Research on the Relationship between Trade Volatility, Property Rights and New Energy Stock Returns under the Background of New Energy Industry Development

Qiyuan Peng[1, *]

[1] Shanxi University of Finance and Economics, Faculty of International Trade, Taiyuan, China

Abstract. The research on the relationship between risk and return of new energy stocks is the focus of financial research. Related research focuses more on the relationship between idiosyncratic fluctuation risk and stock returns. In the Chinese stock market, some Chinese investors clearly prefer stocks with high risk characteristics, which leads to overvalued stocks. However, the short-selling restrictions in the Chinese stock market and the heterogeneity of investors have also led to a significant negative correlation between idiosyncratic volatility and cross-sectional yield. There are many studies on the relationship between idiosyncratic volatility and stock returns, but no consistent conclusions have been drawn, and there is a lack of relevant research on new energy stocks. Therefore. This paper collates the data of 70 listed companies in the new energy and new energy automobile industry from 2017 to 2019, tracks the stock returns of sample companies for 3 years (36 months), and conducts in-depth research on the relationship between idiosyncratic fluctuation risks and new energy stock returns. To further verify and supplement the risk-return relationship of China's new energy stock market and provide a certain basis for the company's decision-making behaviour.

1 Introduction

With the continuous development of the Chinese stock market and the increasing degree of openness of the financial market, the Chinese securities market has shown a prosperous development momentum. In recent years, people have paid more attention to issues such as climate change, energy security, and rising oil prices. The new energy sector has become the fastest growing sector in the energy industry. Under the country's vigorous development of new energy policies, a number of leading companies in the new energy industry have formed on the market, and the stocks of new energy companies continue to be optimistic. Therefore, it is necessary to study the stock price volatility of new energy companies and its correlation with other market factors. This paper studies the relationship between idiosyncratic volatility and the stock return of new energy companies with Chinese evidence added in this field. At the same time, it further distinguishes the nature of property rights, which provides new empirical experience for understanding the difference in the impact of idiosyncratic volatility on the yield of new energy stocks.

The marginal contribution of this article is mainly reflected in the following points: First, a large number of researches on the relationship between idiosyncratic risks and stock expected returns [1] have not reached a consistent conclusion. This article uses the data of A-share new energy listed companies to build a regression model around the financial theory, incorporating company size, asset-liability ratio, and cash flow ratio into the control variables. Empirical research based on the samples in this article adds to the Chinese evidence in this field. Second, this article expands the depth of interpretation of "the mystery of idiosyncratic fluctuations" based on the nature of property rights. Based on the particularity of the property rights of Chinese companies, this paper further introduces the nature of property rights, and studies the relationship between the volatility of the characteristics and the stock return of new energy companies. It provides a new empirical experience to understand the difference in the impact of idiosyncratic volatility on the yield of new energy stocks. Third, the research results of this article have certain reference value for corporate decision-making. This article uses the difference in the attitude of the capital market towards individual stocks, indirectly provides the difference between the impact of characteristic volatility on the return rate of new energy stocks between companies with different property rights.

2 Literature review

Foreign scholars have conducted various studies on the impact of stock returns in the early days. In particular, foreign capital markets started earlier and developed more maturely, so relevant researches are more abundant.

* Corresponding author: 3531563257@qq.com

Roll & Ross [3] applied the relationship between the rate of return and the risk to the company, and found that the company's stock rate of return also has a positive correlation with the level of risk. Fama & French [3] combines the research of the two and found that the company's rate of return is not only affected by the size of the company, but also by the company's own book value. Fama & French proposed a three-factor model for the first time, and summarized the influencing factors of the company's stock return, and concluded that the market level, size and book return are the main factors that affect the stock return. In contrast, due to the late introduction of my country's stock market policies, The market development is not sound enough, and the research on the stock return rate is slightly weak. Gu Juan and Ding Ying [5] use the data of A-share listed companies from 1994 to 2001, and believe that irrational phenomena are widespread in my country's stock market, the growth effect of listed companies is not significant, and the fundamental analysis of the stock market cannot perform well on stock trends. prediction. Li Chao [6] starts from the stock trading volume. It is found that the stock exchange rate will affect the stock return. Further research found that compared with the listed company with a larger market value, the stock exchange rate of a company with a small market value has a greater impact on the stock return. From the research of the trading system and trading strategy, it is found that the short-sale trading system and different trading strategies will have a significant impact on the level of stock returns. Yang Zheng et al. [7] studied from the perspective of behavioral finance and found that market investor sentiment also has an impact on stock yields. Specifically, sentiment affects investor behavior and investment strategies, and then has an impact on stock buying and selling .

