



## On the Chinese B-share price discount puzzle: Some new evidence

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### ARTICLE INFO

#### Article history:

Received 8 February 2008

Accepted 3 October 2008

#### JEL classification:

G12

G15

#### Keywords:

Dual-listed shares

Chinese stock markets

B-share price discounts

### ABSTRACT

Since February 2001, the Chinese Securities Regulatory Commission allowed domestic trade in foreign-currency denominated shares (B-shares) whose trade was originally restricted to foreign investors. We investigate possible effects of lifting the ownership restriction on the B-share discounts and explore why the discount persists even after removing the restriction. The discount is the percentage by which the B-shares are priced less than the otherwise identical Chinese-currency denominated shares held by domestic investors (A-shares). The results suggest that prices in the B- and A-share markets are closely linked over the long-run and that this equilibrium relationship strengthened in the post-lifting period. Our results further rule out information asymmetry as a reason for the continuation of the discount and support instead the importance of firm size and relative supply of the B-shares.

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### 1. Introduction

Several emerging markets have dual-class stocks resulting from ownership restrictions imposed either by the government or the issuing firms. Capital control and sovereignty are often the reasons for imposing these restrictions (Domowitz et al., 1997; and Eun and Janakiramanan, 1998). Recent literature discusses the pervasive impact of ownership restrictions on equity prices in various markets (Bailey and Jagtiani, 1994). Evidence suggests that unrestricted shares commonly trade at premia relative to restricted shares due to several factors like information asymmetry, illiquidity, differential demand elasticity, short-sale constraints and differential risk aversion (Yang, 2003; Chan et al., 2008, and Mei et al. (2008)). Two questions emerge: (1) what is the effect of lifting ownership restrictions on dual-class shares? (2) Do price differentials persist after the removal of these restrictions, and if so why?

The Chinese stock markets (segmented since the early 1990s) present an interesting case study. Historically, domestic investors were confined to the A-share market while trading B-shares was available only to foreign investors in both the Shanghai Stock Exchange and Shenzhen Stock Exchange. Bailey et al. (1999) highlight an interesting anomaly. The B-shares are traded with substantial discounts relative to A-shares, though in other emerging markets with similar ownership restrictions (like the Thai market), the foreign (unrestricted) class shares are commonly traded at premia.

The ownership restrictions were partially lifted on February 19, 2001, when the Chinese Securities Regulatory Commission (CSRC) allowed domestic investors to purchase foreign B-shares. Thus, domestic investors gained access to both local and foreign class shares, while foreigners were still prohibited from trading in local A-shares. When the markets reopened on February 28, 2001, local investors began actively trading the B-shares causing a significant increase in share prices. Surprisingly, this failed to eliminate the B-share discount (discounts decreased on average from 80.7% to 48.1%). Using cross-sectional analysis, Chen et al. (2003) find liquidity and relative risk to be primarily responsible for the persistent B-share discounts while Mei et al. (2008) suggest the turnover rate of A-shares (influenced by investors' overconfidence and speculative trading) explains 20% of the cross-sectional variation in the premia.

This paper revisits the B-share discounts and investigates possible reasons for their persistence even after lifting the restrictions using several techniques including cointegration tests and variance decompositions. We also explore if the effects of factors responsible for the B-share discount have changed after removing the restrictions and examine possible reasons behind discount variations across firms in the post-lifting period.

### 2. Institutional background and data

In early 1990s, China established separate classes of stocks, one for Chinese investors (A-shares) and another for foreign investors (B-shares). Firms can issue both A- and B-shares in the two Chinese stock exchanges. Except for ownership restrictions, these shares have identical voting rights and dividend payouts. Foreign investors may trade only in B-shares transacted in US dollars in the Shanghai Stock

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Exchange and in Hong Kong dollars on the Shenzhen Stock Exchange. Chinese investors trade only in A-shares denominated in Chinese currency (the RMB Yuan). These ownership restrictions were lifted on February 19, 2001 when the CSRC opened the B-share market to domestic investors. We begin the post-lifting period on June 1, 2001 when the CSRC banned investing in B-shares using foreign currency from February 19, 2001 until May 31, 2001 to guard against possible excessive volatility immediately after announcing lifting the restrictions. By May 2003, there were 725 firms with A-shares and 54 firms with B-shares listed on the Shanghai Exchange, while the Shenzhen Exchange had 486 firms with A-shares and 57 firms with B-shares. Of these, 84 firms issued both A- and B-shares.

Daily observations on closing prices and trading volume of the A- and B-shares from March 20, 1998 to May 22, 2003 come from *Securities Industry Research Centre of Asia-Pacific (SIRCA) Database*. Our data start one year after the 1997 Asian financial crises to minimize crisis-related distortions. We also use opening, high, low and closing daily prices of four stock market indexes from the *SIRCA Database*, *Tsinghua Financial Database* and MSCI world index of the *DataStream* provide information on the number of tradable A- and B-shares outstanding, total shares of each firm in the sample, and daily data on an A-share market index.

We exclude all firms in the Shanghai exchange without regular trading activities (e.g., weak stocks listed under the Particular Transfer scheme) and also exclude four firms from the Shenzhen exchange (one under PT and three with missing data). Our sample contains 67 firms (35 listed on Shanghai Stock Exchange and 32 on Shenzhen Stock Exchange).

