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Effects of differences of opinions and short-sale constraints on the dual listed Chinese shares

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Abstract

Purpose – The purpose of this paper is to study the effects of short-sale constraints and differences of opinions on the price premium of dual listed Chinese A-H shares.

Design/methodology/approach – The analysis mainly follows the Miller's model, which indicates that the relaxation of stringent short-sale constraint could reduce the upward bias in stock prices. Following the literature, the paper uses the idiosyncratic return volatility and monthly turnover rate as two main proxies of differences of opinions.

Findings – This study shows that the high level of A-share differences of opinions will lead to the high price premium of A-share portfolio with the short-sale constraint in the A-share market. However, the high level of H-share differences of opinions has no effect on the price premium of H-share portfolio and has also positively contributed to the A-share price premium. The price premium of shorted A-share portfolio is declined more significantly than those of non-shorted ones after the relaxation of short-sale constraint in the A-share market.

Research limitations/implications – The findings in this study provide further evidence that dual listed Chinese A-shares with high level of differences of opinions and short-sale constraints tend to be overvalued.

Practical implications – This study supports Miller's hypothesis that with the control of short-sale constraint, the high level of differences of opinions could lead to the high degree of overvaluation of A-share portfolio. The market capitalization and book-to-market ratio of A-shares also generate significant positive effect to the A-share price premium. Finally, the introduction of short-sale mechanism in A-share market could partially eliminate the mispricing of dual-listed A-shares and improve the price efficiency of A-share market.

Originality/value – This study is mainly focused on the joint effects of differences of opinions and short-sale constraints on the A-share price premium. The new short-sale policy in A-share market in March 2010 provides us an opportunity to study the effect of relaxation of stringent short-sale constraint on the A-share price premium. In the literatures so far, all studies assumed A-shares are strictly prohibited to be sold short.

Keywords Differences of opinions, Short-sale constraint, A-share price premium, Dual listed shares, China, Shares

Paper type Research paper

1. Introduction

The benefits of international diversification attract free capital to move across borders. Such benefits prompt investors to pay higher prices for foreign stocks than they would

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pay for the domestic stocks. However, Chinese dual-listed shares have long been considered as a puzzle that the prices of A-shares which are exclusively held by Chinese domestic investors are usually higher than that of their corresponding foreign shares. The anti-intuitive phenomenon was first documented by Bailey and Jagtiani (1994). Since then, the early literatures were focused on explaining why there are price dispersions between Chinese A- and B-shares. In the last ten years, the academics shifted their attention to focus on the price dispersions between dual-listed A- and H-shares. H-shares are denominated in Hong Kong dollars issued, supervised and traded on the Stock Exchange of Hong Kong. The first H-share, Tsingtao Brewery, was listed in Hong Kong on July 15, 1993. Subsequent to its listing of H-shares in Hong Kong, the corresponding A-share was listed on the Shanghai Stock Exchange (SSE) on August 27, 1993. Since the establishment of dual-listed A- and H- share markets, it is found that the trading prices of H-shares are persistently lower than that of their corresponding A-shares. Why are there persistent A-share price premiums over that of H-shares? What are the main factors contributed to the direction and magnitude of the price dispersions between A- and H-shares? It is our interest in this study to tackle these questions.

Short-sale constraint has been considered as the main factor for the A-share price premiums in the Chinese stock markets. According to Miller's (1977) well-cited study, given the short-sale constraints, negative information cannot be immediately incorporated into stock prices. As a consequence of price discovery delay, stock prices may only reflect the opinions of the optimists, leading to the stock overvaluation. In addition to the short-sale constraint, another cornerstone of Miller's overvaluation hypothesis is the difference of opinion. For any given degree of short-sale constraint, the more heterogeneous the expectations, the greater the price and return bias. Likewise, given the amount of divergence in expectations, the higher the constraint on short sales, the greater the price and return bias. The imperfect disclosure of public information and the speculative nature of Chinese individual investors are the main factors causing high heterogeneous opinions in the Chinese stock market.

Before March 2010, short sale was not allowed for all stocks on Chinese stock exchanges. The A-share prices would mainly reflect the expectations of the most optimistic investors and thus generate high price premiums. On March 20, 2010, the China Securities Regulatory Commissions (CSRC) relaxed the stringent short-sale constraint in A-share market, allowing Chinese investors to sell short the composite stocks of the SSE 50 Index and the Shenzhen Stock Exchange (SZSE) 40 Index via designated security brokers. Such a relaxation caused the pessimists' opinions to be incorporated into the A-share prices. As a result, the price discovery efficiency of A-share market is improved.

In the literature, there are few studies focused on the joint effects of short-sale constraint and differences of opinions on the price premiums between dual-listed A- and H-shares. The aim of this study is to:

- provide evidence that the A-share price premiums could be explained by the joint effects of short-sale constraint and differences of opinions; and
- demonstrate that the introduction of short-sale mechanism in A-share market would narrow the price dispersions between dual-listed A- and H-shares and improve the price discovery.

In our study, we first examine the effects of differences of opinions on A-H share price dispersions with strict short-sale constraint before the introduction of short-sale policy in A-share market. Then we use event study to examine the effect of the relaxation of short-sale constraint on the A-share price premium. Our results reveal that before the introduction of short-sale mechanism in A-share market, the differences of opinions in both A- and H-share markets have significant positive relationships with the A-share price premiums. The relationships hold even when we control for the market capitalization, book-to-market ratio, past momentum returns and other potential factors. The results of event study show that the price premiums of shorted A-shares are declined more than that of non-shorted ones after the new short-sale policy taking place, indicating that the introduction of short-sale policy improves the price discovery of A-share market.

The rest of the paper is organized as follows. Section 2 provides the literature reviews. Section 3 describes the data, variables and testing hypotheses. Section 4 provides empirical tests for the impacts of differences of opinions and short-sale constraint on the A-share price premiums. Section 5 provides the summary and conclusions.

2. Literature reviews

Our research is mainly based on two streams in the literatures. One is the study on the possible explanations for the A-share price premiums and the other one is the study on the joint effects of differences of opinions and short-sale constraint on the capital market performance.

2.1 Studies on A-share price premiums

Regarding the A-share price premiums, most of the literatures are focused on the A-share premiums over B- and H-shares. Several competent hypotheses have been used to explain the A-share premiums. Sun and Tong (2000) showed that the A-share premiums could be explained by economic principles and macroeconomic factors. They found that H-shares and red-chip stocks could be viewed as the substitutions of B-shares and the supply of H-shares and red-chip stocks were positively related to the A-B share price dispersions. In addition, the sensitivity of foreign investors to the inflation rate and change in the official reserves also contributed to the A-share price premiums. Karolyi and Li (2002) found that the fundamental attributes of stocks matter for the magnitude of dual-listed A-B share price dispersions. Specifically, the decline in B-share discounts was concentrated in small capitalization stocks and those with substantial past return momentum around the regulatory changes in 2001. It was not related to the firm's risk and liquidity attributes.

Recently, academics tried to explain the price dispersions of A-shares from the perspective of market microstructure and information environment. Chan *et al.* (2008) constructed three measures of information asymmetry based on the market microstructure models and found that those measures could explain 45 percent of the variation of A-B share premiums. By isolating the impacts of disclosure practices on informational risk, Tang (2011) found that disparity in the public disclosure of information to domestic and foreign investors created a meaningful difference in investors' average information precision across A- and B- shares which contributed to the cross-sectional variation in price differences.

Besides, other factors such as investor sentiment and changes of exchange rate expectation have also been proved to be attributable to the long-term A-share premiums.

Wang and Jiang (2004) found that A-share returns are subjected to the market-specific risk and investor sentiment that are specific to the Chinese stock market, while H-share returns are subjected to the risk and investor sentiment in both Hong Kong and China stock markets. Using intraday high-frequency data, Chong and Su (2006) investigated the co-movement of A- and H-shares in a short period. Their results suggested that the stock markets of China and Hong Kong are segmented and for the small portion of stocks with co-movement, the A-share market played a major role in the price discovery process. By studying the price behavior of 13 dual-listed A-H shares, Li *et al.* (2006) found that the premiums on A-shares relative to H-shares are highly related to the contemporaneous premium of A-share local market relative to H-share local market, especially during the period of Asian financial crisis. Other factors such as the spread of savings rates between Hong Kong and China also contributed to the A-H share price differentials.

Arquette *et al.* (2008) found that the discounts attached to Chinese securities, whether trading as ADRs or H-shares appeared to have been significantly influenced by changes in both exchange rate expectation and investor sentiment during 1998-2006. Their conclusions were generally maintained under additional allowances for market capitalization, dividend payment and the company fixed effects in panel regressions. Burdekin and Redfern (2009) studied the role of investor sentiment in A-share market and provided the evidence that investor sentiment exerted consistently significant effects on the discounts attached to all Chinese foreign shares, including B-shares, H-shares and ADRs and the effects remained very robust even after controlling for other explanatory factors such as expected exchange rate movement and liquidity level. Callen *et al.* (2009) investigated the price disparity between A-shares and B- and H-shares. They decomposed the unexpected price disparity into differences in expected return news and cash flow news and found that the difference of expected return news dominated that of cash flow news in driving the variation of price disparity, suggesting that market news rather than firm specific news caused the price disparity of dual-listed shares.

Cai *et al.* (2011) developed a non-linear Markov error correction model to capture several important dimensions for the dual-listed A-H share dynamic pricing. With respect to the long-run A-share premium, their results revealed that the higher the A-share premium is, the higher the relative difference will be in the market's information asymmetry and opinion divergence. They also proved that the expectation of RMB revaluation also contributed to the long-run A-share premium. In addition, they noted that the recent financial crisis gave rise to a short-term reversal towards a narrowing of the A-share premium. The recent paper of Tong and Yu (2012) offered corporate governance explanation to the A-share premium. Their results suggested that A-share premium is relative high for firms with weak corporate governance characters.

2.2 Studies on joint effects of differences of opinions and short-sale constraints

Miller (1977) established the theoretical foundation for the empirical research in this area. In his study, he asserted that uncertainty and risk implied divergence of opinions. In a market with little or no short selling, the demand for a particular security would come from the minority who hold the most optimistic expectations about it. Since divergence of opinion was likely to increase with risk, it is quite possible that expected returns would be lower for risky securities, rather than higher, which was predicted by the traditional asset pricing models.

