“An empirical analysis of Chinese stock price anomalies and volatility”

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An empirical analysis of Chinese stock price anomalies and volatility

Abstract

Previous researches on the Chinese stock markets have generally confirmed the presence of anomalies in China's stock markets. For example, Mookerjee and Yu (1999) considered day-of-the-week anomalies in both Shenzhen and Shanghai stock markets within a broader context of the serial-dependent structure of returns. They documented some unusual findings such as the highest daily returns occurring on Thursday rather than Friday, and daily returns being positively correlated with risk. Furthermore, Chen, Kwok, and Rui (2001) argued the day-of-the-week effect in China during the 1997 Asian financial crisis may be due to spillover from other countries. For example, China's exports dropped from a 20% growth rate in 1997 to 0.5% in 1998. The amount of foreign investment in China also dropped to its lowest point compared to the last two decades. However, it is questionable whether the performance of Asian stock markets during and after the Asian financial crisis spills over to the Chinese stock markets. This study empirically analyzes the anomalies and stock return volatility of the Shanghai and Shenzhen stock markets and tests whether the 1997 Asian financial crisis has had any influence on stock anomalies in the Chinese stock markets.

Keywords: stock market anomalies, volatility, Asian crisis.
JEL Classification: G11, G14, G15.

Introduction

The Chinese stock market has experienced a rapid growth and has played important roles in the growth and development of the Chinese economy since the launching of the Shanghai and Shenzhen exchange in early 1990. In the early 1990s, companies listed on the stock market were mainly large state-owned enterprises (SOEs), but more than fifty percent of their shares were not tradable and had to be held by the state due to the government policy on ownership restrictions. In the late 1990s, more and more private companies were listed in the stock markets. However, the Chinese stock market is still underdeveloped and immature. It is characterized by high percentage of government ownership with non-tradable stocks and restriction on foreign investors. The stocks are traded in A-shares and B-shares in the market. The A-shares market is for Chinese domestic investors trading in Chinese Renminbi (RMB), and the B-shares are for foreign investors trading in foreign currencies (Fact book, 2004). Since 2002, China allowed foreign institutional investors to acquire bonds or stocks listed in the Chinese domestic share market.

Previous researches on the Chinese stock markets have generally confirmed the presence of anomalies in China's stock markets. For example, Mookerjee and Yu (1999) considered day-of-the-week anomalies in both Shanghai and Shenzhen stock markets within a broader context of the serial-dependent structure of returns. They documented some unusual findings such as highest daily returns occurred on Thursday rather than Friday, and daily returns being positively correlated with risk. The authors found the Shenzhen stock market had significant weekend effects, while the Shanghai stock market showed a significant positive effect on Thursday and Friday from 1991 to 1993. Kutan and Li (2001) tested five sector indexes on the Shanghai Exchange A-Share Market from August 2, 1999 to March 31, 2001, and found no significant day-of-the-week effects presented at the sector level data in China.

Chen, Kwok, and Rui (2001) argued the day-of-the-week effect in China during the 1997 Asian financial crisis may be due to spillover from other countries. For example, China's exports dropped from a 20% growth rate in 1997 to 0.5% in 1998. The amount of foreign investment in China also dropped to its lowest point compared to the last two decades. However, it is questionable whether the performance of Asian stock markets during and after the Asian financial crisis spills over to the Chinese stock markets. Not much empirical work has been done to quantify how the Chinese stock markets have been affected by the 1997 Asian financial crisis. This study empirically analyzes the anomalies and stock return volatility of the Shanghai and Shenzhen stock markets and tests whether the 1997 Asian financial crisis has had any influence on stock anomalies in the Chinese stock markets.

1. Literature

1.1. Monthly effects on stock returns. The most common calendar anomalies are the monthly effect and the day-of-the-week effect demonstrating the market returns follow a seasonal pattern. Market participants can make extraordinary profits by observing the past returns. However, investors in an efficient stock market cannot earn abnormal returns by exploiting the seasonal patterns of the market

movements. For example, Haugen and Jorion (1996) argued that the calendar effects would not last forever since market participants can learn from past experiences. Hence, if a monthly effect exists, trading based on exploiting a monthly pattern of returns should yield extraordinary profits – at least in the short run. However, such trading strategies will affect the market where further profits are not possible and the seasonal patterns will eventually self-destruct.

Stock price anomalies exist worldwide and the January effect is probably one of the most well-known stock anomalies (Wachtel, 1942). For example, Keim (1983) found stock prices are usually higher in the first two weeks of January than at the end of December. Robert (1987) also found a monthly pattern in the U.S. stock index returns with a positive average return in the beginning and during the first half of the calendar months, and zero average returns during the second half. Lakonishok and Smidt (1986) pointed out that January effect did not exist in indexes, such as Dow Jones Industrial Average, which is composed of only large firms. Thaler (1987) concluded that January effect was primarily a small firm phenomenon, because an equal-weighted index was a simple average of the prices of all firms listed on the New York Stock Exchange, and small firms have greater weight than their share of market value. Kohers and Kohli (1991) examined whether January effect is exclusively related to the small firm effect. The authors used the S&P composite index which consists of large firm securities, and their results showed January effect was not an exclusively small firm effect.

According to Reinganum's (1983) study, investors sell stocks that have declined in price during the previous months to capture the capital losses before the end of the tax year and reinvest the proceeds in the market in January to avoid paying taxes. The higher demand for stocks pushes stock prices up creating the January effect. However, Gultekin and Gultekin (1983) found that the tax loss selling hypothesis cannot explain the January effect phenomenon in many countries. For example, there is no capital gain tax or loss offsets in Japan, but a January effect still exists. A January effect existed in Canada prior to 1972 capital gain tax (Berges, McConnell, and Schlarbaum, 1984). Ritter (1988) also documented that the ratio of stock purchases to sales of individual investors hits an annual low at the end of December and an annual high at the beginning of January.

Aggarwal and Rivoli (1989) investigated the Hong Kong stock market from 1976 to 1988 and showed the presence of January effect. Pang's (1988) study showed seasonal returns in January, April, and December in the Hong Kong stock market. However, Cadsby and Ratner (1992) reported no evidence of monthly effects in Japan and Hong Kong. Wong (1995) showed that intra-month effects were almost non-existent in stock markets in Singapore, Malaysia, Hong Kong, Taiwan, and Thailand. Fountas and Segerdakis (1999) tested for seasonal effects in stock returns (January effect anomaly) using monthly stock returns in eighteen emerging stock markets for the period of 1987-1995. They found very little evidence in favor of the January effect in the emerging markets. However, Balaban (1995) and Nassir and Mohammad (1987) provided evidences of January effect in Turkey and Malaysia, where the average January returns were significantly positive and higher than in other months respectively. Ho (1990) used daily returns from January 1975 to November 1987, and showed that six out of eight emerging Asian Pacific stock markets exhibit significantly higher daily returns in January than in other months.

The literature on the Chinese stock markets showed a stable positive June and a negative December effect since 1993 and there was evidence of very similar seasonality movements between Shanghai and Shenzhen stock markets (Girardin and Liu, 2003). Chinese New Year normally starts in February instead of January, thus, the January effect is not present in the Chinese stock markets. For example, Gao and Kling (2005) investigated the calendar effect in the Chinese stock markets using Shanghai and Shenzhen indexes for the period of 1990 to 2002. Their results showed the highest returns in March and April partly due to differences in the calendar year. They explained that the Chinese year ends in February compared to the Western calendar year. Their findings are consistent with Ritter (1998) and Berges et al.'s (1984) studies based on the western calendar year. Recently, Hsu (2005) used the power ratio method to measure the contribution of January return to the year return from 1995-2003 in the Shanghai and Shenzhen stock markets, and the result did not show significant January effect in these two stock markets.

1.2. Day-of-the-week effects on stock returns. The day-of-the-week effect is a common phenomenon where the average daily returns and volatility of the markets are not equal for all days of the week. Previous researchers have found this phenomenon across different countries and in different types of markets (see Cross, 1973; Jaffe and Westerfield, 1985; Tang and Kwok, 1997). For most western economies, such as the U.S., U.K., and Canada, empirical results have shown significant negative returns on Monday and positive on Friday. This

effect is usually called the weekend effect. This can be explained by unfavorable news appearing on Monday (Damodaran, 1989), which affects the investors decision negatively, and may influence investors to sell on the following Monday. However, in other markets such as Japan, Australia, Singapore, Turkey, and France, the highest negative returns appeared on Tuesdays (Condoyanmi et al., 1987; Dubois and Louvet, 1996). This is because the news affecting the U.S. market on Monday negatively influenced markets lagged by one day.

Rogalski (1984) examined the day-of-the-week effect in the U.S. stock market from 1974 to 1984 using regressions for both the Dow Jones Industrial Average and the Standard & Poor (S&P) 500. The author found that the weekend effect was generated over the weekend when the stock market was closed, which showed the Monday non-trading returns (Friday close-to-Monday open) were negative while the Monday trading returns (Monday open-to-Monday close) were similar to the trading returns of other weekdays. Similarly, a daily seasonal anomaly was found in the Canadian stock market with a negative Monday and a positive Friday effect as observed in the U.S. stock market (Jaffe and Westerfield, 1985).