Through the above review and analysis of relevant domestic and foreign literature, there have been many studies on the relationship between stock return and idiosyncratic volatility and related effects, but no unanimous conclusions have been reached. Therefore, this article studies the basic relationship between idiosyncratic volatility and stock returns. A panel data study on the relationship between idiosyncratic volatility and stock returns of listed new energy companies has been carried out, thus adding Chinese evidence in this field.

3 Theoretical analysis and research hypothesis

3.1 Hypothetical analysis of the relationship between idiosyncratic volatility and stock returns

The capital asset pricing model more accurately interprets the relationship between risk and return, that is, return and risk are positively correlated. The higher the return, the greater the risk. If investors want to achieve high returns, they must dare to take high risks. However, with the deepening of the research on the risk-return relationship, the classic risk-return theory has been challenged. After controlling the influence of stock liquidity on the estimation of stock idiosyncratic volatility, Fink et al. found that idiosyncratic volatility had no significant effect on stock returns. Barberis et al. [8] based on idiosyncratic risk characteristics, using stock ticket idiosyncratic volatility and The product of investor forecast errors measures the comprehensive volatility effect, An empirical test of the moderating effect of the relationship between the trait volatility of this variable and the stock return is carried out, and it is found that the comprehensive volatility effect has a significant impact on the relationship between the trait volatility and the stock return. Luo Dengyue [9] found that only when the unanticipated trait volatility is controlled, the relationship between the expected trait volatility and return is significantly positive. Xiong Wei and Chen Langnan [10] believe that stock idiosyncratic volatility is positively correlated with stock returns, and further discovered that investor sentiment has a positive regulatory effect. Based on the above theoretical foundation and background, this article conducts further research on the relationship between stock risk and return, and proposes the following hypotheses:

H1: Trait volatility is positively correlated with new energy stock returns.

3.2 Hypothetical analysis of the relationship between the nature of property rights, characteristic volatility and stock returns

In different companies, the influence of trait volatility is different. If investors are cautious or risk averse to a new energy company, higher idiosyncratic volatility will lower investors' expectations, which in turn will lead to a decline in its stock yield. Therefore, the positive correlation between idiosyncratic volatility and stock returns of new energy companies will be weakened. In contrast, When the market is full of confidence in the company's development or risk appetite, according to the principle of "high risk and high return", higher idiosyncratic volatility will increase stock returns, thereby strengthening the positive correlation between idiosyncratic volatility and company stock returns. Based on behavioural finance theory, stock returns will be affected by investor attitudes and preferences. Compared with non-state-owned enterprises, State-owned new energy companies have many special advantages, such as implicit government guarantees, stable funding sources, stable operations, and policy support. Therefore, this paper proposes the following hypotheses:

H2: Compared with non-state-owned enterprises, the positive correlation between the characteristic volatility of state-owned new energy enterprises and the company's stock return is stronger.

4 Research design

4.1 Sample selection

This article uses China's A-share new energy listed companies as a research sample. Considering that part of the data needs to be sorted manually, the workload is large, the immediacy of data and the time difference of data update, so based on the availability of data, this paper selects the 2017-2019 China A-share listing monthly data (that is, 36 months) as the research Object. Most of the data used in this study comes from the CSMAR database. The stock trading and listed company data comes from the macroeconomic and financial industry database section, and the financial data comes from the relevant report database section.

4.2 Variable definition and interpretation

4.2.1. Stock yield

This article uses the monthly return rate of Shanghai and Shenzhen A-share listings as the explained variable, and the data comes from the Reese database.

