A Historical Analysis of the Effects of Financial Market Liberalization on China's A-Share Premium

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Abstract

Unlike any other experience in international financial markets, Chinese investors consistently pay more for shares of Chinese stocks than do foreign investors. Some researchers have attributed this premium to economic principles such as substitutability. This paper analyzes how the premium has been affected by the regulatory change of 2001 which allowed Chinese investors to purchase B-share stocks. We find that the size of the premium decreased following the regulatory change and that the premium is responding differently to various economic factors. Results further suggest the premium may be explained in part by economic principles and the rational behavior of investors.

JEL classification: G15; G38

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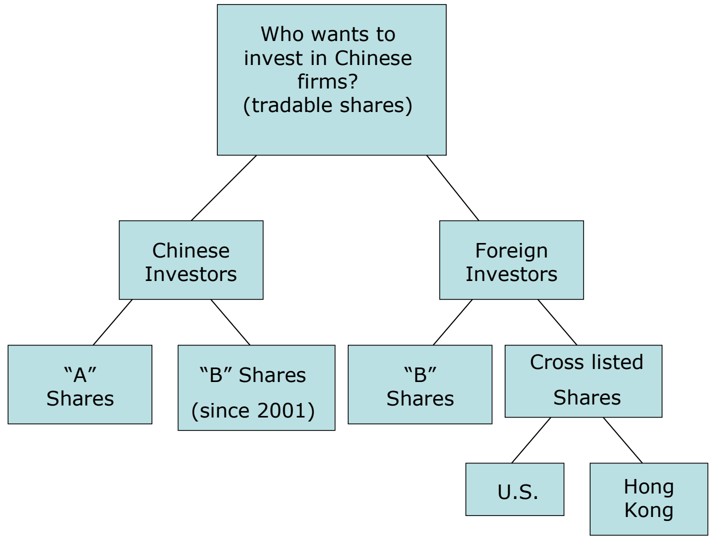
1. Introduction

In the most general context, the goal of this research is to better understand the financial relationship between China and investors around the world. This paper examines ongoing Chinese efforts to integrate its financial markets with those of the rest of the world. A statistical analysis will be made of what drives the difference between the price paid by Chinese investors and non-Chinese investors for shares of stock in Chinese companies. This premium, or difference, has been called the "China syndrome" because never before, anywhere else in the world, have domestic investors consistently paid more for the stock of firms in their own country than foreign investors. Indeed, logic would and does dictate that residents of the home country enjoy certain advantages of and incentives for investing in their own country. On the other hand, given the benefits of international diversification, it is often the case that international investors are willing to pay higher prices for foreign stock than they would pay at home. However, even in light of recent developments in financial market integration, this is not the case in China.

The choices available to those wishing to invest in Chinese stocks are shown graphically in Figure 1. It should be noted that, in addition to mainland Chinese investors, selected foreign institutional investors are also allowed to own and trade A-shares. In addition, while Chinese investors may purchase B-shares as of March 2001, they are required to trade with legal foreign currency accounts.

Figure 1: Available Options for the Purchase of Chinese Stock



It is of interest to note that these tradable shares constitute only approximately 30% of the total number of shares of these companies. The Chinese market is still considered highly regulated in the area of capital controls, although the Chinese government has made substantial strides in liberating its trade account (Wall Street Journal editorial, 2007). In terms of the tradable shares, there is no difference between the A- and B-shares. The shares are identical except for the restrictions on stock ownership.

So what makes China different? In 1994, Bailey first documented the existence of the China syndrome (Bailey, 1994). It is puzzling why China is so different from other markets. Is the cost of capital cheaper to Chinese investors than to foreign investors? Are Chinese investors risk seekers who are willing to pay higher prices than foreign investors? And finally, can existing arguments that explain the discounts present in other emerging markets also explain the opposite phenomenon in China?

