returns, *Journal of Financial Economics*, 49, 345-373

Campbell, J.W., Lo, A.W., and MacKinlay, A.C. (1997) *The Econometrics of Financial Markets*, Princeton University Press.

Campbell, John Y. and Robert J. Shiller, 1988, The dividend-price ratio and expectations of future dividends and discount factors, *Review of Financial Studies*, 1, 195-228.

Campbell, John Y. and John Ammer (1993), What moves the stock and bond markets? A variance decomposition for long-term asset returns, *Journal of Finance*, 48, 3-37.

Chen, Z., and Xiong, P. (2001) Discounts on Illiquid Stocks: Evidence from China, Yale ICF Working Paper, n. 00-56.

China Securities Regulatory Commission (2005), Circular on Issues Relating to the Pilot Reform of Listed Companies Split Share Structure, www.crsc.gov.cn

Collins, D.W, Dent, W. (1984), A Comparison of Alternative Testing Methodologies Used in Capital Market Research, *Journal of Accounting Research*, Vol. 22, No. 1 (Spring, 1984) , pp. 48-84

Dye, R. (1993) Auditing standards, legal liability, and auditing wealth, *Journal of Political Economy* 101, 887-914.

Dimson, E. (1979), Risk Measurement when Shares are Subject to Infrequent Trading, *Journal of Financial Economics* 7, 197-226.

Faccio, M., and L. H. P. Lang (2002) The ultimate ownership of western European corporations, *Journal of Financial Economics*, 65: 365-395.

Fama, Eugene, and K. French (1996), Multifactor explanations of asset pricing anomalies, *Journal of Finance* 51, 55-84.

Ferson, Wayne E. and Campbell R. Harvey (1999), Conditioning variables and the cross-section of stock returns, *Journal of Finance*, 54, 1325-1360.

Glosten, L. and P. Milgrom (1985), Bid, Ask, and Transaction Prices in a Specialist Market with Heterogeneously Informed Traders, *Journal of Financial Economics*, 14, 71-100.

Gompers, P.A., J. L. Ishii and A. Metrick (2003), Corporate governance and equity prices, *Quarterly Journal of Economics*, 118, 107-155.

Haveman, Heather and Yongxiang Wang (2008), Going (more) public: Ownership reform among Chinese firms, mimeo.

Hong, Harrison, José Scheinkman, and Wei Xiong (2006), Asset float and speculative bubbles, *Journal of Finance* 61, 1073-1117.

Inoue, T. (2005) Reform of China's split-share structure takes shape, Nomura Capital Market Review, 8, no. 3.

Jingu, T. and S. Ri, (2006), Reforms to Chinese nontradable shares, Nomura Securities Economic Research, 11 April

Kyle, A.S. (1985), Continuous Auctions and Insider Trading, *Econometrica,* 53, 1315-1336.

Lynch, A.W. and R.R. Mendenhall (1997) New Evidence on Stock Price Effects Associated with Changes in the S&P500 Index, *Journal of Business*, 70, 351-383

Mattlin, M. (2007) The Chinese Government's New Approach to Ownership and Financial Control of Strategic State-Owned Enterprises, BOFIT Discussion Papers, n.10.

Mei, J, J.A Scheinkman, W. Xiong (2004) Speculative Trading and Stock Prices: An Analysis of Chinese AB Share Premia, Princeton University, *mimeo*.

Michaely, R., Shaw, W., 1995. Does the choice of auditor convey quality in an initial public offering?, *Financial Management*, 24, 15-30.

Mitton, T. (2002) A Cross-Firm Analysis of the Impact of Corporate Governance on the East Asian Financial Crisis, *Journal of Financial Economics* 64, May 2002, 215-241.

Pastor, L., and R.Stambaugh (2003) Liquidity risk and expected stock returns, *Journal of Political Economy* 113, 642-685.

Petajisto, Antti, 2008, Why do demand curves slope down?, *Journal of Financial and Quantitative Analysis*, forthcoming.

Shleifer, A. (1986) Do demand curves for stocks slope down?, *Journal of Finance*, 41, 579–590.

Sun, Q. and W.H.S. Tong (2003) China Share Issue Privatization: The Extent of its Success, *Journal of Financial Economics*, 70, 183-222.

Xu, Xiaonian and Yan Wang, 1999, Ownership structure and corporate governance in Chinese stock companies, *China Economic Review*, 10, 75-98.

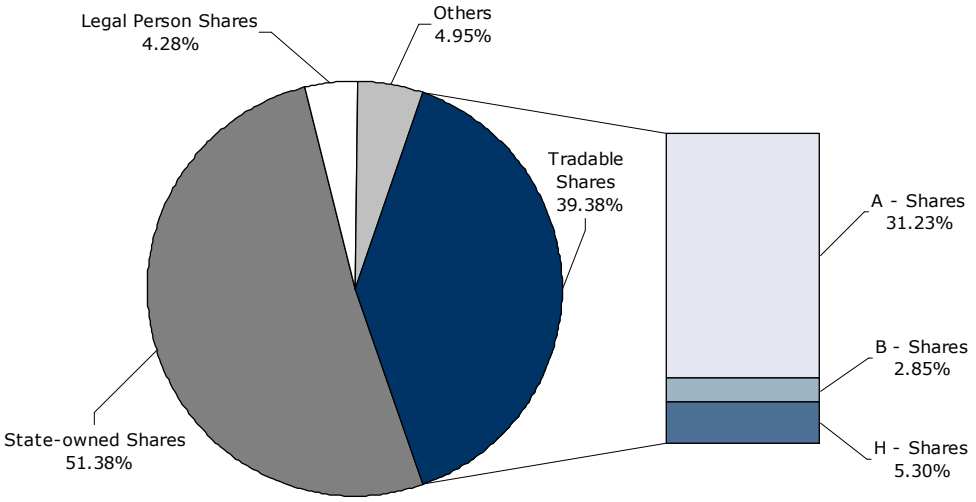
Yuan, C. (2005) New proposals on the desegregation of shares, Linklaters, May

Wan, G., Yuan, C. and S. Ha, (2005) Non-tradable to tradable – reforming the stock markets in the PRC, Linklaters, September

Wang, Fenghua and Yexiao Xu, (2004) What determines Chinese stock returns?, *Financial Analysts Journal* 60, 65-77.

Wurgler, Jeffrey and Ekaterina Zhuravskaya (2002), Does arbitrage flatten demand curves for stocks?, *Journal of Business*, 75, pp. 583-608.

Figure 1. Outstanding Shares of Chinese Listed Companies by Class, February 2006



Source: China Securities Regulatory Commission

Figure 2. Market Performance and Progress of NTS Reform

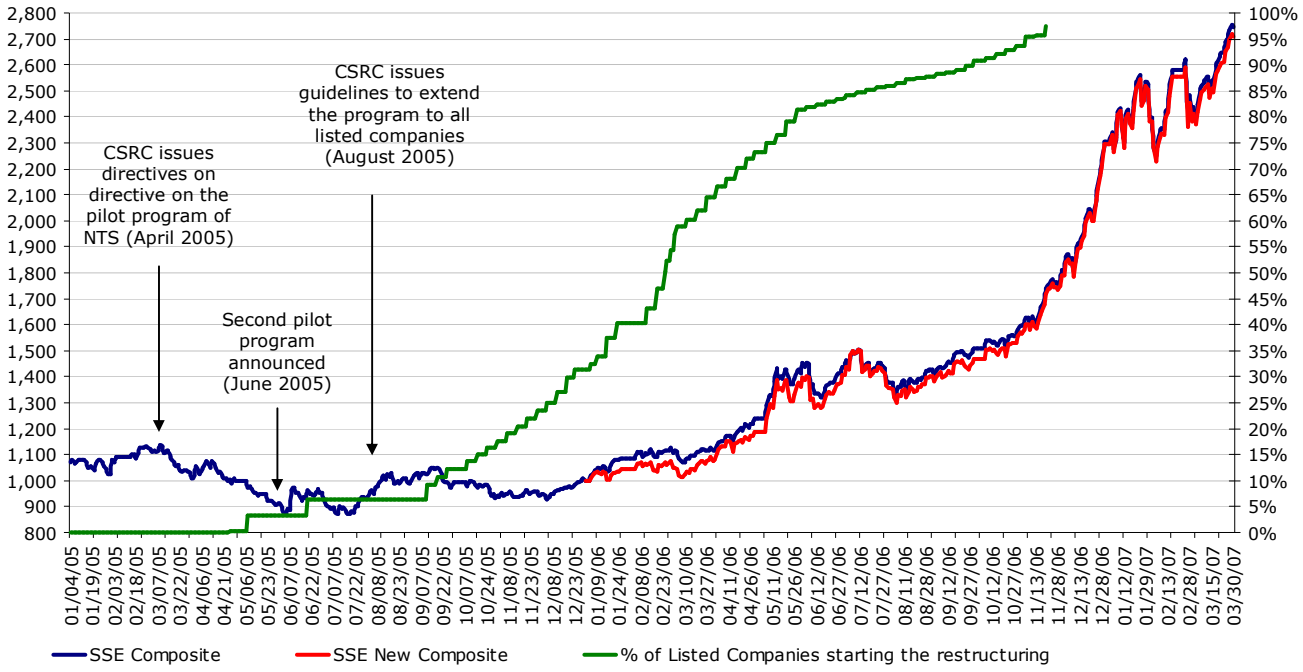


Table 1. Implementation of the NTS Reform Process

Batch #	Launch Date	# of companies completing NTS process by February 2007	Average Duration of NTS Process (days)	Average % of NTS outstanding before the reform	Average Bonus Ratio
1	4/26/2005	3	37.67	69.33	3.00
2	05/09/05	41	41.93	67.95	3.49
3	06/20/05	40	32.38	65.95	3.60
4	09/12/05	38	32.34	66.16	3.23
5	09/19/05	21	28.43	66.54	3.21
6	09/26/05	20	36.10	61.85	3.46
7	10/10/05	21	38.00	65.09	3.26
8	10/17/05	17	38.44	61.61	2.94
9	10/24/05	17	44.41	61.40	3.53
10	10/31/05	18	39.50	66.80	2.96
11	11/07/05	20	34.75	67.44	3.23
12	11/14/05	17	37.59	67.31	3.17
13	11/21/05	21	48.52	64.16	3.28
14	11/28/05	20	39.45	65.30	3.15
15	12/05/05	20	37.68	66.00	3.14
16	12/12/05	27	33.96	65.29	3.64
17	12/19/05	38	35.39	61.88	3.47
18	12/23/05	20	37.97	63.54	3.41
19	01/04/06	13	34.38	63.63	3.38
20	01/09/06	22	39.27	66.25	3.42
21	01/16/06	46	38.36	62.36	3.27
22	01/23/06	38	34.92	61.40	2.89
23	02/13/06	39	37.26	63.82	3.26
24	02/20/06	48	43.21	64.26	2.97
25	02/24/06	47	44.51	64.20	3.22
26	02/27/06	25	39.48	60.68	2.89
27	03/01/06	27	52.93	65.47	2.96
28	03/03/06	41	45.59	60.08	2.95
29	03/06/06	23	47.30	61.37	2.93
30	03/13/06	15	46.60	60.62	2.56
31	03/20/06	24	44.71	63.29	3.69
32	03/27/06	34	44.38	59.97	3.33
33	04/03/06	28	45.80	60.20	3.14
34	04/10/06	22	55.17	60.28	2.84
35	04/17/06	24	46.07	60.34	2.72
36	04/24/06	26	49.00	60.10	2.78
37	04/28/06	18	45.67	59.69	2.80
38	05/08/06	21	41.05	59.54	2.74
39	05/15/06	20	52.69	63.95	2.83
40	05/22/06	36	50.64	60.29	3.15
41	05/29/06	29	64.52	55.81	2.56
42	06/05/06	7	55.69	56.65	2.21
43	06/12/06	9	63.57	63.07	2.76
44	06/19/06	7	45.83	61.91	3.11
45	06/26/06	5	69.60	68.87	2.58
46	06/30/06	5	57.60	52.80	3.10
47	07/03/06	7	71.45	64.60	2.79
48	07/10/06	6	75.33	67.95	2.95
49	07/17/06	5	62.60	67.39	2.63
50	07/24/06	7	51.88	53.88	1.90
51	07/31/06	6	36.40	60.27	2.21
52	08/07/06	4	54.92	65.61	2.73
53	08/14/06	11	38.73	63.86	3.53
54	08/21/06	5	32.80	77.52	2.73
55	08/28/06	3	40.67	43.08	1.47
56	09/04/06	6	61.67	65.34	2.54
57	09/11/06	3	39.00	68.87	3.26
58	09/18/06	6	45.20	58.47	2.87
59	09/25/06	12	36.83	65.20	2.97
60	09/29/06	12	33.95	60.56	2.43
61	10/09/06	7	47.16	59.76	2.41
62	10/16/06	10	43.33	53.50	2.81
63	10/23/06	11	41.44	60.71	2.83
64	10/30/06	11	34.15	64.12	2.34
65	11/06/06	22	32.96	62.53	2.54
66	11/13/06	4	34.08	62.78	2.86
67	11/20/06	25	33.18	57.09	2.81
Total		**1,301**	**44.15**	**62.65**	**2.95**

