Market Segmentation and Differential Reactions of Local and Foreign Investors to Analyst Recommendations

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This paper uses segmented dual-class shares of Chinese firms—A shares traded in mainland China by local investors and H shares traded in Hong Kong by foreign investors—to document a rich pattern in the differential reactions of local and foreign investors to analyst recommendations. This pattern reveals that social connections between analysts and investors affect investor reactions to analyst recommendations. Because of the investors' differential reactions, analyst recommendations may exacerbate, rather than attenuate, the market segmentation between the two share classes. (*JEL* G02, G15)

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A large literature in international finance documents persistent and substantial price deviations between dual-class shares issued by the same firms to local and foreign investors in segmented markets, for example, Bailey and Jagtiani (1994) and Stulz and Wasserfallen (1995). A common explanation of such price deviations is the difference in discount rates of local and foreign investors due to their different risk exposures and preferences. In this paper, we explore differential reactions of local and foreign investors to analyst recommendations as a new explanation to the price deviations between dual-class shares.

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Our study is also motivated by the growing strand of the finance literature that argues investors may agree to disagree about the same public information and react differently. Building on this premise, this literature, for example, Harris and Raviv (1993), Kandel and Pearson (1995), Scheinkman and Xiong (2003), Dumas, Kurshev, and Uppal (2009), Cao and Ou-yang (2009), and Dumas, Lewis, and Osambela (2016), develops a series of models to explain a host of asset market phenomena, such as speculative bubbles, excessive trading, excessive asset price volatility, and volatile international equity flow.[1] However, what causes investors to react to public information differently remains elusive.

This paper takes advantage of a unique setting of segmented dual-class shares issued by a set of Chinese firms to analyze differential reactions of two groups of investors to analyst recommendations, as well as how analyst recommendations affect the market segmentation of the share classes. Several dozen Chinese firms have simultaneously listed their shares in mainland China (i.e., China, excluding Hong Kong, Macau, and Taiwan) in the Shanghai and Shenzhen Stock Exchanges and outside in the Stock Exchange of Hong Kong (SEHK). While Hong Kong officially returned to China in 1997 from British colonization, it has an autonomous government and a financial system independent of the mainland's. China's capital controls prevent capital from freely moving between the mainland and outside (including Hong Kong). The capital controls result in segmentation of A and H shares and make the SEHK a hub for investment in Chinese stocks by foreign investors.

We refer to A share investors, who are primarily residents of the mainland, as "local" and H share investors, who are a mix of investors from Hong Kong and other parts of the world, as "foreign." As the A and H shares have the same cash flow and voting rights, their prices separately reflect the beliefs and preferences of the local and foreign investors. These dually listed shares are also covered by financial analysts of brokerage houses in and out of mainland China, which we refer to as local and foreign houses, respectively.

This setting allows us to examine how social connections between investors and analysts can affect investor reactions to analyst recommendations. Local (foreign) analysts are socially closer to local (foreign) investors and thus may have an advantage in catering to local (foreign) investors by better relating their reports to particular concerns and excitements of local (foreign) investors. Such catering behavior in turn breeds trust among local (foreign) investors for the recommendations made by local (foreign) analysts. These intermingled mechanisms can work together and jointly lead to a social connection effect—local investors more strongly react than foreign investors to the recommendations provided by local analysts, while foreign investors more strongly react than local investors to the recommendations provided by foreign analysts.

[1] See Hong and Stein (2007) and Xiong (2012) for more detailed reviews of this literature.

The following example illustrates the relevance of this social connection effect. In June 2011, American analysts of Muddy Waters Research and Citron Research released a series of reports on a number of Chinese firms, including Sino Forest Corporation listed on Toronto Stock Exchange and Harbin Electric listed on NASDAQ, accusing them of accounting frauds. These reports had led to not only large stock price crashes of the firms being accused but also substantial price declines of all Chinese stocks listed on NASDAQ by as much as 15% in June 2011. In sharp contrast to the dramatic reaction of NASDAQ investors, investors in China hardly reacted to these reports, which were widely circulated by financial news media in China. Many Chinese investors believed that these overseas analysts were vicious and had exaggerated their cases against the Chinese firms.[2] As a result, stock prices traded in China barely budged during this period.

We use an event-study approach to compare daily price reactions of the dually listed A and H shares to a large sample of recommendation changes made by analysts of local and foreign houses. To guide our analysis, we also develop a simple framework, which incorporates not only the social connection effect but also two additional effects previously emphasized by the literature. One is that local investors are better informed than foreign investors about home assets due to their superior private information, for example, Gehrig (1993) and Brennan and Cao (1997), and the other is that local analysts have better information quality than foreign analysts due to their lower information collection cost, for example, Bae, Stulz, and Tan (2008) and Du, Yu, and Yu (2014).

We find rich patterns in the differential reactions of A share and H share investors. For example, A share prices have significantly stronger reactions to recommendation changes made by analysts of local houses than those by analysts of foreign houses, which is driven by the joint effect of A share investors having closer connections to local analysts than to foreign analysts and local analysts having better information than foreign analysts. We also find that H share prices have significantly stronger reactions than A share prices to recommendation changes made by analysts of foreign houses, which is driven by the joint effect of H share investors having closer connections than A share investors to foreign analysts and H share investors being less informed than A share investors about Chinese firms.

To isolate the social connection effect from the other effects, we adopt a difference-in-differences approach. Specifically, by comparing the differential reactions of A share and H share investors to recommendations made by local and foreign analysts, we are able to control the effects of A share investors being better informed and local analysts having better information quality. We

[2] Lee, Li, and Zhang (2015) systematically examine the financial health and performance of Chinese reverse merger firms on the U.S. stock markets between 2001 and 2010, the main targets in these accusations, and find that they tend to be more mature and less speculative than either their U.S. counterparts or a group of exchange-industry size-matched firms. As a group, Chinese reverse merger firms outperformed their matched peers from inception through the end of 2013, even after including most of the firms accused of accounting fraud.

find that the differential reactions of A share investors to recommendations made by local and foreign analysts is indeed significantly greater than the differential reactions of H share investors, which supports the presence of the social connection effect in driving the differential reactions of A share and H share investors to the analyst recommendations. This finding thus adds a new mechanism to the understanding of investors' heterogeneous beliefs in asset markets, in addition to heterogeneous beliefs caused by investor overconfidence, for example, Scheinkman and Xiong (2003).

To ensure the robustness of our findings, we use three different price reaction measures: (1) cumulative abnormal return; (2) cumulative abnormal return deflated by idiosyncratic return volatility; and (3) whether a recommendation change is influential, as suggested by Loh and Stulz (2011). All three measures give consistent results across our analyses. We also take advantage of two special subsamples of the data to further isolate potential effects caused by unobservable characteristics. First, a subset of the recommendation changes in our sample were paired with one for the A share market and the other for the H share market. As these paired recommendations were made by the same house for the same firm on the same date, they allow us to control for all firm specific and analyst specific characteristics, which may not be fully captured by the control variables used in our main analysis. Second, a set of foreign houses in our sample hired both Chinese and non-Chinese analysts to cover Chinese firms. By comparing price reactions of A and H shares to recommendations made by Chinese and non-Chinese analysts of the same foreign houses, we can further control for an argument about A share and H share investors having differential access to reports of local and foreign houses.

Finally, we analyze how analyst recommendations affect the market segmentation between the two classes of shares. This effect may depend on two offsetting forces. On one hand, the information from analyst recommendations makes the prices of both share classes closer to the firm fundamentals and thus comove more with each other; on the other, the differential reactions of A share and H share investors to analyst recommendations lower the return correlation between the two share classes. Interestingly, we find that a firm with more analyst recommendations tends to have a lower return correlation between its two share classes. In other words, analyst recommendations exacerbate rather than attenuate the market segmentation between the two share classes due to the investors' differential reactions.

1. Related Literature

Besides the aforementioned literature on heterogeneous beliefs in asset markets, our finding also adds to the understanding of the heterogeneity between local and foreign investors, which is critical for understanding several central issues in international finance, such as home bias and dynamics of international equity flow.[3] French and Poterba (1991) and Shiller, Kon-Ya, and Tsutsui (1991) attribute home bias to local investors' optimism about home equity returns. Dornbusch and Park (1995) and Radelet and Sachs (2000) argue that foreign investors tend to overreact to changes in local fundamentals and the resulting capital inflows and outflows can destabilize local economies. Our analysis highlights social connections as a new factor, in addition to the well-known information asymmetry between local and foreign investors, in determining the optimism of local investors and the overreactions of foreign investors.

An extensive empirical literature analyzes the price differentials of twin shares and dual-class shares. Froot and Dabora (1999) highlight market-sentiment shocks as an explanation of persistent and substantial price deviations between twin shares issued by three companies. Stulz and Wasserfallen (1995) and Bailey and Jagtiani (1994) examine price deviations of dual-class shares issued by Swiss and Thai firms to local and foreign investors, and emphasize differences between the risk exposures of local and foreign investors as a key driver of the price deviations. Several prior studies, for example, Fernald and Rogers (2002), Chen and Xiong (2002), Karolyi and Li (2003), Chan, Menkveld, and Yang (2008), and Mei, Scheinkman, and Xiong (2009), have also examined the substantial price deviations between different classes of shares issued by Chinese firms to local and foreign investors. These studies attribute the price deviations to differences in investment opportunity sets, liquidity, and speculative trading motives of local and foreign investors. In contrast to these studies, which are primarily concerned with the differential price levels of twin shares and dual-class shares, we use an event-study approach to analyze differential price reactions of A and H shares to analyst recommendations. In this regard, our analysis also differs from the literature on the improved information environment of individual stocks induced by cross listing, for example, Baker, Nofsinger, and Weaver (2002), Lang, Lins, and Miller (2003), and Bailey, Karolyi, and Salva (2006).

Our analysis also differs in emphasis from the literature that highlights proximity as an important determinant of the accuracy of analyst earnings forecast. Bae, Stulz, and Tan (2008) find that analysts reside in a country make more precise earnings forecasts for firms in that country than analysts who are not resident in that country. Furthermore, Du, Yu, and Yu (2014) find that among U.S. analysts who cover Chinese firms listed in the U.S. stock markets, analysts with Chinese ethnic origin provide more accurate forecasts than analysts without Chinese origin. In contrast, our analysis compares the reactions of local and foreign investors after controlling for the differential information between local and foreign analysts.

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[3] See Lewis (2011) and Coeurdacier and Rey (2012) for reviews of the extensive literature related to these issues.

2. Segmented Pairs of A and H Shares

2.1 Institutional background

China established the Shanghai Stock Exchange and the Shenzhen Stock Exchange in 1990 and 1991, respectively, to list stocks issued by Chinese firms. Since then, the Chinese stock markets have had rapid growth. By the end of 2013, these two stock exchanges listed stocks issued by 2489 firms, with a total market capitalization of 23.9 trillion RMB (3.92 trillion U.S. dollars), which represented 41% of China's GDP in 2013. The vast majority (2468 out of the 2489) of the firms issued the so-called "A shares," which were traded in RMB and only by Chinese residents.[4]

Many Chinese firms have also chosen to list their stocks outside mainland China, in places such as Hong Kong, New York, Singapore, and London. Due to its geographical proximity to the mainland, the Stock Exchange of Hong Kong (SEHK) is often the first choice when a Chinese firm decides to list overseas. Shares issued by Chinese firms in the SEHK are often called H shares. H shares were first listed by a Chinese firm in 1993. By the end of 2013, 181 Chinese firms had listed their H shares, with a total market value of 4.91 trillion Hong Kong dollars, accounting for 20.4% of the market capitalization of the SEHK.

Interestingly, a set of firms issued both A and H shares. These dually listed shares are the main sample of our analysis. A and H shares of these firms offer the same voting and cash-flow rights. The three stock exchanges involved in listing these shares all required the firms to disclose identical information to investors, including those in and out of mainland China.