The international finance literature suggests a number of possible explanations for this premium. The first has to do with differences in available information which lead to market segmentation and differences in share prices. In other words, Chinese investors may believe their firms will grow at a higher rate than foreign investors do. A few examples of this include changes in the A-share prices due to various political factors. For instance, the choice of China during the sample period (2000 to 2006) as a location for the 2008 summer Olympics may have provided a boost to Chinese optimism in their economy and a corresponding increase in A-share market prices. Another reason may be differences in demand for the stock. Chinese investors may have fewer investment alternatives, causing them to be more willing to pay higher prices for Chinese shares. These arguments will be examined by considering the premium before and after the significant regulatory change of February 2001. The importance of this change with regard to the premium will be further discussed in section 3. Other important factors include the presence of investment barriers, the ability to purchase cross-listed shares, and the view that Chinese investors may be gripped by a speculative fever (Sun and Tong, 2000). Yet another more recent development which may affect the premium is the exchange rate regime change of July 2005. While the effect of the accumulation of foreign exchange reserves is considered in this paper, a complete analysis of this issue is left for future study.

As discussed above, both economic and behavioral factors can influence the A-share premium. The goal of this paper is to empirically analyze the role of these factors and to investigate if the 2001 regulation that allowed Chinese investors to purchase the B-shares altered the effects of these factors. This research is important for a number of reasons. First, only a cursory analysis of the premium has used data more recent than 2001 (Yang and Lau, 2005). Therefore, we must first confirm the continued existence of the premium. The second is to explain the premium using some variables which reflect the hypothesis that the existence of the premium is primarily driven by demand-side factors. The third is to analyze if the 2001 regulation had any effect on investor behavior and on factors that influence the premium. This could help us to understand the role of market structure on the existence of the premium.

In addition to lifting of the restriction on the domestic purchase of B-shares, the recent reforms revived futures trading and legalized margin trading as well. We anticipate that these moves on the part of the Chinese government to liberalize financial markets will have reduced the premium.[1]

2. Data and Methodology

Building on the techniques used by Yang and Lau, we will examine the stock prices for forty-four Chinese companies for whom both A- and B-shares were traded domestically over the seven-year sample period in order to examine the effects of various demand-side factors on the premium (2005). The basic model may be considered an extension of the panel data analysis used by Domowitz *et al.* (1998). In this study, we use company-level data from 2000 to the 2006 in a panel data analysis using the change in the B-share to A-share price ratio as the dependent variable.

The data for the Chinese stocks were obtained from the following sources: Chinese Stock Exchange's main website http://www.chinastockmarket.org/, Shanghai Stock Exchange http://www.sse.com.cn/, Shenzhen Stock Exchange http://www.szse.cn/main/en, and the Hong Kong Stock Exchange http://www.hkex.com.hk/index.htm. In addition, the Taiwan Economics Journal Online (http://www.finasia.biz/tejonline/tejonline.htm) software was used to collect the data.

Monthly data on the following variables were used to construct a panel for the years 2000 to 2006: Closing Price [price depends on the particular exchange], Volume [millions], Number of Shares Outstanding [billions], Market Value [trillion $], and the China's Foreign Exchange Reserves [billion $]. An inspection of the data showed that the market segmentation effect previously discussed still exists. The stock prices were normalized to a common currency (US dollar) using published exchange rates for the closing dates. The Price Ratio was then computed using the following equation:

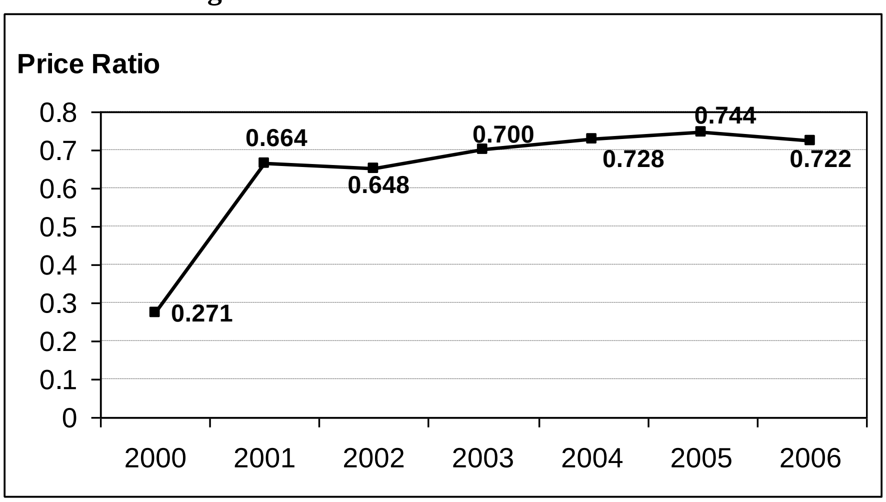
$$Price\ Ratio = P_B/P_A, \qquad (1)$$

where P_B is the closing price of the B-shares and P_A is the corresponding closing price of the A-shares. If the Price Ratio is greater than 1, the A-shares trade at a discount, and if it is less than 1, the A-shares trade at a premium. Then, the premium can be calculated as:

