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STOCK MARKET REACTION TO CREDIT RATING CHANGES: EVIDENCE FROM VIETNAMESE STOCK MARKET

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ABSTRACT

Recently, many studies on the factors affecting the stock market have been carried out in Vietnam, but there is a lack of research on credit rating information. This study aims to examine the reaction of the Vietnamese stock market to credit rating changes. The research is conducted based on the efficient market hypothesis, asymmetric information theory, and behavioral finance theory. The event study method is used to examine the change in stock return of market indexes (VN-Index and HNX) and industry indexes of 24 industries at the time of disclosure and 20 sessions before and after the announcement. At the same time, the study examines the announcement events of credit rating changes in the period from January 3, 2012 to September 12, 2018. The T-test results demonstrate that stock prices have a significant difference when credit rating information is published. This shows that the Vietnamese stock market is not efficient, stock prices traded on the market have not yet fully reflected the information published on the market. The results of this study are empirical evidence that reinforces the conclusions of previous studies on the underperforming stock market in Vietnam. When increasing credit ratings, most of the industry indexes reacted in the 5th session or later. Moreover, when the credit rating was downgraded, the market reacted more slowly, and the stock return of most indexes changed from the 14th session onwards. However, the stock market reaction was very diverse when the credit rating remained unchanged. Research indicates profitable opportunities for investors who know how to capture information and have good analytical techniques. At the same time, information transparency needs to be improved and the herd effect needs to be reduced to improve market efficiency.

KEYWORDS: Credit rating, market efficiency, stock market reaction, stock return, event study method.

1. INTRODUCTION

The national credit coefficient, also known as credit rating, reflects the socio-economic situation as well as financial and monetary issues of a country. When a country's credit rating increases, it means that the country's financial safety has improved in a good direction. Conversely, if this coefficient is downgraded, the financial situation tends to be bad. Credit rating is a basic indicator that investors can consider as a determinant of risk and profitability before deciding to invest in that country. As a result, credit ratings have a significant impact on the stock market. The impact of rating change announcements can be inferred from the market's reaction to the announcement (Choy et al., 2006). The market's reaction to announcements is usually considered through the change in the stock price traded in the market. The market will experience significant volatility if this information cannot be obtained from any other source before, meaning this information has not been reflected in the current share price. Therefore, this is also a way of assessing market efficiency.

Currently, Vietnam is evaluated by three leading prestigious credit rating agencies in the world, including Moody's, Standard and Poor's, and Fitch Ratings. From 2013 to 2021, Moody's assesses Vietnam's credit rating from B2 to Ba3. Besides, according to the assessment of Standard and Poor's, Vietnam has been classified in BB- group since 2010 and increased to BB group from 2019 to the present. At the same time, Fitch Ratings rated Vietnam to increase its rank from B+ to BB. Affected by the Covid-19 pandemic, many countries have had their credit rating downgraded, but Vietnam still maintains a rating that shows the stability of the economy.

Besides, the market efficiency of Vietnam's stock market has been evaluated through a few empirical studies, such as the stock market's reaction to earnings announcements (Nguyen, 2015), search-based sentiment (Nguyen and Pham, 2018), accrual anomaly (Dang and Tran, 2019), information disclosure regulation (Hoang et al., 2020), the January effect and Lunar new year (Truong and Friday, 2021). However, there has been no research examining the market's reaction to credit rating adjustment information disclosure made in Vietnam. Overall, the results of previous studies show that Vietnam's stock market cannot be considered a weak-form efficient market. Investors still have many opportunities to earn unusual profits from published information because market information is not transparent and complete.

Overall, empirical research on the market's response to diverse impact factors is still limited. Therefore, this study analyzes the stock market reaction to credit rating information by testing the difference in stock return before and after the announcement. From there, the research provides empirical evidence to help investors better understand the emerging market and make the right investment decisions. Moreover, the research results are the basis for the management agency to propose effective market promotion solutions.