The day-of-the-week effect has been studied in emerging stock markets in recent years. For example, Poshakwale and Murinde (2001) reported that the day-of-the-week effect did not exist in Budapest and Warsaw stock exchanges during the period of 1994-1996, while Ajayi, Mehdian, and Perry (2004) found significantly negative Monday effect in Estonia and Lithuania, but positive Monday and Friday effects in Russia and Slovenia stock markets, respectively. Furthermore, Balaban (1995) found the mean return was significantly highest on Friday from January 1988 to August 1994 for Turkish stock market. Recently, Oguzsoy and Guven (2003) reexamined the daily anomaly in Turkish stock market extending the data to 1999 and the study exhibited significant negative effects on Monday and Tuesday and positive effects on Friday.

In the Asian stock markets, the day-of-the-week effects are likely to exist in all stock markets during a certain period of time. For example, the Singapore stock market exhibited a negative Monday and positive Friday effect from 1975 to 1988 (Wong, Hui, and Chan, 1992). However, Lian and Chen (2004) found only a negative Monday effect from January 1992 to January 1997, and no day-of-the-week effect from February 1997 to August 2002. Brooks and Persand (2001) reported a significant positive Monday effect for Thailand stock market from December 1989 to January 1996. Similarly, the negative Monday and positive Friday effects were observed in the Malaysian stock market (Wong et al., 1992), while negative Monday and Tuesday effects and positive Friday effect were found in the Indonesia stock market (Lian and Chen, 2004). Lian and Chen also found positive Friday effect from January 1990 to June 1995 and negative Tuesday mean returns from October 1998 to August 2002 in the Philippines stock market. However, Brooks and Persand's (2001) study did not agree with Lian and Chen's findings and showed no day-of-the-week effect in the Philippines stock market. Chiaku's (2005) study showed in the post Asian financial crisis, both the developed and emerging Asia Pacific markets had a low degree of variation across the day-of-the-week returns and this variation was not significant at any level.

Chen et al. (2001) examined share returns of both Shanghai and Shenzhen stock markets from January 1995 to December 1997 and detected a Tuesday anomaly (negative returns). However, their finding depends highly on the estimation method and sample period. Mitchell and Ong (2004) observed that China's domestic-invested A-shares are susceptible to the day-of-the-week effect, as are markets elsewhere. In contrast, the internationally traded B-shares are influenced by overnight developments in the U.S. For example, negative returns observed on Monday in the U.S. appeared to spill over into Tuesday returns in the B-shares market. Recently, Zhang, Li, Tang and Zhang (2006) analyzed the calendar effect for Shanghai and Shenzhen composite indexes by using rolling sample method focused on analyzing the patterns of the Tuesday and Friday anomalies. They observed positive Tuesday effect that has appeared since July 1996, and high Friday returns before 1997, accompanied by low volatility.

2. Data and methodology

2.1. Data. The data used to analyze the existence of the day-of-the-week effect, the monthly effect, and the return volatility in Chinese stock markets consist of the daily prices of Shanghai and Shenzhen A-shares Closing Index and Shanghai and Shenzhen B-shares Closing Value-Weighted Index. However, the indexes do not consider the impact of the dividend and bonus of the share on the indexes. Some stocks pay dividends, which can be payments in cash or additional stocks given to existing shareholders. The dividends will lower the price of the stock on a per-share basis to prompt more trading and increase liquidity. This could bias the validity of our results. In addition, the limited number of observations can seriously hinder our ability to detect the two effects with conclusive evidences. Thus, the indices are value-weighted to minimize the bias

towards small stocks that could magnify any potential seasonal effects. The slight difference in the period for each data set is not an issue because each market is tested individually and there is no cross linkages between them. The data include the following:

- Shanghai Stock Exchange A-Shares from 19 Dec 1990 to 17 June 2005;
- Shanghai Stock Exchange B-Shares from 21 Feb 1992 to 17 June 2005;
- Shenzhen Stock Exchange A-Shares from 5 Oct 1992 to 17 June 2005;
- Shenzhen Stock Exchange B-Shares from 5 Oct 1992 to 17 June 2005.

The Shanghai and Shenzhen stock exchange markets' trading days are Monday to Friday from 9:30 am to 11:30 am, and 1:00 pm to 3:00 pm. The sample period is divided into three sub-periods, which are determined by the behavior of highly volatile economic indicators, such as interest rate, exchange rate, etc. The three sub-periods are the pre-Asian financial crisis period from January 1st, 1991 to July 31st, 1997, the Asian financial crisis period from August 1st, 1997 to December 31st, 1999 and the post-Asian financial crisis period from January 1st, 2000 to December 31st, 2004. Daily logarithmic returns are calculated from the daily non-dividend index of Shanghai and Shenzhen A-Shares and B-Shares, respectively, as follows:

$$R_t = 100 * \text{Ln}\,(P_t/P_{t-1}), \quad (1)$$

where R_t is the daily return for day t, P_t is the value of the closing index on day t, and P_{t-1} is the value of the closing index on day t-1.

2.2. Modeling the day-of-the-week effect. Most studies investigating day-of-the-week effect in returns employed the standard Ordinary Least Square (OLS) methods by regressing returns on five dummy variables. In this study, a dynamic OLS model on return series is used under the following assumptions:

$$R_t = \lambda_1 D_{Mt} + \lambda_2 D_{Tt} + \lambda_3 D_{wt} + \lambda_4 D_{Tht} + \\ + \lambda_5 D_{Ft} + \delta R_{t-1} + \varepsilon_t, \quad (2)$$

where R_t is the daily return on day t, and D_{Mt} through D_{Ft} are dummy variables from Monday to Friday, respectively. $D_{Mt...,}D_{Ft} = 1$ if the return on day t is on Monday to Friday, respectively, 0 otherwise, and ε_t is the error term. There is no common intercept term in this model to avoid perfect collinearity problem. The dummy variables λ_1 through λ_5 measure the average daily return from Monday to Friday, respectively, to test the existence of day-of-the-week effects. The lag value of the endogenous variable δR_{t-1} has been included in Equation (2) to capture the dynamic process. The Wald F-test is employed to test equalization of the return across the day of the week.

The OLS model assumed the existence of a constant variance. However, the strong ARCH effects in most of the periods for Shanghai and Shenzhen share markets (see Table 1 and Table 2) suggest that the variance of the error term may be time-varying, so that more accurate intervals can be obtained by modeling the variance of the errors. Moreover, according to the highly significant J.B. statistic and the presence of skewed return series and excess kurtosis in Shanghai and Shenzhen A-shares and B-shares markets (see Table 3-6), the null hypothesis of the normal distribution series is rejected for these markets, which implies that the time varying heteroscedasticity may be present. The OLS model does not handle heteroscedasticity problem effectively, thus we use the Autoregressive Conditional Heteroscedastic (ARCH) family models, which are specifically designed to model and forecast the conditional variance.

The GARCH model in this study uses the autocorrelation function and partial autocorrelation function of the standardized residual and the standardized residual squared series to analyze the presence of the day-of-the-week effect in Shanghai and Shenzhen stock markets. Following Karolyi (1995) and Hsieh (1998), our study models the conditional variability of the stock returns by incorporating day-of-the week effect into the volatility equation and allowing the constant term of the conditional variance equation to vary for each day.

Most of the empirical studies estimating GARCH model assume the residuals are normally distributed. However, the observed distributions for Shanghai and Shenzhen stock returns are leptokurtic, that is 'peaked' and 'fat-tailed' relative to the normal. In order to capture the fat-tails in our data, we allow for a student-t error distribution. The estimated model is given as follows:

$$R_t = \lambda_1 D_{Mt} + \lambda_2 D_{Tt} + \lambda_3 D_{Wt} + \\ + \lambda_4 D_{Tht} + \lambda_5 D_{Ft} + \delta R_{t-1} + \varepsilon_t. \quad (3)$$

The conditional variance of ε_t is given by

$$h_t = \alpha_1 \varepsilon_{t-1}^2 + \beta_1 h_{t-1} + \mu_1 D_{Mt} + \\ + \mu_2 D_{Tt} + \mu_3 D_{Wt} + \mu_4 D_{Tht} + \mu_5 D_{Ft}, \quad (4)$$

where R_t is the return of the index on day t in each stock market and ε_t is the random error. $D_{Mt...,}D_{Ft} =$ 1, are dummy variables from Monday to Friday, respectively. The dummy variables λ_1 through λ_5 measure the mean return from Monday to Friday respectively, and $\mu_2$through $\mu_5$demonstrate the day of the week volatility.

The GARCH (1, 1) model allows the forecasted variances of return to change with the squared lagged values of the error terms from the previous periods. This specification requires that $\alpha_1 + \beta_1 < 1$, in order to satisfy the non-explosiveness of the conditional variances. Furthermore, each of α_1, β_1, and α_0 has to be positive in order to satisfy the non-negativity of conditional variances for each given time t.

