Asset Float and Stock Prices: Evidence from the Chinese Stock Market*

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Abstract: the 2005-2006 reform of the Chinese stock market, aimed at eliminating nontradeable shares, is used to study the role of asset float on stock prices. The reform implies that holders of nontradeable shares compensate under various forms (cash, bonus shares, warrants) the holders of tradeable shares in exchange for their right to sell their shares at a future time. We exploit a company-level data set to measure the price reaction of each company to both the announcement of the details of the reform and the implementation of the compensation plan, using information about the timing of suspension of each stock from trading and subsequent readmission. The setup of the reform process is useful to disentangle the relative roles of information and supply. We carry out both an event study to measure abnormal returns and a cross sectional analysis to explore the determinants of the abnormal returns, with a particular attention devoted to the impact of supply shocks on returns. We find that the reform process has been successful and characterized by positive abnormal returns. We also find evidence on favor of a negatively sloped demand function.

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1. Introduction

May the balance between supply and demand affect stock prices? While the answer is negative in rational valuation models, the question has been long studied in the financial literature, originally by Scholes (1972) and Mikkelson and Partch (1985) in the analysis of secondary equity distributions and then looking at modifications in the composition of well known indices like the S&P500. 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 the inclusion. The observation of a change in the price of a stock added to or deleted from an index is not per se evidence of a downward sloping demand curve. Other factors may be at work, like new information about fundamentals and liquidity. 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. Brav and Gompers (2003) exploit a situation more directly connected with changes in supply and analyze the response of stock prices to lockup expirations. They find an average 2% decrease which is consistent with downward sloping demand curves and rational investors if there is costly arbitrage and/or unexpectedly large insider sales.

We use the 2005-2006 reform of the Chinese stock market as a laboratory to bring new empirical evidence to the debate about the relevance of supply effects in determining stock prices. The reform, aimed at eliminating nontradeable shares (NTS), implies an increase in the float of most stocks. Before its implementation, the reform had been long discussed in China precisely because of the fear that the large increase in the float could have had a negative impact on stock prices. The domestic Chinese market is largely a closed market, where most of the shares are held by Chinese retail investors. The reform increasing the supply of shares is therefore an important chance to study the relation between price and quantity in a closed system. The reform, to be described later, achieves elimination of NTS through a process by which holders of NTS shares pay compensation to holders of tradeable shares (TS). 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). Compensation is generally paid by assigning new shares to shareholders, which amounts to an immediate positive shock to the amount of circulating shares. There is therefore an interesting possibility to directly evaluate the relation between prices and quantities.

In order to understand how to use the reform experiment in order to shed light on the relevance of supply, it is necessary to know the details of the process. Each company joining the reform process must follow a strictly determined schedule, including both an initial announcement of the compensation paid to shareholders[3] (with the associated trading suspension) and a second suspension from trading associated with the process of shareholders approval. At the end of the process, trading is resumed and compensation, usually in the form of new shares, is paid. Investors can therefore incorporate into prices the information about the details of the reform a few days before the supply shock actually takes place. Moreover, in determining the price, they must also take into account that, at the end of the lock-up period, all the shares will be tradeable and will need a positive demand in equilibrium.

The reform involves therefore an initial announcement about the details of a future supply shock for a specific company and a second time period in which the supply shock actually takes place. In an efficient market where supply is irrelevant to equilibrium prices, investors will react to the first announcement only if this is associated with a change in fundamentals. Price will not move if expectations about fundamentals do not change. The reform then implies a second trading suspension and readmission where supply increases. No change in fundamentals is associated with this part of the reform that takes place few days after the initial announcement. In an efficient market, prices should not change.

We are going to compare the null hypothesis of market efficiency with an alternative hypothesis featuring supply effects and speculative bubbles. This alternative hypothesis has been recently studied by Hong, Scheinkman and Xiong (2006), from now on HSX, who present a theoretical model assuming limited risk absorption on the part of the market. They show that under certain conditions, among which heterogeneous beliefs, overconfidence and short-sale constraints, prices may systematically exceed fundamental values. Contrary to the standard efficient markets theory, the model predicts a drop in prices following an increase in the float, even when such an increase has been expected.

We analyze all the companies which joined the reform from the beginning of the process, April 2005, until the end of September 2006. These companies represent about 90% of the Chinese stock market. We carry out an event study and measure the abnormal performance of each share with respect to an appropriate market index. In evaluating the price reaction, we correct the observed price change to account for the compensation. We next study cumulative and average abnormal (compensation- and risk corrected-) returns, introducing a block-bootstrap resampling that is especially suited to do statistical inference for our sample of observations, characterized by events overlapping across firms. We estimate a number of stock pricing models for the Chinese market to assess the robustness of our results. We also study volume and volatility, which, in the model of

[3] The first suspension period, as we will document later, is the crucial one from the point of view of the release of the information.

HSX (2006), are linked with speculative activity. We finally carry out a cross sectional analysis connecting price changes, volume, volatility and other relevant variables.

Our main findings are as follows. Risk-corrected (with a variety of factor pricing models) stock prices increase substantially (and significantly) in all the event periods considered, except for the period following the second readmission where the price increase is positive but small. The results are robust across factor pricing models. Volume increases substantially in all the event periods, with a particularly strong rise after the end of the overall reform. Idiosyncratic volatility also goes up even though statistical significance is weak. Cross-sectionally, prices react to the surprise in the compensation assigned to the holders of the TS and to volume and volatility. Most importantly, the increase in asset float taking place after the second readmission is cross-sectionally associated with a decrease in prices. Evaluated at its average level, and keeping other variables constant, the increase in supply has decreased prices by almost 7%. These results are not compatible with standard efficient markets theory because the increase in supply was announced several days before its implementation. However our empirical results are compatible with the theory of HSX (2006).

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, with particular reference to the structure of the event study, the test statistics and the bootstrap procedure. Section 5 describes the empirical results, among which the estimation of various multifactor models for the Chinese stock market, the event study and the cross sectional analysis. Section 6 concludes.

2. The Chinese stock market

2.1 Institutional setting

Chinese firms typically have multiple classes of shares. One possibility is to distinguish shares according to geographical locations: shares which can be traded by domestic investors (A-shares), shares denominated in foreign currencies and reserved to foreign investors[4] (B-shares) and shares of companies listed or cross-listed overseas (H-shares, for those listed in Honk Kong). It is worth noticing the residual role played by B-shares, whose market capitalization was about 3% of the capitalization of A-shares at the beginning of 2005.

[4] Since February 2001 domestic residents are allowed to purchase B shares but subject to restrictions.

A second possibility is to distinguish shares according to the trading status, given that some shares are nontradeable. NTS can be either State shares or restricted institutional shares and can only be sold privately. NTS have been issued to the founders of a corporation. Green and Black (2003) suggest that restricted institutional shares and State shares were issued in the early 1990s in order "to limit the ability of restructuring state-owned enterprises to sell their shares to private investors". To prevent a wild privatization process, the State Council decided that state-owned enterprises should issue balanced amounts of restricted institutional shares, State shares and individual 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 such NTS has indeed 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 with respect to their tradeable A-share counterpart. More precisely, they find an average discount of 79% (86%) with respect to their floating counterpart when sale takes place through auctions (private transfers). Interestingly, 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.

These studies suggest that NTS are an active source of change in the Chinese stock market, even though individual retail investors are excluded from their trading. However transfer of control has been implemented by means of NTS, at much lower prices than the ones prevailing among retail investors. Such a large difference raises issues about the correct valuation of stocks. 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 the price of each stock. Moreover, A shares had an average turnover of 500% against a value of 100% for B shares. The authors show that turnover and 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 to 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 therefore seems at first glance a deserved correction for overvaluation of market prices due to irrationally exuberant domestic retail investors.[5]

2.2 The 2005-2006 reform

On April 29, 2005 the China Securities Regulatory Commission (CSRC) announced a pilot program to transform NTS into TS, to be implemented through various batches of companies undergoing reform. This first batch included four companies. On June 2005, the CSRC initiated the second round of the program involving 42 companies, accounting for 10% of overall stock market value. On August 19, this second round was accomplished. On August 24, 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. 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)[6] since October 2005 At the end of September 2006, 1,005 listed companies had either completed or initiated their NTS reform process.

For each company, the stock reform includes a preliminary phase and two suspension periods. In the preliminary phase, the holders of NTS discuss the compensation proposal to be submitted to the holders of TS. Once the company has established a time frame for the reform process with the support of the stock exchange, it publishes a notice to provide full details of the proposal to the shareholders. From that date, that we will call time 0, trading of company's shares is suspended for the first time.

Within ten days after the notice, the company assists NTS holders in the negotiation and communication with the holders of TS, organizing roadshows, investor symposiums, etc. If, during this period, no corrections are made to the proposal, the company makes a public announcement and the shares resume trading (time 1). If instead revisions to the proposal are requested by holders

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[5] Consistently with the results showing valuation inefficiency, Allen, Qian and Qian (2005) suggest that the resource allocation role of the stock market has been both limited and ineffective.

[6] In order to provide further incentives for the companies joining the reform, the CSRC encouraged all mainland-listed companies to turn NTS into TS and stated that reform-compliant companies would be given priority to raise new capital (new issues of shares and IPOs have 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.

of TS, the shares only resume trading after such revisions have been accepted and publicly announced. Once the shares resume trading, no further revisions can be made to the proposal to be submitted for shareholder approval. After this first suspension period, the shares are then suspended for a second time (time 2) after the closing date of registration for participation in shareholders' meeting (the record date for registered shareholders). Trading is resumed again after the meeting that ratifies the completion of the reform process (time 3).

Even when compensation is paid under the form of new shares, the float remains unchanged until the second readmission. Only on the day of the second readmission the float changes 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 the various lockup periods (usually extending for one or two years) proposed by nontradeable shareholders as a part of the compensation, see Jingu (2006).

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 upon the day of the first readmission and a downward jump upon the second readmission. Formal econometric analysis will show that this pattern is indeed the most frequent across all the companies joining the reform.

3. Theoretical effects

Under the efficient markets hypothesis the price of a stock is the present discounted value of expected fundamentals. In an efficient market therefore the reform could affect market valuations only through an impact on the expectations of fundamentals. The effects should take place when new information arrives to investors.

The reform process may affect fundamentals from three points of view. First, by improving corporate governance and the ownership structure, it might lead to better control on the management and more efficient decisions, improving profitability and dividends and also decreasing risks. This would lead to an increase in the price of the stocks going through the reform.

Second, any possible impact on liquidity should also have an effect on expected returns and therefore on the price. The reform increases the float and that is likely to be positive for liquidity. On the basis of the results obtained by MSX (2005) on turnover, it is presumable that Chinese retail investors will actively trade the new shares. Increased trading is associated with better liquidity, which in turn positively affects prices. Liquidity may be associated with lower expected returns even in the presence of irrational investors, which seems to be particularly relevant in the Chinese case given the evidence presented by MSX (2005). Baker and Stein (2004) claim that high liquidity, both at the single stock and at the market level, may be an indicator of overvaluation in the presence of a class of irrational investors and short sale constraints. Smart investors can therefore time the market and use high liquidity as a predictor of low future returns. Increased liquidity may also facilitate price discovery and improve market efficiency, as shown by Chordia, Roll and Subrahmanyam (2005). Increased market efficiency may reassure sophisticated institutional investors and provide an offset to the increased supply.

Third, the resolution of uncertainty about the reform might also be a positive element for the price if there is uncertainty aversion, see e.g. Barberis and Thaler (2003). The previous (failed) attempts[7] to solve the NTS problem might have induced investors to believe that sooner or later nontradeable shares would have been transformed into tradeable shares, inducing expectations of a future potential supply overhang. Resolution of uncertainty, ceteris paribus, should decrease the risk premium and be positive for the price.

It follows that, other things equal, the reform should have a positive impact on the price of stocks, due to expectations of increased future dividends and reduction in expected returns. However, other things are *not* equal in this reform process. In particular, the value of shares which are originally nontradeable must increase on the news that in a near future such shares will become tradeable. If the market value of the company and the supply of the two types of shares do not change, then there must be a simultaneous decrease in the price of currently tradeable shares. The changes in the prices of both NTS and TS of course also incorporate the value of the compensation paid by one class of shareholders and received by the other class, which becomes known at time 1.

Another relevant element is associated with the increase in the float of TS. There is an increase in the float at time 3, but its size is generally small compared to the increase that will take place when the holders of NTS will be able, at expiration of the lockup, to sell their shares. We have already noticed that on average two thirds of the shares were nontradeable before the beginning of the reform process. The actual increase in supply taking place at time 3 is therefore limited to the issues of new shares and to the compensations paid under the form of transfer of NTS. Table 1 shows that tradeable shares were on average equal to 38.68% of the overall shares before the reform. The percentage rises to 49.57% after the reform. This increase is certainly relevant but lower than the total supply of shares which might take place in the future when NTS become fully tradeable. This moment is pushed further into the future due to some lockup provisions that have been imposed to

[7] In the period following September 1999, the time of the first attempt to tackle the NTS issue, the market fell about 20%. In the period following June 2001, the time of the second attempt to tackle the NTS issue, the market again fell about 20%.

holders of NTS in order to limit the negative short run impact of the supply increase.[8] These limitations are aimed at controlling expectations on the part of investors, a very relevant element in light of the model of HSX (2006).

What are the price effects of such current and future increases in the float? HSX (2006) present a theoretical model assuming limited risk absorption on the part of the market. The model includes agents with heterogeneous beliefs, overconfidence and short-sale constraints, a situation which results in prices of stocks exceeding fundamental values due to the presence of an optimism effect (only overoptimistic investors hold stocks while others cannot short them) and of the resale option effect (the possibility to sell stocks to future overoptimistic investors). The model predicts that an increase in the float has a negative effect on prices, even when it is anticipated. The float increase requires an immediate greater heterogeneity in opinions in order to sustain a certain level of prices, but also a future greater heterogeneity. The latter makes the resale option immediately less valuable. However the presence of inside investors, currently constrained by a lockup period, has a positive effect on current prices, again due to overconfidence.