4.2.2. Trait volatility

Trait volatility (IVOL) refers to the practice of Ang et al. [1], and uses the daily excess return of the stock to regress the Fama-French three-factor daily data according to formula (1), and then calculates the standard deviation of the residual to measure the stock's Trait volatility. The regression formula is as follows:

$$R_{i,t} - R_{f,t} = \alpha_{i,t} + \beta_{MKT,i,t} MKT_t + \beta_{SMB,i,t} SMB_t + \beta_{HML,i,t} HML_t + \varepsilon_{i,t} \quad (1)$$

Then use the sample standard deviation of the regression residual to get the stock's characteristic volatility this month.

4.2.3 Nature of property rights

State-owned property rights (SOE) are expressed as, if it is a state-owned enterprise, SOE takes 1, otherwise it takes 0.

4.2.4 Control variables

(1) Company size
The size of a company greatly affects the trend of a company's stock changes. This paper uses the natural logarithm of the total assets at the beginning of the period to measure the company's size.

(2) Asset-liability ratio

The asset-liability ratio (LEV) represents the company's capital structure. The formula for calculating the asset-liability ratio in this article is the total liabilities at the beginning of the period divided by the total assets at the beginning of the period.

(3) Cash flow ratio

The cash flow statement can explain the solvency of the company and its ability to pay dividends. The formula for calculating the operating activity ratio in this article is the ratio of cash flow to total assets at the beginning of the period.

In order to test the relationship between idiosyncratic volatility and monthly

In addition, this article also controls the industry (IND) and year (YEAR) effects.

4.3 Model establishment

4.3.1 Trait volatility and stock return regression model

In order to test the relationship between idiosyncratic volatility and monthly stock returns, this paper establishes the following multiple regression model:

$$MRET_{i,t} = \omega_0 + \omega_1 IVOL_{i,t} + \sum_{\tau=2}^{n} \omega_\tau Controls_{i,t} + \sum YEAR + \sum INDUSTORY + \varepsilon_{i,t} \quad (2)$$

In model (2), the core explanatory variable (IVOL) is the monthly stock return volatility of each company, which is measured by idiosyncratic volatility. In model (2), we control the relevant factors that may affect the company's stock changes, including the company's size (Size), asset-liability ratio (LEV) and other control variables. In addition, this article also controls the industry and annual dummy variables.

4.3.2 Regression model of property rights, characteristic volatility and stock returns

In order to test the moderating effect of the nature of property rights in the relationship between idiosyncratic volatility and stock returns, this paper introduces the intersecting term of idiosyncratic volatility and the nature of equity (IVOL*SOE) to examine the influence of the nature of property rights on the relationship between idiosyncratic volatility and monthly stock returns. Further inspection. This paper establishes a model (3) to test H2:

$$MRET_{i,t} = \lambda_0 + \lambda_1 IVOL_{i,t} + \lambda_2 IVOL * SOE + \lambda_3 SOE + \sum_{\tau=2}^{n} \lambda_\tau Controls_{i,t} + \sum YEAR + \sum INDUSTORY + \varepsilon_{i,t} \quad (3)$$

Among them, IVOL*SOE distinguishes the difference in the impact of different property rights on the volatility of stock returns; state-owned property rights (SOE) are expressed as, if it is a state-owned enterprise, SOE takes 1, otherwise it takes 0.

5 Empirical process and result analysis

5.1 Empirical analysis of trait volatility and overall multiple regression of stock returns

Because this article uses the stock return rate as the explained variable, the next panel regression will use MRET as the explained variable to analyse the influence

of the above-mentioned factors on it. Table 1 shows the regression results of idiosyncratic volatility and new energy stock returns. It can be found that without controlling the company's scale, asset-liability ratio, and cash flow ratio factors. The coefficient of idiosyncratic volatility and stock return is 0.877 and the significance level is 1% (P value=0.000); this regression preliminarily shows that idiosyncratic volatility and new energy stock return are positively correlated.

In the full sample, after controlling for factors such as company size, the coefficient of idiosyncratic volatility and new energy stock yield is 0.857, which is positively significant (P value = 0.000). The regression results show that trait volatility is positively correlated with stock returns, and the empirical results support H1.