$$Premium = (P_B - P_A)/P_A = Price\ Ratio - 1 \qquad (2)$$

Premium shrinks (in absolute value) as the Price Ratio approaches 1 and widens (in absolute value) as the Price Ratio moves away from 1. Figure 2 below shows the pattern of the Price Ratio over the sample period.

Figure 2: The Behavior of the Price Ratio.



[1] This hypothesis is based on the fact that from 1984 to 2001, the premium fell from 80% to about 45% (Yang and Lau, 2005).

Ratios of the volumes of traded shares and of the outstanding shares were computed using the following equations:

$$LIQ = Volume_B/Volume_A \quad (3)$$

$$SUP = Shares\ Outstanding_B/SharesOutstanding_A. \quad (4)$$

The variable LIQ captures the relative liquidity of the A- and B-share markets, while the variable SUP captures relative share supply. Other researchers have typically found that the coefficient of the liquidity variable is positive. This indicates that, as B-shares become more heavily traded, the B-share price increases and the premium becomes smaller. The sign of the relative share supply coefficient may be expected to enter significantly negatively in the regression, confirming that foreign demand for stocks is downward sloping.

Several other variables were used as proxies for economic explanations for the existence of the premium. Each firm's total market value was used as a proxy for the effects of differences in information availability for foreign and domestic investors. This variable, SIZE, represents the firm's total monthly market value. It has been suggested that larger firms have more information available to foreign investors and are, therefore, preferred by foreign investors (Bailey and Jagtiani (1994), Domowitz et al (1997) and Yang and Lau (2005)). The coefficient of this variable would be expected to be positive if this is the case.

The end-of-month levels of China's foreign exchange reserves (CFOR) were used as a proxy for currency risk. This is an indirect indicator since the renminbi exchange rate is highly regulated. If this variable enters positively and significantly into the regression, it would indicate that higher foreign exchange reserves lead to less perceived currency risk on the part of foreign investors and a higher B-share price.

The table below shows the summary statistics for the variables discussed above.

Table 1: Summary Statistics.

	Obs.	Mean	Std. Dev.
Price (A-Stock)	3991	0.757	0.454
Price (B-Stock)	3991	0.463	0.312
SUP	3795	1.544	0.919
LIQ	3795	1.053	2.673
CFOR	3991	448.965	276.338
SIZE	3991	0.004	0.004

Over this time period, the A-share premium ranged from a notable high of 72.9% in 2000 to a low of 25.6% in 2005. The average over the sample period is 35.6%. There were approximately 1.5 times more B-shares outstanding than A-shares, and the B-share trading volume was about 1.05 times as large as the A-share volume. The results for these variables differ greatly from earlier studies with a markedly lower premium and ratio values much closer to one (for comparison, see Yang and Lau, 2005).

To summarize, the variables used in the model are: shares outstanding, a volume ratio or liquidity measure, the size of the firm and the level of foreign exchange reserves. In addition, a dummy variable (REG) was used to measure or quantify the change in the premium that could be accounted for by the regulatory change but not captured by other model variables. This dummy variable takes the value of 1 if t > February 2001 and the value of 0 if t < February 2001. Log differences were used to eliminate autocorrelation which tends to occur with stock market data. A general fixed effects panel regression model is shown in equation (5) below and the variables were calculated as described in equations (1) through (4). The error terms are assumed to follow the first-order autoregressive process (AR1).

$$\begin{aligned}\Delta\ln(P\_RATIO_{i,t}) = \beta_1\Delta\ln(SUP_{i,t}) + \beta_2\Delta\ln(LIQ_{i,t}) + \beta_3\Delta\ln(SIZE_{i,t}) + \beta_4\Delta\ln(CFOR_{i,t}) + \\ + REG + \alpha + \varepsilon_{i,t}\end{aligned} \quad (5)$$

3. Results

The model presented by (5) was tested over the sample period, 2000 to 2006. The estimation results from this model, run over the entire sample period, are shown in column (1) of Table 2. Column (2) in Table 2 presents results that exclude the regulation dummy. The estimates presented in columns (3) and (4) are based on simple linear differences rather than on log differences.

