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Price Volatility, Information and Noise Trading: Evidence from Chinese Stock Markets

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Abstract

In China, domestic firms can issue A- and B-shares. Before Feb 2001, Domestic investors can only invest A-shares while foreign investors can only trade B-shares. This paper makes use of this special feature in testing information and trading noise hypotheses. We find that A-share prices are more volatile than B-share prices even though they are issued by the same companies and are traded in the same stock market. We further find that A-share prices are much more volatile only during the daytime (trading) period while it is less volatile for A-share prices than B-shares prices during the overnight (nontrading) period in China. Since individual investors dominate A-share markets while foreign institutional investors dominate B-share markets, the results are consistent with the conjecture that the higher volatility of A-shares is attributed to the noise trading by domestic investors.

JEL classification numbers: G15
Keywords: Volatility, Noise, Market segmentation, Chinese stock markets, Ownership restriction

1 Introduction

It is generally difficult to distinguish between fundamentals or noise explanations of volatility because neither is directly observable. Previous studies use return volatilities in trading and non-trading periods to investigate the hypotheses of informational and noise trading (French and Roll (1986), Barclay, Litzenberger and Warner (1990), Jones, Kaul and Lipson (1994), Ito, Lyons and Melvin (1998)). This study, however, uses stock market segmentation to investigate the impact of informational and noise trading on stock return volatility. The ownership restriction in Chinese stock market offers us a unique situation to investigate the impact of the investor clienteles on the return volatility of

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securities. First, A-shares and B-shares are issued by the same company and they have same rights and are traded in the same exchange and trading mechanism. Hence, the economic fundamentals on both types of share are common. Second, A-share and B-share markets are completely segmented from each other before Feb 2001 and A-shares can only be owned by domestic investors while foreign investors can trade B-shares only (Sun, Tong and Yan (2009)). Third, the A-share market is dominated by domestic individual investors while the B-share market is dominated by foreign institutional investors (Siu (1996)). Compared with domestic investors, foreign institutional investors are more sophisticated and experienced. Foreign investors also have better means of obtaining information and access to more advanced technology to analyze data (Sjoo and Zhang (2000)). Small domestic investors only rely solely on rumor, perception and government procurements for their investment cues, they trade on noise rather than information (Sherry (1997)). These particular features allow us to investigate how price volatility is related to informational and noise trading.

Our results show that A-share prices are more volatile than B-shares of the same companies. More important is that we find that prices of A-shares are more volatile only during the daytime while the B-share overnight returns are more volatile than those of A-share. The results support the conjecture that price movements in A-share is due to noise trading by domestic individual investors while foreign B-share investors are motivated by informational trading.

The rest of this paper is organized as follows. Section 2 presents the methodology. Section 3 presents the sample data and the preliminary statistics. Section 4 discusses the empirical results. Section 5 summarizes and concludes the study.

2 Methodology

To investigate how volatility is related to informational and noise trading, different stock returns based on the price movement across two trading days are used (Figure 1).

