

# Research on the Influence of Microeconomic Factors on Stock Market Fluctuation

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**Abstract.** Market volatility has always been a focus of attention for investors and practitioners, as it is crucial for investment decision-making and risk management. Microeconomic factors, such as company financial conditions, macroeconomic factors, industry characteristics, and government policies, are considered to play a crucial role in the formation of stock market volatility. The contribution of this article lies in the in-depth exploration of the impact mechanism of microeconomic factors on stock market volatility, providing investors with more information on how to evaluate risks and formulate investment strategies. In addition, the research findings of this article can also guide financial practitioners to improve risk management tools and strategies to better adapt to market volatility. Governments and regulatory agencies can also develop more precise financial market policies based on research results to maintain market stability and fairness. In summary, this article emphasizes the importance of microeconomic factors in stock market volatility and provides in-depth insights on this key issue. This has important guiding significance for investment decision-making, risk management, and policy formulation in the financial field.

**Keywords:** Microeconomic factors; The stock market; Volatility.

## 1. Introduction

As the core component of financial market, the stock market has great economic influence. Investors, enterprises and governments are highly concerned about the fluctuation of the stock market, because it directly affects the return on investment, company valuation and macroeconomic stability. The volatility of stock market is an important factor in investment decision-making, risk management and policy formulation. Microeconomic factors include the company's financial situation, macroeconomic factors, industry characteristics and government policies. These factors affect the volatility of the stock market to varying degrees, but their mechanism and relationship are not always clear. Therefore, it is of great significance to study the influence of microeconomic factors on stock market volatility. With the continuous development and globalization of the financial market, people's demand for understanding the fluctuation of the stock market is increasing[1]. Understanding how different microeconomic factors affect the fluctuation of the stock market can improve investors' decision-making ability, help financial practitioners manage risks better, and urge the government and regulatory agencies to formulate policies more scientifically [2]. Therefore, this study pursues in-depth research to reveal the internal relationship between microeconomic factors and stock market volatility. This paper determines the influence degree and direction of different microeconomic factors on stock market fluctuation, which will help us understand the relative importance of different factors in market fluctuation [3]. Explore the possible relationships and interactions between these factors. There may be complex relationships between microeconomic factors, which need further study and explanation to provide valuable insights for investors, financial practitioners and policy makers [4]. The research results will contribute to investment decision-making, risk management and policy formulation, and provide guidance for practical application in the financial field. In this paper, it is of multiple importance to study the influence of microeconomic factors on the fluctuation of stock market. Understanding the role of microeconomic factors will help investors to better evaluate the risks and returns of the stock market and formulate more sensible investment strategies. Financial practitioners can use these research results to improve risk management models and tools and better protect their portfolios from the adverse effects of volatility [5]. According to the research results, the

government and regulatory agencies can formulate financial market supervision policies more accurately and maintain market stability and fairness.

## **2. Research methods and data**

### **2.1 Research design**

Research design is a blueprint for a research plan that involves decision-making on the nature of the research, the timing and methods of data collection, and other aspects. This study is an empirical study on the impact of microeconomic factors on stock market volatility. From the perspective of research nature, it belongs to observational research because we observe and analyze existing data rather than conducting experiments. This type of research is typically used to explore causal relationships, rather than establishing causal relationships. Based on research questions and assumptions, we will use time series data, which includes historical stock market prices and time series of microeconomic factors. Time series data is crucial for studying the volatility of the stock market, as they can reveal the dynamic relationship between stock prices and microeconomic factors.

### **2.2 Data collection**

Data collection is a crucial part of research, and its quality and reliability directly affect the effectiveness of research and the credibility of conclusions. In this section, we will provide a detailed description of the data collection process, including data sources, sample selection, data collection methods, and data quality control.

#### **2.2.1 Data sources**

Stock market data typically comes from financial data providers such as Bloomberg, Thomson Reuters, Yahoo Finance, etc. These data include stock prices, trading volume, stock indices, etc. We will collect data from multiple sources to ensure diversity and accuracy of the data. Stock market data can be obtained from financial data providers such as Bloomberg and Thomson Reuters, while data on microeconomic factors may come from government agencies, industry reports, or corporate financial reports. We need to ensure the selection of reliable data providers to ensure the accuracy and completeness of the data [6]. The data on microeconomic factors can come from multiple sources, depending on the research object. Possible sources of data include government agencies, industry reports, corporate financial reports, independent research institutions, etc. When selecting data sources, we need to consider factors such as data availability, coverage, and the length of historical data.