2. LITERATURE REVIEW

The research is based on the following theories: efficient market hypothesis, asymmetric information theory, and behavioral finance theory as the basis for studying changes in stock prices when credit rating adjustment information is published. First of all, the efficient market hypothesis was proposed by Fama (1970). This hypothesis assumes that all available information is fully reflected in stock prices at any point in time is the best estimate of the real value of the stocks. The efficient market hypothesis depends on the following three conditions: (1) no transaction cost, (2) public and free information, and (3) current stock prices reflect all available information. Based on the identification of a set of available information, the efficient market hypothesis is categorized into three degrees namely weak-form efficiency, semi-strong form efficiency, and strong-form efficiency. Regarding the available information in the market, each level holds a different viewpoint on market efficiency. Weak-form efficiency states that a security's price reflects historical information about a security's price, including stock price and trading volume. Since it is assumed that the current market price reflects all past earnings and all information in the market, it is not possible to forecast future prices and future rates of return. This means that the rates of return are independent of each other and that future stock price movements are random. Empirical research shows that most markets have weak-form efficiency, especially in emerging markets like Vietnam (Phan and Zhou, 2014). Then, semi-strong form efficiency holds for a certain market if current market prices reflect past stock prices and publicly available market information. This hypothesis implies that investors when making decisions based on new information after publication will not receive higher-than-average returns because stock prices immediately reflect all publicly available information. Finally, strong form efficiency claims that stock prices reflect all public and private information. Accordingly, it is impossible to use internal information, fundamental analysis and technical analysis to earn excess returns in such a market. Therefore, the efficient market hypothesis suggests that the more efficient the market is, the less likely it is that investors will derive extraordinary returns from disclosure events. Stock prices change randomly due to the influence of unpredictable information.

Besides, asymmetric information theory points out the obstacles to efficient markets. Information asymmetry becomes common when information transparency, access to information, and information infrastructure are weak (Akerlof, 1970). When the information is not fully public, the stock price cannot accurately reflect the true value of the company and the profit rate of the transactions. This will greatly affect the decision-making ability and interests of investors. Investors who have inside information or access to information earlier than the time of publication can reap significant arbitrage profits (Wang and Wang, 2017).

Behavioral finance theory suggests that "irrational" behavior is common to many investors. According to this theory, a stock investor can have several characteristics such as the expectation of covering a loss rather than making a large profit, aversion to risk, irrational calculation, overconfidence, calculation conservative, dependent on experience, and especially "herd" mentality. The “herd effect” causes the prices of some stocks do not reflect their “real” or “fair” values. Thus, the “herd effect” affects the market badly in the case of the “herd effect” where all act according to a deviant, irrational behavior pattern. The experimental results of Cao et al. (2021) conducted in

Vietnam have shown that heuristic, prospect, market, and herding factors directly and positively affect the investment decision-making of investors. However, in emerging markets, this effect is quite common. Non-specialist investors in Vietnam will be strongly influenced by the "herd" mentality and tend to make decisions according to the crowd, disturbing the market.

The Vietnamese stock market has also been examined as a weak-form efficient market in recent studies (Phan and Zhou, 2014; Gupta et al., 2014). Research by Phan and Zhou (2014) employed an autocorrelation test, runs test, and variance ratio test, using VN-Index data collected from transactions in the period 2000-2013. The results show that the Vietnamese stock market is not efficient, but in the period 2009-2013, a random walk hypothesis in VN-index was found. This is an indication that the market has made significant progress over time. Gupta et al. (2014) also pointed out that the Vietnam market can be considered a weak-form efficient market in the post-economic crisis period.

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In addition, research conducted in Vietnam on the stock market's response to information disclosure is quite limited. Nguyen (2015) showed the different reactions of the market when dividend information were announced. Stock prices tend to correct upwards from the date of the dividend announcement until a few days after the announcement in the case of a dividend increase announcement. Meanwhile, with a dividend reduction announcement, stock prices tend to fall in the period a few days before the announcement date. This shows that bad news may have leaked before the announcement and the market reaction is quite slow, still persisting for a few days after the announcement date. Research on information disclosure regulations, Hoang et al. (2020) showed that the market reaction is relatively slow. Positive responses were observed on the day of the event but persisted on the second and fifth day after. At the same time, the authors also found a difference in the market reaction in the two centralized exchanges in Vietnam.

