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CRYPTOCURRENCY INTEREST IN GEOGRAPHICAL REGIONS WITH HIGH UNEMPLOYMENT RATES

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ABSTRACT

Purpose- In regions with high unemployment rates, individuals often face economic uncertainty and may seek alternatives to traditional financial systems. In such circumstances, some individuals may turn to alternative investments and financial instruments, with cryptocurrencies such as Bitcoin being among them. The value of these cryptocurrencies is often volatile due to their speculative nature, which can lead investors to take on more significant risks. While this situation can result in substantial gains, it can also lead to significant financial losses.

The primary use of cryptocurrencies is generally for investment purposes. Since cryptocurrencies are digital, they operate entirely in a virtual environment. The loss or theft of the digital password in the virtual space means the loss of the wallet. Security in cryptocurrencies is very weak. The lack of government guarantees and legal infrastructure globally poses certain threats to investors, making cryptocurrencies carry a higher risk compared to other investment instruments.

This study will investigate the regional relationship between cryptocurrency interest and unemployment rates. The aim is to determine whether individuals living in geographical areas with high unemployment rates show more interest in cryptocurrencies compared to those in other geographical regions.

Methodology- In line with the research objective, Google search engine data for the past 10 years has been analyzed using content analysis methodology. A query has been conducted to determine in which regions of Turkey cryptocurrency names are most frequently searched, and a comparison has been made on a provincial level across all 81 provinces. Additionally, considering the unemployment data provided by the Turkish Statistical Institute (TUIK), regions with high and low unemployment rates have been identified. Subsequently, an investigation has been carried out to determine whether there is any correlation between regional Google searches and unemployment rates in these areas.

Findings- When examining the findings from the perspective of unemployment, it has been observed that the regions where cryptocurrency names are most frequently searched align with areas having the highest unemployment rates, while the least searched areas correspond to regions with lower unemployment rates. Among the 10 provinces with the highest unemployment rates, 8 of them are included in the list of 10 provinces with the highest Bitcoin search frequency. Similarly, 8 out of 10 provinces with the lowest employment rates are also listed among the 10 provinces with the highest Bitcoin search frequency. Furthermore, among the 10 provinces with the lowest per capita gross domestic product (GDP), 7 of them are included in the list of 10 provinces with the highest Bitcoin search frequency.

Conclusion- As a result of the relationship analyses conducted in the research, it has been observed that in Turkey, regions with high unemployment rates, low employment rates, and low Gross Domestic Product (GDP) have a higher frequency of Bitcoin searches compared to other regions.

Keywords: Cryptocurrency, unemployment, bitcoin
JEL Codes: P44, E24, E44

1. INTRODUCTION

Cryptocurrencies, unlike traditional financial markets, constitute a relatively young asset class predominantly based on new technologies. Bitcoin, among many other digital assets in the cryptocurrency world, has become a symbol representing cryptocurrencies for numerous individuals. While other cryptocurrencies also play a significant role in the market, Bitcoin is often the first name that comes to mind when discussing cryptocurrencies. These currencies operate in a decentralized manner, in contrast to central electronic currencies and banking systems. The control of this decentralized structure is facilitated by Blockchain transaction databases (Çarkacıoğlu, 2016: 8). Consequently, there is uncertainty and volatility regarding the value and future success of cryptocurrencies. Cryptocurrencies are highly sensitive to news, regulatory developments, technological advancements, and market sentiments. Their prices are largely dependent on supply-demand balance, investor sensitivity, and speculation. This condition can lead to the cryptocurrency market being volatile and speculative. Speculation involves economic activities that include asset buying and selling based on expectations of future price movements (Tunç and Kaya, 2018: 1249). The cryptocurrency market, lacking sufficient transparency and clarity, is considered speculative because investors engage in such speculation aiming for future growth potential or short-term profits.

