Speculative Trading and Stock Prices:
An Analysis of Chinese A-B Share Premia*

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Abstract

In this paper we use data from China's stock markets to analyze non-fundamental components in stock prices. During the period 1993-2000, several dozen Chinese firms offered two classes of shares: class A, which could only be held by domestic investors, and class B, which could only be traded by foreigners. Despite their identical rights, A-share prices were on average 400% higher than the corresponding B shares. We use a model of investor overconfidence (Scheinkman and Xiong (2003)) that produces correlations among prices, turnover, and volatility, to explain this premium. By adopting a panel regression method, we find that the turnover rate of A shares is able to explain 20% of the cross-sectional variation in A-B share premium. We also conduct various specification analyses, and examine the relation between float, turnover rate, and volatility.

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I. Introduction

In classic asset pricing models stock prices are determined by firm fundamentals, *i.e.*, the future stream of dividends and the discount factors that apply.[1] The recent Internet bubble presents a challenge to this methodology for asset pricing. For example, several recent studies[2] show that in some extreme carve-out examples the value of a firm can be less than its subsidiary, suggesting the existence of a non-fundamental component in stock prices. Although the Internet bubble was dramatic, it is still difficult to use it to examine in more detail the behavior of the non-fundamental component of stock prices because it is difficult to measure the fundamental value of a stock.

Chinese stock markets provide a unique opportunity to investigate non-fundamental determinants of stock prices. During the period 1993-2000, there were several dozen firms that offered two classes of shares, class A and class B, with identical rights. Until 2001, domestic investors could only buy A shares while foreign investors could only hold B shares. Despite their identical payoffs, class A shares traded on average at 400% more than the corresponding B shares. In addition, A shares turned over at a much higher rate – 500% versus 100% per year for B shares. The striking price difference and big share turnover are often attributed to speculative bubbles by commentators. In this paper, we formally conduct such an analysis. The identical payoff structure of A and B shares makes it possible to control for stock price fundamentals. The relative large sample allows a formal statistical analysis of the non-fundamental component in stock prices. The large panel also permits to control for cross-sectional differences in risk and liquidity, as well as the time variation of interest rates and risk premium.

Our empirical analysis is based on a theory of speculative bubbles developed in Scheinkman and Xiong (2003), which links investors' speculative behavior caused by overconfidence to a non-fundamental component in stock prices. When investors have heterogeneous beliefs about the value of a stock and short sales are costly, the ownership of a share of the stock provides an opportunity to profit from other investors' over-valuation (Harrison and Kreps (1978)). Scheinkman and Xiong (2003) use

[1] See Malkiel (2000) for an introduction of this approach.
[2] *e.g.,* Lamont and Thaler (2003), Ofek and Richardson (2003), and Mitchell, Pulvino and Stafford (2002).

overconfidence, the belief by investors that their opinions are more precise than they actually are, to derive an explicit dynamics for heterogeneous beliefs among investors and a resulting speculative component for stock prices. Scheinkman and Xiong also show that cross-sectionally, there should be a positive association between the volume of speculative trading, the size of the non-fundamental component and the volatility of stock prices.

Chinese stock markets are well suited for testing the model of speculative bubbles by Scheinkman and Xiong. First, Chinese stock markets were only recently re-opened in early 1990s after being closed for nearly half a century. As a result, most domestic investors are new to stock trading, and are more likely to be subject to behavioral biases such as overconfidence. Second, not only short-sales of stocks by investors and derivative securities are illegal, but also equity issuance by firms, a common practice that firms use to “arbitrage” the over-valuation of their own stocks is severely constrained by the restrictive quota rules imposed by Chinese government. This suggests that the A-share prices are more likely to display departures from fundamentals than B-share prices.

Our analysis emphasizes the cross sectional correlation between the A-B share premia and the turnover rates. We show that the A-share turnover is able to explain 20% of the cross sectional variation of the A-B premia. In a panel regression we find that a model with firm random effects and a time fixed effect is not rejected by the data, when compared to a model with both firm and time fixed effects. In the firm random effect and time fixed effect model a one standard deviation change in turnover of the A share of a firm adds 22 percentage points to the A-B share premium. In addition the variations in the time effect coefficients is well explained (R^2=85%) by a linear combination of Chinese and world interest rates and China’s risk premium as measured in the dollar denominated Chinese sovereigns.

After February 2001, Chinese residents could purchase B shares using foreign currency. We show that after the rule change B-share prices, turnover rates and price volatilities all went up dramatically, indicating that the B-share market became more similar to the A-share market. We also examine the effect of share float on the A-B premium and share turnover rate, and the correlation between turnover rates and the volatility of the A-B premium. The results are again consistent with speculative trading.

Cochrane (2002) pointed out a cross-sectional correlation between the market/book ratio of US stocks and their turnover rates during the Internet bubble period of 1996-2000. However, he does not provide a formal analysis of this empirical regularity. Previous studies on Chinese stock prices, *e.g.,* Fernald and Rogers (2002), and Chen, Lee, and Rui (2001), have emphasized the effects of cost of capital, payout ratio, sales growth, and liquidity factor, but no one has examined the change in the cross-sectional variation of the A-B share premia over time, and its relation to speculative trading.

The rest of the paper is organized as follows. Section II provides a brief review of the model in Scheinkman and Xiong (2003) that guides the empirical analysis. In Section III, we describe some basic facts of the Chinese stock markets. In Section IV, we analyze the A-B share premium and other variables related to speculative trading. Section V concludes the paper.

II. Theory on Speculative Trading and Asset Prices

In this section, we provide a brief review of a model, analyzed in Scheinkman and Xiong (2003), which connects speculative trading to high stock prices. The basic insight is that when investors have heterogeneous beliefs about the value of a stock and short sales are costly, the ownership of a share of the stock provides an opportunity (option) to profit from other investors' over-valuation (Harrison and Kreps (1978)). Scheinkman and Xiong (2003) use overconfidence to derive the dynamics of heterogeneous beliefs among investors, and explicitly study a speculative market for a single risky asset with limited supply and many risk-neutral agents, in a continuous time model with infinite horizon. They show that the resale option leads to speculative trading, and contributes a speculative component to stock prices. In addition, fluctuations on the option value add to stock price volatility.

In the model in Scheinkman and Xiong (2003), the fundamental variable, that determines future dividends of the asset, is unobservable to all investors. The current dividend of the asset is a noisy observation of this fundamental variable. In addition to the dividends, there are two other sets of information available at each instant. This information is available to all agents, however investors are divided in two groups, which differ on the interpretation of the signals. This difference is a result of investors' overconfidence, a behavioral bias that has been observed in psychological experiments.[3] Because of overconfidence, when forecasting future dividends, each group of investors places different weights on the three sets of information, resulting in different forecasts. Although investors in the model know exactly the amount by which their forecast of the fundamental variable exceeds that of investors in the other group, behavioral limitations lead them to agree to disagree. As information flows, the forecasts by agents of the two groups fluctuate, and the group of agents that is at one instant relatively more optimistic may become in a future date less optimistic than the agents in the other group. These changes in relative opinion generate trades. Scheinkman and Xiong (2003) show that the difference in beliefs between the two groups of investors is a linear mean-reverting process, with the mean-reverting speed and the volatility parameters determined by exogenous variables such as the investors' overconfidence level, the asset's fundamental volatility, and the information contained in the signals.

When deciding the value of the asset, investors consider their own view of the fundamental as well as the fact that the owner of the asset has an option to sell the asset in the future to the investors in the other group. In equilibrium, the asset price has two parts: the current owner's expectation of all future discounted dividends and the value of the resale option to the current owner. The resale option can be exercised at any time, and the new owner gets in turn another option to sell the asset in the future. These characteristics makes the option "American" and gives it a recursive structure.