Through the comprehensive review of prior studies related to the research topic, many of them employed the event study method to analyze the market's reaction when a piece of information is public. Overall, prior studies suggest analyzing market reactions based on statistical tests to determine whether there is a difference in stock returns before and after information disclosure. It is important to address that the proposed research model in this study expands the current literature in two aspects: (a) whether credit rating information affects stock returns and (b) whether the stock market in Vietnam is a weak-form efficient market.

3. RESEACRCH METHODOLOGY

3.1. Sample Selection

The data used in the article includes the market index and the industry index for the period from January 3, 2012 to September 12, 2018 at the time of information disclosure and 20 sessions before and after the announcement of the credit rating. Market indexes include VN-Index (general index of Vietnam market) and HNX (index of Hanoi stock exchange). Industry indexes of 24 main industries operating on the Vietnam stock market include Real Estate, Rubber, Securities, Technology, Oil And Gas, Services, Development Investment, Construction Investment, Medicine, Education, Airlines, Minerals, Energy, Banks, Plastics, Fertilizer, Manufacturing Business, Steel, Food, Trading, Seafood, Transportation, Construction Material, Construction.

3.2. Estimation Method

To measure the stock market reaction to credit rating changes, this study uses the change in stock prices at the time the rating change information is published. This index is determined by the formula:

$$RVN\_t = \log[(P]\_t)] - \log[(P]\_(t-1))] \quad (1)$$

Where:RVTt is profit at day t; Ptis stock price at day t; Pt-1is stock price at dayt-1.

Based on previous empirical studies, the study uses the event study method. Specifically, the study used the T-test to test the difference between the two mean values of two data pairs in the pre-disclosure sessions (RVNt-i) and the post-disclosure sessions (RVNt+i) where t0 is the date the information was published. With this test, the expected result after t-testing for 20 data pairs in turn is that there is a difference in mean when information about increasing/decreasing credit ratings is published (RVNt+i > RVNt-i when information is credit rating upgrade and RVNt+i < RVNt-i when information is credit rating downgrade) and there is no difference in mean when credit rating disclosure information is unchanged.

4. RESULTS AND DISCUSSIONS

4.1. Empirical Results

The study uses returns that change when credit ratings change, including price indexes and industry indexes. Table 1 shows the results of the T-test on the change in stock returns of VN-Index and HNX when the credit rating information is published. At the same time, Table 2 summarizes the T-test results of the stock return change of the industry indexes in the group of main sectors on the Vietnamese stock market when the credit rating information is published.

Table 1: Changes in profit of VN-Index, HNX when credit rating information is announced

Date	VN-Index				HNX			
	RVN_{t+1}	RVN_{t-1}	RVN_{t+1} - RVN_{t-1}	T-test	RVN_{t+1}	RVN_{t-1}	RVN_{t+1} - RVN_{t-1}	T-test
Panel A: Credit rating upgraded								
1	0.07	-0.03	-0.10	-0.80	0.07	0.02	-0.06	-0.35
2	-0.04	-0.04	0.00	-0.03	-0.10	-0.14	-0.05	-0.38
3	-0.07	0.02	0.09	0.66	0.06	0.06	0.00	-0.01
4	0.03	0.02	-0.01	-0.13	-0.01	0.01	0.02	0.14
5	0.06	0.19	0.13	0.92	**-0.07**	**0.18**	**0.25**	**1.90****
6	0.02	0.16	0.14	1.09	**-0.11**	**0.05**	**0.16**	**1.33***
7	0.04	-0.03	-0.07	-0.44	-0.02	0.00	0.03	0.21
8	-0.02	0.05	0.07	0.63	0.02	0.05	0.02	0.21
9	0.06	-0.06	-0.11	-0.85	0.05	-0.07	-0.12	-0.68
10	-0.03	0.02	0.05	0.38	-0.11	-0.02	0.09	0.6
11	0.15	0.00	-0.15	-1.60	0.09	0.18	0.09	0.77
12	0.01	0.00	-0.01	-0.07	0.06	-0.11	-0.18	-1.02
13	0.08	0.09	0.01	0.07	-0.03	0.08	0.11	0.74
14	-0.03	0.01	0.04	0.26	0.08	-0.07	-0.15	-1.08
15	**-0.05**	**0.14**	**0.19**	**1.66***	**0.01**	**0.17**	**0.16**	**1.37***
16	0.00	0.06	0.07	0.51	-0.04	0.13	0.17	1.18
17	0.04	0.00	-0.04	-0.28	0.06	0.09	0.03	0.24
18	-0.01	-0.03	-0.02	-0.19	-0.09	-0.09	0.00	0.02
19	0.09	0.03	-0.06	-0.42	0.08	0.06	-0.02	-0.13
20	**-0.09**	**0.05**	**0.14**	**1.60****	**-0.07**	**0.07**	**0.14**	**1.81****
Panel B: Credit rating unchanged								
1	0.06	-0.16	-0.23	-1.32	-0.12	-0.21	-0.09	-0.51
2	0.13	-0.13	-0.26	-1.16	0.09	-0.21	-0.30	-1.39
3	0.09	-0.07	-0.16	-1.2	0.03	0.02	0.00	-0.03
4	0.29	0.03	-0.26	-0.87	0.17	-0.12	-0.29	-1.13
5	0.27	0.1	-0.17	-0.78	0.18	-0.18	-0.36	-1.58
6	0.22	0.18	-0.03	-0.11	0.28	0.18	-0.10	-0.34