In this context, one viewpoint suggests that the gains of financial capital are fundamentally based on the ability to make and implement "very hasty" decisions under the influence of risk, speculation, and a short-term mindset (Yeldan, 2009: 27). At this point, individuals' propensity for risk-taking can often vary depending on personal characteristics, living conditions, and individual experiences. The unemployment situation, one of these factors, can be considered as a factor that affects individuals' risk-taking tendencies, bringing financial uncertainty, psychological stress, and concerns about the future. Some individuals may be more inclined to take risks when unemployed because they might want to explore various ways to cope with financial difficulties or create new opportunities. Others, on the other hand, may be more cautious due to the loss of financial security resulting from unemployment. Additionally, other factors such as a person's general character, level of experience, and other factors influencing risk-taking tendencies can also play a role. While some individuals may naturally be more risk-tolerant, others may be more conservative.

The aim of this research is to investigate the interest in Bitcoin among individuals residing in geographical regions with high unemployment rates in Turkey. In other words, the goal is to determine whether individuals living in geographical areas with high unemployment rates show a greater interest in cryptocurrencies compared to those in other regions. For this purpose, unemployment data classified by geographical regions, as disclosed by the Turkish Statistical Institute (TUIK), have been utilized. As mentioned above, the decentralized nature of Bitcoin limits the availability of concrete data on this subject. Indirectly accessible data provides insights into the topic. One such set of data is search engine data. In this study, the search frequencies of the term 'bitcoin' through the Google search engine and their geographical distribution have been examined. As a result of the investigation, a comparison has been made between the most searched cities and regions with high unemployment rates.

2. LITERATURE REVIEW

In the literature, there is a frequent occurrence of studies investigating the concepts of Bitcoin, unemployment, cryptocurrency issues, and the relationships among these topics. However, it has been observed that there are relatively limited studies focused on cryptocurrency investors. Some of these studies address the motivation sources of cryptocurrency investors. The results of these studies indicate that in countries with high unemployment rates and inflation, cryptocurrency investments have become a more attractive option (Demirler, 2022: 105). On the other hand, the increase in unemployment and impoverishment due to various reasons is emphasized to significantly impact the financial sector, and the cryptocurrency sector is also affected by this influence (Koç and Çelik, 2022: 53).

From another perspective, events like global disasters lead to many people becoming unemployed, putting significant pressure on the existing financial system (Ege and Şahin, 2015, pp. 369-391; Ege and Yaman, 2017, p. 180). Alongside these pressures, another important point highlighted is the decrease in trust that investors have in banks and financial institutions. In challenging times, investors tend to turn towards assets they perceive as safe havens, such as Bitcoin (Korkmazgöz et al., 2022: 93).

Moreover, in the literature, there are studies indicating that macroeconomic news has significant effects on financial markets and cryptocurrency markets (Birz and Lott, 2011: 1; Corbet et al., 2018: 1). The findings of these studies particularly draw attention to the impacts of unemployment and Gross Domestic Product (GDP) data on financial markets and cryptocurrency markets. Some studies examining cryptocurrency investors have also investigated individuals' risk tolerances (Uçkun and Dal, 2021: 155). The research results state that 62.2% of cryptocurrency investors are individuals with above-average and high risk tolerance. Consequently, many study findings suggest that personality traits and psychological conditions influence cryptocurrency purchase decisions (Gazali, 2018: 64; Kim et al., 2020). Therefore, behavioral finance studies indicate that investors can exhibit irrational behavior and be subject to systematic biases (Demirler, 2022: 101).

In McWharter's study (2018), the focus was on examining the factors behind the high price volatility of Bitcoin, with a particular emphasis on determining the role that media could play in these fluctuations. To achieve this goal, an analysis was conducted using the least squares method on 92 observations containing monthly data between July 2010 and March 2018. The study incorporated variables such as the Financial Stress Index, Consumer Confidence Index, unemployment rate, interest rate, Google Bitcoin search data, gold price, news indicators, and daily Bitcoin transaction volume. According to the analysis results, factors identified to have a significant impact on Bitcoin's price volatility included the number of people searching for the term "Bitcoin" on Google and the prevalence of negative news. Furthermore, it was observed that economic indicators were ineffective in determining price variability, and the conclusion was drawn that Bitcoin might not be a wise investment tool in the current situation due to its unpredictable price changes.