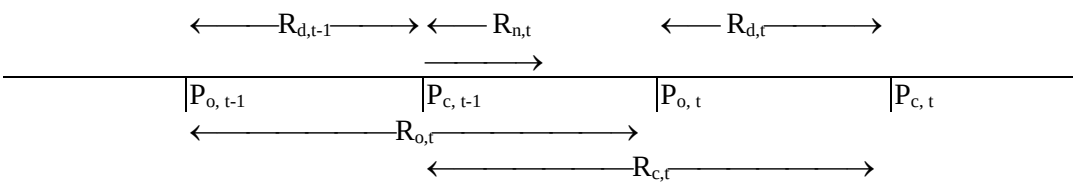

Figure 1: Interday and intraday returns

where

$P_{o,\,t}$ = opening price on day t

$P_{c,\,t}$ = closing price on day t

$R_{o,t}$ = open-to-open return on day t

$R_{c,t}$ = close-to-close return on day t

$R_{d,t}$ = daytime return on day t

$R_{n,t}$ = overnight return on day t

The open-to-open return, $R_{o,t}$, is defined as $\ln(P_{o,\ t} / P_{o,\ t-1})$ and the variance of open-to-open return, $Var(R_{o,t})$, measures the interday stock return volatility during trading hours plus following non-trading hours after the stock exchange is closed and before the exchange opens next day. The close-to-close return, $R_{c,t}$, is defined as $\ln(P_{c,\ t} / P_{c,\ t-1})$ and the variance of close-to-close return, $Var(R_{c,t})$, measures the interday return volatility during non-trading hours plus following trading hours after the stock exchange is opened and before the exchange closes next day. The daytime return, $R_{d,t}$, is defined as $\ln(P_{c,\ t} / P_{o,\ t})$ and the variance of daytime return, $Var(R_{d,t})$, measures the intraday stock return volatility during trading period. The overnight return, $R_{n,t}$, is defined as $\ln(P_{o,\ t} / P_{c,\ t-1})$ and the variance of overnight return, $Var(R_{n,t})$, measures the stock return volatility during non-trading period.

Since A- and B-shares are issued by the same companies and they are traded on the same exchange, any news or information related to the company should be reflected in both A- and B-share markets. If both A- and B-share investors trade on information, we expect that there is no significant difference in the interday (open-to-open and close-to-close) and intraday (daytime and overnight) return volatilities between A-shares and B-shares. Hence, the return variance ratio between A-shares and B-shares, $Var(R_A)/Var(R_B)$, is not different from one.

When noise traders are causing volatility, the cause must be the trading itself. For example, poorly informed individual investors over-react to each other's trades and this will increase return variances (Shiller (1981), French and Roll (1986), Black (1986)). If A-share investors trade on noise rather than information, the interday variance ratio between A-shares and B-shares will be larger than one. Further, volatility related to noise trading should occur when the market is open. Thus, the variance of daytime stock returns is larger in A-shares than in B-shares and the daytime variance ratio between A-shares and B-shares is larger than one. The stock market in China is closed during the overnight period while it is the daytime of foreign markets such as the Europe and the U.S and news from foreign markets is continuously produced. This increases the overnight volatility of B-shares and the overnight variance ratio between A-shares and B-shares is smaller than one.

Ronen (1997) argues that treating cross-sectional observations as being independent overstates the power of the variance ratio test. Since stocks originating from the same country may be more or less correlated with each other, we use an alternative approach to test the equality of return variances. We first compute the variance ratio in each month for each company. Since the mean variance ratio is biased upward, we primarily rely on the median variance ratio for inference. In a given month, we compute the median variance ratio across all stocks in each A- and B-share market. Finally, we tabulate the distribution of the median variance ratios across sample period for Shanghai and Shenzhen markets.[2] By using only one observation (i.e. median) in each month, we avoid the problem of cross-sectional dependence.

[2]Choe (1994) uses similar method to investigate transitory volatility at the open and close for foreign stocks traded on the NYSE.

Also, obtaining one variance ratio per month rather than computing one variance ratio using the entire sample period minimizes the impact of potential outliers and of changing variances through time.[3]

3 Data and Sample Summary Statistics

The Shanghai Stock Exchange and the Shenzhen Stock Exchange were officially opened in December 1990 and July 1991 respectively. Each company's issue is restricted to one of the exchange, hence, no company is cross-listed on both exchanges. In Shanghai, price limit rule was lifted from 21 May 1992 and resumed from 16 December 1996 with 10% of the previous day's closing price. In Shenzhen, price limit rule was lifted from 17 August 1991 and resumed from 16 December 1996 with 10% of the previous day's closing price. Recent studies document that price limits delay price discovery, postpone desired trading activity, and create volatility spillovers to post-limit-hit days (Kim and Rhee (1997), Lee and Choi (2001) and Yang and Kim (2001)). The imposition of price limit rule may have affected our results. To avoid the effect of price limit rule on variance estimation, the sample period is from July 1992 to November 1996 for both Shanghai and Shenzhen Stock Exchanges. At the end of 1996, there are 293 and 237 companies listed on the Shanghai and the Shenzhen Stock Exchanges respectively. There are 36 companies that have both A and B shares listed in Shanghai, and 33 companies that have both shares listed in Shenzhen. This forms our initial sample of data. For each company, we collect daily opening prices, closing prices, trading volumes and number of free-floating shares for both A and B shares from the Taiwan Economic Journal (TEJ) database. To mitigate the effect of thin trading, only trading days with trading volume on day t-1 and day t for both A- and B-shares will be used to calculate stock returns and variances. We also exclude days following holidays as these days will complicate comparisons of variance across and within day. The elimination of such days results in a minimal loss of data. For each stock, if there are less than ten pairs of consecutive 'valid' trading days in a given calendar month, the entire month is eliminated. Finally, we are left with 35 companies in Shanghai and 32 companies in Shenzhen.