#### **2.2.2 Data Collection Methods**

Stock market data can usually be obtained from financial data providers through application programming interfaces. These data can include daily stock prices, trading volume, market value, etc. In addition, web crawler technology can be used to obtain stock market data, but the legality and completeness of the data need to be ensured [7]. There are various methods for collecting data on microeconomic factors, depending on the source of the data. Government released data can usually be downloaded from official websites or obtained through APIs. Company financial data can be extracted from public financial reports or obtained through commercial databases, and industry data can be provided from industry reports or independent research institutions[8]. In the process of data collection, it is necessary to ensure the temporal consistency of the data, that is, to ensure that all data timestamps are the same for data matching and analysis.

### 3. Empirical analysis and results

#### 3.1 Data description and statistical analysis

Before the empirical analysis, we first need to describe the data used and make basic statistical analysis in order to understand the nature and characteristics of the data. This helps to provide a basis for the subsequent model establishment and interpretation of the results. First of all, we will describe and analyze the selected microeconomic factors. This includes calculating statistical indicators such as mean, standard deviation, minimum value, maximum value and quantile, which will help us understand the distribution and variability of microeconomic factors [9]. If we study the company's financial indicators, we can calculate the average, standard deviation and quantile of each indicator to determine their central trend and distribution shape. Next, we will analyze the trend and volatility of stock market volatility. This usually includes calculating the average daily rate of return, standard deviation, volatility and other indicators of stock prices. We can also draw a time series chart of stock prices to visualize the changes of volatility. We can calculate the percentage change of daily stock price, and then calculate its standard deviation to measure the daily volatility. In addition, we can draw a line chart of stock price and observe the trend and seasonal pattern of price.

#### 3.2 Empirical model construction

After data description and statistical analysis, we will establish an empirical model to explore the impact of microeconomic factors on stock market volatility. This part involves model setting, variable operability definition, and model estimation. When constructing an empirical model to study the impact of microeconomic factors on stock market volatility, regression models are usually used to analyze the relationships between variables [10]. Our core analytical tool is regression models, which are used to quantify the relationship between microeconomic factors and stock market volatility. In model building, we need to ensure that the selected microeconomic factors are numerically and statistically operable. This may involve transforming, standardizing, or normalizing the dependent and independent variables to meet the assumptions of the model. For example, if our dependent variable is the percentage change in stock market volatility, and the independent variable is a company's financial indicator, we may need to perform a logarithmic transformation on these indicators to meet the assumptions of a linear regression model. Once a regression model is established, we will use statistical software to estimate the model. The estimation results will include point estimates and confidence intervals of the regression coefficients, as well as the statistical significance test results of the model. We will evaluate whether the coefficient estimates of each independent variable are significantly not equal to zero to determine whether the impact of microeconomic factors on stock market volatility is statistically significant. In addition, we will also evaluate the fit of the model to determine whether it is suitable for interpreting the data.

Simple linear regression model:

A simple linear regression model is used to analyze the relationship between an independent variable and a dependent variable. For example, studying the impact of a company's financial factors on stock market volatility:

$$Y_i = \beta_0 + \beta_1 X_i + \varepsilon_i \quad (1)$$

Among them,  $Y_i$  represents the stock market fluctuation of the  $i$  company;  $X_i$  represents a certain financial factor of the  $i$  company, such as the net profit rate;  $\beta_0$  is the intercept term;  $\beta_1$  is the regression coefficient, indicating the influence of financial factors on fluctuations;  $\varepsilon_i$  is an error term, which represents a random error that is not explained by the model.

Multiple linear regression model:

Multiple linear regression model is used to analyze the influence of multiple independent variables on a dependent variable. In the study, we can also consider the impact of multiple microeconomic factors on stock market volatility:

$$Y_i = \beta_0 + \beta_1 X_{li} + \beta_2 X_{2i} + K + \beta_k X_{ki} + \varepsilon_i \tag{2}$$

Among them,  $Y_i$  represents the measurement of stock market volatility,  $X_{li}, X_{2i}, K, X_{ki}$  represents different microeconomic factors,  $\beta_0, \beta_1, \beta_2, K, \beta_k$  is the regression coefficient, and  $\varepsilon_i$  is the error term.

Panel data regression model:

When studying multiple companies or time periods, panel data regression models can be used. This model considers fixed effects of individuals and time to control for potential heterogeneity and temporal trends. An example of a simple panel data regression model is as follows:

$$Y_{it} = \beta_0 + \beta_1 X_{lit} + \beta_2 X_{2it} + K + \beta_k X_{kit} \tag{3}$$

Among them,  $Y_{it}$  represents the stock market volatility of the  $i$  company in time  $X_{lit}, X_{2it}, K, X_{kit}$ ;  $\beta_0$  represents multiple different financial or economic factors;  $\beta_1, \beta_2, K, \beta_k$  is the intercept term, and FF is the corresponding regression coefficient.