As to the timing of the price effects, investors have started to form expectations about the details of the various compensation proposals well before the announcements on the part of each firm. Theoretically, all investors should have reassessed equilibrium prices on the day, long preceding day 0 and common to all firms, when the extension of the reform process to all of the stock market became publicly known. That day may be presumably set at the end of August 2005. Changes in prices due to fundamentals should therefore be concentrated before time 0. This is an advantage for the empirical design of our study because it does not force us to study the impact of fundamentals when studying the reaction of the prices to the reform process.

Having already adjusted to news about fundamentals, prices should therefore react only to unanticipated news about the compensation at time 1, when the negotiations between holders of NTS and holders of TS are over and information is released to the market.

Various factors might impact the price on the day of the second readmission, time 3. A minor reaction could take place in response to the formal approval by the shareholders, eliminating all remaining uncertainty. In practice the process is designed in such a way as to make the formal approval an act devoid of any practical importance, as shown by the history of the process, where virtually all of the proposals have been accepted by the shareholders. More importantly, the date of second readmission is the time when compensation is assigned to the shareholders and the float

[8] There is a 12 month lockup period to holders of NTS, see Wan, Yuan and Ha (2005). 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 is further prohibited from trading on the stock exchange more than 5% (10%) of the company's total share capital within 12 (24) months. Finally, the company and the controlling shareholder are entitled to stabilize the market price of the shares for example through buy-backs.

shock may take place. Prices will therefore certainly react to the payment of the compensation, similarly to what happens in the case of dividends and stock splits. Any reaction of the price due to float modifications should also be visible on the date of the second readmissions.

4. Methodological issues

We discuss some important methodological issues, starting with the correction of prices upon the second readmission. The day of the second readmission is the time when the compensation is paid, so that prices drop because they go ex-compensation. It is therefore necessary to analyze compensation-corrected prices. In what follows we describe the way we perform the correction to account for compensation. We also describe the estimation of the residuals for the event study and the methodology that we use to perform the statistical inference.

4.1 The compensation-corrected price

On the day of payment of the compensation the price moves simply because each stock goes ex-compensation, similarly to what happens in the case of a dividend or a split, even regardless of any supply or fundamental effect. We therefore need to compute a compensation-corrected price.

Compensation can be realized through various channels. The more standard case is the one in which holders of NTS offer holders of TS a certain number of shares (SH) and/or a certain amount of Yuan (CASH) every 10 shares. The stock price should react in such a way that the total wealth of the tradeable shareholders does not change when the compensation is paid[9]. Formally:

$$p_0 QTS = p_1 \left[QTS + \frac{QTS}{10} SH \right] + \frac{QTS}{10} CASH ;$$

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. Rearranging we get:

$$Jump = -Cash\_Comp - Sh\_Comp ;$$

where $Jump \equiv \frac{p_1 - p_0}{p_0}$, $Sh\_Comp \equiv \frac{SH}{10 + SH}$ and $Cash\_Comp \equiv \frac{CASH}{p_0 (10 + SH)}$.

[9] Of course this does not imply no change in wealth for the two categories of shareholders as a consequence of the reform process. The total wealth redistribution may result from the payment of the compensation *and* from the change in stock prices. But redistribution of wealth across the two categories is incorporated by prices after the announcement, which takes place several days before the moment of the second readmission. Here we simply assume that, given the available information set, total wealth of holders of TS should not change overnight as a reaction to payment of the compensation.

The compensation can take place by warrants assignment as well. Galai and Meir (1978) modify the Black-Scholes call option model taking into account the fact that if a warrant is exercised it increases the number of outstanding shares of the firm and thus dilutes the equity of its shareholders. We valuate the warrant according to their specification. Warrant prices *W* are given by:

$$W = \left(\frac{N}{N/\gamma + M} \right) \left[\left(S - \sum_i e^{-rt_i} + \frac{M}{N} W \right) N(d_1) - e^{-rT} x N(d_c) \right];$$

where

$$d_1 = \frac{\ln\left(\frac{S - \sum_i e^{-rt_i} D_i + (M/N)W}{x} \right) + rT}{\sigma\sqrt{T}} + \frac{\sigma\sqrt{T}}{2};$$

$$d_2 = d_1 - \sigma\sqrt{T};$$

and where *S* is the stock price, *X* is the exercise price, *N* is the number of outstanding shares of stock, *M* is the number of warrants, γ is the number of shares that can be purchased with each warrant, *r* is the risk free interest rate[10], *T* is the time until expiration, σ is the standard deviation of the return of *S+(M/n)W* per unit time[11], *N(d)* is the cumulative normal distribution function evaluated at *d*, t_i is the time until the *i*th dividend is paid and D_i is the *i*th dividend.

The value of the warrant is next multiplied by the number of options (N_W) that holders of NTS give to holders of TS every 10 shares, $War\_Comp \equiv (N_W \times W)/10$[12].

4.2 The event study

The event study uses information about 1,005 companies undergoing the reform process between April 2005 and September 2006. We isolate four event windows over the event period for each stock, associated with the two dates of suspension and readmission of their shares to trading:

1. *run-up window* (window 1) runs from ten days before the first suspension and the suspension itself;
2. *release and post-release window* (window 2) runs from the first readmission date to ten days after the readmission. This includes the percentage change between the opening price upon readmission and the closing price of the suspension day, the percentage change between the

[10] The interest rate used is the time deposit one. We took the middle rate at the specific time horizon:1 year, 15 months, 18 months or 2 years.
[11] We choose a time horizon of 12 weeks.
[12] In our analysis we observe the warrant assignment in the compensation plan of 16 companies.

closing price and the opening price on the readmission date and the percentage changes for the remaining 8 days;

3. *pre-supply shock window* (window 3) runs from ten days before the second suspension to the suspension day;
4. *supply shock and post-supply shock window* (window 4) runs from the second readmission date to ten days after such date. This includes the percentage change between the opening price upon readmission and the closing price of the suspension day, the percentage change between the closing price and the opening price on the readmission date and the percentage changes for the remaining 8 days.

The event study uses the residuals from a pricing model. We experiment with several pricing models, described below. Each pricing model is estimated with data preceding the beginning of the reform process. For company *i* involved in the reform process we estimate a multifactor model $r_{it} = \alpha_i + \sum_{k=1}^{K} \beta_{ik} r_{kt} + \varepsilon_{it}$ using observations between *t-120* and *t-10*, where *t* is the day of the first suspension for stock *i* and r_{kt} is the return of the *k-th* factor-replicating portfolio. Define with a_i, b_{ik} the estimated parameters. Such parameters are used to compute the abnormal returns over the event windows $ar_{it} = r_{it} - a_i - \sum_{k=1}^{K} b_{ik} r_{kt}$. The abnormal returns are then summed to form cumulative abnormal returns (CAR) defined as:

$$CAR_{i0} = ar_{i0}$$
$$CAR_{it} = CAR_{it-1} + ar_{it}, t = 1,2...T$$

where *T* is the length of the event window. Cumulative abnormal returns are then averaged across companies to obtain the mean cumulative abnormal residuals (*MCAR*): $MCAR_T = N^{-1} \sum_{i=1}^{N_t} CAR_{iT}$.

For the two event windows 2 and 3 (defined above), the number of firms with active available residuals depends on the horizon analyzed within the window. In several cases the time length between the first readmission and the second suspension is shorter than 10 days. Consider for example a firm, say firm A, for which the second suspension takes place six days after the first readmission. In the case of firm A it is possible to compute six residuals which can be attributed both to the period following the first readmission and the period preceding the second suspension. In analyzing any horizon between 1 and 6, firm A therefore actively contributes to the overall results. However for horizons larger than or equal to 7 there are no residuals for this firm.

We follow Lynch and Mendenhall (1997) and use the same total number of firms for all the horizons within a given window, simply summing all the available residuals for each date. In such a case, computation of the *MCAR* may give results which differ from those obtained by the computation of the mean average abnormal residuals (*MAAR*) defined as the mean across all firms of the average residuals, $MAAR_T = N^{-1}\sum_{i=1}^{N_t}(CAR_{iT} / T)$. Lynch and Mendenhall (1997) point out that in this case *MCAR* assigns the same weight to each residual while *MAAR* assigns more weight to residuals of firms with a shorter window.

4.3 The bootstrap and the variance estimators

In order to test for the existence of non-negative abnormal returns we need to estimate the variance of *MCAR* and *MAAR*. Such a variance is measured 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:

$$Var(MCAR_{it}) = N^{-2}\sum_{i=1}^{N_t} V_i \ .$$

V_i is the variance of the *i*-th company, computed as:

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

X_i is the matrix of regressors used in the estimation period, X_i^* is the matrix of the same variables over 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:

$$J_t = \frac{MCAR_{it}}{\sqrt{Var(MCAR_{it})}}$$

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 which are divided in batches of companies going through the reform process over similar time frames. The variance estimator that has been described computes the total variance as the sum of the variances, ignoring covariance terms. Positive covariances across firms would therefore imply an underestimation of the total variance that is obtained with this variance estimator. 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.

The third estimator is obtained by a bootstrap analysis organized along the following lines. For all the companies involved in the reform process we estimate a multifactor model over the same estimation period (bootstrap estimation period). The bootstrap estimation period is therefore different from the estimation period used for the event study, as the latter is company-specific and includes observations between *t-120* and *t-10*, where *t* is the day of the first suspension. The bootstrap estimation period includes 110 observations prior to March 2, 2004. Estimation of the multifactor model over the same period allows us to retrieve a matrix of residuals respecting the cross sectional covariance properties in calendar time. Define with $a_i^{(b)}, b_{ik}^{(b)}$ for $k=1,2\ldots K$ the estimated parameters of the multifactor model. Such parameters are used to estimate abnormal returns over the bootstrap estimation window $ar_{it} = r_{it} - a_i^{(b)} - \sum_{k=1}^{K} b_{ik}^{(b)} r_{kt}$ .We then resample these abnormal returns in such a way to respect the correlation properties.

In order to describe our bootstrap consider the simplified case of three firms, going through the reform process at different points in time of the year 2006. Suppose that firm A carries out the reform process between January 10 and January 20; firm B does the same between January 15 and January 25 and firm C reforms between March 5 and March 15. Firms A and B have a five day overlap. In order to carry out the bootstrap, we use the residuals of the bootstrap estimation periods to simulate what would happen under the null hypothesis of no abnormal behavior. We extract a (randomly selected) series of 10 consecutive observations from the estimated residuals of stock A over the bootstrap estimation period. We do that by randomly selecting a number between 1 and 90, say number *k*, from a uniform distribution and by considering the sequence of 10 residuals for firm A between *k* and *k+10*, selected from the bootstrap estimation period. In order to respect the (potential) cross sectional dependence we consider a sequence of 5 residuals for firm B between *k+5* and *k+15*, again from the bootstrap estimation period. In such a way there is an overlap of 5 days in the bootstrapped residuals, corresponding to the overlap that takes place among the event windows. As to firm C, we consider 10 residuals from the bootstrap estimation period between *j* and *j+10*, where *j* is another number randomly extracted from a uniform distribution between 1 and 90. In the case of firm C 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 apply the statistical tests to the simulated sample and retrieve the results. We repeat the procedure 1,000 times, to have 1,000 artificial samples of abnormal residuals from which we can compute an empirical distribution of the statistical tests. The comparison between the empirical distribution and the actual value of the tests may now be 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 distribution is empirically highly non-normal.

5 Empirical results

5.1 Data and summary statistics

We collect data for all the 1,440 listed companies in Shanghai and Shenzhen Stock Exchanges. For each company we have daily data about market value, price to book, opening and closing price, turnover by volume. We use as market indices both the Shanghai and the Shenzhen Stock Exchange Composite Index. Both indices are weighted by float and not simply by capitalization. This is important in view of the large difference between float and capitalization associated with the existence of TS and NTS. Each index is used as a market benchmark for each stock traded in the same market. We choose as interest rate the middle rate of the three-month time deposit rate.
Nomura Institute of Capital Market Research[13] provided us with the relevant dates of each company entering the reform process between April 2005 and January 2006. For the period between January 2006 and end of August 2006 we retrieved the dates of trading suspension from an analysis of prices and volumes for each company. Overall there are 1,157 companies starting the reform process between April 2005 and August 2006. 1,060 companies finished the reform process by the end of September 2006. For 1,005 of them we were able to find all the necessary data, including those of the compensation plan, representing 95% of the 1,060 companies which completed the reform process by the end of September of 2006.
Nomura Institute of Capital Market Research also provided us the compensation plan of each company. Compensation to holders of originally tradeable shares can be realized through various channels: (a) new shares can be offered directly by nontradeable shareholders (b) new shares may be offered by the company to both tradeable and nontradeable shareholders (c) new shares may be offered by company to tradeable shareholders only (d) holders of nontradeable shares may cancel part of their shares. Moreover holders of original tradeable shares may be offered compensation in cash or a certain assignment of warrants. Offers are usually expressed as a percentage of 10 tradeable shares originally held. Table 2 reports the relevance of the various channels, showing that in some cases more than one channel is used at the same time. However, the typical case (76% of the cases) involves a direct transfer of currently nontradeable shares to the holders of tradeable

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

shares. The second most popular method (9%) involves new issues that are assigned only to holders of tradeable shares.

Table 3 reports some summary statistics. Column two reports the number of companies included in every batch, also described in Figure 1. Usually batches include a substantial number of companies, between 15 and 49, except for the first experimental batch, which only included 3 companies, and the last batches, when most of the process is completed. This means that the market can derive relevant information from the outcome of the reform process of each batch and use that information to form expectations about the outcome of the following batches. We will use this insight when we try to understand the price reaction to the various announcements. The third and the fourth columns provide information about the trading location of each company. On average there is a prevalence of the Shanghai market even though some batches (see for example the second and the third) include mainly companies from the Shenzhen market. In our empirical analysis we will control for this difference by considering an appropriate market benchmark for each company.

The columns between the fifth and the seventh provide information about the length of the suspension periods. On average the length of the first suspension period is 11 days and that of the second suspension period is 19 days. The second suspension lasts longer because of the various procedures which need to be put in place to inform all the shareholders before the formal vote. The average distance between the day of the first suspension period and the beginning of the second suspension is 7 trading days.

The eight column reports the percentage of outstanding NTS for each company before the start of the reform process. The grand average is 60% and there is little difference across companies. The ninth column reports the number of shares paid on average to a shareholder holding 10 TS. The grand average is close to 3 with a rather small standard deviation (across companies) of 0.5. The tenth column reports the average (over the three months preceding the start of the reform process) price-to-book value of the companies in the various batches, which is rather stable across batches and averages 1.9. The last column reports the size (as measured by the average market value measured over the three months preceding the start of the reform process for each company) of the companies and shows a downward trend from larger to smaller companies.