Scheinkman and Xiong demonstrate that when a trade occurs, the buyer has the highest valuation of discounted future dividends among all agents, and because of the re-sale option, the price he pays exceeds his valuation of future dividends. Agents pay prices that exceed their own valuation of future dividends, because they believe that in the future they will find a buyer willing to pay even more. This difference between the transaction price and the highest fundamental valuation can be reasonably called a bubble. A numerical example shows that the magnitude of the bubble component can be large relative to the fundamental value of the asset.

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[3] See Hirshleifer (2001) and Barber and Odean (2002) for reviews of this literature.

The option value fluctuates with the difference in beliefs among investors. Since investors in both groups use all available information to form their own beliefs, the shocks to the difference in beliefs are orthogonal to shocks to the asset owner's belief. Therefore, the two components in asset prices are independent, and the fluctuations in the value of the resale option contribute an extra component to price volatility.

The frequency of asset turnover is determined by the asset owner's optimal exercise strategy of his resale option. The asset owner trades off the value of waiting versus the opportunity cost of the funds tied in the asset. In equilibrium, an asset owner will sell the asset to agents in the other group, whenever his view of the fundamental is surpassed by the view of investors in the other group by a critical amount. Passages through this critical point determine turnover. When trading costs are small, the critical amount is low, and this results in high share turnover.

To summarize, Scheinkman and Xiong (2003) show that the speculative motive that originates from heterogeneous beliefs among overconfident investors, may lead to high stock prices, high price volatility, and large share turnover, phenomena that have been observed in various historical episodes such as the stock market boom of 1929 or the recent internet bubble. In particular, the model indicates that the option value (bubble), volatility of the option value, and the share turnover move in the same direction when other exogenous variables, such as investors' overconfidence, amount of information in signals and trading costs change. Although the difference of beliefs among investors is not directly observable, the comovement among these three variables can be directly tested.

In Scheinkman and Xiong (2003), investors are risk neutral. However, when investors are risk averse, and when only a limited number of overconfident investors participate in trading the asset, the total risk bearing capacity of investors and the total amount of floating shares will affect the magnitude of the bubble. Hong, Scheinkman and Xiong (2003) analyze such a situation in a model with three periods. Among other things, they show that when investors are risk averse and trading costs are zero, the critical point in difference of beliefs at which trades occur is no longer zero, as in the risk neutral case. The critical point increases with the total amount of floating shares and decreases with investors' risk bearing capacity. These results suggest that, in a cross section of assets subject to common causes resulting in speculative trading, the size of the bubble should vary negatively with an asset's float.

III. Introduction to the Chinese Stock Market and Data Description

A. A brief History of the Chinese Stock Market

China made a dramatic transition from a planned economy to a market economy, starting in 1978. In 1990, stock exchanges were established in Shanghai and Shenzhen. These stock exchanges listed shares of partially privatized state enterprises. Growth was spectacular – by 2001 each exchange listed more than 500 companies and the total market cap of Chinese stocks exceeded US$500 billion. The number of shareholders increased 160 times, from 400,000 in 1991 to more than 64 million in 2001.

As other emerging markets, China displayed remarkable booms and busts. Figure 1 illustrates the behavior of the Shanghai A share and B share indices. Beginning in 1991, the Shanghai index went from 100 to 250 in less than a year and then exploded to 1200 by the first quarter of 1992. By mid-1992, multiples of 50 to 100 times earnings became the norm on the Shanghai Stock Exchange and some "hot" issues fetched even higher multiples.[4] A crash started in June 1992, and the Shanghai stock market dropped by more than 60 percent in a period five months. Within a few days of hitting bottom, speculation pushed the market right back up. In just three months, the overall market index rose from 500 to a new height of 1300, but by mid 1994 the index was back to 500. In the second half of the decade the market generally trended upwards, but as it can be seen from the figure, there were numerous episodes in which the index lost several hundred points in a short period. For example, during the 1993-2001 period, there were 20 mini-crashes

[4] As an example, Happy Flying, a consumer electronics company, sold for over 1,000 times its previous year's earnings at one point. Apparently investors believed that the earnings of Happy Flying would rise astronomically as a result of equipping 1.2 billion consumers with TVs and VCRs, and quickly bring the price-earnings ratio to a more reasonable level. When the market fell, Happy Flying not only led the way but also crashed more spectacularly than any other stock, dropping from 13.10 Yuan to 2.60 Yuan. See Malkiel and Mei (1997) for more details.

when the Shanghai market Index lost more than 10% in a month while similar mini-crashes only happened 8 times in the Nasdaq during the same time period.

In addition to high volatility, the Chinese stock market had very high turnover. From 1991 to 2001, class A shares turned over on average at an annual rate of 500%, which is even higher than the 365% turnover of DotCom firms in their heyday, and five times the turnover rate of the typical NYSE stock.[5]

There are two important features of the Chinese market during this time that makes it ideal for testing the implications of the model in Scheinkman and Xiong (2003). The first is the presence of the two classes of common shares with identical rights. The second is that regulation restricted short sales and the issuance of seasoned equity offerings.

An important obstacle to testing theories of deviations of prices from fundamentals is that the latter are typically not observable. The Chinese stock markets provide a unique sample. Many Chinese companies issued two classes of common shares with identical voting and dividend rights. They are also listed on the same stock exchanges. *Class A* shares were restricted to domestic residents. Foreigners could hold *Class B* shares, but until February 2001 residents could not legally purchase this class of shares. Capital controls however continue to serve as a restriction for resident Chinese to acquire these shares, since purchase requires foreign currency. Both classes of shares are listed in the Shanghai or Shenzhen stock exchanges. In the period 1993-2001, at least 73 companies had both class A and class B shares. Figure 2 shows the premium of A over B shares of an equally weighted portfolio. The average premium in 1993-2000 exceeded 420% and even after the changes in February 2001, the premium was still around 100%, reflecting the effect of capital controls.

[5] Ofek and Richardson (2001).

Chinese residents also face a very stringent "short-sale" constraint. Chinese investors accounts are kept centrally at the stock exchanges, and it is illegal to short-sell. An exchange's computer always check an investor's position before it executes a trade. This trading system makes it very difficult for financial institutions to lend stocks to their clients for short selling purposes. Moreover, there is no derivatives market for trading stock futures or options.[6] So far, there are no legal ways for arbitrageurs to take a short position on either individual stock or the overall market in China.

Normally, when equity prices exceed their fundamental values, companies will increase the supply of equities to arbitrage the difference. Baker and Wurgler (2002) present strong evidence of U.S. corporate market timing, showing that firms tend to issue equity when their market value is high. This automatic market correction mechanism is impaired in China due to tight government's control over IPOs and seasoned equity offerings (SEOs). Chinese companies need government approval to sell their equity. The process is highly political and companies often have to wait years for issuing shares. Due to strict quotas, which generally bind, many qualifying companies are unable to take advantage of favorable market conditions to sell their shares.

B. Speculative Trading in the Chinese Market: Some Preliminary Evidence

Our sample covers prices and other characteristics for all firms that listed both A and B shares from 1993-2001. However to provide some general description of speculative behavior in the Chinese market, we also collected data for the much larger set of all companies that listed A shares, though typically not B shares, during the period of 1997-2001. The data include daily closing prices, monthly returns (with dividend reinvested), annual dividends and earnings per share, turnover, and the number of floating A shares.[7]

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[6] The government banned bond futures market in 1994 because of a price manipulation scandal and has shut down the derivatives market ever since.

[7] The data are obtained from Shenzhen GTA Information Technology Inc., which has compiled its data using similar techniques as CRSP.

