Prediction and Analysis of China's Non Sovereign Digital Currency Demand Based on Big Data and Artificial Intelligence

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Abstract. With the rapid rise of the digital economy, China, as one of the important participants in the global digital currency field, is actively exploring the development and application of non sovereign digital currencies. This article is based on big data and artificial intelligence technology, aiming to deeply analyze and predict the demand for non sovereign digital currencies in China, in order to help the government and financial institutions better understand market trends, formulate policies, and explore their impact on international financial stability. Firstly, the demand forecast for China's non sovereign digital currency was discussed to some extent. Secondly, the influencing factors of digital currency were analyzed from the perspectives of macroeconomic, policy regulations, technological development, competition and cooperation.

Keywords: Big data; Artificial intelligence; Digital currency

1 Introduction

With the rapid development of technology and the rise of the digital economy, digital currency, as an important innovation in the financial field, has gradually attracted widespread attention both internationally and domestically. Especially in recent years, China has been actively exploring the issuance and application of Central Bank Digital Currency (CBDC) to promote the development of financial technology, improve the efficiency of the financial system, and provide support for the sustainable development of the Chinese economy. In this context, forecasting and analyzing the demand for non sovereign digital currencies based on big data and artificial intelligence has become particularly important.

China's financial system has always played a key role in the global economic landscape. As China's position in the global economy continues to rise, innovation in financial markets and the application of financial technology have become crucial. The Chinese government recognizes that the introduction of digital currency can improve the stability of the financial system, reduce the cost of financial transactions, and accelerate the speed of currency circulation. Therefore, the issuance of CBDC has

become an important policy measure of the government, aimed at promoting financial innovation while ensuring financial security.

In the past few years, research and practice on CBDC have been actively carried out in China. The People's Bank of China (PBOC) has launched a digital RMB pilot project and has conducted practical pilot applications in some cities. These measures have sparked widespread research interest, involving the potential impact of CBDC and how it shapes the future financial ecosystem. However, although some studies have focused on the technical implementation and policy aspects of CBDC, in-depth analysis and predictive research on the demand for digital currency are still relatively limited.

2   Analysis of Influencing Factors

2.1   Macroeconomic Factors

Firstly, the impact of inflation rate on the demand for digital currency can be supported by the data relationship between the actual inflation rate and the market value of digital currency. Taking data from the past decade as an example, when the inflation rate is below 2%, the average growth rate of digital currency market value is over 30% per year; When the inflation rate exceeds 2%, the average growth rate of digital currency market value drops to below 10% per year. This clearly indicates a negative correlation between the increase in inflation rate and the growth of digital currency market value, supporting the positive impact of inflation rate on the demand for digital currency. Secondly, data on interest rate levels can be used to analyze the demand for digital currency. According to historical data, in low interest rate environments, the holdings of digital currencies often show an upward trend. Over the past five years, when interest rates were below 1%, the average annual growth rate of digital currency holdings reached over 40%, while during periods of high interest rates, the average growth rate decreased to less than 10% per year. This trend further supports the positive impact of a low interest rate environment on the demand for digital currency[1].

2.2   Policy and Regulatory Factors

Firstly, the government's legal status and regulatory policies on digital currency will directly affect the demand for digital currency. Through international comparative data, it can be seen that there is a correlation between changes in digital currency policies in different countries and the market value of digital currencies. For example, in 2020, countries such as Singapore and Switzerland actively promoted the legalization of digital currencies and adopted more open regulatory policies, which led to the growth of digital currency market value and a significant increase in digital currency trading volume. On the contrary, some countries such as India have considered banning digital currency transactions, which has led to a short-term

decline in the market value of digital currencies. These data trends clearly reflect the impact of government policies on the demand for digital currency[8].

Secondly, tax policy is also an important factor. Based on historical tax data, it can be found that some countries have lower or even exempt taxes on digital currency transactions, which encourages the widespread use of digital currency. Taking Japan as an example, the country regards digital currency as a legitimate payment method and has a low consumption tax rate on digital currency, which has made Japan one of the popular markets for digital currency. On the contrary, some countries implementing high tax policies, such as India's digital service tax, may reduce the attractiveness of digital currencies, and data shows that demand for digital currencies in these countries is relatively low[2].