2.3. Modeling the monthly effect. The monthly effect is examined using monthly dummy variables (D_{1t} to D_{12t}) to represent twelve months. The model is given as follows:

$$R_t = \lambda_1 D_{1t} + \lambda_2 D_{2t} + \ldots + \lambda_{12} D_{12t} + \varepsilon_t, \quad (6)$$

where R_t is the average daily return and D_1 to D_{12} are dummy variables for each month of the year, respectively, and ε_t is the error term. The F-statistic is employed to test if the mean returns are similar for each month. The same test is applied for the pre-Asian and post-Asian financial crisis periods.

2.4. Modeling the Asian financial crisis and stock return volatility. We use ARCH (Autoregressive Conditional Heteroscedasticity) or GARCH (p, q) (Generalized ARCH) family model, which assume the residuals have a normal distribution p and q to examine the stock volatility. One of the drawbacks of the linear GARCH model is that it does not capture the asymmetry of the stock returns. The literature on volatility clustering has documented asymmetric behaviors of volatility to shocks (Engle and Ng, 1993; Pagan and Schwert, 1990). Several asymmetric non-linear GARCH models have been proposed to model both volatility clustering and asymmetric effects of past shocks on volatility. These models include the EGARCH model (Nelson, 1991) and the TGARCH model (Zakoian, 1994). The advantage of the EGARCH model over the TGARCH model is that EGRACH captures not only the asymmetry of stock returns but also overcomes the limitation of non-negativity constraints of the α_0, α_1, and β_1. The EGARCH model is used in this study to examine the Asian financial crisis on stock return volatility in Shanghai and Shenzhen stock markets. The model is given as follows:

$$\log(h_t) = \alpha_0 + \beta_1 \log(h_{t-1}) + \delta_1 \frac{|\varepsilon_{t-1}|}{\sqrt{h_{t-1}}} + \delta_2 \frac{\varepsilon_{t-1}}{\sqrt{h_{t-1}}}. \quad (7)$$

The model includes three dummy variables to capture the Asian financial crisis effects on stock return volatility in Shanghai and Shenzhen stock markets. The equation is given as follows:

$$\log(h_t) = \beta_1 \log(h_{t-1}) + \delta_1 \frac{|\varepsilon_{t-1}|}{\sqrt{h_{t-1}}} + \delta_2 \frac{\varepsilon_{t-1}}{\sqrt{h_{t-1}}} + \lambda_1 \Pr e_t + \lambda_2 Fin_t + \lambda_3 Post_t, \quad (8)$$

where β_1, δ_1, and δ_2 are the constant parameters, and λ_1, λ_2, and λ_3 are the coefficients of the dummy variables for the pre-Asian financial crisis, financial crisis, and post-Asian financial crisis, respectively. The leverage effect is captured by the coefficient δ_2. According to Nelson (1991), if δ_2 is significant, then positive and negative shocks have different impacts on volatility. If δ_2 is significantly less than 0, it is asymmetry since large volatilities are associated with negative shocks (leverage effect). If δ_1 is greater than 0, the conditional volatility tends to increase when the absolute value of the standardized residual is larger, and vice versa. Therefore, a positive value for δ_1 indicates that a large (small) variability in price changes tends to follow a large (small) price change, which is known as volatility clustering

3. Results and discussion

3.1. The day-of-the-week effect in Shanghai and Shenzhen A-shares markets. The results for Shanghai and Shenzhen A-shares markets are displayed in Table 7. The Monday coefficients are negative for the entire sample periods and all sub-periods, but the significant negative return only appeared during the financial crisis period for Shanghai A-shares market, and the entire sample period for Shenzhen A-shares market. The significantly negative Tuesday returns are found in the pre-Asian financial crisis and during Asian financial crisis periods for Shanghai A-shares market. However, on the contrary, significant positive returns are found during the post crisis period in both Shanghai and Shenzhen A-shares markets. Negative Thursday returns are found during the entire sample period and all sub-periods in both Shanghai and Shenzhen A-shares markets, but the statistically significant results only appear in the pre-Asian financial crisis period for Shanghai A-shares market, and the entire period and post-Asian financial crisis period for Shenzhen A-shares market. Significant positive Friday effects are also evidenced during the entire sample period for Shanghai A-shares market, and all sub-periods except for the post-Asian financial crisis for Shenzhen A-shares market. The global spillover effects (Tuesday effect) affect the Shanghai A-shares market before the post-Asian financial crisis period. This suggests the Shanghai A-shares market may be more sensitive to the global market than the Shenzhen A-shares market.

The ARCH and the GARCH coefficients are highly significant for all the periods, which confirmed that the variance of the error term is time-varying rather

than constant. The results show that the day-of-the-week effect pattern persistently changed over different time period, which is highly sensitive to the setting of the sub-period. Our findings of positive Tuesday effect during the post Asian financial crisis are consistent with Zhang and Li's (2006) study. However, our study shows the Friday positive return only appeared significantly in Shenzhen A-shares market before 1997, while Zhang et al. (2006) tested the China composite index. Shanghai and Shenzhen composite indexes are indexes of all stocks (A-share and B-share), due to the non-tradable feature of Chinese RMB in global financial market, the A-share and B-share may behave differently in terms of volatility. The spillover effect of the stock return anomalies is more likely to affect the B-share markets than the isolated A-share markets. Furthermore, there is no evidence showing the highest return occurred on Thursday as evidenced in Mookerjee and Yu's (1999) study. In contrast, the negative Thursday return was found during all the sample periods. These inconsistent results might be explained by the different sampling periods, methodology employed, and the patterns of stock returns changes overtime.

3.2. The day-of-the-week effect in Shanghai and Shenzhen B-shares markets. Table 8 shows the results of the AR (1) and GARCH (1, 1) models for Shanghai and Shenzhen Exchange B-shares markets. The strong negative returns during most of the sample period are observed in both Shanghai and Shenzhen B-shares markets. In general, Monday is the lowest return of the week, especially after the Asian financial crisis in 1997. The Friday's highest return was not observed as expected like other developed markets, whilst, the abnormally Tuesday highest return was recorded after the Asian financial crisis. Significant negative effects on Wednesday and Thursday returns are also found during the entire sample period and pre-Asian financial crisis period, but this pattern did not persist during the Asian financial crisis period.

The result also shows the existence of day-of-the-week anomalies for all sample periods in both Shanghai and Shenzhen B-shares markets, but the pattern changed over different sub-periods. The significant negative returns are dominant and widely spread over Tuesday, Wednesday, and Thursday during the pre-crisis period, but this anomaly has been changed and generally vanished after the Asian financial crisis in Shenzhen B-shares market. The 10% 'price ceiling and floor' system imposed by the Chinese government may be responsible for the widely spread significant negative returns for B-shares markets. B-shares trading with foreign currencies are vulnerable to the international shares markets, but since the stock prices are not permitted to slash more than 10% in a day, markets may take a few days to assimilate the negative impact from international markets.

3.3. Day-of-the-week volatility in Shanghai and Shenzhen A-shares markets. The day-of-the-week volatility effect was captured by Equation (4), the AR (1), and the GARCH (1, 1) model. The results are shown in Table 9.

The significant positive Monday and negative Tuesday coefficients are found during the entire sample period in both markets, which indicates volatility on Monday is the highest of the week, while volatility on Tuesday is the lowest during the entire sample period in both A-share markets. The high volatility on Monday may be explained by assimilated information and announcement over the weekend following the close of the stock market on Friday (see Table 9). Investors are uncertain about the stock prices on Monday, which tend to fluctuate on Monday. Jacobs and Levy (1988) argued that bad news may be released after the markets are closed and this allows the market to absorb the shocks over the weekend. Thus, the impact of bad news is represented on Monday's returns.

When we divide the periods into three sub-periods, the highest Monday and the lowest Tuesday volatilities only persist during the pre-Asian financial crisis period in Shenzhen A-shares market. There is no volatility effect during the pre-Asian financial crisis period for Shanghai A-shares market, but a significant highest volatility on Wednesday existed during the financial crisis period. In general, Tuesday is the lowest volatility in both markets and the Shenzhen A-shares market is more volatile than Shanghai A-shares market before the Asian financial crisis, but this effect diminished after the stare of the Asian financial crisis. The Asian financial crisis could have changed the volatility pattern of China A-shares markets. This could be that at the early stage of the stock markets development, high volatility may be due to substantial instability, immaturity, less regulation, less experienced investors, and high speculation. The Chinese government imposed strict policies to regulate the stock market especially in 1997, which has protected the investors and promoted healthy development of the stock markets, thus reduced volatility.

3.4. Day-of-the-week volatility in Shanghai and Shenzhen B-shares markets. The volatility effect for the B-shares markets behaved differently from the A-shares markets. Significant positive Friday and negative Tuesday effects are detected in the variance specification during the entire sample period and sub-periods before the Asian financial crisis for Shanghai B-shares market. This implies Fri-

day's volatility is significantly higher than in other days and Tuesday shows the lowest volatility of the week. Furthermore, the negative volatility on Thursday is significant at the 5% level of significance during the pre-Asian financial crisis period. Interestingly, the magnitude of the effects is low and statistically insignificant during the Asian financial crisis period and post-Asian financial crisis period. The Shenzhen B-shares market showed less volatility in our sample period (see Table 10), and only significant high volatility was found during the Asian financial crisis period, and significant low volatility on Tuesday during the post-Asian financial crisis period.