During our sample period, China imposed stringent capital controls, which prevented local and foreign investors from freely moving capital across its borders. As a result, local investors could not simply move capital to Hong Kong to trade H shares; neither could foreign investors move capital to the mainland to trade A shares. As A shares were traded only in the mainland and H shares were not traded in Mainland China, the capital controls had led to segmentation of the dually listed A and H shares, which, in turn, made it difficult for people to arbitrage any price deviation between them.[5] Instead, the

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[4] Only a small fraction of these firms (106 out of the full set of 2,489 firms) issued the so-called "B shares," which were traded in foreign currency, specifically in US dollars on the Shanghai Stock Exchange and in Hong Kong dollars on the Shenzhen Stock Exchange. Before February 2001, A shares were restricted to Chinese residents, and B shares were restricted to foreign investors. After February 2001, the Chinese government relaxed the restriction on B shares by allowing Chinese residents with foreign currency to legally trade B shares, while maintaining the restriction on A shares. Also note that some firms issued both A and B shares. See Mei, Scheinkman, and Xiong (2009) for a study of the price differential between A and B shares issued by these firms.

[5] Several exceptions to the capital controls exist. In 2002, China introduced a program called Qualified Foreign Institutional Investors (QFIIs), which allowed a selected group of foreign institutions to invest in financial assets in mainland China, subject to quotas set by the China Securities Regulatory Commission (CSRC). In 2011, China introduced RMB QFII, which mainly allowed Chinese firms collecting RMB outside China to invest in the mainland securities market. By the end of 2013, the number of QFIIs and RQFIIs totaled 251 and 61, with a total investment value of 49.7 billion U.S. dollars, and 157.5 billion RMB, respectively, which were minor relative to the market capitalization of China's securities markets. In 2007, China launched another program called Qualified Domestic Institutional Investors (QDIIs), which allowed a group of domestic institutions to

prices of A and H shares reflected risk preferences and beliefs of two groups of investors in and out of mainland China.

Investors in mainland China were predominantly local individuals or institutions. In contrast, investors in the SEHK came from all over the world. Based on the survey data released by Hong Kong Exchange Clearing Limited (HKEx), which owned the SEHK, during the 12-month period from October 2010 to September 2011, investors from Hong Kong contributed to only 42% of the SEHK's total trading volume, among which 20% was from institutional investors and 22% was from retail investors, while investors from outside Hong Kong contributed to 46% of the trading volume, among which 42% was from institutional investors and 4% was from retail investors.[6] The remaining 12% of the trading volume was by dealers. Within the trading volume by overseas investors, the fractions of investors from the United States, the United Kingdom, continental Europe, and mainland China were 28%, 27%, 14%, and 10%, respectively.[7] The relatively minor contribution of investors from mainland China reflected China's restrictive capital controls that prevented its residents from trading shares listed in Hong Kong.

2.2 Summary statistics

Our data sample spans January 1, 2007 to October 31, 2014. We choose to start the sample in 2007 because China completed an important stock market reform in 2006, which allowed previously nontradable state and enterprise shares to become tradable. We obtained daily closing stock prices of the pairs of A and H shares from CSMAR (for A shares) and WIND (for H shares). Figure 1 shows that the number of A-H pairs increased over time from 37 on January 1, 2007 to 86 on October 31, 2014. There is no delisting of any A or H shares in this sample.[8]

The firms that issued these pairs of A and H shares were typically blue-chip companies from key industries of China, such as energy, electric power, manufacturing, banking, and finance industries. The list of companies includes Industrial and Commercial Bank of China, China Construction Bank, Bank

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invest in securities outside mainland China, including stocks traded in Hong Kong, again subject to quotas set by the CSRC. By the end of 2013, there were 83 QDIIs, with a total net asset value of merely 58.8 billion RMB. After November 2014, the Chinese government further relaxed the capital controls as part of its effort to qualify RMB for the Special Drawing Rights (SDRs) of International Monetary Fund through various channels, such as establishing the Hong Kong-Shanghai direct shuttle program. This program allows investors of Stock Exchange of Hong Kong to buy A shares in Shanghai Stock Exchange and investors of Shanghai Stock Exchange to buy H shares in Stock Exchange of Hong Kong, albeit under certain quotas.

6 See the HKEx Web site at http://www.hkex.com.hk/eng/stat/statrpt/factbook/factbook2011/Documents/32.pdf.

7 Beyond the investment flows to H shares via the QDII program, Hong Kong also hosts a group of mainland residents who regularly travel to Hong Kong for business and other purposes and who are thus able to invest in H shares.

8 Among the 86 A-H pairs, 17 listed their A shares on the Shenzhen Stock Exchange and 69 on the Shanghai Stock Exchange. Furthermore, 62 of them had H shares listed before A shares, 22 had A shares listed before their H shares, and only 2 had the exact same listing date for both A and H shares.

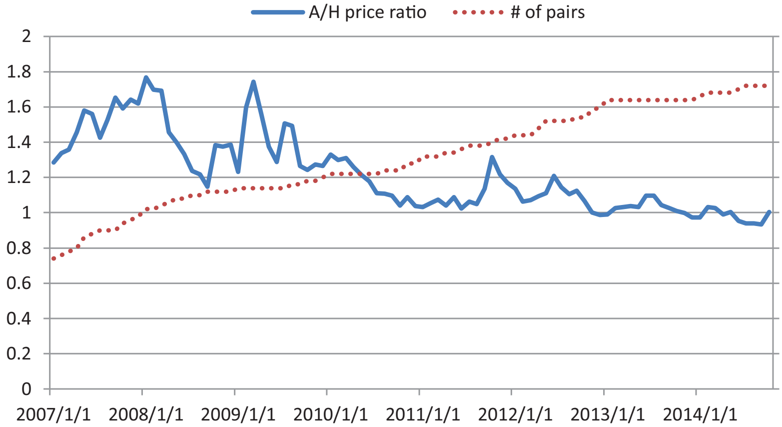

Figure 1
Number of pairs and average price ratio of A shares to H shares
The dotted line with the scale on the right is the number of pairs of A and H shares issued by Chinese firms. The solid line with the scale on the left is the average price ratio of A shares and H shares, weighted across different pairs by the total market value of each pair's A and H shares.

of China, and Agricultural Bank of China (the four largest banks), China Life and Ping An Insurance (the two largest insurance companies), Petro China and Sinopec (the two largest energy companies), China Southern Airlines, China Eastern Airlines, and Air China (the three largest airlines).

The prices of these paired A and H shares could substantially deviate from each other. Figure 1 plots the average price ratio of A shares to H shares, value weighted across all available pairs. The average price ratio mostly stayed in a range between 1 and 2 during the sample period. This price deviation reflects the aforementioned segmentation of A and H markets. The literature, as referenced in Section 1, has pointed out that many factors, such as differences in investment opportunity sets, risk exposure, risk preferences, and sentiment of the A share and H share investors, might have contributed to this price deviation. Our study focuses on analyzing the differential price reactions of A and H shares to analyst recommendations rather than the differences in their price levels.

Table 1 reports the summary statistics of the pairs of A and H shares. There are several notable points. First, the daily returns of A shares are less volatile than those of the corresponding H shares. Second, the returns of both A and H shares have positive skewness, with the skewness of H shares significantly larger than that of A shares. Third, A shares are more liquid based on two measures of liquidity: turnover rate and the illiquidity measure of Amihud (2002), which is given by absolute value of daily return divided by daily trading volume. Fourth, the fraction of tradable shares held by institutional investors is about 14.74% for A shares, lower than that of 29.77% for H shares.

Panel B of Table 1 shows that the number of tradable H shares is slightly less than that of the corresponding A shares, with H shares on average contributing

Table 1
Characteristics of the paired A and H shares

A. Share characteristics

	A shares					H shares					A-H	
	Mean	*SD*	*Min*	*Median*	*Max*	*Mean*	*SD*	*Min*	*Median*	*Max*	*Diff*	*t-value*
Market ret	0.0003	0.016	−0.088	0.001	0.095	0.0002	0.016	−0.127	0.001	0.143	0.0001	0.20
Share ret	0.0005	0.001	−0.001	0.000	0.004	0.0004	0.001	−0.001	0.000	0.004	0.0001	1.92*
Ret vol	0.025	0.005	0.011	0.025	0.034	0.027	0.005	0.014	0.027	0.036	−0.002	−6.83***
Skewness	0.367	0.309	−0.103	0.299	2.013	0.440	0.199	−0.111	0.414	1.050	−0.073	−1.98*
Idiosyn vol	0.019	0.005	0.008	0.019	0.028	0.022	0.005	0.011	0.023	0.033	−0.003	−9.92***
R-Square	0.426	0.137	0.108	0.420	0.684	0.325	0.187	0.023	0.275	0.769	0.101	8.24***
Amihud	0.055	0.091	0.001	0.019	0.529	0.370	0.781	0.001	0.039	3.546	−0.315	−4.17***
Turnover	1.812	1.628	0.274	1.441	10.543	0.739	0.344	0.087	0.777	1.682	1.074	6.27***
Institutional	14.735	12.181	0.120	12.060	74.994	29.773	15.885	1.414	29.743	64.075	−15.04	−8.38***

B. Firm characteristics

	Mean	*SD*	*Min*	*Median*	*Max*
H-fraction	0.390	0.167	0.121	0.365	0.922
Size	24.056	1.701	20.283	24.130	27.696
Correlation daily	0.451	0.085	0.170	0.451	0.692
Correlation weekly	0.501	0.099	0.238	0.497	0.771
Correlation monthly	0.601	0.093	0.331	0.608	0.812

C. Granger causality of A/H share

	Daily returns			Weekly returns		
	H leads A	H does not lead A	Subtotal	H leads A	H does not lead A	Subtotal
A leads H	8	23	31	1	9	10
A does not lead H	27	28	55	20	54	74
subtotal	35	51	86	21	63	84

D. Number of recommendation changes made by top 10 local and foreign houses

Foreign		Local	
Broker name	No. obs	Broker name	No. obs
Goldman Sachs	208	*Guotai Junan*	263
Citi	154	*China Merchants Securities*	228
Macquarie	146	*Bank of China International*	218
CLALEXHK	138	*China International Capital Corp.*	169
HSBC	136	*SWS Research Co., Ltd*	156
UBS	136	*Citic Securities Co., Ltd*	142
Merrill International	130	*PingAn Securities*	86
Capital Securities Corp.	127	*Haitong International Securities*	69
Credit Suisse	116	*CCB International Securities, Ltd*	63
BNP Paribas Equity Research	114	*Everbright Securities Co., Ltd*	55

Market ret for A shares is the daily return of the Shanghai Composite Index and for H shares is the daily return of the Hong Kong Hang Seng Index. *Share ret* is the daily return of either A or H share in the pairs of A and H shares. *Ret vol* is each share's daily return volatility. *Skewness* is each share's daily return skewness. *Idiosyn vol* is each share's idiosyncratic volatility after a linear regression to remove the contemporaneous returns of the Shanghai Composite Index and the Hong Kong Hang Seng Index, and *R-Square* is the R-square of the regression. *Amihud* is the illiquidity measure of Amihud (2002) with the unit of 10^{-8}. *Turnover* is daily traded shares divided by the total number of tradable shares. *Institutional* is the fraction of all tradable shares held by institutional investors at the end of each year. *H fraction* is the fraction of a firm's tradable H shares in its total number of tradable shares. *Size* is the logarithm of the total market value of a firm's tradable A and H shares. Correlation is the daily (weekly and monthly) return correlation between a firm's A and H shares. The significance level for the Granger causality test is 5%. We use *, **, and *** to denote significance at the 10%, 5%, and 1% level, respectively.

to 39% of the total number of tradable A and H shares across all pairs. The daily returns of the pairs of A and H shares have an average correlation of 0.451, the weekly returns of the pairs of A and H shares have an average correlation of 0.501, and the monthly returns have an average correlation of 0.601. The increased correlation over longer horizons suggests that A share and H share prices become more integrated over longer terms despite the market segmentation.