Table 1 provides some summary statistics. Since our sample period overlaps with the U.S. tech bubble, we split our sample into two groups: High tech firms and the rest (called low-tech). We classify firms that belong to Information Technology, Biotech, Telecom, and Computers as high-tech companies.[8] For A shares, we find that the high-tech firms are generally larger in market capitalization, have higher prices, and tend to trade more heavily. The monthly turnovers were a staggering 43% for the high-tech firms and 39% for the low-tech firm, which are equivalent to annual rate of 516% and 468% respectively. In comparison, even during the heydays of the U.S. Internet bubble, the average annual turnover of DotCom firms was only 365% and the average annual turnover of NYSE stocks was 98% (see Ofek and Richardson (2002)). High-tech firms also delivered higher mean returns to their shareholders, but they also had higher market volatility. In comparison with what was found by Ofek and Richardson (2002) on Internet stocks in the U.S., the differences in behavior between Chinese high-tech and the low-tech firms are much smaller. This is consistent with findings of Morck, Yeung and Yu (2000), which shows that Chinese stocks tend to move together. For this reason we will not differentiate between the two type of firms in what follows.

IV. Empirical Analysis

A. Speculative Trading and A-B Share Premia

One of the main huddles in testing a model of asset bubbles is that deviations from fundamental value are unobservable. The presence of the two classes of shares of Chinese stocks with identical voting and dividend rights with a substantial price difference suggests the presence of a bubble component in the price of the more expensive class. Of course, some of this premium could result from different discounting of future payoffs by domestic and foreign investors, including the risk of future expropriation of foreigners.[9] However, discounting differences cannot explain the cross sectional variation of the premia or the correlation between trading volume and premium. On the other hand it is reasonable to attribute some of the premia to Chinese investors'

[8] We classified G (info tech including telecom and computer), C5, C51, C5110, C5115 (electronics), C85, C8501, C8599 (biotech, Pharmersuticals), L20, L2001, L2005, L2099 (info services) as high tech, and all others as low tech.

[9] Fernald and Rogers (2002).

overconfidence. Overconfidence is more pronounced in the face of more difficult tasks.[10] The Chinese stock market only resumed its operation in early 1990s after being shut down for near half a century and domestic investors had little previous experience with investing. It is thus natural to assume that Chinese investors are less sophisticated than the typical foreign investors in Chinese stocks.

Our sample covers the period of 1993 to 2001. This period covers the market slump from 1993-1995, a major bull market in 1996-1997 and a tech stock boom from 1999-2001 that coincides with the tech bubble in the U.S. There is also the important regime change in February 2001, when the Chinese government changed the regulations on B-shares, allowing domestic investors to legally own and trade them if they have foreign currency.[11]

Table 2A and 2B provide some simple comparison between A and B shares. The comparison is based on matching A and B shares of the same companies in the sample. On average, A shares had about 10 times the market capitalization of the corresponding B shares. A shares were also more actively traded than B shares. The average turnover of A shares was four times that of B shares during the sample period. There was also more cross-sectional variation of turnover in A shares than in B shares. The average cross-sectional variation of monthly turnover in A shares was 18.5% compared to 5.3% for B shares. On the other hand, B shares had slightly larger cross-sectional variation of log market capitalization during the sample period.

Table 2B also provides some simple statistics on the A-share price premium over the corresponding B share. On average, A shares fetched a 421.8% premium over B-shares, even though they were entitled to exactly the same legal rights and claim to dividends.[12] In addition, average (over time) cross-sectional standard deviation of the

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[10] See Lichtenstein, Fischhoff, and Phillips (1982).

[11] Some Chinese companies list their foreigners-only shares on the Hong Kong Stock exchange (Called H shares). Our study does not include the H shares, since we like to minimize the impact of overseas market on the price movement of foreigners-only shares. Bekaert and Urias (1999) shows that the price of American Deposit Receipts (ADRs) of foreign companies listed in the U.S. are often influenced by the price market movements in New York. The Hong Kong Stock exchange also has more stringent listing requirements such as more rigorous accounting and disclosure rules. As a result, H share companies tend to be much larger, comparing to B-share companies.

[12] Since B shares were traded in dollars and A shares in Yuans, the difference depends on the

premia is 167.3%. The presence of such a large domestic share premium is quite striking, given the fact that domestic shares generally sell at a discount in many emerging and developed markets. Hietala (1989), Bailey (1994), Bailey and Jagtiani (1994), and Stulz and Wasserfallen (1993) have all found price discount for domestic shares in Finland, Indonesia, Malaysia, the Philippines, Singapore, Switzerland, and Thailand. These authors have used liquidity factors, supply and demand factors to explain the discount. But they have not linked the price difference to speculation.

Figure 2 presents a graphic plot of the equally weighted average A shares premium over time. The premium rose from 300% in April 1993 to about 800% in March 1999 and then fell to 100% at the end of 2001. The relaxation of restrictions on purchase of B shares by domestic investors in February 2001 did not eliminate all premia, since domestic Chinese investors have limited access to the necessary foreign currency. Figure 2 also provides the number of firms used in our study of A-B premia. This number changes over time because of listings and de-listings and grows, in the sample period from less than 10 to over 70.

Figure 3 plots the cross-sectional standard deviation of price premia over time. It fluctuates from 50% to over 400%. A casual comparison between Figure 1 & 3 indicates that this variation may be related to the price level in the A shares market.

Could the existence of a speculative bubble help explain the large variation of premia on A shares? In this section, we propose a formal regression analysis to test this view. According to the theory of speculative bubbles described in Section II, A-share prices can be decomposed as the sum of two components, a fundamental component and a bubble component. The fundamental component is the current expected value of discounted future dividends and we assume, in analogy to Gordon's Growth Formula, that it can be written as $\frac{E_i}{R_i^A(t) - g_i}$, where E_i is the expectation of current (unobservable) earnings, g_i its growth rate and $R_i^A(t)$ the discount rate that applies. $R_i^A(t)$ can be determined by a version of CAPM:

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exchange rate. We used the official rate of the Bank of China. A black market rate would lower the average premium, but would not affect the cross sectional results that we emphasize.

$$R_i^A(t) = r_{China}(t) + \beta_i^A \mu_{China},$$

where $r_{China}(t)$ is the domestic interest rate available to Chinese investors and $\beta_i^A \mu_{China}$ is the risk premium of the firm with β_i^A as the beta of the firm's A shares and μ_{China} as the market premium in Chinese stock market. The speculative component is proportional to σ_i, the volatility of E_i, and a non-linear function q of the difference of beliefs among Chinese investors about the firm's fundamental value, x_i. That is, the firm's A-share price is

$$P_i^A(t) = \frac{E_i}{R_i^A(t) - g_i} + \sigma_i q(x_i).$$

Similarly,

$$P_i^B(t) = \frac{E_i}{R_i^B(t) - g_i} + \sigma_i \hat{q}(x_i),$$

where $\hat{q}$ would determine the bubble in B-share market. For simplicity, we will assume first that the B-share price provides a reasonable measure of the fundamental component of the firm value, that is $\hat{q} = 0$. Later we will treat the case when $\hat{q} > 0$. The discount rate $R_i^B(t)$ is given by $R_i^B(t) = r_{World}(t) + \beta_i^B \mu_{World} + \lambda_p$, with $r_{World}(t)$ as the world interest rate, β_i^B as the beta of the firm's B share, μ_{World} is the world market premium and λ_p is a sovereign risk premium associated with China.

Thus, a firm's A and B share premium can be expressed as

$$\rho_{it} = \frac{P_{it}^A - P_{it}^B}{P_{it}^B} = \frac{R_i^B - g_i}{R_i^A - g_i} + \frac{\sigma_i}{P_i^B} q(x_i) - 1 \qquad (1)$$

If we ignore the difference in the discount rates for A and B shares, and assume that earning volatility σ_i is proportional to B-share price, then $\rho_{it} \propto q(x_i)$. We start with this simplification, although we will bring back later the term involving the difference in discount rates.

