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Asymmetric Synchronicity in Extreme Stock Price Movements: Evidence from China's Stock Market

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Abstract

We investigate the synchronicity of extreme stock returns by using the individual stock trading data from WIND database during a time span from May 1st 2014 to Dec 31th 2016 and find that there is an asymmetrical pattern of stock prices co-movement with respect to extreme market conditions, namely, the individual stock prices tend to fall down at the same time more than to rise up at the same time when the market experiences the extreme events. This is quite different from the fact that stock prices co-movements are almost symmetric under normal market conditions. We give an explanation with empirical evidence to this phenomenon that extreme positive and negative returns come mainly from different inherent mechanisms. Extreme positive returns happen mainly due to individual stock information release, while extreme negative returns mainly result from a market wide pessimistic investor sentiment.

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Keywords: asymmetry; stock price synchronicity; extreme market condition

1. Introduction

The Chinese stock market as one of the most important emerging markets in the world has been quite volatile all along, with frequent extreme returns of both market level and individual stocks. From Aug 2014 on, the market index experienced two rounds of rapid rise with an increase of more than 150%, followed by two rounds of market crash. Till Aug 2015, the index fell to 2850 from 5178. In Chinese stock market, there’s a limit of maximum ±10% return rate of stock price during a single day. The price limit was even reached by more than one thousand (out of approximately two thousand and five hundred) stocks in one day for a number times, which appears great synchronicity. The remarkable phenomena give rise to our consideration of co-movement of stock prices especially under extreme return conditions.

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In the literature context of stock price co-movement, Lo and MacKinlay[1] demonstrate that the price changes of a portion of stocks will lead those of the others in the stock market, while Badrinath et al.[2] provide empirical evidence for that. Morch et al.[3] find that stock prices move together more in poor economies than in rich economies and argue that property rights explain the difference. Barberis et al.[4] show that the co-movement of stock prices comes from not only fundamentals but also frictions and investor sentiment. Other literatures involve in that stocks of what kind of characteristics have higher synchronicity than the others, like corporate transparency (Jin and Myers[5]) and institutional investor holdings (An and Zhang[6]).

Previous studies focus mostly on the synchronicity of the overall market and individual stocks of different characteristics, while the phenomenon of thousand stocks simultaneously reaching price limits stimulates our consideration of stock prices co-movement especially under extreme return conditions. Intuitively, on larger scale and more frequently stocks reach price-down threshold than price-up threshold, to which extent, we demonstrate the synchronicity asymmetry with summary statistics. Noting that price surges happen separately while price crashes concentrate, we put forward the interpretation that price surges are more related to individual stock information while a large batch of price crashes is more due to a market-wide reason like market sentiment.

2. Synchronicity Asymmetry

The price limit from regulation policy gives rigorous and authentic standard to define extreme price returns. We obtain stock trading data of historical sequence covering more than 2000 stocks traded in Shanghai Stock Exchange from WIND database, as well as a version of high-frequency intraday data, and an investor sentiment index from CSMAR database. As drew in a Lorenz curve of total number of stock price limits and trading days in our sample, the Gini index is 0.93 in the aspect of down-limit vs. 0.58 the opposite of up-side (Figure 1), which implies the intense concentration of individual stock extreme negative returns. Using a measure of proportion of stock price limit happening with each other, as is found by us that downside co-movement synchronicity is stronger than that of upside in the aspect of synchronized frequency (See Table 1). That is to some extent consistent with Ang and Chen[7], who find that correlations between U.S. stocks and the aggregate U.S. market are much greater for downside moves.

![Fig. 1. Lorenz curve on trading day and up/down-limit event inequality](image)

It is noteworthy that using a similar measure to gauge inter-stock simultaneous rises and falls of prices, the asymmetry appears to fade away to a great extent. That is to say that we find much stronger asymmetry during extreme conditions. The co-movement performance is different between the normal market condition and the extreme market condition. The finding implies exceptional mechanisms that drive extreme stock returns compared to those driving common price co-movement, which is novel.
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