Table 2. Mean Abnormal returns

	Big Four	B shares	H shares	Liquidity Beta	Bid/Ask
9-May	-1.37%	-1.37%	-1.72%	0.88%	0.57%
16-May	-0.63%	0.31%	-1.02%	-0.64%	-1.27%
23-May	-1.07%	0.56%	0.20%	1.29%	-0.83%
30-May	-1.46%	-0.65%	-1.68%	-0.11%	-1.38%
20-Jun	0.21%	0.32%	-0.52%	0.35%	0.42%
27-Jun	1.42%	-0.63%	0.83%	-0.02%	-0.70%
4-Jul	1.49%	-1.07%	0.05%	-0.52%	-0.31%
11-Jul	1.29%	0.18%	0.78%	0.81%	1.77%
22-Aug	-1.73%	1.00%	-1.00%	-1.33%	-2.85%
29-Aug	-0.85%	-1.44%	-1.57%	0.64%	0.26%
5-Sep	-0.53%	0.70%	-0.77%	-0.91%	-0.85%
12-Sep	-1.79%	-0.39%	-1.05%	-0.85%	-1.89%

Table 3. Cross section regressions of abnormal returns at NTS announcement dates: First round of the pilot program, April 29, 2005

	Panel A: Market Model				Panel B: Market Model with Market Value				Panel C: Factor Model			
	9-May	16-May	23-May	30-May	9-May	16-May	23-May	30-May	9-May	16-May	23-May	30-May
Concentration (TSH)	-0.263	-0.081	-0.325	-0.346	-0.224	-0.039	-0.262	-0.272	-0.146	0.023	-0.156	-0.17
	(0.047)**	(0.024)**	(0.047)**	(0.047)**	(0.046)**	(0.022)	(0.045)**	(0.044)**	(0.036)**	(0.020)	(0.032)**	(0.032)**
Legal Person Shares	0	0.003	0.001	0.002	-0.002	0.001	-0.002	-0.002	-0.006	0.001	-0.004	-0.004
	(0.007)	(0.004)	(0.006)	(0.006)	(0.007)	(0.004)	(0.006)	(0.006)	(0.007)	(0.004)	(0.005)	(0.005)
Dummy B Shares	-0.088	1.117	2.081	1.459	-0.223	0.959	1.837	1.192	-0.5	0.485	1.132	0.531
	(0.916)	(0.483)*	(0.642)**	(0.800)	(0.900)	(0.481)*	(0.630)**	(0.770)	(0.875)	(0.443)	(0.546)*	(0.683)
Dummy H Shares	6.582	2.856	11.503	10.062	5.951	2.172	10.455	8.844	2.955	-0.428	6.134	4.533
	(1.931)**	(1.099)**	(2.012)**	(1.852)**	(1.816)**	(0.991)*	(1.793)**	(1.647)**	(1.539)	(0.912)	(1.429)**	(1.306)**
NTS	-0.007	-0.014	-0.026	-0.046	-0.025	-0.033	-0.055	-0.08	-0.02	-0.005	-0.023	-0.048
	(0.018)	(0.009)	(0.013)*	(0.014)**	(0.018)	(0.010)**	(0.014)**	(0.014)**	(0.017)	(0.009)	(0.012)	(0.013)**
Big4	-1.606	-0.9	-1.388	-1.299	-0.902	-0.16	-0.27	0.022	-0.509	-0.169	-0.059	0.132
	(0.788)*	(0.417)*	(0.616)*	(0.597)*	(0.782)	(0.419)	(0.617)	(0.611)	(0.746)	(0.384)	(0.516)	(0.523)
Turnover	0.38	0.333	0.218	-0.029	0.379	0.305	0.156	-0.064	0.543	0.465	0.31	0.093
	(0.237)	(0.139)*	(0.184)	(0.253)	(0.235)	(0.139)*	(0.181)	(0.251)	(0.230)*	(0.129)**	(0.148)*	(0.231)
Volatility	0.009	-0.104	1.441	0.295	-0.35	-0.46	0.904	-0.358	-1.112	-1.274	-0.215	-1.394
	(0.521)	(0.230)	(0.333)**	(0.341)	(0.529)	(0.243)	(0.323)**	(0.348)	(0.438)*	(0.247)**	(0.241)	(0.305)**
Mining dummy	0.531	-4.69	-1.768	-2.386	1.152	-4.018	-0.758	-1.208	2.585	-3.027	1.102	0.586
	(1.190)	(0.966)**	(0.900)*	(0.846)**	(1.182)	(0.926)**	(0.834)	(0.852)	(1.232)*	(0.872)**	(0.844)	(0.706)
Manufactor dummy	-0.134	0.134	0.065	0.672	-0.251	0.015	-0.104	0.46	-0.09	0.18	0.133	0.746
	(0.403)	(0.240)	(0.285)	(0.328)*	(0.401)	(0.238)	(0.283)	(0.324)	(0.386)	(0.234)	(0.248)	(0.300)*
Utilities dummy	1.258	0.869	0.663	-0.215	1.398	1.011	0.888	0.05	1.102	1.366	1.05	0.034
	(0.780)	(0.542)	(0.775)	(0.720)	(0.770)	(0.525)	(0.744)	(0.698)	(0.756)	(0.525)**	(0.677)	(0.695)
Finance dummy	0.23	2.469	-0.404	1.802	1.533	3.837	1.705	4.252	2.502	3.656	1.937	4.453
	(1.146)	(1.035)*	(1.012)	(1.043)	(1.349)	(0.855)**	(1.350)	(1.315)**	(1.195)*	(1.038)**	(0.812)*	(1.049)**
Log Size					-1.066	-1.115	-1.696	-1.994				
					(0.345)**	(0.176)**	(0.244)**	(0.227)**				
Liquidity beta	1.003	-0.191	0.890	0.301	1.047	-0.141	0.970	0.387	1.428	0.228	0.825	0.076
	(0.238)**	(0.148)	(0.184)**	(0.233)	(0.238)**	(0.147)	(0.180)**	(0.229)	(0.234)**	(0.144)	(0.158)**	(0.218)
BidAsk	-1.987	2.442	0.151	0.282	-3.708	0.640	-2.588	-2.936	-2.627	1.612	-1.042	-0.904
	(2.311)	(1.121)*	(1.024)	(1.011)	(2.616)	(1.175)	(1.127)*	(0.943)**	(2.406)	(1.021)	(0.898)	(0.892)
Constant	3.767	1.611	2.161	5.417	12.844	11.089	16.56	22.369	4.905	1.834	2.843	6.331
	(1.709)*	(0.900)	(1.203)	(1.275)**	(3.558)**	(1.888)**	(2.402)**	(2.327)**	(1.650)**	(0.846)*	(0.997)**	(1.102)**
Observations	1207	1207	1207	1207	1207	1207	1207	1207	1207	1207	1207	1207
R-squared	0.08	0.07	0.15	0.11	0.09	0.1	0.19	0.16	0.09	0.07	0.07	0.07

Robust standard errors in parentheses

* significant at 5%; ** significant at 1%

Table 4. Cross section regressions of abnormal returns at NTS announcement dates: Second round of the pilot program, June 21, 2005

	Panel A: Market Model				Panel B: Market Model with Market Value				Panel C: Factor Model			
	20-Jun	27-Jun	4-Jul	11-Jul	20-Jun	27-Jun	4-Jul	11-Jul	20-Jun	27-Jun	4-Jul	11-Jul
Concentration (TSH)	0.111	0.091	0.062	0.084	0.122	0.088	0.061	0.06	0.078	0.029	0.011	-0.048
	(0.024)**	(0.028)**	(0.029)*	(0.038)*	(0.026)**	(0.032)**	(0.031)*	(0.041)	(0.023)**	(0.030)	(0.031)	(0.040)
Legal Person Shares	-0.007	-0.001	0.002	0	-0.008	-0.001	0.002	0.002	-0.009	-0.001	0.002	0.003
	(0.005)	(0.006)	(0.006)	(0.007)	(0.005)	(0.006)	(0.006)	(0.007)	(0.005)	(0.006)	(0.006)	(0.007)
Dummy B Shares	-0.856	-1.657	-1.691	0.122	-0.898	-1.647	-1.691	0.218	-0.385	-1.172	-1.354	0.978
	(0.480)	(0.605)**	(0.748)*	(0.729)	(0.473)	(0.611)**	(0.748)*	(0.723)	(0.481)	(0.614)	(0.760)	(0.733)
Dummy H Shares	-4.842	-3.771	-3.388	-2.315	-5.026	-3.727	-3.385	-1.891	-3.757	-1.796	-1.756	1.93
	(1.072)**	(1.333)**	(1.466)*	(1.637)	(1.084)**	(1.382)**	(1.480)*	(1.654)	(1.037)**	(1.403)	(1.522)	(1.679)
NTS	0.057	0.03	-0.005	0.01	0.053	0.031	-0.005	0.021	0.032	0.018	-0.009	-0.003
	(0.010)**	(0.013)*	(0.014)	(0.016)	(0.012)**	(0.013)*	(0.015)	(0.016)	(0.010)**	(0.013)	(0.014)	(0.016)
Big4	-0.104	1.022	1.544	0.49	0.072	0.98	1.541	0.075	-0.131	0.576	1.122	-0.519
	(0.462)	(0.504)*	(0.602)*	(0.603)	(0.483)	(0.558)	(0.605)*	(0.608)	(0.464)	(0.520)	(0.594)	(0.592)
Turnover	0.447	0.498	0.287	0.486	0.443	0.499	0.287	0.496	0.353	0.382	0.21	0.299
	(0.057)**	(0.154)**	(0.147)	(0.173)**	(0.056)**	(0.157)**	(0.148)	(0.176)**	(0.058)**	(0.152)*	(0.147)	(0.186)
Volatility	-0.567	-1.113	-0.937	-1.279	-0.658	-1.091	-0.936	-1.064	-0.029	-0.279	-0.347	0.148
	(0.205)**	(0.287)**	(0.340)**	(0.332)**	(0.237)**	(0.294)**	(0.350)**	(0.350)**	(0.208)	(0.295)	(0.361)	(0.396)
Mining dummy	-1.006	-0.251	-1.227	-2.488	-0.865	-0.286	-1.229	-2.826	-1.236	-1.287	-2.081	-4.389
	(0.574)	(0.770)	(1.139)	(1.377)	(0.591)	(0.805)	(1.145)	(1.366)*	(0.553)*	(0.862)	(1.140)	(1.431)**
Manufactor dummy	-0.533	-0.62	0.045	-0.523	-0.559	-0.614	0.045	-0.457	-0.536	-0.6	0.045	-0.584
	(0.240)*	(0.298)*	(0.336)	(0.370)	(0.248)*	(0.302)*	(0.337)	(0.373)	(0.248)*	(0.307)	(0.337)	(0.376)
Utilities dummy	-0.3	0.428	1.333	-0.703	-0.277	0.422	1.333	-0.758	-1.169	-0.093	1.154	-1.286
	(0.484)	(0.524)	(0.749)	(0.717)	(0.487)	(0.525)	(0.751)	(0.714)	(0.467)*	(0.506)	(0.751)	(0.738)
Finance dummy	-5.523	-3.01	-1.324	0.753	-5.221	-3.083	-1.329	0.031	-4.964	-3.018	-1.583	-0.284
	(2.895)	(1.266)*	(2.504)	(1.971)	(3.001)	(1.312)*	(2.558)	(1.929)	(2.827)	(1.190)*	(2.452)	(1.930)
Log Size					-0.255	0.062	0.004	0.609				
					(0.235)	(0.270)	(0.237)	(0.263)*				
Liquidity beta	-0.337	0.030	-0.334	0.020	-0.331	0.028	-0.334	0.008	-0.224	-0.361	-0.636	-0.086
	(0.126)**	(0.183)	(0.204)	(0.196)	(0.126)**	(0.184)	(0.205)	(0.196)	(0.127)	(0.186)	(0.206)**	(0.202)
BidAsk	-0.069	1.598	-0.523	-1.940	-0.497	1.702	-0.517	-0.924	0.379	2.685	0.312	-0.414
	(0.865)	(0.948)	(1.247)	(1.287)	(0.813)	(0.964)	(1.326)	(1.338)	(0.912)	(1.073)*	(1.241)	(1.166)
Constant	-2.786	-2.182	0.644	0.228	-0.598	-2.714	0.613	-4.993	-1.928	-2.335	0.269	-0.185
	(0.828)**	(0.995)*	(1.194)	(1.402)	(2.277)	(2.408)	(2.351)	(2.637)	(0.839)*	(1.049)*	(1.221)	(1.421)
Observations	1207	1207	1207	1207	1207	1207	1207	1207	1207	1207	1207	1207
R-squared	0.13	0.08	0.03	0.04	0.14	0.08	0.03	0.04	0.08	0.05	0.03	0.02