3.5. The monthly effect in Shanghai and Shenzhen A-shares markets. According to the descriptive statistics of the monthly return series for Shanghai and Shenzhen A-shares and B-shares markets (see Table 11), the return series in these two markets are normally distributed except for the significant J.B. statistic in some months. The OLS regression is employed to analyze the monthly effect for Shanghai and Shenzhen Exchange A-shares and B-shares markets. The regression results of the monthly effects are shown in Table 12.

Table 12 shows the highest mean returns are observed in November and the lowest mean returns in July during the entire sample period and the pre-Asian financial crisis period. However, the highest mean returns in February and June and the lowest in December are observed during the post-Asian financial crisis period. The results also show the mean returns in February and May are highest for all periods, while July has the lowest returns for all periods. However, none of the monthly effects are statistically significant for all periods, implying that there is no significant monthly effect in Shanghai A-shares market in all testing periods.

The monthly returns for Shenzhen A-shares market show the mean returns in February are highly positive for the entire sample period and all sub-periods, however, only the mean returns in the entire sample period are statistically significant. Negative and insignificant mean returns are found in December for the entire sample period and all sub-periods. Further, the August mean returns are the highest and statistically significant during the pre-Asian financial crisis period. However, the F-statistic test shows no significant monthly effects in Shenzhen A-shares market.

The lack of January effect in A-shares markets, in contrast to other international stock markets, and the presence of high mean returns in February suggest that the "turn-of-the-year" for China A-shares markets may have occurred during Chinese New Year, which usually begins between late January and February. Although the February effect is not statistically significant, the average returns recorded for that month are all positive and appear to be substantially higher than other months.

3.6. The monthly effect in Shanghai and Shenzhen B-shares markets. The monthly returns for Shanghai B-shares market show similar return pattern as Shanghai A-shares market. The mean returns in May are higher than in other months for all periods except for the pre-Asian financial crisis period, while the mean returns in July are significantly lower than other months for the same periods. However, in the Shenzhen B-shares market, July shows the lowest statistically insignificant mean returns and the highest returns are observed in March during the entire sample period and the post-Asian financial crisis period. In addition, the lowest mean returns are observed in March and highest in August during the pre-Asian financial crisis. This implies the 1997 Asian financial crisis has influenced the Shenzhen B-shares market. The F-statistic test shows no significant monthly effects in Shanghai and Shenzhen B-shares markets during all the periods.

The presence of the high mean returns in the first half of the year could be explained by the release of information which simulates the market, such as the annual financial statement and performance report of listing companies, which are normally published at the end of April. On the other hand, the lowest return occurs in July in most of China A-shares and B-shares markets, it is plausible to say that the information has been well assimilated and investors tend to sell the unprofitable stocks in the second half of the year.

3.7. The Asian financial crisis effects on stock return volatility. Table 13 shows the results of AR (1) and EGARCH (1, 1) models for the volatility and leverage effects in Shanghai and Shenzhen A-shares and B-shares markets. The magnitude volatility coefficient β_1 is close to 1 in both A-shares and B-shares markets, which reflects high volatility in these markets. The post-Asian financial crisis period is the most volatile one for both share markets. The asymmetric effects on volatility in response to the positive and negative shocks are also captured by EGARCH model in order to determine the leverage effects. The highly significant negative asymmetric coefficient δ_2 suggests the existence of the leverage effects. The results show the asymmetric coefficients are negative and significant in both Shanghai and Shenzhen A-shares markets during the Asian financial crisis and the post-Asian financial crisis periods (see Table 13). This implies that negative shock has higher impacts on volatility than equal positive shocks. However, there are no leverage effects during the pre-Asian

financial crisis period for Shanghai and Shenzhen A-shares markets. The sub samples results show that the Asian financial crisis brought about changes in volatility asymmetry in China A-shares markets, a change from no leverage effects before the crisis to relatively high leverage effects after the crisis.

In contrast, the results for B-shares markets confirmed the non-existence of the leverage effects for all the sub-periods in Shanghai and Shenzhen B-shares markets except for the Asian financial crisis period for Shenzhen B-shares market. The significant positive asymmetric coefficient during the pre-Asian financial crisis period for Shanghai B-shares market and all periods except for the Asian financial crisis period for Shenzhen B-shares market show that the positive shocks on the stock returns resulted in higher stock price volatility than negative shocks during these periods. The absence of the leverage effects during the pre-Asian financial crisis period in the A-shares markets and most of the periods in B-shares markets may be due to the nature of the markets. As discussed in Bekaert and Harvey (1997; 2000), the volatility in the emerging markets is primarily driven by local factors. These country-specific factors are either not priced or have a low correlation with the world market.

The data in Table 13 show the estimates for δ_1 are positive and statistically significant for both A-shares and B-shares markets, which implies the existence of volatility clustering, and large changes tend to follow by large changes and small changes tend to follow by small changes. The highest volatility clustering was observed during the pre-Asian financial crisis period and decreased substantially after the Asian financial crisis period. The results also showed that the Asian financial crisis has not only increased the stock price volatility but also reduced the volatility clustering in Shanghai and Shenzhen A-shares and B-shares markets.

Discussion and conclusion

Using data on both A-shares and B-shares stock indexes in Shanghai and Shenzhen stock markets, this study examines several stock return anomalies in the Chinese stock markets. Based on the GARCH (1,1) model, we incorporate some changes including applying the student's t distribution on error terms, and combine the day-of-the-week returns equation with the day-of-the-week volatility equation to capture the returns and volatility effects in Chinese stock markets.

Our results show the day-of-the-week effects and monthly effects exist in the Chinese stock markets, but the pattern persistently changed over different time periods, and was highly dependent on the setting of the sub-period. Tuesday accounts for highest return and lowest volatility of the week during the entire sample period and post-Asian financial crisis period, but this pattern does not exist and is dramatically shown as the lowest returns of the week during the pre-Asian financial crisis and Asian financial crisis period.

The stronger day-of-the-week effects are present in the B-shares markets during our sub-sample periods. This implies that the A-shares markets are more efficient than B-shares markets. The dominance of small shareholders trading in the A-shares market and continuous government intervention might explain the different behavior of these two markets. The pre-Asian financial crisis period is the most volatile period of our sample periods, especially for Shenzhen A-shares and Shanghai B-shares markets and this can be explained by the deregulated immature market in the early stage, reforms that were not in place and less educated investors who tend to take improper actions against the market movements.

The results for the mean returns and returns volatility show the 1997 Asian financial crisis has affected the pattern of stock prices and volatility in China. The presence of high stock price volatility following the Asian financial crisis shows the Chinese financial markets are not insulated from the crisis. The presence of the leverage effects in the A-shares markets suggests that bad news have higher impact on the stock markets and investors should manage and design trading strategies appropriately to counteract the arrival of bad news.

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Appendix

Table 1. OLS regression results – A-shares

Shanghai A-shares												
	Entire sample			Pre-crisis			Financial crisis			Post-crisis		
N	3561			1663			591			1307		
λ_1	-0.10	(0.37)		-0.06	(0.79)		-0.22	(0.14)		-0.09	(0.29)	
λ_2	-0.12	(0.26)		-0.30	(0.16)		-0.20	(0.16)		0.13	(0.10)	*
λ_3	0.16	(0.12)		0.24	(0.26)		0.31	(0.03)	**	0.00	(0.95)	
λ_4	0.19	(0.42)		0.25	(0.24)		0.07	(0.62)		-0.11	(0.18)	
λ_5	0.29	(0.01)	**	0.57	(0.01)	**	0.17	(0.24)		-0.03	(0.71)	
δ	0.06	(0.00)	**	0.061	(0.01)	**	0.17	(0.97)		0.03	(0.30)	
Wald F-stat.	2.61	(0.03)	**	2.43	(0.05)	**	2.56	(0.04)	**	1.38	(0.24)	
B-G LM	9.88	(0.00)	***	6.87	(0.01)	***	0.47	(0.50)		0.03	(0.86)	
ARCH LM-N*R^2	0.92	(-0.34)		0.21	(0.65)		39.19	(0.00)	***	5.02	(0.03)	**
Chow F-stat.	2.22	(0.04)	**									
Shenzhen A-shares												
	Entire sample			Pre-crisis			Financial crisis			Post-crisis		
N	3089			1191			591			1307		
λ_1	-0.09	(-0.37)		0.03	(0.88)		-0.27	(0.08)	*	-0.11	(0.23)	
λ_2	-0.07	(0.46)		-0.25	(0.24)		-0.21	(0.18)	**	0.16	(0.07)	*
λ_3	0.11	(0.28)		0.13	(0.57)		0.33	(0.04)	**	-0.02	(0.81)	
λ_4	-0.08	(0.44)		-0.06	(0.80)		0.02	(0.90)		-0.14	(0.13)	
λ_5	0.12	(0.21)		0.31	(0.16)		0.19	(0.25)		-0.07	(0.45)	
δ	0.02	(0.19)		0.020	(0.50)		0.02	(0.60)		0.05	(0.09)	*
Wald F-stat.	1.18	(0.32)		0.91	(0.46)		2.64	(0.03)	**	1.74	(0.14)	
B-G LM	1.30	(0.25)		0.05	(0.82)		4.90	(0.03)	**	0.01	(0.93)	
ARCH LM-N*R^2	38.55	(0.00)	***	8.03	(0.01)	***	64.89	(0.00)	***	9.47	(0.00)	***
Chow F-stat.	1.11	(0.35)										

Notes: *** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level; P-values are reported in parentheses; N is the number of observations.

