

Analysis of the Transmission Mechanism of Monetary Policy on Economic Resilience

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Abstract:

This study examines the relationship between China's monetary policy and economic resilience from 2010 to 2022, with a focus on the relationship and impact mechanism between interest rates and economic resilience. The aim is to identify the connection between monetary policy and economic resilience and discover how to enhance national economic resilience through monetary policy. This study employs ordinary least squares regression, and the interest rate is used as the core variable which is closely related to monetary policy. The results show a significant negative relationship between interest rates and economic resilience, and key factors such as urban unemployment rate and total import and export volume also have significant relationships with economic resilience.

Keywords: Monetary policy, Economic resilience, Transmission mechanism, Shibor

1. INTRODUCTION

Economic changes have always attracted much attention throughout history. The development of a region or even a country can be reflected through economic data. According to the physical definition of resilience, we know that the more resilient a material is, the lower the possibility of deformation or fracture. From this, we can understand that economic resilience is an indicator to measure whether the economy can quickly and effectively recover after being impacted, and whether it can sustain its development. Nowadays, the modern economy is constantly being subjected to economic crises, natural disasters, and outbreaks of epidemics, which has also triggered many people's thoughts on economic resilience. This study will study the impact of monetary policy on economic resilience from the aspect of monetary

policy, aiming to deeply research the economic dimension influence of monetary policy on economic resilience, and establish a theoretical connection between monetary policy and economic resilience. Additionally, this study will examine how monetary policy can effectively regulate the level of interest rates through its policies and thereby enhance economic resilience, thereby filling the theoretical gap in existing literature regarding the impact of monetary policy on resilience. Based on the theoretical framework, this study will also analyze the role of monetary policy in helping to restore economic resilience at the practical level, and provide suggestions based on the current research situation.

2. LITERATURE REVIEW

After resilience was introduced into the field of eco-

nomics, many people conducted various studies and analyses from different perspectives. Volkov A and Zickiene A, et al. (2021) proposed to measure economic resilience at the departmental level and conducted research by including the agricultural sector. [1] Lee CT and Hu JL, et al. (2022) selected 52 economies during the early stage of the COVID-19 pandemic to compare economic resilience and proposed corresponding resistance measures. [2] Yang, XD and Li, HL, et al. (2024) studied economic resilience among cities and revealed the spatial correlation and heterogeneity of urban agglomerations. [3] Zhang QY and Lin YL, et al. (2025) used the entropy method, kernel density estimation and spatial Durbin model to research the spatio-temporal evolution and influencing factors of regional economic resilience. [4]

By reading the literature, it was found that previous studies have been very comprehensive, covering both theoretical discussions and empirical analyses in detail, laying a solid foundation for subsequent exploration. However, there is a lack of research on the impact of monetary policy on economic resilience, and no use of ordinary least squares method for the research. Therefore, this study attempts to start from the aspect of monetary policy, using ordinary least squares method to study the transmission mechanism between monetary policy and economic resilience, and examining the impact of monetary policy changes on economic resilience.

The marginal contribution of this study lies in the following: Firstly, existing studies mostly focus on the uncertainty of monetary policy, but lack in-depth discussions on the role of monetary policy in enhancing economic resilience. For example, De Pooter, M and Favara, G, et al. (2021) studied the impact of monetary policy uncertainty on the transmission process of monetary policy. [5] Secondly, existing studies mainly focus on the combined research of economic resilience and other factors, lacking research on monetary policy and economic resilience. And this study, from the perspective of the lack of previous research, conducts an economic resilience study by collecting national overall data and treating the country as a whole. Moreover, it innovatively incorporates the impact of monetary policy changes on economic resilience.

3. EMPIRICAL ANALYSIS

3.1 The Meaning of Economic Resilience

Resilience was originally used only in physics. It describes the property of an object that returns to its original shape after being deformed by an external force. And Reggiani (2002) was one of the first people to introduce

the concept of resilience into economics. He once pointed out that resilience in economics means the recovery and adaptability of the economic system after being subjected to external shocks. [6] This is also the meaning of economic resilience.