In the left section of panel C in Table 1, we report the lead-lag relationship between the daily returns of A and H shares. Among the 86 firms in our sample and conditional on 5% significance level, 28 firms have no Granger causality in either direction, 31 firms have A share returns Granger causing H share returns, 35 firms have H share returns Granger causing A share returns, and 8 firms have Granger causality in both directions. The right section of panel C further reports the lead-lag relationship in weekly returns: 54 firms with no Granger causality in either direction, 10 firms with A share returns Granger causing H share returns, 21 firms with H share returns Granger causing A share returns, and 1 firm with Granger causality in both directions. Overall, if we interpret Granger causality as a reflection of the direction of information flow, this panel shows that information flows symmetrically between the prices of A and H shares. Furthermore, the weaker lead-lag relationship in weekly returns than in daily returns suggests that information flows across the A share and H share markets at a frequency faster than weekly frequency.

3. Data Sample of Analyst Recommendations

The segmented pairs of A and H shares offer a unique opportunity to analyze how investors in and out of mainland China react to public news. We focus on comparing their reactions to analyst recommendations issued by a set of brokerage and research firms, which we simply call houses and which cover both A share and H share markets.[9] We collect analyst recommendations issued between January 1, 2007 and October 31, 2014, for the 86 firms with pairs of A and H shares from I/B/E/S and Bloomberg. The initial sample has 38867 recommendations made by 117 houses.

An analyst report typically contains an earnings forecast for the firm, together with a recommendation to investors regarding whether to buy or sell the firm's stocks. As each firm in our sample has both A and H shares, traded by two

[9] As the information transmitted by these announcements is firm specific, it has minimal implications for investors' aggregate wealth and consumption. That is, it does not affect the discount rates of A share and H share investors. To the extent that A share and H share investors face different investment opportunities and market risks, it is possible that they use different discount rates to evaluate the same stock investment and that the difference in their discount rates is an important factor driving the aforementioned large price deviations between the pairs of A and H shares. By comparing price reactions of A and H shares to firm-specific news announcements, we isolate the heterogeneity in the discount rates of A share and H share investors from our analysis of the belief revisions induced by the news among the two groups. Furthermore, we ignore the heterogeneity within each of these groups by treating both A share and H share investors as homogenous groups.

different sets of investors, it is common for a house to issue a report specifically on one class of shares (say A shares) of a firm, which is targeted to investors of the share class. Such a report may or may not be accompanied by a simultaneous report by the same house on the other share class of the firm. The timing of the reports on the two classes of shares is driven by the needs of the house to serve its clients in the two markets.

By focusing on recommendations issued by houses that cover both A and H shares, we can compare the reactions of A share and H share investors to the recommendation changes made by the same house. In other words, when an analyst of a house issues an upgrade to the A share market and another upgrade to the H share market, we can compare the price reactions of the two markets. We will later discuss a variety of factors that may affect the reactions of the two markets. In particular, we are interested in examining whether social connections between the analyst and investors in A share and H share markets may cause them to react differently.

In addition to the heterogeneity between A share and H share investors, we also explore another dimension of heterogeneity between local and foreign analysts. Our analysis builds on a simple notion that A share investors have closer connections to local analysts than foreign analysts, while H share investors have closer connections to foreign analysts than local analysts. This notion motivates us to compare the A share (or H share) price reactions to recommendation changes made by local and foreign analysts, and compare the price reactions of A and H shares to recommendation changes by local (or foreign) analysts. Furthermore, we will also perform a type of difference-in-differences analysis by examining whether the differential price reactions of A shares to recommendation changes of local and foreign analysts are greater than that of H shares.

We count a house as local if its controlling shareholders are Chinese corporations, and as foreign otherwise. For most of the analysis, we treat analysts working for local houses as local analysts and those working for foreign houses as foreign analysts. In Section 5.4, we will further divide analysts of foreign houses into Chinese and non-Chinese based on their names.

Following the literature, we analyze stock price reaction if there is a change in analyst recommendation issued to a specific share class. While different brokers will use different rating scales, Bloomberg and I/B/E/S have standardized the recommendations in five numerical values of 5, 4, 3, 2, and 1, corresponding to strong buy, buy, hold, sell, and strong sell, respectively. We then calculate recommendation change as the difference of a recommendation relative to the same analyst's previous recommendation within one year. If there is not any previous recommendation in one year, we assign the change to be +1 if the current recommendation is strong buy (i.e., recommendation = 5) and -1 if the recommendation is sell or strong sell (i.e., recommendation = 2, 1). We adopt this asymmetric treatment because analysts tend to give favorable recommendations. In our sample, the average recommendation is 3.85, which is closer to buy than the neutral category of hold.

To focus on recommendation changes issued by houses that cover both A share and H share markets, we remove recommendations issued by houses with reports only on A shares or only on H shares. Following Loh and Stulz (2011), we also use several criteria to further screen these recommendations. We delete those recommendations made in the four-day period around firms' quarterly earnings announcements and earnings guidance announcements (one day before to two days after the announcement date) to avoid any contaminating effect caused by these announcements. Finally, we require a valid recommendation to have active trading around its release date in both A and H shares of the firm. After applying these filters, we have a sample with 8,113 recommendation changes for 82 firms, which were made by analysts from 76 houses. Among the houses, there are 34 local houses and 44 foreign houses (two foreign houses were acquired by local houses during the sample period). The list of local houses includes almost all of the major brokerage firms in mainland China, such as Citic Securities, China International Capital Corporation, China Merchants Securities, Guotai Junan Securities, and SWS Research Co Ltd., and relative smaller brokerage firms, such as First Capital Securities, Zheshang Securities, Sinolink Securities, Bohai Securities, and Cinda Securities, while the list of foreign houses includes brokerage and research firms from all over the world, such as JP Morgan, Goldman Sachs, Credit Suisse, BNP Paribas, Nomura, and Sanford Bernstein.[10] The average number of recommendation changes made by an individual house is 107. There is also dispersion across the houses, with Guitai Junan Securities and Goldman Sachs being the two most active ones, issuing 471 and 439 recommendation changes, respectively. Panel D of Table 1 reports the number of recommendation changes in our final sample made by top ten local and foreign houses.

In this final sample, there are 1,475 and 872 recommendation changes issued for A shares by local and foreign houses, respectively, and 1,438 and 4,328 recommendation changes issued for H shares by local and foreign houses, respectively. Among these changes, 4,792 observations are upgrades, and 3,321 changes are downgrades. This asymmetric pattern of having more upgrades than downgrades is consistent with the data sample of Asquith, Mikhail, and Au (2005), which has 1,126 recommendation observations with 739 reiterations, 262 upgrades, and 125 downgrades.

Figure 2 depicts the sample distribution of recommendation changes across firms and over time. In panel A, each bar indicates the total number of recommendation changes regarding a specific firm. This number is split into two parts, with the top part indicating the number of recommendation

[10] At the end of 2013, the total asset of Citic Securities, the largest brokerage firm in China, was 192.93 billion RMB, while that of First Capital Securities was only 10.80 billion RMB, according to online information provided by Securities Association of China at http://www.sac.net.cn/ljxh/xhgzdt/201405/t20140530_93890.html.

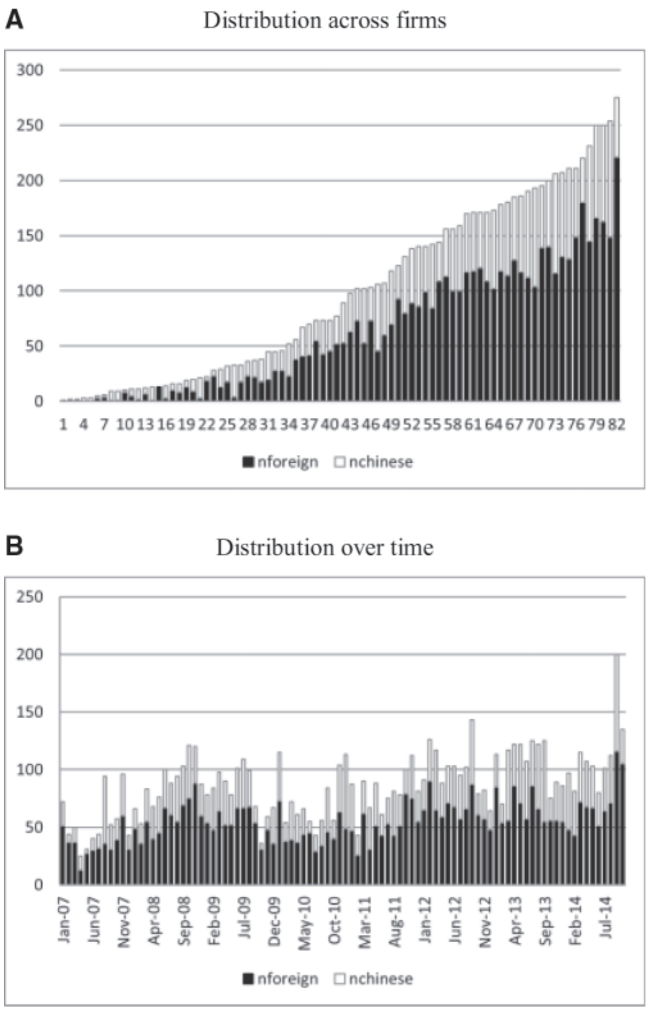

Figure 2
Sample distribution of analyst forecasts across firms and over time
In panel A, each bar indicates the number of recommendation changes regarding a firm in our sample. In panel B, each bar indicates the number of recommendation changes made in a month. In both panels, the top indicates the number of recommendation changes made by local analysts, while the bottom is the number of recommendation changes made by foreign analysts.

changes issued by local houses, and the bottom part indicating the number of recommendation changes by foreign houses. There are 82 firms with valid recommendation changes. The number of recommendation changes for a firm ranges from 1 to 275. More importantly, the recommendation changes for each firm are well spread out between local and foreign houses, invalidating a concern that local houses might follow one set of firms while foreign houses follow another set. Panel B depicts the sample distribution of recommendation changes over time. The balance of recommendation changes made by local and foreign houses is also stable over time.

4. Hypothesis Development

In this section, we develop a set of hypotheses for analyzing how A share and H share investors react to the recommendations of local and foreign analysts in the presence of the market segmentation between A share and H share markets. The reaction of group-i investors, where $i \in \{A, H\}$ with A referring to A share investors and H to H share investors, to a recommendation made by an analyst $j \in \{LF\}$, where L refers to local analysts and F to foreign analysts, may depend on several effects.

First, the literature has long emphasized that local investors might be better informed than foreign investors about home firms, for example, Gehrig (1993) and Brennan and Cao (1997). This investor-side effect implies that A share investors are more informed than H share investors about Chinese firms and thus are less responsive to any new information, including analyst recommendations.

Second, the literature has also pointed out the local analysts might have more accurate information about the firm's fundamental than foreign analysts, for example, Bae, Stulz, and Tan (2008) and Du, Yu, and Yu (2014). This analyst side effect implies stronger reactions to the recommendations of local analysts than to that of foreign analysts, after controlling for other effects.

Third, investor reaction to analyst recommendation may also depend on the social connection between the investors and the analyst. Specifically, with a closer connection to A share investors, local analysts have an advantage relative to foreign analysts in understanding the risk preference and sentiment of A share investors. That is, local analysts may be able to not only provide more informed reports about the business prospect and profitability of Chinese firms but also better connect their reports to the concerns and sentiment of local A share investors. In this sense, local analysts can provide more class-specific information in relation to the local market conditions. Consequently, their recommendations may have better reception than that of foreign analysts among A share investors. This social connection effect thus implies that A share investors more strongly react to recommendations of local analysts than to that of foreign analysts, even after controlling for the aforementioned investor and analyst side effects.