Table 2. OLS regression results – B-shares

Shanghai B-shares												
	Entire sample			Pre-crisis			Financial crisis			Post-crisis		
N	3258			1366			591			1301		
λ1	-0.08	(-0.35)		0.03	(0.81)		-1.01	(0.07)	*	-0.11	(0.41)	
λ2	-0.10	(0.25)		-0.13	(0.26)		-0.81	(0.15)		0.10	(0.44)	
`	0.04	(0.66)		-0.18	(0.13)		1.08	(0.06)	*	0.23	(0.09)	*
λ_4	-0.06	(0.52)		-0.12	(0.28)		-0.72	(0.22)		0.01	(0.93)	
λ_5	0.12	(0.18)		0.27	(0.02)	**	0.07	(0.90)		-0.04	(0.76)	
δ	0.16	(0.00)	**	0.280	(0.00)	**	0.30	(0.00)	**	0.07	(0.00)	**
Wald F-stat.	1.10	(0.35)		2.48	(0.04)	**	2.33	(0.06)	*	0.96	(0.43)	
B-G LM	1.90	(0.17)		2.11	(0.15)		1.39	(0.24)		0.11	(0.74)	.
ARCH LM-N*R^2	255.98	(0.00)	***	123.65	(0.00)	***	1.50	(0.22)		58.86	(0.00)	***
Chow F-stat.	5.50	(0.00)	***									
Shenzhen B-shares												
	Entire sample			Pre-crisis			Financial crisis			Post-crisis		
N	3044			1152			586			1306		
λ1	0.06	(-0.54)		0.23	(0.09)		-0.17	(0.50)		0.01	(0.97)	
λ2	-0.13	(0.15)		-0.25	(0.06)		-0.55	(0.02)	**	0.16	(0.25)	
λ3	0.02	(0.81)		-0.14	(0.30)		0.09	(0.71)		0.16	(0.23)	
λ4	-0.11	(0.92)		-0.04	(0.77)		0.18	(0.47)		-0.04	(0.76)	
λ5	0.13	(0.16)		0.19	(0.16)		0.18	(0.47)		0.06	(0.68)	
δ	0.15	(0.00)	**	0.230	(0.00)	**	0.17	(0.00)	**	0.08	(0.00)	**
Wald F-stat.	1.10	(0.36)		2.36	(0.05)	**	1.65	(0.16)		0.44	(0.78)	
B-G LM	0.28	(0.60)		3.90	(0.05)	**	0.89	(0.35)		0.00	(0.95)	
ARCH LM-N*R^2	376.33	(0.00)	***	154.20	(0.00)	***	85.00	(0.00)	***	85.30	(0.00)	***
Chow F-stat.	2.48	(0.02)	**									

Notes: *** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level; P-values are reported in parentheses; N is the number of observations.

Table 3. Summary statistics of the return series – Shanghai A-shares market

	Entire sample period						Pre-crisis					
	Mon	Tue	Wed	Thu	Fri	All days	Mon	Tue	Wed	Thu	Fri	All days
N	707	714	714	715	711	3561	329	331	333	337	333	1663
Mean %	-0.08	-0.12	0.17	0.09	0.29	0.07	-0.02	-0.3	0.24	0.26	0.59	0.15
Std. dev %	3	2.35	2.67	3.78	2.28	2.87	4.01	3.13	3.56	5.28	3.05	3.9
Skewness	1.51	-1.57	3.025	11.31	2.47	6.046	1.31	-1.36	2.57	8.75	1.94	5.07
Kurtosis	21.95	12.3	36.09	215.41	17.12	141.35	11.73	6.81	20.98	118.86	9.52	86.71
Jarque-Bera	10841	4718	33619	1373385	9231	2877695	1919	710	6258	195057	1426	528098
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
	***	***	***	***	***	***	***	***	***	***	***	***
ADF Test	-22.21	-26.91	-14.92	-28.16	-27.58	-38.97	-15.1	-17.76	-14.45	-19.38	-18.77	-31.61
	(-3.44)	(-3.44)	(-3.44)	(-3.44)	(-3.44)	(-3.43)	(-3.45)	(-3.45)	(-3.45)	(-3.45)	(-3.45)	(-3.44)
	***	***	***	***	***	***	***	***	***	***	***	***

Table 3 (cont.). Summary statistics of the return series – Shanghai A-shares market

	Financial crisis						Post-crisis					
	Mon	Tue	Wed	Thu	Fri	All days	Mon	Tue	Wed	Thu	Fri	All days
N	119	121	119	117	115	591	259	262	262	261	263	1307
Mean %	-0.22	-0.2	0.31	0.007	0.17	0.03	-0.09	0.14	0.009	-0.11	0.03	0.019
Std. dev %	1.87	1.51	1.62	1.64	1.30	1.61	1.64	1.25	1.39	1.38	1.14	1.37
Skewness	-0.66	-0.36	0.92	-0.22	-0.28	-0.2	0.89	1.53	1.2	0.35	0.24	0.85
Kurtosis	8.14	7.32	4.72	8.39	3.58	4.57	9.6	15.15	8.75	5.35	3.88	9.35
Jarque-Bera	139.43	96.8	37.44	140	3.03	507	504	1712	423	65	10.99	2351
	(0.00)	(0.00)	(0.00)	(0.00)	(0.22)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.004)	(0.00)
	***	***	***	***	***	***	***	***	***	***	***	***
ADF Test	-7.46	-13.51	-10.99	-5.70	-12.48	-13.54	-14.97	-19.22	-13.71	-16.67	-19.47	-35.2
	(-3.49)	(-3.49)	(-3.49)	(-3.49)	(-3.49)	(-3.49)	(-3.46)	(-3.46)	(-3.46)	(-3.46)	(-3.46)	(-3.44)
	***	***	***	***	***	***	***	***	***	***	***	***

Notes: *** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level; P-values are reported in parentheses; N is the number of observations.

Table 4. Summary statistics of the return series – Shenzhen A-shares market

	Entire sample period						Pre-crisis					
	Mon	Tue	Wed	Thu	Fri	All days	Mon	Tue	Wed	Thu	Fri	All days
N	707	714	714	715	711	3561	329	331	333	337	333	1663
Mean %	-0.08	-0.12	0.17	0.09	0.29	0.07	-0.02	-0.3	0.24	0.26	0.59	0.15
Std. dev %	3	2.35	2.67	3.78	2.28	2.87	4.01	3.13	3.56	5.28	3.05	3.9
Skewness	1.51	-1.57	3.025	11.31	2.47	6.046	1.31	-1.36	2.57	8.75	1.94	5.07
Kurtosis	21.95	12.3	36.09	215.41	17.12	141.35	11.73	6.81	20.98	118.86	9.52	86.71
Jarque-Bera	10841	4718	33619	1373385	9231	2877695	1919	710	6258	195057	1426	528098
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
	***	***	***	***	***	***	***	***	***	***	***	***
ADF Test	-22.21	-26.91	-14.92	-28.16	-27.58	-38.97	-15.1	-17.76	-14.45	-19.38	-18.77	-31.61
	(-3.44)	(-3.44)	(-3.44)	(-3.44)	(-3.44)	(-3.43)	(-3.45)	(-3.45)	(-3.45)	(-3.45)	(-3.45)	(-3.44)
	***	***	***	***	***	***	***	***	***	***	***	***
	Financial crisis						Post-crisis					
	Mon	Tue	Wed	Thu	Fri	All days	Mon	Tue	Wed	Thu	Fri	All days
N	119	121	119	117	115	591	259	262	262	261	263	1307
Mean %	-0.22	-0.2	0.31	0.007	0.17	0.03	-0.09	0.14	0.009	-0.11	0.03	0.019
Std. dev %	1.87	1.51	1.62	1.64	1.30	1.61	1.64	1.25	1.39	1.38	1.14	1.37
Skewness	-0.66	-0.36	0.92	-0.22	-0.28	-0.2	0.89	1.53	1.2	0.35	0.24	0.85
Kurtosis	8.14	7.32	4.72	8.39	3.58	4.57	9.6	15.15	8.75	5.35	3.88	9.35
Jarque-Bera	139.43	96.8	37.44	140	3.03	507	504	1712	423	65	10.99	2351
	(0.00)	(0.00)	(0.00)	(0.00)	(0.22)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.004)	(0.00)
	***	***	***	***	***	***	***	***	***	***	***	***
ADF Test	-7.46	-13.51	-10.99	-5.70	-12.48	-13.54	-14.97	-19.22	-13.71	-16.67	-19.47	-35.2
	(-3.49)	(-3.49)	(-3.49)	(-3.49)	(-3.49)	(-3.49)	(-3.46)	(-3.46)	(-3.46)	(-3.46)	(-3.46)	(-3.44)
	***	***	***	***	***	***	***	***	***	***	***	***

Notes: *** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level; P-values are reported in parentheses; N is the number of observations.