Till now, most of the applications of Miller's overvaluation model are concentrated in US markets. Though academics adopted different proxies for differences of opinions and short-sale constraints, their conclusion are qualitatively similar. For example, Chen *et al.* (2002) adopted the breadth of mutual fund ownership as a measure of the level of short-sale constraint and found that decreases (increases) in breadth of ownership led to low (high) subsequent returns. Diether *et al.* (2002) took the dispersion in analysts' forecast as the proxy and showed that stocks with higher dispersion in analysts' earnings forecast earned lower future returns than otherwise similar stocks. This effect was most pronounced in small stocks and stocks that had performed poorly over the past year. Johnson (2004) showed that relationships between forecast dispersion and subsequent returns documented by Diether *et al.* (2002) could be explained by the financial leverage. Recent studies examined the joint effects of short-sale constraint and differences of opinions on the stock performance and the conclusions are more consistent with Miller's hypothesis. Boehme *et al.* (2006) showed evidence that the significant overvaluation for stocks were subject to both differences of opinions and short-sale constraint. Stocks were not systematically overvalued when either one condition was not met.

Nagel (2005) adopted the institutional ownership as the proxy for the short-sale constraint. He found that holding size fixed, the underperformance of stocks with high market-to-book ratio, analyst forecast dispersion, turnover or volatility was most pronounced among stocks with low institutional ownership. Berkman *et al.* (2009) also adopted the institutional ownership as the indirect measure of short-sale constraint and other five distinct proxies for the differences of opinions (turnover rate, return volatility, forecast dispersion, list age and income volatility) and found that stock returns with high differences of opinions are more negative within the subsample of stocks that are most difficult to sell short.

For the applications of Miller's overvaluation hypothesis in Chinese stock market, Mei *et al.* (2003) analyzed the joint effects of short-sales constraint and heterogeneous beliefs on dual-listed Chinese A-B share prices and trading volumes. They found that the A-B share price difference was positively related to the domestic turnover rate. Both price difference and turnover rate increased with the idiosyncratic return volatility and decreased with the float of domestic shares. Their results indicated that investors' speculative motives could help to explain a significant fraction of the price difference. Chan *et al.* (2010) investigated the effect of short-sale eligibility of H-shares on A-H share premiums. They found that when the market went down, the prices of shorted H-shares decreased more than those of non-shorted ones, resulting in larger A-H share premiums. As the short-sale eligibility allowed more investors to trade, the trading volumes were high for shorted H-shares which contributed to the higher A-H price premiums.

Compared with the study of Chan *et al.* (2010), our study is focused on the joint effects of differences of opinions and short-sale constraint on the A-share price premiums. Besides, the relaxation of the stringent short-sale constraint in A-share market in March 2010 provided us an opportunity to further study the effects of short-sale constraint on the A-share price premiums. While in the literatures so far, all studies assumed A-shares are strictly prohibited to be sold short.

3. Data, variables and testing hypotheses

In this section, we describe the data and variable constructions and propose the testing hypotheses.

3.1 Data and variable constructions

Our data includes price premiums of firms that are dual-listed on the SSE and the Stock Exchange of Hong Kong from January 2001 to March 2011. At the end of March 2011, there are totally 55 pairs of A-H dual-listed shares in our study[1]. The A-share transactions, returns and firm-characteristics data are retrieved from China Security Market Research Database (CSMAR) and the H-share data are retrieved from the Datastream.

We define A-share price premium *PREM* as:

$$PREM_{i,t} = \frac{P^A_{i,t} - P^H_{i,t}}{P^A_{i,t}} \tag{1}$$

where P^A is the A-share monthly closing price, P^H is its corresponding H-share monthly closing price which has been converted to RMB by monthly exchange rate, and i identifies the firm and t identifies the current calendar month. We exclude the observations if either monthly closing price is missing. The main explanatory variables in our study are the proxies for the differences of opinions in both Shanghai and Hong Kong stock markets. We adopt two variables as the main proxies of differences of opinions according to the literature and data availability.

The first proxy is the idiosyncratic monthly return volatility (*SIGMA*) which is computed as the standard deviation of daily idiosyncratic return. We exclude the firm-month observation if it has less than five daily returns in one specific month. Following Mei *et al.* (2003), we measured the idiosyncratic return $\mu_{i,t}$ as the residual return in the following CAPM model:

$$R_{i,t} = \beta_0 + \beta_1 MKT_{i,t} + \beta_2 MKT_{i,t-1} + \mu_{i,t} \tag{2}$$

where R is the daily A-share (H-share) return, MKT is the daily Shanghai Composite Index (Hang Seng China Enterprise Index) return and i identifies the firm and t identifies the current calendar month.

The second proxy is the monthly turnover rate (*TURN)* obtained by:

$$TURN_{i,t} = \frac{\sum_{j=1}^{n} DST_j}{MSO} \tag{3}$$

where *DST* is the number of daily shares traded and MSO is the monthly shares outstanding and n is the number of trading days in the current calendar month. For A-shares, we use number of tradable shares instead of total shares outstanding as the denominator to obtain the monthly turnover rate. Again we exclude the firm-month observation if there are less than five daily trading records in a specific month.

In the robustness test, we use one alternative proxy *RETVOL* to examine the effects of differences of opinions on the A-H price premiums. *RETVOL* is the monthly return volatility which is measured by the standard deviation of a firm's daily stock excess return in a month in which the excess return is measured as the difference between A-share (H-share) daily return and the corresponding return of daily Shanghai Composite Index (Hang Seng China Enterprise Index). In our analysis, we also use several variables to control for the potential factors influencing the long-term A-share premiums. We obtain the stock market capitalization as the product of monthly closing

price and the number of total shares outstanding in June of each year. In our study, we take the natural logarithm of the market capitalization to avoid the potential skewness. We also control for the book-to-market factor to ensure that the effect of differences of opinions is distinct from the glamour anomaly. Book-to-market ratio is obtained by dividing the book value of the firm to its market value of equity at the end of previous fiscal year. To capture the effects of past return momentum, we calculate cumulative buy-and-hold return for previous one month (*RET1*), six months (*RET26*) and penultimate six months (*RET712*), respectively, for each firm.

Following Fama and French (1992), we estimate the stock beta as the sum of slopes in the regression of following CAPM model:

$$R_{i,t} = \beta_0 + \beta_1 MKT_{i,t} + \beta_2 MKT_{i,t-1} + \mu_{i,t} \tag{4}$$

where R is the monthly A-share (H-share) raw return, MKT is the monthly Shanghai Composite Index (Hang Seng China Enterprise Index) return and i identifies the firm and t identifies the current calendar month. In order to obtain reliable beta estimation, there must be at least 12 of the 36 monthly returns in firm-month observations preceding to the estimation month. From the estimation of above equation, we denote:

$$Beta = \beta_1 + \beta_2.$$

Many of the existing literatures have pointed out the importance of market condition and exchange rate change in realigning A- and H-share prices (Arquette *et al.*, 2008; Cai *et al.*, 2011). In order to control for these two factors and also to rule out the possibility that our differences of opinions proxies reflect the rapidly changing fundamentals or changing perception of these fundamentals, we calculate another two sets of control variables, *MKTRET* and *EXP*. Specifically, $MKTRET^A$ and $MKTRET^H$ are the monthly returns of Shanghai Composite Index and Hang Seng China Enterprise Index (market returns in A- and H-share markets), respectively, and *EXP* is measured as:

$$EXP_t = \frac{NDF_t - SP_t}{SP_t} \tag{5}$$

where *NDF* is the 12-month non-deliverable forward price of RMB against US dollar and *SP* is the spot exchange rate between RMB and US dollar.

In the event study, the dummy variable, *SHORT*, is equal to one if the A-share observation is allowed to be shorted after March 2010, otherwise it is zero. Besides eliminating the A-share observations with insufficient data available, some variables with extreme values will largely affect the empirical results. Thus, we further winsorize *PREM, SIGMA, TURN, DISP, RETVOL, MV, BM, RET1, RET26*, *RET712* and *Beta* at 1 and 99 percent levels.

3.2 Testing hypotheses

The relatively simple environment in Chinese stock market (strictly enforced restriction on short-sales, segmentation of A- and H-share markets and the lack of derivative instrument) before the new short-sale policy in March 2010 facilitates us to isolate the effect of short-sale constraint. We expect that the high heterogeneous opinions of A-share prices will lead to the high degree of overvaluation of A-shares during the sample period from January 2001 to February 2010. Thus, our first hypothesis is:

H1. Before the introduction of short-sale mechanism in A-share market, the high level of A-share differences of opinions will lead to the high level of A-share price premium.

However, the short-sale regulations vary widely across A- and H-share markets. The latter put shorted securities in an official list which is revised over time. In addition, the Hong Kong market is well established, more open and rigorous in terms of listing requirements and information disclosure than that of the China stock market. The different institutional settings regarding the short-sale policies make the impacts of heterogeneous opinions in Hong Kong quite different from that in Shanghai. With heterogeneous beliefs and no short-sale constraints in the H-share market[2], both optimistic and pessimistic investors determine the equilibrium H-share prices. Thus, in the H-share market, we expect that the differences of opinions may not lead H-share prices to deviate from their fundamental values and cause the overvaluation of H-shares. However, with stringent short-sale constraint in the A-share market, pessimistic investors are unable to sell short the overvalued A-shares and the equilibrium A-share prices will have a positive bias as we stated in the *H1*. As a result, our second hypothesis is:

H2. Since H-shares are not subjected to the strict short-sale constraint, the high level of differences of opinions in H-share market may not lead to the high H-share price relative to the corresponding A-share price and thus also contribute positively to the A-share price premium.

The policy launched in March 2010 allowed short sales for some A-shares. The introduction of short-sale policy in A-share market made the price of shorted A-shares to reflect not only the opinions of optimistic investors but also the opinions of pessimistic investors. As a result, we expect that the shorted A-shares become less overvalued. Since there are no fundamental changes in the H-share market during the event period, we conjecture that A-share premium would decline sharply for shorted A-shares. And for the non-shorted A-shares, the price premiums would also be narrowed because of the improvement of overall information environment in the A-share market. However, the premium decline of non-shorted A-shares should be less than that of shorted ones. Thus, the new policy would enhance the price discovery of shorted A-shares. Hence, our third hypothesis is:

H3. The price dispersions between A- and H-shares are narrowed more for shorted A-shares than those of non-shorted ones after the new short-sale policy is introduced in the A-shares market.