Robust standard errors in parentheses

* significant at 5%; ** significant at 1%

Table 5. Cross section regressions of abnormal returns at NTS announcement dates: Extension of NTS reform to the market, August 24, 2005

	Panel A: Market Model				Panel B: Market Model with Market Value				Panel C: Factor Model			
	22-Aug	29-Aug	5-Sep	12-Sep	22-Aug	29-Aug	5-Sep	12-Sep	22-Aug	29-Aug	5-Sep	12-Sep
Concentration (TSH)	-0.139	-0.008	0.065	-0.03	-0.094	-0.002	0.068	-0.003	0.031	0.066	0.094	0.105
	(0.027)**	(0.023)	(0.032)*	(0.024)	(0.028)**	(0.024)	(0.034)*	(0.024)	(0.028)	(0.023)**	(0.029)**	(0.029)**
Legal Person Shares	0.001	-0.003	-0.004	0	-0.001	-0.004	-0.004	-0.002	-0.001	-0.005	-0.003	-0.001
	(0.005)	(0.005)	(0.004)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)	(0.005)	(0.005)	(0.005)
Dummy B Shares	1.166	-1.139	0.124	-0.065	1.096	-1.152	0.118	-0.138	0.447	-1.572	0.105	-0.849
	(0.670)	(0.646)	(0.618)	(0.536)	(0.652)	(0.649)	(0.621)	(0.534)	(0.670)	(0.640)*	(0.605)	(0.562)
Dummy H Shares	4.89	-0.593	-1.948	1.691	4.097	-0.694	-1.992	1.209	-0.706	-2.898	-3.108	-2.818
	(1.144)**	(1.412)	(1.301)	(1.002)	(1.192)**	(1.435)	(1.339)	(0.958)	(1.300)	(1.419)*	(1.272)*	(1.045)**
NTS	-0.004	-0.001	0.018	-0.01	-0.023	-0.003	0.017	-0.022	-0.004	0.003	0.017	0.003
	(0.013)	(0.011)	(0.011)	(0.011)	(0.013)	(0.012)	(0.011)	(0.011)*	(0.013)	(0.011)	(0.011)	(0.011)
Big4	-1.078	-0.198	-0.517	-1.005	-0.33	-0.103	-0.477	-0.557	0.235	0.247	-0.175	-0.099
	(0.492)*	(0.509)	(0.565)	(0.410)*	(0.495)	(0.526)	(0.593)	(0.438)	(0.469)	(0.502)	(0.573)	(0.380)
Turnover	0.2	0.63	0.453	0.6	0.166	0.626	0.452	0.575	0.202	0.613	0.484	0.606
	(0.098)*	(0.087)**	(0.067)**	(0.082)**	(0.097)	(0.088)**	(0.068)**	(0.083)**	(0.092)*	(0.083)**	(0.068)**	(0.083)**
Volatility	1.727	-1.47	-0.287	0.476	1.24	-1.534	-0.314	0.184	0.217	-2.136	-0.567	-0.735
	(0.320)**	(0.271)**	(0.233)	(0.252)	(0.314)**	(0.286)**	(0.246)	(0.274)	(0.332)	(0.265)**	(0.237)*	(0.262)**
Mining dummy	-2.821	-1.973	2.177	-1.161	-2.267	-1.904	2.208	-0.798	-0.22	-0.791	2.603	0.862
	(0.991)**	(0.743)**	(1.080)*	(0.866)	(1.036)*	(0.737)**	(1.082)*	(0.838)	(0.911)	(0.753)	(1.085)*	(0.904)
Manufactor dummy	0.659	-0.521	-0.046	0.032	0.55	-0.534	-0.052	-0.03	0.744	-0.387	-0.175	0.119
	(0.290)*	(0.260)*	(0.237)	(0.236)	(0.286)	(0.262)*	(0.237)	(0.237)	(0.298)*	(0.257)	(0.241)	(0.241)
Utilities dummy	1.137	0.041	0.023	0.991	1.161	0.046	0.024	1.018	0.975	0.313	-0.293	1.382
	(0.598)	(0.553)	(0.576)	(0.583)	(0.605)	(0.553)	(0.576)	(0.568)	(0.656)	(0.540)	(0.588)	(0.577)*
Finance dummy	2.946	-4.318	1.014	0.676	4.398	-4.135	1.09	1.542	4.901	-3.087	0.59	1.672
	(0.844)**	(1.203)**	(0.643)	(0.797)	(0.954)**	(1.244)**	(0.682)	(0.814)	(0.999)**	(1.133)**	(0.640)	(0.812)*
Log Size					-1.166	-0.148	-0.062	-0.702				
					(0.204)**	(0.179)	(0.197)	(0.198)**				
Liquidity beta	-0.479	0.000	-0.392	-0.514	-0.511	-0.004	-0.394	-0.536	-0.475	-0.137	-0.186	-0.516
	(0.125)**	(0.118)	(0.100)**	(0.118)**	(0.124)**	(0.119)	(0.100)**	(0.119)**	(0.132)**	(0.117)	(0.101)	(0.122)**
BidAsk	7.999	-2.545	3.613	3.508	5.947	-2.804	3.504	2.304	4.236	-3.799	2.187	0.273
	(1.164)**	(0.936)**	(0.869)**	(1.012)**	(1.218)**	(0.999)**	(0.883)**	(1.044)*	(1.102)**	(0.927)**	(0.859)*	(1.086)
Constant	-5.737	4.673	-2.697	-1.43	4.468	5.977	-2.153	4.717	-3.609	5.239	-2.076	-0.531
	(1.193)**	(1.016)**	(0.913)**	(1.005)	(2.069)*	(1.957)**	(1.834)	(2.084)*	(1.179)**	(1.002)**	(0.904)*	(1.044)
Observations	1207	1207	1207	1207	1207	1207	1207	1207	1207	1207	1207	1207
R-squared	0.2	0.15	0.16	0.22	0.22	0.15	0.16	0.23	0.07	0.16	0.14	0.16

Robust standard errors in parentheses

* significant at 5%; ** significant at 1%

Table 6. Abnormal returns at implementation of NTS reform at the company level

	Panel A: Market Model			Panel B: Market Model with Market Value			Panel C: Factor Model		
	Readmission	Day 1	Day 10	Readmission	Day 1	Day 10	Readmission	Day 1	Day 10
Concentration (TSH)	-0.027	-0.021	-0.028	-0.022	-0.021	-0.021	-0.029	-0.038	0.004
	(0.041)	(0.043)	(0.064)	(0.044)	(0.046)	(0.064)	(0.042)	(0.044)	(0.070)
Legal Person Shares	-0.013	0.014	0.016	-0.013	0.014	0.016	-0.01	0.015	0.014
	(0.006)*	(0.006)*	(0.010)	(0.007)*	(0.006)*	(0.010)	(0.007)	(0.006)*	(0.011)
Dummy B Shares	-1.372	0.067	2.889	-1.401	0.067	2.842	-0.036	0.071	2.789
	(0.797)	(0.809)	(1.256)*	(0.795)	(0.813)	(1.256)*	(0.764)	(0.804)	(1.172)*
Dummy H Shares	-0.727	0.022	2.698	-0.822	0.02	2.548	0.755	0.336	0.998
	(1.575)	(1.705)	(2.411)	(1.602)	(1.725)	(2.382)	(1.709)	(1.755)	(2.525)
NTS	0.045	-0.001	-0.042	0.045	-0.001	-0.042	0.049	0.001	-0.053
	(0.015)**	(0.013)	(0.021)*	(0.015)**	(0.013)	(0.021)*	(0.015)**	(0.013)	(0.021)*
Compensation	4.287	3.247	1.223	4.207	3.246	1.098	4.444	2.980	1.018
	(2.150)*	(2.186)	(2.848)	(2.139)*	(2.217)	(2.830)	(2.269)	(2.219)	(3.140)
Big4	-0.532	0.51	0.869	-0.49	0.511	0.937	-1.507	0.58	1.855
	(0.621)	(0.595)	(1.039)	(0.635)	(0.597)	(1.063)	(0.633)*	(0.594)	(0.953)
Turnover	0.108	0.103	0.526	0.107	0.102	0.522	0.071	0.103	0.505
	(0.043)*	(0.037)**	(0.108)**	(0.043)*	(0.037)**	(0.108)**	(0.039)	(0.038)**	(0.111)**
Volatility	-0.62	-0.426	-1.535	-0.648	-0.426	-1.578	-1.182	-0.426	-1.306
	(0.328)	(0.356)	(0.547)**	(0.341)	(0.378)	(0.582)**	(0.369)**	(0.361)	(0.560)*
Mining dummy	0.422	1.756	-1.106	0.474	1.756	-1.02	-0.267	1.572	-1.04
	(1.030)	(1.064)	(2.121)	(1.060)	(1.092)	(2.180)	(1.158)	(1.075)	(2.237)
Manufactor dummy	0.483	-0.209	-0.18	0.467	-0.209	-0.204	0.526	-0.3	-0.321
	(0.364)	(0.371)	(0.551)	(0.361)	(0.372)	(0.551)	(0.431)	(0.378)	(0.596)
Utilities dummy	0.685	-1.006	-1.378	0.686	-1.006	-1.376	1.247	-1.146	-1.994
	(0.893)	(0.692)	(1.257)	(0.894)	(0.693)	(1.256)	(0.940)	(0.706)	(1.338)
Finance dummy	-0.821	-3.689	-6.062	-0.664	-3.687	-5.81	-1.25	-4.253	-5.513
	(2.986)	(1.132)**	(3.825)	(3.060)	(1.256)**	(4.018)	(2.593)	(1.015)**	(3.597)
Log Size				-0.088	-0.001	-0.141			
				(0.277)	(0.284)	(0.412)			
Liquidity beta	0.468	-0.187	-0.147	0.473	-0.187	-0.138	-0.129	-0.219	0.153
	(0.239)	(0.231)	(0.379)	(0.240)*	(0.234)	(0.380)	(0.276)	(0.243)	(0.400)
BidAsk	-0.157	1.797	2.248	-0.247	1.796	2.106	0.311	1.811	2.117
	(0.954)	(1.345)	(1.661)	(0.991)	(1.373)	(1.700)	(1.070)	(1.423)	(1.775)
Constant	-1.408	-2.758	1.322	-0.742	-2.747	2.393	-0.531	-2.729	1.496
	(1.251)	(1.174)*	(1.724)	(2.248)	(2.468)	(3.576)	(1.314)	(1.203)*	(1.822)
Observations	693	693	693	693	693	693	693	693	693
R-squared	0.07	0.04	0.08	0.07	0.04	0.08	0.07	0.04	0.07

Robust standard errors in parentheses

* significant at 5%; ** significant at 1%

The Lock-Up Period In the Chinese Stock Market Reform: Implication for market efficiency and downward sloping demand curves

Marianna Caccavaio

January 30, 2009

Abstract

We investigate volume and price patterns around the lockup expiration in the recent split share structure reform in China. We find that, even though the events are totally anticipated, there is a drop in the stock price, and an increase in volume, when the lockup ends. We discuss our results to the light of the Petajisto (2008) model and we provide supportive evidence to his main implications. Specifically, we find that the slopes of the demand curve are negatively related to firm size and positively related to idiosyncratic risk.