Overall, the regression results presented in column (1) seem to be robust to model specifications because the alternative model specifications (columns (2)-(4)) do not alter the qualitative results. Before analyzing the results presented in column (1) in detail, it is important to note the intuitive implications of negative and positive signs of coefficients. A negative sign means that the premium decreases. Because the premium is a negative number to start with, a negative sign implies that the premium widens. By a similar logic, a positive sign implies that the premium shrinks or gets smaller in absolute value.

Table 2: Fixed Effects Model Estimates (of First Differences).

Variable	Models with log difference		Models with linear difference	
	(1)	(2)	(3)	(4)
SUP	-0.138***	-0.126***	-0.019*	-0.017*
	(0.032)[a]	(0.031)	(0.010)	(0.010)
LIQ	0.079***	0.075***	0.008***	0.008***
	(0.002)	(0.002)	(0.0003)	(0.0003)
SIZE	-0.031**	-0.050***	-0.972	-0.321
	(0.014)	(0.014)	(1.721)	(1.700)
CFOR	-0.401***	-0.254**	-0.0004***	-0.0004***
	(0.125)	(0.116)	(0.0002)	(0.0001)
REG	0.015**	---	0.014***	---
	(0.007)		(0.005)	
α	0.005	0.017***	-0.004	0.009***
	(0.005)	(0.003)	(0.003)	(0.002)
ρ	0.197	0.186	0.23	0.151
N	3633	3679	3633	3679
Durbin-Watson	1.908	1.714	1.858	1.806
Baltagi-Wu LBI	1.988	1.784	1.920	1.862
R^2	0.3229	0.3084	0.1208	0.1190

[a] Standard errors are in parentheses.
*p<.1; **p<.05; ***p<.01.

The shares outstanding variable (a measure of relative *supply*) decreases the premium. This result is consistent with the arguments that the foreign demand curves for Chinese stocks are downward sloping. As the shares outstanding ratio increases, indicating an increase in the supply of B-shares relative to A-shares, the premium widens. These results confirm the findings earlier researchers.

The results show that when the volume ratio (a measure of *liquidity*) increases, i.e. more B-shares are traded relative to A-shares, the premium shrinks. Bailey and Jagtiani also found the same relationship between these variables in a test of the Thailand stock exchange. This result provides support for the hypothesis that liquidity has a significant effect on the premium. It also supports the argument that these types of demand size factors may be driving the premium.

The effect of a change in the *size* of the firm was significant and negative in this regression. This implies that the premium is smaller for smaller firms. This result could indicate that, in an era of rapid price increases, foreign investors have a preference for the potential growth of smaller, lesser known Chinese companies. This could also reflect institutional investment behavior or growing trends in diversification. This finding is consistent with Sun and Tong (2000), but not with other literature. Sun and Tong (2000) suggest the possibility that the variable may be a good cross-sectional proxy for information availability, but not a good time-series proxy given that the size variable depends more on A-share than B-share market value. This would lead to a negative correlation since the premium is a negative function of the A-share price.

We used the end-of-month levels of China's foreign exchange reserves as a proxy for currency risk. One would expect a positive relationship between foreign exchange reserves and the B-share discount because higher foreign exchange reserves could indicate less currency risk on the part of foreign investors. However, foreign exchange reserves do not enter the regression as expected. The effect of the variable is significant and the coefficient is negative over the sample period. In particular, a 10% increase in China's foreign exchange reserves reduces B-share to A-share price ratio by about 4% and thus widens the A-share premium.