5.2 Estimating multifactor models for the Chinese stock market

We experiment with several risk pricing models for the Chinese stock market in view of their relevance in the determination of abnormal returns. We consider a simple market model, a three factor model of the Fama-French type including the market, a size portfolio and a value portfolio, an extended Fama-French model also allowing for a volume-risk replicating portfolio and finally an extended Fama-French model also allowing for a liquidity-risk replicating portfolio. The size (SMB), value (HML), volume (HVMLV) and liquidity (HLMLL) portfolios have been built following the methodology described by Fama and French (1996). The extension of the Fama-French model to include a liquidity factor seems to be particularly relevant in the Chinese case. A vast literature has documented the relation between liquidity and expected returns. Pastor and Stambaugh (2003) show that liquidity risk is priced in the cross section of United States stocks.

We test the validity of the various pricing models over the period 1/1/1998-1/4/2005, a total of 1,762 days (holidays are excluded). Our starting sample includes almost half of the total number of companies quoted in Shanghai and Shenzhen. Once a new company is listed on the market, it is added to the sample. At the end of the period there are 1,329 quoted companies.

We do not start the analysis before 1998 to account for structural breaks in the market. Importantly, the CSRC (China Security Regulatory Commission) was excluded from the issuance process until the mid-1990s because the government controlled the amount of the annual equity issuance and the initial public offerings process. In that period, a large number of listed companies did not even meet the formal listed requirements. We end the analysis of the pricing models on April 2005, before the start of the NTS reform process. We replicate our tests over 3 sub-periods (1998-2000, 2001–2002, 2003-2005) to take into account some modifications that have been made to the listing system, see Green (2004). During the period 1998-2000 the majority of the listed companies went through the old planning system which was strongly influenced by the local government. Only during 2001-2002 there was considerable evidence that new policy priorities were leading to changes in the stock market[14], even though the screening procedures of listing committees still were a black box. The screening system of the government agency for listing equities has become much clearer since December 2003 and a sponsoring system was introduced in February 2004.

To form the risk replicating portfolios, 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 price-to-book (PB) groups (low, medium, or high: L, M, H) based on the bottom 30 percent, middle 40 percent and top 30 percent of the book-to-price value. Similar groups are created for volumes (VO, the number of shares traded for a stock on a particular day) to create low, medium and high volume portfolios (LVOL, MVOL, HVOL) and for liquidity

[14] Among which the failure of industrial policy, the government's growing financial liabilities, the creation of an asset management industry for the national pension system

(LIQ, the Pastor and Stambaugh (2003) indicator[15]) to obtain low, medium and high liquidity (LLIQ, MLIQ, HLIQ). Value-weighted portfolio returns are then computed for each portfolio.

SMB is the difference between the average returns of the three small-stock portfolios (S/L,S/M, and S/H) and the average returns of the three big-stock portfolios (B/L, B/M, and B/H). HML is the difference between the average returns of the two low-PB portfolios (S/H and B/H) and the average returns of the two high-PB. We similarly computed HVOLMLVOL and HLIQMLLIQ.[16]

Table 3 reports summary statistics about the factors. Panel I shows that the two market indices have an almost perfect correlation. In what follows we will therefore use the Shanghai index as the market return. The other factors have a fairly low correlation among themselves. The price range-replicating portfolio is the one characterized by the largest correlation with the market (30%). It also has a high correlation with the idiosyncratic volatility and the volume portfolios. The liquidity portfolio has a very correlation with the other portfolios. Panel II reports summary statistics for the whole sample, while Panel III-V explores various sub-samples. The Panels illustrate the difference among sub-periods. In particular, the market return was positive and large between 1998 and 2000, strongly negative in 2000-2001 and then mildly negative in 2003-2005. From the difference between the maximum and the minimum observation one can notice that there was also a modest stabilization of market returns. The volatility of most risk replicating portfolios also decreased over time.

The factor returns are unstable across time. The size portfolio is very brilliant in the first sub-period, stable in the second and negative in the third. The value portfolio is always positive but noticeably so especially in the third period. The volume and price range portfolios behave similarly. This could be compatible with the existence of a fixed risk premium or with a time-varying risk premium. We do not have enough observations to test those alternative hypotheses. We do not formally tests for the existence of structural breaks even though the data suggest the possibility that the Chinese markets may have gone through various stages in the different sub-samples. The liquidity portfolio

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[15] 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. Most of the estimated coefficients are negative and the average value is -0.09, coherently with the intuitive meaning of the measure which associates liquidity with stock reversals. We then exploit the company-specific liquidity measures to form the portfolios in the manner described above.

[16] The analyses were carried out both under the assumption of global Chinese markets (i.e. considering both Shanghai Shenzhen as a unique market) and under the assumption of complete segmentation, without any noticeable difference in results.

is stable. Its negative sign is compatible with the existence of a liquidity premium because it is long stocks with high liquidity and short stocks with low liquidity.

To compare the performance of the various models, we consider their ability to price the returns of 91 sectors in the Chinese market. Table 5 contains a list of the sectors as well as the results of regressions of each sector on risk factors included in what will the final specification of our study. This specification includes the market return, the market return lagged once to allow for nonsynchronous trading[17], the SMB, HML, HLIQMLLIQ portfolios. The average coefficient of determination is equal to 64%, lower than similar analyses carried out in the US and European stock markets but showing that the model can explain a substantial portion of the variability of the sectors. The alphas are usually close to zero. The sectors are very sensitive to the market but also responding to the other three factors.

In order to formally test the asset pricing model we use a time series methodology and run an OLS regression of each sector return on the returns of the risk replicating portfolios. We then consider the constants of the various equations and use two statistical tests described by Cochrane (2006). The first is the classical Gibbons, Ross and Shanken (1989) statistic (GRS statistic) $\frac{T-N-K}{N}\left[1+\bar{f}'\Omega^{-1}\bar{f}\right]^{-1}\alpha'\Sigma^{-1}\alpha$. T is the number of observations, N is the number of test assets, K is the number of factors, $\bar{f}$ is the *(K,1)* vector of sample means of the factors, Ω is the variance covariance matrix of the factors, α is the *(N,1)* vector of estimated constants from the OLS time-series regressions, Σ is the residual variance-covariance matrix i.e. the sample estimate of $E\varepsilon_t\varepsilon_t^{'}=\Sigma$. The GRS statistic is characterized by a $F_{N,T-N-K}$ distribution. This statistic assumes that errors are normally distributed, i.i.d. and homoskedastic.

It is possible to avoid the normality assumption and to allow for more general errors (correlated over time and heteroskedastic) by adopting the following test $\alpha'\operatorname{var}(\alpha)^{-1}\alpha$, which is distributed χ^2_N where $\operatorname{var}(\alpha)$ is the upper-left corner of $\operatorname{var}(\begin{bmatrix}\alpha\\ \beta\end{bmatrix})=T^{-1}d^{-1}Sd^{-1'}$ where $d=-\begin{bmatrix}1 & \bar{f}'\\ \bar{f} & Eff'\end{bmatrix}\otimes I_N$ and S is the long run covariance matrix corrected to take into account of heteroskedasticity and autocorrelation (see Cochrane (2006) page 234). We will refer to this test as chi-square test.

The presence of a large number of sectors (91) and short time periods is a problem for the statistical tests. Cochrane (2006) points out that estimates of the spectral density matrix S tend to become unstable and near singular when the number of moments is more than about 10% the number of

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17 See Scholes and Williams (1977) and Asness, Krail and Liew (2001) for a recent application to hedge funds.

data points. We therefore randomly select 45 sectors out of 91 and compute the p-values of the chi-square and GRS statistics. We repeat the exercise 1,000 times. Table 6 contains summary statistics about the empirical distribution of the p-values. The results are generally encouraging. Both the market model and the factor model with the Fama-French as well as liquidity factors[18] are generally not rejected, event though the multifactor model performs better particularly in the most recent subsample, where the median p-value of the market model is only equal to 2%. This sub-sample is particularly important because it is the one closest to the sample period considered in our event study. The liquidity model is in our opinion the most suitable candidate for determining abnormal returns in our event study.

5.3 Price reactions

Tables 7A and 7B and figure 4 report results of the CAR analysis for the 1,005 companies included in our sample. We computed residuals from the market model, the three-factor Fama-French model, a four-factor model including the three Fama-French factors plus alternatively a volume-replicating portfolio, an idiosyncratic volatility-replicating portfolio, a price range-replicating portfolio and the Pastor-Stambaugh liquidity-replicating portfolio. The results are robust in that all the multifactor models provide qualitatively similar outcomes. In view of the results presented in the previous section, we only present results for the market model and the four-factor liquidity model.

All the models give coherent estimates of the abnormal returns before the first suspension, showing that there is an abnormal increase in the price which amounts to about 2.6%-2.7% in the ten days before the suspension. Only the last two-three days record some significant abnormal returns. This result may be explained by the possibility of information leakage about the identities of the companies joining the various batches.

Upon readmission there is a further increase in the price equal to 1.7%[19] when the market model is considered, which reduces to 1.6% when the multifactor liquidity model is considered. This is of course an average number, as only 67% of the companies show an increase in the price. We expect heterogeneous reactions to the compensation announcements on the part of the various companies, which may be explained on the basis of the surprise component implicit in each announcement. In what follows we will explore the cross-sectional link between price reactions and compensation announcements, trying to estimate the surprise component.

[18] Results for the other mutifactor models are not reported but are available upon request.

[19] Of curse this refers to the difference between the closing price of the last trading day and the opening price of the readmission day. We have also investigated the percentage change between the previous close and the close of the readmission day but the results are robust.

After the initial jump upon readmission, the price keeps growing in the subsequent ten trading days, to reach a cumulative increase of 3.7%. The results are strongly significant regardless of the variance estimates used in the tests. When the interval between the first readmission and the second suspension is viewed from the point of view of the second suspension, i.e. we count ten days going backward from the date of the second suspension rather going forward from the date of the first readmission, we find a build up in price which is larger than 5%. This result is not independent of the one obtained for the period after the first readmission, as many companies have a horizon equal to or smaller than 10 days between the two suspension periods and therefore fall in both empirical analyses. These results are a sign of strong inefficiency if they are interpreted as a delayed reaction to the details of the reform announced before the first readmission. We will return to the interpretation of these results after presenting empirical results about volume and idiosyncratic volatility and their relation with the abnormal returns.

Finally upon the day of the second readmission there is a further increase of 1.2% (multifactor model) which reduces to 0.76% over the horizon. Notice that here we refer to the compensation-corrected prices. On the day of the second readmission the raw prices register a decrease of 17.1%. This is the only place where we register a difference between the market model and the multi-factor model. The market model estimates two statistically significant abnormal cumulative returns, for the readmission day and the day following that, whereas the multifactor model estimates t least four significant abnormal cumulative returns. The two models are however in agreement as to the sign of the abnormal residuals, which are estimated to be negative after the day of the second readmission. Figure 3 illustrates the point.

Overall, investors' reactions are hard to interpret in the period between the two suspensions. Remember that nothing relevant happens in that period. Investors might be attracted by the payment of the compensation, perhaps not realizing that the market price would fall when the payment is made. We are going to explore further this event window by looking at he cross sectional behavior of abnormal returns and at their relationship with relevant variables like volume and volatility.

5.4 Volume, idiosyncratic volatility and the cross section of abnormal returns

5.4.1 Volume and volatility

Our measure of volume is total turnover, i.e. the number of shares traded for a stock on a particular day. Figure 4 reports the daily total turnover of the Shanghai and Shenzhen stock markets between March 2004 and September 2006. The increase in total turnover after the beginning of the reform process is clearly visible from the figure. The average turnover before the reform is equal to 2,442,470.78 units, going up to 5,102,136.27 after the reform.

Table 8 reports the (simple) average turnover for the stocks participating in the reform process. The average is reported before, during and after the reform process. In each case we report both the absolute value of turnover and its share with respect to the total turnover of the market. For example, the absolute value of the turnover for the stocks joining the reform process one month before suspension (3,452 for the Shanghai market) is the simple average of the daily turnover in the four weeks preceding the start of the reform process. The number represents 0.08% of the total turnover of the market over the same period. Turnover however increases by 72% in the period after the first readmission (and before the second suspension) with respect to the level before the reform. The increase is 60% for the Shenzhen market and 68% for the markets together. Volume increases by 120% in the month after the second suspension (with respect to volume before the first suspension) for each single market.

These numbers clearly indicate the existence of a positive effect on turnover. 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-120 through day t-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 greater than the 99th percentile in each day equal to the median observation. Table 9 and Figure 5 present data and pictures. Both the table and the figures confirm the large increase in volume, which lasts over a long period of 60 days after the second readmission. Table 9 reports the abnormal volume, averaged across firms, considering the usual four event periods.

Table 9 shows that actual volume is 23% larger than normal volume ten days before the first suspension, an increase reaching 77% the day before suspension. However the table also clearly shows that the large increase in volume is unequally distributed across firms. The median is very often negative in this sub-period, even when the mean is large. For example, four days before the first suspension the mean abnormal volume is 37.96% but the median is -3.7%. This is a signal of non-normality of the empirical distribution and highlights the relevance of our bootstrap in evaluating the relevance of the statistics. The bootstrap shows that the average increase in volume is significant in most of the event period.

On the day of the first readmission volume is 169.93% higher than normal, an increase that reduces to 71.65% after 10 days. On the day of the second readmission volume is 111.25% higher than normal, an increase that reduces to 64.86% after 10 days.[20] When judged by the bootstrap, increases in volume are statistically significant, especially after the second readmission.

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 $\upsilon_{it} = \beta_0 + \beta_1 \upsilon_{mt} + \varepsilon_{it}$ [21]. The regression is estimated by means of generalized least squares[22]. The volume regressions are carried out along the same lines already described for the returns regressions, i.e. using observations between times *t-120* and *t-10*, where *t* is the day of the first suspension.