JEL classification: G, G14, N25.

Keywords: Demand curve, Chinese Stock Market, Nontradeable shares, Event study, Asset float.

1. Introduction

Does supply affect stock prices? The question has long been studied in the financial literature, originally by Scholes (1972), Mikkelson and Partch (1985) and Loderer, Cooney and Van Drunen (1991) in the analysis of secondary equity offerings. Other authors have looked at modifications in the composition of indices: Harris and Gurel (1986) and Shleifer (1986) find that the prices of stocks added to the S&P500 go up on average 3% on the day of inclusion. An increase in the price of a stock added to an index is not per se evidence of a downward sloping demand curve, as other factors may be at work, particularly liquidity and new information about fundamentals. Kaul, Mehrotra and Morck (2000) analyze the Canadian stock market in the context of an information-free experiment and attribute the price movements to downward sloping demand curves. Cha and Lee (2001) use equity mutual fund flows and find evidence consisting with a horizontal demand function. Brav and Gompers (2003) exploit a situation more directly connected with changes in supply and find that prices on average drop 2% after lockup periods expire.

Why should the demand function for stocks slope down? Wurgler and Zhuravskaya (2002) consider the interaction of arbitrageurs and nonarbitrageurs and show that the slope of the demand function depends on arbitrage risk. In a more elaborate model, Petajisto (2008) shows that the slope of the demand function for stocks is limited by the amount of capital available to arbitrageurs. Importantly, Petajisto (2008) shows through calibration of his model that limited short selling increases the slope of the demand curve. These models are crucial in highlighting the role of professional traders who may short stocks.

In 2005-2006 the Chinese authorities have reformed the stock market through corporate actions heavily featuring an increase in the supply of shares. To our knowledge, no other stock market in financial history has witnessed such a widespread and large increase in supply (about 33%) in such a short time period (less than two years). The reform aims at eliminating a class of shares, defined nontradeable shares (NTS), that cannot be freely traded on the local stock markets. This is achieved through a process by which holders of nontradeable shares pay compensation to

holders of tradeable shares (TS), usually through an increase in the amount of circulating shares. Each company following the reform had to respect a given schedule implying two trading suspensions and subsequent readmissions. At the end of the second suspension period, compensation is paid, usually in forms associated with an increase in the float and after a company-specific lock-up period, holders of NTS are free to sell their shares.

The setup of the Chinese reform is ideal to evaluate the effects of increased supply on stock prices. The end of the lock-up period is publicly known in advance (at least twelve months). It is therefore possible to identify for a very large number of companies the specific day of increase in the supply of shares. Moreover, short selling was prohibited in China during the reform period (and even before then). The models by Wurgler and Zhuravskaya (2002) and Petajisto (2008) therefore imply that the demand curve must slope down. Indeed, the reform represents the third attempt on the part of the Chinese authorities. Two previous attempts had been carried out but had quickly stopped because of bad stock market reactions. As a consequence, this reform has been designed very carefully from the point of view of the compensation to be paid to holders of tradable shares. Compensation was supposed to be paid exactly in anticipation of the excess supply of stocks hitting the market. Therefore both authorities and investors have long agreed on the reality of downward sloping demand curves in China.

We analyze 1,038 lockup expirations events occurred from June 2006 to November 2008. We investigate volume and price patterns around the unlocking day, and we find that, even though the events are totally anticipated, there is a drop in the stock price, and an increase in volume, when the lockup ends. We discuss our results in the light of the Petajisto (2008) model and we find supportive evidence to his main implications. Specifically we find that the slopes of the demand curve are negatively related to firm size and positively related to idiosyncratic risk.

After this introduction, the plan of the paper is as follows. Section 2 discusses the theoretical background, section 3 presents the Chinese stock market and contains a description of the reform

process and of the lockup agreements. Section 4 describes methodological issues, the structure of the event study and the empirical results. Section 5 concludes.

2. Estimating the slope of the demand function

Several methodologies and data sets have been used to estimate the slope of the demand function for stocks.

Scholes (1972), Holthausen, Leftwich and Mayers (1990) and Mikkelson and Partch (1985) examine price reactions to large block sales and document a price impact, but it is not clear whether the results are due to information effects or downward sloping demand function. Shleifer (1986) documents a 3% abnormal return for stocks included in the S&P500 after September 1976, persisting for horizons of ten and twenty days. A cross-sectional regression of abnormal return on abnormal volume (defined both as the difference between the announcement date volume and the average daily volume in the previous six months both expressed as a fraction of the number of shares outstanding and as announcement date volume) provides an estimated coefficient around 1. However Loderer, Cooney and van Drunen (1991) notice that finite elasticity is consistent with cross-sectional price-quantity relation of any sign and therefore they examine whether, after controlling for potential information effects, the market's reaction to the announcement of seasoned equity offerings is related to possible price elasticity determinants. They find that size and variance of returns affect elasticities but there is no clear evidence about the impact of liquidity and proxies for heterogeneity of information. Their estimate of the elasticity has a mean of 11.12 and a median of 4.31. Kaul, Mehrotra and Morck (2000) consider an experiment directly connected with supply. The Toronto Stock Exchange implemented a previously announced redefinition of the public float and as a result changed the weights of several stocks belonging to the TSE300 index. They found that the stocks affected by the reform experienced on average a 2.34% excess returns during the event week and no complete price reversal (up to a horizon of nine weeks) with heavy volume in

the event week. Cross-sectionally, both returns and volume are associated with variables that proxy for the shift in demand.

A downward sloping demand curve may imply a market price different from the present discounted value of fundamentals. Wurgler and Zhuravskaya (2002) note that arbitrage may be insufficient to offset this deviation because of arbitrage risk. Theoretically, an arbitrageur would need to buy (sell) the mispriced stock and offset this position with a perfectly correlated portfolio. The possibility to form such hedging portfolio is therefore a necessary condition to proceed with the arbitrage. If the hedging portfolio cannot be found then there is arbitrage risk that severely limits arbitrage activities. The amount of risk arbitrage also depends on the total capital available to arbitrageurs and on the arbitrageurs' risk aversion. Wurgler and Zhuravskaya test the model using data on the cross section of stock returns added to the S&P500, the size of the excess demand coming from index funds and the variance of the arbitrage portfolio. They find that on average stocks have very imperfect substitutes, excess demand moves prices and arbitrage risk magnifies this effect. They estimate the elasticity between 5.57 and 11.72, with a mean of 8.24, depending on the different levels of arbitrage risk.

Brav and Gompers (2003) study expiration of lockups in a sample of 2,794 initial public offerings and find that abnormal returns are equal to -1.5% a the event date. They notice that it is hard to explain the fall in prices in a rational expectations framework because investors know the date of lockup expiration and should sell in advance. Therefore either investors are systematically surprised by the sales on the part of the insiders or arbitrage is costly.

Field and Hanka (2001) also analyze expiration of lockups and look at the relation between abnormal returns and trading volume, but do not find a strong relation between the two variables.

Petajisto (2008) finds, consistently with Shleifer (1986) that elasticity of the demand curve is a little below unity but the slope approximately doubles for small stocks. Moreover slopes are negatively related to firm size and positively related to idiosyncratic risk.

Reasons for downward sloping demand function: (i) a liquidity premium increasing with the size of the position (ii) different reservation prices due to heterogeneous information or to heterogeneous beliefs (iii) lack of substitutability across stocks which may bring forward insufficient arbitrage (iv) market segmentation: according to Merton (1987) the elasticity of the expected return on the stock of a firm with respect to an increase in its size is a positive function of return variance and of firm size and a negative function of the degree of "investor recognition" for the stock.

3. The Chinese stock market

3.1. Institutional setting

Chinese firms typically issue multiple classes of shares. The existence of multiple classes of shares (A-shares, B-shares, overseas listed shares, legal-person shares, State shares) can be traced back to the restructuring of State-owned enterprises (SOEs) taking place in the 1990s and to the interest on the part of the State not to totally relinquish control of firms. A-shares could be traded only by domestic investors until 2003. Since that date the possibility of trading domestic renminbi-denominated securities has been extended to Qualified Foreign Institutional Investors (QFII) but only up to a value of 5.65 billion dollars, about 1% of the stock market capitalization. B-shares are denominated in foreign currencies and until February 2001 were reserved to foreign investors. Overseas listed shares are issued by Chinese companies on securities markets outside mainland China (H-shares, for those listed in Hong Kong, N-shares listed in New York, L-shares listed in London and S-shares listed in Singapore). Legal-person shares have been given, in the restructuring process of State-owned enterprises (SOEs), to domestic institutions, stock companies, non-bank financial institutions. State shares are owned by the State Council. Legal-person shares and State shares are together known as nontradeable shares. At the beginning of 2006, NTS accounted for about 63% of the total number of shares outstanding. NTS have the same cashflow and voting rights as TS.

Transfer of NTS has become possible since mid 1990s through irregularly scheduled auctions and over-the-counter transactions. According to Green and Black's (2003) analysis of 840 transactions taking place in the Shenzhen market in the period 1994-2003, such transfers have often involved large blocks affecting the control of the companies. The dominant sellers were State-controlled shareholding companies, and the dominant buyers were private companies. 32% (46%) of the deals were associated with a change in control in 2001 (2002). Chen and Xiong (2001) study the irregularly scheduled auctions and OTC transactions of restricted institutional shares for the period August 2000-July 2001 and find a large discount averaging 79% (86%) with respect to their floating counterpart when sale takes place through auctions (private transfers). The discount varies with some characteristics of the company: the discount is lower for large firms, firms with a high return on equity, firms with high earnings-price or book-price ratios, firms with low debt-equity ratios, firms with low stock return volatility.

To study fairness of stock valuations, Mei, Scheinkman and Xiong (2005), from now on MSX, compare the performance of A and B shares across 75 companies for the period 1993-2001, finding a 421.8% premium for A shares over B shares, regardless of equal property rights on dividends. The premium is interpreted as a proxy of the bubble component of stock prices. Moreover, A-shares had an average turnover of 500% against a value of 100% for B-shares. The authors show that turnover and risk premium are cross sectionally correlated and are both positively associated with return volatility, taken as a proxy of fundamental uncertainty and as a condition for the relevance of heterogeneous beliefs. Also, the premium is negatively associated with the float of A-shares. MSX (2005) conclude that the market for A-shares is dominated by domestic speculative investors. Considering these results, the large discount associated with the transfer of NTS looks like a deserved correction for overvaluation of market prices due to irrationally exuberant domestic retail investors.