One possible interpretation of this result is that the confidence levels of domestic (Chinese) investors increase more in response to an increase in foreign exchange reserves as compared to an increase in foreign investor confidence. Furthermore, during this time, the level of foreign exchange reserves held by the Chinese government was growing rapidly. It is possible that the percentage changes in this period were consistent with foreign investors' expectations and that the changes in foreign reserves conveyed to domestic and institutional investors that the Chinese economy was overly reliant on the US economy.[2]

The regulation dummy has a positive and significant effect. This finding is consistent with our argument that regulation decreased the price discrepancy between A- and B-share stock prices. A change in the regulation of stock ownership, however, does not eliminate A-share stock premium possibly because certain regulations, such as the requirement of maintaining foreign currency accounts in order to trade, limit the substitutability of A- and B-shares.

Because the effects of the variables that influence the premium may differ pre- and post-regulation, an alternative model specification was used to test how the effects of these variables differed in the pre- and post-regulation time periods. Particularly, we are concerned that traders might change their behavior in response to a regulation, and thus potentially alter the slopes of the demand curves for A- and B-share stocks. In order to more accurately measure and compare the effects of these variables after the regulatory change, the alternative model allows variables to affect the B-share price discount differently pre- and post-change. The alternative model is given below:

$$\begin{aligned}\Delta\ln(P\_RATIO_{i,t}) &= \beta_1\Delta\ln(SUP\_PRE_{i,t}) + \beta_2\Delta\ln(SUP\_POST_{i,t}) + \beta_3\Delta\ln(LIQ\_PRE_{i,t})\\ &+ \beta_4\Delta\ln(LIQ\_POST_{i,t}) + \beta_5\Delta\ln(SIZE\_PRE_{i,t}) + \beta_6\Delta\ln(SIZE\_POST_{i,t}) + \\ &+ \beta_7\Delta\ln(CFOR\_PRE_{i,t}) + \beta_8\Delta\ln(CFOR\_POST_{i,t}) + REG + \alpha + \varepsilon_{i,t}\end{aligned} \tag{6}$$

where $\Delta ln(SUP\_PRE_{(i,t)}) = \Delta ln(SUP_{(i,t)})$ if $t <$ February 2001 and zero otherwise, and $\Delta ln(SUP\_POST_{(i,t)}) = \Delta ln(SUP_{(i,t)})$ if $t >$ February 2001 and zero otherwise. Other variables are defined similarly and the error term is assumed to follow the first-order autoregressive process. The estimation results based on (6) using the fixed effects model are summarized in Table 3. Estimation results in columns (5) and (6) in Table 3 are based on first order log differences. Table 3 also reports Wald test p-values of a hypothesis that the coefficients of variables remain the same pre- and post-regulation.

[2] The Chinese also announced an exchange rate regime change in July 2005, during the sample period. This may also have affected the results for this variable.

Table 3: Fixed Effects Model Estimates of Pre- and Post-Regulation Changes.

Variable	(5)	(6)
SUP:		
Before Regulation	-0.136***	-0.136***
	(0.033)[a]	(0.033)
After Regulation	-0.167*	-0.148
	(0.093)	(0.093)
Test: Before=After (P-value)	0.750	0.905
LIQ:		
Before Regulation	0.080***	0.080***
	(0.002)	(0.002)
After Regulation	0.067***	0.066***
	(0.006)	(0.006)
Test: Before=After (P-value)	0.031**	0.027**
SIZE:		
Before Regulation	0.002	0.002
	(0.015)	(0.015)
After Regulation	-0.300***	-0.317***
	(0.043)	(0.043)
Test: Before=After (P-value)	0.000***	0.000***
CFOR:		
Before Regulation	-0.464***	-0.359**
	(0.126)	(0.117)
After Regulation	1.648*	0.437
	(0.845)	(0.650)
Test: Before=After (P-value)	0.014**	0.202
Regulation Dummy	0.021**	---
	(0.009)	
α	0.0004	0.018***
	(0.007)	(0.003)
ρ	0.183	0.112
N	3633	3633
Durbin-Watson	1.930	1.881
Baltagi-Wu LBI	2.009	1.950
R^2	0.333	0.330

[a] Standard errors are in parentheses.
*p<.1; **p<.05; ***p<.01

Consistent with our initial model, the regulation dummy has positive and significant effect on price ratio. However, the regulatory change of 2001 and the increase in the price ratio from 0.271 in 2000 to approximately 0.7 from 2001 to 2006 have brought about substantial changes in the way we explain the A-share premium. The persistence of the premium is confirmed, but the way demand-size factors affect the premium has changed.