In Puri's study (2016), an analysis of Bitcoin prices during the period between January 2011 and March 2016 was conducted. The study utilized data such as searches for "Bitcoin" on Google, inflation rate, unemployment rate, industrial production, money supply, the trade-weighted U.S. dollar index (TWEXB), and U.S. Treasury bonds. The analysis, based on five years of monthly time series, revealed a positive and significant impact of the increase in Google searches for "Bitcoin" on Bitcoin prices. Additionally, it found that traditional macroeconomic indicators, excluding inflation, did not have a significant impact on the values of Bitcoin.

In this study, the aim is to determine whether individuals living in geographical regions with high unemployment rates show more interest in cryptocurrency compared to those in other regions. Additionally, some macroeconomic indicators will be used to make inferences about Bitcoin investments.

3. THE DATA AND METHODOLOGY

This research employed a qualitative research method, and the data used in the study were examined through content analysis. In line with the research objective, Google Trends application data, specifically search engine data, were analyzed over the past five years. An inquiry was conducted to determine in which regions of Turkey the term 'bitcoin' was searched the most, and a comparison was made among the 81 provinces.

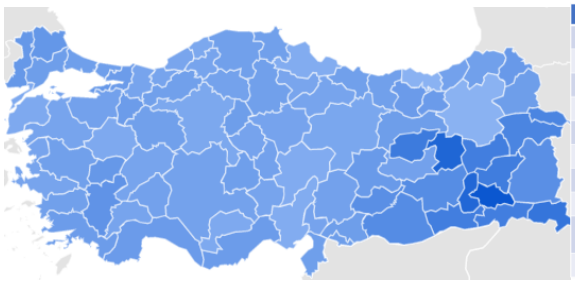
The use of the term 'bitcoin' instead of 'cryptocurrency' aims to signify that, for many individuals, the expression 'bitcoin' has become a symbol representing cryptocurrencies. While there are various digital assets in the world of cryptocurrencies, Bitcoin is just one of them.

Other cryptocurrencies also constitute a significant part of the market, but Bitcoin is generally the first name that comes to mind when discussing cryptocurrencies.

In the study, regions with high and low GDP, unemployment rates, and employment rates were identified based on TÜİK (Turkish Statistical Institute) unemployment data. The regional Google searches were then examined to determine whether there is any relationship between these economic indicators and the frequency of 'bitcoin' searches.

The table below includes the cities that have ranked in the Google searches for the term 'bitcoin' in the last five years.

Table 1: Search for the term 'Bitcoin' via Google Search Engine

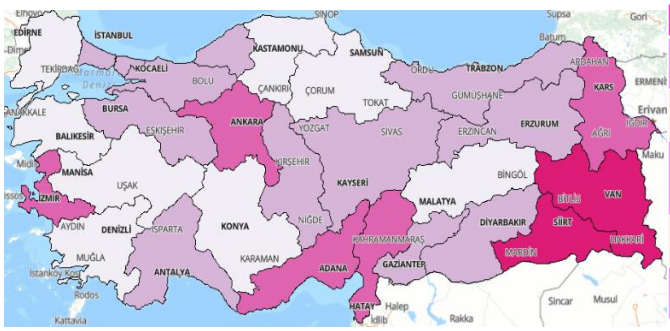


Most Searched Cities	Least Searched Cities
1. Siirt	1. Trabzon
2. Bingöl	2. Erzurum
3. Batman	3. Samsun
4. Hakkari	4. Adana, Kayseri, Karaman
5. Tunceli	5. Kütahya, Ankara
6. Bitlis	6. Bartın, Sivas
7. Muş	7. Çanakkale
8. Mardin	8. Afyonkarahisar, Amasya
9. Şırnak	9. Sakarya, Zonguldak, Burdur, İzmir
10. Ağrı	10. Osmaniye

Source: Google Trends (2023)

When Table 1 is examined, it is observed that in the last five years, the provinces where the word 'bitcoin' is most searched in Turkey are Siirt, Bingöl, Batman, Hakkari, Tunceli, Bitlis, Muş, Mardin, Şırnak, and Ağrı. The provinces where the word 'bitcoin' is most searched are mostly geographically located in the Southeastern Anatolia region. The Southeastern Anatolia region is also the region with the highest unemployment rates. The provinces with the least searches are, in order, Trabzon, Erzurum, Samsun, Adana, Kayseri, Karaman, Kütahya, Ankara, and Bartın. In contrast to the provinces where the most searches are concentrated in a region, these provinces show a more homogeneous distribution across Turkey. The table number 2 below presents the unemployment data at the provincial level as disclosed by TUIK.