3.2. The 2005-2006 reform and the lockup agreements

On April 29, 2005 the China Securities Regulatory Commission (CSRC) announced a pilot program to transform NTS into TS through a well-defined process. For each company, the process includes a preliminary phase and two suspension periods. (see Beltratti Caccavaio 2008) In a preliminary phase the float may change because shares assigned in the compensation package can be immediately traded. However the transformation of the original NTS into TS does not immediately change the float, due to lockup periods proposed by nontradeable shareholders as a part of the compensation. Lockup agreements are compulsory in split share structure reform schemes. The CSRC restricts the non-tradable shareholders of a firm from selling their holdings within 12 months after the reform scheme implementation date. After the initial 12-month lockup, a non-tradable shareholder is only allowed to sell less than 5% and 10% of the total shares outstanding in 12 and 24 months respectively. Additional lockup terms may be imposed by non-tradable shareholders voluntarily to sweeten reform schemes. Those terms include extended lockup period and extra conditions for unlocking the non-tradable shares. According to regulations, an individual non-tradable shareholder may need to sell her shares in a multi-stage process. Figure 1 illustrates a typical process of unlocking and trading non-tradable shares. On t_0, the reform scheme is implemented. Investors are informed of the unlocking dates, the number of shares to be unlocked, and the owners of the non-tradable shares. At the end of the first lockup period, on t_1, the non-tradable shareholders sell a portion of their holdings. On t_2, the non-tradable shareholders sell an additional portion. This process will continue till t_k, when all non-tradable shares start bearing trading rights. Required by regulations, the length between t_0 and t_1 must be longer than 12 months. The length between t_0 and t_2 must be longer than 24 months. The shares lockup expiration process in the split share structure reform can last up to 15 years, beginning on 19 June 2006 and ending on 4 August 2020. During this period of time, there will be approximately 432 billion non-tradable shares owing into the market. Figure 2 shows the intertemporal distribution of the unlocking events in our sample. The figure reports the total number of unlocking events in each month, and the total market value of the unlocked shares for each month. The market value of the unlocked shares is

almost constant across the process. The largest expiration event in our sample occurred on October 2006, by the lockup expiration of 24 billions of Renminbi of China Merchant Bank.

4. Empirical results

4.1. Methodological issues

The event study uses the residuals from a pricing model. The pricing model is estimated using observations between t_i-*130* and t_i-*50*, where t_i is the day of the lockup expiration for stock *i.* The estimated parameters are used to compute the cumulative abnormal returns (CAR) in the event windows. In what follows we will consider simple CAPM-adjusted returns. We also consider various robustness tests regarding the definition of the market index, the risk model to be used to compute excess returns and the estimation window length. Results are similar and they are available upon request. For all event windows, cumulative abnormal returns are then averaged across companies to obtain the mean cumulative abnormal residuals (MCAR).

We measure the variance of MCAR in two ways. The first follows Campbell, Lo and MacKinaly (1997) and assumes independence across abnormal residuals of different firms. Our event periods are sometimes overlapping across firms because the latter are divided in batches of companies going through the reform process over similar time frames. Campbell, Lo and MacKinlay (1997) discuss inference in event windows with clustering and notice that standard methods suffer from lack of power. The second estimator is the cross-sectional variance (CS variance), see Asquith (1983) and Lynch and Mendenhall (1997). Campbell, Lo and MacKinlay (1997) point out that the use of the CS variance is justified under the weaker assumption of cross sectionally uncorrelated residuals. Brown and Warner (1985) show that the CS variance is robust to the possibility of increases in the variance of the securities during the event periods

4.2. Data and summary statistics

We have collected daily data for all the companies listed in the Shanghai Stock Exchange and in the Shenzhen Stock Exchange from the beginning to November 2008. Data include: market value, price to book, opening and closing price, highest and lowest price, unadjusted price, bid and ask price for the closing price, return index, turnover by volume, dividend yield, number of shares. Data are downloaded from Datastream (Università Commerciale Luigi Bocconi, Economics Department). Moreover we used three data sets for our empirical work: i) China listed firm's corporate governance research database, ii) China listed firm's cash and stock dividends research database, and iii) China stock market equity division reform research database[1].

Table 1 reports the summary statistics of our sample. The sample contains 1038 share lockup expiration events occurred between June 2006 and November 2008. Table reports the number of lockup expiration events in each month, the mean percentage of unlocked shares, the effective mean percentage of unlocked shares computed taking into account the fact that the large non-tradable shareholders were allowed to unlock less than 5% of the total shares., the average market value of unlocked shares computed using share price on the unlock day, and the mean number of holders of unlocked shares. The number of holders of unlocked shares is really low, indeed the truth is that investors in China's stock markets are very few but very rich. The major players are professionals at fund management companies, securities houses, trust companies, corporates, and gray market fund management companies[2].

4.3. Price reactions

Table 2 and figure 3 report results of the CAR analysis for the 1,038 lockup expiration included in our sample. In the fifty days before the lockup expiration abnormal prices decrease by 2.96%, with a concentration in the twenty days before each lockup expiration. On the lockup day there is no abnormal return, and there is no persistency of abnormal returns subsequent to the

[1] We thank "Paolo Baffi" Centre on Central Banking and Financial Regulation and Fondazione Eni Enrico Mattei for financial support.
[2] Privatizing China, Walter and Howie 2008

lockup expiration events. Results are reported for the full sample and for some subsamples. Subsamples are: stocks listed in the Shanghai Stock Exchange Market, stocks listed in the Shenzhen Stock Exchange Market, small firms, big firms, firms with a high idiosyncratic value, and firm with a low idiosyncratic value. Size samples based on market value at t_i-50 where t_i is the lockup day. Idiosyncratic risk based on the root mean squared error of a regression of stock returns on the market index, the size factor, the floating ratio factor and the liquidity factor over the period from t_i -130 to t_i -50. The abnormal returns are larger for small firms and for high idiosyncratic risk firms, consistently with the prediction of Petajisto (2008) model.

4.4. Volume reaction

We compute abnormal volume following Ajinkya and Jain (1989) and Lynch and Mendenhall (1997). This is based upon the residuals of a regression of the company (capitalization corrected) volume on the market (capitalization corrected) volume $\upsilon_{it} = \beta_0 + \beta_1 \upsilon_{mt} + \varepsilon_{it}$. The regression is estimated by means of generalized least squares[3]. The coefficients of the volume regressions are estimated using observations between times t_i-*130* and t_i-*50*, where t_i is the day of the lockup expiration. The cumulative residual analysis described in table 3 and figure 4 shows that companies have a positive abnormal volume in the period preceding the lockup expiration. Volume keeps increasing relatively to the market in even after the day of the expiration. As for the price reaction results are reported for the full sample and for some subsamples.

4.5. Analysis of the results

The abnormal returns from the event study are consistent with the implication of Petajisto (2008). This allows us to perform a test by comparing the demand curves implied by lockup expiration in China distinguish by small-cap and large-cap. Petajisto (2008) implications 1 and 2 link the fee of

[3] The equation is estimated on the basis of OLS to retrieve the residuals. The residual is then regressed on its own lag and the slope coefficient is used as an estimate of the AR(1) coefficient to transform the original data as in the Cochrane-Orcutt procedure. Finally, OLS is applied to the transformed data.

the intermediary to the slope of the demand curve. As one possible way to test these implications, he start with the observation that small-cap money managers generally charge higher fees than large-cap managers, presumably due to higher information costs for small firms. Hence, small-cap stocks should have steeper demand curves than large-cap stocks. We want to test whether the idiosyncratic risk of a stock affects the price impact around lockup expiration. We choose our event window as before, from 50 trading days before the day of the lockup expiration to 20 trading days after the lockup expiration. Hence, we test if the abnormal return on a stock is positively related to the idiosyncratic risk of the stock. To estimate idiosyncratic risk, we use 80 trading days from 130 trading days before the day of the lockup expiration to 50 trading days before the lockup expiration. We require a minimum of 2 months of valid return observations. We regress the stock's daily return on the market index, the size factor, the floating ratio factor and the liquidity factor. For details refer to Beltratti-Caccavaio (2008). We define idiosyncratic risk as the root mean squared error of this regression. We also take the market value of every firm on 50 trading days before the day of the lockup expiration in order to obtain a value that is not affected by the anticipation of the event. Since it is possible that the level of idiosyncratic risk is also related to the cross correlations of stocks, e.g. stocks with high idiosyncratic risk tend to move together, we need to control for this comovement of stocks with similar idiosyncratic risk. The market equity of a firm can also plausibly be associated with the slope of the demand curve, so we control for that as well. Hence, we form a 10×5 matrix of control portfolios based on market equity and idiosyncratic risk. We pick all stocks in Shanghai and Shenzhen Stock market and we sort them into 10 deciles based on the market value. Having estimated the idiosyncratic risk of each stock as described before, we then subdivide each market equity decile into quintiles based on idiosyncratic risk. The procedure is similar to the one used by Fama and French (1992) for market equity and beta. We perform a sequential sort rather than an independent sort because idiosyncratic risk and market equity have a high negative correlation. Some sample statistics for the control portfolios are in table 4. We report

the median number of stocks in each benchmark portfolio, the median market capitalization of each benchmark portfolio, and the median idiosyncratic risk for each benchmark portfolio.

The cumulative abnormal return on a stock in the event window is then the difference between its own cumulative return and the cumulative return of its benchmark portfolio (matched on market equity and idiosyncratic risk). Results are in table 5 and table 6. As before the event windows are: t_i-50 through t_i-20, t_i-50 through t_i, t_i-50 through t_i+20, t_i, t_i through t_i+20, t_i through t_i+50 where t_i is the lockup day. The Table presents the mean, the median, the minimum, the maximum, the standard deviation, the percentage of positive abnormal price range and the number of observations. Results are reported for value weighted control portfolios. The abnormal return cumulated over the fifty days before the lockup days is -6.30%. Moreover we compute the median abnormal returns for each benchmark portfolio and we compared the results obtained with the Petajisto procedure with those found with the standard event study procedure. As expected the latter are decreasing with the increase of idiosyncratic risk.

A similar exercise is done for volume. The cumulative abnormal volume on a stock in the event window it the difference between its own cumulative volume and the cumulative volume of its benchmark portfolio. Results are in table 7 and table 8. The abnormal volume cumulate over the fifth days before the lockup days is smaller than those obtained with the standard event study procedure.

Hence, each observation represents an independent data point and we can regress all the observations on the explanatory variables in one cross-section. .The regression results are shown in Table 9. Idiosyncratic risk turns out to be statistically significant both in the univariate regression and in the bivariate regression. Market equity also turns out to be statistically significant. The coefficient of idiosyncratic risk is about 0.7, meaning that an increase in idiosyncratic volatility of 10% would decrease the abnormal return around index changes by 7 percentage points. This certainly has economic significance. For market equity, the positive coefficient tells us that

increasing the market capitalization of a stock reduces its expected price impact around a lockup expiration event.

5. Conclusions and further analysis

In this paper we have analyzed 1,038 lockup expirations events occurred from June 2006 to November 2008 in China due to the recent split share structure reform. We have investigated volume and price patterns around the unlocking day, and we have found that, even though the events are totally anticipated, there is a drop in the stock price, and an increase in volume, when the lockup ends. We have discussed our results in the light of the Petajisto (2008) model and we found that the slopes of the demand curve are negatively related to firm size and positively related to idiosyncratic risk. These results are interesting and will require further analysis on the price elasticity of demand for stock.

Moreover the setup of the reform allows us to study two other interesting elements. First is the relation between the compensation paid by holders of TS and holders of NTS. The size of the compensation is bounded by the surplus obtained from holders of NTS, who are unwilling to pay more than their own advantage, and by the loss suffered from holders of TS as a result of the increased supply. It is therefore interesting to investigate, at the level of each single company, the relations among the compensation, the increase in supply, the change in prices. Second, the data can also shed light on the motivations for the lock-up in the Chinese reform. The literature proposes two predominant explanations for the existence of lock-ups, the commitment hypothesis and the quality hypothesis, see Brav and Gompers (2003). In the Chinese case the lock-up can also be interpreted as part of the compensation package offered to holders of TS. We will therefore investigate variables that may explain the characteristics of the lockups proposed by the Chinese companies.

REFERENCES

Acharya, Viral and Lasse Pedersen, 2005, Asset pricing with liquidity risk, *Journal of Financial Economics* 77, 375-410.

Ajinkya, Bipin and Prem Jain, 1989, The behavior of daily stock market volume, *Journal of Accounting and Economics* 11, 331-359.

Alizadeh, Sassan, Michael Brandt and Francis Diebold, 2002, Range-based estimation of stochastic volatility models, *Journal of Finance* 57, 1047-1092.

