Empirical Analysis of Stock Price Crash Risk of RE Industry: Evidence from China Fortune Land Development Co., Ltd.

Fangming Li[✉]

School of Social Science, University of Manchester, Manchester M13 9PR, UK
`fmli2@outlook.com`

Abstract. The RE business is China's core industry, and CFLD is a representative firm in the Chinese RE sector. China has implemented several laws for RE firms as part of its recent economic reform and measures to avert systemic risks. The "three red lines" strategy is one of the most well-known. The policy has a significant influence on the RE company's operations and development. This paper measures the magnitude of the company's stock price crash risk (SPCR, hereafter) by tracking the volatility of the CFLD stock price, earnings, and P/E value within 180 days before and after the release of the three red line policies. Consequently, it was determined that the danger of stock price collapse rose dramatically following the announcement of the CFLD policy.

Keywords: Economic policy uncertainty · Chinese RE company · return volatility

1 Introduction

The effects of economic policy uncertainty (EPU) on corporate behaviors have been a subject of worry across the world [1]. According to the research, EPU greatly influence the market demand and business strategic direction. To measure the stock price crash risk more comprehensively, a new index which designed for China to measure EPU effects and determined that EPU offers a major impact on the danger of a stock crash in China [2, 3]. The Chinese government has implemented various policies in recent years that have had a substantial influence on the real estate (RE, hereafter) business. The "Three Red Lines" (TRL, hereafter) policy, implemented in 2020 by China's central bank and authority is one such measure [4].

Under TRL policy, land agents are subject to tougher financing restrictions and risk management requirements. The policy establishment limited establishes three different levels for developers' liability-to-asset ratios, net debt-to-equity ratios, and cash-to-short-term debt ratios [5]. Developers that fail to satisfy any of the three requirements are in violation of the rules and will face consequences such as decreased access to finance resources [6].

It has forced the RE company to lower their leverage ratio of the operation and put a further limitation for the business lending. This makes it more difficult for the company

to obtain additional cash flow, which increases the liquidity risk of the enterprise to a large extent. The government new action has restricted the further growth of the RE sector and increases investors awareness of the health of the company. Besides that, the new policy also creates a great deal of uncertainty in the stock market and restrains the economy to some extent.

RE industry is a very important presence in China's economic system. With the economic reforms of 1978, China has witnessed quick and profound socioeconomic developments [7]. This development has been followed by significant changes in land usage and adjustments that have influenced all areas of the country's economy especially for RE industry [8]. China Housing Market Value Report shows that, from 2000 to 2020, China's housing market value surge from 23 trillion to 418 trillion CNY. The RE industry in China is a foundation of the economy [9, 10].

There are some obvious advantages for the discovery of EPU effect on stock by using Chinese stock sample [11]. From the establishment of new China in 1949, its RE closely followed the expansion of economy and frequently influenced by economic policies [7, 10]. There is more information available for the investigation of the EPU impact on stock market (SM, hereafter) price. In addition, the authority of China has implemented many macro policy adjustments and made periodic rules amendments as it transitions of the structure of the economy [12]. This enables more evidence available for the detection of EPU effect. Besides that, in China, the corporation is especially vulnerable to EPU since the Chinese government has centralized rights to allocate certain resources, that makes Chinese companies very sensitive to policy [11]. Furthermore, the Chinese SM is less stable than the American and European SM, possibly because the Chinese SM is less institutionalized, individual investors are the main trader, and they suffer crashes easily [13].

2 Empirical Design and Methodology

2.1 Target Company Description

This paper focus on the company called China Fortune Land Development Co Ltd (CFLD), which was listed on the Shanghai Stock Exchange in 2003. CFLD is a representative RE enterprise in Chinese SM, its primary business is the acquisition of land, the planning and design of new communities, and the development and sale of properties to people and corporations. Residential and commercial properties, as well as infrastructure such as roads, water supply, and sewage systems, are common projects for the firm.

2.2 Data Source and Time Range

The CFLD's stock price and return statistics are sourced from the China Stock Market&Accounting Research (CSMAR), the P/E value is collected from Hithink Royal Flush. The influence of recent news events and other news on market prices is quite timely, even before the occurrence is officially announced, the market price has already soared [1]. Therefore, the detection of SPCR mainly focus on the effect arises from the stock price of 180 days before and after the new RE policy announcement date.

2.3 Methodology

The analysis of the SPCR is mainly focus on two factors: stock price and price-earing ration (P/E ratio). The measurement of SPCR is measured through the fluctuation of CFLD's stock price and the changes in P/E value in the research period. And the analysis is separated into 3 stages: entire period analysis, pre-announcement date period analysis and post-announcement date period analysis.