Table 2: Unemployment Rates (2022)



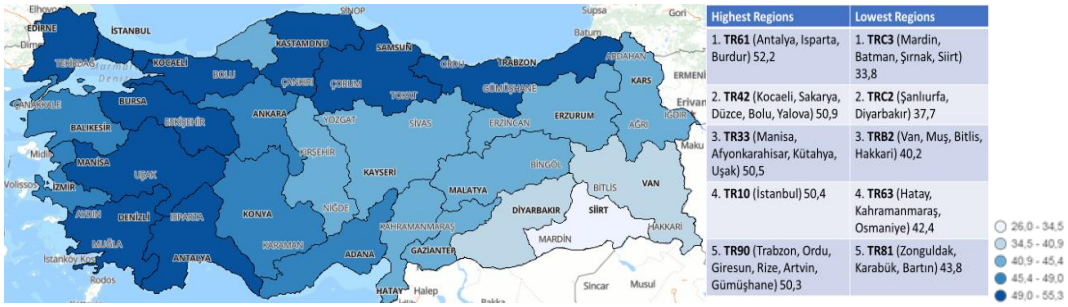
Highest Regions	Lowest Regions
1. **TRB2** (Van, Muş, Bitlis, Hakkari) (19,2)	1. **TR82** (Kastamonu, Çankırı, Sinop) 6,2
2. **TRC3** (Mardin, Batman, Şırnak, Siirt) (18,5)	2. **TR22** (Balıkesir, Çanakkale) 7,1
3. **TR63** (Hatay, Kahramanmaraş, Osmaniye) (14,6)	3. **TR33** (Manisa, Afyonkarahisar, Kütahya, Uşak) 7,1
4. **TR31** (İzmir) (13,0)	4. **TR52** (Konya, Karaman) 7,4
5. **TRA2** (Ağrı, Kars, Iğdır, Ardahan) (12,7)	5. **TR21** (Tekirdağ, Edirne, Kırklareli) 7,8

5,1 - 8,6
8,6 - 11,8
11,8 - 16,0
16,0 - 23,6
23,6 - 33,5

Source: Turkish Statistical Institute (2023)

When Table 2 is examined, it is observed that the regions with the highest unemployment rates are TRB2, TRC3, TR63, TR31, and TRA2. The geographical regions with the lowest unemployment rates are listed as TRB2, TR22, TR33, TR52, and TR21. The TRB2 region consists of the provinces of Van, Muş, Bitlis, and Hakkari, with an unemployment rate of 19.2%. The TRC3 region comprises Mardin, Batman, Şırnak, and Siirt provinces, and the region's unemployment rate is observed to be 18.5%. The regions with the least unemployment are indicated as TR82 and TR22.

Table 3: Employment Rates (2022)