This measure is very different from the one that we have presented in table 9 because it takes into account the contemporaneous market volume. The abnormal volume discussed in table 9 is on the contrary computed on the basis of an estimate of the normal volume in the 110 days before the beginning of the reform process for each company. The large increase in market volume following the beginning of the reform process implies the possibility that the increase in the volume of the companies going through the reform may be lower than the overall increase.

Indeed, the cumulative residual analysis described in table 10 shows that companies entering the reform process have generally a positive abnormal volume with respect to the market volume. After the first readmission volume keeps increasing also relatively to the market. A very strong increase in volume takes place after the second readmission.

As to volatility, we adopt two alternative measures. The first is the standard deviation of returns; the second is 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 standard deviation which requires a time series of observations for its estimation.

On average the daily standard deviation of returns for a single stock is 3%, corresponding to an annualized value of about 50%. Figure 5 presents a graph of the price range across the usual sub-periods. The figure shows clearly the large and permanent increase in volatility associated with the reform. Table 11 documents that the empirical distribution of the range across firms is highly non-

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[20] 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.

[21] 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*.

[22] 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.

normal, with huge differences between the mean and the median of the distribution. The table also shows that the increase in volatility is in general not statistically significant.

5.4.2 The cross section of abnormal returns

Finally, we perform a cross sectional analysis that explains the abnormal returns of stocks on the basis of volume, idiosyncratic volatility as well as other interesting variables. The results are presented in table 12. The variables considered in the regression are the compensation surprise, volume, volatility, size, a batch number dummy, a measure of the current supply increase.

The compensation surprise is included on the basis of the idea that the market price should react, upon the day of the first readmission, to the new information about compensation and not to overall compensation. We estimate the compensation surprise for the *i-th* company as the difference between the actual compensation (number of shares offered to the holders of tradeable shares) and the time series average of the compensations paid by all the companies completing the reform process before company *i*.[23] We include in the cross sectional analysis only companies offering share compensation and exclude those offering compensation in the form of cash and warrants. It is difficult for us to estimate a compensation surprise for the latter companies given the small number of companies paying compensation under the forms of cash and/or warrants. This however leaves us with more than 84% of the total sample, as already shown in table 1.

Volume and volatility are included because of their importance in the theory of HSX (2006), according to which overvaluation caused by speculative behavior should also be associated with large volume and volatility. Volume is a reflection of differences of opinion across traders, induced by disagreement about the true value of the firm and idiosyncratic volatility is a proxy for objective uncertainty about value. We alternatively measure volatility in terms of historical standard deviation and in terms of price range but we report only the latter results.

The dummy is included to allow for learning on the part of investors about the details of the reform process. There was much more uncertainty when investors were trying to understand the price reaction for the early batches than what presumably happens for the later batches, where price reactions could use the experience of previous history.

Finally, an estimate of the current supply increase, the percentage increase in the number of tradeable shares, is included to evaluate the relevance of limited risk absorption and negatively sloped demand functions. The current supply should be a crucial determinant of the bubble. MSX (2005) have shown that supply is cross-sectionally negatively associated with the bubble. Here we

[23] We repeat all the estimates by measuring the surprise with respect to the average compensation paid by companies included in the previous batch, but the results are basically unchanged.

perform a different test, as our dependent variable is not the spread between the prices of A-shares and B-shares, as in MSX (2005), but the percentage change in the price of A-shares. Theoretically, such a percentage change should be negatively affected by a change in the supply that could act as bubble-bursting element. We study whether this is true, i.e. whether stocks with a higher increase in supply had, other things being equal, a larger drop (or a small increase) in prices.

We run the cross section four times, to explain the jump in prices (i) upon the first readmission, (ii) between first readmission and second suspension, (iii) upon the second readmission and (iv) after the second readmission. Therefore, differently from what we do earlier, we group together the periods after the first readmission and before the second suspension, and separately study the point jump upon the first and second readmissions. The returns on the two readmission days are alternatively measured in terms of percentage difference between the opening price of the readmission day and the last closing price before the suspension periods and in terms of the percentage difference between the closing 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.

In all cases the cross section are repeated to consider as a left-hand side variable the residuals from all the four pricing models that we use. Results are reported only for the market model and the four-factor models; the other results are available upon request. We include all the independent variables that we have described for all the sub-periods, even though we expect different subsets of them to be relevant over different sub-samples.

The first result to be noticed is that the dummy for the batch number is significantly negative for all sub-periods. Prices react more in the initial phases than at the end of the reform process. There seem to be no objective reasons associated with fundamentals that may explain such a dampening down of the reaction, except for a sort of learning phenomenon on the part of investors. One should keep in mind that the Chinese stock market (unexpectedly) performed exceptionally well during the implementation of the reform process and this may have made price discovery more difficult.

In the case of the first readmission, all variables have a significant impact. The sign of the compensation surprise is expected as a positive compensation shock induces investors to revise upward the price. Volume also has the expected sign and is strongly significant, coherently with the model of HSX (2006). Volatility has the wrong sign but it is not significant.

In the period between suspensions, volume and volatility are significant and positive, as well as the compensation surprise. It is hard to understand why the compensation surprise is still positive. In an

efficient market traders should have accounted for such a surprise in the day of the first readmission, without delayed effects. The positive impact of volume and volatility are again consistent with HSX (2006).
The jump on the day of the second readmission is negatively related to the increase in the supply of tradeable shares. Other things being equal, a 1% increase in supply produces a 0.26% decrease in the compensation-corrected prices. A 33% increase in supply, corresponding to the sample value, has therefore produced, according to the linear model and keeping other variables constant, a 7.8% decrease in prices. A smaller effect (0.2%) is also measured in the period following the second readmission. It follows that cross-sectionally there is a negative impact of supply on prices in the day of the second readmission and in the period following it. In both sub-periods there is some evidence of a positive link between volatility and prices, coherently with HSX (2006).
It is important to point out that the negative effect of the supply shock would have not been apparent from the event study results, which showed a positive, albeit small, abnormal return on the day of the second readmission. Such a positive return is not inconsistent with the results of the cross sectional analysis, which measures the marginal impact of increased supply on returns. The negatively sloped demand function may have been shifted by other variables like volume and volatility. The total positive return on the day of the second readmission may well result from a negative supply shock and stronger effects coming from other variables shifting the demand curve.
Qualitative results do not change when the returns of the four periods are redefined in order to consider the closing and not the opening price.

6. Interpretations and conclusions

To diminish segmentation in the stock market, Chinese authorities have started a reform process by which companies were assumed to transform their NTS into TS by the end of 2006. This reform process is of great importance given the relevance of NTS, which used to account for more than two thirds of the overall stock market in 2004. Elimination of NTS was expected to have deep consequences for the market as a whole. On the negative side, it was feared that the large increase in supply could have decreased prices. On the positive side, it was hoped that elimination of NTS may have a positive impact on liquidity and corporate governance.
In this paper we have studied the short run effects of the reform. We have carried out a classic event study, based on estimation of a multifactor model and statistical analyses of the out of sample residuals. Among the most relevant results are: (a) the reform has increased the turnover of the companies joining the reform process, (b) prices of stocks entering the reform process have gone up

significantly, (c) prices have gone up between the first and the second suspension of the shares, (d) prices have incurred a large drop upon readmission after the second suspension due to the payment of the compensation but have been approximately stable after correcting for compensation.
The large increase in volume that takes place after the first readmission can perhaps be interpreted as an indicator of speculation. We measure a negative effect of supply on prices, indicating a downward sloping demand curve. This is consistent with limited risk absorption capacity on the part of Chinese investors. Among the puzzles that we find are the late effects of the compensation surprise on prices. Overall, the theoretical model of HSX (2006) can explain most of our empirical findings.
From a policy point of view our results justify the precaution of the Chinese authorities with respect to the elimination of NTS. We have measured a quantitatively important negative effect of increased supply on prices, which has been more than offset in aggregate terms by the existence of other factors which have been positive for prices, among which volatility and volume. Moreover, the presence of lock-ups is likely to have been very helpful in stabilizing the market, both for its reduction in the immediate supply increase and also for its potential positive effect on demand. The model of HSX (2006) shows that the expectation of future increases in supply due to selling from insiders may be beneficial to current prices when traders are characterized by overconfidence. The ample future supply potentially coming from sale of NTS may therefore have been a positive and stabilizing force on the market.

The care and attention paid by the Chinese authorities in arranging the reform of the Chinese stock market may be hard to understand from the point of view of the traditional efficient market model, but not from the point of view of a model allowing for limited risk absorption. Moreover, the consequences of the reform may be better understood in terms of a more general model allowing for speculation induced by behavioral reasons. Such a more general model is very important in making us understand why the reform of the Chinese stock market has been a highly successful one.
To some extent the reform has been highly successful. In a classic application of the classical general equilibrium model, increased supply may have created its own increase in demand through speculation induced by a combination of short sale constraints, behavioral biases and fundamental uncertainty. It remains to be seen whether the Chinese stock market will be able to sustain the future supply increases associated with expiration of lock-ups. HSX (2006) explains why expected increases in supply may positively affect stock prices before the event and negatively affect stock prices when supply increase actually takes place.

References

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

Ajinkya, B. and P. Jain (1989), The Behavior of Daily Stock Market Volume, Journal of Accunting and Economics, 11, 331-359

Alizadeh, S., M.W. Brandt and F.X. Diebold (2002), Range-based estimation of stochastic volatility models, Journal of Finance, 57, 1047-1092

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

Allen, F., J. Qian and M. Qian (2005), China's Financial System: Past, Present and Future, mimeo

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

Asness, C., R. Krail and J. Liew (2001), Do hedge funds hedge?, Journal of Portfolio Management, 28, 6-19

Asquith, P. (1983), Merger Bids, Uncertainty and Stockholder Returns, *Journal of Financial Economics*, 11, 51-83

Baker, M.and J.C. Stein (2004), Market Liquidity as a Sentiment Indicator, *Journal of Financial Markets*, forthcoming

Barberis, N. and R. 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

Beltratti, A. and B. Bortolotti (2006), Structural Reforms in the Chinese Stock Market, mimeo

Brav, A. and J. Heaton (1999), Did ERISA's Prudent Man Rule Change the Pricing of Dividend Omitting Firms?, unpublished working paper, Duke University

Brav, A. and P.A. Gompers (2003), The Role of Lockups in Initial Public Offerings, Review of Financial Studies, 16, 1-29

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

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

Chordia, T., R. Roll and A. Subrahmanyam (2005), Liquidity and Market Efficiency, mimeo

Cochrane, J.H. (2006), Asset pricing, Princeton University Press, Princeton and Oxford

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

Eun, C.S., and W. Huang (2002), Asset Pricing in China: Is There a Logic?

Fama, E. and French, K. (1996), Multifactor Explanations of Asset Pricing Anomalies, *Journal of Finance*, Vol. 51, 1, 55-84

Gibbons, M., S.A. Ross and J. Shanken (1989), A Test of the Efficiency of a Given Portfolio, Econometrica, 57, 1121-1152

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.

Green, S. and A. 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 S., 2004, The development of China's Stock Market, 1984-2002

Hong, H., J. Scheinkman and W. 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. (2006), Reforms to Chinese Nontradeable Shares, Nomura Securities, Economic Research

Kaul, A., V. Mehrotra and R. Morck (2000), Demand curves for stocks do slope down: New evidence from an index weights adjustment, Journal of Finance, 55, 893-912

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

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

Nomura Institute of Capital Market Research, Opportunity and Challenge for investing in China

Pastor, L. and R. Stambaugh (2003) Liquidity Risk and Expected Stock Returns, *Journal of Political Economy*, 113, 642-685

Scholes, M. and J. Williams (1977), Estimating betas from nonsynchronous data, Journal of Financial Economics, 5, 309-328

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

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

Wurgler J. and K. Zhuravskaya (2002), Does arbitrage flatten demand curves for stocks?, Journal of Business, 75, 583-608

	MEAN	MEDIAN	MIN	MX	STANDARD DEVIATION
Percentage of tradeable shares before the reform process	38.68	37.27	8.68	83.77	10.97
Percentage of tradeable shares after the reform process	49.57	48.28	9.85	94.30	12.86
Percentage increment in the number of tradeable shares paid as compensation	33.70	32.00	0.00	137.33	14.34

Table 1. AMOUNT OF TRADEABLE SHARES. Sumary statistics about percentages of tradeable shares before and after the reform process.

COMPENSATION CHANNELS

Shares offered by non tradeable shareholders	Shares offered by company to tradeable and nontradeable shareholders	Shares offered by company to tradeable shareholders	Holders of nontradeable shares cancel their shares	Cash	Options	NUMBER OF CASES	%
x						810	76.5%
x	x					25	2.4%
x		x				16	1.5%
x				x		44	4.2%
x					x	14	1.3%
x	x			x		3	0.3%
x	x				x	2	0.2%
x	x			x	x	1	0.1%
x		x		x		3	0.3%
						1	0.1%
x				x	x	3	0.3%
	x					17	1.6%
	x			x		1	0.1%
	x				x	1	0.1%
	x		x	x		1	0.1%
		x				97	9.2%
			x			5	0.5%
			x	x		1	0.1%
				x		11	1.0%
					x	3	0.3%
						1059	100.0%

Table 2. COMPENSATION CHANNELS. Compensation to holders of originally tradeable shares can be realized through various channels: (a) new shares can be offered by nontradeable shareholders (b) new shares may be offered by the company to both tradeable and nontradeable shareholders (c) new shares may be offered by company to tradeable shareholders (d) holders of nontradeable shares may cancel part of their shares. Moreover holders of original tradeable shares may be offered compensation in cash or a certain assignment of warrants. Offers are usually expressed as a percentage of 10 tradeable shares originally held. Table 1 contains the number of cases and the percentage.