3 Empirical Analysis

3.1 Entire Period

The Fig. 1 indicates the general stock price trend in the given period of time. As the diagram shows that, the stock price of CFLD continually decrease during the 180 days before and after the policy announcement date. And there is an abnormal phenomenon of stock price falling off a cliff. In addition, the stock price falls by more than 65.8% in a one-year period, and the volatility of stock return is 2.89% which is largely greater the market index. These possibly indicate that, due to the limited financial resources, the financial situation of CFLD deteriorates, that makes investors doubt the prospects of the company, that also brings more risk and uncertainty to the SM of CFLD. Such a big impact on a representative company in an industry may mean a change in the operating environment of the entire industry, and may trigger a butterfly effect, which will negatively impact the entire economy and increase the systemic risk.

Besides the general trend in stock price movement, the comparison between the volatility of stock return and Shanghai SE Composite index returns which is represented on Fig. 2 shows that, the volatility of CFLD' stock price is obviously greater than that of Shanghai SE Composite Index. It indicates that investors' investment in CFLD faces a greater risk than the whole market. Although investors' expectations cannot accurately reflect the crash risk faced by the company, it also reflects the risks of investing in the
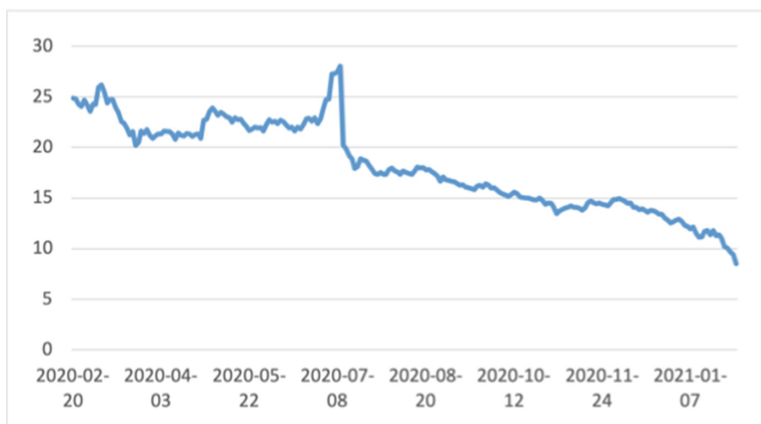
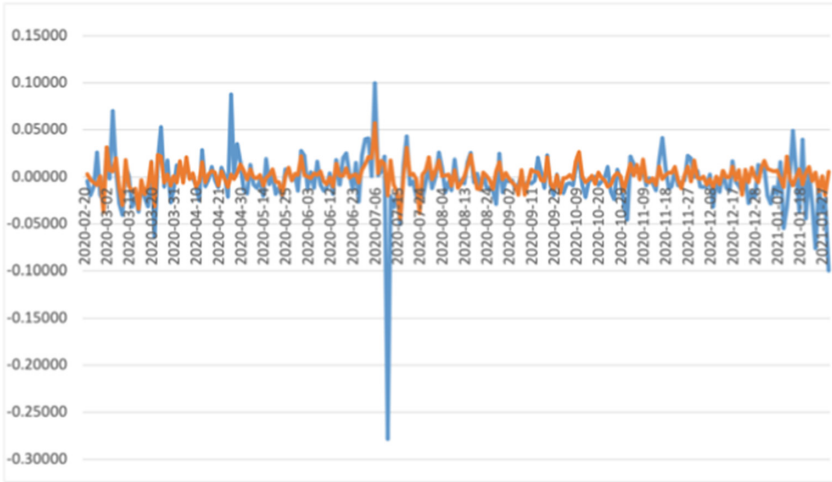**Fig. 1.** Price change trend for the entire period [owner-draw]

Fig. 2. Price volatility for the entire period [owner-draw]

Fig. 3. P/E ratio changes for the whole period [owner-draw]

company to some extent. To explicitly learn about the investors' changes in expectation of CFLD, Fig. 3 shows the fluctuation of the price-earnings ratio (P/E ratio) in the research period. According to Fig. 3, there is a larger fluctuation of P/E ratio in the research period, that indicates that investors' expectations of CFLD changes due to the EPU. The general trend of P/E ratio is decrease from 5.77 at beginning of research period to 3.4312 at the end of research period. It possibly refers that CFLD is facing an increased SPCR.

3.2 Pre-announcement

Figure 4 displays the volatility of the CFLD stock price prior to the policy's implementation, which helps to understand the impact of the policy's influence. Figure 5 depicts a

Fig. 4. Price change trend for pre-announcement period [owner-draw]
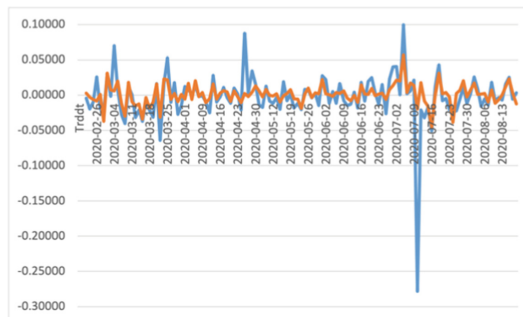
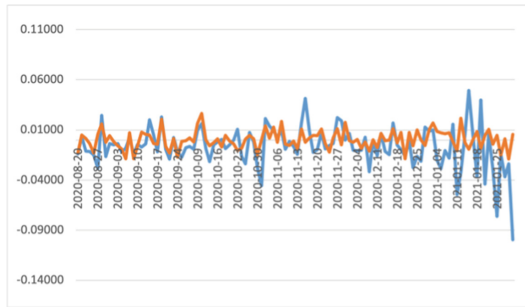**Fig. 5.** Price volatility for the pre-announcement period [owner-draw]