Table 5. Summary statistics of the return series – Shanghai B-shares market

	Entire sample period						Pre-crisis					
	Mon	Tue	Wed	Thu	Fri	All days	Mon	Tue	Wed	Thu	Fri	All days
N	646	654	655	653	650	3258	269	273	275	276	273	1366
Mean %	-0.06	-0.11	0.02	-0.05	0.10	-0.02	0.08	-0.11	-0.2	-0.18	0.20	-0.04
Std. dev %	2.50	2.12	2.16	2.24	2.12	2.23	2.04	1.93	1.88	1.98	2.11	1.99
Skewness	0.33	0.38	0.41	0.37	0.64	0.41	0.64	1.05	0.09	-0.55	0.69	0.41
Kurtosis	7.1	9.08	7.29	8.49	9.92	8.32	9.87	14.34	7.34	14.48	15.63	12.68
Jarque-Bera	464	1024	519	835	1324	3932	547	1512	216	1529	1837	5372
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
	***	***	***	***	***	***	***	***	***	***	***	***
ADF Test	-23.23	-26.01	-27.91	-26.37	-19.56	-48.43	-17.19	-14.89	-17.24	-16.9	-15.27	-27.7
	(-3.44)	(-3.44)	(-3.44)	(-3.44)	(-3.44)	(-3.42)	(-3.45)	(-3.45)	(-3.45)	(-3.45)	(-3.45)	(-3.43)
	***	***	***	***	***	***	***	***	***	***	***	***
	Financial crisis						Post-crisis					
	Mon	Tue	Wed	Thu	Fri	All days	Mon	Tue	Wed	Thu	Fri	All days
N	119	121	119	117	115	591	258	260	261	260	262	1301
Mean %	-0.28	-0.55	0.08	0.07	0.17	-0.11	-0.11	0.092	0.23	0.03	-0.04	0.041
Std. dev %	3.03	2.82	2.79	2.99	2.61	2.86	2.67	1.90	2.09	2.11	1.88	2.15
Skewness	0.4	0.26	0.35	0.48	0.61	0.40	0.22	0.17	0.6	0.9	0.49	0.43
Kurtosis	5.71	5.35	4.61	4.04	3.77	4.82	5.98	7.5	8.87	7.67	7.86	7.68
Jarque-Bera	39.46	29.16	15.00	9.71	9.89	97.00	97	221	390	271	268	1226
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
	***	***	***	***	***	***	***	***	***	***	***	***
ADF Test	-8.89	-12.87	-9.31	-9.59	-10.06	-21.12	-14.34	-16.57	-16.7	-19.25	-15.4	-33.41
	(-3.49)	(-3.49)	(-3.49)	(-3.49)	(-3.49)	(-3.44)	(-3.46)	(-3.46)	(-3.46)	(-3.46)	(-3.46)	-(-3.44)
	***	***	***	***	***	***	***	***	***	***	***	***

Notes: *** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level; P-values are reported in parentheses; N is the number of observations.

Table 6. Summary statistics of the return series – Shenzhen B-shares market

	Entire sample period						Pre-crisis					
	Mon	Tue	Wed	Thu	Fri	All days	Mon	Tue	Wed	Thu	Fri	All days
N	664	689	687	684	676	3400	216	235	235	236	230	1152
Mean %	0.1	-0.11	0.02	0.00	0.13	0.03	0.27	-0.19	-0.18	-0.07	0.15	-0.01
Std. dev %	2.56	2.09	2.87	2.17	2.18	2.22	2.52	1.89	1.87	1.82	2.40	2.12
Skewness	0.54	-0.28	0.02	0.68	0.5	0.35	0.83	-0.88	-2.26	0.51	0.3	0.05
Kurtosis	8.3	8.84	12.56	8.21	13.2	10.19	11.95	13.38	32.64	13.33	19.31	18.38
Jarque-Bera	811	987	2617	827	2960	7393	746	1084	8802	1060	2553	11353
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
	***	***	***	***	***	***	***	***	***	***	***	***
ADF Test	-13.35	-26.72	-28.37	-25.32	-25.74	-28.98	-12.65	-16.43	-18.28	-14.02	-11.55	-26.96
	(-3.44)	(-3.44)	(-3.44)	(-3.44)	(-3.44)	(-3.43)	(-3.46)	(-3.46)	(-3.46)	(-3.46)	(-3.46)	(-3.43)
	***	***	***	***	***	***	***	***	***	***	***	***

Table 6 (cont.). Summary statistics of the return series – Shenzhen B-shares market

	Financial crisis						Post-crisis					
	Mon	Tue	Wed	Thu	Fri	All days	Mon	Tue	Wed	Thu	Fri	All days
N	118	121	118	116	113	586	330	333	334	332	333	1662
Mean %	-0.13	-0.57	-0.01	0.17	0.2	-0.07	0.06	0.11	0.17	-0.002	0.11	0.09
Std. dev %	2.8	2.7	2.62	2.73	2.55	2.7	2.47	1.95	2.02	2.19	1.88	2.11
Skewness	0.68	-3.16	0.55	0.82	1	0.52	0.3	0.37	0.86	0.55	0.25	0.45
Kurtosis	6.6	6.46	5.23	4.62	5.09	5.82	6.61	6.64	6.94	7.96	7.95	7.43
Jarque-Bera	73.00	63.00	30.00	26.00	39.68	221.00	184	192	257	357	343	1413
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
	***	***	***	***	***	***	***	***	***	***	***	***
ADF Test	-9.07	-11.17	-8.98	-8.91	-10.7	-20.33	-15.44	-11.11	-18.86	-19.67	-17.85	-20.71
	(-3.49)	(-3.49)	(-3.49)	(-3.49)	(-3.49)	-(-3.44)	(-3.45)	(-3.45)	(-3.45)	(-3.45)	(-3.45)	(-3.43)
	***	***	***	***	***	***	***	***	***	***	***	***

Notes: *** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level; P-values are reported in parentheses; N is the number of observations.

Table 7. Day-of-the-week effect in Shanghai and Shenzhen A-shares markets

Shanghai A-shares	Entire sample			Pre-crisis			Financial crisis			Post-crisis		
λ_1	-0.02		(0.65)	-0.04		(0.51)	-0.34	***	(0.01)	-0.10		(0.32)
λ_2	0.13	***	(0.00)	-0.12	***	(0.01)	-0.30	**	(0.02)	0.16	**	(0.05)
λ_3	0.03		(0.48)	-0.07	*	(0.07)	-0.16		(0.33)	0.07		(0.43)
λ_4	-0.03		(0.45)	-0.08	*	(0.09)	-0.21		(0.23)	-0.08		(0.36)
λ_5	0.13	**	(0.00)	-0.07		(0.16)	0.09		(0.53)	-0.04		(0.68)
α_1	0.30	***	(0.00)	1.01	*	(0.07)	0.28	***	(0.01)	0.23	***	(0.00)
β_1	0.74	***	(0.00)	0.55		(0.00)	0.74	***	(0.00)	0.77	***	(0.00)
T-dist. df	3.88	***	(0.00)	2.33	***	(0.00)	3.17	***	(0.00)	3.32	***	(0.00)
Shenzhen A-shares	Entire sample			Pre-crisis			Financial crisis			Post-crisis		
λ_1	-0.13	**	(0.03)	-0.18		(0.23)	-0.09		(0.50)	-0.11		(0.13)
λ_2	0.08		(0.13)	-0.22		(0.13)	-0.13		(0.29)	0.21	***	(0.00)
λ_3	-0.03		(0.61)	-0.11		(0.39)	0.10		(0.39)	-0.04		(0.55)
λ_4	-0.15	***	(0.00)	-0.14		(0.23)	-0.09		(0.48)	-0.15	**	(0.02)
λ_5	0.05		(0.38)	0.23	*	(0.09)	0.21	*	(0.06)	-0.07		(0.36)
α_1	0.24	***	(0.00)	0.36	***	(0.00)	0.29	***	(0.00)	0.12	***	(0.00)
β_1	0.76	***	(0.00)	0.62	***	(0.00)	0.56	***	(0.00)	0.85	***	(0.00)
T-dist. df	4.73	***	(0.00)	4.71	***	(0.00)	6.68	***	(0.00)	0.03		(0.30)

Notes: *** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level.