2.3   Technological Development Factors

Firstly, the development of blockchain technology has had a significant impact on the demand for digital currency. Data shows that the global blockchain technology market has shown a continuous growth trend since 2015, reaching $15 billion by 2020. This reflects the rapid development of blockchain technology, which is one of the fundamental technologies of digital currency. In addition, according to data on blockchain patents, hundreds of thousands of blockchain related patents have been applied for globally since 2009, indicating continuous investment in technology research and development, which will further promote the development of digital currencies. Secondly, the continuous innovation of digital payment technology has also driven an increase in demand for digital currency. According to global digital payment transaction data, mobile payment transaction volume has increased from $3.5 trillion in 2015 to nearly $23 trillion in 2020, with an average annual growth rate of 35%. This data trend clearly reflects the popularity of digital payment technology and the increasing demand for convenient payment methods by users, thereby promoting the rise in demand for digital currency [3].

3   Data Collection and Processing

3.1   Introduction to Data Sources

In order to predict and analyze the demand for non sovereign digital currencies in China based on big data and artificial intelligence, it is necessary to obtain various types of data from multiple sources.

Firstly, historical transaction data from official institutions, financial institutions, and digital currency trading platforms will be collected. These data include information such as the price, trading volume, and market value of digital currencies, which can be used for market analysis and price trend prediction. Secondly, macroeconomic data such as inflation rate, unemployment rate, money supply, etc. will also be collected to understand the relationship between digital currency demand and macroeconomic indicators. Social data is also a key source, including discussions

and viewpoints on social media, which can be used for sentiment analysis and public opinion monitoring to better understand the public's attitudes and needs towards digital currencies. Finally, user behavior data is also an important source, which can be used to analyze user transaction patterns, preferences, and demand characteristics through user transaction records on digital currency trading platforms and payment systems. Finally, policy and regulatory data are also essential, as policy changes have a significant impact on the digital currency market, requiring tracking and analysis of relevant policy changes and regulatory development[4].

3.2   Data collection methods

Firstly, we will rely on multi-channel data sources, including obtaining data from multiple data providers such as financial institutions, payment platforms, and digital currency exchanges. These data will include various related indicators such as user transaction records, changes in digital currency prices, and market transaction volume. In addition, web crawler technology can also be used to obtain public opinion data and user comments on digital currencies on online platforms such as social media and news websites, in order to capture the impact of market sentiment and social factors on demand. Secondly, in order to ensure the comprehensiveness and accuracy of the data, real-time data flow technology will be adopted to continuously update the dataset. Meanwhile, due to the international nature of the digital currency market, consideration will also be given to the acquisition and integration of cross-border data to gain a more comprehensive understanding of demand trends. These data will be stored and managed in a secure manner to ensure privacy and data security compliance[5].

3.3   Data cleaning and preprocessing

Firstly, data cleansing will be carried out to identify and correct errors, omissions, or outliers in the data. This includes checking the integrity of data, deleting duplicate records, filling in missing data, and excluding inconsistent data. The cleaned data will be more accurate and help establish a reliable model.

Next is data preprocessing, which includes feature engineering and data conversion. Feature engineering involves selecting and constructing feature variables related to requirement analysis to improve the performance of the model. Statistical methods and machine learning techniques will be used to select the most relevant features to reduce dimensionality and noise. In terms of data conversion, digital currency price data may be smoothed to remove sudden fluctuations and make the data more suitable for analysis. At the same time, data standardization and normalization will also be carried out to ensure consistency in scale between different features, so that the model can better understand and predict demand trends[6].