Allen, F., Jun Qian and Meijun Qian, 2007, China's financial system: Past, present and future, in L. Brandt and T. Rawski, eds.: *China's economic transition: Origins, mechanisms and consequences*, forthcoming.

Amihud, Yakov, 2002, Illiquidity and stock returns: Cross-section and time-series effects, *Journal of Financial Markets* 5, 31-56.

Asness, Cliff, Robert Krail and John Liew, 2001, Do hedge funds hedge?, *Journal of Portfolio Management* 28, 6-19.

Asquith, Paul, 1983, Merger bids, uncertainty and stockholder returns, *Journal of Financial Economics* 11, 51-83.

Baker, Malcolm and Jeffrey Wurgler, 2006, Investor sentiment and the cross-section of stock returns, *Journal of Finance* 61, 1645-1680.

Barberis, Nicholas and Richard Thaler, 2003, A survey of behavioral finance, in *Handbook of the economics of finance*, edited by G.M. Constantinides, M. Harris and R. Stulz, Elsevier Science.

Brav, Alon and Jonathan Heaton, 1999, Did ERISA's prudent man rule change the pricing of dividend omitting firms?, unpublished working paper, Duke University.

Brav, Alon and Paul Gompers, 2003, The role of lockups in initial public offerings, *Review of Financial Studies* 16, 1-29.

Brown, Stephen J. and Jerold B. Warner, 1985, Using daily stock returns. The case of event studies, *Journal of Financial Economics* 14, 3-31.

Campbell, John, Andrew Lo, and MacKinlay, 1997, *The Econometrics of financial markets*, Princeton University Press.

Cha, Heung-Joo and Bong-Soo Lee, 2001, The market demand curve for common stocks: evidence from equity mutual fund flows, *Journal of Financial and Quantitative Analysis* 36, 195-220.

Chen, Zhiwu, and Peng Xiong, 2001, Discounts on illiquid stocks: Evidence from China, Yale ICF Working Paper, n. 00-56.

Chordia Tarun, Richard Roll and Avanidhar Subrahmanyam, 2007, Liquidity and Market Efficiency, forthcoming *Journal of Financial Economics.*

Cochrane, John, 2006, *Asset pricing*, Princeton University Press, Princeton and Oxford.

Collins, Daniel, and Warren Dent, 1984, A comparison of alternative testing methodologies used in capital market research, *Journal of Accounting Research* 22, 48-84.

Diamond, Douglas W. and Robert E. Verrecchia, 1987, Constraints on short-selling and asset price adjustment to private information, *Journal of Financial Economics* 18, 277-311

Dimson, Elroy, 1979, Risk Measurement when Shares are Subject to Infrequent Trading, *Journal of Financial Economics* 7, 197-226.

Fama, Eugene, and Kenneth French, 1996, Multifactor explanations of asset pricing anomalies, *Journal of Finance* 51, 55-84.

Field, L.C., Hanka, G., 2001, The Expiration of IPO Share Lockups, *Journal of Finance*, 56, 2, 471-500

Galai, Dan, and Meir I. Schneller, 1978, Pricing of warrants and the value of the firm, *Journal of Finance* 33, 1333-1342.

Gibbons, Michael, Stephen Ross and Jay Shanken, 1989, A test of the efficiency of a given portfolio, *Econometrica* 57, 1121-1152.

Green, Stephen and Alissa Black, 2003, A market in control: non-tradeable shares deals in companies listed at the Shenzen Stock Exchange, Asia programme working paper no. 11, The Royal Institute of International Affairs.
Green Stephen, 2004, The development of China's stock market, 1984-2002.
Griffin, John M., Federico Nardari and Renè M. Stulz, 2007, Do investors trade more when stocks have performed well? Evidence from 46 countries, *Review of Financial Studies*, forthcoming.
Harris, Lawrence, and Eitan Gurel, 1986, Price and volume effects associated with changes in the S&P list: New evidence for the existcne of price pressures, *Journal of Finance* 41, 815-829
Hong, Harrison, José Scheinkman, and Wei Xiong, 2006, Asset float and speculative bubbles, *Journal of Finance* 61, 1073-1117.
Inoue, Takeshi, 2005, Reform of China's split-share structure takes shape, *Nomura Capital Market Review*, 8, no. 3.
Jingu, Takeshi, 2006, Reforms to Chinese nontradeable shares, Nomura Securities, Economic Research.
Kaul, Aditya, Vikas Mehrotra, and Randall Morck, 2000, Demand curves for stocks do slope down: New evidence from an index weights adjustment, *Journal of Finance* 55, 893-912.
Lee, Charles M., and Bhaskaran Swaminathan, 2000, Price momentum and trading volume, *Journal of Finance* 55, 2017-2069.
Loderer, Claudio, John. W. Cooney, and Leonard D. Van Drunen, 1991, The price elasticity of demand for common stock, *Journal of Finance* 46, 621-651.
Lynch, Anthony W., and Richard R. Mendenhall, 1997, New evidence on stock price effects associated with changes in the S&P500 index, *Journal of Business* 70, 351-383.
Mei, Jianping, José Scheinkman, and Wei Xiong, 2004, Speculative trading and stock prices: An analysis of Chinese AB share premia, Working paper, NYU and Princeton University.
Merton, Robert C., 1987, A simple model of capital market equilibrium with incomplete information, *Journal of Finance* 42, 483-510.
Mikkelson, Wayne H., and Megan Partch, 1985, Stock price effects and costs of secondary distributions, *Journal of Financial Economics* 14, 165-194.
Pastor, Lubos, and Robert Stambaugh, 2003, Liquidity risk and expected stock returns, *Journal of Political Economy* 113, 642-685.
Petajisto, Antti, 2008, Why do demand curves slope down?, *Journal of Financial and Quantitative Analysis*, forthcoming
Scholes, Myron, 1972, The market for securities: Substitution versus price pressure and the effect of information on share price, *Journal of Business* 45, 179-211.
Scholes, Myron and J. Williams, 1977, Estimating betas from nonsynchronous data, *Journal of Financial Economics* 5, 309-328.
Shleifer, Andrei, 1986, Do demand curves for stocks slope down?, *Journal of Finance* 41, 579-590.
Wan, Gary, Cheng Yuan and Simon Ha, 2005, Non-tradeable to tradeable – reforming the stock markets in the PRC, Linklaters, September.
Wang, Fenghua and Yexiao Xu, 2004, What determines Chinese stock returns?, *Financial Analysts Journal* 60, 65-77.
Wurgler, Jeffrey A. and Zhuravskaya, Ekaterina V., Does Arbitrage Flatten Demand Curves for Stocks?. *The Journal of Business*, Vol. 75, No. 4, October 2002

	No of Expired Lockup	Lockup Percentage	Lockup Percentage CAP	Market Value Expired Lockup CAP	No. of Holder Owning Share with Expired Lockup Period
Jun-06	6	48.62	13.37	273.65	3.17
Jul-06	5	43.96	12.47	800.94	3.00
Aug-06	22	27.99	10.12	1415.40	3.14
Sep-06	3	32.41	10.00	391.54	2.00
Oct-06	15	40.58	10.93	10952.70	7.47
Nov-06	47	34.83	7.67	703.18	1.96
Dec-06	42	32.70	8.07	360.59	1.69
Jan-07	43	31.66	7.56	191.09	2.05
Feb-07	59	31.85	7.64	287.91	2.07
Mar-07	63	27.15	7.34	409.75	1.76
Apr-07	68	32.67	7.81	361.62	2.04
May-07	54	35.34	8.40	475.85	2.28
Jun-07	61	28.99	8.13	376.25	2.38
Jul-07	59	36.41	8.14	398.40	2.41
Aug-07	59	36.17	8.46	425.87	2.37
Sep-07	32	37.86	8.61	485.34	2.09
Oct-07	24	42.10	9.96	665.26	2.04
Nov-07	35	42.08	9.63	539.95	1.94
Dec-07	36	34.39	9.42	490.78	2.25
Jan-08	31	38.85	7.14	372.47	1.74
Feb-08	24	29.34	6.71	316.28	1.88
Mar-08	36	30.01	8.89	412.15	2.25
Apr-08	25	31.71	7.02	795.22	1.88
May-08	18	32.09	7.74	405.95	1.67
Jun-08	12	33.91	7.08	708.26	1.42
Jul-08	10	40.26	12.12	447.29	2.40
Aug-08	12	30.54	9.73	346.64	2.67
Sep-08	59	35.57	7.18	293.23	1.80
Oct-08	50	34.01	8.18	1701.38	1.80
Nov-08	28	35.73	8.60	994.15	2.50

Table 1. Summary statistics: The sample contains 1038 share lockup expiration events occurred between June 2006 and November 2008. The data on lockup expirations are from Equity Division Reform CSMAR Database. Table reports the total number of lockup expiration each month, the mean percentage of unlocked shares, the effective mean percentage of unlocked shares computed taking into account the fact that the large non-tradable shareholders were allowed to unlock less than 5% of the total shares., the average market value of unlocked shares computed using share price on the unlock day, and the number of holders of unlocked shares.

Day over which the AR is cumulated	Whole	Shanghai	Shenzen	Small	Big	High sigma	Low sigma
t-50 through t-20	**-0.73**	**-0.93**	**-0.38**	**-1.43**	**-0.05**	**-3.29**	**1.93**
CLM variance t-stat	-0.92	-0.91	-0.31	-1.21	-0.05	-2.56	2.15
CS variance t-stat	-1.42	-1.41	-0.48	-2.04	-0.07	-3.97	3.31
t-50 through t	**-2.96**	**-2.92**	**-3.03**	**-3.06**	**-2.87**	**-8.77**	**3.07**
CLM variance t-stat	-2.72	-2.00	-1.92	-1.83	-2.04	-5.29	2.27
CS variance t-stat	-4.57	-3.49	-2.98	-3.43	-3.06	-8.33	4.14
t-50 through t+20	**-2.82**	**-2.39**	**-3.54**	**-3.18**	**-2.47**	**-12.93**	**7.70**
CLM variance t-stat	-2.02	-1.29	-1.73	-1.50	-1.35	-6.35	4.33
CS variance t-stat	-3.67	-2.41	-2.94	-3.01	-2.23	-10.39	8.77
t	**0.19**	**0.39**	**-0.14**	**-0.01**	**0.41**	**-0.18**	**0.58**
CLM variance t-stat	0.92	1.26	-0.63	-0.04	1.64	-0.64	1.88
CS variance t-stat	1.44	2.23	-0.67	-0.08	2.04	-0.83	3.81
t through t+20	**0.15**	**0.58**	**-0.62**	**0.01**	**0.29**	**-4.51**	**4.97**
CLM variance t-stat	0.22	0.64	-0.63	0.01	0.32	-4.92	5.13
CS variance t-stat	0.33	1.02	-0.87	0.02	0.44	-6.21	9.78
t through t+50	**-0.18**	**0.75**	**-1.80**	**0.29**	**-0.65**	**-9.28**	**9.26**
CLM variance t-stat	-0.15	0.49	-1.16	0.18	-0.41	-5.63	6.47
CS variance t-stat	-0.26	0.86	-1.67	0.32	-0.65	-8.40	11.97

Table 2. Abnormal returns from the Market Model. The table reports results of the mean cumulative abnormal returns and the mean average abnormal returns for the 1,038 luckup expirations events included in the sample. The event study is performed on the residuals from a market model. For each company *i* the model is estimated over a period including observation between t_i-130 and t_i -50 where t_i is the lockup day. The estimated parameters are used to compute the abnormal returns over the event windows: t_i-50 through t_i-20, t_i-50 through t_i, t_i-50 through t_i+20, t_i, t_i through t_i+20, t_i through t_i+50. Abnormal returns are summed to form cumulative abnormal returns (CAR). CARs are then averaged across companies to obtain the mean cumulative abnormal residuals (MCAR). The null hypothesis of no abnormal returns is tested under the assumption of independence across abnormal residuals of different firms following Campbell, Lo and MacKinlay (1997) (CLM variance) and under the assumption of no correlation across abnormal residuals (CS variance) see Asquith (1983) and Lynch and Mendenhall (1997). The table presents the t-stat for all the procedures. Results are reported for the full sample and for some subsamples. Subsamples are: stocks listed in the Shanghai Stock Exchange Market, stocks listed in the Shenzhen Stock Exchange Market, small firms, big firms, firms with an high idiosyncratic value, and firm with a low idiosyncratic value. Size samples based on market value at t_i-50 where t_i is the lockup day. Idiosyncratic risk based on the root mean squared error of a regression of stock returns on the market index, the size factor, the floating ratio factor and the liquidity factor over the period from t_i-130 to t_i-50.