[3]A drawback of this aggregation procedure is that only a small number of stocks may dominate the picture because many stocks in the sample started trading during the sample period. We examined the sensitivity of the results by calculating the median variance ratio for each stock and then obtaining the average and median across stocks. The results were similar to what we reported here.

Table 1: Investor distribution in A- and B-share markets

	A-share investors (10,000)			B-share investors (10,000)		
Shanghai						
Year	Person	Company	Total	Person	Company	Total
1992	110.23	0.70	111.23	-	-	-
1993	421.09	1.40	422.49	0.83	0.19	1.02
1994	571.00	2.00	573.00	1.57	0.32	1.89
1995	682.00	2.50	682.50	2.32	0.38	2.70
1996	1200.00	3.30	1203.30	4.11	0.46	4.57
Shenzhen						
Year	Person	Company	Total	Person	Company	Total
1992	104.91	0.14	105.05	0.26	0.11	0.37
1993	352.22	1.05	353.28	0.68	0.20	0.88
1994	480.72	2.27	483.00	0.80	0.30	1.10
1995	551.90	3.14	555.04	1.86	0.36	2.23
1996	1085.30	4.27	1089.58	8.91	0.45	9.36

Sources: Shanghai Stock Exchange Statistics Annual and Shenzhen Stock Exchange Fact Book, various years.

Table 1 shows the number of individual investors and institutional investors in A- and B-share markets of both Shanghai and Shenzhen Stock Exchanges from 1992 to 1996. Compared with the B-share markets, the number of investors in the A-share markets is much enormous. The total number of investors in the A-share market is more than 10 million in both Shanghai and Shenzhen Stock Exchanges while it is less than 10 thousand in the B-share market. At the end of 1996, 99.7% and 99.6% of investors are domestic individual investors in the A-share markets of Shanghai and Shenzhen Stock Exchanges respectively. In other words, the proportion of domestic institutional investors is less than 1% in A-share market. In the B-share market, however, about 10% and 5% of investors are foreign institutional investors in the B-share markets of Shanghai and Shenzhen Stock Exchanges respectively. Individual investors dominate A-share market relative to B-share market.

Table 2: Summary statistics of returns and turnover for A- and B-shares

	Open-to-open	Close-to-close	Daytime	Overnight	Turnover	N
Panel A : Shanghai						
A-share	0.026	0.032	-0.022	0.080**	0.0280	16914
B-share	-0.051*	-0.048*	-0.118**	0.020	0.0033	
Panel B : Shenzhen						
A-share	0.362**	0.332**	0.579**	0.112**	0.0348	8624
B-share	0.315**	0.328**	0.428**	0.213**	0.0032	

This table reports returns and turnover for A- and B-shares, July 1992 to November 1996. **Open-to-open** denotes the average daily open-to-open return $R_{o,t}$ defined as $\ln(P_{o,t} / P_{o,t-1})$. **Close-to-close** denotes the average daily close-to-close return $R_{c,t}$ defined as $\ln(P_{c,t} / P_{c,t-1})$. Numbers in parentheses represent the standard deviations of these returns. **Daytime** denotes the average daytime return $R_{d,t}$ defined as $\ln(P_{c,t} / P_{o,t})$. **Overnight** denotes the average overnight return $R_{n,t}$ defined as $\ln(P_{o,t} / P_{c,t-1})$. **Turnover** denotes the average daily turnover (number of shares traded / number of free-floating shares) for each type of shares. To mitigate the effect of thin trading, only trading days with trading volume on day t-1 and day t for both A and B shares are used to calculate stock returns and turnover. If there are less than 10 pairs of consecutive 'valid' trading days in a given calendar month for a company, the entire month is eliminated. **N** is the total number of observations. ** and * denote significant at the 5% and 10% level respectively.