Although the difference of beliefs x_i is not directly observable, the theory described in section II implies that it is an increasing function of the turnover rate of firm's A shares. To explain the cross-sectional variation in A and B share premium given in Figure 3, we run the following regression of the ratio between A and B-share prices on their turnover rates:

$$\rho_{it} = c_{0t} + c_{1t}\tau_{it}^{A} + c_{2t}\tau_{it}^{B}, \qquad (2)$$

where $\tau_{it}^{A} = \log(1 + turnover_{it}^{A})$ and $\tau_{it}^{B} = \log(1 + turnover_{it}^{B})$. Here, we expect the coefficient c_{1t} to be positive. We incorporate the turnover of B shares in the regression, since it is possible that a speculative bubble may also exist in B shares. If this is the case, then the coefficient c_{2t} should be negative. Another explanation for A-B share premium is a liquidity discount for B shares, since B shares, which have on average 10% of the A-share float, might be illiquid. If so, we expect that firms with smaller B share turnover would have a bigger price discount in B shares and a higher A-B share premium. Thus, the B share illiquidity argument would also imply a negative value for coefficient c_{2t}.

The results of this regression are reported in Table 3.[13] In the period between April 1993 and December 2000, A and B-share turnovers explain on average 25% of the cross-sectional variation in A-B share premium. The average c_{1t}, the coefficient on A-share turnover, is positive and highly significant with a Fama-MacBeth t- statistics of 8.3,[14] and A-share turnover explains 20% of the cross sectional variation of the premium. A 5% increase in A-share turnover would increase a stock's A-B premium by more than 15%. We also observe that c_{2t} coefficient is positive on average, inconsistent with either the bubble or the liquidity discount explanation of B shares, but its t-stat is insignificant.

[13] During the period of 1997-2000, the first day returns for Chinese IPO averaged 211% in high-tech industries and 141% in other industries. For this reason we exclude from our data set observations that correspond to the first twelve months after an IPO.

[14] The Fama-McBeth t-statistics are computed by taking the time series mean divided by standard deviation of the parameter estimates and times the square root of the number of time periods minus one.

B. Specification Test

In the regression specification of equation (2), we have ignored the difference in the discount rates for A and B shares. To incorporate this difference, a natural extension is to include a firm fixed effect and a time effect. To conserve degrees of freedom, the following parsimonious form is employed by imposing constant c_{1t} and c_{2t}:

$$\rho_{it} = u_i + c_{0t} + c_1 \tau_{it}^A + c_2 \tau_{it}^B + \varepsilon_{it} \qquad (3)$$

The terms u_i and c_{0t} come from linearizing the term $\frac{R_i^B - g_i}{R_i^A - g_i}$ in equation (1). The firm fixed effect term u_i deals with the effect caused by the firm's growth rate and betas, while the time effect term c_{0t} summarizes variables such as the Chinese interest rate, the world interest rate, and the risk premium associated with China's political risk.[15]

To avoid perfect collinearity, we set $c_{01} = 0$. While the above model is a reasonable extension to model (2), the downside is that it consumes many degrees of freedom since we need to estimate each u_i individually. We can simplify this estimation, if we view the firm specific terms as randomly distributed across cross-sectional units. More precisely we will assume that the component u_i are uncorrelated and with identical variances, and *orthogonal* to the regressors. That is,

$$E[\varepsilon_{it}] = 0, \quad E[\varepsilon^2_{it}] = \sigma^2_\varepsilon, \quad var[u^2_i] = \sigma^2_u, \quad cov[u_i u_j] = 0 \text{ if } i \neq j,$$
$$E[\varepsilon_{it} u_j] = 0 \text{ for all } i, t, \text{ and } j, \quad E[\varepsilon_{it}\varepsilon_{js}] = 0 \text{ if } t \neq s \text{ or } i \neq j. \qquad (4)$$

The combination of model (3) and assumptions (4) constitutes a random effects model. By the same token, we may impose the random effects restriction on the time dimension instead of the cross-sectional dimension. This would imply that c_{0t} vary randomly over time. Moreover, we may further simplify model (3) by eliminating either the time or firm effect.

[15] Here we ignore the Chinese as well as the world market premium, since the ex ante market premiums are hard to measure.

In order to determine which model should be used, we will perform a specification test described by Hausman (1978).[16] Under the hypothesis given in (4), both the OLS estimate of (3) and the GLS estimate of the random effect model described in Greene (2002) are consistent, but OLS is inefficient. Therefore, under the null hypothesis, a test that is based on the difference,

$$\boldsymbol{W} = [\boldsymbol{c}-\boldsymbol{\theta}]' \textstyle\sum^{-1}[\boldsymbol{c}-\boldsymbol{\theta}], \qquad \textstyle\sum = \mathrm{Var}[\boldsymbol{c}-\boldsymbol{\theta}] = \mathrm{Var}[\boldsymbol{c}] - \mathrm{Var}[\boldsymbol{\theta}], \qquad (5)$$

should be asymptotically distributed as a chi-square with 2 degrees of freedom.[17] Here, $\boldsymbol{c}$ and $\boldsymbol{\theta}$ and are vector of estimates for c_1 and c_2 with or without imposing (4). Table 4 gives the coefficient estimates for the different model specifications as well as results for the specification tests for the 1993-2000 period. The critical value from the chi-square table with two degrees of freedom is 5.99. In our estimation process, we have used both balanced panel (stocks that have no missing observation during the sample period) and unbalanced panel (all stocks during the sample period). The results are quite similar. Thus, we report most of our results using the balanced panel but we also report the result for selected model using unbalanced panel for comparison purposes.

Based on the critical value, we can see that the two most restrictive specifications D and E, with only either the time effect or firm effect, are strongly rejected.[18] The model specification C, with fixed firm effect but random time effect, is not rejected for the sample period, but it is strongly rejected for the 1997-2000 period with a $\chi^2 = 8.06$. This is to be expected, since Figure 2 shows that the premia vary over time and are auto-correlated, what violates the orthogonality assumptions of (4). On the other hand, the model specification B, with time effect but random firm effect, is not rejected by the data. This implies that, while the fixed time-effects are important for capturing the time-varying average premium in Figure 2, the firm effect is also present but could be treated as a random effect. While there could be other cross-section variables such as risk and liquidity that influence an individual share average premium, these variables are

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[16] See also Wu (1973).

[17] See Greene (2002) for details.

[18] We have also performed two F-tests of specifications D and E against specification A. Both of D & E are strongly rejected as well.

uncorrelated with turnover.[19] As a result, these variables do not affect the consistency of the turnover estimates. Under this specification, (B in Table 4), we can see that A turnover has a statistically and economically significant effect on the premia. A one-standard deviation increase in A turnover raises the A-B premium by 22%. Comparing specifications B and F, we see that the point estimates for balanced panel and unbalanced panel are almost identical. However, B turnover is now statistically significant, once we use the extra data. The coefficient of B turnover is similar to that obtained in the balanced panel, and the sign is consistent both with the existence of a bubble in B shares and with illiquidity in B shares.

Equation (1) suggests that the time effect term, c_{0t}, is proxing for variables that include, at least, Chinese interest rates, world interest rates, and the risk premium from China's political risk. This suggests that we examine the specification:

$$c_{0t} = \vartheta_0 + \vartheta_1 r_{China} + \vartheta_2 r_{world} + \vartheta_3 i_{ChinaSprd} \qquad (6)$$

Intuitively, an increase in Chinese interest rates should lower A-share price due to an increase in the discount rates. Thus, we would expect ϑ_1 to be negative. Also, an increase in world interest rates should lower B-share prices and thus ρ_{it}. Moreover, an increase in China's political/sovereign risk, which we proxy by using the spread between Chinese long-term bond and US 10-year bond ($i_{ChinaSprd}$), should also lower B-share prices.[20] This implies that ϑ_2 and ϑ_3 should be positive. Here we use the Chinese three-month deposit for Chinese risk free rate r_{China} and US three-month Treasury bill rate to proxy for world interest rate r_{world}. Table 5 presents the results for the time period March 1994-December 2000.[21] The R^2 is 85%, ϑ_1 and ϑ_3 have the right signs and are highly significant, while ϑ_2 has the right sign but is not statistically significant. Hence the time

[19] These variables are constant over time but vary across stocks and tend to affect the mean premium of individual stocks.
[20] Kim and Mei (2001) discover that China's political risk affect stock prices in Hong Kong. This imply that political risk could affect B share prices as well, since investors in Hong Kong shares are likely to invest in B shares as well.
[21] Our sample here is a little short since the Chinese Long-term bond data starts at March 1994.

fixed effect is well described by a combination of Chinese interest rates, world interest rates and a measure of political risks and each of these variables contribute with the "right" sign.

