

Study on the Impact of Widening Price Limit on the Volatility of GEM

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Abstract

On August 24, 2020, the price limit of GEM market was officially relaxed from the previous 10% to 20%. This policy adjustment provided a good "quasi-natural" experiment for the standard. By constructing a differential difference model (DID), this paper took GEM stocks as the experimental group and small and medium-sized board stocks as the control group, and made use of relevant data from 2017 to 2023. Study the effect of this system adjustment on the volatility of GEM stock price. The empirical test results show that the relaxation of the limit of rise and fall increases the volatility of GEM stocks.

Keywords

GEM; Price Limit; Stock Volatility; Differences in Differences.

1. Introduction

In 1996, the system of limit on the rise and fall was officially established in China's stock exchange market. At the beginning of the establishment of China's stock market, investors are not mature, the relevant mechanism is not perfect, financial stability is the bottom line of supervision is the red line, in this context, the "limit up and down system" has fully played the role of "market stabilizer". With the continuous development of China's economy, the corresponding policies of the stock market have been unable to adapt to the current market demand, and the domestic stock listing system has changed from the approval system to the registration system. On April 27, 2020, the reform plan of the GEM pilot registration system was formally established. Since August 24 of the same year, in order to cooperate with the effective implementation of the reform, As well as enhancing the liquidity and pricing efficiency of the GEM market, the growth and decline limit of the GEM market has been significantly adjusted again, and there is no limit of rise and fall within five days from the date of listing of the company and the subsequent change from the previous 10% to 20%, which has laid the foundation for the determination of China's registration system reform. As the vanguard of China's stock market registration system reform, the effect of its policy adjustment evaluation has far-reaching significance to the development of the whole stock market. This paper studies the changes of stock price volatility in GEM market after the price restriction is relaxed, which can provide some help for relevant investors on the one hand and provide some reference for policy makers on the other hand

2. Empirical Design

2.1. Sample Selection

In this paper, with the help of the implementation of the relaxation policy of the growth enterprise Market, a quasi-natural experiment is constructed to test the impact of this policy adjustment on stock volatility by using the differential model. On August 24, 2020, the growth and decline limit of GEM was officially adjusted to 20%. This paper takes this date as the event

window and selects data length from January 2017 to December 2023. Since the subsequent empirical analysis uses quarterly data, that is, the first quarter of 2017 to the second quarter of 2020 is the prior window period, and the third quarter of 2020 to the fourth quarter of 2023 is the post window period. The GEM market is dedicated to serving the technological innovation growth stock market, while the small and medium-sized board market is also a market for the independent innovation growth of small and medium-sized enterprises, and is widely used to compare with the GEM market. Therefore, this paper selects the stocks in the GEM as the experimental group and the stocks in the small and medium-sized board as the control group. The data comes from the National Tai'an Database (CSMAR database).

In this paper, the samples are processed as follows: (1) Companies with ST and companies in the financial industry in the 2012 industry classification of CSRC are excluded from the samples. (2) Companies whose quarterly trading days are less than 50% of the quarterly trading days and companies that are delisted are excluded. (3) In order to eliminate the influence of extreme values on the results, 1% and 99% of the relevant variables were double-tailed.

2.2. Variable Selection

The explanatory variable in this paper is the product of Treat and Time two virtual variables, named TDID; Among them, Treat is the group dummy variable. If it is the experimental group, that is, the stocks in GEM, the value is 1, and the control group, that is, the stocks in small and medium-sized board, is 0. The value of Time is 0 before the event, that is, from the first quarter of 2017 to the second quarter of 2020, and the value of time is 1 after the event window, that is, from the third quarter of 2020 to the fourth quarter of 2023.

The explained variables in this paper are measured from the perspectives of stock ordinary volatility and stock characteristic volatility. The stock ordinary volatility adopts the quarterly standard deviation TVOL of stock return, and selects the quarterly standard deviation of daily stock return to measure stock price volatility

Since there are many factors affecting stock volatility, this paper selects several indicators as the control variables of this empirical model combined with previous literature studies. In terms of corporate financial indicators, price-to-book ratio and return on assets are selected as control variables, and in terms of corporate ownership concentration, the sum of shareholding ratios of top ten shareholders is selected as control variables.

The control variables selected in this paper are the sum of market to sales ratio, return on assets, leverage ratio, growth rate of operating income and shareholding ratio of top ten shareholders.

2.3. Model Selection

This article mainly studies the impact of the policy of relaxing the limit on the rise and fall of GEM on the volatility of GEM stocks. Since the relaxation of the limit on the rise and fall of GEM was implemented, the main board of Shanghai and Shenzhen has not changed the limit on the rise and fall of GEM, so the implementation of this policy provides us with a good opportunity for quasi-natural experiment. Difference-in-Differences (DID) is a statistical technique widely used in policy evaluation, treatment or other interventions, which can control the influence of other factors except policy factors while avoiding endogeneity problems to a certain extent. Therefore, this paper constructs a difference-in-differences model for empirical analysis.