This social connection effect is originated from two distinct yet closely related mechanisms. First, local analysts may be better at catering to A share investors by relating their reports to particular concerns and excitements of local investors.[11] Second, such catering behavior helps to breed trust of A share

[11] As argued by Mullainathan and Shleifer (2005) and Gentzkow and Shapiro (2006), it is a common practice for the media to slant reports toward the prior beliefs of its customers, and, in contrary to the common wisdom, such media bias helps build, rather than destroy, a media firm's reputation of quality.

investors for local analysts, and similarly trust of H share investors for foreign analysts.[12] As a result, relative to foreign investors, local investors may trust local analysts more and regard information provided by local analysts as more reliable.

These aforementioned effects may work along the same or opposite directions in driving the reactions of one group of investors to the recommendations of one type of analysts. To facilitate our analysis of the investors' differential reactions, we adopt a simple linear framework to capture these effects in the reaction of group-i investors to a recommendation of analyst j:

$$reaction_{i,j} = -\alpha \; Investor_i + \beta \; Analyst_j + \gamma \; Connection_{i,j}, \tag{1}$$

where $reaction_{i,j}$ is the reaction of i-share investors to recommendation provided by analyst j, $Investor_i$ is the amount of private information of group-i investors, $Analyst_j$ is the information quality of analyst j, and $Connection_{i,j}$ is a measure of the social distance between investor i and analyst j. According to our earlier discussion, we make the following normalization: $Investor_{i=H}=0$ and $Investor_{i=A}=1$, because A share investors are better informed than H share investors. Similarly, we normalize $Analyst_{j=L}=1$ and $Analyst_{j=F}=0$, as the recommendations of local analysts tend to be more informative than those of foreign analysts. Furthermore, we assume that

$$Connection_{A,L} = Connection_{H,F} > Connection_{A,F} = Connection_{H,L}$$

and normalize the difference between the two levels of social connection to be one. The standard learning theory would imply that $\alpha > 0$ as H share investors are less informed and have a tendency to more strongly react to public information, $\beta > 0$ as local analysts' recommendations more accurate, and $\gamma > 0$ as a stronger social connection leads to a stronger reaction.[13]

Our empirical analysis focuses on comparing the stock price reactions to analyst recommendations under the four possible investor-analyst pairs in the segmented market environment for the A and H shares. First, we examine the differential reactions of A share investors to the recommendations of local and foreign analysts. By taking the difference of Equation (1) for the reactions of A share investors to the recommendations of local and foreign analysts, we obtain

$$reaction_{A,L} - reaction_{A,F} = \beta + \gamma > 0. \tag{2}$$

By taking the difference, the investor side effect is removed. The remaining analyst side effect and social connection effect work along the same

[12] As emphasized by Guiso, Sapienza, and Zingales (2008, 2009) and Gennaioli, Shleifer, and Vishny (2015), social trust is an important factor in many economic transactions, such as trades between countries, individuals' participation in stock markets, and individual's choices of money managers.

[13] In an earlier version of this paper, we developed a more formal Bayesian framework. Through the use of Bayes' rule, this Bayesian framework derives the same three effects in a nonlinear expression, which can be linearized to give the linear form adopted in (1).

direction and jointly imply that A share investors more strongly react to the recommendations made by local analysts than that by foreign analysts.

We also examine the differential reactions of H share investors to the recommendations of local and foreign analysts. As before, by taking the difference of Equation (1) for the reactions of H share investors to the recommendations of local and foreign analysts, we obtain

$$reaction_{H,L} - reaction_{H,F} = \beta - \gamma. \tag{3}$$

There are still two remaining effects, the analyst side effect and the social connection effect, which now operate on opposite directions. On one hand, the recommendations of foreign analysts are less precise and thus attract weaker reactions. On the other hand, the closer connections of H share investors to foreign analysts cause stronger reactions. These two offsetting effects thus make the net effect not determined. We summarize these discussions as the following hypothesis:

Hypothesis 1. A share prices more strongly react to the recommendations made by local analysts than those by foreign analysts, while H share prices may or may not more strongly react to the recommendations made by foreign analysts.

We also compare the reactions of A share and H share investors to the recommendations by local analysts. By taking the difference of Equation (1) for reactions of A share and H share investors, we have

$$reaction_{A,L} - reaction_{H,L} = -\alpha + \gamma. \tag{4}$$

This expression contains two offsetting forces: The first term captures A share investors having better private information and thus reacting less strongly than H share investors, and the second term captures A share investors having closer connections to local analysts and thus reacting more strongly than H share investors. The net effect of these two forces is not determined. Similarly, we compare the reactions of A share and H share investors to the recommendations made by foreign analysts by taking difference of Equation (1) for reactions of A share and H share investors:

$$reaction_{A,F} - reaction_{H,F} = -\alpha - \gamma < 0. \tag{5}$$

The same two forces are still present but along the same direction now. Consequently, H share investors more strongly react than A share investors to the recommendations by foreign analysts. We summarize these discussions in the following hypothesis:

Hypothesis 2. H share investors more strongly react than A share investors to the recommendations made by foreign analysts, although A share investors may or may not more strongly react than H share investors to the recommendations by local analysts.

In Hypotheses 1 and 2, the social connection effect is entangled with two other effects. To further isolate the social connection effect, we use a difference-in-differences strategy, that is, the difference between (2) and (3):

$$\left[reaction_{A,L} - reaction_{A,F}\right]\left[reaction_{H,L} - reaction_{H,F}\right] = 2\gamma > 0. \qquad (6)$$

In fact, taking the difference between (4) and (5) gives the same expression. This additional difference allows us to remove the effects of A share investors having better private information and local analysts having more precise recommendations. Consequently, we have the following hypothesis:

Hypothesis 3. The differential reactions of A share investors to the recommendations made by local and foreign analysts are greater than the differential reactions of H share investors or, equivalently, the differential reactions of A share and H share investors to the recommendations by local analysts are greater than their differential reactions to the recommendations by foreign analysts.

5. Empirical Analysis

In this section, we first present empirical results on testing the three hypotheses outlined in the previous section and then examine how analyst recommendations affect the market segmentation between the two share classes.

5.1 Summary statistics

We use three measures to examine stock price reactions to analyst recommendation changes. The first one is *CAR(-1,1)*, the cumulative abnormal return from taking a long position in the recommended share if the recommendation change is favorable and a short position if it is unfavorable from one day before to one day after the recommendation announcement. Note that this measure by design already accounts for whether the recommendation change is upgrade or downgrade. To calculate *CAR(-1,1)*, we estimate a linear regression of the daily return of each share on the returns of both the Shanghai Composite Index and the Hong Kong Hang Seng Index. We use data from 365 days to 10 days before each recommendation.

The cumulative abnormal return *CAR(-1,1)* is the main measure of price reactions in our analysis. We also adopt two other measures for robustness. As some stocks tend to have greater price fluctuations than others, the second measure deflates the cumulative abnormal return, *CAR(-1,1)*, by the share's idiosyncratic volatility σ. The idiosyncratic volatility is calculated from the aforementioned market model used to calculate *CAR(-1,1)*. *dCAR(-1,1)* denotes this measure of deflated cumulative abnormal return.

Table 2
Price reactions to analyst recommendation changes

	A shares			*H shares*			*A − H*	
	No. obs	*Mean*	*t-value*	*No. obs*	*Mean*	*t-value*	*Mean*	*t-value*
A.CAR(-1,1)								
LocalAnalyst	1,475	0.5%	4.53***	1,438	0.5%	4.26***	0.0%	0.12
ForeignAnalyst	872	0.2%	1.13	4328	1.2%	17.56***	−1.0%	−6.9***
LA - FA		0.3%	1.86*		−0.7%	−5.16***		
B. dCAR(-1,1)								
LocalAnalyst	1,475	24.6%	4.53***	1,438	23.8%	4.43***	−0.8%	−0.11
ForeignAnalyst	872	2.2%	0.28	4,328	58.5%	18.54***	−56.3%	−6.6***
LA - FA		22.4%	2.30**		−34.7%	−5.58***		
C. Inf								
LocalAnalyst	1,475	6.3%	7.09***	1,438	5.9%	5.72***	−0.4%	−0.44
ForeignAnalyst	872	4.2%	2.44**	4,328	7.9%	13.06***	−3.7%	−3.8***
LA - FA		2.1%	2.21**		−2.0%	−2.64***		

In panel A, *CAR(-1,1)* is the cumulative abnormal return of a position based on the recommendation change from one day before to one day after the recommendation announcement, based on a market model with the Shanghai Composite Index and the Hong Kong Hang Seng Index as the market returns using return data from 365 days before to 10 days before each announcement. In panel B, *dCAR(-1,1)* is the deflated *CAR(-1,1)* by the idiosyncratic volatility generated by the corresponding market model. In panel C, we define a recommendation change to be influential (i.e., *Inf* = 1) if the share's *CAR(-1,1)* has the same sign as the direction of the change and an absolute value greater than a 2.5% tail of normal distribution with volatility equal to the share's idiosyncratic volatility during the prior year. Local Analysts are analysts of brokerage or research firms with Chinese corporations as their controlling shareholders. Foreign analysts are analysts of brokerage or research firms without Chinese corporations as their controlling shareholders. We use *, **, and *** to denote significance at the 10%, 5%, and 1% level, respectively.

The third measure follows Loh and Stulz (2011). To deal with the large amount of noise in an average analyst recommendation, they propose to analyze influential recommendations that visibly move stock prices. Specifically, they define a recommendation to be influential if it leads to a statistically significant abnormal stock return in the same direction as the recommendation change. Following their analysis, we define that a recommendation change issued to a particular share class is influential if the share price reacts in the same direction as the recommendation change and the absolute value of *CAR(-1,1)* exceeds $\sigma \times \sqrt{3} \times 1.96$, where σ is the share's idiosyncratic volatility, 3 is the length of the three-day return period, and 1.96 corresponds to the 2.5% significance level of normal distribution. By this definition, we expect 2.5% of the recommendation changes to be influential by pure chance.

Table 2 summarizes the price reactions to analyst recommendation changes based on these three measures. Panel A reports *CAR(-1,1)*. For A shares, there are 1475 recommendation changes made by local analysts with an average *CAR(-1,1)* of 0.5%, which is significant with a t-statistic of 4.53. There are 872 recommendation changes by foreign analysts with an average *CAR(-1,1)* of 0.2%, which is insignificant. The differential reaction of 0.3% to these two sets of recommendation changes is positive and significant. This difference is consistent with Hypothesis 1, which posits that A share prices more strongly react to recommendation changes made by local analysts than those by foreign analysts.

For H shares, the average *CAR(-1,1)* for the 1,438 recommendation changes made by local analysts is 0.5%, and for the 4328 recommendation changes by foreign analysts is 1.2%. The difference of -0.7% is also statistically and economically significant, even though Hypothesis 1 states that H share prices may or may not more strongly react to recommendation changes made by foreign analysts. This significantly negative difference indicates that the social connection effect dominates the effect of foreign analysts having lower information quality than local analysts.

We can also compare the impact of recommendations made by local analysts on A share and H share prices. The reaction of A share prices is almost the same as that of H share prices. This lack of differential reactions is actually consistent with Hypothesis 2, which states that despite A share investors having closer social connections to local analysts, they may or may not more strongly react than H share investors to recommendations made by local analysts. This is because A share investors also have more private information than H share investors and thus less strongly react to any public information. In response to recommendations made by foreign analysts, the reaction of A share prices is 1.0% lower than that of H share prices. This difference is highly significant and is consistent with Hypothesis 2, which also posits that H share investors should more strongly react than A share investors to recommendations made by foreign analysts. This is because H share investors have not only closer connections to foreign analysts but also less private information relative to A share investors.