C. The 2001 Relaxation of Restrictions

On February 28, 2001, Chinese authorities opened up the markets for B shares to domestic investors provided they used foreign currency. This change allows us to further examine the behavior of A and B share markets.

Table 6 reports the market reaction to the change. Panel A shows that from February 16, 2001 to March 9, 2001, A-share prices on average decreased by 0.5%, and the drop is statistically insignificant with a standard deviation of 22%. On the other hand, B-share prices jumped on average by 63% and the jump is highly significant with a standard deviation of only 7.3%. Therefore, most price reaction came from B shares. Panel B shows the change in B share turnover rates around the change in regulation. Before the event, B shares have an average turnover of 12.3%, while post-event it becomes 44.4%, which is similar to the A-share turnover rate reported in Table 2. Panel C shows the change in B-share price volatility around the event. On average, B-share price volatility increased by 236% after the event. All these observations indicate that after allowing Chinese domestic investors to buy B shares, B-share markets behaved like A-share markets, i.e., shares turned over faster, prices became higher, and share price volatility increased.

To further investigate the behavior of B-share markets after February 2001, we report the result of cross-sectional regression of A-B premium to A-share and B-share turnover in the period of March 2001 to December 2001 in Panel B of Table 3. The coefficient of A-share turnover is still positive and significant, while the coefficient of B-share turnover becomes negative and also significant. This suggests that after the event, a speculative component might have appeared in B-share prices.

D. Float and Turnover

To investigate the nature of A-share and B-share turnover, we run the following cross-sectional regressions:

$$\tau_{it}^{A} = \alpha_{0t} + \alpha_{1t} Log(MarketCap_{it}^{A}) + \varepsilon_{it} \qquad (7)$$

The results are shown in Table 7. Panel A shows that, in the period between April 1993 to December 2000, a firm's A-share turnover decreases with its own market capitalization, and the coefficient is highly significant. On the other hand, Panel B indicates that, in the same period, a firm's B-share turnover increases with its own market capitalization, and the coefficient is also highly significant. A positive relationship between A-share turnover and its capitalization is consistent with the speculative trading theory. As shown in Hong, Scheinkman and Xiong (2003), when investors are risk averse, a larger difference in beliefs is required to turnover all shares when more shares are floating. As a result, share turnover rates drop when float increases. The negative relation between B share turnover and B share capitalization is consistent with the liquidity story, as opposed to a bubble in B-shares. B shares are usually less liquid. When a firm's B-share float becomes larger, more foreign investors will be interested in trading in this share market, and liquidity improves. As a result, more shares turn over faster.[22]

To further investigate the behavior of B-share turnover after February 2001, the bottom of Panel A and B of Table 7 reports the cross-sectional regression result of A and B-share turnover rates on their share capitalization after the rule change. This time, while the A-share coefficient remains positive, the B share coefficient becomes negative and significant, which is opposite to the positive coefficient found for the period before the event. This result further suggests that B share markets became more speculative after they were opened to domestic investors.

In our basic cross-sectional regression of A-B share premium, we do not control for the market capitalization of A and B shares. If investors are risk averse and if each firm has a group of under-diversified investors, the firm size may affect the share premium. To control for this potential effect, we add the logarithm of A-share market capitalization and B-share market capitalization to the basic regression:

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[22] Chordia, Subrahmanyam and Anshuman (2001) provide evidence of positive link between firm size, liquidity and turnover in US stocks.

$$\rho_{it} = c_{0t} + c_{1t}\tau_{it}^{A} + c_{2t}\tau_{it}^{B} + c_{3t}Log(MarketCap_{it}^{A}) + c_{4t}Log(MarketCap_{it}^{B}) + \varepsilon_{it} \qquad (8)$$

The results are reported in Table 8. For the period April 1993 to December 2000, the market capitalization of A shares has a negative and highly significant effect on A-B share premium, consistent with the hypothesis that investors in each firm may be un-diversified. A-share turnover is still highly significant with a t-stat of 7.15, and it explains 14% of cross-sectional variations in A-B share premium. Again, the market capitalization of B shares has a negative and highly significant effect on A-B share premium, consistent with the liquidity story.

E. Speculative Trading and Volatility

The speculative component in A-share prices also contributes an extra component in A-share price volatility, since the bubble component fluctuates with the difference in beliefs among investors and these movements are orthogonal to that of the firm's fundamental value. For simplicity, we ignore the differences in discount rates for A shares and B shares. Then, the fundamental component $\frac{E_i}{R_i^A - g_i}$ in A-share price can be approximated by the corresponding component in B-share price, and the price difference between A and B shares $P_i^A - P_i^B = \sigma_i q(x_i)$ represents the bubble component, and its volatility is

$$Vol[\Delta(P_i^A - P_i^B)] = \sigma_i q'(x_i) Vol(\Delta x_i),$$

which increases with the difference of beliefs among domestic investors, x_i. As we have discussed already, x_i can be proxied by the turnover rate of A shares. For the period January 1997 to December 2000, we use the daily stock prices of A shares and B shares to estimate the monthly volatility of the price difference between A and B shares,

$Vol[\Delta(P_i^A - P_i^B)]$.[23] To examine the effect of speculative trading on price volatility, we further run the following cross-sectional regression:

$$\frac{Vol[\Delta(P_{it}^A - P_{it}^B)]}{P_{it}^B} = d_{0t} + d_{1t}\tau_{it}^A + d_{2t}\tau_{it}^B + d_{3t}Log(Shares_{it}^A) + d_{4t}Log(Shares_{it}^B) + \varepsilon_{it} \qquad (9)$$

The results are reported in Table 9. On average, the turnover rates and market caps of A and B shares explain 20% of the cross-sectional variations in the bubble component volatility. The coefficient of A share turnover is positive and significant, consistent with our hypothesis.

V. Conclusion

Analyzing data on Chinese A-B share premia, we argue that speculative trading can contribute to a significant non-fundamental component in stock prices. Although this is a special data sample, its behavior is quite similar to that of the recent Internet bubble in the US, and therefore we expect that our results will help understand speculative bubbles in more general contexts.

Our study also contributes to the market segmentation literature in international finance. Previous studies, such as Hietala (1989), Bailey (1994), Bailey and Jagtiani (1994), and Stulz and Wasserfallen (1995) have used capital controls, information asymmetries, corporate governance, liquidity, as well as price discrimination to explain the price difference between foreign and domestic shares. Our analysis indicates that overconfidence and the resulting speculative trading could also help explain this price difference.

[23] We use only data from the 1997-2000 period due to a limitation on access to daily data.

References

Bailey, W., and J. Jagtiani, 1994, Foreign Ownership Restrictions and Stock Prices in the Thai Capital Market, *Journal of Financial Economics* 36, 57-87

Bailey, W.,1994, Risk and Return on China's New Stock Market, *Pacific-Basin Finance Journal*, 243-260.

Baker, M. and J. Wurgler, 2002, Market Timing and Capital Structure, *Journal of Finance* 57, 1-32.

Barber, B. and T. Odean, 2001, The Internet and the Investor, *Journal of Economic Perspectives,* 15, 41-54.