BATCH	NUMBER OF COMPANIES			NUMBER OF DAYS			COMPENSATION's DETAILS		FIRM's CHARACTHERISTICS	
	TOTAL	SSE	ZSE	FIRST SUSPENSION	FIRST READMISSION	SECOND SUSPENSION	% of NTS	SHARES	PTBV	MV
	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)	(IX)	(X)
1	3	2	1	3	15	20	67	3.00	2.63	4,736
2	42	28	14	12	15	16	67	3.29	2.23	7,120
3	40	12	28	8	6	18	66	3.77	1.94	2,681
4	38	13	25	10	6	17	65	3.23	1.74	1,290
5	21	13	8	8	6	15	67	3.21	1.89	3,103
6	20	12	8	8	10	18	60	3.29	2.15	2,521
7	21	13	8	9	10	19	60	3.10	2.10	2,079
8	17	12	5	11	8	20	60	3.08	1.79	2,154
9	17	10	7	11	10	24	62	3.24	1.56	1,774
10	18	14	4	9	7	24	57	2.96	1.80	2,936
11	20	12	8	8	7	20	64	3.23	2.06	3,503
12	17	9	8	10	7	21	61	3.17	2.06	2,245
13	21	13	8	10	6	31	60	3.38	2.21	1,957
14	21	14	7	10	7	23	61	2.60	1.52	1,812
15	19	11	8	9	6	23	59	3.20	7.52	1,454
16	27	16	11	8	5	21	63	3.64	2.74	4,711
17	38	19	19	8	7	19	61	3.55	1.63	1,789
18	18	10	8	7	9	20	62	3.31	1.79	1,619
19	15	8	7	11	4	18	62	3.28	1.92	3,853
20	23	14	9	9	9	19	63	3.26	1.59	2,339
21	46	20	26	11	7	18	58	2.92	1.68	2,525
22	38	24	14	10	5	15	60	2.89	2.76	2,729
23	40	27	13	12	5	15	60	3.02	1.53	2,279
24	49	39	10	14	5	17	62	3.05	1.97	3,852
25	44	30	14	14	4	16	61	2.97	1.68	2,675
26	26	14	12	12	1	19	59	2.93	1.50	2,139
27	27	19	8	10	9	20	63	3.04	0.24	1,468
28	41	31	10	12	10	20	58	2.87	1.68	1,786
29	25	17	8	18	10	18	62	2.81	1.57	3,344
30	16	10	6	11	8	14	61	2.40	2.42	2,439
31	26	19	7	17	7	20	62	3.43	1.87	989
32	34	22	12	14	6	20	57	3.23	2.57	1,197
33	28	14	14	14	10	21	56	2.96	2.00	1,318
34	22	18	4	13	9	23	59	2.46	1.97	1,141
35	26	17	9	13	6	22	59	2.59	1.89	1,219
36	26	15	11	11	8	18	59	2.35	0.56	1,167
37	18	10	8	11	6	14	59	2.49	2.00	899
38	20	12	8	11	7	21	57	2.43	2.25	2,134
39	23	13	10	10	6	17	60	2.83	2.30	1,820
40	34	24	10	11	7	16	58	2.83	2.25	1,334
41	34	22	12	10	5	13	57	2.36	1.42	682
42	7	4	3	11	3	11	57	2.21	1.77	410
43	10	6	4	10	4	TBC	62	2.51	1.24	2,268
44	7	4	3	10	5	TBC	57	2.67	0.08	486
45	5	3	2	12	TBC	TBC	66	2.58	1.67	601
46	7	4	3	9	TBC	TBC	56	1.86	3.05	1,141
47	8	7	1	9	TBC	TBC	64	2.78	1.63	539
48	6	3	3	13	TBC	TBC	60	1.97	0.40	71,544
49	8	6	2	11	TBC	TBC	64	0.99	0.53	327
Average	24	14	9	11	7	19	61	2.88	1.90	3,513

Table 3. SUMMARY STATISTICS. Table 2 contains summary statistics about the companies included in every batch. Column (I) reports the number of companies included in every batch. Columns (II) and (III) distinguish between Shanghai Stock Exchange (SSE) and Shenzhen Stock Exchange (ZSE). Column (IV), (V) and (VI) provide information about the length of the first suspension period, the first readmission period and the second suspension period. Column (VII) reports the percentage of outstanding non-tradable share for each company before the start of the reform process. Column (VIII) reports the number of shares paid on average to a shareholder holding 10 tradable shares. Column (IX) and (X) reports the average price to book value and the marked value of the companies in the various batch. The average is computed from day t-120 through t-11 relative to the day of the first suspension.

PANEL I: FACTOR CORRELATIONS

	SHANGHAI SE COMP	SHENZEN SE COMP	SIZE	VALUE	IDIOSYNCRATIC VOLATILITY	VOLUME	PRICE RANGE	LIQUIDITY
SHANGHAI SE COMP	1	0.98	0.19	0.24	-0.08	0.23	0.30	-0.04
SHENZEN SE COMP		1	0.25	0.21	-0.06	0.28	0.31	-0.03
SIZE			1	0.10	0.14	0.24	0.23	0.14
VALUE				1	-0.18	-0.07	0.03	0.07
IDIO VOLATILITY					1	0.35	0.48	-0.09
VOLUME						1	0.57	-0.10
PRICE RANGE							1	-0.05
LIQUIDITY								1

PANEL II: FACTOR STATISTICS

	SHANGHAI SE COMP	SHENZEN SE COMP	SIZE	VALUE	IDIOSYNCRATIC VOLATILITY	VOLUME	PRICE RANGE	LIQUIDITY
From Jan 1998 to Apr 2005								
MEAN	0.01	-0.01	0.03	0.04	0.02	0.05	0.03	-0.06
MEDIAN	-0.01	0.00	0.04	0.03	0.00	0.02	0.01	-0.05
MIN	-8.36	-8.32	-4.07	-4.39	-2.04	-2.76	-3.41	-3.33
MAX	9.86	9.68	4.40	3.53	3.99	3.23	4.48	2.72
ST.DEV	1.42	1.50	0.68	0.67	0.42	0.64	0.61	0.51
% PERFORMANCE	-5.02	-27.23	50.32	84.16	37.06	117.32	63.79	-67.99
From Jan 1998 to Dec 2000								
MEAN	0.09	0.08	0.10	0.01	0.05	0.10	0.05	-0.08
MEDIAN	0.04	0.08	0.08	0.04	0.02	0.05	0.02	-0.07
MIN	-8.36	-8.32	-4.07	-4.39	-1.63	-2.44	-3.41	-2.74
MAX	9.05	9.07	4.40	3.53	3.99	3.23	4.48	2.72
ST.DEV	1.50	1.59	0.75	0.90	0.52	0.73	0.70	0.58
% PERFORMANCE	69.89	63.13	101.19	6.51	40.14	103.45	42.96	-45.51
From Jan 2001 to Dec 2002								
MEAN	-0.08	-0.09	0.01	0.03	0.00	0.02	0.01	-0.03
MEDIAN	-0.02	-0.04	0.03	0.00	0.00	-0.01	0.00	-0.04
MIN	-6.33	-6.59	-2.17	-2.13	-0.84	-1.36	-3.34	-3.33
MAX	9.86	9.68	1.97	2.35	1.02	2.82	3.43	2.03
ST.DEV	1.46	1.57	0.47	0.44	0.27	0.46	0.52	0.44
% PERFORMANCE	-35.46	-39.70	7.37	12.58	1.17	9.82	4.86	-16.41
From Jan 2003 to Apr 2005								
MEAN	-0.02	-0.05	-0.06	0.08	0.00	0.00	0.02	-0.07
MEDIAN	-0.07	-0.06	0.00	0.05	-0.01	0.00	0.00	-0.04
MIN	-3.88	-4.99	-3.89	-1.84	-2.04	-2.76	-2.81	-2.01
MAX	5.81	5.33	2.22	2.13	1.53	2.74	3.27	1.38
ST.DEV	1.26	1.28	0.72	0.46	0.38	0.64	0.56	0.46
% PERFORMANCE	-12.23	-25.46	-29.84	52.71	-2.29	-2.64	10.04	-30.90

Table 4 RISK FACTORS. The table contains summary statistics about the risk factors. The factors are: the Shanghai market index, the Shenzhen market index, a size portfolio (SMB), a value portfolio (HML), an idiosyncratic volatility-replicating portfolio, a volume-replicating portfolio, a price range-raplicating portfolio, a liquidity-replicating potfolio. Panel I reports correlations, Panel II reports summary statistics over the ling sample, Panel III to V report summary statistics over three sub-samples.

Fama and French three factor model plus liquidity replicating portfolio (from January 2003 to April 2005)

SECTORS	R-SQUARED	ESTIMATED COEFFICIENTS ALFA	MARKET	MARKET_1	SMB	HML	HLIQMLLIQ
Airlines	0.67	0.03	0.95	-0.06	-0.25	-0.09	-0.29
Apparel Rtl	0.62	-0.02	0.94	-0.03	0.63	-0.15	0.09
Auto & Parts	0.61	-0.11	1.04	0.09	-0.31	0.25	-0.09
Auto Parts	0.54	-0.03	1.13	0.06	-0.60	0.45	-0.23
Automobiles	0.54	-0.14	1.02	0.13	-0.18	0.20	0.07
Banks	0.66	-0.02	1.09	-0.03	-0.35	0.36	-0.06
Basic Mats	0.86	-0.02	1.03	-0.02	-0.41	0.44	0.04
Basic Resource	0.85	-0.02	1.00	-0.02	-0.46	0.52	0.00
Beverages	0.42	0.07	0.74	-0.01	-0.29	-0.03	-0.18
Brdcst & Ent	0.53	0.06	1.23	-0.05	0.20	-0.34	0.33
Brewers	0.45	0.02	0.70	0.02	-0.03	-0.02	-0.20
Broadline Rtl	0.63	0.00	1.00	0.02	0.38	-0.13	-0.09
Build Mat/Fixt	0.59	-0.08	0.89	0.08	0.12	-0.06	0.12
Chemicals	0.76	0.03	1.17	-0.02	-0.48	0.17	0.05
Cloth & Access	0.64	0.02	0.97	0.01	0.14	-0.14	0.00
Coal	0.65	0.06	1.08	-0.04	-0.53	-0.27	-0.12
Coml Veh/Truck	0.64	0.04	1.05	-0.02	-0.20	-0.56	-0.37
Commodity Chem	0.71	0.04	1.31	-0.05	-0.61	0.42	0.02
Comp Hardware	0.57	0.04	1.31	-0.08	0.42	-0.17	0.25
Computer Svs	0.36	0.06	1.03	-0.03	0.82	-0.69	-0.25
Con & Mat	0.64	-0.03	0.89	0.04	0.13	-0.12	0.01
CONS.DISCRETNRY.	0.79	-0.04	1.05	0.02	-0.11	-0.03	-0.04
Consumer Eltro	0.55	-0.04	1.10	0.13	0.43	-0.24	0.06
Consumer Gds	0.73	-0.08	1.03	0.05	-0.18	0.11	-0.06
CONSUMER STAPLES	0.65	0.03	0.78	0.00	-0.16	-0.20	-0.07
Consumer Svs	0.85	0.04	0.94	-0.05	-0.17	-0.22	-0.12
Cont & Pack	0.44	-0.03	0.83	-0.01	0.26	-0.08	0.12
Div Inds	0.53	-0.02	1.03	0.05	-0.25	-0.13	0.19
DS-MARKET EX RES	0.98	0.00	0.98	0.00	-0.18	-0.03	-0.04
DS-MARKET EX TMT	0.97	0.00	1.02	0.00	-0.38	0.09	0.01
Dur Hh Prd	0.61	-0.02	1.06	-0.04	0.27	0.08	0.03
Electricity	0.74	0.02	0.98	0.09	-0.58	-0.04	0.13
Eltro Eq	0.60	0.02	1.32	0.00	0.31	-0.35	0.46
Eltro/Elec Eq	0.71	-0.01	0.96	0.00	0.13	-0.50	0.26
Farm & Fish	0.67	-0.02	0.93	-0.04	0.28	0.23	-0.14
Fd & Drug Rtl	0.46	0.03	0.66	0.04	0.13	-0.15	-0.14
Fd Producers	0.60	-0.06	0.88	0.01	0.02	-0.40	0.08
Fd Rtl & W	0.46	0.03	0.66	0.04	0.13	-0.15	-0.14
Financial Svs	0.78	-0.01	1.18	0.01	0.10	-0.09	0.01
Financials	0.79	-0.02	1.13	-0.02	-0.18	0.14	-0.04
Food & Bev	0.64	0.01	0.78	-0.01	-0.13	-0.20	-0.07
Food Products	0.59	-0.06	0.88	0.01	-0.01	-0.46	0.06
Forestry & Pap	0.74	0.04	0.93	0.07	0.19	-0.03	0.09
Gas Dst	0.52	-0.09	0.99	-0.09	0.54	0.20	0.07
Gen Retailers	0.70	0.04	1.00	-0.01	0.33	-0.32	-0.10
General Inds	0.64	-0.03	0.95	0.02	-0.06	-0.12	0.14
Gs/Wt/Mul Util	0.60	-0.04	0.98	-0.02	-0.08	0.13	0.24
Health Care	0.67	-0.01	0.74	0.00	0.00	-0.25	-0.06
Heavy Con	0.86	0.01	0.91	-0.01	0.27	0.01	-0.09
Home Imprv Rtl	0.41	0.05	1.09	-0.02	0.34	-0.07	0.17
Hotels	0.46	0.08	1.00	0.02	0.53	-0.47	0.02
Household Gds	0.63	-0.01	1.04	-0.03	0.23	0.01	0.01
Inds Eng	0.30	-0.19	0.84	-0.02	0.03	-0.84	-0.13
Inds Gds & Svs	0.88	0.00	0.93	-0.03	-0.13	-0.31	-0.07
Inds Machinery	0.58	0.01	0.97	0.12	0.01	-0.11	0.12
Inds Suppliers	0.57	0.02	1.08	-0.01	0.10	-0.35	-0.19
Inds Transpt	0.80	0.03	0.90	-0.05	-0.26	-0.20	-0.17
Industrial Met	0.78	-0.04	0.98	-0.02	-0.49	0.72	0.02
Industrials	0.73	-0.05	0.91	-0.01	0.04	-0.53	0.10
Leisure Gds	0.64	-0.02	1.03	-0.03	0.26	0.02	0.09
Marine Transpt	0.67	0.12	1.00	-0.02	-0.60	-0.25	-0.30
Market	0.98	0.00	1.03	-0.01	-0.35	0.07	0.02
Media	0.55	0.08	1.27	-0.11	0.35	-0.32	0.21
Mobile T/Cm	0.47	0.06	1.35	0.02	0.92	-0.40	0.89
NON-FINANCIAL	0.01	0.05	-0.01	-0.05	0.01	0.05	-0.10
Oil Eq & Svs	0.58	0.04	1.13	0.02	-0.37	-0.28	-0.01
Paper	0.74	0.04	0.93	0.07	0.19	-0.03	0.09
Pers & H/H Gds	0.65	-0.01	1.02	-0.02	0.23	0.00	0.05
Pharm & Bio	0.38	-0.07	0.66	0.01	0.29	-0.32	-0.10
Publishing	0.32	0.07	0.74	-0.05	0.28	-0.35	-0.04
R/E Hld & Dvlp	0.70	-0.04	1.02	0.05	0.22	-0.13	0.13
Real Estate	0.70	-0.04	1.02	0.05	0.22	-0.13	0.13
Recreatnal Svs	0.58	0.06	0.81	0.02	0.19	-0.36	-0.11
Retail	0.65	0.02	0.94	0.04	0.31	-0.38	-0.07
S/W & Comp Svs	0.67	0.02	1.04	-0.02	0.41	-0.40	-0.20

Table 5 SECTORS. The table contains a list of the 91 sectors (Datastream classification) which are used to test the pricing models and summary statistics obtained from application of a factor pricing model including the market return, the market return lagged, the size (SMB) portfolio, the value (HML) portfolio and the liquidity portfolio (HLIQMLLIQ) . The pricing moel is estimated over the period January 2003-April 2005, using daily data. The second column reports the value of the coefficient of determination, the third column reports the value of the estimated intercept of the regression, the columns from the fourth to the eigth report the estimated sensitivities to the risk factors.