4. Empirical studies on A-H share price premiums

4.1 Descriptive statistics

Table I presents the summary statistics of price premium variables (Panel A) and their correlation matrix (Panel B) in A- and H-share markets. It is observed that there are very large A-share price premiums, *PREM*, during the sample period with mean 45.85 percent, median 50.35 percent and standard deviation of 28.63 percent. Regarding the proxies of difference of opinion, it seems there is no big difference between idiosyncratic return volatility (*SIGMA*) in A-share and H-share markets. The mean (median) of *SIGMA_a* and *SIGMA_h* is 1.76 percent (1.58 percent) and 2.02 percent (1.83 percent), respectively. However, the monthly turnover rate (*TURN*) is quite

Table I. Summary statistics of price premium variables and their correlation matrix in A- and H-share markets

Panel A: summary statistics

Variable	*Mean*	*Median*	*Q1*	*Q3*	*SD*
PREM	0.4585	0.5035	0.2596	0.6913	0.2863
SIGMA_a	0.0176	0.0158	0.0107	0.0225	0.0100
SIGMA_h	0.0202	0.0183	0.0125	0.0252	0.0118
TURN_a	0.3842	0.2646	0.1296	0.5335	0.3610
TURN_h	0.2062	0.1571	0.0877	0.2627	0.1780
MV_a (in RMB millions)	113.7938	20.4862	6.7371	67.6116	305.9074
MV_h (in RMB millions)	44.4980	6.0574	1.7129	20.4766	147.7508
BM_a	0.6727	0.5247	0.3645	0.7477	1.0751
BM_h	0.7751	0.6250	0.4219	0.9901	0.5298
RET1_a	0.0109	0.0070	−0.0684	0.0829	0.1373
RET1_h	0.0225	0.0102	−0.0573	0.0936	0.1469
RET26_a	0.0591	−0.0120	−0.1779	0.1947	0.1064
RET26_h	0.1378	0.0721	−0.1033	0.3282	0.4095
RET712_a	0.0623	−0.0316	−0.2282	0.2285	0.4832
RET712_h	0.1759	0.0663	−0.1428	0.4046	0.5115

Panel B: Pearson correlation matrix

	PREM	*SIGMA_a*	*TURN_a*	*MV_a*	*BM_a*	*RET1_a*	*RET26_a*	*RET712_a*
PREM	1.0000	0.3878	0.2435	−0.2845	−0.2024	0.0382	0.0259	0.0027
SIGMA_a		1.0000	0.4380	−0.2502	−0.1043	0.1535	0.1279	0.0489
TURN_a			1.0000	−0.1782	0.0410	0.1429	0.0837	0.0069
MV_a				1.0000	−0.0535	−0.0041	0.0210	0.0348
BM_a					1.0000	0.0320	−0.0040	−0.1045
RET1_a						1.0000	0.0129	0.0109
RET26_a							1.0000	0.1237
RET712_a								1.0000
	PREM	*SIGMA_h*	*TURN_h*	*MV_h*	*BM_h*	*RET1_h*	*RET26_h*	*RET712_h*
PREM	1.0000	0.3410	0.1480	−0.3805	0.4423	−0.0450	−0.0735	−0.1093
SIGMA_h		1.0000	0.3464	−0.3405	0.1985	0.1127	0.0778	0.0769
TURN_h			1.0000	−0.1327	−0.0528	0.1018	0.1660	0.1559
MV_h				1.0000	−0.2580	0.0119	0.0168	0.0376
BM_h					1.0000	−0.0017	−0.0924	−0.2613
RET1_h						1.0000	0.0295	0.0543
RET26_h							1.0000	0.1191
RET712_h								1.0000

Notes: This table presents the summary statistics of price premium variables and their correlation matrix in A- and H-share markets; *PREM* is the price premium of dual-listed A-shares; *SIGMA_a*, *TURN_a*, *MV_a*, *BM_a*, *RET1_a*, *RET26_a* and *RET712_a* is the idiosyncratic return volatility, monthly turnover rate, market capitalization, book-to-market ratio, past one-month return, past six-month return and penultimate past six-month return, respectively, in the A-share market; while *SIGMA_h*, *TURN_h*, *MV_h*, *BM_h*, *RET1_h*, *RET26_h* and *RET712_h* is the idiosyncratic return volatility, monthly turnover rate, market capitalization, book-to-market ratio, past one-month return, past six-month return and penultimate past six-month return, respectively, in the H-share market; Table I provides the rough evidence for our first two hypotheses

different in A- and H-share markets. The mean (median) of *TURN_a* is 38.42 percent (26.46 percent), which is nearly two times as that of *TURN_h* with mean (median) of 20.60 percent (15.71 percent). The high A-share turnover rate in our study is consistent with findings in most of the literatures.

Figure 1 shows the relationship between dual-listed A-share price premium and idiosyncratic monthly return volatility (*SIGMA*) in both A- and H-share markets from January 2001 to March 2011. And Figure 2 shows the relationship between dual-listed A-share price premium and monthly turnover rate (*TURN*) in both A- and H-share markets from January 2003 to March 2011. As shown in two figures, the A-share price premiums tend to have a downward trend. For example, Figure 1 shows that the premium has a very high value of 89.58 percent at the beginning of January 2001 and decreases to 21.85 percent in September 2010. However, the two proxies of differences of opinions, *SIGMA* and *TURN*, tend to be very volatile without a clear pattern in the period from January 2001 to March 2011.

From Table I, we also find that the market capitalization (*MV*) of A-share is much larger than that of the corresponding H-share. The mean (median) of *MV_a* is 113.79 million (20.49 million) which is much larger than *MV_h* with mean (median) of 44.50 million (6.06 million). The result of *MV* is not surprising as the trading of dual-listed A-H shares is more active in Shanghai than that in the Hong Kong stock market. As the result of the market capitalization difference, the dual-listed A-H shares have a relative high *BM* ratio in Hong Kong with mean (median) of 77.51 percent (62.50 percent), compared with 67.27 percent (52.47 percent) in Shanghai. In addition,

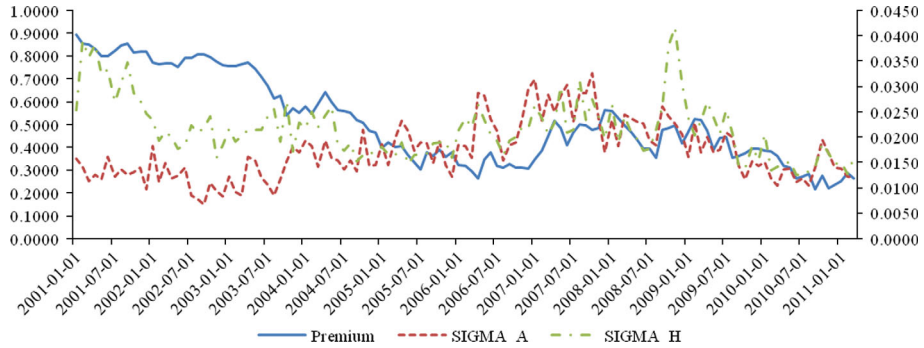

Figure 1.
Dual-listed A-share price premium and idiosyncratic return volatility in A- and H-share markets

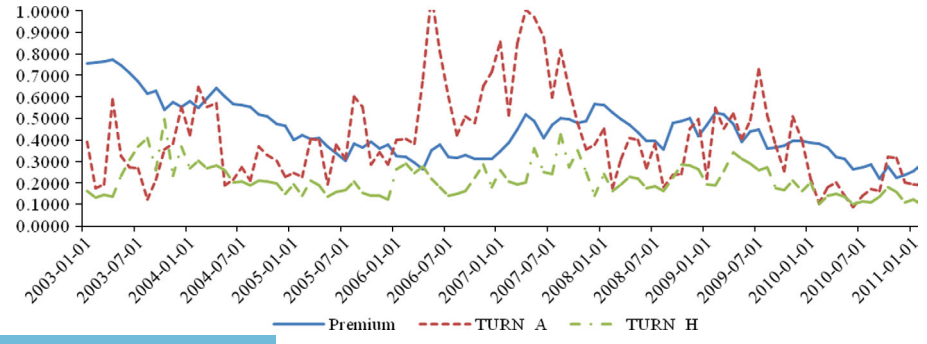

Figure 2.
Dual-listed A-share price premium and monthly turnover rate in A- and H-share markets

the past stock performance of H-share is usually better than that of A-share. Specifically, the average past one-month return *RET1* is 1.09 percent for A-shares and 2.25 percent for H-shares. The average past six-month return *RET26* is 5.91 percent for A-shares and 13.78 percent for H-shares. When we extend the return horizon to the penultimate six-month, the average return *RET712* rises to 6.23 percent for A-shares and 17.59 percent for H-shares.

The Pearson correlation matrix of Table I provides the rough evidence to our first two hypotheses. It is observed that the levels of differences of opinions in both A- and H-share markets have positive relationships with A-share premiums. For example, the correlation coefficient between the price premium, *PREM* and *SIGMA_a* (*SIGMA_h*) is 0.3878 (0.3410). It indicates that the high idiosyncratic return volatility in both A- and H-share markets would lead to the high A-share price premiums. Similarly, the high correlation between *PREM* and monthly turnover rate *TURN* in both markets would have the similar effects on the price differentials of A-H shares. Considering the relationship between *PREM* and market capitalization *MV*, we find the correlation coefficient is − 0.2845 in A-share market and − 0.3805 in H-share market, indicating that the price premiums are negatively related to the market capitalization in both A- and H-share markets. By contrast, the growth opportunity and past stock performance in Shanghai and Hong Kong markets have generated opposite effects on A-share price premiums. Specifically, the A-share (H-share) *BM* ratio is negatively (positively) related to A-share price premiums. The positive correlations between *PREM* and *RETs* in A-share market indicate that if the dual-listed stocks performed well in A-share market in the past, the high A-share premiums would be expected. The negative correlations between *PREM* and *RETs* in H-share market show just the opposite.

4.2 H1 *and* H2 *testing with portfolio analysis*

In this section, we test the validity of *H1* and *H2* regarding the relationships between the level of differences of opinions and the magnitude of A-share price premiums. We first examine the relationships between the mean price premiums of A-share portfolios and the two main proxies of differences of opinions. The sample period for *SIGMA* and *TURN* is from January 2001 to March 2010. The portfolio analysis helps us to determine the qualitative effects of differences of opinions on the A-H share price dispersions in the market with a strict short-sale constraint. We then examine the effects with more precise Fama and MacBeth (1973) regression analysis in which we control for the pronounced size, book-to-market ratio and return momentum effect.