Bekaert, G. and Michael S. Urias, 1996, Diversification, Integration and Emerging Market Closed-End Funds, *Journal of Finance* 51, 835-869.

Chen, G., B. Lee, and O. Rui, 2001, Foreign Ownership Restrictions and Market Segmentation in China's Stock Markets, *Journal of Financial Research* 24, 133-155.

Chordia, T., A. Subrahmanyam and V. Anshuman, 2001, Trading Activity and Expected Stock Returns, *Journal of Financial Economics* 59, 3-32.

Cochrane, J. (2002), Stocks as Money: Convenience Yield and the Tech-stock Bubble, NBER Working Paper 8987.

Fama, E. and J. MacBeth, 1973, Risk, Return, and Equilibrium: Empirical Tests, *Journal of Political Economy* 81, 607-636.

Fernald, J. and J. Rogers, 2002, Puzzles in the Chinese Stock Market, *Review of Economics and Statistics* 84, 416-432.

Greene, W., 2002, *Econometric Analysis*, Prentice Hall.

Harrison, M. and D. Kreps, 1978, Speculative Investor Behavior in a Stock Market with Heterogeneous Expectations, *Quarterly Journal of Economics* 92, 323-336.

Hausman, J., 1978, Specification Tests in Econometrics, *Econometrica* 46, 1251-71.

Hietala, P., 1989. Asset Pricing in Partially Segmented Markets: Evidence from the Finnish Market, *Journal of Finance* 44, 697-718.

Hirshleifer, D., 2001, Investor Psychology and Asset Pricing, *Journal of Finance* 56, 1533-1597.

Hong, H., J. Scheinkman, and W. Xiong, 2003, Float and Bubbles, in preparation.

Lamont, O. and R. Thaler, 2003, Can the Market Add and Subtract? Mispricing in Tech Stock Carve-outs, *Journal of Political Economy* 111, 227-268.

Kim, K and J. Mei, 2001, "What Makes the Stock Market Jump?---An Analysis of Political Risk on the Hong Kong Stock Returns", *Journal of International Money and Finance*, 1003-1016.

Lichtenstein, S., B. Fischhoff, and L. Phillips, 1982, Calibration of Probabilities: The State of the Art to 1980, in Daniel Kahneman, Paul Slovic, and Amos Tversky, ed.: *Judgement under Uncertainty: Heuristics and Biases,* Cambridge University Press, Cambridge.

Malkiel, B., 2000, *A Random Walk Down Wall Street*, W. W. Norton & Company.

Malkiel, B., and J. Mei, 1997, *Global Bargain Hunting*, Simon and Schuster, New York.

Mitchell, M., T. Pulvino, and E. Stafford, 2002, Limited Arbitrage in Equity Markets, *Journal of Finance* 57, 551-584.

Morck, R., B. Yeung, and W. Yu, 2000, Why Do Emerging Markets Have Synchronous Stock Price Movements? *Journal of Financial Economics* 58, 215-260.

Ofek, E. and M. Richardson, 2003, Dotcom Mania: The Rise and Fall of Internet Stock Prices, *Journal of Finance* 58, 1113-1137.

Scheinkman, J. and W. Xiong, 2003, Overconfidence and Speculative Bubbles, *Journal of Political Economy*, forthcoming.

Stulz, R.M. and W. Wasserfallen, 1995, Foreign Equity Investment Restrictions and Shareholder Wealth Maximization: Theory and Evidence, *Review of Financial Studies*, 1019-1057.

Wu, D.-M. (1973) Alternative tests of independence between stochastic regressors and disturbances, *Econometrica* 41 (4), 733-750.

Table 1: Summary statistics for monthly data (A shares) (1/1997-12/2000)

Variables	High tech	Mean	Median	Std
Market Cap (Billion)	Yes	3.37	2.39	2.73
	No	2.96	2.11	3.2
Price (Yuan)	Yes	16.73	15.67	5.04
	No	12.09	11.97	3.64
Turnover	Yes	0.43	0.43	0.10
	No	0.39	0.39	0.09
Volume (Million)	Yes	24.17	16.45	20.59
	No	27.80	21.97	21.62
Monthly return (%)	Yes	1.61	1.79	0.79
	No	1.07	1.03	0.95
Std (%)	Yes	14.39	13.87	2.82
	No	12.28	12.09	2.06

Table 2: Summary statistics of A-B pairs.

A. Market capitalization of the pairs of A and B shares (4/1993-12/2001)

	Mean	Median	Min	Max	Std.
A shares (billions of Yuans)	3.36	2.42	0.87	20.16	2.95
B shares (billions of Yuans)	0.33	0.23	0.03	1.88	0.35
Ratio (B/A)	10.3%	8.6%	1.5%	85.2%	10.5%

B. Comparison between A and B shares using Monthly Data (4/1993-12/2001)

		Turnover	Log(1+Turnover)	Log (market cap)	Premium
Mean	A	0.474	0.341	19.63	421.8%
	B	0.107	0.090	19.13	
Average S.D.*	A	0.339	0.190	0.801	167.3%
	B	0.072	0.057	0.909	

* indicate average cross-sectional standard deviation over time.

Table 3. Summary Of Average Cross-Sectional Regression Of A-B Share Premium On Log Turnover

$$\rho_{it} = \frac{P_{it}^{A} - P_{it}^{B}}{P_{it}^{B}} = c_{0t} + c_{1t}\tau_{it}^{A} + c_{2t}\tau_{it}^{B}$$

A. Cross-Sectional Regressions (**April 1993-December 2000**)				
	C_{0t}	C_{1t}	C_{2t}	Average Adj.R^2
Average Coeff.	3.449	3.570	1.487	0.255
FM t-Stat	20.93	8.317	1.081	
Average Marginal R^2	-	0.204	0.045	
B. Cross-Sectional Regressions (**March 2001-December 2001**)				
	C_{0t}	C_{1t}	C_{2t}	Average Adj.R^2
Average Coeff.	1.974	0.402	-0.427	0.086
FM t-Stat	18.66	2.614	-2.229	
Average Marginal R^2	-	0.053	0.065	

Note: $\tau_{it}^{A} = \log(1 + turnover_{it}^{A})$ and $\tau_{it}^{B} = \log(1 + turnover_{it}^{B})$. Average Coeff. provide the time-series average of coefficients and FM t-stat is computed by $\sqrt{T-1}$ * Average Coeff. divided by the standard deviation of coefficients based on Fama-Macbeth (1973). T is the number of time periods. Average Marginal R^2 is the time-series average of marginal R^2 for the cross-sectional regression over time.

Table 4: Specification Test for Pooled Time-series and Cross-Sectional Regressions for A-B premium (April 1993-December 2000)

$$\rho_{it} = \frac{P_{it}^A - P_{it}^B}{P_{it}^B} = u_i + c_{0t} + c_1\tau_{it}^A + c_2\tau_{it}^B + \varepsilon_{it}$$

		C_1	C_2	Adjusted R^2
A. Time-varying C_{0t},	Coeff.	1.608	-1.108	0.797
Firm fixed effects	t-Stat	9.989	-1.701	
B. Time-varying C_{0t},	Coeff.	1.631	-1.085	-*
Firm Random Effect	t-Stat	10.04	-1.651	
	Economic Significance	0.22	0.04	
	Specification Test against A: χ^2= 1.46			Not Rejected
C. Firm fixed effects,	Coeff.	1.564	-1.082	-*
Time Random Effect	t-Stat	9.592	-1.638	
	Specification Test against A: χ^2= 3.23			Not Rejected**
D. Time-varying C_{0t}	Coeff.	2.756	0.168	0.590
Only	t-Stat	12.62	0.187	
	Specification Test against B: χ^2= 76.3			Rejected
E. Firm fixed effects	Coeff.	-0.019	0.681	0.229
Only	t-Stat	-0.087	0.717	
	Specification Test against C: χ^2= 117.4			Rejected
F. Time-varying C_{0t},	Coeff.	1.623	-1.204	
Firm Random Effect	t-Stat	16.95	-3.390	
Unbalanced Panel	Specification Test against A: χ^2= 0.0			Not Rejected

Note: Specifications A-E are estimated based on a balanced panel of 28 stocks with no missing data from 4/1993-12/2000. Specification F is estimated based on an unbalanced panel of 73 stocks with missing data from 4/1993-12/2000.