H_0: Pricing errors are jointly equal to 0

PERIODS	STATISTICS	MARKET MODEL p-value GRS	MARKET MODEL p-value Chi2	F&F with LIQUIDITY REPLICATING PORTFOLIO p-value GRS	F&F with LIQUIDITY REPLICATING PORTFOLIO p-value Chi2
from: Jan 1998	MEAN	0.16	0.18	0.09	0.23
to: Apr 2005	MEDIAN	0.11	0.11	0.04	0.07
	MIN	0.00	0.00	0.00	0.00
	MAX	0.84	0.99	0.78	1.00
	% P-VALUE >0.05	70	69	46	53
	ST.DEVIATION	0.17	0.20	0.12	0.31
from: Jan 1998	MEAN	0.22	0.30	0.25	0.54
to: Dec 2000	MEDIAN	0.16	0.15	0.20	0.61
	MIN	0.00	0.00	0.00	0.00
	MAX	0.96	1.00	0.93	1.00
	% P-VALUE > 0.05	76	63	82	78
	ST.DEVIATION	0.21	0.33	0.21	0.39
from: Jan 2001	MEAN	0.69	0.58	0.74	0.69
to: Dec 2002	MEDIAN	0.71	0.60	0.76	0.88
	MIN	0.12	0.00	0.09	0.00
	MAX	0.98	1.00	0.99	1.00
	% P-VALUE > 0.05	100	96	100	87
	ST.DEVIATION	0.16	0.27	0.16	0.37
from: Jan 2003	MEAN	0.09	0.09	0.17	0.55
to: Apr 2005	MEDIAN	0.05	0.02	0.12	0.64
	MIN	0.00	0.00	0.00	0.00
	MAX	0.64	1.00	0.81	1.00
	% P-VALUE > 0.05	50	32	77	76
	ST.DEVIATION	0.09	0.19	0.16	0.41

Table 6. MULTIFACTORS MODELS FOR THE CHINESE STOCK MARKET. Table compares the simple market model and Fama&French model over the period 1/1/1998 -1/4/2005. Risk replicating portfolios are computed following Fama&French (1996) (SMB and HML). Liquidity portfolio (HLIQMLLIQ) is built following Pastor and Stambaugh (2003). The ability of the models to price returns from 91 sectors (Datastream classification) is considered in order to compare the performance of the two models from a pricing perspective. Under the null hypothesis all the pricing error are jointly equal to zero. P-values are computed both assuming errors correlated over time and heteroskedastic (chi square test) and assuming errors normally distributed, i.i.d and homoskedastic (GRS test). The table reports summary statistics (mean, median, minimum value, maximum value, percentage of p-vaues larger than 5%, standard deviation) about an empirical distribution obtaind by randomly considering 45 sectors over 1,000 tests. Each time 45 sectors are randomly selected from the 91 sectors and the p-values of the chi-square and GRS tests are computed. The exercize is repeated 1,000 times.

mkt	MCAR	CLM variance	CS variance	Bootstrap	MAAR	CLM variance	CS variance	Bootstrap	% AR >0
BEFORE FIRST SUSPENSION	0.04	0.10	0.27	0.44					44.64
	0.32	0.00	0.00	0.23					50.15
	0.45	0.00	0.00	0.23					50.46
	0.64	0.00	0.00	0.22					52.50
	0.60	0.00	0.00	0.28					51.48
	0.76	0.00	0.00	0.29					52.50
	1.16	0.00	0.00	0.16					55.06
	1.82	0.00	0.00	0.01					56.69
	2.57	0.00	0.00	0.00					61.18
AFTER SECOND SUSPENSION	1.69	0.00	0.00	0.00	1.69	0.00	0.00	0.00	65.27
	0.46	0.00	0.02	0.18	0.23	0.00	0.02	0.18	54.85
	1.42	0.00	0.00	0.02	0.49	0.00	0.00	0.01	58.07
	2.12	0.00	0.00	0.00	0.55	0.00	0.00	0.00	59.24
	2.66	0.00	0.00	0.00	0.57	0.00	0.00	0.00	61.16
	3.05	0.00	0.00	0.00	0.57	0.00	0.00	0.00	59.81
	3.28	0.00	0.00	0.00	0.57	0.00	0.00	0.00	61.68
	3.43	0.00	0.00	0.00	0.57	0.00	0.00	0.00	62.32
	3.58	0.00	0.00	0.00	0.57	0.00	0.00	0.00	64.23
	3.67	0.00	0.00	0.00	0.57	0.00	0.00	0.00	62.73
BEFORE FIRST SUSPENSION	2.29	0.00	0.00	0.00	2.29	0.00	0.00	0.00	43.11
	3.17	0.00	0.00	0.00	1.59	0.00	0.00	0.00	50.26
	3.84	0.00	0.00	0.00	1.29	0.00	0.00	0.00	56.83
	4.37	0.00	0.00	0.00	1.13	0.00	0.00	0.00	58.59
	4.80	0.00	0.00	0.00	1.03	0.00	0.00	0.00	58.50
	5.02	0.00	0.00	0.00	0.97	0.00	0.00	0.00	60.59
	5.19	0.00	0.00	0.00	0.94	0.00	0.00	0.00	62.53
	5.22	0.00	0.00	0.00	0.92	0.00	0.00	0.00	62.61
	5.31	0.00	0.00	0.00	0.91	0.00	0.00	0.00	62.77
	5.31	0.00	0.00	0.00	0.90	0.00	0.00	0.00	66.82
AFTER SECOND SUSPENSION	1.30	0.00	0.00	0.00					53.73
	1.24	0.00	0.00	0.01					53.12
	0.93	0.00	0.02	0.08					51.02
	0.68	0.00	0.06	0.17					51.23
	0.54	0.00	0.11	0.27					52.16
	0.52	0.00	0.13	0.31					50.62
	0.47	0.01	0.15	0.34					50.83
	0.45	0.01	0.17	0.36					51.14
	0.40	0.03	0.20	0.38					50.67
	0.62	0.00	0.09	0.32					49.79

Table 7A. EVENT STUDY: RESIDUALS FROM THE SIMPLE MARKET MODEL. Table reports results of the CAR analysis for all the 1005 companies included in the sample. The event study is performed on the residuals from a simple market model. For each company involved in the stock reform process the model is estimated over a period including observation between t-120 and t-10 where t is the day of the first suspension. The estimated parameters are then used to compute the abnormal returns over the event windows. The abnormal returns are summed to form cumulative abnormal return (CAR). CARs are then averaged across companies to obtain the mean cumulative abnormal residuals (MCAR). MCARs are computed for the 10 days before the first suspension, the ten days after the first suspension, the ten days before the second suspension, and the ten days after the second suspension. Mean average abnormal resturns (MAAR) defined as the mean across all firms of the average residuals for each firm are computed for the 10 days after the second suspension and the 10 days first the second suspension taking into account the fact that for these periods the number of firms whit available residuals depend on the horizon. The null hypothesis of no abnormal returns is tested (a) under the assumption of independence across abnormal residuals of different firms following Campbell, Lo and MacKinaly (1997) (CLM variance) (b) under the assumption of no correlation across abnormal residuals (CS variance) and (c) using a general bootstrap analysis (bootstrap). Table presents the p-values for all the procedures.

ff	MCAR	CLM variance	CS variance	Bootstrap	MAAR	CLM variance	CS variance	Bootstrap	% AR >0
BEFORE FIRST SUSPENSION	0.06	0.02	0.20	0.29					46.27
	0.31	0.00	0.00	0.09					50.87
	0.44	0.00	0.00	0.08					51.99
	0.70	0.00	0.00	0.05					54.65
	0.60	0.00	0.00	0.08					53.12
	0.79	0.00	0.00	0.07					53.01
	1.24	0.00	0.00	0.02					57.10
	1.89	0.00	0.00	0.00					59.75
	2.71	0.00	0.00	0.00					65.88
AFTER SECOND SUSPENSION	1.59	0.00	0.00	0.00	1.59	0.00	0.00	0.00	65.07
	0.40	0.00	0.05	0.04	0.20	0.00	0.05	0.04	55.16
	1.39	0.00	0.00	0.00	0.47	0.00	0.00	0.00	57.45
	2.10	0.00	0.00	0.00	0.55	0.00	0.00	0.00	59.46
	2.62	0.00	0.00	0.00	0.56	0.00	0.00	0.00	60.92
	3.02	0.00	0.00	0.00	0.58	0.00	0.00	0.00	61.21
	3.24	0.00	0.00	0.00	0.58	0.00	0.00	0.00	64.21
	3.41	0.00	0.00	0.00	0.58	0.00	0.00	0.00	62.90
	3.55	0.00	0.00	0.00	0.58	0.00	0.00	0.00	62.77
	3.66	0.00	0.00	0.00	0.58	0.00	0.00	0.00	61.82
BEFORE FIRST SUSPENSION	2.34	0.00	0.00	0.00	2.34	0.00	0.00	0.00	40.76
	3.25	0.00	0.00	0.00	1.63	0.00	0.00	0.00	50.05
	3.95	0.00	0.00	0.00	1.33	0.00	0.00	0.00	56.94
	4.45	0.00	0.00	0.00	1.15	0.00	0.00	0.00	58.91
	4.85	0.00	0.00	0.00	1.04	0.00	0.00	0.00	60.80
	5.03	0.00	0.00	0.00	0.98	0.00	0.00	0.00	61.37
	5.20	0.00	0.00	0.00	0.95	0.00	0.00	0.00	63.58
	5.25	0.00	0.00	0.00	0.93	0.00	0.00	0.00	65.51
	5.34	0.00	0.00	0.00	0.92	0.00	0.00	0.00	65.33
	5.32	0.00	0.00	0.00	0.91	0.00	0.00	0.00	66.82
AFTER SECOND SUSPENSION	1.25	0.00	0.00	0.00					53.83
	1.18	0.00	0.00	0.00					52.30
	0.88	0.00	0.02	0.00					51.02
	0.67	0.00	0.07	0.02					51.64
	0.50	0.00	0.13	0.05					50.31
	0.48	0.00	0.15	0.05					49.48
	0.46	0.01	0.16	0.06					50.31
	0.46	0.02	0.16	0.08					49.59
	0.50	0.01	0.14	0.08					50.36
	0.76	0.00	0.05	0.05					49.90

Table 7B. EVENT STUDY: RESIDUALS FROM THE FAMA&FRENCH MODEL WITH LIQUIDITY REPLICATING PORTFOLIO. Table reports results of the CAR analysis for all the 1005 companies included in the sample. The event study is performed on the residuals from a Fama and French model with liquidity replicating portfolio.

	BEFORE FIRST SUSPENSION		AFTER FIRST READMISSION			AFTER SECOND READMISSION		
	TURNOVER BY VOLUME	%	TURNOVER BY VOLUME	%	INCREMENT	TURNOVER BY VOLUME	%	INCREMENT
SHANGHAI	3,452	0.08%	5,937	0.12%	72%	7,594	0.14%	120%
SHENZEN	3,118	0.07%	5,015	0.14%	61%	6,838	0.13%	119%
TOTAL	3,323	0.07%	5,582	0.14%	68%	7,302	0.13%	120%

Table 8. TURNOVER BY VOLUME. Table reports the simple average turnover (number 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. Table reports absolute value of turnover (TURNOVER BY VOLUME), its share with respect to the total turnover of the market (%) and its increment (INCREMENT) with respect to the average value computed over the month before the first suspension.

ABNORMAL VOLUME %	MEAN	MEDIAN	STANDARD DEVIATION	% AV > 0	P-VALUE
BEFORE FIRST SUSPENSION	22.47	-13.63	3.56	42.63	0.103
	28.23	-7.05	4.03	45.95	0.082
	37.59	-1.35	4.37	48.96	0.042
	43.52	1.46	4.82	50.93	0.031
	45.13	9.35	4.65	54.46	0.034
	33.11	-10.88	4.50	44.19	0.032
	37.96	-3.70	4.38	47.72	0.019
	45.01	3.61	4.30	52.28	0.008
	58.23	10.97	4.96	54.88	0.010
	77.46	21.74	5.35	57.99	0.000
AFTER FIRST READMISSION	169.93	88.57	8.63	71.47	0.000
	133.43	46.60	7.77	67.12	0.001
	124.05	42.75	8.87	63.46	0.003
	109.58	41.90	7.77	65.13	0.000
	96.10	27.18	8.51	60.69	0.000
	85.51	19.58	9.43	57.72	0.000
	61.53	13.24	8.53	54.65	0.004
	64.03	12.33	9.21	53.85	0.000
	75.28	13.01	11.09	57.73	0.000
	71.65	15.49	11.91	56.11	0.000
BEFORE SECOND SUSPENSION	111.25	40.59	6.76	66.49	0.025
	97.38	27.95	7.10	59.23	0.015
	88.79	17.51	7.50	55.36	0.008
	62.08	-13.47	7.96	45.28	0.018
	45.34	-25.62	8.17	42.30	0.010
	41.61	-27.62	10.38	39.75	0.012
	49.99	-9.74	9.65	47.09	0.001
	64.87	-17.51	14.71	43.22	0.000
	48.40	-8.87	12.70	45.45	0.002
	64.86	4.69	15.46	52.22	0.001
AFTER SECOND READMISSION	494.65	361.51	16.31	96.06	0.000
	223.26	148.57	9.25	86.62	0.000
	162.38	97.79	7.81	78.22	0.000
	145.55	80.26	7.46	78.32	0.000
	134.70	74.37	10.08	73.76	0.000
	125.13	65.85	7.81	72.30	0.000
	119.61	59.24	7.16	71.78	0.000
	112.43	56.36	6.53	71.68	0.000
	110.82	49.98	6.81	69.61	0.000
	105.99	44.53	6.30	68.88	0.000

Table 9. PERCENTAGE ABNORMAL VOLUME. Table presents the abnormal volume computed as in Brav and Heaton (1999) and Brav and Gompers (2003). The sample is composed of 1010 companies involved in the reform process form April 2005 through August 2006. Abnormal volume is the percentage difference between actual volume and normal volume, where normal volume is defined as the mean daily volume in trading from t-120 through day t-11 relative to the day of the first suspension. The measure of volume is the turnover by volume expressed as 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, ten days before the second suspension and ten days after the second readmission. Table presents the mean, the median, and the standard deviation. P-value is computed by using the bootstrap distribution.