7	-0.10	0.15	0.25	1.56	0.03	0.12	0.08	0.87
8	-0.06	-0.03	0.03	0.13	-0.11	-0.05	0.06	0.19
9	0.16	-0.17	-0.33	-1.24	0.21	-0.01	-0.23	-0.75
10	**-0.11**	**0.27**	**0.37**	**1.83***	**-0.13**	**0.11**	**0.24**	**1.02**
11	-0.16	-0.19	-0.02	-0.08	-0.15	-0.26	-0.11	-0.34
12	0.09	0.04	-0.05	-0.34	0.10	0.20	0.09	0.41
13	-0.01	-0.05	-0.05	-0.25	-0.01	-0.06	-0.06	-0.23
14	0.19	-0.06	-0.25	-1.7	0.12	-0.03	-0.15	-0.79
15	-0.06	0.08	0.14	1.37	-0.13	0.18	0.31	1.62
16	0.18	-0.10	-0.28	-1.25	0.14	-0.05	-0.19	-1.03
17	**0.18**	**-0.07**	**-0.25**	**-2.58****	0.10	-0.07	-0.17	-1.32
18	0.18	0.10	-0.08	-0.36	**0.31**	**-0.08**	**-0.38**	**-2.40****
19	0.33	-0.05	-0.37	-1.83	0.21	0.06	-0.16	-0.86
20	0.20	-0.02	-0.21	-1.12	0.34	-0.07	-0.41	-1.74
Panel C: Credit rating decreased								
1	-0.49	-0.38	0.10	0.59	-0.81	-0.46	0.36	1.46
2	-0.13	-0.25	-0.11	-0.59	-0.41	-0.41	0.00	-0.01
3	-0.21	-0.02	0.19	0.34	-0.11	0.38	0.49	0.69
4	-0.26	0.36	0.62	1.60	-0.03	0.35	0.38	0.83
5	-0.07	0.03	0.10	0.26	-0.06	-0.10	-0.04	-0.10
6	-0.15	0.17	0.32	1.27	-0.11	0.12	0.23	0.75
7	-0.04	-0.02	0.02	0.16	-0.19	-0.10	0.09	0.62
8	-0.05	-0.08	-0.03	-0.08	-0.12	-0.10	0.02	0.06
9	0.19	0.21	0.02	0.13	-0.07	0.25	0.31	1.94
10	0.27	-0.26	-0.54	-1.35	**0.44**	**-0.35**	**-0.79**	**-1.84***
11	0.01	0.07	0.07	0.25	0.06	0.00	-0.06	-0.21
12	0.00	0.27	0.27	1.34	0.36	0.22	-0.14	-0.44
13	-0.10	0.27	0.37	1.94	-0.25	0.24	0.48	1.76
14	-0.16	0.11	0.27	1.23	-0.17	-0.05	0.11	0.30
15	0.01	-0.18	-0.19	-1.00	-0.1	-0.36	-0.26	-0.65
16	**-0.09**	**-0.57**	**-0.48**	**-1.87***	-0.17	-0.61	-0.44	-1.14