Panel B of Table 2 reports price reactions based on the deflated abnormal return measure *dCAR(-1,1)*. After the normalization, the overall pattern in the differential reactions of A share and H share prices remains virtually identical. The normalization also helps to interpret the economic magnitudes of the price reactions. In particular, during the three-day period around the recommendation announcements, the stronger reactions of A share prices to recommendation changes made by local analysts than those by foreign analysts are on average by 22.4% of the idiosyncratic volatility, and H share prices more strongly react than A share prices to recommendation changes of foreign analysts on average by 56.3% of the idiosyncratic return volatility.

Panel C of Table 2 summarizes the fraction of influential recommendation changes: 6.3% of the recommendation changes made by local analysts for A shares are influential, 7.9% of the recommendation changes made by foreign analysts for H shares are influential, 5.9% of the recommendation changes made by local analysts for H shares are influential, and 4.2% of the recommendation changes made by foreign analysts for A shares are influential.[14] All of these fractions are significantly higher than the 2.5% level determined by pure

[14] Loh and Stulz (2011) analyze a sample of analyst recommendations for U.S. stocks in the I/B/E/S database and find the fraction of influential recommendation changes to be around 11%, which is slightly higher than the fractions in our sample.

chance. More importantly, in A share markets, the fraction of influential recommendation changes by local analysts is significantly higher than that by foreign analysts, while the recommendation changes made by foreign analysts are significantly more influential in H share markets than in A share markets. These differences are both consistent with Hypotheses 1 and 2.

5.2 Regression analysis

To formally compare the differential reactions of A share and H share prices, we use several regression specifications to control for a host of other variables that might also affect stock price reactions. Specifically, to examine the differential price reactions of A and H shares to the recommendation changes made by local (or foreign) analysts, we use the following regression specification in the subsample of recommendation changes issued to A (or H) shares:

$$PriceReaction_{i,j,t,m} = \beta_0 + \beta_1 LocalAnalyst_i + \beta_2 Controls_{i,j,t,m} + \varepsilon_{i,j,t,m}, \quad (7)$$

where $PriceReaction_{i,j,t,m}$ is the share price reaction to the recommendation change made by house i to share class m of firm j on date t; $LocalAnalyst_i$ is a dummy, which takes the value of one if the recommendation is made by a local analyst or zero otherwise, and $Controls_{i,j,t,m}$ represents a host of control variables, which, as we will discuss later, include the magnitude of the recommendation change. According to Hypothesis 1, we expect the coefficient β_1 to be positive in the subsample of recommendation changes issued to A shares, and undetermined in the subsample of recommendation changes issued to H shares. The value of β_1 is also a direct measure of the differential price reactions of the market to recommendation changes made by local and foreign analysts.

To examine the differential price reactions between A and H shares to recommendation changes made by local (or foreign) analysts, we use the following regression specification in the subsample of recommendation changes made by local (or foreign) analysts:

$$PriceReaction_{i,j,t,m} = \beta_0 + \beta_1 Ashare_m + \beta_2 Controls_{i,j,t,m} + \varepsilon_{i,j,t,m}, \quad (8)$$

where $Ashare_m$ is a dummy, which takes a value of 1 if the recommendation is issued to A shares or 0 otherwise. According to Hypothesis 2, we expect the coefficient β_1 to be negative in the subsample of recommendation changes made by foreign analysts, and undetermined in the subsample of recommendation changes made by local analysts. The value of β_1 from this regression is a direct measure of the differential price reactions of A and H shares to the sample of recommendations.

As illustrated by our theoretical framework, the price reactions estimated from regressions (7) and (8) contain not only the social connection effect but also other alternative effects related to heterogeneous private information of A share and H share investors and heterogeneous information quality of local and foreign analysts. To isolate the social connection effect, we examine the following difference-in-differences regression motivated by Hypothesis 3 in the full sample of recommendation changes made by both local and foreign analysts to both A and H shares:

$$PriceReaction_{i,j,t,m} = \beta_0 + \beta_1 Ashare_m + \beta_2 LocalAnalyst_i + \beta_3 Ashare_m * LocalAnalyst_i + \beta_4 Controls_{i,j,t,m} + \varepsilon_{i,j,t,m} \tag{9}$$

Hypothesis 3 suggests that the coefficient β_3 of the interaction term $Ashare_m * LocalAnalyst_i$ is positive, because its value measures how much the differential reactions of A share investors to recommendations made by local and foreign analysts are greater than the differential reactions of H share investors.

In estimating each of the regressions specified in (7), (8), and (9), we use all three aforementioned measures of price reactions. For both *CAR(-1,1)* and *dCAR(-1,1)*, we use OLS regression; while for *Inf*, we use logit regression as it is a dummy variable. Because some recommendation changes are made on the same day or by the same brokerage houses, we cluster errors on announcement dates and firm/house pairs in calculating t-statistics to control for the possibly correlated noise among the stock returns around these events.

Table 3 reports summary statistics for the control variables used in the regression analysis, separately for subsamples of recommendation changes issued to A and H shares. In the list of control variables, we include four types of other variables: recommendation characteristics, firm characteristics, brokerage house characteristics, and market characteristics.

We use three variables to characterize recommendation changes. First, the magnitude of recommendation change, *Drecomm*, is simply the absolute value of a recommendation change. The average change is 1.243 for the A share sample, while 1.496 for the H share sample. We also include two dummies *Prev_own* and *Prev_other* to measure whether there are other recommendations issued by the same brokerage house during the prior one week for the same share class and the other class of the firm, respectively. If a house has recently issued a recommendation for the same firm, the prior recommendation may have partially leaked the information in the current recommendation to the public. Including these dummies help to control for these nuanced effects. In the data, the frequency of having another recommendation in the prior one week by the same house for either share class of the same firm is less than 5% in both A share and H share samples.

We use two brokerage house characteristics to capture each house's ability. We measure a house's experience, *Experience*, by the number of quarters the house has been covering a firm, which has an average value of 19.881 in the A share sample and 23.843 in the H share sample. We follow Hong and Kubik (2003) to use a ranking method to measure the accuracy of a house's previous earnings forecasts. Specifically, we collect all EPS forecasts from I/B/E/S and Bloomberg, and compute each house's EPS forecasting errors by the absolute

Table 3
Summary statistics for control variables

Variables	*N*	*Mean*	*Median*	*SD*	*Min*	*P5*	*P95*	*Max*
A. A share sample								
Drecomm	2,347	1.243	1.000	0.493	1	1	2	4
Prev_own	2,347	0.015	0.000	0.121	0	0	0	1
Prev_other	2,347	0.046	0.000	0.209	0	0	0	1
Experience	2,347	19.881	12.459	21.271	0.000	0.000	64.098	93.148
Accrank	2,173	3.031	3.000	1.386	1	1	5	5
Size	2,294	24.201	24.207	1.492	19.314	21.747	26.823	28.226
Ncover	2,347	12.348	12.000	4.871	1	5	21	26
Institutional	2,266	19.409	13.320	19.510	0.174	0.889	59.201	95.220
Hfraction	2,271	0.414	0.355	0.210	0.105	0.156	0.790	0.973
Turnover	2,347	1.312	0.734	1.551	0.008	0.063	4.520	14.010
Idiov	2,347	0.018	0.017	0.007	0.005	0.008	0.031	0.049
Momentum	2,347	0.000	0.000	0.004	−0.017	−0.006	0.006	0.043
AHprcratio	2,346	1.421	1.246	0.587	0.662	0.830	2.660	4.900
B. H share sample								
Drecomm	5,766	1.496	1	0.712	1	1	3	4
Prev_own	5,766	0.028	0	0.166	0	0	0	1
Prev_other	5,766	0.011	0	0.106	0	0	0	1
Experience	5,766	23.843	17.984	22.592	0.000	0.000	70.689	92.262
Accrank	5,408	3.182	3.000	1.347	1	1	5	5
Size	5,523	23.977	23.780	1.407	19.605	21.943	26.404	28.035
Ncover	5,766	22.319	23.000	7.115	1	9	32	45
Institutional	5,227	35.613	35.425	17.401	1.634	6.897	67.856	94.429
Hfraction	5,523	0.430	0.363	0.221	0.096	0.168	0.852	0.973
Turnover	5,765	0.872	0.714	0.799	0.034	0.235	1.907	38.290
Idiov	5,766	0.021	0.020	0.007	0.006	0.010	0.034	0.043
Momentum	5,765	0.001	0.001	0.005	−0.022	−0.006	0.007	0.117
AHprcratio	5,753	1.424	1.257	0.583	0.629	0.827	2.606	5.677

Drecomm is the absolute value of recommendation change. *Prev_own* is a dummy regarding whether there is a recommendation change made by the same brokerage house for the same share in the previous one week. *Prev_other* is a dummy if there is a recommendation made by the same brokerage house for the other class share of the firm in the previous one week. *Experience* is measured as the number of months an analyst has covered the firm up to the time of the event. *Accrank* is the quintile derived from sorting the analyst's previous year's forecast errors among errors of all forecast observations of the firm/year. *Size* is the logarithm of the market capitalization of tradable shares in the share class at the end of the previous year. *Ncover* is the number of analysts covering the firm. *Institutional* is the fraction of all tradable shares held by institutional investors. *Hfraction* is the fraction of a firm's tradable shares issued in H share class. *Turnover* and *Momentum* are both measured by their average values in the prior three-month period. *Idiov* is the idiosyncratic volatility estimated from the market model. *AHprcratio* is the average price ratio of A and H shares during the five-day period before the announcement.

forecast error divided by the firm's share price at the end of the previous year, sort errors of all observations into five quintiles, and use a house's quintile in the previous year as the measure. This variable, *Accrank*, has an average value of 3.031 in the A share sample and 3.182 in the H share sample.

We use several firm characteristics to capture uncertainty faced by investors regarding a firm's shares. We include size and analyst coverage as investors face a more opaque information environment for small firms and firms with less analyst coverage. As the two share classes are segmented, we separately measure size of each share class, *Size*, by logarithm of the market value of all in the class at the end of the previous year. *Size* has an average value of 24.201 in the A share sample and 23.977 in the H share sample. We measure analyst coverage, *NCover*, by the number of analysts that cover a given share class of a firm in a given year. This variable has an average value of 12.348 in the A share sample and 22.319 in the H share sample. We also include the fraction of tradable shares held by institutional investors, *Institutional*, as a control variable as institutional investors usually subscribe to Bloomberg and other news portals and have better access to analyst reports than retail investors. This fraction has an average value of 19.4% in the A share sample, which is lower than the average value of 35.6% in the H share sample, consistent with the fact that there are more institutional investors in the Hong Kong stock market. We also include *Hfraction*, the ratio of tradable H shares to the total number of tradable A and H shares across all the two share classes. This variable has an average value of around 0.4 in both A share and H share samples.

We also include several market variables, such as turnover rate *Turnover*, idiosyncratic return volatility *Idiov*, and return momentum *Momentum*. These variables serve to control for timing of analyst recommendations, that is, analysts releasing recommendations during periods of high volatility and high sentiment in A share and H share markets. We measure *Turnover* and *Momentum* by their average values in the prior three months and *Idiov* by the aforementioned market model with data in the prior one year. All these market variables are share-specific, that is, when the dependent variable observation is a reaction in A market, the observation for *Idiov* is also based on A market. We also include the price ratio of A to H shares, *AHprcratio,* as it may contain information for future price movements. This ratio has an average value of 1.421 in the A share sample and 1.424 in the H share sample. The difference in these values is due to the different times when the two samples of recommendations were made.

Table 4 reports the OLS regression results from using *CAR(-1,1)* as the dependent variable to separately estimate regressions (7), (8), and (9). Note that if we do not include any control variables, the univariate analysis of these regressions will lead to the summary statistics presented in Table 2. The first and second major columns report results from estimating regression (7) in the samples of recommendation changes issued to A and H shares, respectively. In the first major column for the A share sample, the coefficient of the key dummy variable *LocalAnalyst* has a positive estimate of 0.4% with a t-statistic of 2.26, which confirms that A share investors more strongly react to recommendations by local analysts, as stated by Hypothesis 1.[15] In the second major column for the H share sample, the coefficient of *LocalAnalyst* has a negative estimate of −0.6% with a t-statistic of −4.09. This coefficient suggests that H share investors more strongly react to recommendations by foreign analysts, despite the countervailing effect of foreign analysts potentially having lower information quality than local analysts.