Table 2 presents the summary statistics of stock listed on Shanghai and Shenzhen Stock Exchanges. Panel A shows that A-shares preformed better than B-shares of the same Shanghai listed companies during 1992 to 1996. A-shares earn higher returns than B-shares during both interday and intraday intervals. For Shanghai listed companies, A-shares earn positive returns except during the daytime period. The daytime return is –0.022% but is insignificant at the conventional level. The overnight return of A-shares is significantly positive (0.080%). B-shares earn significant negative returns except during the overnight period. Panel B shows that the performance of Shenzhen listed companies is much better than that of Shanghai listed companies. All interday and intraday returns are significantly positive and much higher for both A- and B-shares of Shenzhen listed companies. A-shares earn higher returns than B-shares except during the overnight period. In China, only a portion of shares of a company can be listed and traded in the market. Share turnover is measured as the trading volume divided by the number of free-floating shares. In Shanghai, average daily turnovers are 0.028 and 0.003 for A-share and B-share respectively while they are 0.035 and 0.003 for A-share and B-share in Shenzhen respectively. The overall result is that the liquidity of A-shares is much higher than that of B-shares.

4 Empirical Results

4.1 Distribution of Cross-sectional Variance Ratios

To investigate the effect of informational vs noise trading on stock return volatility, we use the variance ratio test. We first compute the median variance ratio in each month for each company. In a given month, we compute the median variance ratio across all stocks in each A- and B-share market.

Table 3: Distribution of cross-sectional variance ratios

Variance Ratio	No. of months	Mean	S.E.	Q1	Median	Q3	%(ratio > 1)	p-value
Panel A: All								
Open-to-open	53	3.109	0.508	0.989	1.697	2.699	0.74	0.000
Close-to-close	53	2.852	0.521	0.830	1.337	2.378	0.58	0.108
Daytime	53	3.106	0.574	0.791	1.474	2.689	0.68	0.005
Overnight	53	1.473	0.220	0.617	0.907	1.288	0.36	0.020
Panel B: Shanghai								
Open-to-open	53	4.941	1.447	1.160	2.135	3.912	0.81	0.000
Close-to-close	53	3.746	0.733	0.862	1.418	2.825	0.64	0.020
Daytime	53	4.610	1.155	0.943	1.783	2.864	0.72	0.001
Overnight	53	1.977	0.360	0.716	0.997	1.479	0.49	0.445
Panel C: Shenzhen								
Open-to-open	53	2.914	0.772	0.814	1.506	2.551	0.68	0.005
Close-to-close	53	2.597	0.645	0.875	1.393	2.500	0.72	0.001
Daytime	53	3.684	1.324	0.939	1.414	2.904	0.72	0.001
Overnight	53	1.323	0.256	0.335	0.739	1.316	0.40	0.065

This table reports the distributions of cross-sectional median variance ratios for interday and intraday returns for A and B shares traded on the Shanghai and Shenzhen Stock Exchange during July 1992 to November 1996. We calculate the variance ratio for each company in each month, and obtain the median variance ratio across all companies in each month. Then, we tabulate the distribution of the median variance ratios across the 53 months. The variance of open-to-open return measures the stock return volatility during trading hours plus following non-trading hours after the stock exchange is closed and before the exchange opens next day. The variance of close-to-close return measures the stock return volatility during non-trading hours plus following trading hours after the stock exchange is opened and before the exchange closes next day. The variance of daytime return measures the stock return volatility during trading period. The variance of overnight return measures the stock return volatility during non-trading period. The last column presents the sign test p-value based on the 53 median variance ratios.