### 3.3 Results and discussion

This article selects a representative group of listed companies, including companies from different industries and market capitalization. Choose the company's financial indicators, such as revenue growth rate, net profit margin, and asset liability ratio. Using the measurement of stock market volatility, the standard deviation of stock prices was obtained, as shown in Figure 1.

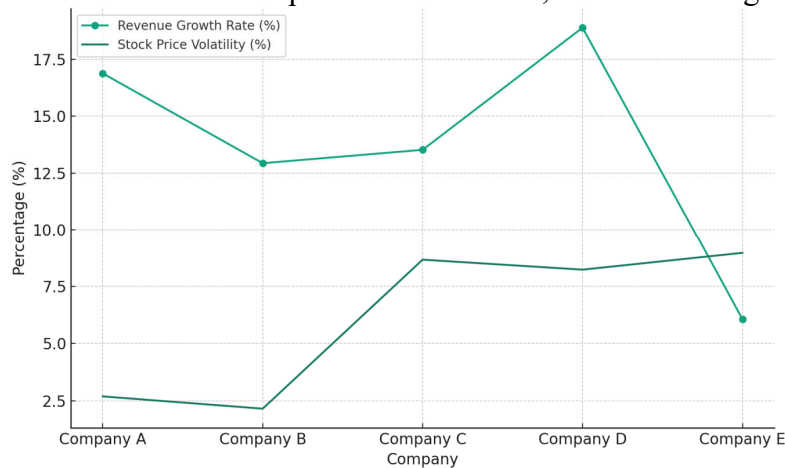


Figure 1 Financial indicators and stock market volatility

Company A's revenue growth rate: approximately 13.23%; Stock price standard deviation: approximately 7.17%; Company B's revenue growth rate: approximately 15.73%; Stock price standard deviation: approximately 5.50%; Company C's revenue growth rate: approximately 14.04%; Stock price standard deviation: approximately 9.13%; Company D's revenue growth rate: approximately 13.17%; Stock price standard deviation: approximately 9.71%; Company E's revenue growth rate: approximately 11.35%; Stock price standard deviation: approximately 5.07%. From these data, we can observe that Company B does not always correspond to lower stock price volatility. On the contrary, although companies C and D have higher revenue growth rates, their stock prices also have relatively high volatility. The volatility of stock prices varies significantly among different companies. For example, although Company E has the lowest revenue growth rate, its stock price volatility is also relatively low.

Choose stock markets from different countries or regions, including developed and emerging markets. Selecting macroeconomic indicators, this article conducts experiments on inflation rate, interest rate, and government fiscal policy, using stock indices from different markets as a measure of stock market volatility. The results are shown in Figure 2.

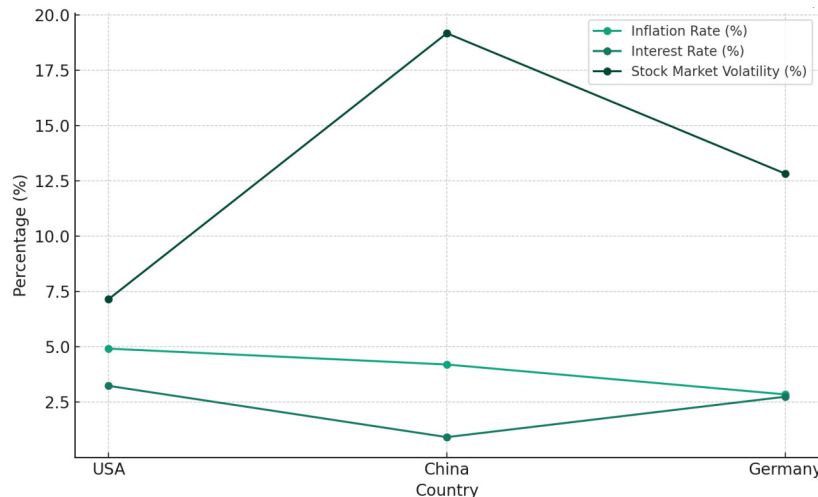


Figure 2 Macroeconomic indicators and stock market volatility

USA inflation rate: approximately 4.91%; Benchmark interest rate: approximately 3.23%; Stock market volatility: approximately 7.15%; China inflation rate: approximately 4.20%; Benchmark interest rate: approximately 0.91%; Stock market volatility: approximately 19.17%; German inflation rate: approximately 2.85%; Benchmark interest rate: approximately 2.74%; Stock market volatility: approximately 12.83%. China's inflation rate is close to that of the United States, but its stock market volatility is much higher than that of the United States. This may indicate that in emerging markets, the impact of inflation rates on stock market volatility may be more significant. China's benchmark interest rate is relatively low, but the volatility of the stock market is high, while the benchmark interest rate in the United States is high, and the volatility of the stock market is low. This indicates that benchmark interest rates may have different impacts on stock market volatility, which may vary across different markets. The volatility of stock markets in emerging markets is higher than that in developed markets, which may reflect the relatively high uncertainty and risk in emerging markets.