* Adjusted R^2 not reported due to the use of generalized least squares.

** This specification is rejected for the Jan 1997-Dec 2000 period with χ^2= 8.06.

Table 5. Explain the Variation of c_{0t} *(March 1994-December 2000)*

$$c_{0t} = \vartheta_0 + \vartheta_1 r_{China} + \vartheta_2 r_{world} + \vartheta_3 i_{ChinaSprd}$$

	ϑ_0	ϑ_1	ϑ_2	ϑ_3	Adj.R^2
Coeff.	-1.866	-0.683	0.187	2.473	0.851
t-Stat	-1.355	-11.02	1.020	9.806	

Note: The t-statistics are computed using Newey-West autocorrelation-consistent standard errors with 6 lags. Here we use the Chinese three- month deposit for Chinese risk free rate r_{China} and US three-month treasury bill rate to proxy for world interest rate r_{world}. $i_{ChinaSprd}$ is defined as the spread between Chinese long-term bond and US 10-year bond.

Table 6. Market Reaction To The Event Of Opening B Shares To Domestic Investors In February 2001

A. Price reactions (2/16/2001 – 3/09/2001)

	N	Mean	STD
A share price changes	73	-0.5%	22%
B share price changes	73	63%	7.3%

B. Changes in monthly turnover of B shares (6 months before and after)

	N	Mean	Median	STD
Pre-event turnover	73	12.3%	10.5%	7.7%
Post-event turnover	73	44.4%	44.7%	15.8%
Ratio (Post/Pre)	73	3.62	4.25	2.06

C. Ratios of post-event and pre-event share price volatility (6 months before and after)

	N	Mean	Median	STD
Ratio	70	3.36	2.70	2.21

Note: The trading of three firms had been halted during the period.

Table 7. Explaining Cross-Sectional Variation of Turnovers by Market Capitalization

A. Summary Of Average Cross-Sectional Regressions for A shares

$$\tau_{it}^{A} = \alpha_{0t} + \alpha_{1t} Log(MarketCap_{it}^{A}) + \varepsilon_{it}$$

April 1993-December 2000			
	α_{0t}	α_{1t}	Average Adj.R^2
Average Coeff.	1.071	-0.037	0.110
FM t-Stat	5.613	-3.807	
March 2001-December 2001			
	α_{0t}	α_{1t}	Average Adj.R^2
Average Coeff.	1.507	-0.063	0.124
FM t-Stat	3.145	-2.858	

B. Summary Of Average Cross-Sectional Regressions for B shares

$$\tau_{it}^{B} = \alpha_{0t} + \alpha_{1t} Log(MarketCap_{it}^{B}) + \varepsilon_{it}$$

April 1993-December 2000			
	α_{0t}	α_{1t}	Average Adj.R^2
Average Coeff.	-0.062	0.006	0.070
FM t-Stat	-1.889	3.798	
March 2001-December 2001			
	α_{0t}	α_{1t}	Average Adj.R^2
Average Coeff.	0.600	-0.013	0.015
FM t-Stat	4.875	-2.718	

Note: $\tau_{it}^{A} = \log(1 + turnover_{it}^{A})$ and $\tau_{it}^{B} = \log(1 + turnover_{it}^{B})$. Average Coeff. provide the time-series average of coefficients and FM t-stat is computed by $\sqrt{T-1}$ * Average Coeff. divided by the standard deviation of coefficients based on Fama-Macbeth (1973). T is the number of time periods. Average Marginal R^2 is the time-series average of marginal R^2 for the cross-sectional regression over time.

Table 8. Explain Cross-Sectional Variation of A-B Premium by Turnovers and Market Capitalization

This table presents a summary of average coefficients of the following cross-sectional regressions over two different time periods.

$$\rho_{it} = \frac{P_{it}^A - P_{it}^B}{P_{it}^B} = c_{0t} + c_{1t}\tau_{it}^A + c_{2t}\tau_{it}^B + c_{3t}Log(MarketCap_{it}^A) + c_{4t}Log(MarketCap_{it}^B) + \varepsilon_{it}$$

April 1993-December 2000						
	C_{0t}	C_{1t}	C_{2t}	C_{3t}	C_{4t}	Average Adj. R^2
Average Coeff.	26.585	2.282	6.081	-0.952	-0.220	0.502
FM t-Stat	16.799	7.151	5.368	-14.215	-5.602	
Average Marginal R^2	-	0.139	0.051	0.212	0.071	
March 2001-December 2001						
Average Coeff.	5.658	-0.063	-0.329	-0.272	0.096	0.285
FM t-Stat	5.976	-0.404	-2.305	-8.584	3.246	
Average Marginal R^2		0.022	0.035	0.289	0.044	

Note: $\tau_{it}^A = \log(1 + turnover_{it}^A)$ and $\tau_{it}^B = \log(1 + turnover_{it}^B)$. Average Coeff. provide the time-series average of coefficients and FM t-stat is computed by $\sqrt{T-1}$ * Average Coeff. divided by the standard deviation of coefficients based on Fama-Macbeth (1973). T is the number of time periods. Average Marginal R^2 is the time-series average of marginal R^2 for the cross-sectional regression over time.

Table 9. Explaining Cross-Sectional Variation of Excess Volatility

A. Summary Of Average Cross-Sectional Regressions of A Share Excess Volatility

$$\frac{Vol[\Delta(P_{it}^{A} - P_{it}^{B})]}{P_{it}^{B}} = d_{0t} + d_{1t}\tau_{it}^{A} + d_{2t}\tau_{it}^{B} + d_{3t}Log(Shares_{it}^{A}) + d_{4t}Log(Shares_{it}^{B}) + \varepsilon_{it}$$

	d_{0t}	d_{1t}	d_{2t}	d_{3t}	d_{4t}	Average Adj. R^2
Average Coeff.	2.247	0.215	-1.123	-0.065	-0.040	0.198
FM t-Stat	7.753	2.601	-2.234	-4.091	-3.348	
Average Marginal R^2	-	0.040	0.041	0.074	0.048	

B. Cross-sectional Correlation Averaged over 1997-2000

	Log A Turnover	Log B Turnover	Log A Shares	Log B Shares	Vol $(\Delta P^A - P^B)/P^B$
Log A Turnover	1.000	0.189	-0.307	-0.283	0.157
Log B Turnover		1.000	-0.082	0.144	-0.104
Log A Shares			1.000	0.338	-0.198
Log B Shares				1.000	-0.207
Vol $(\Delta P^A - P^B)/P^B$					1.000

Note: $\tau_{it}^{A} = \log(1 + turnover_{it}^{A})$ and $\tau_{it}^{B} = \log(1 + turnover_{it}^{B})$. Average Coeff. provide the time-series average of coefficients and FM t-stat is computed by $\sqrt{T-1}$ * Average Coeff. divided by the standard deviation of coefficients based on Fama-Macbeth (1973). T is the number of time periods. Average Marginal R^2 is the time-series average of marginal R^2 for the cross-sectional regression over time.