To study the effects of the relative magnitude of differences of opinions *r_SIGMA* and *r_TURN* on the A-share price premiums, we define:

$$r\_SIGMA_{i,t} = \frac{SIGMA^{A}_{i,t} - SIGMA^{H}_{i,t}}{SIGMA^{A}_{i,t}} \tag{6}$$

$$r\_TURN_{i,t} = \frac{TURN^{A}_{i,t} - TURN^{H}_{i,t}}{TURN^{A}_{i,t}} \tag{7}$$

where $SIGMA^{A}$ and $SIGMA^{H}$ are the idiosyncratic return volatility and $TURN^{A}$ and $TURN^{H}$ are the monthly turnover rate in A- and H-share markets, respectively, and i identifies the firm and t identifies the current calendar month. We divide firm-month

observations into two portfolios based on the absolute magnitude of *SIGMA* and *TURN* in both A- and H-share markets, respectively, and also based on the relative magnitude of *r_SIGMA* and *r_TURN*. For each month, we sorted our observations by the differences of opinion proxies. If the difference of opinion proxy (*SIGMA*, *TURN*, *r_SIGMA* or *r_TURN*) of the firm-month observation is smaller (larger) than that of the monthly median, then the firm will be falling into "low" ("high") sub-portfolio. For each "low" and "high" sub-portfolio, the mean A-share price premium is calculated for every calendar month. Finally, we compare the mean A-share premium between "high" and "low" sub-portfolios using "high-low". Table II reports the mean price premiums of A-share portfolios formed by means of two main proxies of differences of opinions.

The results based on the absolute magnitude of differences of opinions *SIGMA* and *TURN* in Table II verify both of our *H1* and *H2*. That is, we do observe positive relationships between the level of differences of opinions in both A- and H-share markets and the A-share price premiums. In fact, the A-share price premium increases monotonically with the level of differences of opinions in both A- and H-share markets. In the A-share market, for portfolios categorized by *SIGMA*, the A-share price premium increases from 47 percent with low level of *SIGMA* to 60.88 percent with high *SIGMA* value. For portfolios categorized by *TURN*, the A-share price premium increases from 41.63 percent with low level of *TURN* to 50.49 percent with high *TURN* value.

To test whether the relationships between mean A-share price premiums and differences of opinions are statistically significant, we calculate the differences of mean A-share price premiums between portfolios with high and low levels of differences of opinions. The results in Table II show that all differences are statistically significant at 1 percent level using a two-tailed *t*-test. In the A-share market, the high-low difference is 13.88 and 8.86 percent, respectively, for *SIGMA* and *TURN*. They are 11.83 and 7.07 percent, respectively, for *SIGMA* and *TURN* in

	Mean price premium of A-share portfolio					
Portfolio	*SIGMA_a*	*SIGMA_h*	*TURN_a*	*TURN_h*	*r_SIGMA*	*r_TURN*
Low	0.4700***	0.4804***	0.4163***	0.4254***	0.5441***	0.4567***
	(23.34)	(23.97)	(26.63)	(26.61)	(32.56)	(29.04)
High	0.6088***	0.5988***	0.5049***	0.4961***	0.5353***	0.4729***
	(41.11)	(39.61)	(39.87)	(36.41)	(29.55)	(36.14)
High-low	0.1388***	0.1183***	0.0886***	0.0707***	−0.0087	0.0162
	(14.22)	(12.01)	(8.97)	(5.27)	(−0.35)	(0.79)

Notes: Significant at: *10, **5 and ***1 percent levels; this table reports the mean price premium of A-share portfolio by means of two proxies of differences of opinions; in each calendar year-month, firms with dual-listed A- and H-shares are divided into two portfolios based on the high or low level of *SIGMA* and *TURN* in both A- and H-share markets and also based on the high or low level of *r_SIGMA* and *r_TURN*, where *r_SIGMA* is the relative idiosyncratic return volatility and *r_TURN* is the relative monthly turnover rate in A-H share markets; we first calculate the average price premium of each portfolio in every calendar-month; we then calculate and report the mean price premium of A-share portfolio based on *SIGMA* and *TURN*, respectively, in both A- and H-share markets and also based on *r_SIGMA* and *r_TURN*; difference in mean price premium of A-share portfolio (high-low in the table) based on *SIGMA* and *TURN* in both A- and H-share markets and based on *r_SIGMA* and *r_TURN* is evaluated with a two-sided *t*-test; White's (1980) heteroskedasticity-consistent *t*-statistics are shown in parentheses

Table II.
Portfolio analysis of mean price premium of A-shares based on proxy of differences of opinions

the H-share market. The results demonstrate that the mean A-share price premiums of portfolios with high level of differences of opinions are significantly higher than that with low level of differences of opinions.

However, when we calculate the differences of mean A-share price premiums between portfolios with high and low levels of relative magnitude of differences of opinions, the differences are not statistically significant. As can be seen from Table II, the "high-low" difference is −0.87 percent for *r_SIGMA* and 1.62 percent for *r_TURN* and both differences are not statistically significant. The result is not surprising because the level of differences of opinions in both A- and H-share markets is positively related to the A-share premium. The high level of A-share differences of opinions pushes up A-share prices while the high level of H-share differences of opinions drags down the H-share prices. When we adopt *r_SIGMA* and *r_TURN* in the analysis, the effects of A- and H-share differences of opinions offset each other so the A-share premium differences become not significant.

To further examine the effects of differences of opinions on the A-share price premiums, we adopt an independent two-dimensional categorized approach to take both A- and H-share differences of opinions into consideration simultaneously. Specifically, for each calendar year-month, we categorize A- and H-share *SIGMA* and *TURN* into two independent portfolios each. Then we merge these portfolios together based on *SIGMA* and *TURN*, respectively. This approach will leads to four double-categorized portfolios, respectively, based on *SIGMA* or *TURN*. Table II provides the mean price premiums of above double-categorized A-share portfolios.

Consistent with our *H1* and *H2* and the results in Table II, the results in Table III indicate that the differences of opinions in both A- and H-share markets are positively related to the A-share price premiums. The relationships hold even when we control for the effects of differences of opinions in either A- or H-share market. For example, in Panel A of Table III, when the A-share *SIGMA* is low, the difference of A-share price premiums between portfolios with high and low H-share *SIGMA* is 8.51 percent and significant at 1 percent level. On the other hand, when the H-share *SIGMA* is low, the difference of A-share price premiums between portfolios with high and low A-share *SIGMA* is 12.24 percent and also significant at 1 percent level. For the *TURN* in Panel B of Table III, when the A-share *TURN* is high, the difference of A-share price premiums between portfolios with high and low H-share *TURN* is 5.29 percent and significant at 5 percent level. On the other hand, when the H-share *TURN* is high, the difference of A-share price premiums between portfolios with high and low A-share *TURN* is 7.34 percent and also significant at 5 percent level.

4.3 H1 *and* H2 *testing with regression analysis*

In this section, we examine the effects of differences of opinions on A-share price premiums in a regression framework after controlling for the market capitalization, book-to-market ratio and past return momentums in both A- and H-share markets:

$$\begin{aligned} PREM_{i,t} = {} & \beta_0 + \beta_1 DIFF^A_{i,t} + \beta_2 DIFF^H_{i,t} + \beta_3 MV^A_{i,t} + \beta_4 MV^H_{i,t} + \beta_5 BM^A_{i,t} \\ & + \beta_6 BM^H_{i,t} + \beta_7 RET1^A_{i,t} + \beta_8 RET1^H_{i,t} + \beta_9 RET26^A_{i,t} + \beta_{10} RET26^H_{i,t} \\ & + \beta_{11} RET712^A_{i,t} + \beta_{12} RET712^H_{i,t} + \mu_{i,t} \end{aligned} \quad (8)$$

		Low	High	High-low
Panel A: mean price premium of A-share portfolio				
			SIGMA_a	
SIGMA_h	Low	0.4391***	0.5581***	0.1224***
		(19.93)	(32.31)	(10.57)
	High	0.5208***	0.6357***	0.1125***
		(27.86)	(39.61)	(9.79)
	High-low	0.0851***	0.0753**	
		(7.34)	(6.91)	
Panel B: mean price premium of A-share portfolio				
			TURN_a	
TURN_h	Low	0.3916***	0.4688***	0.0772***
		(23.77)	(21.08)	(4.09)
	High	0.4484***	0.5218***	0.0734**
		(22.74)	(43.57)	(7.68)
	High-low	0.0568***	0.0529**	
		(3.52)	(2.52)	

Notes: Significant at: *10, **5 and ***1 percent levels; this table reports the mean price premium of A-share portfolio based on an independent two-dimensional categorized approach to take both A- and H-share differences of opinions into consideration simultaneously; for each calendar year-month, we categorize A- and H-share idiosyncratic return volatility (*SIGMA*) and monthly turnover rate (*TURN*) into two independent portfolios each; we then merge these portfolios based on *SIGMA* and *TURN*, respectively; we first calculate the average price premium of each portfolio in every calendar-month categorized by *SIGMA* and *TURN*; we then calculate and report the mean price premium of A-share portfolio based on *SIGMA* (Panel A) and *TURN* (Panel B), respectively; the difference in mean price premium of A-share portfolio is evaluated with a two-sided *t*-test; White's (1980) heteroskedasticity-consistent *t*-statistics are shown in parentheses

Table III.
Multivariate analysis of A-share price premium based on proxy of differences of opinions

where *PREM* is the mean A-share price premium, $DIFF^A$ and $DIFF^H$ are the specified proxies of differences of opinions (*SIGMA* and *TURN*) in A- and H-share markets, respectively, MV^A and MV^H are the market capitalizations and BM^A and BM^H are the book-to-market ratios in A- and H-share markets, respectively, $RET1^A$, $RET26^A$, $RET712^A$ and $RET1^H$, $RET26^H$ and $RET712^H$ are the past one-month return, past six-month return and penultimate past six-month return in A- and H-share markets, respectively, again i identifies firm and t identifies the calendar month. To be consistent with our portfolio analysis, the estimation period based on *SIGMA* and *TURN* are from January 2001 to March 2010. Table IV reports the estimation results of nine regression model specifications. For the convenience of interpretation, all variables are converted into percentages before regression.

According to our *H1* and *H2*, the predicted sign of regression coefficients of proxies of differences of opinions in both A- and H-share markets should be positive. The estimation results based on *SIGMA* and *TURN* in the first two columns of Table IV are consistent with our predictions. The *SIGMA* seems to have a much greater explanatory power for the dual-listed A-share price premiums compared with that of *TURN*. Both $SIGMA^A$ and $SIGMA^H$ in Model 1 could explain 20.84 percent of the variability of A-share price premiums.