We divide our sample into four groups based on trading exchanges: Shanghai A-shares (SHA), Shanghai B-shares (SHB), Shenzhen A-shares (SZA), and Shenzhen B-shares (SZB). We convert all prices to Chinese currency using official daily exchanges obtained from the *Tsinghua Financial Database*. To investigate the impact on the markets from lifting ownership restrictions, we divide our sample into two sub-periods (pre- and post-lifting). The pre-lifting period is March 20, 1998 to February 19, 2001, while the post-lifting period starts June 1, 2001 (the date when restrictions on trading B-shares ended) and ends May 22, 2003.

### 3. Empirical properties of the B-share price discount

The B-share price discount is the ratio of the price difference between the A- and B-shares to the A-share price, that is  $\left(\frac{PA_{i,t} - PB_{i,t}}{PA_{i,t}}\right)$ . Despite removing the restrictions in 2001, Fig. 1 shows that the B-share discounts persist across firms ranging from 28.1% to 71.4% and averaging 47.6%. A *t*-test shows that the overall mean of the B-share discounts is statistically significant in both periods. According to summary statistics of B-shares discounts (not shown here), the standard deviation of price discounts increased by

0.94% in the post-lifting period. To gauge the persistence of B-share price discounts, we compute the half-life statistic which estimates the number of days it would take for a shock in the series to diminish to half the original size. The average half-life is 12.8 days in the pre-lifting period but increases to 16.8 days in the post-lifting period. Thus, the B-share discounts became more persistent after lifting the restrictions.

B-share prices generally increased in both exchanges after lifting the restrictions. For example, the B-share market indexes of Shanghai and Shenzhen rose 171% and 253%, respectively, in the first month after lifting the restrictions. The decreases in B-share price discounts over time were primarily driven by relatively larger increases in B-share prices. The average increase in B-share prices after removing the restrictions is 158.6% while A-share prices rose only 2.2%. Hence, price movements appear to have aligned prices in both markets. Does this imply that A- and B-shares have developed a long-run (cointegrating) relation? If so, has lifting the restrictions affected the price dynamics? We address these issues next.

#### 3.1. Cointegration analysis

We first test for unit roots in A- and B-share prices using the Augmented Dickey–Fuller and the Phillips–Perron procedures. We select optimal lag lengths by the Akaike Information Criterion (AIC), allowing up to 20 lags (20 working days per month). We study the cointegrating relationship between A- and B-share markets using a vector error-correction model (VECM). The results provide useful information on long-term relations while allowing for short-run dynamics.

Let  $X$  be a  $2 \times 2$  vector of log A-share price ( $PA_t$ ) and log B-share price ( $PB_t$ ). Then,

$$\Delta X_t = \Gamma_1 \Delta X_{t-1} + \dots + \Gamma_{k-1} \Delta X_{t-k+1} + \Pi X_{t-k} + \varepsilon_t, \tag{1}$$

where

$$\Gamma_i = -(I - A_1 - \dots - A_i), i = 1 \dots k-1, \text{ (“short-run” matrix)}$$

$$\Pi = -(I - A_1 - \dots - A_k) \text{ (“long-run” matrix)}.$$

Following Johansen and Juselius (1990, 1992, JJ), we apply the maximum likelihood procedure to determine the rank of  $\Pi$  and estimate  $\alpha$  and  $\beta$ . Under the null hypothesis, there are  $r$  ( $0 < r < n$ , thus  $(n - r)$  unit roots) cointegrating vectors, i.e.,  $\Pi = \alpha\beta'$  with  $\alpha$  and  $\beta$  being  $n \times r$  ( $r [0, 1]$ ) and we have:

$$\Delta X_t = \Gamma_i \Delta X_{t-1} + \alpha\beta' X_{t-k} + \varepsilon_t \tag{2}$$

where  $\Delta$  is the first difference operator,  $\alpha$  is a  $(2 \times r)$  adjustment coefficient matrix,  $\beta$  is a  $(2 \times r)$  coefficient matrix of cointegrating

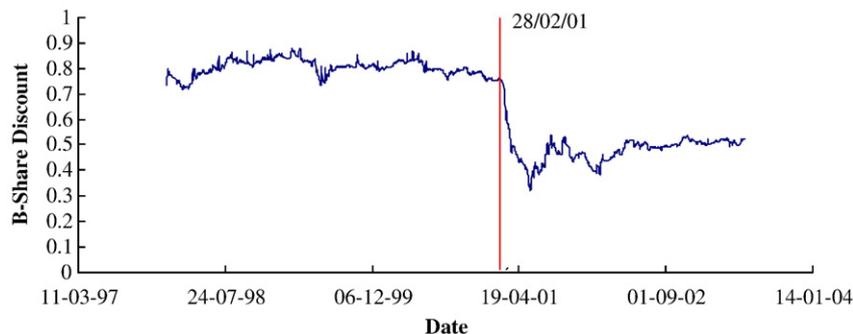


Fig. 1. The B-share discounts. Notes: the figure shows the average B-share discounts of 67 firms with A- and B-shares. The vertical line shows when the B-share market reopened for trading after lifting the ban.

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