Table 3 reports the average, the standard error of the mean, the median and the first and third quartiles using monthly median variance ratios for 53 months during the period from July 1992 to November 1996. Panel A shows the results of all sixty-seven companies. Panel B and panel C show the results of thirty-five and thirty-two companies listed on the Shanghai and Shenzhen stock exchanges respectively. To test the null hypothesis that the variance ratio equals to one, we conduct the sign test using monthly median variance ratios during the sample as data. This test is robust to the existence of outliers. Panel A reports that both the open-to-open and close-to-close median variance ratios are larger than one (1.697 and 1.337 respectively). The result for open-to-open return variance

ratio is significant at the 1 percent level while the result for close-to-close return variance ratio is marginally insignificant at the 10 percent level. Panel A also shows that the median variance ratio for daytime period is 1.474. In the fifty-three months during the sample period, the median variance ratios for daytime period are larger than one in thirty-six months (68 percent of trading months). The sign test shows that the result is significant at the 1 percent level. On the other hand, the median variance ratio for overnight period is smaller than one (0.907) and the result is significant at the 5 percent level. In the fifty-three months during the sample period, the median variance ratios for overnight period are larger (smaller) than one in nineteen months (thirty-four months). As the ratio is defined as the volatility of domestic A-share over that of foreign B-share, the results imply that the volatility of foreign share is much larger than that of A-share during overnight period. The overall results show that the volatility of domestic A-shares is larger (smaller) than that of foreign B-shares for 24-hour period and during the trading period (non-trading period). The variance ratio results suggest the noise trading by A-share investors.

Panel B of Table 3 shows that the results for companies listed on the Shanghai Stock Exchange. The median open-to-open and close-to-close variance ratios are 2.135 and 1.418 respectively. The volatility of domestic A-shares is larger than that of foreign B-shares for 24-hour period in eight-one and sixty-four percent of trading months when returns are measured by opening prices and closing prices respectively. The results are highly significant at the 5 percent level. The median variance ratio for daytime stock returns is 1.783. In the fifty-three months during the sample period, the median variance ratios for daytime period are larger than one in thirty-eight months (72 percent of trading months). The sign test shows that the result is significant at the 1 percent level. On the other hand, the median variance ratio for overnight period is smaller than one (0.997). The median overnight variance ratios are larger than one in twenty-six months or in almost half of trading months. The sign test shows that the variance ratio is insignificantly different from one.

Panel C indicates the results for companies listed on the Shenzhen Stock Exchange. The median ratios for both open-to-open and close-to-close return variances are larger than one (1.506 and 1.393). The sign tests indicate that both open-to-open and close-to-close return variance ratio are significant at the 1 percent level. The median daytime variance ratio for Shenzhen listed companies is 1.414. The volatility of domestic A-shares is larger than that of foreign B-shares when the exchange is opened in seventy-two percent of trading months. The result is highly significant at the 1 percent level. On the other hand, the median variance ratio for overnight period is 0.739 and is much smaller than one. The sign test indicates that the result is significant at the 10 percent level. During fifty-three trading months, the median variance ratios for overnight period are larger than one in forty percent of trading time, i.e. twenty-one months. The results are consistent with the trading noise hypothesis in A-share market since trading noises result from trading activities.

4.2 Sensitivity Test

As mentioned earlier, a small number of companies may dominate in the aggregation procedure because many companies in the sample started trading during the sample period. To address this important concern, we examine the robustness of the results by calculating the median variance ratio for each company and then obtaining the average

and median across companies. We continue to use the median to guard against the unwanted impact of outliers.

Table 4: Summary statistics of cross-sectional variance ratio for companies listed on the Shanghai Stock Exchange