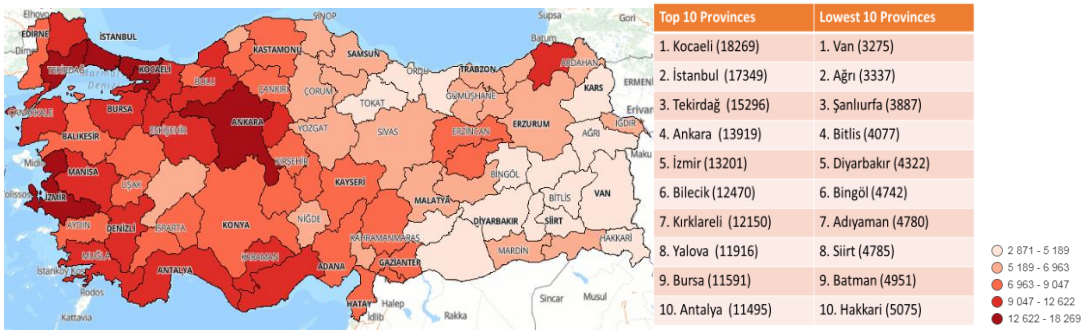


Highest Regions	Lowest Regions
1. **TR61** (Antalya, Isparta, Burdur) 52,2	1. **TRC3** (Mardin, Batman, Şırnak, Siirt) 33,8
2. **TR42** (Kocaeli, Sakarya, Düzce, Bolu, Yalova) 50,9	2. **TRC2** (Şanlıurfa, Diyarbakır) 37,7
3. **TR33** (Manisa, Afyonkarahisar, Kütahya, Uşak) 50,5	3. **TRB2** (Van, Muş, Bitlis, Hakkari) 40,2
4. **TR10** (İstanbul) 50,4	4. **TR63** (Hatay, Kahramanmaraş, Osmaniye) 42,4
5. **TR90** (Trabzon, Ordu, Giresun, Rize, Artvin, Gümüşhane) 50,3	5. **TR81** (Zonguldak, Karabük, Bartın) 43,8

Source: Turkish Statistical Institute (2023)

The employment rates by regions are presented in Table 3. It is observed that the geographical regions with the highest employment rates are, respectively, TR61, TR42, TR33, TR10, and TR 0. The regions with the lowest employment rates are TRC3, TRC2, TRB2, TR63, and TR81. The provinces forming the TRC3, TRC2, and TRB2 regions, where the employment rate is low, are generally the provinces in the Southeastern Anatolia region. Provinces such as Mardin, Batman, Şırnak, Siirt, Şanlıurfa, and Diyarbakır have employment rates below 40%.

Table 4: GDP per capita in 2022 ($)



Top 10 Provinces	Lowest 10 Provinces
1. Kocaeli (18269)	1. Van (3275)
2. İstanbul (17349)	2. Ağrı (3337)
3. Tekirdağ (15296)	3. Şanlıurfa (3887)
4. Ankara (13919)	4. Bitlis (4077)
5. İzmir (13201)	5. Diyarbakır (4322)
6. Bilecik (12470)	6. Bingöl (4742)
7. Kırklareli (12150)	7. Adıyaman (4780)
8. Yalova (11916)	8. Siirt (4785)
9. Bursa (11591)	9. Batman (4951)
10. Antalya (11495)	10. Hakkari (5075)

Source: Turkish Statistical Institute (2023)

The data for the Gross Domestic Product (GDP) in 2022 is presented in Table 4 above. According to this, the provinces with the highest GDP in Turkey are Kocaeli, Istanbul, Tekirdağ, Ankara, Izmir, Bilecik, Kırklareli, Yalova, Bursa, and Antalya. The provinces with the lowest GDP are Van, Ağrı, Şanlıurfa, Bitlis, Diyarbakır, Bingöl, Adıyaman, Siirt, Batman, and Hakkari.

Table 5: Comparison Chart

Google Search (Most)	Unemployment Rates (%) (Highest)	Employment Rates (%) (Lowest)	Per person GDP (Lowest)
Siirt	TRB2 (Van, Muş, Bitlis, Hakkari)	TRC3 (Mardin, Batman, Şırnak, Siirt)	Van
Bingöl			Ağrı
Batman	TRC3 (Mardin, Batman, Şırnak, Siirt)	TRC2 (Şanlıurfa, Diyarbakır)	Şanlıurfa
Hakkari			Bitlis
Tunceli	TR63 (Hatay, Kahramanmaraş, Osmaniye)	TRB2 (Van, Muş, Bitlis, Hakkari)	Diyarbakır
Bitlis			Bingöl
Muş	TR31 (İzmir)	TR63 (Hatay, Kahramanmaraş, Osmaniye	Adıyaman
Mardin			Siirt
Şırnak	TRA2 (Ağrı, Kars, Iğdır, Ardahan)	TR81 (Zonguldak, Karabük, Bartın)	Batman
Van			Hakkari