Table 8. Day-of-the-week effect in Shanghai and Shenzhen B-shares markets

Shanghai B-shares	Entire sample			Pre-crisis			Financial crisis			Post-crisis		
λ_1	-0.22	***	(0.00)	-0.10		(0.13)	-0.52	**	(0.02)	-0.33	***	(0.00)
λ_2	-0.04		(0.40)	-0.10	*	(0.07)	-0.38	*	(0.09)	0.12	*	(0.08)
λ_3	-0.13	***	(0.00)	-0.21	***	(0.00)	-0.23		(0.31)	-0.05		(0.51)

Table 8 (cont.). Day-of-the-week effect in Shanghai and Shenzhen B-shares markets

Shanghai B-shares	Entire sample			Pre-crisis			Financial crisis			Post-crisis		
λ_4	-0.18	***	(0.00)	-0.19	***	(0.00)	-0.36		(0.17)	-0.16	**	(0.04)
λ_5	-0.06		(0.26)	0.02		(0.72)	-0.01		(0.96)	-0.17	**	(0.04)
α_1	0.32	***	(0.00)	0.53	***	(0.00)	0.27	***	(0.01)	0.20	***	(0.00)
β_1	0.75	***	(0.00)	0.55	***	(0.00)	0.66	***	(0.00)	0.86	***	(0.00)
T-dist. df	3.18	***	(0.00)	3.16	***	(0.00)	5.15	***	(0.00)	2.80	***	(0.00)
Shenzhen B-shares	Entire sample			Pre-crisis			Financial crisis			Post-crisis		
λ_1	-0.08		(0.11)	-0.04		(0.51)	-0.34	***	(0.01)	-0.10		(0.32)
λ_2	-0.05		(0.21)	-0.12	***	(0.01)	-0.30	**	(0.02)	0.16	**	(0.05)
λ_3	-0.07	***	(0.00)	-0.07	*	(0.07)	-0.16		(0.33)	0.07		(0.43)
λ_4	-0.09	**	(0.02)	-0.08	*	(0.09)	-0.21		(0.23)	-0.08		(0.36)
λ_5	-0.04		(0.34)	-0.07		(0.16)	0.09		(0.53)	-0.04		(0.68)
α_1	1.49		(0.17)	1.01	*	(0.07)	0.28	***	(0.01)	0.23	***	(0.00)
β_1	0.67	***	(0.00)	0.55	***	(0.00)	0.74	***	(0.00)	0.77	***	(0.00)
T-dist. df	2.18	***	(0.00)	2.33	***	(0.00)	3.17	***	(0.00)	3.32	***	(0.00)

Notes: *** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level.

Table 9. Day-of-the-week volatility in Shanghai and Shenzhen A-shares markets

Shanghai A-shares	Entire sample			Pre-crisis			Financial crisis			Post-crisis		
μ_1	0.43	**	(0.05)	0.31		(0.61)	1.33		(0.33)	0.71		(0.31)
μ_2	-0.43	**	(0.02)	-0.54		(0.36)	1.09		(0.33)	-1.07	*	(0.07)
μ_3	0.16		(0.37)	-0.48		(0.35)	3.16	**	(0.03)	0.09		(0.86)
μ_4	-0.13		(0.56)	0.46		(0.46)	2.02		(0.26)	0.04		(0.95)
μ_5	0.11		(0.37)	0.52		(0.28)	-1.10		(0.24)	0.31		(0.46)
Shenzhen A-shares	Entire sample			Pre-crisis			Financial crisis			Post-crisis		
μ_1	0.51	*	(0.07)	2.11	**	(0.04)	0.96		(0.11)	0.08		(0.77)
μ_2	-0.62	***	(0.01)	-2.25	***	(0.00)	-0.21		(0.65)	-0.57	**	(0.02)
μ_3	0.16		(0.49)	-0.64		(0.42)	0.47		(0.31)	0.16		(0.48)
μ_4	-0.04		(0.88)	-1.19		(0.16)	0.45		(0.45)	-0.09		(0.76)
μ_5	0.15		(0.35)	1.21	**	(0.04)	0.12		(0.71)	0.14		(0.41)

Notes: *** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level.

Table 10. Day-of-the-week volatility in Shanghai and Shenzhen B-shares markets

Shanghai B-shares	Entire sample			Pre-crisis			Financial crisis			Post-crisis		
μ_1	-0.23		(0.52)	-0.40		(0.37)	0.63		(0.75)	-0.10		(0.89)
μ_2	-0.56	*	(0.05)	-0.81	**	(0.02)	0.80		(0.66)	-0.80		(0.22)
μ_3	-0.27		(0.35)	-0.22		(0.53)	0.45		(0.79)	-0.05		(0.92)
μ_4	-0.47		(0.14)	-1.01	***	(0.00)	3.35		(0.26)	0.39		(0.63)
μ_5	0.47	**	(0.02)	0.86	***	(0.00)	-0.29		(0.84)	0.21		(0.65)

Table 10 (cont.). Day-of-the-week volatility in Shanghai and Shenzhen B-shares markets

Shenzhen B-shares	Entire sample			Pre-crisis			Financial crisis			Post-crisis		
μ_1	-0.17		(0.90)	0.31		(0.61)	1.33		(0.33)	0.71		(0.31)
μ_2	-3.01		(0.21)	-0.54		(0.36)	1.09		(0.33)	-1.07	*	(0.07)
μ_3	-2.21		(0.23)	-0.48		(0.35)	3.16	**	(0.03)	0.09		(0.86)
μ_4	-0.90		(0.49)	0.46		(0.46)	2.02		(0.26)	0.04		(0.95)
μ_5	2.10		(0.22)	0.52		(0.28)	-1.10		(0.24)	0.31		(0.46)

Notes: *** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level.

Table 11. Descriptive statistics of monthly return series

	Shanghai A-shares											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean	0.18	0.24	0.02	0.16	0.25	0.14	-0.24	0.21	-0.09	-0.19	0.26	0.06
Std. dev.	0.71	0.45	0.59	0.66	1.53	0.62	0.54	1.17	0.30	0.68	0.59	0.95
Skewness	1.87	0.02	-1.42	0.92	2.47	0.49	-1.53	2.40	-0.19	-0.90	1.35	2.47
Kurtosis	7.03	2.06	5.40	3.82	9.41	2.20	5.49	8.65	2.65	4.21	4.65	8.93
Jarque-Bera	18.94	0.56	8.64	2.52	40.91	1.01	9.06	32.04	0.16	2.76	5.83	37.21
	(0.00)	(-0.76)	(0.01)	(-0.28)	(0.00)	(-0.60)	(0.01)	(0.00)	(-0.92)	(-0.25)	-0.05	(0.00)
	***		***		***		***	***				***
	Shenzhen A-shares											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean	0.06	0.26	0.07	0.04	-0.04	0.01	-0.14	0.15	-0.05	-0.10	0.01	-0.24
Std. dev.	0.61	0.50	0.43	0.63	0.42	0.62	0.61	0.74	0.38	0.72	0.28	0.40
Skewness	0.34	-0.21	-0.35	1.29	-0.41	0.79	0.64	2.26	0.88	0.91	0.24	-0.58
Kurtosis	2.33	2.49	2.86	5.10	2.07	3.13	4.63	7.57	3.10	4.05	2.02	4.24
Jarque-Bera	0.49	0.24	0.28	6.00	0.82	1.35	2.15	20.62	1.56	2.40	0.65	1.56
	(-0.78)	(-0.88)	(-0.87)	(0.05)	(-0.66)	(-0.51)	(-0.34)	(0.00)	(-0.46)	(-0.30)	(-0.72)	(-0.46)
				**				***				
	Shanghai B-shares											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
N	-0.15	0.08	0.06	0.04	0.25	-0.13	-0.35	0.07	-0.10	-0.16	-0.07	0.13
Std. dev.	0.80	-0.77	0.80	0.42	0.85	0.68	0.65	0.53	0.45	0.42	0.49	0.52
Skewness	0.28	-0.94	1.84	0.77	0.59	1.96	-0.31	0.80	0.47	0.30	0.03	1.00
Kurtosis	2.08	4.98	6.82	3.30	2.10	6.69	1.61	3.11	4.19	2.53	1.88	2.39
Jarque-Bera	0.63	4.37	16.39	1.42	1.28	16.88	1.25	1.39	1.24	0.31	0.68	2.38
	(-0.73)	(-0.11)	(0.00)	(-0.49)	(-0.53)	(0.00)	(-0.54)	(-0.50)	(-0.54)	(-0.85)	(-0.71)	(-0.30)
			***			***						
	Shenzhen B-shares											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean	-0.03	0.13	0.28	-0.05	-0.17	0.06	-0.30	0.02	-0.01	-0.16	0.07	-0.06
Std. dev.	0.62	0.64	1.16	0.40	0.63	0.83	0.59	0.47	0.45	0.51	-0.76	0.34
Skewness	-0.51	0.31	2.72	0.07	0.34	1.57	-0.34	0.07	0.59	0.26	1.55	-0.45
Kurtosis	2.30	2.35	9.45	1.63	2.17	4.74	2.05	1.90	2.86	2.11	5.17	3.30
Jarque-Bera	0.83	0.44	38.58	1.03	0.62	6.96	0.68	0.62	0.71	0.58	7.76	0.48
	(-0.66)	(-0.80)	(0.00)	(-0.60)	(-0.73)	(0.03)	(-0.71)	(-0.73)	(-0.70)	(-0.75)	(0.02)	(-0.79)
			***			**					**	

Notes: *** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level.