Based on the estimation results from regression Models 3-7 in Table IV, we could infer that the stock market capitalization (*MV*), book-to-market ratio (*BM*) and past

Table IV. Regression results of A-share price premium based on proxy of differences of opinions and control variables

	1 (*SIGMA*)	2 (*TURN*)	3	4	5	6	7	8 (*SIGMA*)	9 (*TURN*)
DIFF_a	8.87***	0.21***						5.29***	0.18***
	(14.13)	(6.44)						(6.56)	(4.90)
DIFF_h	5.26***	0.12**						1.10*	0.28***
	(8.34)	(2.51)						(1.65)	(8.23)
MV_a			9.04***					12.44***	12.49***
			(16.53)					(10.61)	(10.69)
MV_h			−15.36***					−17.25***	−18.53***
			(−26.55)					(−11.76)	(−12.24)
BM_a				−27.54***				−10.48***	−14.96***
				(−12.93)				(−2.93)	(−4.20)
BM_h				28.58***				0.84	2.19
				(21.48)				(0.35)	(0.88)
RET1_a					0.18**			0.17***	0.18***
					(2.21)			(2.77)	(2.68)
RET1_h					−0.22***			−0.16***	−0.14**
					(−3.93)			(−2.86)	(−2.27)
RET26_a						0.04		0.12***	0.15***
						(1.03)		(3.43)	(4.88)
RET26_h						−0.13***		−0.06**	−0.12***
						(−4.40)		(−2.10)	(−4.14)
RET712_a							0.04	0.06*	0.05*
							(0.98)	(1.89)	(1.67)
RET712_h							−0.11***	−0.02	−0.04*
							(−4.06)	(−1.01)	(−1.69)
Adjusted R^2 (%)	20.84	9.42	45.47	30.57	10.24	12.19	10.71	58.30	62.48

Notes: Significant at: *10, **5 and ***1 percent levels; this table shows the regression results of A-share price premium based on proxy of differences of opinions after controlling for the market capitalization, book-to-market ratio and past return momentums in both A- and H-share markets; the dependent variable in all nine model specifications is the mean price premium of A-shares, *PREM* in equation (8); two proxies of differences of opinions *SIGMA* and *TURN* in all models are specified by *DIFF* (*DIFF_a* and *DIFF_h*) in A- and H-share markets; the control variables in all models are market capitalization (*MV*), book-to-market ratio (*BM*), past one-month return (*RET1*), past six-month return (*RET26*) and penultimate past six-month return (*RET712*); the table shows the regression estimate of weighted Fama and Macbeth coefficients and their corresponding heteroskedasticity-consistent *t*-statistics (in parenthesis), where the weights correspond to the number of observations in each month

return momentums (*RETs*) do influence the magnitude of A-share price premiums. Specifically, the A-share market capitalization, the H-share book-to-market ratio and the past A-share returns are positively related to the A-share premiums; while the H-share market capitalization, the A-share book-to-market ratio and the past H-share returns are negatively related to the A-share premiums. Compared with our main variables of interest *SIGMA* and *TURN* in Models 1 and 2, the control variables also have substantial explanatory power to the A-share premiums with the adjusted R^2 ranges from 10.24 percent (*RET1*) to 45.47 percent (*MV*).

In the regression Models 8 and 9, we use all differences of opinions proxy variables and control variables to test whether the effects on A-share premiums generated by differences of opinions proxy variables are distinct from that generated by control variables. The results shown in the last two columns of Table IV indicate that the proxies of differences of opinions *SIGMA* and *TURN* have the incremental explanatory power on the A-share premiums. The coefficients of *SIGMA* and *TURN* are all significantly positive in two models. For example, the coefficient of $SIGMA^A$ is 5.29 with *t*-statistic 6.56 in Model 8. The result implies that 1 percent increase in A-share idiosyncratic return volatility will lead to a 5.29 percent increase in A-share price premium, *ceteris paribus*. The implications of other coefficients of differences of opinions are similar.

In addition, the estimated coefficients of all control variables in Models 8 and 9 have the predicted sign and are significant at 5 percent levels or above except for the H-share BM ratio and past penultimate six-month return (*RET712*). The regression results indicate that both proxies of differences of opinions and prevailing pricing factors have explanatory power on A-share price premiums. The weak significance of coefficients of *RET712*'s implies that the investment horizon of most investors is no longer than six months in both A- and H-share markets. It seems that investors in both markets like to pursue stocks with recent high abnormal returns regardless of their fundamental values. Such investment behavior is relatively easy to cause speculative bubble in the A-share market as indicated by Mei *et al.* (2003). Besides, the speculative investors are more likely to be affected by the differences of opinions than the value investors. The regression results in Table IV support our *H1* and *H2* that high differences of opinions lead to an upward bias in A-share prices and cause large price dispersions in the segmented A- and H-share markets with stringent short-sale constraint.

4.4 Robustness regression analysis with alternative proxies of differences of opinions

In this section we use robustness regression test to study whether the relationships between A-share price premiums and proxies for differences of opinions derived from the main regression model (equation (8)) in Table IV remain valid when we use alternative proxy of differences of opinions and control for other factors that may have explanatory power over A-share premiums.

In order to rule out the possibility that our results on A-share price premiums are mainly driven by *SIGMA* and *TURN* in the main regression model of equation (8), we use one alternative proxy *RETVOL* for the differences of opinions. The regression result using *RETVOL* for the differences of opinions is shown in the first model (column one) of Table V. The result shows that the coefficients of both A- and H-share *RETVOLs* are positive and significant at 5 percent level or above. The result implies that 1 percent increase in A-share (H-share) monthly excess return volatility will lead to a 3.74 percent (1.50 percent) increase in A-share price premium. The result on *RETVOL* provides further

	1 (*RETVOL*)	2 (*SIGMA*)	3(*SIGMA*)	4(*TURN*)	5 (*TURN*)
DIFF_a	3.74***	5.32***	1.28***	0.17***	0.03*
	(5.25)	(6.37)	(2.96)	(4.71)	(1.88)
DIFF_h	1.50**	0.67	0.55	0.33***	0.13***
	(2.55)	(0.89)	(1.15)	(8.44)	(3.34)
MV_a	12.37***	12.07***	22.33***	11.41***	21.53***
	(10.78)	(10.69)	(5.63)	(9.39)	(5.41)
MV_h	−17.51***	−17.20***	−25.29***	−17.52***	−24.21***
	(−11.92)	(−12.41)	(−11.36)	(−11.73)	(−11.21)
BM_a	−10.81***	−7.23*	−3.33	−13.81***	−3.25
	(−3.01)	(−1.93)	(−1.45)	(−3.49)	(−1.49)
BM_h	−0.01	0.75	4.86***	3.40	4.28***
	(−0.00)	(0.30)	(2.71)	(1.29)	(2.65)
RET1_a	0.19***	0.18**	0.07***	0.15*	0.07***
	(3.19)	(2.45)	(5.11)	(1.88)	(4.70)
RET1_h	−0.19***	−0.17***	−0.15***	−0.14**	−0.17***
	(−3.48)	(−2.99)	(−7.70)	(−2.15)	(−8.00)
RET26_a	0.12***	0.10**	0.05***	0.12***	0.06***
	(3.64)	(2.59)	(3.51)	(3.15)	(3.42)
RET26_h	−0.06**	−0.06*	−0.07***	−0.13***	−0.08***
	(−2.32)	(−1.74)	(−4.25)	(−4.25)	(−5.43)
RET712_a	0.06**	0.03	0.04***	0.31	0.04***
	(2.00)	(0.85)	(3.07)	(0.82)	(3.45)
RET712_h	−0.03	−0.01	−0.03**	−0.03	−0.03***
	(−1.19)	(−0.16)	(−2.11)	(−0.92)	(−3.17)
Beta_a		2.50	−1.71	0.65	−1.07
		(1.54)	(−0.48)	(0.36)	(−0.30)
Beta_h		1.64	−5.92***	−1.20	−5.72***
		(1.22)	(−4.22)	(−0.87)	(−4.16)
MKTRET_a			0.13***		0.13***
			(5.01)		(5.07)
MKTRET_h			−0.27***		−0.32***
			(−9.85)		(−10.58)
EXP			1.52***		1.34***
			(8.43)		(7.25)
Firm effect	No	No	Yes	No	Yes
Time effect	No	No	Yes	No	Yes
Adjusted R^2 (%)	56.76	56.77	53.73	60.88	46.70

Notes: Significant at: *10, **5 and ***1 percent levels; this table reports the robustness regression results of A-share price premium with one alternative proxy of differences of opinions, *RETVOL* and also controlling for the risk factor, market condition and expected RMB exchange rate change; *RETVOL* is the monthly excess return volatility; the dependent variable is the price premium of A-shares, *PERM*; the alternative proxy *RETVOL* and two main proxies *SIGMA* and *TURN* in the robustness regression models are specified by *DIFF* (*DIFF_a* and *DIFF_h*) in A- and H-share markets, respectively; the table shows the regression estimate of weighted Fama and Macbeth coefficients and their corresponding heteroskedasticity-consistent *t*-statistics (in parenthesis), where the weights correspond to the number of observations in each month without control of firm effect and time effect (Models 1, 2 and 4); the table also shows the regression estimate of panel regression with control of both firm effect and time effect (Models 3 and 5)

Table V.
Robustness regression results of A-share price premium with alternative proxy of differences of opinions

support to our first two hypotheses that the absolute magnitude of differences of opinions in both A- and H-share markets generates positive impacts to the A-share price premiums. Of particular importance, we test whether the price premiums of A-shares are caused by the contemporaneous risk factors embedded in the pricing of the dual-listed stocks. We estimate *beta* from equation (4) where $beta = \beta_1 + \beta_2$. The predicted sign of the beta coefficient is unknown, depending on the investors' attitude toward risk. Specifically, if investors of both A- and H-share markets are risk lover, we expect that the high A-share beta or the low H-share beta would lead to the large price premiums of A-shares. Thus, the coefficient of A-share beta should be positive and that of H-share beta should be negative. On the other hand, if investors in both markets are risk averse, then the coefficient of A-share beta is expected to be negative and that of H-share beta is expected to be positive.

In Models 2 and 4 of Table V, we add betas into the main regression model of equation (8) where the proxies of differences of opinions are still *SIGMA* and *TURN*. The results indicate that the risk factors have nearly no impacts on our conclusions regarding the effects of differences of opinions on the A-share premiums. The magnitude and significance of the coefficients for the differences of opinions proxies are quite similar to those estimated in the main regression models in Table IV. For example, the coefficients of A- and H-share *SIGMA* in the regressions with risk factors are 5.32 and 0.67, respectively, very close to that of 5.29 and 1.10 in the main regression of Model 8 in Table IV. In particular, three of the four coefficients of the differences of opinions are significant at 5 percent level or above in the regressions with risk factors. However, all four beta coefficients are insignificant. The results indicate that the effects of risk factors on the A-share price premiums are at least partially subsumed to that of the differences of opinions or other prevailing pricing factors.