Company	N	Open-to-open	Close-to-close	Daytime	Overnight
Automation Instrumentation	23	1.107	0.954	0.936	0.776
China 1st Pencil	36	2.457	1.943	2.682	1.297
China Textile Machinary	36	1.847	2.183	1.534	1.128
Chlor Alkali Chemical	48	2.580	2.111	2.470	1.687
Dajiang (Group) Stock	14	2.343	1.621	2.119	1.244
Dazhong Taxi	46	2.933	2.004	3.529	1.296
Diesel Engine	31	3.050	2.623	2.789	1.772
Erfangji	52	1.729	1.609	2.013	0.803
Forever	13	4.231	2.327	2.398	1.918
Friendship	22	1.616	1.896	1.555	1.069
Good & Materials	29	1.262	1.428	1.906	0.894
Haixin	19	1.514	1.367	1.510	0.735
Heilonggiang Ele	5	3.016	1.739	2.979	0.688
Hero	29	2.773	1.729	2.040	1.940
Hua Xin Cement	19	1.996	1.347	1.646	1.050
Industrial Sewing Machine	24	2.177	1.829	2.328	0.782
Jinjiang Tower	36	1.718	1.307	1.932	0.811
Jinqiao Export	42	1.802	1.250	1.502	1.118
Lianhua Fibre	16	2.334	1.073	2.415	3.149
Lujiazui	24	2.264	2.482	2.176	2.485
Narcissus Electric Appliances	24	1.508	1.308	1.369	0.584
New Asia	2	5.368	3.288	4.906	0.474
Phoenix	32	1.217	0.846	0.961	0.743
Posts & Telecommunications	25	1.086	0.579	0.710	0.951
Refrigerator Compressor	39	2.493	1.293	2.181	1.117
Rubber Belt	21	1.701	0.879	1.931	0.729
Sanmao Textile	11	0.970	1.161	1.593	0.686
Shangling Electric Appliances	31	2.704	2.322	2.512	1.148
Steel Tube (Baosight)	30	1.828	1.289	2.221	0.797
Tianjin Marine	3	2.996	1.653	2.247	1.263
Tyre & Rubber	48	1.935	1.292	1.790	1.478
Vacuum Electron Device	52	1.352	1.257	1.658	0.437
Wai Gaoqiao	40	1.271	1.175	1.305	1.120
Wing Sung	18	3.430	3.792	3.740	2.466
Yaohua Pilkington Glass	34	2.520	1.917	2.110	2.512
mean	28	2.204	1.682	2.106	1.233
median	29	1.996	1.609	2.040	1.117
S.E.		0.157	0.114	0.138	0.109
%VR > 1		97	89	91	57
p-value		0.000	0.000	0.000	0.199

This table reports the median variance ratios for various returns for A and B shares traded on the Shanghai Stock Exchange during July 1992 to November 1996. To mitigate the

effect of thin trading, only trading days with trading volume on day t-1 and day t for both A and B shares are used to calculate stock returns and variances. If there are less than 10 pairs of consecutive 'valid' trading days in a given calendar month, the entire month is eliminated. The sign test p-value is based on the 35 median variance ratios.

Table 4 shows the median variance ratios for thirty-five companies listed on the Shanghai Stock Exchange. During the sample period of July 1992 to November 1996, the average (median) trading months included for calculating the median variance ratio for each company is 28 (29). The median open-to-open and close-to-close variance ratios are 1.996 and 1.609 respectively. Out of 35 Shanghai listed companies, only one company has median open-to-open variance ratios less than one. About ninety percent of companies have median variance ratio greater than one when close-to-close stock returns are used. The sign test indicates that the results are significant at the 1 percent level. The results further confirm that the volatility of domestic A-shares is predominantly larger than that of foreign B-shares of the same company during trading period. The median daytime variance ratio is larger than one in more than ninety percent of companies. The cross-sectional median daytime variance ratio is 2.040 and the sign test indicates that the result is significant at the 1 percent level. During overnight period, fifty-seven percent of companies have median variance ratio larger than one and the cross-sectional median variance ratio is 1.117. The sign test shows that the overnight variance ratio is not significantly different from one.