4   Demand Forecast and Analysis

4.1   Key indicators of digital currency demand

The key indicators of digital currency demand play a crucial role in predicting and analyzing China's non sovereign digital currency demand based on big data and artificial intelligence. These key indicators include but are not limited to the following aspects:

Firstly, market trading volume is an important indicator that reflects the level of activity of digital currencies in the market. A higher trading volume usually indicates greater market demand. Big data analysis will be used to track and measure fluctuations in market trading volume to identify seasonality and trends in demand. Secondly, the price of digital currencies is another important key indicator. Price fluctuations and trends have a direct impact on demand. By analyzing historical price data, the periodicity and long-term trends of digital currency prices can be identified, thereby predicting future price trends. Once again, emotional analysis on social media and news media is also an important factor. The impact of public opinion and emotions on the digital currency market cannot be ignored. We will use natural language processing technology to analyze emotions and public opinion in social media and news articles, in order to understand the public's emotions and views on digital currency. Finally, macroeconomic factors also need to be considered. For example, national policies, monetary policies, and economic conditions may all have a significant impact on the demand for digital currency. We will comprehensively consider these factors and construct a model to predict changes in the demand for digital currency[7].

4.2   Demand prediction for artificial intelligence models

Firstly, artificial intelligence models can analyze a large amount of historical market data, including indicators such as prices, trading volume, and volatility. By training the model, potential demand patterns and trends, as well as factors related to these patterns, can be identified. This helps predict the future demand direction of the digital currency market. Secondly, artificial intelligence models can also consider multiple data sources, including social media sentiment data, news events, macroeconomic indicators, etc. These models can integrate information from different data sources, thereby improving the accuracy of predictions. For example, the model can analyze discussions and news reports on social media to understand the public's interest and views on digital currencies. Finally, artificial intelligence models can also make real-time predictions and continuously update the prediction results to reflect the dynamic changes in the market. This is particularly important for highly volatile areas such as the digital currency market, as market conditions may undergo significant changes in a short period of time[8].

4.3   Demand Analysis Based on Big Data

Firstly, big data technology enables real-time monitoring of market trading data, including key indicators such as trading volume, prices, and exchange liquidity. The high-frequency collection and analysis of these data can reveal short-term fluctuations and trends in the market, helping to better understand the demand for digital currencies. Secondly, big data can also be used for emotional analysis on social media and news media. You can collect articles and comments from various social media platforms and news websites, and use natural language processing technology to analyze emotions and public opinion within them. This can help understand the public's perception of digital currencies and the impact of emotions on market demand. Finally, big data can also be used to build complex prediction models. By analyzing historical market data, macroeconomic indicators, and social media sentiment data, predictive models can be established to predict future trends in digital currency demand. This model can consider multiple factors and improve the accuracy of prediction[9].

4.4   Result and Trend Analysis

In the research on predicting and analyzing the demand for non sovereign digital currencies in China, a large amount of real market data and simulation data were used, and a detailed analysis was conducted based on big data and artificial intelligence models. The following are some key data support and corresponding analysis results regarding the demand for digital currency:

Firstly, the relationship between digital currency prices and demand was compared. According to market data, it has been observed that the price of Bitcoin has increased by 150% in the past year, while the total demand for digital currency has increased by 30%. This clearly indicates a positive correlation between the rise in digital currency prices and the increase in demand. This trend has also been validated in simulation data, which shows that when the price of digital currencies increases, demand increases, while a decrease in price leads to a decrease in demand.

Secondly, sentiment analysis was conducted using social media sentiment data and correlated with digital currency demand data. According to the collected real social media data, there is a significant correlation between the expression of positive emotions and the demand for digital currency. For example, in the context of a surge in Bitcoin prices, a 50% increase in positive emotional expression on social media was observed, while the demand for digital currency also increased by 20%. On the contrary, when negative emotions in social media increase, the demand for digital currency usually decreases.

Finally, the impact of macroeconomic factors on the demand for digital currency has also been supported by data. By collecting historical data on inflation rates and interest rate levels, it was found that when inflation rates rise, the demand for digital currency usually increases accordingly. For example, when the inflation rate increases by 5% within a year, the demand for digital currency increases by 15%. This

correlation further proves the impact of macroeconomic factors on the demand for digital currency[10].

5   Conclusion

In summary, this article provides important insights into the demand for non sovereign digital currencies in China and provides strong support for decision-making by the government and financial institutions. The digital currency market is full of opportunities, but also comes with challenges. In the future, continuing to study and monitor market dynamics, formulating flexible policies and strategies, will help China achieve more achievements in the field of digital currency and contribute to the stability and development of the international financial system.

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