15 Because of the availability of several control variables, the number of observations is reduced from 2,347 to 2,098, that is, 1,475 recommendation changes by local analysts and 872 by foreign analysts, as summarized in Table 2.

Table 4
Regression analysis of price reactions measured by CAR

	Regression (7)		Regression (8)		Regression (9)
Variable	A share sample	H share sample	Local analyst sample	Foreign analyst sample	Full sample
Ashare			0.007**	−0.007***	−0.006***
			(2.43)	(−3.21)	(−3.09)
LocalAnalyst	0.004**	−0.006***			−0.006***
	(2.26)	(−4.09)			(−4.00)
*Ashare*LocalAnalyst*				0.011***	
				(4.60)	
Drecomm	0.001	0.003**	0.005***	0.002	0.002**
	(0.38)	(2.53)	(2.93)	(1.36)	(2.49)
Prev_own	−0.013*	−0.010**	−0.009*	−0.010**	−0.010***
	(−1.67)	(−2.56)	(−1.79)	(−2.17)	(−3.00)
Prev_other	0.005	0.011**	0.013**	0.005	0.007**
	(0.88)	(2.24)	(2.33)	(0.99)	(2.00)
Size	−0.002**	−0.003***	−0.003***	−0.002***	−0.003***
	(−2.50)	(−3.47)	(−3.26)	(−3.34)	(−4.67)
Institutional	0.056	0.076*	0.062	0.061	0.061*
	(1.22)	(1.85)	(1.19)	(1.53)	(1.92)
Hfraction	−0.005	0.008***	0.002	0.006*	0.004*
	(−1.08)	(2.60)	(0.54)	(1.81)	(1.91)
Experience	−0.008	0.105***	0.027	0.085***	0.065***
	(−0.16)	(3.64)	(0.68)	(2.88)	(2.74)
Ncover	0.094	0.107	0.317*	0.005	0.115
	(0.44)	(0.89)	(1.85)	(0.04)	(1.10)
Accrank	0.001	0.001**	0.000	0.001**	0.001**
	(0.78)	(2.51)	(0.71)	(2.53)	(2.44)
Idiov	0.111	0.078	0.024	0.085	0.070
	(0.54)	(0.48)	(0.11)	(0.56)	(0.56)
Turnover	−0.001	−0.003***	−0.002	−0.002**	−0.002**
	(−0.68)	(−3.12)	(−1.63)	(−2.11)	(−2.56)
Momentum	0.600**	0.092	0.377	0.127	0.200
	(1.99)	(0.47)	(1.38)	(0.63)	(1.23)
AHprcratio	0.001	0.001	0.001	0.001	0.001
	(0.51)	(0.56)	(0.49)	(0.60)	(0.88)
Observations	2,098	4,901	2,493	4,506	6,999
R^2	0.018	0.021	0.018	0.021	0.021
F	2.05**	8.05***	2.99***	8.13***	9.89***

The dependent variable is *CAR(-1,1)*, the cumulative abnormal return of a position based on the recommendation change from one day before to one day after recommendation announcement. *Ashare* =1 if the recommendation is for A shares. *LocalAnalyst = 1* if the recommendation is made by local analysts. Other control variables are the same as those reported in Table 3. We cluster errors on announcement dates and firm/house pairs, and use *, **, and *** to denote significance at the 10%, 5%, and 1% level, respectively. The coefficient estimate for *Institutional*, *Experience*, and *Ncover* is multiplied by 1,000.

Among the control variables, the coefficient of absolute recommendation change magnitude *Drecomm* is significantly positive in the H share sample, confirming a basic intuition that larger upgrades or downgrades tend to have stronger price impacts. The coefficient of *Prev_own* is significantly negative for both samples, consistent with the intuition that a previous recommendation in a recent period reduces the impact of a recommendation. The coefficient of *Prev_other* is not significant in the A share sample and is positive in the H share sample, suggesting that a recent recommendation by the same house to the other share class does not significantly reduce the impact of a recommendation.

The coefficient of *Size* is significantly negative in both samples, consistent with a common observation that stock prices of larger firms react less strongly to analyst recommendations. The coefficient of *Hfraction* is significantly positive in the H share sample, indicating that more tradable shares issued to the H share market are associated with stronger price reactions by H shares. The coefficients of *Experience* and *Accrank* are both significantly positive in the H share sample, although insignificant in the A share sample, consistent with the notion that recommendation changes made by more experienced or more accurate houses have larger price impacts. The coefficient of turnover rate is significantly negative in the H share sample, albeit insignificant in the A share sample. The coefficients of other control variables are either mixed cross the two samples or insignificant.

The third and fourth major columns of Table 4 report results from estimating regression (8) in the samples of recommendation changes made by local and foreign analysts, respectively. In the local analyst sample (the third column), the coefficient of the key dummy variable *Ashare* has a positive estimate of 0.7% with a t-statistic of 2.43, and in the foreign-analyst sample (the fourth column), the coefficient of *Ashare* has a negative estimate of -0.7% with a t-statistic of -3.21. This asymmetric pattern is consistent with Hypothesis 2, which states that H share investors more strongly react than A share investors to recommendations made by foreign analysts, although A share investors may or may not more strongly react than H share investors to recommendations by local analysts. The coefficients of control variables are similar to those in the first and second columns.

The fifth major column of Table 4 uses the full sample of recommendation changes to estimate regression (9). The coefficient of key interaction term $Ashare*LocalAnalyst$ has a positive estimate of 1.1% with a t-statistic of 4.60, and the coefficients of control variables are again similar to those reported before. This result confirms Hypothesis 3 that the differential reactions of A share investors to the recommendation changes by local and foreign analysts are greater than the differential reactions of H share investors by a substantial magnitude of 1.1%. As illustrated by our theoretical framework, by comparing the differential reactions of A share investors to those of H share investors, this regression isolates the social connection effect from the effects induced by heterogeneous private information of A share and H share investors, which interferes the results from estimating regression (7), and heterogeneous information quality of local and foreign analysts, which interferes the results from estimating regression (8). Thus, the result from estimating regression (9) indicates the presence of the social connection effect in driving the reactions of A share and H share investors to analyst recommendations.[16]

[16] There is a 10% daily stock price change limit in the A share market, but not in the H share market. In our sample, only 46 out of the 8,113 recommendation changes reached the daily price change limit during the three-day window around the announcement date. Removing these observations virtually gives the same results.

Table 5
Regression analysis of price reactions measured by *dCAR*

	Regression (7)		Regression (8)		Regression (9)
Variable	A share sample	H share sample	Local analyst sample	Foreign analyst sample	Full sample
Ashare			0.281**	−0.517***	−0.462***
			(2.04)	(−4.55)	(−4.31)
LocalAnalyst	0.289**	−0.327***			−0.314***
	(2.47)	(−4.49)			(−4.31)
*Ashare*LocalAnalyst*				0.606***	
				(4.38)	
Drecomm	0.050	0.123***	0.172**	0.093*	0.110**
	(0.44)	(2.60)	(2.30)	(1.71)	(2.46)
Prev_own	−0.740**	−0.607***	−0.536**	−0.654***	−0.625***
	(−1.99)	(−3.19)	(−2.11)	(−2.82)	(−3.67)
Prev_other	0.250	0.577**	0.649*	0.275	0.389
	(0.55)	(2.13)	(1.68)	(0.72)	(1.38)
Size	−0.141**	−0.126***	−0.141***	−0.108***	−0.117***
	(−2.53)	(−3.45)	(−2.93)	(−2.69)	(−3.93)
Institutional	4.479*	3.229*	3.392	3.070*	2.987*
	(1.67)	(1.80)	(1.28)	(1.65)	(1.96)
Hfraction	−0.524*	0.448***	−0.038	0.321*	0.196
	(−1.96)	(2.83)	(−0.18)	(1.90)	(1.53)
Experience	−2.232	6.080***	0.781	4.693**	3.294**
	(−0.50)	(3.87)	(0.29)	(2.40)	(2.07)
Ncover	4.518	3.124	14.230*	−0.994	4.629
	(0.38)	(0.54)	(1.74)	(−0.15)	(0.90)
Accrank	0.047	0.041*	0.016	0.058**	0.043**
	(1.13)	(1.86)	(0.46)	(2.31)	(2.10)
Idiov	−2.528	−18.274***	−8.421	−17.803***	−14.538***
	(−0.22)	(−2.82)	(−0.79)	(−2.63)	(−2.59)
Turnover	−0.028	−0.096***	−0.078*	−0.027	−0.043
	(−0.68)	(−2.79)	(−1.74)	(−0.75)	(−1.51)
Momentum	16.727	−2.180	13.652	−4.658	1.322
	(1.24)	(−0.27)	(1.25)	(−0.55)	(0.20)
AHprcratio	0.015	0.056	0.051	0.059	0.062
	(0.14)	(0.81)	(0.55)	(0.77)	(1.05)
Observations	2,098	4,901	2,493	4,506	6,999
R^2	0.014	0.022	0.013	0.021	0.019
F	2.22***	7.55***	2.11***	6.77***	8.33***

The dependent variable is *dCAR(-1,1)*, the cumulative abnormal return of a position based on the recommendation change *CAR(-1,1)* deflated by the idiosyncratic volatility. *Ashare* =1 if the recommendation is for A shares. *LocalAnalyst=1* if the recommendation is made by local analysts. Other control variables are the same as those reported in Table 3. We cluster errors on announcement dates and firm/house pairs and use *, **, and *** to denote significance at the 10%, 5%, and 1% level, respectively. The coefficient estimate for *Institutional*, *Experience*, and *Ncover* is multiplied by 1,000.

We also use the two alternative price reaction measures, *dCAR(-1,1)* and *Inf*, as the dependent variable to rerun regressions (7), (8), and (9). Tables 5 and 6 report the respective results, which are consistent with those reported in Table 4. In both Tables, the coefficient estimate of the key term *LocalAnalyst* from estimating regression (7) is significantly positive in the A share sample (major Column 1), of *Ashare* from estimating regression (8) is significantly negative in the foreign-analyst sample (major Column 4), and of the interaction term $Ashare*LocalAnalyst$ from estimating regression (9) is significantly positive in the full sample (major Column 5).