3.2 Material and Method

3.2.1 Survey Region

This study selects China as the region for the study of economic resilience. The reason for this choice is that China is the world's second-largest economy and it is an important part of global economic growth. Moreover, China has also driven the economic development of many developing countries. Not only that, but its economic scale and influence also make it an important subject for studying the relationship between monetary policy and economic resilience.

3.2.2 Data Source

The research period selected for this study is from 2010 to 2012. The research data included GDP data, interest rate data (IR), urban unemployment rate (UR), total import and export volume (TEI), consumer price index (CPI), capital and financial flow data (CF), exchange rate (ER), and total fixed asset investment data (FAI). The GDP data, urban unemployment rate, total import and export volume, consumer price index and total fixed asset investment data mainly originated from the China Statistical Yearbook, and the data was obtained from the official website www.stats.gov.cn. Among them, the GDP data was obtained through calculation to obtain the real GDP data. The real GDP data was based on the year 2010 as the base year, and then the economic resilience (ECR) was calculated using the real GDP. The urban unemployment rate used the registered data from the National Bureau of Statistics before 2019, and China began a population census after 2019. From that time on, the monthly average of the survey unemployment rate was used. The capital and financial flow data and the exchange rate data both come from the statistics of The People's Bank of China, available on the official website www.pbc.gov.cn. The exchange rate data is calculated by taking the arithmetic mean of the daily interest rates for each year to obtain the average value for that year. The interest rate data comes from the Shanghai Interbank Offered Rate, available on the official website www.shibor.org. Since the Shibor does not provide data on rest days and holidays, the research data in this study uses the arithmetic average as the interest rate for each year after removing rest days and holidays. The specific descriptive statistics are shown in Table 1.

Table 1 Descriptive statistics of main variables

Variable	Mean	Std. dev.	Min	Max	Obs
ECR	0.527734	0.355879	0	1.098364	12
IR	0.036528	0.01012	0.023968	0.052187	12
UR	0.040083	0.001677	0.036	0.042	12
TEI	0.444476	0.048718	0.37746	0.523616	12
CPI	102.4417	1.145313	100.9	105.4	12
CF	0.012254	0.008291	0.001758	0.030302	12
ER	6.529653	0.270687	6.143067	6.899642	12
FAI	10.74167	6.558611	2.6	20.4	12

3.2.3 Construction of a Model for Monetary Policy and Economic Resilience

This study constructs a regression equation to examine the relationship between economic resilience and monetary policy by using variables that may affect monetary policy. The specific regression equation is:

$$ECR_t = \beta_0 + \beta_1 \text{InterestRate}_t + \beta_2 \text{UrbanUnemploymentRate}_t + \beta_3 \text{TotalExport}_t - \beta_4 \text{ImportVolume}_t + \beta_5 \text{CPI}_t + \beta_6 \text{ExchangeRate}_t + \beta_7 \text{FAI}_t + \epsilon_t$$

Among them, ECR_t is the dependent variable, β_0 is the intercept term, InterestRate_t is the core independent variable, and the remaining variables are control variables. ϵ_t represents the error term.

3.2.4 Construction of an Economic Resilience Assessment Model

Currently, there is no definite method to calculate the specific numerical value of economic resilience in the academic community. Considering that economic resilience can reflect a country's ability to recover after an economic impact, and there is a certain correlation between the country's output changes and the size of economic shocks. Therefore, referring to the construction idea of resilience proposed by Xiaojing Chao and Zhixin Xue (2023) and making some modifications, the calculation for cities will be extended to the overall country. [7] By observing the deviation between the real GDP of a country in a given year and the real GDP in 2010, this can serve as a specific indicator for measuring the economic resilience of a country under different economic shocks. The specific calculation formula is:

$$ECR_t = \frac{E_t - E_{2010}}{E_{2010}}$$

According to the above formula, ECR_t represents the eco-

nomie resilience of China in period t , E_t represents the real GDP of China in period t , and E_{2010} represents the real GDP of China in 2010. The larger the value of ECR_t , the better the economic resilience of the country is, the less it is affected by economic shocks, and the faster it recovers after facing economic shocks.