17	0.16	-0.08	-0.25	-1.07	0.04	0.03	-0.01	-0.06
18	**0.31**	**-0.33**	**-0.64**	**-3.20****	**0.19**	**-0.42**	**-0.61**	**-2.98****
19	0.06	-0.19	-0.25	-0.79	0.16	-0.19	-0.35	-0.95
20	-0.03	0.26	0.30	1.37	-0.23	0.36	0.59	2.39

Note: ***; **; * indicates statistical significance at 1%, 5%, 10% respectively.

Table 2: Stock market reaction to credit rating changes

Field	Volatile day																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Panel A: Credit rating upgraded																				
VN-Index															x					x
HNX					x	x									x					x
Real Estate				x						x										
Rubber								x					x							
Securities					x															x
Technology					x					x					x					x
Oil And Gas						x														
Services				x																
Development Investment				x	x												x	x	x	x
Construction Investment					x		x						x				x			
Medicine					x			x							x	x				
Education		x				x									x	x				
Airlines																				x
Minerals																				
Energy					x						x						x			x
Banks																				x
Plastics						x				x										x
Fertilizer					x															x
Manufacturing Business		x			x								x			x				
Steel						x									x					

Food			x			x														
Trading																				
Seafood			x		x					x					x					
Transportation					x								x							x
Construction Material				x	x		x											x		
Construction																				x
Panel B: Credit rating unchanged																				
VN-Index										x							x			
HNX																		x		
Real Estate					x						x									
Rubber			x											x						
Securities																		x		
Technology					x					x									x	
Oil And Gas									x											
Services																				
Development Investment									x	x							x			
Construction Investment													x						x	
Medicine		x																	x	
Education		x		x															x	
Airlines										x						x				
Minerals								x												
Energy			x																x	x
Banks																	x	x		
Plastics					x															
Fertilizer		x	x							x										x
Manufacturing Business		x																		
Steel			x						x				x							
Food																		x		
Trading							x						x							
Seafood		x																		
Transportation			x							x			x	x						

Construction Material					x															
Construction														x						
Panel C: Credit rating decreased																				
VN-Index															x		x			
HNX									x								x			
Real Estate							x						x							
Rubber													x		x		x	x		
Securities																	x			
Technology		x																x		
Oil And Gas															x			x		
Services							x						x						x	
Development Investment														x			x			
Construction Investment														x	x	x	x			
Medicine							x								x			x		
Education														x	x					
Airlines							x						x	x						
Minerals						x						x		x						
Energy															x		x			
Banks															x		x			
Plastics														x	x	x	x			
Fertilizer		x												x			x			
Manufacturing Business															x		x			
Steel															x		x			
Food														x	x		x			
Trading													x		x		x			
Seafood		x																x		
Transportation									x			x			x		x			
Construction Material							x								x		x			
Construction									x											

4.2 Discussions

Based on Table 1, when the credit rating is upgraded, the profit of VN-Index has a positive value (1.83) at the significance level of 10% in the 15th session. Meanwhile, HNX also had a positive stock profit (1.9) in the 3rd session with a significance level of 5%.When the credit coefficient remained unchanged, the stock profit of VN-Index, in the 10th trading session with a significance level of 10%, reached a positive value (1.83). In the 18th trading session, HNX's profit decreased (-2.40) at a significance level of 5% when the credit rating was unchanged. At the same time, when the credit rating was downgraded, the profit of VN-Index and HNX decreased at the 16th and 10th trading sessions, respectively, at 5% significance level.