Figure 1: Shanghai A and B Share Price Indices

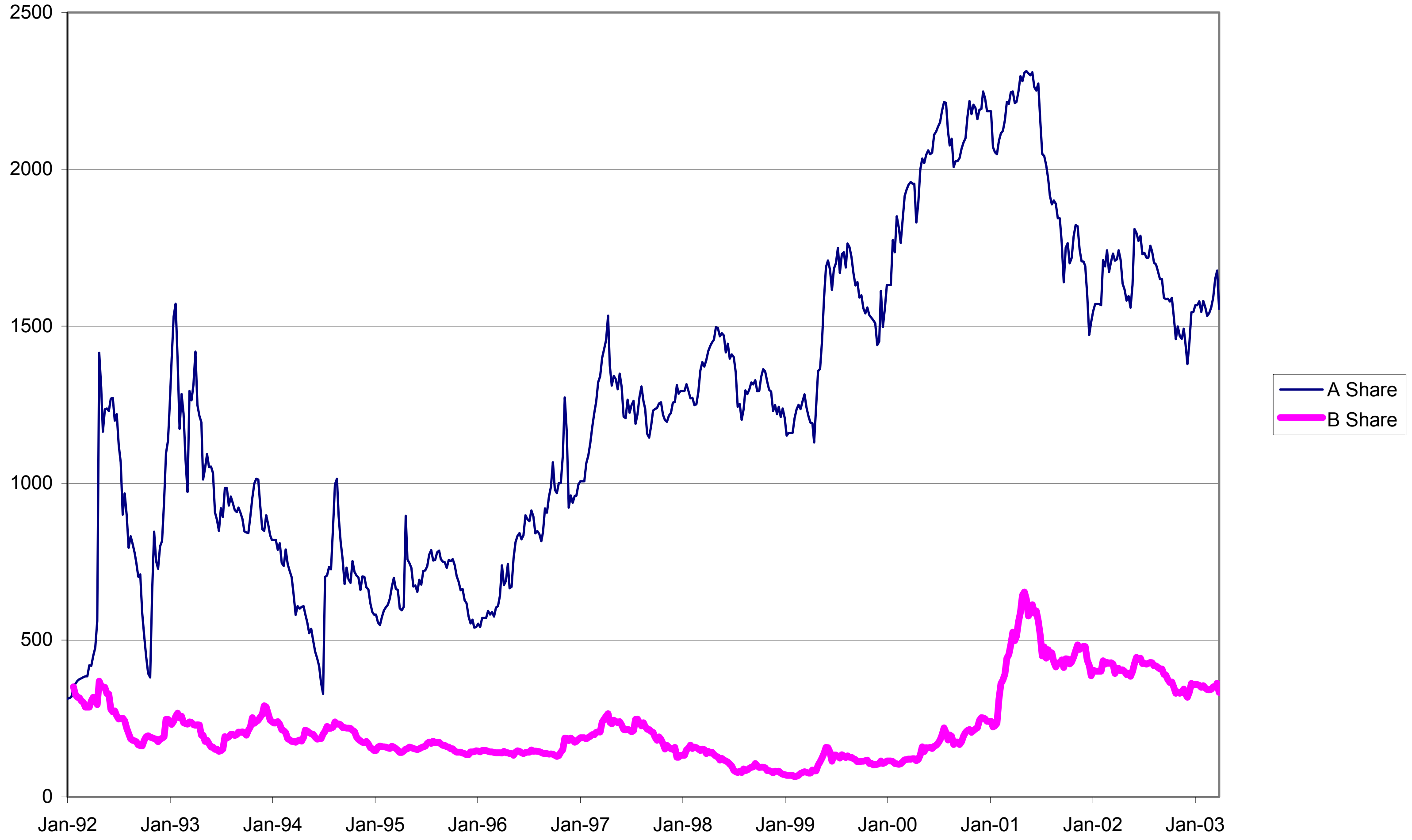

Figure 2: A Share Price Premium Over B Shares And Number Of Firms In The Sample (4/1993-12/2001)

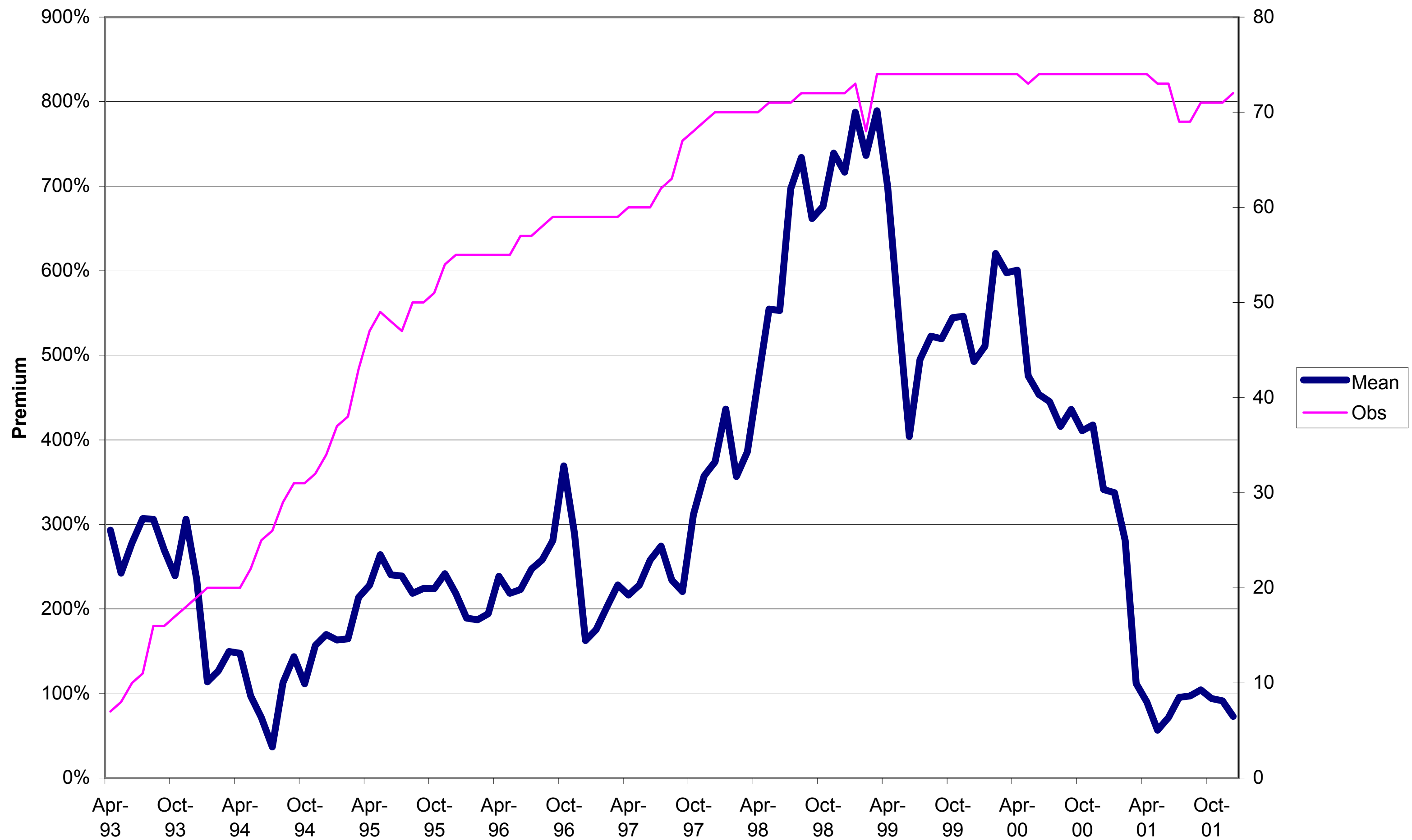

Figure 3: Cross-sectional Standard Deviation of Price Premium Over Time and the Variation Explained By The Following Regression (4/1993-12/2001)

$$\rho_{it} = c_{0t} + c_{1t} Log(Turnover_{it}^{A}) + c_{2t} Log(Turnover_{it}^{B}) + c_{3t} Log(MarketCap_{it}^{A}) + c_{4t} Log(MarketCap_{it}^{B}) + \varepsilon_{it}$$