3.2.5 Selection of Monetary Policy Variables

1. Core Variable

The core explanatory variable of this study is the interest rate (IR), selecting the three-month deposit rate of Shanghai Interbank Offered Rate as its value. In international academic research, central bank adjusts monetary policies by using short-term interest rates to influence market interest rates and thereby change commodity prices. Moreover, selecting IR as the core variable can better observe the impact of monetary policies. Additionally, in China's monetary market, the Shibor is an important benchmark interest rate. (Gu RB and Chen X et al.) (2014) [8] When the central bank adjusts monetary policy tools, the Shibor will change accordingly. Therefore, choosing the three-month deposit rate of Shibor helps to better reflect the changes in monetary policy.

2. Control Variable

The control variables in this study include urban unemployment rate (UR), total export-import volume (TEI), consumer price index (CPI), capital and financial account flows (CF), exchange rate (ER), and total social fixed asset investment (FAI). From the perspective of urban unemployment rate, monetary policy can promote companies to change job positions and labor demand by altering interest rates and the quantity of issued currency, thereby influencing the urban unemployment rate. Moreover, when studying the effect of monetary policy, it is necessary to control the unemployment rate to avoid mutual influence on eco-

economic resilience. From the perspective of total export-import volume, the total export-import volume data uses the proportion of total export-import to the actual GDP of the National Bureau of Statistics, which can reflect China's dependence on and degree of openness in foreign trade. Through trade, the country can transfer risks while bringing certain foreign exchange income and job positions. Therefore, when implementing monetary policy, the total export-import volume will indirectly affect economic resilience, and controlling this variable helps reduce the interference of international trade factors. Taylor (1993) proposed the famous "Taylor rule", which states that monetary policy should be adjusted according to changes in economic growth and inflation to ensure economic stability. [9] The implementation of monetary policy adjusts the money supply, which will affect the price level and inflation level, and will subsequently react on economic resilience. Controlling CPI can more clearly present the transmission path between monetary policy and economic resilience. To ensure that inflation factors do not affect the research, the data of consumer price index is selected with the CPI of the previous year as the base period (i.e., CPI of the previous year = 100); From the perspective of capital and financial account flows, the capital and financial account flow data uses the proportion of capital and financial flows to the actual GDP as calculated by the People's Bank of China, which can reflect the scale of capital flows in China, and the international flow of capital will affect international commodity prices and economic stability, thereby influencing economic resilience. Controlling this variable helps study the relationship between monetary policy and economic resilience; From the perspective of exchange rate, the level of exchange rate will affect the position of the country in international trade and the price

of goods in the international market, thereby affecting the country's economic stability and economic resilience. Controlling this variable can eliminate the influence of exchange rate fluctuations on economic resilience, and thereby more accurately study the relationship between monetary policy and economic resilience; From the perspective of total social fixed asset investment, total social fixed asset investment reflects the scale of social investment, and the change in fixed asset investment reflects the amount of available funds for enterprises. Controlling this variable can eliminate the impact of monetary policy through investment on economic resilience.

3.3 Regression Result Analysis

The table below presents the benchmark regression results of China's monetary policy on economic resilience. The first column shows the regression results without introducing control variables. From the data in the table, we can see that the core variable interest rate (IR) has a negative and significant effect on China's economic resilience at the 10% level. The second column shows the regression results after adding control variables. From the table, we can see that the core explanatory variable interest rate (IR) still maintains a negative impact and is significant at the 5% level. The results indicate that monetary policy can significantly help improve economic resilience by controlling IR. The lower the control of IR by the monetary policy, the higher the country's economic resilience and the stronger the country's ability to restore economic levels. This shows that monetary policy, as an important tool for a country to adjust economic stability and development, has certain rationality in improving economic resilience.