Day over which the AV is cumulated	Whole	Shanghai	Shenzen	Small	Big	High sigma	Low sigma
t-50 through t-20	**5.03**	**4.76**	**5.49**	**6.96**	**3.19**	**-1.56**	**11.89**
CLM variance t-stat	4.84	3.73	3.09	4.59	2.24	-0.95	9.92
CS variance t-stat	8.10	6.11	5.33	8.31	3.48	-1.60	15.51
t-50 through t	**7.38**	**7.49**	**7.18**	**11.88**	**3.06**	**-5.72**	**20.99**
CLM variance t-stat	4.68	3.78	2.77	5.07	1.46	-2.50	10.54
CS variance t-stat	9.34	7.57	5.48	11.17	2.63	-4.63	21.56
t-50 through t+20	**12.84**	**12.55**	**13.34**	**20.67**	**5.35**	**-8.64**	**35.17**
CLM variance t-stat	5.78	4.57	3.53	6.15	1.85	-2.87	11.79
CS variance t-stat	13.75	10.72	8.61	16.42	3.89	-5.91	30.53
t	**0.73**	**0.88**	**0.45**	**0.88**	**0.57**	**0.02**	**1.46**
CLM variance t-stat	2.95	2.62	1.35	2.28	1.86	0.06	3.97
CS variance t-stat	4.54	4.42	1.69	4.12	2.39	0.07	7.52
t through t+20	**6.90**	**6.33**	**7.91**	**10.92**	**2.81**	**-2.65**	**16.80**
CLM variance t-stat	6.36	4.74	4.25	6.62	2.03	-1.92	10.77
CS variance t-stat	13.00	9.54	8.92	15.41	3.54	-3.16	26.06
t through t+50	**14.26**	**12.13**	**18.00**	**23.58**	**4.77**	**-7.67**	**37.00**
CLM variance t-stat	5.87	4.09	4.27	6.43	1.53	-2.50	10.57
CS variance t-stat	17.63	12.01	13.33	21.84	3.95	-6.01	37.69

Table 3. Abnormal Volume from the Ajinkya and Jian (1989) Model. The table reports results of the mean cumulative and average abnormal volume analyses for the 1,038 lockup expiration events included in the sample. The event study is performed on the residuals from the Ajinkya and Jian (1989) model. For each company *i* the model is estimated over a period including observation between t_i-130 and t_i -50 where t_i is the lockup day. The estimated parameters are used to compute the abnormal returns over the event windows: t_i-50 through t_i-20, t_i-50 through t_i, t_i-50 through t_i+20, t_i, t_i through t_i+20, t_i through t_i+50. The estimated parameters are then used to compute the abnormal volume over the event windows. Abnormal volumes are summed to form cumulative abnormal volume and then averaged across companies to obtain the mean cumulative abnormal volume residuals (MCAV). The null hypothesis of no abnormal volume is tested under the assumption of independence across abnormal residuals of different firms following Campbell, Lo and MacKinlay (1997) (CLM variance) and under the assumption of no correlation across abnormal residuals (CS variance) see Asquith (1983) and Lynch and Mendenhall (1997). The table presents the t-stat for all the procedures. Results are reported for the full sample and for some subsamples. Subsamples are: stocks listed in the Shanghai Stock Exchange Market, stocks listed in the Shenzhen Stock Exchange Market, small firms, big firms, firms with a high idiosyncratic value, and firm with a low idiosyncratic value. Size samples based on market value at t_i-50 where t_i is the lockup day. Idiosyncratic risk based on the root mean squared error of a regression of stock returns on the market index, the size factor, the floating ratio factor and the liquidity factor over the period from t_i-130 to t_i-50.

	Market Value	Idiosyncratic Risk				
		Low	2	3	4	High
Panel A	Small	39	39	38	37	39
Number of Stocks	2	47	43	54	50	51
	3	59	46	53	43	42
	4	45	54	55	45	51
	5	51	50	51	48	52
	6	50	52	52	45	51
	7	47	50	47	49	41
	8	42	49	52	46	35
	9	47	52	44	46	43
	Big	40	51	40	37	48
Panel B	Small	214	262	262	261	344
Market Value	2	449	434	558	639	714
	3	677	626	743	632	721
	4	825	975	983	717	1043
	5	1142	976	1184	1180	1364
	6	1455	1565	1433	1189	1645
	7	1620	1637	1817	1692	1640
	8	1867	2209	2445	2412	1756
	9	3713	4521	3199	4802	3694
	Big	48808	20298	35290	7259	12460
Panel C	Small	0.53	0.74	0.82	0.87	1.14
Idiosyncratic Risk	2	0.77	0.85	1.30	1.45	1.83
	3	0.99	0.96	1.32	1.12	1.45
	4	0.79	1.14	1.34	1.17	1.87
	5	0.90	1.05	1.26	1.39	1.88
	6	0.89	1.15	1.31	1.22	1.83
	7	0.77	1.05	1.21	1.35	1.32
	8	0.73	1.02	1.32	1.29	0.92
	9	0.84	1.12	1.08	1.31	1.38
	Big	0.61	1.13	0.89	0.87	1.66

Table 4: Sample statistics for the control portfolios. Panel A reports the median number of stocks in each benchmark portfolio, panel B reports the median market capitalization of each benchmark portfolio, panel C reports the median idiosyncratic risk for each benchmark portfolio. The statistics are computed for all companies listed in Shanghai and Shenzhen Stock Exchange Market in the sample period. The 10×5 benchmark portfolios are formed first by dividing stocks into size deciles based on market value at t_i-50 where t_i is the lockup day. Stocks within each size decile are then sorted into quintiles based on the root mean squared error of a regression of stock returns on the market index, the size factor, the floating ratio factor and the liquidity factor over the period from t_i-130 to t_i-50.

	Day over which the AR is cumulated	Mean	Median	Min	Max	St. Dev.	% Positive	No. Of Obs
Value Weighted	t-50 through t-20	-2.43	-3.37	-219.02	98.54	17.10	40%	1038
	t-50 through t	-5.39	-5.76	-227.57	112.27	19.76	34%	1038
	t-50 through t+20	-6.30	-7.20	-181.76	96.44	23.41	35%	1038
	t	-0.28	-0.45	-10.49	11.60	2.71	42%	1038
	t through t+20	-1.19	-1.77	-136.29	106.28	15.37	43%	1038
	t through t+50	-3.09	-4.54	-379.67	81.27	24.17	40%	968

Table 5: Abnormal returns from the control portfolios. The table shows the buy-and-hold abnormal returns for all the 1038 lockup expiration events. The abnormal return on a stock is the difference between the stock return and the return on its control portfolio which has similar idiosyncratic risk and market equity. The event windows are: t_i-50 through t_i-20, t_i-50 through t_i, t_i-50 through t_i+20, t_i, t_i through t_i+20, t_i through t_i+50 where t_i is the lockup day. The Table presents the mean, the median, the minimum, the maximum, the standard deviation, the percentage of positive abnormal price range and the number of observations. Results are reported for both equally weighted and value weighted control portfolio.

	Market Value	Idiosyncratic Risk				
		Low	2	3	4	High
Panel A	Small	-9.550	-6.020	-3.848	-2.741	-3.476
CAR Petajisto	2	-0.980	-2.507	-2.826	-6.264	-4.712
	3	-1.667	-1.849	-0.388	-2.267	-1.869
	4	-2.521	-2.309	-0.760	-1.734	-2.267
	5	-2.674	-1.335	-0.520	-0.201	-3.543
	6	-0.513	-2.977	-2.504	0.183	-6.458
	7	-2.149	-3.362	-5.547	-0.046	-1.934
	8	-1.942	-0.276	-3.717	-2.574	-0.504
	9	-2.950	-0.253	0.098	-2.824	-1.807
	Big	-0.937	-3.425	-2.744	-1.774	-1.204
Panel B	Small	4.363	-1.227	-4.460	-1.661	-2.490
CAR Standard	2	8.954	-1.108	1.211	-7.335	-11.019
	3	5.014	-1.618	5.215	3.673	-5.649
	4	2.841	0.045	5.339	2.083	-12.267
	5	-0.345	1.281	-0.002	-2.654	-9.430
	6	0.724	-4.967	-0.344	0.240	-15.396
	7	6.953	-0.474	-7.657	4.073	-3.657
	8	3.390	1.367	-0.826	-2.148	-3.980
	9	2.577	0.368	-1.108	0.718	-9.521
	Big	-0.443	-0.508	-2.445	-5.826	-7.949

Table 6: MCAR for the control portfolios. Table reports the median MCAR cumulated over day t_i-50 through t_i where t_i is the lockup day of each benchmark portfolio. The values are computed for all companies listed in Shanghai and Shenzhen Stock Exchange Market in the sample period. The 10×5 benchmark portfolios are formed first by dividing stocks into size deciles based on market value at where t_i is the lockup day. Stocks within each size decile are then sorted into quintiles based on the root mean squared error of a regression of stock returns on the market index, the size factor, the floating ratio factor and the liquidity factor over the period from t_i-130 to t_i-50. Panel A reports results from the Petajisto (2008) procedure, panel B reports results from the standard procedure.

	Day over which the AV is cumulated	Mean	Median	Min	Max	St. Dev.	% Positive	No. Of Obs
Value Weighted	t-50 through t-20	0.74	1.49	-29.88	12.06	4.94	82%	1038
	t-50 through t	0.93	2.35	-49.52	20.00	8.41	82%	1038
	t-50 through t+20	1.49	3.35	-70.67	27.31	10.76	81%	1038
	t	0.01	0.06	-1.04	0.36	0.25	82%	1038
	t through t+20	0.57	1.14	-22.14	10.49	3.89	82%	1038
	t through t+50	1.18	2.42	-50.14	24.49	8.81	81%	968

Table 7: Abnormal volume from the control portfolios. The table shows the abnormal volume for all the 1038 lockup expiration events. The abnormal volume on a stock is the difference between the stock volume and the volume on its control portfolio which has similar idiosyncratic risk and market equity. The volume is computed as in the Ajinkya and Jian (1989) model The event windows are: t_i-50 through t_i-20, t_i-50 through t_i, t_i-50 through t_i+20, t_i, t_i through t_i+20, t_i through t_i+50 where t_i is the lockup day. The Table presents the mean, the median, the minimum, the maximum, the standard deviation, the percentage of positive abnormal price range and the number of observations. Results are reported for both equally weighted and value weighted control portfolio.