comparison of the return on CFLD stock and the return on the market index prior to the policy's implementation. As shown in Fig. 4, the stock price changes are generally constant more than two months before the policy is announced, and according to Fig. 5, the volatility of stock returns is larger than that of market index returns only in a few days. Yet, the company's stock price plummeted drastically two months before the policy was released, and the abnormally abrupt decrease in stock price happened during this period. In four days, the stock price dropped by more than 20%. Also, share values decreased by more than 27% in the 180 days preceding the policy's issuance. This is due, in part, to an increase in the likelihood of a drop in company share values in the two months preceding the policy's announcement.

3.3 Pre-announcement

The CFLD company's share price increased after the policy was announced. Figure 6 shows that the stock price of CFLD Corporation continued to fall after the policy was issued. The stock price dropped by more than 52% in less than a year. Figure 7 shows that the volatility of CFLD returns is still much higher than that of the market index over the same time period. Furthermore, the data shows that the return volatility of stock

Fig. 6. Price change trend for post-announcement period [owner-draw]

Fig. 7. Price volatility for the post-announcement period [owner-draw]

prices has increased significantly over time. Nonetheless, the volatility of stock returns following the policy announcement was lower than before, maybe because individuals were unduly concerned about unpredictable occurrences.

4   Test Statistics

To test whether there is a difference between pre or post announcement return and average return in the whole period, a hypothesis test is use to test it:

$$\text{Null hypothesis} : \text{H}_0 : \mu = -0.004143056 \tag{1}$$

$$\text{Alternative hypothesis} : \text{H}_1 : \mu \neq -0.004143056 \tag{2}$$

4.1   Pre-announcement

As the Table 1 and 2 shows that, the range of pre-announcement return is $0.2\% \pm 3.5\%$, the mean difference between pre-announcement returns and entire period average return

Table 1. One-Sample Statistics for Pre-announcement return [owner-draw]

	N	Average	Standard Deviation	Standard Error Mean
pre	123	-0.002	0.03459	0.00312

Table 2. One-Sample Test of Pre-announcement return [owner-draw]

Test Value = -0.004143056

	t	df	Sig. (2-tailed)	Average Difference	95% Confidence Interval of the Difference	
					Lower	Upper
pre	0.698	122	0.486	0.00218	-0.004	0.0084

is 0.218% (95% confidence interval is from -0.004 to 0.0084). One sample t-test shows that, t(109) = 0.698, p = 0.486 > 0.05, the result indicate that there is no obvious difference between pre-announcement return and entire period average return.

4.2 Pre-announcement

As the Table 3 and 4 shows that, the range of post-announcement return is 0.66% ± 2.1%, the mean difference between pre-announcement returns and entire period average return is -0.243% (95% confidence interval is from -0.0063 to 0.0015). One sample t-test shows that, t(122) = -1.241, p = 0.217 > 0.05, the result indicate that there is no obvious difference between post-announcement return and entire period average return.

Table 3. One-Sample Statistics for Post-announcement return [owner-draw]

	N	Average	Standard Deviation	Standard Error Mean
post	110	-0.0066	0.02057	0.00196

Table 4. One-Sample Test of Post-announcement return [owner-draw]

Test Value = -0.004143056

	t	df	Sig. (2-tailed)	Average Difference	95% Confidence Interval of the Difference	
					Lower	Upper
post	-1.241	109	0.217	-0.00243	-0.0063	0.0015

5 Conclusion

In this paper, China Fortune Land Development Co Ltd (CFLD) is taken as the research example. The research mainly focusses on the comparison of price change and return volatility and P/E ratio fluctuation between CFLD and market index (SSE Composite Index) in the 180 days before and after the policy release. The increasing SPCR is mainly reflected in the sharp decline of the company's stock price, fluctuation of the return on the CFLD is obviously larger than on the market index in selected period. In specific, the market reacts more actively after the policy announcement than before. This paper only considers the policy change impact on the volatility of company stock price in targeted period, it may not be the only factor causing the augment of crash risk. However, in 2020, the worldwide company is still suffering from the pandemic, which may also bring some negative effect for CFLD stock price. As much empirical research found that, besides macro factor effect on crash risk, there is also many other factors may attribute some positive effect on crash risk, for example: financial disclosure method, religious effect and even the manager behaviours [14, 15]. I hope to consider more possible factors into the detection of CFLD SPCR to draw a more comprehensive understanding on it. The research is only focus on a specific company, the SM reaction of CFLD for policy change may not represent the whole industry. I hope this research can provide some useful information for the discovery of SPCR on RE company.

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