Table 2 Benchmark regression results of monetary policy on economic resilience

variable	ECR	ECR
IR	0.088*	0.047**
UR		0.031**
TEI		0.001***
CPI		0.762
CF		0.361
ER		0.552
FAI		0.000***
observed value	12	12
$\sqrt{R^2}$	0.2632	0.9961

Note: *, ** and *** indicate significance at the 10%, 5% and 1% levels respectively, and the same applies below. From the perspective of controlling variables, the signs of urban unemployment rate (UR), consumer price index

(CPI), capital and financial account flows (CF), exchange rate (ER), and total fixed asset investment (FAI) are all negative. Among them, UR is also significantly negative at the 5% level. The results of the regression analysis

indicate that a decrease in the unemployment rate, an increase in residents' consumption capacity resulting from a decline in the price level, and an enhancement of international purchasing power due to a decrease in the exchange rate all contribute to an improvement in economic resilience. In particular, the impact of changes in the unemployment rate on economic resilience is more significant. However, the sign of the total export-import volume (TEI) is negative and is significant at the 1% level. This suggests that when China's total export-import volume increases, economic resilience will significantly improve.

3.4 Robustness Test

To verify the rationality of this regression, this study employs the substitution variable method. By substituting the core variable IR, the reliability of the regression results is tested. This study replaces the three-month Shibor interest rate originally used with the one-year Shibor interest rate and conducts a new regression, aiming to determine whether short-term interest rates and long-term interest rates have the same impact on economic resilience. From the regression results, it can be observed that the regression coefficient symbol of IR for economic resilience has not changed and is more significant than the original regression result.

Table 3 The test results of monetary policy on economic resilience

variable	ECR
IR	0.018**
UR	0.012**
TEI	0.000***
CPI	0.562
CF	0.248
ER	0.327
FAI	0.000***
observed value	12
$\sqrt{R^2}$	0.9975

4. CONCLUSIONS AND RECOMMENDATIONS

4.1 Conclusions

This study explores the impact of monetary policy on economic resilience and its transmission mechanism from a theoretical perspective through the regression of interest rates and economic resilience. The paper finds that changes in monetary policy will affect interest rate changes, which in turn will have an impact on various factors, ultimately leading to changes in economic resilience. Lowering interest rates helps to enhance economic resilience. In the final part, the paper conducts a robustness test by replacing variables and reaches a consistent conclusion. Whether it is short-term interest rates or long-term interest rates, their impact on economic resilience is consistent. Lowering interest rates has a certain promoting effect on improving economic resilience.

This study also has certain limitations and problems. Although I have selected multiple control variables, there may still be other important influencing factors that have not been taken into account and included in the model.

Secondly, the monetary policy and economic resilience theories may not fully adapt to the real economic environment in some aspects, and the implementation of monetary policy is also constrained by various factors and faces certain feasibility issues. For example, the adjustment of interest rates may be constrained by factors such as the stability of the financial market, making it difficult to fully implement the recommendations derived from the research.

4.2 Recommendations

The conclusions drawn from this study have the following suggestions for enhancing economic resilience:

Firstly, as found in this study, a reduction in interest rates can effectively enhance economic resilience. Therefore, when facing economic shocks, the government can attempt to appropriately lower the interest rates without affecting the overall economic environment, reducing people's savings, stimulating consumption, accelerating the circulation of money and economic recovery, and thereby improving economic resilience.

In addition, this study also found that an increase in the total volume of imports and exports can also effectively en-

hance economic resilience. Therefore, it is recommended that the country actively participate in international trade and cooperation. Maintaining a high level of economic resilience over the long term can effectively prevent sudden economic shocks and, when facing shocks, be able to promptly seek help from other countries and effectively adjust the domestic economy, avoiding excessive economic losses and falling into a serious economic crisis.

Finally, from the perspective of urban unemployment rates, this factor can reflect the state of people's livelihood and the stability of society in the country. This study found that a lower unemployment rate can also effectively enhance economic resilience. A low unemployment rate also means good economic growth, and the development and economic growth of society have a large demand for labor. The country can encourage employment and create new jobs through policies to lower the unemployment rate, thereby improving the social and economic level and economic resilience.

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