	Market Value	Idiosyncratic Risk				
		Low	2	3	4	High
Panel A	Small	-1.532	0.539	1.380	2.455	0.443
CAV Petajisto	2	1.056	0.936	-0.520	1.860	-0.350
	3	0.739	-0.267	1.540	-2.402	-0.838
	4	-0.653	0.068	1.564	0.562	-0.254
	5	0.960	1.560	1.101	0.322	-0.624
	6	1.160	0.605	0.601	0.524	-1.456
	7	1.555	0.729	0.453	0.419	-0.390
	8	0.923	0.600	0.897	-0.443	0.528
	9	1.391	-0.727	0.869	0.960	-1.486
	Big	1.371	0.493	0.317	0.342	0.410
Panel B	Small	0.908	1.080	0.857	2.583	1.326
CAV Standard	2	0.269	0.388	0.882	1.244	-0.394
	3	1.483	0.402	-0.582	-1.182	-0.239
	4	-0.256	0.920	1.779	1.696	0.587
	5	0.789	1.297	0.851	1.224	-0.948
	6	0.494	-0.667	0.674	-0.523	-2.112
	7	0.730	1.321	0.551	1.031	1.600
	8	0.654	0.277	0.948	-0.854	0.483
	9	1.305	-0.084	0.050	-0.066	0.840
	Big	1.272	0.016	0.469	0.725	-0.810

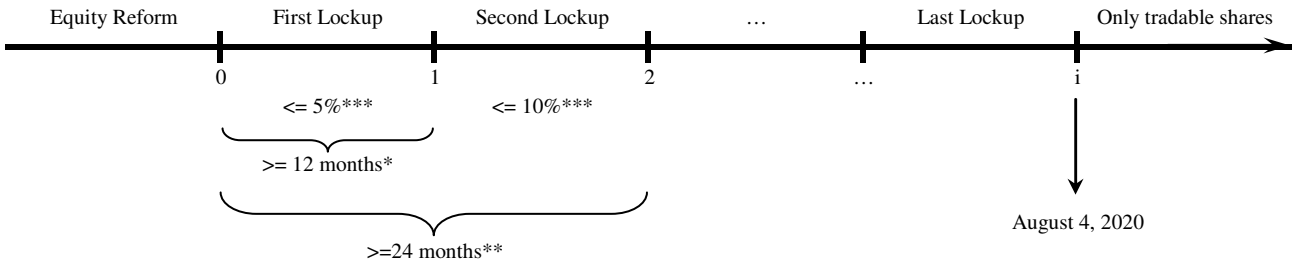
Table 8: MCAV for the control portfolios. Table reports the median MCAV cumulated over day t_i-50 through t_i where t_i is the lockup day. The values are computed for all companies listed in Shanghai and Shenzhen Stock Exchange Market in the sample period. The 10×5 benchmark portfolios are formed first by dividing stocks into size deciles based on market value at where t_i is the lockup day. Stocks within each size decile are then sorted into quintiles based on the root mean squared error of a regression of stock returns on the market index, the size factor, the floating ratio factor and the liquidity factor over the period from t_i-130 to t_i-50. Panel A reports results from the Petajisto (2008) procedure, panel B reports results from the standard procedure.

	Car t-50 through t		
Sigma	-0.587**		-0.817**
	(0.283)		(0.409)
Ln Market Value		0.767**	0.874***
		(0.327)	(0.319)
Constant	-3.853*	-11.492**	-10.199*
	(2.320)	(5.312)	(5.752)
Observations	1038	1038	1038
R-squared	0.02	0.02	0.03

*** p<0.01, ** p<0.05, * p<0.1

Robust standard errors in parentheses

Table 9. Cross Sectional Analysis . The table presents the results of cumulative abnormal returns for lockup expiration events regressed on the log of market value and idiosyncratic volatility of a stock. The cumulative abnormal returns are defined as the market-adjusted cumulative returns form 50 trading days before the lockup day. Robust Standard Errors are reported in parentheses. Significance levels are denoted by (*) for 10 percent, (**) for 5 percent and (***) for 1 percent.



* The length between 0 and 1 must be longer than 12 months
** The length between 0 and 2 must be longer than 24 months
*** After the initial 12-month lockup, a non-tradable shareholder is only allowed to sell less than 5% and 10% of the total shares outstanding in 12 and 24 months respectively

Figure 1: The process of unlocking nontradable shares.

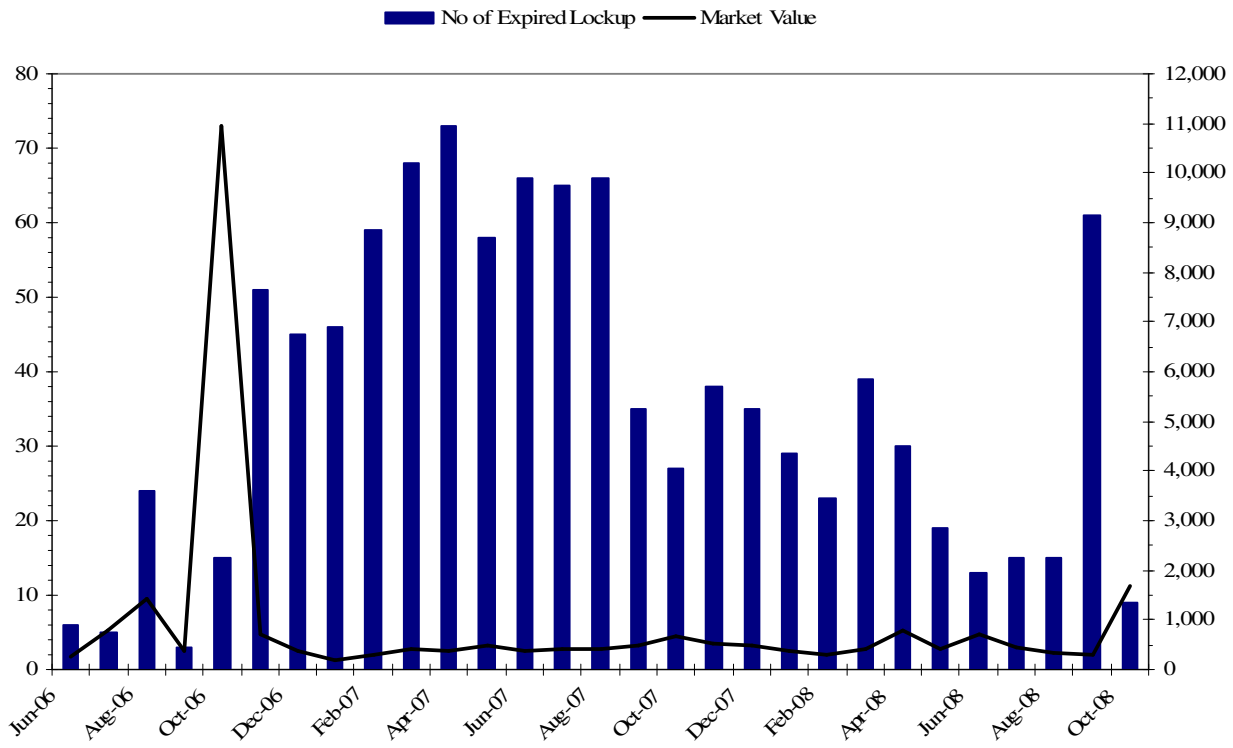


Figure 2: The intertemporal distribution of the share lockup expiration events. The sample includes 1.038 share lockup expiration events occurred in both Shanghai Stock Exchange and Shenzhen Stock Exchange between June 2006 and August 2008. The figure reports the timing of the various lockup expiration events, the number of unlocking events in each month, and the market value of the unlocked shares in each month.

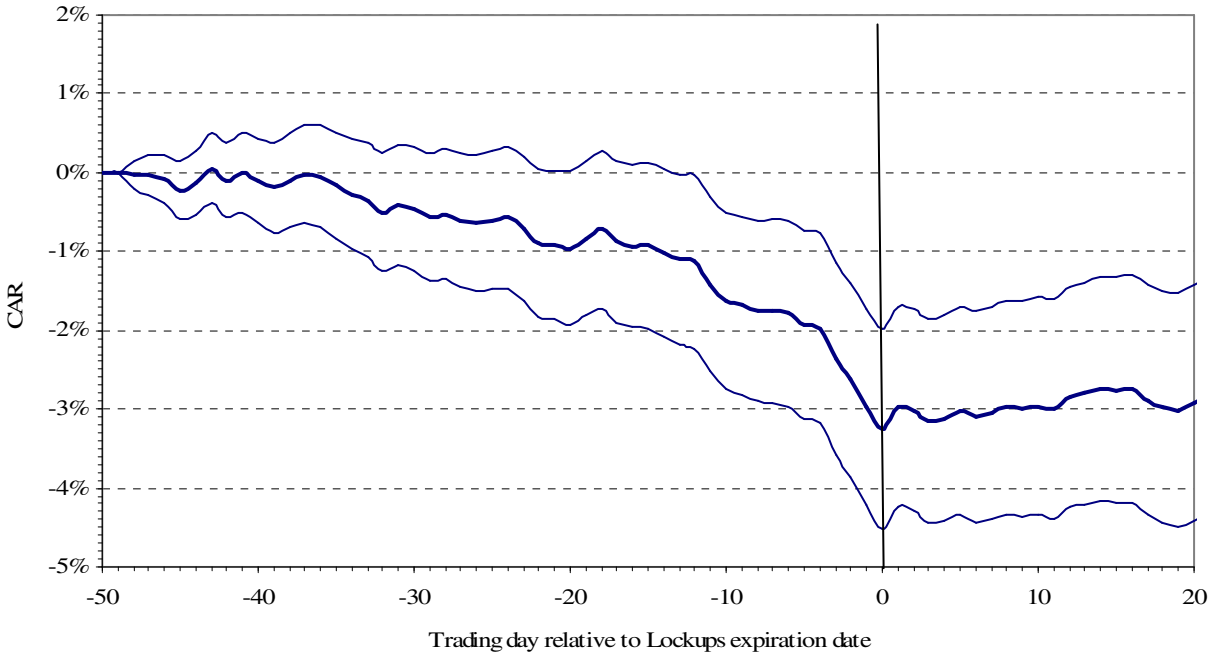


Figure 3. Mean Cumulative Abnormal Returns. The figure reports result of the MCAR analysis for the 1,038 lockup events in our sample and their 95% confidence interval. Residuals are computed from the market model. The cumulative residuals are computed starting 50 trading days before the lockup day to 20 trading days after the lockup day.

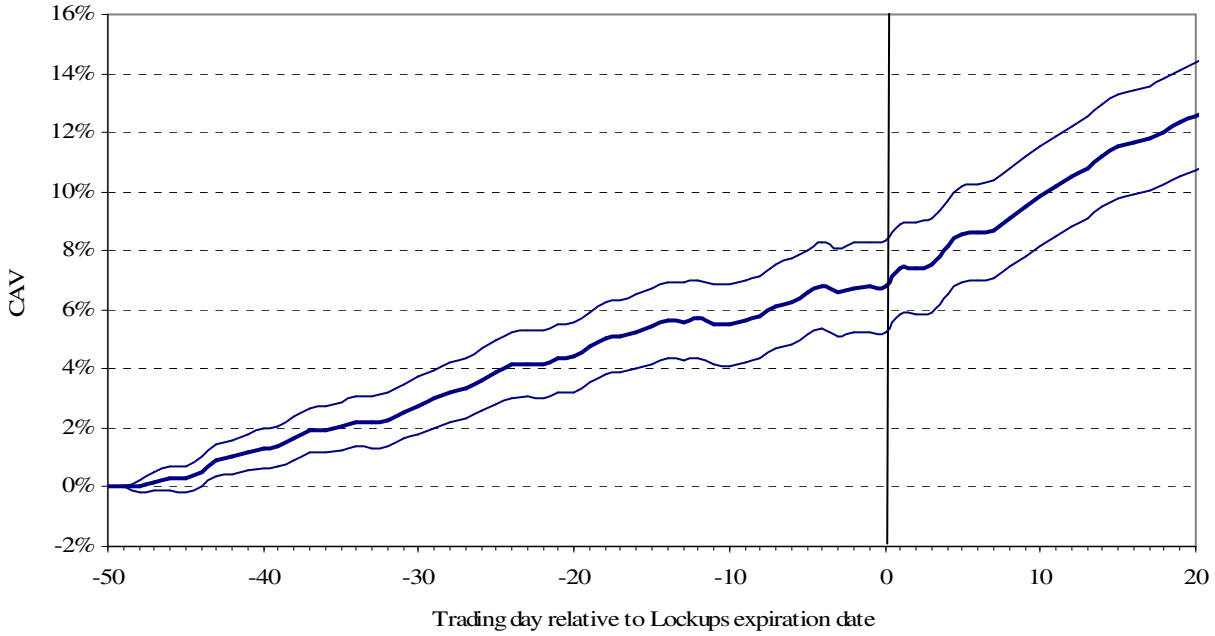


Figure 4. Mean Cumulative Abnormal Volume. The figure reports result of the MCAV analysis for the 1,038 lockup events in our sample and their 95% confidence interval. Residuals are computed from the Ajinkya and Jian (1989) model. The cumulative residuals are computed starting 50 trading days before the lockup day to 20 trading days after the lockup day.