Table 6
Logit regression analysis of price reactions measured by *Inf*

	Regression (7)		Regression (8)		Regression (9)
Variable	A share sample	H share sample	Local analyst sample	Foreign analyst sample	Full sample
Ashare			0.443	−0.564**	−0.448*
			(1.41)	(−2.25)	(−1.96)
LocalAnalyst	0.513**	−0.282*			−0.263*
	(2.19)	(−1.85)			(−1.74)
*Ashare*LocalAnalyst*				0.766***	
				(2.73)	
Drecomm	0.156	0.282***	0.317**	0.250***	0.263***
	(0.64)	(4.05)	(2.14)	(3.33)	(3.87)
Prev_own	0.000	−0.585	−0.409	−0.897	−0.746*
	(.)	(−1.41)	(−0.75)	(−1.47)	(−1.80)
Prev_other	0.394	0.643*	−0.121	0.941**	0.561*
	(0.78)	(1.67)	(−0.22)	(2.49)	(1.87)
Size	−0.262**	−0.240***	−0.189**	−0.267***	−0.220***
	(−2.28)	(−3.33)	(−1.98)	(−3.78)	(−3.90)
Institutional	8.451	7.825**	8.194	6.342*	6.674**
	(1.54)	(2.11)	(1.44)	(1.67)	(2.14)
Hfraction	−0.968*	0.619*	−0.442	0.645*	0.223
	(−1.70)	(1.90)	(−1.05)	(1.92)	(0.87)
Experience	−2.152	4.433	−5.256	6.119**	2.277
	(−0.31)	(1.48)	(−0.97)	(2.09)	(0.87)
Ncover	13.633	13.676	24.538	8.298	12.271
	(0.55)	(1.10)	(1.27)	(0.60)	(1.07)
Accrank	0.107	0.014	0.037	0.036	0.038
	(1.31)	(0.34)	(0.53)	(0.82)	(1.01)
Idiov	−61.480***	−46.650***	−46.297**	−60.063***	−52.766***
	(−2.87)	(−3.05)	(−2.46)	(−3.92)	(−4.55)
Turnover	−0.045	−0.240*	−0.071	−0.049	−0.060
	(−0.47)	(−1.71)	(−0.67)	(−0.40)	(−0.76)
Momentum	71.432***	−41.536**	18.812	−28.311	−13.093
	(2.86)	(−2.30)	(0.77)	(−1.52)	(−0.84)
AHprcratio	0.238	0.251*	0.159	0.335***	0.282***
	(1.27)	(1.89)	(0.89)	(2.60)	(2.64)
Observations	2,098	4,901	2,493	4,506	6,999
Pseudo R^2	0.037	0.029	0.017	0.035	0.025
Chi^2	30.27***	68.57***	20.75	71.06***	82.49***

The dependent variable is *Inf*, a dummy for a recommendation change to be influential or not, that is, whether the share's *CAR(-1,1)* has the same sign as the direction of the change and an absolute value greater than a 2.5% tail of normal distribution with volatility equal to the share's idiosyncratic volatility during the prior year. *Ashare* =1 if the recommendation is for A shares. *LocalAnalyst = 1* if the recommendation is made by local analysts. Other control variables are the same as those reported in Table 3. We cluster errors on announcement dates and firm/house pairs and use *, **, and *** to denote significance at the 10%, 5%, and 1% level, respectively. The coefficient estimate for *Institutional*, *Experience*, and *Ncover* is multiplied by 1,000.

Taken together, by using three different measures of stock price reactions, we find a rich set of differential investor reactions to analyst recommendations. The patterns of these differential reactions are consistent with the predictions outlined in Hypotheses 1-3. In particular, the findings support the presence of the social connection effect in driving the differential reactions of local and foreign investors to recommendations made by local and foreign analysts. In the next two subsections, we take advantage of two special subsamples of the data to further demonstrate the robustness of this key result.

5.3 Paired subsample

In our sample, 296 pairs of recommendation changes are made by the same brokerage house for the same firm on the same date, with one for the firm's A shares and the other for its H shares. To take advantage of these paired recommendation changes, we can use a difference-in-differences approach to control for all firm specific characteristics and analyst specific characteristics, which may not be fully captured by the control variables used in our earlier regressions.

Specifically, we first measure the differential price reaction between A and H shares to each of these paired recommendation changes, then run the following regression:

$$D\_PriceReaction_{i,j,t} = \beta_0 + \beta_1 LocalAnalyst_i + \beta_2 Controls_{i,j,t} + \varepsilon_{i,j,t}, \quad (10)$$

where $D\_PriceReaction_{i,j,t}$ is the differential price reaction between A share and H share to the recommendation change pair made by house i for the two classes of shares of firm j on date t; $LocalAnalyst_i$ is a dummy, which takes the value of one if the recommendation is made by a local analyst and zero otherwise. According to Hypothesis 3, the differential reactions of A share and H share investors to recommendations made by local analysts are greater than their differential reactions to recommendations by foreign analysts. Thus, we expect β_1 to be positive. Like before, we use the three measures of price reactions to compute the differential reactions of A and H shares as the dependent variable. The control variables include all of those used in regressions (7)-(9). For any variable with different values for A and H shares, such as idiosyncratic volatility and turnover, we include its values for both share classes in the regression. As before, we cluster errors on announcement dates and firm/house pairs in calculating t-statistics.

Table 7 reports the regression results. The first major column uses the difference of *CAR(-1,1)* between A and H shares as the dependent variable. The coefficient estimate of the key variable *LocalAnalyst* has a large positive value of 1.6% with a t-statistic of 3.24, despite that the small sample size makes many of the control variables insignificant. The second major column uses the difference of *dCAR(-1,1)* as the dependent variable and gives almost the same result, with the coefficient of $LocalAnalyst$ being positive and highly significant. The third major column uses the difference of *Inf* between A and H shares as the dependent variable. In this regression, the coefficient of $LocalAnalyst$ is positive but insignificant. The small sample size makes it rather difficult to draw statistical significance in variation of influential recommendation changes, which are just about 6% of the sample.

Taken together, Table 7 shows that even after using a small sample of paired recommendation changes to control for all unobservable firm and analyst characteristics, there is still significant evidence supporting the key prediction of Hypothesis 3 that the differential reactions of A share and H share investors

Table 7
Regression analysis of paired recommendation changes

	CAR(-1,1)		*dCAR(-1,1)*		*Inf*	
	Estimate	*t-value*	*Estimate*	*t-value*	*Estimate*	*t-value*
LocalAnalyst	0.016	3.24***	0.726	2.83***	0.023	0.48
Hfraction	0.143	1.05	8.163	1.23	0.713	0.69
Accrank	−0.001	−0.36	−0.096	−0.9	0.012	0.73
AHprcratio	−0.002	−0.36	−0.010	−0.04	0.074	1.69*
Drecomm_A	−0.006	−0.94	−0.239	−0.83	−0.114	−2.6**
Prev_own_A	−0.030	−1.44	−1.659	−1.65	−0.004	−0.01
Prev_other_A	−0.023	−0.98	−1.011	−0.93	−0.132	−1.34
Idiov_A	0.525	0.77	18.879	0.58	−4.896	−1.2
Turnover_A	0.000	0	−0.046	−0.29	−0.020	−0.74
Momentum_A	−0.919	−0.73	−46.664	−0.89	−5.981	−0.85
Size_A	0.033	1.13	1.974	1.33	0.156	0.7
Institutional_A	0.159	1.13	8.991	1.27	2.228	1.79*
Experience_A	0.209	1.88*	10.386	1.54	−0.085	−0.08
Ncover_A	−0.094	−0.18	−8.005	−0.31	1.256	0.27
Drecomm_H	−0.007	−1.11	−0.279	−1.05	0.084	1.93*
Prev_own_H	−0.014	−0.37	−0.045	−0.03	−0.105	−0.48
Prev_other_H	0.042	1.92	1.879	1.82*	0.126	0.45
Idiov_H	−0.750	−1.09	−22.922	−0.74	−11.113	−2.07**
Turnover_H	0.005	0.73	0.319	1.08	0.048	1.07
Momentum_H	1.883	1.76*	106.348	2.23**	17.536	2.31**
Size_H	−0.037	−1.23	−2.210	−1.45	−0.196	−0.86
Institutional_H	−0.071	−0.43	−0.329	−0.04	0.006	0.01
Experience_H	−0.087	−0.8	−6.625	−0.95	−0.605	−0.54
Ncover_H	0.179	0.3	3.193	0.13	−6.270	−1.77*
Observations	296 pairs		296 pairs		296 pairs	
R^2	0.110		0.112		0.119	
F	1.66**		2.05***		1.11	

This table reports difference-in-differences analysis using the paired sample of recommendation changes made by the same brokerage house for the same firm on the same day, one for A shares and the other for H shares. The dependent variable in the first, second, and third major column is the difference between A and H shares in *CAR(-1,1)*, *dCAR(-1,1)*, and *Inf*, respectively. *LocalAnalyst=1* if the recommendation is made by local analysts. Other control variables are the same as those in Table 3. Variable names end with *A* are associated with A shares, and those end with *H* are with H shares. We cluster errors on announcement dates and firm/house pairs and use *, **, and *** to denote significance at the 10%, 5%, and 1% level, respectively. The coefficient estimate for *Institutional*, *Experience*, and *Ncover* is multiplied by 1,000.

to recommendations made by local analysts are greater than their differential reactions to recommendations by foreign analysts.

5.4 Chinese versus non-Chinese analysts of foreign houses

In our earlier analysis, we treat analysts working for local houses as local analysts and for foreign houses as foreign analysts. In this subsection, we further explore the heterogeneity within analysts of foreign houses. It is common for foreign brokerage houses to hire both Chinese and non-Chinese analysts to cover Chinese firms, although it is rare for local houses to hire non-Chinese analysts. As A share investors might have closer social connections with Chinese analysts of foreign houses, while H share investors might have closer connections with non-Chinese analysts of foreign houses, Hypothesis 3 again implies that the differential reactions of A share investors to recommendations made by Chinese and non-Chinese analysts of foreign houses to be greater than the differential reactions of H share investors. This consideration thus motivates another difference-in-differences analysis of the price reactions of A and H shares to recommendation changes made by Chinese and non-Chinese analysts of foreign houses.

This difference-in-differences analysis allows us to control for an argument about A share and H share investors having differential access to reports of local and foreign houses. That is, due to language and cultural reasons, it may be easier for A share investors to access reports and contact analysts of local houses and for H share investors to obtain reports and contact analysts of foreign houses. As investors (A share or H share investors) have the same access to reports by Chinese and non-Chinese analysts of the same foreign houses, comparing price reactions of A and H shares to these reports naturally controls for this accessibility issue.

We use analyst name to identify whether an analyst is Chinese. Bloomberg provides the full name of the analyst for each analyst report, and I/B/E/S provides the analyst's last name together with the initial of the first name for each analyst report. We define an analyst as Chinese if his full name is based on Pinyin, the official phonetic system for transcribing the sound of Chinese characters into Latin script, and as foreign if his name is not based on Pinyin.

Note that A share investors are primarily residents of mainland China, while H share investors are mixed with residents from outside mainland China, including Chinese speaking regions such as Hong Kong, Taiwan, Singapore, and other parts of the world such as the United States, the United Kingdom, and continental Europe. It is thus useful to separate analysts with origins in mainland China from those with origins in Hong Kong, Taiwan, and Singapore, even though they also can speak Chinese. To do so, we take advantage of the fact that the Pinyin systems used in mainland China, Hong Kong, Taiwan, and Singapore are different from each other. Specifically, by potentially abusing the term "Chinese," we define an analyst as Chinese only if his full name matches Pinyin used in mainland China. It is easy for both local and foreign investors to recognize an analyst whose name matches this criterion as coming from a family in mainland China.

We adopt a regression specification similar to (9):

$$\begin{aligned}PriceReaction_{i,j,t,m} = {} & \beta_0 + \beta_1 Ashare_m + \beta_2 ChineseAnalyst_i \\ & + \beta_3 Ashare_m * ChineseAnalyst_i + \beta_4 Controls_{i,j,t,m} + \varepsilon_{i,j,t,m}\end{aligned} \tag{11}$$

where $PriceReaction_{i,j,t,m}$ is the share price reaction to the recommendation change made by analyst i for firm j in market m on date t, $ChineseAnalyst_i$ is a dummy variable indicating whether a recommendation change is made by a Chinese analyst of a foreign house.