Table 1. Overall regression of idiosyncratic volatility and new energy stock returns

Variable	MRET	
	(1)	(2)
IVOL	0.878*** (78.11)	0.857*** (76.70)
Size		0.009*** (3.41)
LEV		0.013* (1.81)
CFO		0.008 (1.31)
YEAR	Controlled	Controlled
INDUSTORY	Controlled	Controlled
N	87 804	87 804
F	525.17	524.41
Adj R2	0.401	0.424
Note: ***, **, * indicate the significance level of 0.01, 0.05, and 0.1, respectively.		

5.2 Empirical analysis of the nature of property rights, characteristic volatility and stock returns

In order to verify whether there is a difference in the impact of the characteristic volatility on the stock return under different property rights, on the basis of model (3), the property property and its crossover terms with the characteristic volatility are introduced, which is reported in Table 2. Regression results: Trait volatility is significantly positively correlated with stock returns, indicating that in general, whether state-owned or non-state-owned enterprises. As the idiosyncratic volatility increases, the stock return rate increases; however, the coefficient of the crossover term of state-owned property rights and idiosyncratic volatility (IVOL*SOE) is significantly positive. The positive correlation is stronger.

Table 2. Nature of property rights, characteristic volatility and stock returns

Variable	MRET	
	(1)	(2)
IVOL	0.840*** (58.42)	0.822*** (58.31)
Size	0.105*** (5.01)	0.097*** (4.74)
LEV	-0.022** (-2.03)	-0.018* (-1.81)
CFO		0.009*** (3.31)
YEAR		0.014* (1.88)
INDUSTORY		0.008 (1.28)
N	Controlled	Controlled
F	Controlled	Controlled
Adj R2	87 804	87 804
Note: ***, **, * indicate the significance level of 0.01, 0.05, and 0.1, respectively.		

6 Research conclusions

This paper studies the relationship between idiosyncratic volatility and new energy stock returns. On the basis of the original research, introduces the cross-term of the nature of property rights and idiosyncratic volatility, and examines the effect of property rights on idiosyncratic volatility and new energy stocks. The impact of the rate of return relationship. the result shows:

(1) Trait volatility is positively correlated with the yield of new energy stocks. As the volatility of traits increases, the company's stock returns increase significantly.

(2) Compared with non-state-owned enterprises, the positive correlation between the characteristic volatility of state-owned new energy enterprises and the company's stock returns is stronger. That is to say, compared with non-state-owned enterprises, the development prospects of state-owned new energy enterprises, the implicit government guarantees and the stability of their operating conditions will give investors more confidence, and investors expect high characteristic volatility to bring higher returns. The company's stock returns should be more sensitive to trait volatility.

References

1. Ang A, Hodrick R J, Xing Y,et al. The Cross-Section of Volatility and Expected Returns.Journal of Finance, 2006.61(1):259-299.
2. Tinic S M, West R R. Risk，Return, and Equilibrium: A Revisit. Journal of Political Economy, 1986.94(1):126-147.
3. Fama E F, French K R. The Cross-Section of Expected Stock Returns[J]. Journal of Finance, 1992.47(2):427-465.
4. Fink J D, Fink K E.He H. Expected Idiosyncratic Volatility Measures and Expected Returns. Financial Management, 2012. 41(3):519-553.
5. Rachwalski M, Wen Q. Idiosyncratic Risk Innovations and the Idiosyncratic Risk-Return Relation. Review of Asset Pricing Studies,2016. 6:303–328.
6. Gujuan,Dingying.An Empirical Study on the Value Growth Effect of China's Securities Market.Economic Review,2003(02):101-105.
7. Peng Songlin,Su Dongwei.Short-sales, investment strategies and stock returns: An empirical test based on China’s A-share market.Sankei Review,2017,8(04):135-153.
8. Yang Zheng,Wang Hongjian,Dai Jing,Xu Chuanhua.Relaxation of interest rate control,

equalization of profit margins and the "removal of reality to virtuality" of real enterprises.Financial Research,2019(06):20-38.

9. Luo Dengyue.Trait volatility and cross-sectional returns: A test based on the Fama-French stock portfolio. Statistics and Decision,2013(04):167-169.
10. Xiong Wei,Chen Langnan.Volatility of stock characteristics, stock returns and investor sentiment.Management Science,2015,28(05):106-115.