Based on the results from Table 2, when the credit rating was upgraded, most industries had stock price changes at the 5th trading session since the announcement date, including Securities, Technology, Medicine, Construction Investment, Energy, Fertilizer, and Transportation. Particularly, the Education and Manufacturing and Business Sector Indexes reacted after 2 sessions from the date the information was published. At the same time, the market Food and Seafood industry reacted on the 3rd session since the date of the announcement. Then, on the 4th trading session from the date the information was announced, the Real Estate industry reacted. For the Service and Construction Material industries, the T-test results were statistically significant in both sessions 4th and 5th. In the 6th trading session, the stock indexes of the Oil & Gas, Plastics, and Steel sectors reacted. After two trading sessions, the Rubber industry changed its stock price from the 8th session. Meanwhile, the profit of the Airlines, Banking, Construction, and Trading sectors changed in the 20th session. At the same time, there was no response from the Minerals industry when raising the credit rating.

According to the results in the case of unchanged credit rating in Table 2, the indexes reacted on day 2 in Medicine, Education, Fertilizer, Manufacturing Business, and Seafood industries. In the 3rd session after the announcement, the Rubber, Steel, Transportation, and Energy sectors had significant stock price changes. For the Real Estate, Technology, Plastics, and Building Materials industries, there was a reaction in the 5th session. The rest of the sectors had a slower difference, from the 7th session onward.

Moreover, in the case of a credit rating downgrade, most of the indexes reacted to the credit rating downgrade information in the 14th trading session and later, according to the results from Table 2. Specifically, the Rubber and the Trade sector reacted to the news of the credit rating downgrade in the 14th session. Development Investment, Construction Investment, Education, Plastics, and Food all had reactions in the 15th trading session. In the 16th session, the Oil & Gas, Energy, Banking, Manufacturing, and Steel sectors changed. Particularly in the 2nd trading session from the date announced, the average profit of the Technology, Fertilizer, and Fisheries industries has decreased. The Mineral and Airline sectors reacted in the 6th and 7th sessions, respectively. Then, the Real Estate, Service, and Food sectors reacted in the 8th session. Finally, the Transportation and Construction has a reaction in the 10th trading session.

5. CONCLUSIONS

This study evaluates the stock market's reaction to information on changes in credit rating in Vietnam. The data used in the article includes market indexes (VN-Index and HNX) and industry indexes of 24 industries (Real Estate, Rubber, Securities, Technology, Oil And Gas, Services, Development Investment, Construction Investment, Medicine, Education, Airlines, Minerals, Energy, Banks, Plastics, Fertilizer, Manufacturing Business, Steel, Food, Trading, Seafood, Transportation, Construction Material, and Construction)for the period from January 3, 2012 to September 12, 2018 at the time of information disclosure and 20 sessions before and after the announcement of the credit rating. The T-test results demonstrate that stock prices are significantly different when credit rating information is published. Meanwhile, credit rating information can be found through other sources, independent of official announcements. As a result, stock prices traded on the market have not yet reflected all information disclosed in the market. This result is similar to the previous study by Phan and Zhou (2014) and Hoang et al. (2020).

When the credit rating increased, most industry indexes reacted in the 5th session or later, but Education and Manufacturing businesses had the earliest reaction (2nd trading session). The VN-Index was recorded to react to the news of increasing its credit rating in the 15th trading session, much later than the HNX, changing prices in the 5th and 6th trading sessions. Besides, in the case of an unchanged credit rating, the market reactions are diverse, and the stock return change is concentrated in the 10th session. On the contrary, when the credit rating was downgraded, the change was quite slow in industries, mainly from the 14th session onwards. Meanwhile, the Technology, Fertilizer, and Seafood industries reacted in the second trading session when announcing their credit rating downgrade. In general, the Vietnamese stock market reacts quite slowly to the announced credit rating information, as early as the 2nd day after the announcement. Therefore, it can be concluded that the market is not efficient.

Therefore, investors need to quickly grasp information that affects the stock market because there is still a chance to earn differential profits from stock price fluctuations in Vietnam. Based on public and reliable information sources, investors need to classify good and bad information to make appropriate investment decisions, avoiding the influence of the "herd effect". At the same time, securities market regulators in Vietnam need to take measures to increase the amount of information disclosed in public, complete, and easily accessible. This contributes to reducing information asymmetry and increasing market efficiency.

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