	MCAV	CLM variance	CS variance	Bootstrap	MAAV	CLM variance	CS variance	Bootstrap
BEFORE FIRST SUSPENSION	-3.53	1.00	1.00	0.88				
	-5.36	1.00	1.00	0.80				
	-8.29	1.00	1.00	0.78				
	-10.49	1.00	1.00	0.75				
	-15.97	1.00	1.00	0.83				
	-21.87	1.00	1.00	0.89				
	-26.37	1.00	1.00	0.92				
	-30.58	1.00	1.00	0.92				
	-37.52	1.00	1.00	0.94				
AFTER SECOND SUSPENSION	4.23	0.00	0.00	0.00	0.04	0.00	0.00	0.00
	5.28	0.00	0.00	0.00	0.03	0.00	0.00	0.00
	6.71	0.00	0.00	0.00	0.02	0.00	0.00	0.00
	8.64	0.00	0.00	0.00	0.02	0.00	0.00	0.00
	8.64	0.00	0.00	0.00	0.02	0.00	0.00	0.00
	8.71	0.00	0.00	0.00	0.02	0.00	0.00	0.00
	8.50	0.00	0.00	0.00	0.02	0.00	0.00	0.00
	8.36	0.00	0.00	0.00	0.02	0.00	0.00	0.00
	8.89	0.00	0.00	0.00	0.02	0.00	0.00	0.00
	8.77	0.00	0.00	0.00	0.02	0.00	0.00	0.00
BEFORE FIRST SUSPENSION	-0.33	0.68	0.63	0.31	0.00	0.68	0.63	0.31
	0.65	0.26	0.33	0.14	0.00	0.26	0.32	0.14
	1.61	0.10	0.20	0.08	0.01	0.08	0.17	0.07
	2.85	0.02	0.11	0.02	0.01	0.01	0.07	0.02
	3.84	0.01	0.07	0.01	0.01	0.00	0.02	0.01
	5.12	0.00	0.03	0.00	0.01	0.00	0.00	0.00
	6.18	0.00	0.01	0.00	0.02	0.00	0.00	0.00
	6.88	0.00	0.01	0.00	0.02	0.00	0.00	0.00
	7.96	0.00	0.00	0.00	0.02	0.00	0.00	0.00
	9.68	0.00	0.00	0.00	0.02	0.00	0.00	0.00
AFTER SECOND SUSPENSION	24.18	0.00	0.00	0.00				
	37.83	0.00	0.00	0.00				
	47.47	0.00	0.00	0.00				
	57.31	0.00	0.00	0.00				
	64.90	0.00	0.00	0.00				
	71.77	0.00	0.00	0.00				
	78.40	0.00	0.00	0.00				
	85.35	0.00	0.00	0.00				
	91.25	0.00	0.00	0.00				
	97.48	0.00	0.00	0.00				

Table 10. EVENT STUDY: RESIDUALS FROM THE AJINKYA AND JIAN (1989) MODEL. Table reports results of the cumulative abnormal volume analysis for all the 1005 companies included in the sample. The event study is performed on the residuals from the Ajinkya and Jian (1989) model applied to volume. For each company involved in the stock reform process the model is estimated over a period including observations between t-120 and t-10 where t is the day of the first suspension. The estimated parameters are then used to compute the abnormal volume over the event windows. The abnormal volumes are summed to form cumulative abnormal volume (CAV). CAV are then averaged across companies to obtain the mean cumulative abnormal residuals (MCAV). MCAV are computed for the 10 days before the first suspension, the ten days after the first suspension, the ten days before the second suspension, and the ten days after the second suspension. Mean average abnormal volume (MAAV) defined as the mean across all firms of the average residuals for each firm. MAAV are computed for the 10 days after the second suspension and the 10 days first the second suspension taking into account the fact that for these periods the number of firms whit available residuals depend on the horizon. The null hypothesis of no abnormal volume is tested (a) under the assumption of independence across abnormal residuals of different firms following Campbell, Lo and MacKinaly (1997) (CLM variance) (b) under the assumption of no correlation across abnormal residuals (CS variance) and (c) with a general bootstrap analysis (bootstrap). Table presents the p-values for all the procedures.

ABNORMAL PRICE RANGE %	MEAN	MEDIAN	STANDARD DEVIATION	% APR > 0	P-VALUE
BEFORE FIRST SUSPENSION	0.14	-0.30	0.07	44.09	0.259
	0.10	-0.31	0.07	42.43	0.255
	0.46	-0.45	0.09	43.05	0.185
	0.33	-0.22	0.08	46.27	0.219
	0.23	-0.34	0.08	42.32	0.237
	0.03	-0.47	0.07	39.83	0.254
	0.29	-0.14	0.08	45.64	0.210
	0.35	-0.21	0.08	45.75	0.177
	0.39	-0.09	0.08	48.55	0.200
	0.47	-0.18	0.09	46.37	0.139
AFTER SECOND READMISSION	1.16	1.11	0.12	64.21	0.090
	0.45	-0.02	0.09	49.59	0.170
	0.45	-0.07	0.09	48.58	0.157
	0.64	-0.05	0.09	48.91	0.136
	0.43	-0.21	0.11	45.28	0.116
	0.40	-0.25	0.12	44.61	0.082
	0.23	-0.29	0.14	42.15	0.068
	0.20	-0.49	0.15	42.12	0.057
	0.50	-0.27	0.18	43.64	0.026
	0.21	-0.22	0.18	45.00	0.031
BEFORE SECOND SUSPENSION	0.58	-0.11	0.09	47.41	0.153
	0.25	-0.21	0.09	44.50	0.225
	0.10	-0.37	0.10	44.75	0.253
	-0.57	-0.91	0.11	38.50	0.603
	-0.57	-0.94	0.12	35.53	0.668
	-0.70	-0.83	0.14	36.36	0.776
	-0.24	-0.49	0.17	42.44	0.797
	-0.34	-0.77	0.19	38.10	0.836
	-0.32	-0.69	0.22	36.36	0.865
	0.02	-0.10	0.24	47.22	0.055
AFTER SECOND READMISSION	5.85	4.39	0.19	93.46	0.000
	1.92	1.24	0.10	69.81	0.026
	1.21	0.63	0.09	59.65	0.061
	0.90	0.36	0.08	58.09	0.113
	0.79	0.23	0.08	54.88	0.123
	0.74	0.21	0.09	53.01	0.126
	0.74	0.20	0.08	54.56	0.139
	0.70	0.10	0.09	52.28	0.126
	0.53	0.09	0.08	52.28	0.137
	0.78	0.21	0.09	54.05	0.112

Table 11. PERCENTAGE ABNORMAL PRICE RANGE. Table presents the abnormal Price range. The sample is composed of 1,010 companies involved in the reform process form April 2005 through August 2006. Abnormal Price range is the percentage difference between actual Price range and normal Price range, where normal Price range is defined as the mean daily Price range from t-120 thought day t-11 relative to the day of the first suspension. The measure of Price range is expressed as ((High price – Low Price)/Low price) for a particular day. The periods considered are: ten days before the first suspension, 10 days after first suspension, ten days before the second suspension and ten days after the second readmission. The Table presents the mean, the median, and the standard deviation. P-value is computed by using the bootstrap distribution.

		UPON FIRST SUSPENSION	BETWEEN FIRST READMISSION AND SECOND SUSPENSION	UPON SECOND SUSPENSION	AFTER SECOND READMISSION
MARKET MODEL	Batch number	-0.036	-0.070	-0.032	-0.033
		(0.019)*	(0.032)**	(0.03)	(0.04)
	Compensation surprise	0.017	0.022		
		(0.005)***	(0.009)**		
	Δ Tradable shares			-0.264	-0.202
				(0.040)***	(0.043)***
	Price range	-0.067	0.876	0.14	1.930
		(0.079)	(0.300)***	(0.10)	(0.333)***
	Ln Volume	1.066	1.306	0.425	1.325
		(0.203)***	(0.395)***	(0.415)	(0.485)***
	Constant	-5.47	-9.055	5.610	-12.971
		(1.613)***	(2.952)***	(3.95)	(4.078)***
	Observations	979	979	979	979
	R-squared	0.07	0.05	0.09	0.10
F&F with LIQUIDITY PORTFOLIO	Batch number	-0.059	-0.129	-0.098	-0.147
		(0.020)***	(0.033)***	(0.034)***	(0.039)***
	Compensation surprise	0.017	0.022		
		(0.005)***	(0.008)***		
	Δ Tradable shares			-0.262	-0.197
				(0.041)***	(0.042)***
	Price range	-0.073	0.747	0.156	1.951
		(0.08)	(0.301)**	(0.10)	(0.339)***
	Ln Volume	1.157	0.926	0.329	1.231
		(0.215)***	(0.390)**	(0.43)	(0.505)**
	Constant	-5.749	-4.205	7.644	-9.844
		(1.698)***	(2.95)	(4.024)*	(4.121)**
	Observations	979	979	979	979
	R-squared	0.07	0.05	0.09	0.10

Table 12. CROSS SECTIONAL ANALYSIS. Table presents the results for the cross sectional analysis that links the change in the price of the stocks, volume and idiosyncratic volatility. The independent variables considered in the regression are the batch number, the compensation surprise, a demand curve factor, volume and volatility. The batch number is the consecutive number of the batch in which the company is involved. The compensation surprise is measure as the percentage difference between the company-specific share compensation and the average share compensation paid by all the companies which have completed the reform process before the company under consideration. Δ Tradable shares is measured as (ΔTS)/(TS), where TS is the percentage of tradable shares of outstanding and ΔTS is the difference between the percentage of tradable share of outstanding after and before the reform process. Non-tradable share is the percentage of non tradable share of outstanding. Volume is measured as the number of shares traded for a stock on a particular day and it is expressed in logs (Ln volume). Volatility is alternatively measured as historical volatility (Return volatility) or the percentage spread between the high and low price of the stock (Price range). The cross section is run to explain the jumps in prices upon the first readmission (I), between first and second readmission (II), upon the second readmission (III) and after the second readmission (VI). Jumps are the residuals for the simple market model and for the Fama&French model with liquidity replicating portfolio. For the JUMP I returns are computed between the last day of transaction before first suspension and the readmission price. Regressors are value of the day of the first readmission. For the JUMP II returns are computed between first and second suspension. Regressors are mean value over the days between first and second suspension. For the JUMP III returns are computed between the last day of transaction before second suspension and the readmission price. Regressors are value over of the day of the second readmission. For the JUMP IV returns are computed over the 10 days after the second readmission. Regressors are mean value over the 10 days after the second readmission. Robust Standard Errors are reported in parentheses. Significance levels are denoted by (*) for 10 percent, (**) for 5 percent and (***) for 1 percent. Table reports number of observations and R-squared.

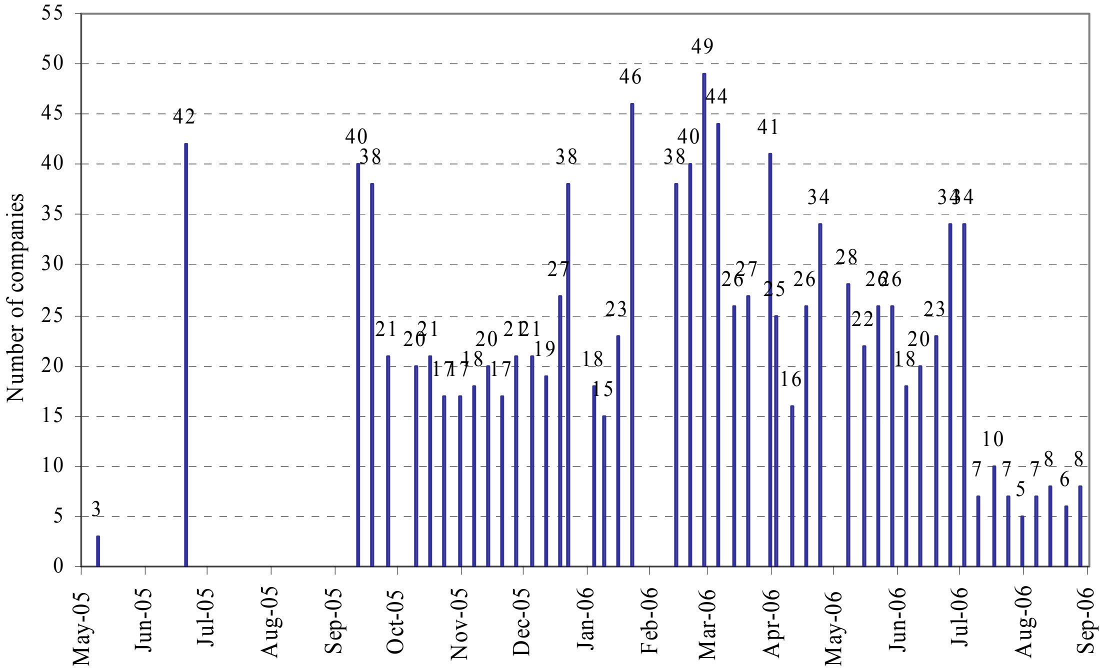

Figure 1. BATCHES OF COMPANIES. Timing of the various batches and number of companies entering each batch.