In Models 3 and 5 of Table V, we further add the market return and exchange rate change as the control variables to study the effect of *SIGMA* and *TURN* on the price premiums of A-shares[3]. In these two models, the coefficients of A-share market return ($MKTRET^A$) and RMB expected exchange rate change (*EXP*) are positive and significant at 1 percent level while the coefficient of H-share market return ($MKTRET^H$) is negative and also significant at 1 percent level. The signs of these coefficients are consistent with the existing literature. The results indicate that when the investment sentiment and market return of A-shares are high and investors expect RMB tend to be appreciated, the A-share premiums will increase significantly. However, when the investment sentiment and market return of H-share are high, the A-share premiums will be expected to decline. Moreover, even after we control for risk factor, market condition and the expected change of RMB exchange rate, we still find that the differences of opinions *SIGMA* and *TURN* have incremental explanatory power for the A-share premiums. Specifically, three of the four coefficients of *SIGMA* and *TURN* are positive and significant at 10 percent level or above in Models 3 and 5.

4.5 Event study of A-share price premiums with relaxation of short-sale constraint

On March 20, 2010, CSRC introduced the short-sale mechanism into the A-share market. In this section, we study the impacts of newly launched short-sale policy on the A-H share price dispersions. Specifically, we test our *H3* whether the new short-sale policy in A-share market will facilitate the price discovery of A-shares and cause the price dispersions of shorted A-shares to be narrowed more than those of non-shorted ones.

4.5.1 Portfolio analysis on joint effects. For the event study, our test period is from March 2009 to March 2011. To explore the joint effects of new short-sale policy and differences of opinions on A-share price premiums, we first categorize all sample A-shares into two portfolios as "shorted" and "non-shorted" portfolios according to the new short-sale policy. We then divide the sample into two sub-periods for each A-share portfolio. The "pre-event" sub-period is from March 2009 to March 2010 while the "post-event" sub-period is from April 2010 to March 2011. Finally, we further categorize the shorted and non-shorted A-share portfolios into two sub-portfolios, respectively, based on the high or low magnitude of *SIGMA*, *TURN*, *r_SIGMA* and *r_TURN*. For A-share portfolios constructed above, we first calculate the mean price premium of shorted and non-shorted A-share portfolios in both pre- and post-event sub-periods, respectively, based on the high or low level of *SIGMA*, *TURN*, *r_SIGMA* and *r_TURN*. Then, the A-share price premium change between pre- and post-event sub-period is calculated for a given level of *SIGMA, TURN*, *r_SIGMA* and *r_TURN*. Our ultimate goal of the portfolio analysis of event study is to test whether the price premium change of shorted A-share portfolio is larger than that of non-shorted ones for each level of *SIGMA*, *TURN*, *r_SIGMA* and *r_TURN*. The differences of A-share price premium change between pre- and post-event sub-period of shorted and non-shorted A-share portfolios are shown in the last column of Table VI named "difference in difference".

Panel A of Table VI reports the mean price premium of A-share portfolios based on the absolute level of *SIGMA*. The results shown in the last column support our *H3* that the new policy causes the price premium of shorted A-share portfolio to decline more than that of non-shorted portfolio. For example, when A-share *SIGMA* is low, the price premium of shorted A-share portfolio drops 10.58 percent more than that of non-shorted portfolio. The more significant result to support our *H3* is that the mean price premium of shorted A-share portfolio in the post-event period is only − 0.54 percent and insignificant. The price premium is gone! The results based on H-share *SIGMA* are also similar. When *SIGMA* of H-shares is low, the price premium of shorted A-share portfolio is also almost disappeared in the post-event period. The premium change comparison of the last column shows that the price premium of shorted A-share portfolio drops 11 percent more than that of non-shorted portfolio on average.

Panel B of Table VI reports the mean price premium of A-share portfolios based on the absolute level of *TURN*. Consistent with the results shown in Panel A, the price premium of shorted A-share portfolio is eliminated in the post-event period when *TURN*s of either A- or H-share portfolios are low. As can be seen from the last column for premium change comparisons, the price premium of shorted A-share portfolio drops more than that of non-shorted portfolio in three out of four cases. The price premium of shorted A-share portfolio drops 5.95 percent (with *t*-statistic of 2.60) and 18.06 percent (with *t*-statistic of 10.59), respectively, for the case of high and low H-share turnover rates and drops 12.72 percent (with *t*-statistic of 5.52) more for the case of low A-share turnover rate. The only exception is for the case of high A-share turnover rate in which the difference of price premium change is only insignificantly − 0.81 percent. Overall, the mean price premium of A-share portfolios based on *TURN* also supports our *H3*. Figure 3 shows that the A-share price premium of shorted A-share portfolios has dropped much sharper than that of non-shorted ones in the same period after the relaxation of short-sale constraint in the A-share market.

Table VI.
Event study of A-share price premium with the relaxation of short-sale constraint

		Shorted A-share portfolio			Non-shorted A-share portfolio			
		Pre-event	Post-event	Post-pre	Pre-event	Post-event	Post-pre	Difference in difference
Panel A: mean price premium of A-share portfolio								
SIGMA_a	Low	0.2043***	−0.0054	−0.2096***	0.4416***	0.3377***	−0.1038***	0.1058***
		(9.37)	(−0.23)	(−8.17)	(22.65)	(17.08)	(−4.32)	(3.40)
	High	0.4236***	0.2535***	−0.1701***	0.5772***	0.4583***	−0.1189***	0.0513*
		(13.99)	(12.60)	(−5.01)	(39.33)	(33.56)	(−7.69)	(1.84)
SIGMA_h	Low	0.2221***	0.0232	−0.2069***	0.4905***	0.3979***	−0.0969***	0.1100***
		(12.38)	(1.03)	(−12.81)	(20.06)	(24.33)	(−3.56)	(3.62)
	High	0.4405***	0.2205***	−0.2200***	0.5391***	0.4222***	−0.1170***	0.1030**
		(15.87)	(7.03)	(−5.82)	(45.09)	(33.23)	(−15.30)	(2.45)
Panel B: mean price premium of A-share portfolio								
TURN_a	Low	0.2757***	0.0439	−0.2318***	0.4949***	0.3903***	−0.1046***	0.1272***
		(14.43)	(1.68)	(−14.21)	(29.03)	(37.04)	(−6.84)	(5.52)
	High	0.2970***	0.1796***	−0.1174***	0.5496***	0.4240***	−0.1256***	−0.0081
		(12.01)	(8.82)	(−3.13)	(34.33)	(31.74)	(−12.21)	(−0.21)
TURN_h	Low	0.1962***	−0.0344	−0.2305***	0.4632***	0.4132***	−0.0499**	0.1806***
		(10.80)	(−1.63)	(−15.98)	(19.55)	(30.50)	(−2.22)	(10.59)
	High	0.4267***	0.2123***	−0.2143***	0.5609***	0.4061***	−0.1548***	0.0595**
		(14.58)	(10.61)	(−6.30)	(40.51)	(21.32)	(−7.63)	(2.60)
Panel C: mean price premium of A-share portfolio								
r_SIGMA	Low	0.2772***	0.1002***	−0.1770***	0.4870***	0.3848***	−0.1022***	0.0748**
		(14.36)	(3.86)	(−5.15)	(29.96)	(29.78)	(−6.29)	(2.04)
	High	0.2939***	0.0844***	−0.2094***	0.5601***	0.4394***	−0.1207***	0.0888***
		(10.25)	(3.65)	(−10.54)	(27.00)	(29.29)	(−6.93)	(4.15)
r_TURN	Low	0.3350***	0.0992***	−0.2358***	0.5449***	0.3656***	−0.1793***	0.0565**
		(14.18)	(5.15)	(−11.78)	(33.99)	(21.84)	(−10.40)	(2.38)
	High	0.2560***	0.0854***	−0.1706***	0.4876***	0.4418***	−0.0458**	0.1248***
		(11.04)	(4.38)	(−6.24)	(27.51)	(41.02)	(−2.68)	(3.98)

Notes: Significant at: *10, **5 and ***1 percent levels; this table reports the event study results of price premium changes between shorted and non-shorted A-share portfolios before and after the relaxation of strict short-sale constraint; the test period of event study is from March 2009 to March 2011; we first categorize all sample A-shares into two portfolios as "shorted" and "non-shorted" portfolios according to the new short-sale policy; we then divide the sample into two sub-periods for each A-share portfolio; the "pre-event" sub-period is from March 2009 to March 2010 while the "post-event" sub-period is from April 2010 to March 2011; finally, we further categorize the shorted and non-shorted A-share portfolios into two sub-portfolios, respectively, based on the low or high magnitude of *SIGMA*, *TURN*, *r_SIGMA* and *r_TURN*; we calculate the mean price premium of shorted and non-shorted A-share portfolios in both pre- and post-event sub-periods based on *SIGMA*, *TURN*, *r_SIGMA* and *r_TURN*. Panels A-C report the mean price premium of A-share portfolio based on *SIGMA*, *TURN* and, *r_SIGMA* and *r_TURN* of A- and H-shares, respectively, and its corresponding heteroskedasticiy-consistent *t*-statistics (in the parentheses); the difference of the price premium change of the A-share portfolio between pre- and post-event sub-period is evaluated with a two-sided *t*-test and presented in the column as "difference in difference"

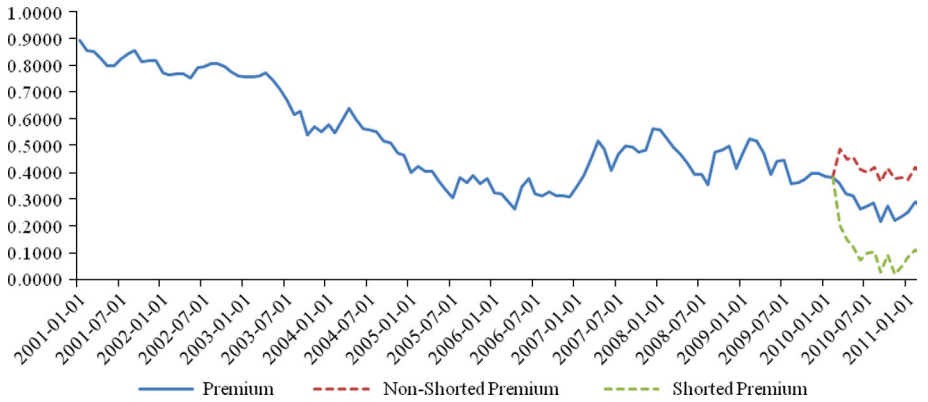

Figure 3.
A-share price premium of shorted and non-shorted A-share portfolios

Panel C of Table VI reports the mean price premium of A-share portfolios based on the relative magnitude of differences of opinions *r_SIGMA* and *r_TURN*. The results shown in the last column support our *H3* that the new policy caused the price premium of shorted A-share portfolios to decline more than that of non-shorted ones. For example, when *r_SIGMA* is low, the A-share price premium of shorted A-share portfolio drops 7.48 percent (with *t*-statistic of 2.04) more than that of non-shorted A-share portfolio. And when *r_SIGMA* is high, the difference of A-share price premium between shorted and non-shorted A-share portfolios becomes 8.88 percent (with *t*-statistic of 4.15). The similar results are obtained for the study of *r_TURN*. The difference of mean price premium between shorted and non-shorted A-share portfolios increases from 5.65 percent (with *t*-statistic of 2.38) when *r_TURN* is low to 12.48 percent (with *t*-statistic of 3.98) when *r_TURN* is high.