Similar to our earlier results, the coefficient of the measure of relative supply has a negative effect both pre- and post-regulation. Furthermore, the hypothesis that the effect of this coefficient remains the same after the regulation cannot be rejected. The volume of shares or the liquidity of the market has a positive and significant effect on the B-share to A-share price ratio. However, we reject the hypothesis (at the 5% level) that the change in liquidity of the market has the same effect on the price ratio after the regulation took effect. Specifically, the change in liquidity had a larger effect pre-regulation implying that an increase in liquidity reduced the price disparity between A- and B-shares by a larger amount before the regulation took effect.

While it is apparent that the volume of shares and the measure of relative supply are of continued importance to investors, other factors that previously accounted for the premium affect the premium differently post-regulation. The results of the SIZE variable and the CFOR variable are particularly notable. The results show that the size of firms had no significant effect during the pre-regulatory period.

Furthermore, our findings show that in the post-regulatory period, the larger the firms are, the wider the premium is. As previously stated, this may be a result of increased investor sophistication in that investors are looking for smaller cap stocks for greater possible gains and greater diversification. This result, however, is inconsistent with the argument that the information available to investors about larger firms tends to shrink the premium.

The CFOR variable findings are also interesting. In the pre-regulatory period, the variable is negative and significant. This indicates that as the Chinese government acquires more foreign exchange reserves, the premium widens, perhaps for the reasons given earlier. In the post-regulatory period, the variable is marginally significant (significant at the 10% level) and is positive, indicating that as foreign exchange reserves increase, the premium becomes smaller. The Wald test shows that the change in the effect of CFOR post-regulation is significant at the 10% level. This supports the argument given in the literature which states that foreign investors may view the regulatory change as a favorable sign that the Chinese government will be able to support its stated exchange rate goals. The accumulation would then put upward pressure on the B-share price, relative to the A-share price and shrink the premium.

4. Conclusion

The number of Chinese stock trading accounts has risen to about 100 million and the Shanghai benchmark index jumped 130% in 2006. It is apparent from the increases in the number of listed firms and the returns on the stocks that a speculative fever has gripped both Chinese and foreign investors alike. While banks are offering Chinese investors 3% on their savings, it is no surprise that the Chinese are mortgaging their homes and investing their retirement savings in the market (McDonald, 2007). An understanding of the workings of the Chinese stock markets is therefore crucial to making appropriate investment decisions in this growing market.

With additional years of financial market reforms and developments, we are now able to shed more light on the nature of the A-share premium in China than were provided by earlier research on this issue. It is evident from the analysis that this premium may be explained, at least in part, by economic principles and by the rational behavior of investors. While our findings confirm that the effects of changes in measures of relative supply and liquidity are qualitatively the same as suggested by earlier research, a change in the size of a firm has a negative effect on the price ratio. This response of the premium to the firm size variable may suggest that Chinese investors have become increasingly knowledgeable and confident with regard to financial markets and investing. The results also show that the A-share premium shrank and that the behavior of investors might have changed after the regulation took effect. The fact that the premium is now close to half of what is was before the B-share regulatory change is testament to the dynamic nature of the Chinese market. This dynamic nature of the Chinese stock market, however, makes it hard to pinpoint and to predict the magnitude and the direction of various factors that influence the A-share premium over time because new regulations affect investor sentiment and investor strategies. Therefore, as suggested by our results, the effects of various demand-side factors are not the same pre- and post-regulation.

A further avenue of research would be to monitor and model the effects of China's continued structural changes and deregulation. The Chinese, over this time period, have reduced margin requirements and relaxed requirements for options and derivatives trading, among other financial market reforms. The inclusion of these variables in the model may provide insight into informing future decisions concerning the likely effects of deregulation. Accounting for institutional ownership of these stocks may also lead to an increased understanding of significance of this persistent premium.

Unfortunately, a theoretical framework that explains the A-share premium and how it should be influenced by regulatory changes is not yet developed. The development of such theoretical models would aid empirical researchers. In addition, as researchers and business people remain fascinated by the BRIC (Brazil, Russia, India and China) countries, future research might compare Chinese patterns of financial market integration with those of other fast growing countries.

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