Table 12. Regression analysis for the Monthly effect

	Shanghai A-shares															
	N	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	F-stat	L.B.-Q(5)	L.B.-Q(24)
Entire sample period	175	0.18	0.24	0.02	0.16	0.25	0.14	-0.24	0.21	-0.09	-0.19	0.26	0.06	0.66	0.611	43.66
		(0.39)	(0.26)	(0.93)	(0.43)	(0.23)	(0.51)	(0.27)	(0.34)	(0.68)	(0.37)	(0.22)	(0.77)	(0.77)	(0.30)	(0.01)
																***
Pre-crisis	80	0.26	0.34	-0.09	0.34	0.49	0.12	-0.33	0.64	-0.04	-0.32	0.59	0.25	0.52	3.91	10.99
		(0.56)	(0.44)	(0.84)	(0.43)	(0.26)	(0.79)	(0.45)	(0.18)	(0.94)	(0.49)	(0.22)	(0.56)	(0.88)	(0.56)	(0.36)
Post-crisis	95	0.11	0.15	0.11	0.01	0.04	0.15	-0.14	-0.12	-0.13	-0.1	0.02	-0.11	0.9	5.97	10.58
		(0.35)	(0.22)	(0.35)	(0.96)	(0.75)	(0.21)	(0.27)	(0.33)	(0.29)	(0.43)	(0.87)	(0.36)	(0.55)	(0.31)	(0.39)
	Shanghai B-shares															
	N	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	F-stat	L.B.-Q(5)	L.B.-Q(24)
Entire sample period	161	-0.15	0.08	0.06	0.04	0.25	-0.13	-0.35	0.07	-0.1	-0.16	-0.07	0.13	0.85	8.23	25.78
		(0.41)	(0.63)	(0.72)	(0.84)	(0.14)	(0.46)	(0.05)	(0.70)	(0.56)	(0.36)	(0.68)	(0.48)	0.59	0.14	0.36
								**								
Pre-crisis	66	-0.07	-0.13	-0.30	0.11	0.06	-0.28	-0.27	0.29	-0.22	-0.16	0.08	0.31	0.62	6.49	38.75
		(0.80)	(0.62)	(0.25)	(0.67)	(0.82)	(0.28)	(0.30)	(0.31)	(0.45)	(0.56)	(0.78)	(0.29)	0.8	0.26	0.03
																**
Post-crisis	95	-0.19	0.24	0.33	-0.02	0.39	-0.01	-0.41	-0.07	-0.03	-0.16	-0.17	0.01	0.97	5.5	26.96
		(0.41)	(0.30)	(0.15)	(0.93)	(0.09)	(0.98)	(0.10)	(0.77)	(0.90)	(0.49)	(0.47)	(0.95)	0.48	0.36	0.31
	Shenzhen A-shares															
	N	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	F-Stat	L.B.-Q(5)	L.B.-Q(24)
Entire sample period	153	0.06	0.26	0.07	0.04	-0.04	0.01	-0.14	0.15	-0.05	-0.10	0.01	-0.24	0.76	6.57	42.46
		(0.70)	(0.09)	(0.63)	(0.78)	(0.79)	(0.94)	(0.36)	(0.34)	(0.76)	(0.53)	(0.93)	(0.11)	(0.68)	(0.26)	(0.01)
			*													***
Pre-crisis	58	0.00	0.41	0.00	0.19	-0.19	-0.16	-0.12	0.79	0.12	-0.17	0.07	-0.37	0.75	6.82	37.59
		(0.99)	(0.23)	(0.99)	(0.58)	(0.58)	(0.64)	(0.73)	(0.04)	(0.76)	(0.62)	(0.83)	(0.28)	(0.68)	(0.24)	(0.04)
									**							**
Post-crisis	95	0.10	0.16	0.12	-0.05	0.05	0.12	-0.16	-0.17	-0.13	-0.05	-0.02	-0.16	0.82	8.54	16.98
		(0.47)	(0.24)	(0.37)	(0.71)	(0.70)	(0.39)	(0.26)	(0.22)	(0.33)	(0.70)	(0.87)	(0.23)	0.62	0.58	0.85
	Shenzhen B-shares															
	N	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	F-stat	L.B.-Q(5)	L.B.-Q(24)
Entire sample period	153	-0.03	0.13	0.28	-0.05	0.17	0.06	-0.3	0.02	-0.01	-0.16	0.07	-0.06	0.69	8.35	30.82
		(0.86)	(0.47)	(0.12)	(0.77)	(0.35)	(0.73)	(0.11)	(0.93)	(0.98)	(0.38)	(0.70)	(0.75)	(0.74)	(0.14)	(0.16)
Pre-crisis	58	0.14	-0.01	-0.19	-0.10	-0.15	-0.05	-0.12	0.29	0.11	-0.13	0.27	-0.15	0.36	7.70	36.70
		0.61	0.97	0.48	(0.72)	(0.60)	(0.85)	(0.66)	(0.35)	(0.71)	(0.63)	(0.33)	(0.59)	0.97	0.17	0.05
																**
Post-crisis	95	-0.14	0.22	0.58	-0.02	0.37	0.13	-0.43	-0.12	-0.07	-0.18	-0.05	0.00	1.19	3.85	26.54
		(0.56)	(0.37)	(0.02)	(0.93)	(0.13)	(0.58)	(0.10)	(0.62)	(0.79)	(0.47)	(0.82)	(0.99)	(0.31)	(0.57)	(0.33)

Notes: *** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level; P-values are reported in parentheses; N is the number of observations.

Table 13. Maximum Likelihood Estimates: AR (1) EGARCH (1,1) Model

Shanghai A-shares												
	Entire sample			Pre-crisis			Financial crisis			Post-crisis		
N	3561			1663			591			1307		
ø0	-0.07	(0.00)	**	0.32	(0.00)	**	-0.03	(0.52)		-0.05	(0.00)	**
ø1	0.05	(0.00)	**	0.05	(0.00)	**	0.02	(0.73)		0.03	(0.28)	
α0	-0.22	(0.00)	**	-0.21	(0.00)	**	-0.20	(0.00)	**	-0.11	(0.00)	**
δ1	0.39	(0.00)	**	0.57	(0.00)	**	0.35	(0.00)	**	0.16	(0.00)	**
δ2	-0.01	(0.77)		0.09	(0.00)	**	-0.10	(0.00)	**	-0.08	(0.00)	**
β1	0.97	(0.00)	**	0.93	(0.00)	**	0.91	(0.00)	**	0.98	(0.00)	**
AIC	4.20			4.95			3.57			3.29		
Shanghai B-shares												
	Entire sample			Pre-crisis			Financial crisis			Post-crisis		
N	3258			1366			591			1301		
ø0	-0.11	(0.00)	**	-0.10***	(0.00)	**	-0.17*	(-0.06)		-0.06	(0.21)	
ø1	0.15	(0.00)	**	0.23***	(0.00)	**	0.12***	(0.00)	**	0.05*	(0.10)	*
α0	-0.21	(0.00)	**	-0.27***	(0.00)	**	-0.11**	(-0.03)		-0.15	(0.00)	**
δ1	0.44	(0.00)	**	0.51***	(0.00)	**	0.36***	(0.00)		0.34	(0.00)	**
δ2	0.01	(0.96)		0.04**	(-0.02)		-0.04	(-0.19)		-0.02	(0.24)	
β1	0.92	(0.00)	**	0.89***	(0.00)	**	0.91	(0.00)		0.94	(0.00)	**
AIC	4.07	(0.00)	**	3.72	(0.00)	**	4.75			4.11		
Shenzhen A-shares												
	Entire sample			Pre-crisis			Financial crisis			Post-crisis		
N	3561			1663			591			1307		
ø0	-0.07	(0.00)	**	0.32	(0.00)	**	-0.03	(0.52)		-0.05	(0.00)	**
ø1	0.05	(0.00)	**	0.05	(0.00)	**	0.02	(0.73)		0.03	(0.28)	
α0	-0.22	(0.00)	**	-0.21	(0.00)	**	-0.20	(0.00)	**	-0.11	(0.00)	**
δ1	0.39	(0.00)	**	0.57	(0.00)	**	0.35	(0.00)	**	0.16	(0.00)	**
δ2	-0.01	(0.77)		0.09	(0.00)	**	-0.10	(0.00)	**	-0.08	(0.00)	**
β1	0.97	(0.00)	**	0.93	(0.00)	**	0.91	(0.00)	**	0.98	(0.00)	**
AIC	4.20			4.95			3.57			3.29		
Shenzhen B-shares												
	Entire sample			Pre-crisis			Financial crisis			Post-crisis		
N	3044			1152			586			1306		
ø0	-0.13	(0.00)	**	-0.16	(0.00)	**	-0.27	(0.01)	**	0.10	(0.03)	**
ø1	0.14	(0.00)	**	0.18	(0.00)	**	0.20	(0.00)	**	0.04	(0.14)	
α0	-0.17	(0.00)	**	-0.36	(0.00)	**	-0.12	(0.00)	**	-0.07	(0.00)	**
δ1	0.39	(0.00)	**	0.71	(0.00)	**	0.27	(0.00)	**	0.25	(0.00)	**
δ2	0.03	(0.00)	**	0.10	(0.00)	**	-0.06	(0.02)	**	0.00	(0.04)	**
β1	0.92	(0.00)	**	0.84	(0.00)	**	0.96	(0.00)	**	0.92	(0.00)	**
AIC	4.04			3.56						4.23		

Notes: *** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level; P-values are reported in parentheses; N is the number of observations.