4.5.2 Regression analysis on joint effects. To further investigate the movement of A-share price premium after March 2010, we use the regression analysis to study the joint effects of new short-sale policy and differences of opinions on the A-share price premium. Since the length of test period is only 13 months from March 2010 to March 2011, we only include the market capitalization *MV* and book-to-market ratio *BM* in A- and H-share markets as the control variables along with the shorted dummy, interaction terms and proxies of differences of opinions in the joint effects regression model:

$$PREM_{i,t} = \beta_0 + \beta_1 DIFF^A_{i,t} + \beta_2 DIFF^H_{i,t} + \beta_3 SHORT_i + \beta_4 SHORT_i{*}DIFF^A_{i,t} + \beta_5 SHORT_i{*}DIFF^H_{i,t} + \beta_6 MV^A_{i,t} + \beta_7 MV^H_{i,t} + \beta_8 BM^A_{i,t} + \beta_9 BM^H_{i,t} + \mu_{i,t} \quad (9)$$

where *PREM* is the mean A-share price premium, $DIFF^A$ and $DIFF^H$ are the absolute level of proxies of differences of opinions (*SIGMA*, *TURN* and *RETVOL*) in A- and H-share markets, respectively, *SHORT* is a dummy variable which equals one if A-share can be shorted according to the new short-sale policy and zero otherwise, $SHORT{*}DIFF^A$ and $SHORT{*}DIFF^H$ are the interaction terms of short-sale constraint and differences of opinions in A- and H-share markets, respectively, MV^A and MV^H are the market capitalization and BM^A and BM^H are the book-to-market ratio in A- and H-share markets, respectively. Table VII reports the regression results of joint effects of new short-sale policy and differences of opinions on A-share price premium.

	1 (*SIGMA*)	2 (*TURN*)	3 (*RETVOL*)	4 (*SIGMA*)	5 (*TURN*)	6 (*RETVOL*)
DIFF_a	7.24***	0.06	4.15***			
	(5.60)	(1.40)	(3.98)			
DIFF_h	−1.76	−0.02	0.41			
	(−1.09)	(−0.11)	(0.27)			
r_DIFF				7.66***	−3.05***	5.35*
				(3.31)	(−6.54)	(1.68)
SHORT	−22.35***	−24.98***	−32.60***	−4.94***	−2.54***	−4.71***
	(−5.32)	(−7.01)	(−6.20)	(−4.72)	(−3.77)	(−4.31)
*SHORT*DIFF_a*	10.98**	0.24***	12.84***			
	(2.37)	(3.35)	(3.92)			
*SHORT*DIFF_h*	1.69	1.66***	−0.12			
	(0.55)	(6.13)	(−0.04)			
*SHORT*r_DIFF*				5.99	2.40***	18.29***
				(1.55)	(5.15)	(2.64)
MV_a	18.51***	16.43***	18.35***	17.46***	13.67***	18.32***
	(13.24)	(19.00)	(12.42)	(18.78)	(15.79)	(19.27)
MV_h	−24.49***	−23.23***	−24.26***	−25.99***	−24.06***	−26.25***
	(−19.90)	(−48.85)	(−19.24)	(−35.03)	(−38.02)	(−33.99)
BM_a	7.94***	7.87***	8.18***	7.12***	6.13***	7.79***
	(8.95)	(12.14)	(8.83)	(11.47)	(14.13)	(11.16)
BM_h	1.28	1.44	2.31	−2.94**	−5.02***	−2.97***
	(0.85)	(0.66)	(1.25)	(−2.02)	(−4.40)	(−2.19)
Adjusted R^2 (%)	57.97	56.08	59.09	56.76	53.83	56.33

Notes: Significant at: *10, **5 and ***1 percent levels; this table provides the regression results of A-share price premium based on the joint effects of short-sale constraints and differences of opinions after the relaxation of short-sale constraint in the A-share market; the sample period is from March 2010 to March 2011; the dependent variable in all models is the mean price premium of A-shares, *PREM*; the absolute level of proxy of differences of opinions in the first three models is specified by *DIFF* in both A- and H-share markets (*DIFF_a* and *DIFF_h*), respectively; the relative level of proxy of differences of opinions in Models 4-6 is specified by *r_DIFF* in A- and H-share markets, respectively; *SHORT* is the shorted dummy variable; *SHORT*DIFF_a* and *SHORT*DIFF_h* are the interaction terms of short-sale constraint and absolute level of differences of opinions in A- and H-share markets, respectively; *SHORT*r_DIFF* is the interaction term of short-sale constraint and relative level of differences of opinions in A-H share markets; the control variables in all models are the market capitalization *MV* (*MV_a* and *MV_h*) and book-to-market ratio *BM* (*BM_a* and *BM_h*), respectively, in both A- and H-share markets; the table shows the regression estimate of weighted Fama and Macbeth coefficients and their corresponding heteroskedasticity-consistent *t*-statistics (in parenthesis), where the weights correspond to the number of observations in each month

Table VII.
Regression results of A-share price premium based on the joint effects of short-sale constraints and differences of opinions

In the first three models of Table VII, we test the joint effects of absolute level of differences of opinions and short-sale constraints on the A-share premium. While in Models 4-6 of Table VII, the joint effects of relative level of differences of opinions and short-sale constraints on the A-share premium are examined[4]. In the regression results of Table VII, the coefficients of shorted dummy variables are our main interest. As shown in the first three columns of Table VII, when the absolute level of differences of opinions is used in the test, the coefficients of shorted dummy in all three models are significantly negative. They are −22.35(with *t*-statistic of −5.32), −24.98 (with *t*-statistic of −7.01) and −32.60 (with *t*-statistic of −6.20), respectively, when *SIGMA,*

TURN and *RETVOL* are used as proxies of difference of opinions. The results indicate that the relaxation of short-sale constraint in the new policy has greatly narrowed the price premium of shorted A-share portfolio, which further supports our *H3*.

The results with respect to the main effects of differences of opinions are mixed. The coefficients of proxy of differences of opinions in both A- and H-share markets are not as remarkable as they are in the main and robustness regression tests (Tables IV and V). Only the coefficients of $SIGMA^A$ and $RETVOL^A$ have significant positive values of 7.24 (with *t*-statistic of 5.60) and 4.15 (with *t*-statistic of 3.98), respectively. Other coefficients of $SIGMA^H$ and $RETVOL^H$ in the H-share market and $TURN^A$ and $TURN^H$ in both A- and H-share markets are statistically insignificant. The interaction effects between short-sale constraints and differences of opinions are positive and significant at 5 percent level reflected in four of the six coefficients. The exceptions are the coefficients of $SIGMA^H$ and $RETVOL^H$ which is 1.69 (with *t*-statistic of 0.55) and -0.12 (with *t*-statistic of -0.04), respectively. The interaction results indicate that with the control of short-sale constraint, the higher the idiosyncratic return volatility or excess return volatility in A-share market and the monthly turnover rate in both A- and H-share markets, the larger will be the A-share price premium.

We obtain qualitatively similar results in Models 4-6 (last three columns) of Table VII when the joint effects of relative level of differences of opinions and short-sale constraints are examined. As can be seen, the coefficients of shorted dummy in Models 4-6 are all significantly negative but with smaller magnitude compared with that in the first three columns. They are -4.94 (with *t*-statistic of -4.72), -2.54 (with *t*-statistic of -3.77) and -4.71 (with *t*-statistic of -4.31), respectively, when *SIGMA*, *TURN* and *RETVOL* are used as proxy of difference of opinions. Compared with the first three models, the coefficients of relative level of differences of opinions are all significant, particular for *r_SIGMA* which is 7.66 (with *t*-statistic of 3.31) and *r_TURN* which is -3.05 (with *t*-statistic of -6.54), respectively. The interaction effects between short-sale constraints and relative level of differences of opinions are positive and significant at 1 percent level reflected in two of the three coefficients.

The main effects of differences of opinions in the regression tests are consistent with the findings of Boehme *et al.* (2006) that the stocks with significant overvaluations are subjected to both differences of opinions and short-sale constraints. Stocks are not systematically overvalued when either one condition is not met. In addition, the first two models of Table VII show that the coefficients of market capitalization *MV* are significantly positive at 18.51 (with *t*-statistic of 13.24) and 16.43 (with *t*-statistic of 19.00) in the A-share market and significantly negative at 24.49 (with *t*-statistic of 19.90) and 23.23 (with *t*-statistic of 48.85) in the H-share market, when *SIGMA* and *TURN* are used as the differences of opinions, respectively. The coefficients of book-to-market ratio *BM* are significantly positive at 7.94 (with *t*-statistic of 8.95) and 7.87 (with *t*-statistic of 12.14) in the A-share market and statistically insignificant in the H-share market, when *SIGMA* and *TURN* are used as the differences of opinions, respectively. The regression results of Table VII indicate that market capitalization *MV* and book-to-market ratio *BM* of A-shares generate significant positive effect to the A-share price premium. However, the market capitalization *MV* of H-shares generates significant negative effect to the A-share price premium. The results of Table VII are consistent with the patterns we documented in the early analysis.

5. Summary and conclusions

In this study, we provides evidence that dual-listed Chinese A-shares with high level of differences of opinions and short-sale constraints tend to be overvalued and the price premium between dual-listed A-H shares tends to be significant. Our analysis mainly follows the Miller's (1977) model, which indicates that the relaxation of stringent short-sale constraint could reduce the upward bias in stock price.