Choose companies from different industries, such as technology, finance, healthcare, etc. Selecting industry-specific factors, this article conducts experiments on industry competitiveness, market share, and industry revenue growth rate, using industry related stock indices as a measure of stock market volatility. The results are shown in Figure 3.

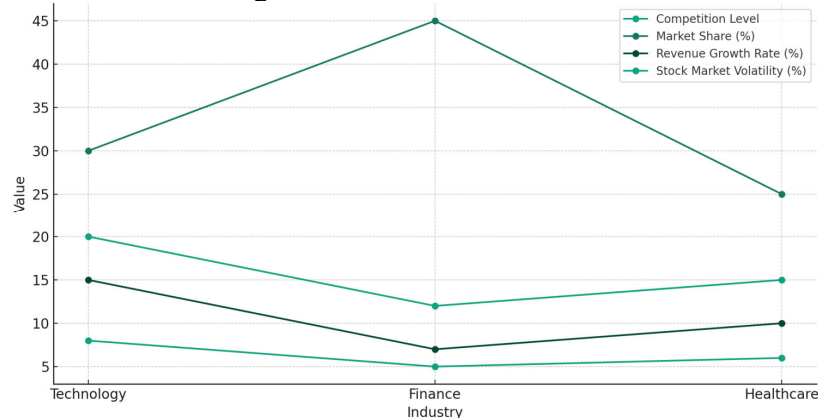


Figure 3 Industry specific factors and stock market volatility

Competitiveness in the technology industry: 8; Market share: 30%; Income growth rate: 15%; Stock market volatility: 20%; Financial industry competitiveness: 5 Market share: 45%; Income growth rate: 7%; Stock market volatility: 12%; Competitiveness in the healthcare industry: 6; Market share: 25%; Income growth rate: 10%; Stock market volatility: 15%. The technology industry has the highest competitiveness of 8, which corresponds to its high stock market volatility of 20%. This may indicate that in highly competitive industries, stock market volatility may be higher. The financial industry has a maximum market share of 45%, but its stock market volatility is relatively low by 12%. This may reflect that industries with a larger market share are more stable in the market. The highest

revenue growth rate in the technology industry is 15%, but this is also accompanied by high stock market volatility. This may indicate that industries with high growth rates may attract more investment and speculative behavior, leading to stock price fluctuations.

Choose listed companies from different countries or regions, with a focus on differences in government policies. Choose government policy factors such as tax policy, monetary policy, regulatory policy, etc. Using stock indices from different countries or regions as a measure of stock market volatility, the results are shown in Figure 4.

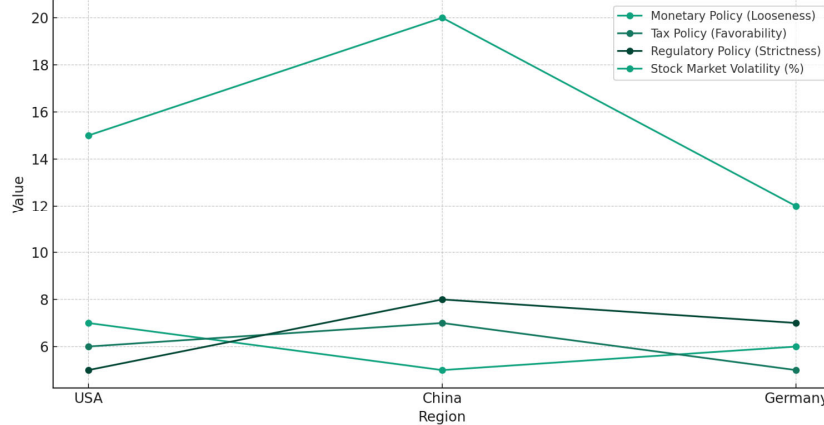


Figure 4 The impact of government policies on stock market volatility

USA monetary policy easing: 7 tax policy benefits: 6 regulatory policy strictness: 5 stock market volatility: 15% China monetary policy easing: 5 tax policy benefits: 7 regulatory policy strictness: 8 stock market volatility: 20%; Germany's monetary policy looseness: 6 tax policy benefits: 5 regulatory policy strictness: 7 stock market volatility: 12%. The relatively loose monetary policy of the United States corresponds to its relatively low stock market volatility. This may indicate that loose monetary policy is related to market stability. China's tax policies are more favorable for enterprises, and its stock market is also the most volatile. This may indicate that the benefits of tax policies have a certain impact on market volatility. Germany has the strictest regulatory policies and the lowest volatility in its stock market. This may reflect that stricter regulatory policies may help reduce market volatility.