In order to study the impact of changes in the growth enterprise Market on stock price fluctuations, this paper constructs the following differential model

$$VOL_{i,t} = \beta_0 + \beta_1 Time + \beta_2 Treat + \beta_3 TDID + \sum \beta_i X_{i,t} + \gamma_i + \theta_t + \varepsilon_{i,t}$$

Vol uses the quarterly standard deviation of daily stock returns to calculate the quarterly volatility of individual stocks, Time is 0 before the occurrence of the policy and 1 after the occurrence of the policy, Treat is the group dummy variable, the experimental group is 1 and the control group is 0, TDID is the interaction term of Time and Treat, $X_{i,t}$ are the control variables, and γ is the individual fixed effect. θ is the time fixed effect.

3. Empirical Result

The benchmark regression results of the differential model of the impact of the relaxation of the increase and decline of GEM on stock volatility are shown in Table 1. In the absence of Time fixed effects and individual fixed effects (i.e., columns (1) and (2)), the coefficients of TDID (the interaction term of time and Treat) are positive and significant at the 1% significance level, regardless of whether control variables are added. This shows that the policy of easing the limit of rise and fall has indeed increased the volatility of the stock stock on the GEM. Furthermore, when the time fixed effect and individual fixed effect were added to the model (i.e., column (3)), the TDID coefficient remained significantly positive, further verifying the robustness of the above conclusions. Therefore, we can infer that the relaxation of price restrictions has increased the volatility of stock prices in the GEM market.

Among the regression coefficients of control variables, the coefficient significance of operating income growth rate Incgr is relatively low, and the remaining control variables have a high significance, and the circulation market value, ROA and operating income growth rate have a negative effect on stock volatility, while the other control variables have a positive effect. By observing R square and adjusting R square, the coefficients of determination in the six regressions are all greater than 0.05, indicating that the goodness of fit of the model is good.

Table 1. Regression test results

	TVOL		
	(1)	(2)	(3)
TDID	0.01*** (6.59)	0.011*** (54.03)	0.0074*** (5.59)
Time	0.002** (2.36)	0.016*** (14.82)	
Treat	0.024*** (30.85)	0.013*** (11.46)	
ROA		-0.0153*** (-4.12)	-0.0083** (-2.48)
Incgr		0.00001 (0.02)	-0.0001* (1.52)
Lev		0.0253*** (13.84)	0.022*** (7.62)
PS		0.0005*** (17.76)	0.0003*** (9.19)
Own		0.0207*** (8.06)	-0.014** (-2.24)
CFE	NO	NO	YES
TFE	NO	NO	YES
R-Squared	0.035	0.1179	0.2733
Note: *, ** and *** indicate significant levels of $P < 0.1$, $P < 0.05$ and $P < 0.01$ respectively, and the t value is in brackets.			

4. Summary

In this paper, based on the background of the relaxation of the growth and decline limit of GEM in August 2020, the impact of the relaxation of the rise and fall limit on the volatility of GEM stocks is studied from the perspective of stock price earnings volatility. Under the "quasi-natural" experimental conditions of policy implementation, this paper adopts the differential model, with listed companies on GEM as the experimental group and listed companies on small and medium-sized board as the control group, and uses relevant data from the first quarter of 2017 to the fourth quarter of 2023 for empirical testing. The results of the differential model and robustness test show that: The relaxation of the rise and fall limits has significantly increased the volatility of GEM stock prices as a whole.

References

- [1] Sialm C, Stochastic taxation and asset pricing in dynamic general equilibrium[J]. Journal of Economic Dynamics and Control, 2006, 30(3): 511-540.
- [2] Foresti P, Napolitano O, On the stock market reactions to fiscal policies [J]. International Journal of Finance & Economics, 2017, 22(4):296-303.
- [3] Pastor, Veronesi. Political Uncertainty and Risk Premia[J]. Journal of Financial Economics, 2013, 110(3):520-545.
- [4] Nishimura, Sun. Impacts of Donald Trump's tweets on volatilities in the European stock markets[J]. Finance Research Letters, 2025, 72: Volume 72.
- [5] Fischer Black. The Pricing of Commodity Contracts[J]. Journal of Financial Economics, 1976(3):167-197.
- [6] Nelson. Conditional Heteroskedasticity in Asset Returns: A New Approach[J]. Econometrica, 1996 (59):347-370.
- [7] Stein. Transactional Risk, Market Crashes, and the Role of Circuit Breakers[J]. Journal of Business, 1991(64):443-462.
- [8] Phylaktis. Price Limits and Stock Market Volatility in the Athens stock exchange[J]. European financial management, 1999(5):69-84.