Following the literature, we use idiosyncratic return volatility and monthly turnover rate as two main proxies of differences of opinions. The relaxation of stringent short-sale constraint in A-share market in March 2010 provides us an opportunity to analyze the joint effects of short-sale constraints and differences of opinions on the A-share price premium. Our results indicate that with strict short-sale constraints, the high level of differences of opinions in both A- and H-share markets will lead to the high price premium of A-shares. The results prevail even if we control for the pricing factors such as the market capitalization, book-to-market ratio, past return momentums and other potential pricing factors. The effects of differences of opinions on dual-listed A-shares are quite distinctive. It seems a bit counter-intuitive that the level of H-share differences of opinions is positively related to the A-share price premium. This is due to the different institutional setting between mainland China and Hong Kong stock markets. As Hong Kong stock market is very open and internationalized, both optimistic and pessimistic opinions are reflected in H-share prices. Thus, the differences of opinions in H-share market may not cause the H-share prices to deviate from their fundamental values. However, the A-share market tends to be more domestic oriented and overvalued. As a result, the high level of differences of opinions in H-share market could also lead to the large price premium of A-shares.

The event study shows that after the introduction of short-sale mechanism in A-share market, the price premium of shorted A-share portfolio drops more significantly compared with that of non-shorted ones. The significant negative coefficients of shorted dummy variables in the regression analysis explain why the price premium of shorted A-share portfolio is narrowed with the relaxation of short-sale constraint in the A-share market. The positive regression coefficients of the interaction terms support Miller's hypothesis that with the control of short-sale constraints, the high level of differences of opinions could lead to the high degree of overvaluation of A-share prices. The regression results also indicate that market capitalization and book-to-market ratio of A-shares generate significant positive effect to the A-share price premium that are consistent with the literature. Our study provides further evidence that the introduction of short-sale mechanism in A-share market could partially eliminate the mispricing of dual-listed A-shares and improve the price efficiency of A-share market.

Notes

1. The descriptive information of firms in our study with company name and sector, the stock code and IPO date in both A- and H-share markets is presented in Appendix 1.
2. Appendix 2 provides the list of firms with shorted A-shares after the introduction of short-sale policy in A-share market. As they are all large capitalization stocks, the corresponding H-shares are likely to be not subjected to the short-sale constraints in the sample period.

3. We use panel regression method adopted by Arquette *et al.* (2008) in these two models. In fact, the results of Models 2 and 4 in Table V are not the same for the Fama-MacBeth regression and panel regression with beta coefficients insignificant in Fama-MacBeth regression and significant in panel regression.
4. The following regression model is used to obtain the results of Models 4-6 in Table VII:

$$PREM_{i,t} = \beta_0 + \beta_1 r\_DIFF_{i,t} + \beta_2 SHORT_i + \beta_3 SHORT_i * r\_DIFF_{i,t} + \beta_4 MV^A_{i,t} + \beta_5 MV^H_{i,t} + \beta_6 BM^A_{i,t} + \beta_7 BM^H_{i,t} + \mu_{i,t} \quad (10)$$

where *r_DIFF* is the relative level of proxy of differences of opinions (*r_SIGMA*, *r_TURN* and *r_RETVOL*) in A- and H-share markets, respectively, and other variables are the same as that in equation (9).

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Appendix 1

Table AI. Descriptive information of 55 firms with dual-listed A- and H-shares in the study

Company name	A-share	H-share	A-share IPO date	H-share IPO date	Sector
Huaneng Power International Inc.	600011	0902	December 6, 2001	January 21, 1998	Industrials
Anhui Expressway Co. Ltd	600012	0995	January 7, 2003	November 13, 1996	Public utility
China Minsheng Banking Corp. Ltd	600016	1988	December 19, 2000	November 26, 2009	Finance
China Shipping Development Co. Ltd	600026	1138	May 23, 2002	November 11, 1994	Public utility
Huadian Power International Corp. Ltd	600027	1071	February 3, 2005	June 30, 1999	Industrials
China Petroleum & Chemical Corp.	600028	0386	August 8, 2001	October 19, 2000	Industrials
China Southern Airlines Co. Ltd	600029	1055	July 25, 2003	July 31, 1997	Public utility
China Merchants Bank Co. Ltd	600036	3968	April 9, 2002	September 22, 2006	Finance
China Eastern Airlines Corp. Ltd	600115	0670	November 5, 1997	February 5, 1997	Public utility
Yanzhou Coal Mining Co. Ltd	600188	1171	July 1, 1998	April 1, 1998	Public utility
Guangzhou Pharmaceutical Co. Ltd	600332	0874	February 6, 2001	October 30, 1997	Conglomerates
Jiangxi Copper Co. Ltd	600362	0358	January 11, 2002	June 12, 1997	Industrials
Jiangsu Expressway Co. Ltd	600377	0177	January 16, 2001	June 27, 1997	Public utility
Shenzhen Expressway Co. Ltd	600548	0548	December 25, 2001	March 12, 1997	Public utility
Anhui Conch Cement Co. Ltd	600585	0914	February 7, 2002	June 12, 1997	Industrials
Tsingtao Brewery Co. Ltd	600600	0168	August 27, 1993	July 15, 1993	Industrials
Guangzhou Shipyard International Co. Ltd	600685	0317	October 28, 1993	August 6, 1993	Industrials
SINOPEC Shanghai Petrochemical Co. Ltd	600688	0338	November 8, 1993	July 26, 1993	Industrials
Nanjing Panda Electronics Co. Ltd	600775	0553	November 18, 1996	May 2, 1996	Industrials
Shenji Group Kunming Machine Tool Co. Ltd	600806	0300	January 3, 1994	December 7, 1993	Industrials
Maanshan Iron & Steel Co. Ltd	600808	0323	January 6, 1994	November 3, 1993	Industrials
Beiren Printing Machinery Holdings Holdings Ltd	600860	0187	May 6, 1994	August 6, 1993	Industrials
SINOPEC Yizheng Chemical Fibre Co. Ltd	600871	1033	April 11, 1995	March 29, 1994	Industrials
Tianjin Capital Environmental Protection Group Co. Ltd	600874	1065	June 30, 1995	May 17, 1994	Public utility
Dongfang Electric Corp. Ltd	600875	1072	October 10, 1995	June 6, 1994	Industrials
Luoyang Glass Co. Ltd	600876	1108	October 31, 1995	July 8, 1994	Industrials
Chongqing Iron & Steel Co. Ltd	601005	1053	February 28, 2007	October 17, 1997	Industrials
China Shenhua Energy Co. Ltd	601088	1088	October 9, 2007	June 15, 2005	Public utility
Sichuan Expressway Co. Ltd	601107	0107	July 27, 2009	October 7, 1997	Public utility
Air China Ltd	601111	0753	August 18, 2006	December 15, 2004	Public utility
China Railway Construction Corp. Ltd	601186	1186	March 10, 2008	March 13, 2008	Conglomerates
Agricultural Bank of China Ltd	601288	1288	July 15, 2010	July 16, 2010	Finance

(continued)

Table AI.

Company name	A-share	H-share	A-share IPO date	H-share IPO date	Sector
Ping An Insurance (Group) Co. of China Ltd	601318	2318	March 1, 2007	June 24, 2004	Finance
Bank of Communications Co. Ltd	601328	3328	May 15, 2007	June 23, 2005	Finance
Guangshen Railway Co. Ltd	601333	0525	December 22, 2006	May 14, 1996	Public utility
China Railway Group Ltd	601390	0390	December 3, 2007	December 7, 2007	Conglomerates
Industrial & Commercial Bank of China Ltd	601398	1398	October 27, 2006	October 27, 2006	Finance
Beijing North Star Co. Ltd	601588	0588	October 16, 2006	May 14, 1997	Properties
Aluminum Corp. of China Ltd	601600	2600	April 30, 2007	December 12, 2001	Industrials
China Pacific Insurance (Group) Co. of China Ltd	601601	2601	December 25, 2007	December 23, 2009	Finance
Metallurgical Corp. of China Ltd	601618	1618	September 21, 2009	September 24, 2009	Conglomerates
China Life Insurance Co. Ltd	601628	2628	January 9, 2007	December 18, 2003	Finance
Shanghai Electric Group Co. Ltd	601727	2727	December 5, 2008	April 28, 2005	Industrials
CSR Corp. Ltd	601766	1766	August 18, 2008	August 21, 2008	Industrials
China Oilfield Services Ltd	601808	2883	September 28, 2007	November 20, 2002	Industrials
PetroChina Co. Ltd	601857	0857	November 5, 2007	April 7, 2000	Industrials
China Shipping Container Lines Co. Ltd	601866	2866	December 12, 2007	June 16, 2004	Public utility
Dalian Port (PDA) Co. Ltd	601880	2880	December 6, 2010	April 28, 2006	Public utility
China Coal Energy Co. Ltd	601898	1898	February 1, 2008	December 19, 2006	Public utility
Zijin Mining Group Co. Ltd	601899	2899	April 25, 2008	December 23, 2003	Industrials
China COSCO Holdings Co. Ltd	601919	1919	June 26, 2007	June 30, 2005	Public utility
China Construction Bank Corp.	601939	0939	September 25, 2007	October 27, 2005	Finance
Bank of China Ltd	601988	3988	July 5, 2006	June 1, 2006	Finance
Datang International Power Generation Co. Ltd	601991	0991	December 20, 2006	March 21, 1997	Industrials
China CITIC Bank Corp. Ltd	601998	1998	April 27, 2007	April 27, 2007	Finance

Appendix 2

Company name	A-share code	H-share code
China Minsheng Banking Corp. Ltd	600016	1988
China Petroleum & Chemical Corp.	600028	0386
China Southern Airlines Co. Ltd	600029	1055
China Merchants Bank Co. Ltd	600036	3968
Jiangxi Copper Co. Ltd	600362	0358
China Shenhua Energy Co. Ltd	601088	1088
Air China Ltd	601111	0753
China Railway Construction Corp. Ltd	601186	1186
Ping An Insurance (Group) Co. of China Ltd	601318	2318
Bank of Communications Co. Ltd	601328	3328
China Railway Group Ltd	601390	0390
Industrial & Commercial Bank of China Ltd	601398	1398
Aluminum Corp. of China Ltd	601600	2600
China Pacific Insurance (Group) Co. of China Ltd	601601	2601
China Life Insurance Co. Ltd	601628	2628
Shanghai Electric Group Co. Ltd	601727	2727
CSR Corp. Ltd	601766	1766
PetroChina Co. Ltd	601857	0857
China Coal Energy Co. Ltd	601898	1898
Zijin Mining Group Co. Ltd	601899	2899
China COSCO Holdings Co. Ltd	601919	1919
China Construction Bank Corp.	601939	0939
Bank of China Ltd	601988	3988

Table AII.
The list of firms with shorted A-shares after the introduction of short-sale policy in A-share market