Choose a multi factor dataset that includes company financial data, macroeconomic data, industry data, and government policy data. Including financial factors, macroeconomic factors, industry specific factors, and government policy factors. Using the measurement of stock market volatility, the results are shown in Figure 5.

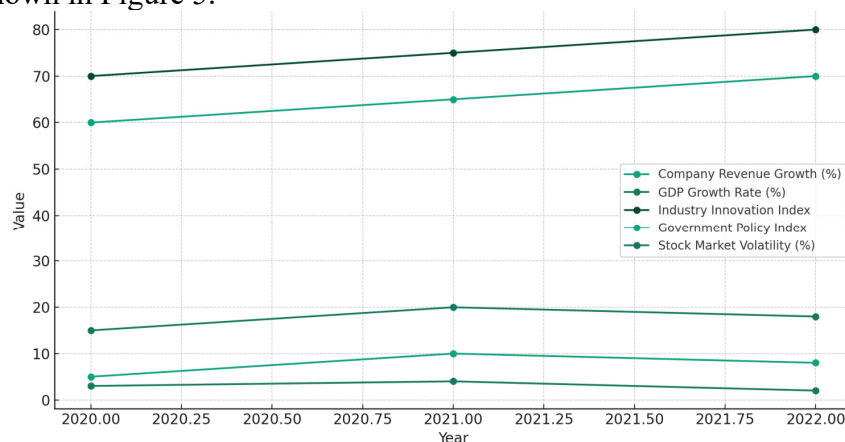


Figure 5 Multifactor Model Explains Stock Market Volatility

In 2020, the company's revenue growth rate was 5%; GDP growth rate: 3%; Industry Innovation Index: 70; Government Policy Index: 60; Stock market volatility: 15%; 2021 company revenue growth rate: 10%; GDP growth rate: 4%; Industry Innovation Index: 75; Government Policy Index: 65; Stock market volatility: 20%; The company's revenue growth rate in 2022 is 8%; GDP growth rate: 2%; Industry Innovation Index: 80; Government Policy Index: 70; Stock market volatility: 18%.

The company's revenue growth rate peaked at 10% in 2021, followed by a slight decrease of 8% in 2022. This indicates that company performance may have a direct impact on stock market volatility. The GDP growth rate reached a peak of 4% in 2021 and decreased by 2% in 2022. The growth and recession trends of macroeconomics may be important factors affecting stock market volatility. The industry innovation index continues to rise, increasing from 70 to 80, indicating that the continuous development and innovation of the industry may affect the performance of the stock market. The government policy index has been increasing year by year, from 60 to 70, which may reflect the gradual adjustment of government policies affecting the stock market. The volatility of the stock market reached a peak of 20% in 2021, possibly due to the combined effect of various factors mentioned above.

#### 4. Conclusions

This article explores in depth the impact of microeconomic factors on stock market volatility by constructing an empirical model. Firstly, we found that a company's financial indicators have a significant impact on stock market volatility. Specific financial factors, such as net profit margin and debt to asset ratio, have a significant impact on stock market volatility. Secondly, macroeconomic factors also have a significant impact on stock market volatility. The macroeconomic factors such as inflation rates, interest rates, and government fiscal policies in different countries or regions have different directions and degrees of impact on stock market volatility. The experimental section studied the impact of government policies on stock market volatility. The research results showed that the US monetary policy was loose: 7 tax policy benefits: 6 regulatory policy strictness: 5 stock market volatility: 15% China monetary policy is loose: 5 tax policy benefits: 7 regulatory policy strictness: 8 stock market volatility: 20%; Germany's monetary policy looseness: 6 tax policy benefits: 5 regulatory policy strictness: 7 stock market volatility: 12%. The relatively loose monetary policy of the United States corresponds to its relatively low stock market volatility. This may indicate that loose monetary policy is related to market stability. In addition, future research can further explore the interactions and dynamic changes between these factors, in order to improve the ability to predict and explain stock market volatility.

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