Table 8
Regression analysis of recommendation changes by Chinese and non-Chinese analysts of foreign houses

	CAR(-1,1)		*dCAR(-1,1)*		*Inf*	
	Estimate	*t-value*	*Estimate*	*t-value*	*Estimate*	*t-value*
Ashare	−0.014	−2.93***	−0.721	−3.1***	−1.144	−2.5**
ChineseAnalyst	0.001	0.44	−0.143	−0.88	−0.692	−2.29**
Ashare ChineseAnalyst*	0.015	2.64***	0.855	2.86***	1.865	2.93***
Drecomm	0.002	0.93	0.070	0.59	0.398	2.71***
Prev_own	0.000	0.05	−0.027	−0.07	−0.262	−0.33
Prev_other	−0.005	−0.91	−0.125	−0.37	−0.188	−0.29
Size	−0.002	−1.24	−0.083	−1.23	−0.166	−1.25
Institutional	−0.059	−0.77	−1.791	−0.45	−13.304	−1.71*
Hfraction	0.010	1.55	0.536	1.62	0.696	1.27
Experience	−0.022	−0.38	−0.806	−0.23	−4.569	−0.83
Ncover	0.047	0.17	6.682	0.5	20.289	0.77
Accrank	0.003	2.48**	0.121	2.47**	0.213	2.26**
Idiov	−0.034	−0.12	−24.712	−1.85	−53.824	−2.2**
Turnover	0.000	0.28	0.029	0.4	0.058	0.42
Momentum	0.534	1.31	23.433	1.27	18.083	0.54
AHprcratio	0.004	0.97	0.190	1.14	0.322	1.3
Observations	1,117		1,117		1,117	
R^2 or Pseudo R^2	0.038		0.031		0.058	
F or Chi^2	2.55***		2.09***		33.09***	

This table examines price reactions of A and H shares to recommendation changes made by Chinese and non-Chinese analysts of foreign houses. The dependent variable in the first, second, and third major column is *CAR(-1,1), dCAR(-1,1),* and *Inf*, respectively. *Ashare* = 1 if the recommendation is issued for A shares. *ChineseAnalyst=1* if the recommendation is made by a Chinese analyst. Other control variables are the same as those in Table 3. We cluster errors on announcement dates and firm/house pairs and use *, **, and *** to denote significance at the 10%, 5%, and 1% level, respectively. The reported coefficient estimate for *Institutional*, *Experience*, and *Ncover* is multiplied by 1,000.

We focus on a subsample of analyst recommendations made by foreign houses that have both Chinese and non-Chinese analysts. Because some foreign houses have only non-Chinese analysts and analyst names are missing from some analyst reports, the sample size drops to 741 recommendation changes made by non-Chinese analysts of foreign houses and 376 recommendation changes by Chinese analysts.

Table 8 reports the regression results. In the first major column, the dependent variable is *CAR(-1,1).* The coefficient estimate of the key interaction term *Ashare∗ChineseAnalyst* has a large positive value of 1.5% with a t-statistic of 2.64. In the second and third major columns, the dependent variable is *dCAR(-1,1)* and *Inf*, respectively. In both cases, the coefficient estimate of *Ashare∗ChineseAnalyst* is significantly positive with a t-statistic of 2.86 and 2.93, respectively. Taken together, these results confirm that the differential price reactions of A share investors to recommendation changes made by Chinese and non-Chinese analysts of the same foreign houses are greater than the differential reactions of H share investors. This pattern is again consistent with Hypothesis 3 and supports the presence of the social connection effect in driving the differential reactions of A share and H share investors to analyst recommendations.

5.5 Analyst recommendations and market segmentation

How do analyst recommendations affect the market segmentation between the two classes of shares? We anticipate two opposite forces to determine this effect. On one hand, information from analyst recommendations may make the prices of both share classes to better reflect the firm fundamentals and thus comove more with each other. On the other hand, an analyst recommendation may lead to differential price reactions between the two share classes and thus to comove less with each other.

To examine which force dominates, we run the following regression:

$$Corr_{i,t} = \beta_0 + \beta_1 Nreports_{i,t} + \beta_2 F_{i,t} + \beta_3 Controls_{i,t} + \varepsilon_{i,t} \tag{12}$$

where $Corr_{i,t}$ is the daily return correlation between the A share and H share prices of firm i in year t and $Nreports_{i,t}$ is the number of analyst recommendations made for firm i in year t. If the aforementioned the differential-reaction effect dominates the information effect, the coefficient β_1 is negative. We also include a list of control variables in this regression. In particular, we include $F_{i,t}$ the fraction of recommendations for firm i in year t that are made by either local analysts to A share investors or by foreign analysts to H share investors, because the close social connections between analysts and investors in these recommendations may further lower the return correlation between the two share classes. We also include the fraction of institutional holding, market size, turnover, and idiosyncratic volatility in both A share and H share markets as controls since these factors may affect the return correction between A and H shares. Finally, we control the yearly time effect.

Table 9 reports the regression results. The coefficient estimate of *Nreports* is -0.019 and highly significant, confirming that a firm with more analyst recommendations tends to have a lower return correlation between its A and H shares. This effect is also economically significant, because the number of reports has mean and standard deviation of 3.97 and 1.10 in this sample, while the return correlation has mean and standard deviation of 0.46 and 0.11.

Among the control variables, the coefficient of F is negative, as expected, albeit insignificant. Interestingly, the coefficient of institutional holding in A shares *Institutional_A* is significantly positive, consistent with the argument that institutions in the A share market pay more attention to asset fundamentals than retail investors and their presence increases the return correlation of A shares with H shares. On the other hand, the coefficient of institutional holding in H shares *Institutional_H*, which is typically held by foreign institutions subject to the well-known hot money effect in international capital markets, is significantly negative, suggesting that the presence of foreign institutions reduces the return correlation between A and H shares. Overall, Table 9 shows that more analyst recommendations are associated with a lower return correlation between the two share classes. That is, analyst recommendations exacerbate rather than attenuate the market segmentation between A and H shares.

Table 9
Regression analysis of market segmentation

	Estimate	*t-value*
Nreports	−0.019	−2.60***
F	−0.013	−0.40
Institutional_A	0.001	4.28***
Institutional_H	−0.001	−2.75***
Size_A	0.030	5.23***
Size_H	0.009	1.50
Turnover_A	0.015	2.59***
Turnover_H	0.067	5.22***
Idiov_A	4.525	3.48***
Idiov_H	−1.047	−0.79
Observations	430	
Adj R^2	0.345	
F	14.3***	

The dependent variable is the daily return correlations for each stock pair in every year. *Nreports* is the number of recommendation changes made by all houses in both market, and *F* is the fraction of recommendation change made by either by local analysts to A share investors or by foreign analysts to H share investors. *Institutional_A* and *Institutional_H* are the fraction of all tradable shares held by institutional investors in A share and H share markets, respectively. *Size_A* and *Size_H* are the logarithm of the market capitalization of tradable shares at the end of the previous year for A and H shares, respectively. *Turnover_A* and *Turnover_H* are measured by the average turnover rates in the prior three-month period for A share and H share markets, respectively. *Idiov_A* and *Idiov_H* are idiosyncratic volatility estimated from the market model for A and H shares, respectively. This regression also controls for the yearly time effect.

Note that the return correlation between A and H shares increases with the horizons, as we have shown in summary statistics of Table 1. This observation leads to a natural question regarding whether the differential reactions of A share and H share investors remain persistent over time. If the differential reactions are induced by nonfundamental reasons, one would expect the differential reactions to gradually converge over time. To examine this issue, we face the common challenge of having greater noise in long-horizon returns, which reduces the power of statistical tests. Nevertheless, we depict the cumulative returns around the announcement day of analyst recommendations from day −3 to day 20 in Figure 3. Panel A depicts the cumulative returns averaged across four types of recommendations based on the analyst-investor combination, that is, from local analysts to A share investors, from foreign analysts to A share investors, from local analysts to H share investors, and from foreign analysts to H share investors. Panel B separately depicts the cumulative returns for each of these four types.

Panel A shows modest reaction reversal from day 8 afterward, even though the reversal pattern is statistically insignificant due to the greater noise in the long-horizon returns. Panel B further shows that the reversal pattern is particularly visible in reactions of A share prices to the recommendations of local analysts and in reactions of H share prices to the recommendations of local analysts. The presence of reaction reversal suggests that the differential reactions of A share and H share investors would partially converge over time,

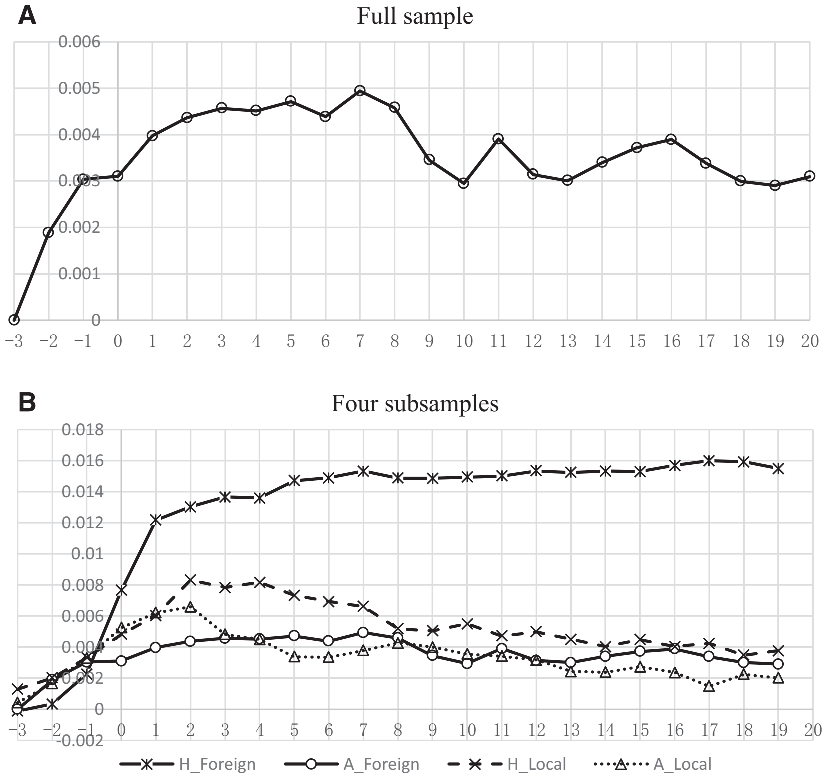

Figure 3
Cumulative abnormal returns
The figure depicts the cumulative abnormal return of a position based on the recommendation change from three days before to t days after the recommendation announcement (up to 20 days), by using a market model with the Shanghai Composite Index and the Hong Kong Hang Seng Index as the market returns and estimated from 365 days to 10 days before each announcement. Panel A is for the full sample with all relevant recommendation changes. Panel B separately depicts the four types of recommendations based on the analyst-investor combination, that is, from local analysts to A share investors (A_Local), from foreign analysts to A share investors (A_Foreign), from local analysts to H share investors (H_Local), and from foreign analyst to H share investors (H_Foreign).

which in turn help to explain the increase in return correlation between the two share classes over longer horizons.[17]

6. Conclusion

This paper uses the segmented dual-class shares of Chinese firms to analyze the differential reactions of local and foreign investors to analyst recommendations.

[17] Despite the partial reaction reversal over longer horizons, our key results summarized in Tables 4–6 regarding the differential reactions of A share and H share investors to analyst recommendations remain robust after using a longer event window of from one day before to ten days after the announcement day. This robustness result is available on request from the authors.

We find a rich set of differential reactions. In particular, our findings support a new notion that social connections between investors and analysts can cause differential investor reactions to analyst recommendations. Furthermore, we show that analyst recommendations exacerbate rather than attenuate the market segmentation between the two share classes due to investors' differential reactions to analyst recommendations.

Our study sheds light on an important source of heterogeneity in financial markets. As investors have different social connections with different analysts, gurus, or other sources of information, they are likely to hold different beliefs about the same financial asset and, as a result, to speculate against each other. This helps to explain the widely observed excessive trading in asset markets. This insight is particularly useful for understanding international investments. Foreign investors face more severe informational barriers in investing in local assets. To mitigate the informational barriers, it is beneficial for them to hire better informed local analysts or local money managers to facilitate their investment decisions. However, as emphasized by Gennaioli, Shleifer, and Vishny (2015), social trust is the key in maintaining the relationship between investors and money managers. The lack of trust and social connections may prevent foreign investors from effectively relying on the expertise of local analysts and local money managers to overcome their informational barriers. This helps explain the widely documented home bias in portfolio investments of investors across the world and why equity holdings of foreign investors tend to be highly volatile. This also offers an explanation for the segmentation between dual-class shares issued by the same firms in different markets.

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