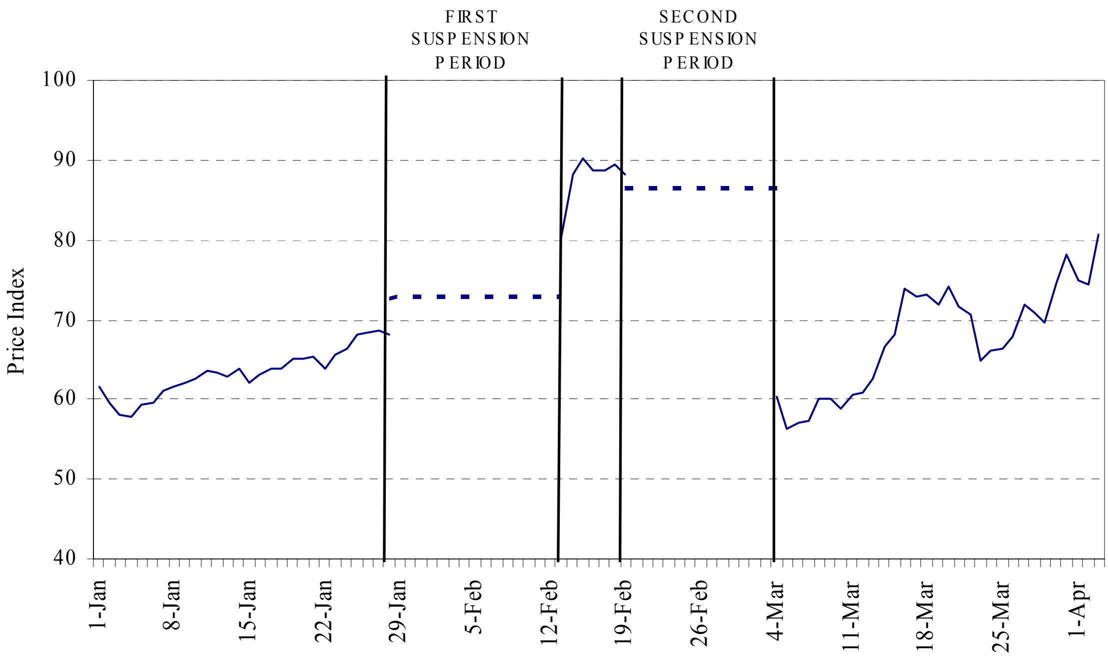

Figure 2. BAOTOU HUAZI INTL. PRICE INDEX. For each company the stock reform includes two suspension periods. Figure shows the mechanism of the reform process reporting the price index of one specific example.

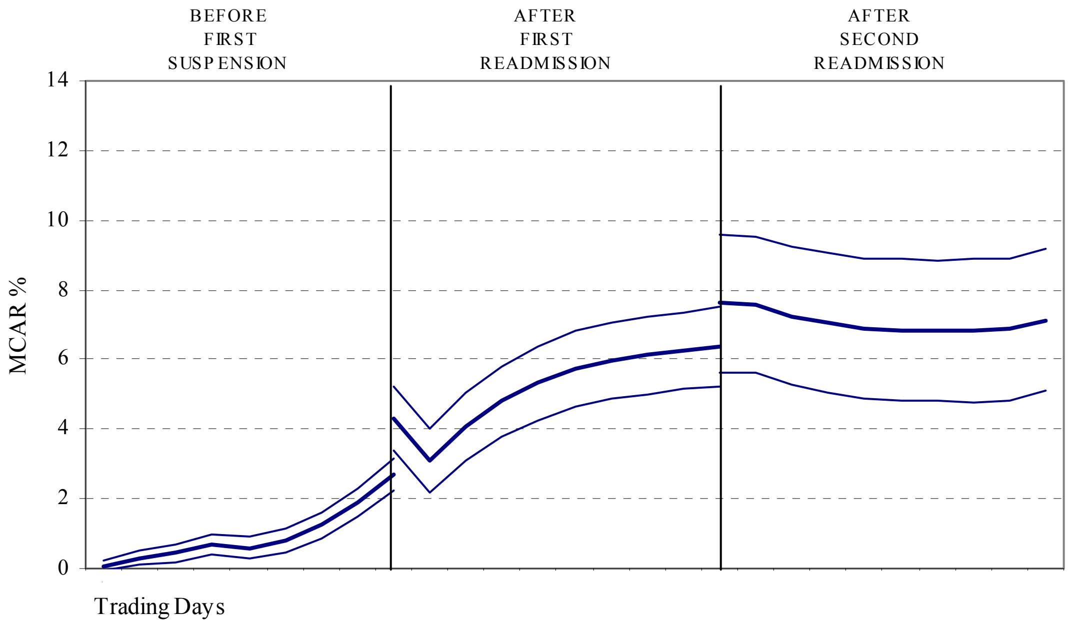

Figure 3. MEAN CUMULATIVE ABNORMAL RETURNS: RESIDUALS FROM THE MULTIFACTOR MODEL. The figure reports result of the CAR analysis for all the 1005 companies included in our sample. Residuals are computed from the Fama & French model with liquidity replicating portfolio. Figure shows the MCAR and 95% confidence interval (CLM variance).

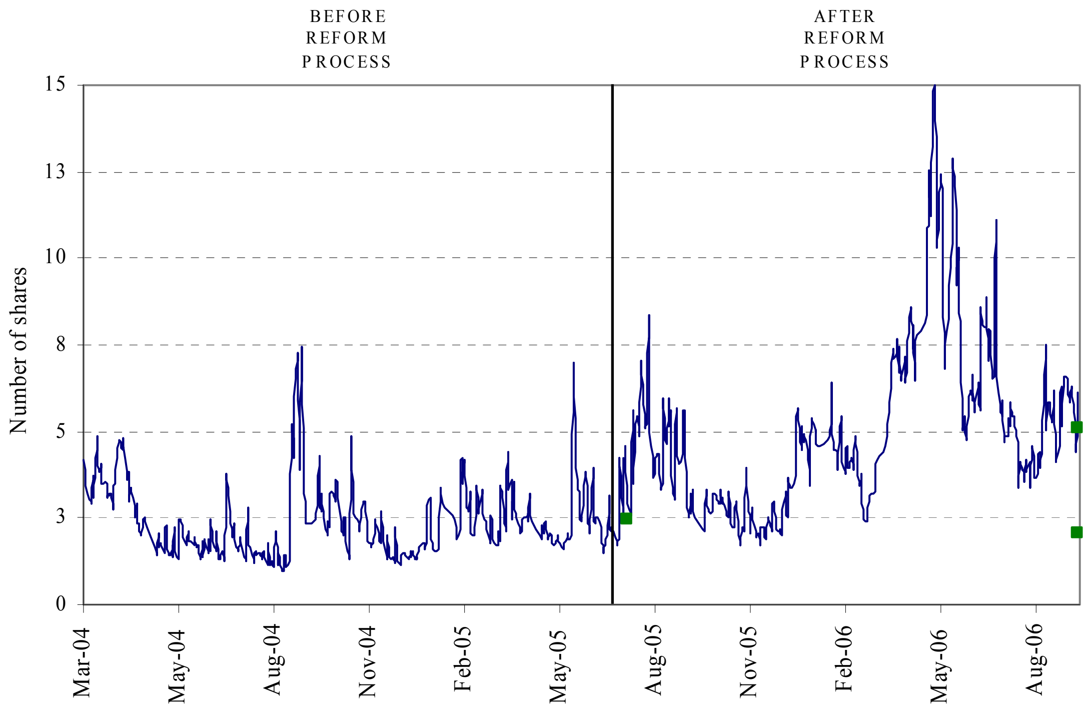

Figure 4. DAILY TURNOVER BY VOLUME. Figure reports the daily total turnover by volume (number of shares traded for a stock on a particular day) of the Shanghai and Shenzhen stock markets between March 2004 and September 2006.

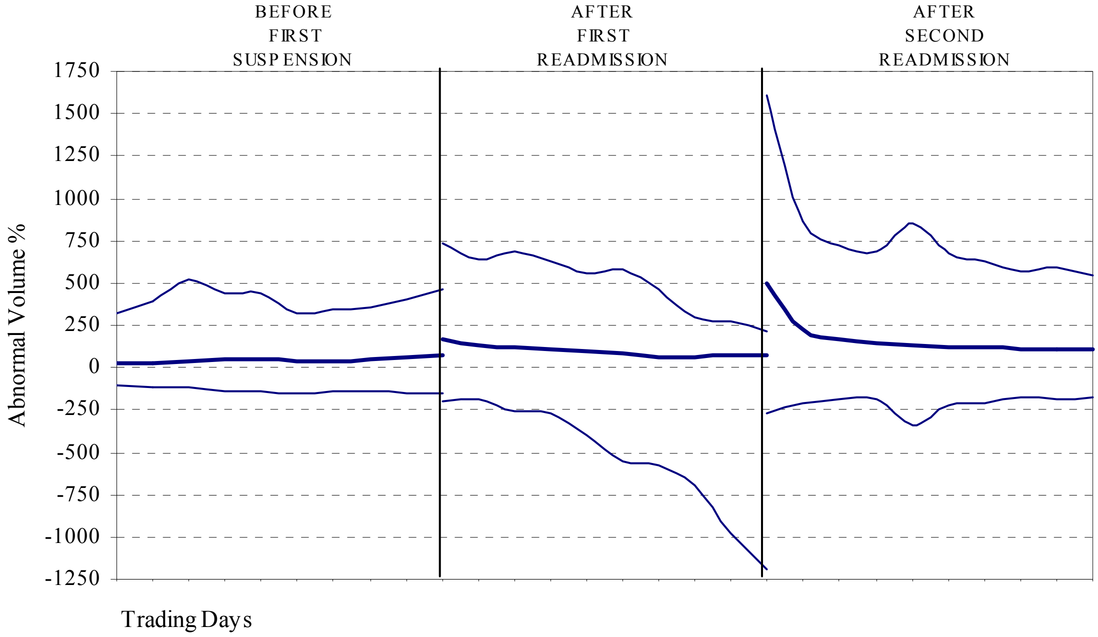

Figure 5. PERCENTAGE CUMULATIVE ABNORMAL VOLUME. Figure presents the cumulative abnormal volume computed as in Brav and Heaton (1999) and Brav and Gompers (2003) and 95% confidence interval. The sample is 1010 companies involved in the reform process from April 2005 through August 2006. Abnormal volume is the percentage difference between actual volume and normal volume, where normal volume is defined as the mean daily volume in trading from t-120 thought day t-11 relative to the day of the first suspension. The abnormal volumes are summed to form cumulative abnormal volume. The measure of volume is the turnover by volume expressed as the number of shares traded for a stock on a particular day. The periods considered are: ten days before the first suspension, 10 days after first suspension, and 10 days after the second readmission. Confidence interval is computed by using bootstrap distribution.

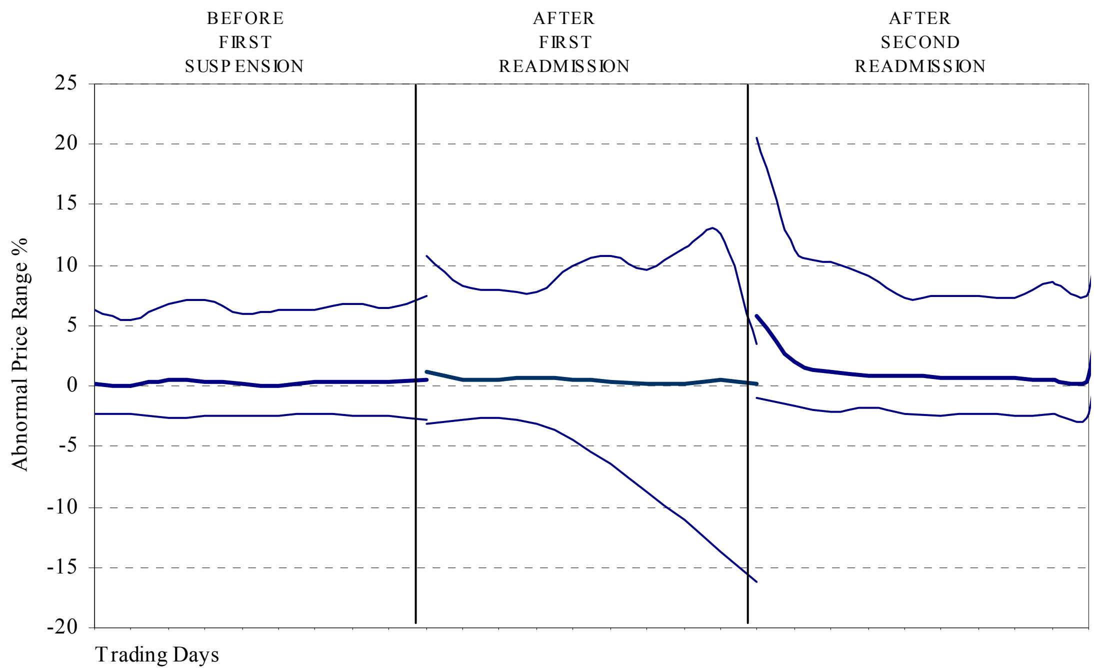

Figure 6. PERCENTAGE CUMULATIVE ABNORMAL PRICE RANGE. Figure presents the abnormal Price range computed as in Brav and Heaton (1999) and Brav and Gompers (2003) and 95% confidence interval. The sample is 1010 companies involved in the reform process from April 2005 through August 2006. Abnormal high –Low spread is the percentage difference between actual Price range and normal Price range, where normal Price range is defined as the mean daily Price range in trading from t-120 thought day t-11 relative to the day of the first suspension. The measure of Price range is expressed as ((High price – Low Price)/Low price) for a particular day. The abnormal price ranges are summed to form cumulative abnormal price range. The periods considered are: ten days before the first suspension, 10 days after first suspension, and 10 days after the second readmission. Confidence interval is computed by using bootstrap distribution.