Table 5: Summary statistics of cross-sectional variance ratio for companies listed on the Shenzhen Stock Exchange

Company	N	Open-to-open	Close-to-close	Daytime	Overnight
Baoshi	2	7.716	7.567	9.063	0.473
Changchai	2	5.304	3.775	6.791	3.107
China Bicycles	41	1.998	1.715	1.693	1.165
China International Marine Containers	15	2.422	1.643	2.149	1.386
China Merchants Shekou Port Service	30	1.591	1.484	1.272	0.698
China Southern Glass (Csg Tech)	21	1.041	1.727	1.304	0.456
China Vanke	27	0.703	0.711	0.773	0.339
Chiwan Wharf	26	0.907	1.685	1.029	0.540
Fangda	8	1.176	1.668	1.122	0.496
Fiyta	29	0.915	0.997	1.165	0.303
Foshan Electrical and Lighting	8	4.368	2.564	3.400	0.755
Gintian Industry	24	0.862	0.917	1.159	0.298
Guangdong Electric Power Development	17	0.772	1.222	1.034	0.926
Gujing Distile	2	3.875	7.258	3.143	2.182
Hainan Pearl River Enterprises	8	1.186	1.267	0.937	0.487
Health Mineral water (Accord Pharma)	19	1.421	1.595	1.525	0.564
Huafa Electronics	14	0.763	0.755	0.662	0.350
Jiangling Motors	13	0.941	1.294	1.196	0.512
Konka Group	12	0.661	1.814	1.185	0.610
Lionda Holdings	17	0.949	1.835	1.069	0.562
Livzon Pharmaceutical	13	1.991	1.508	2.438	0.456

Hefei Meran	3	5.062	9.220	7.201	1.042
Nanshan Power station company	22	1.650	1.490	1.897	0.705
Petrochemical	16	1.082	1.757	1.752	0.592
Properties & Resources Development	22	1.008	0.900	0.850	0.418
SEZ Real Estate & Properties	26	1.534	1.399	1.664	0.818
Shenbao Industrial	19	1.061	1.053	0.996	0.633
Shenzhen Textile	17	1.364	1.235	1.483	0.551
Tellus	14	1.234	1.510	1.398	0.416
Victor Onward Textile Industrial	18	0.789	1.364	0.959	0.951
Zhonghao	26	1.315	1.045	1.412	0.373
International Enterprise	5	0.956	0.778	0.696	0.504
mean	17	1.832	2.086	2.013	0.740
median	17	1.181	1.499	1.288	0.556
S.E.		0.290	0.360	0.350	0.101
%VR > 1		66	81	78	16
p-value		0.039	0.000	0.001	0.000

This table reports the median variance ratios for various returns for A and B shares traded on the Shenzhen Stock Exchange during July 1992 to November 1996. To mitigate the effect of thin trading, only trading days with trading volume on day t-1 and day t for both A and B shares are used to calculate stock returns and variances. If there are less than 10 pairs of consecutive 'valid' trading days in a given calendar month, the entire month is eliminated. The sign test p-value is based on the 32 median variance ratios.

Table 5 shows the results of cross-sectional variance ratios for Shenzhen listed companies. The average (median) trading months included for calculating the median variance ratio for each company is 17 (17). The cross-sectional median open-to-open and close-to-close variance ratios are 1.181 and 1.499 respectively. The volatility of domestic A-shares is larger than that of foreign B-shares for 24-hour period in sixty-six and eight-one percent of companies when returns are measured by opening prices and closing prices respectively. The sign test indicates that the results are significant at the 5 percent level. Near eighty percent of Shenzhen listed companies have the median daytime variance ratio larger than one. The cross-sectional daytime median variance ratio is 1.288 and the sign test indicates that the result is significant at the 1 percent level. On the other hand, the median overnight variance ratio is much smaller than one (0.556). Sixteen percent of companies have the median overnight variance ratios larger than one and the sign test confirms that the variance ratio is significantly less from one. The results are consistent with the trading noise hypothesis in both Shanghai and Shenzhen A-share market since trading noises result from trading activities.

5 Summary and Conclusion

In China, domestic firms can issue A- and B- shares. Before Feb 2001, domestic investors can only invest A-shares while foreign investors can trade B-shares only. We find that market segmentation results in different share price volatility across these shares even though they are issued by the same companies and are traded in the same stock market.

We further find that A-share prices are much more volatile than B-share prices only during the daytime (trading) period while they are less volatile during the China overnight (nontrading) period. Since individual investors dominate A-share markets while foreign institutional investors dominate B-share markets, the results support the conjecture that price movements in A-share is due to noise trading by domestic individual investors while foreign B-share investors are motivated by informational trading.

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