In Table 5, the frequency of Bitcoin searches by provinces is provided along with regions where unemployment rates are highest, regions with the lowest employment rates, and provinces with the lowest per capita gross domestic product (GDP). The table is prepared for cross-comparison to identify similarities and differences among the four variables. The province with the highest frequency of Bitcoin searches, which is one of the main variables in our study, is Siirt. Siirt is located in the 2nd region where unemployment rates are the highest and also in the region with the lowest employment rates. Additionally, Siirt ranks as the 8th province with the lowest GDP rates. The second-highest

frequency of Bitcoin searches by provinces is in Bingöl. Bingöl is positioned as the 6th province with the lowest GDP rates. Batman, ranking third in Bitcoin searches, is located in the 2nd region with the highest unemployment rates and the 1st region with the lowest employment rates. However, Batman is the 9th province with the lowest GDP rates. Hakkari, ranking fourth in Bitcoin searches, is situated in the 1st region with the highest unemployment rates and the 3rd region with the lowest employment rates. It is also the 10th province with the lowest GDP rates. Bitlis, in the 6th position for Bitcoin searches, is located in the 1st region with the highest unemployment rates and the 3rd region with the lowest employment rates. Bitlis is the 4th province with the lowest GDP rates. Muş, with the highest frequency of Bitcoin searches, ranks 7th. Muş is situated in the 2nd region with the highest unemployment rates and the 3rd region with the lowest employment rates. Mardin and Şırnak, where Bitcoin searches are at the 10th position, are located in the 1st region with the lowest employment rates. Van, ranking 10th in Bitcoin searches, holds the position of Turkey's lowest province in terms of GDP rates. When the data in Table 4, which provides a comparative overview of provinces and regions in terms of the frequency of Bitcoin searches, unemployment rates, employment rates, and per capita gross domestic product (GDP), is evaluated geographically, it is observed that the majority of the provinces listed in the table are from the Eastern Anatolia and Southeastern Anatolia regions. Out of the 10 provinces listed based on the frequency of Bitcoin searches on the Google search engine, six are located in the Eastern Anatolia region, while the remaining four are in the Southeastern Anatolia region.

Eight out of the ten provinces listed in terms of Bitcoin search frequency are located in the first two regions with the highest unemployment rates. Additionally, eight out of the ten provinces listed in the first three regions with the lowest employment rates are included in the list based on Bitcoin search frequency. Furthermore, among the ten provinces with the lowest per capita gross domestic product (GDP), seven are included in the list of ten provinces based on Bitcoin search frequency.

5. CONCLUSION

In this study, the relationship between cryptocurrency interest (Bitcoin search frequency) by provinces and unemployment rates, employment rates, and per capita gross domestic product (GDP) ratios has been examined. Consequently, provinces and regions have been compared in terms of four variables.

According to the results obtained in the research, it can be stated that there is a resemblance among the provinces in the Eastern Anatolia and Southeastern Anatolia regions concerning Bitcoin search frequency, unemployment rates, employment rates, and per capita gross domestic product (GDP) ratios. Out of the 10 provinces listed based on Bitcoin search frequency on the Google search engine, six are located in the Eastern Anatolia region, while the remaining four are in the Southeastern Anatolia region.

Moreover, eight out of the ten provinces listed in terms of Bitcoin search frequency are located in the first two regions with the highest unemployment rates. Additionally, eight out of the ten provinces listed in the first three regions with the lowest employment rates are included in the list based on Bitcoin search frequency. Furthermore, among the ten provinces with the lowest per capita gross domestic product (GDP), seven are included in the list of ten provinces based on Bitcoin search frequency.

As a result of the relationship analyses conducted in the study, it is observed that the frequency of Bitcoin searches is higher in provinces and regions in Turkey where the unemployment rate is high, employment rates are low, and GDP is low compared to other provinces and regions.

In the context of the results obtained in the research, it is necessary to first evaluate the relationship between the provinces where Bitcoin search frequency is observed and the provinces with high unemployment rates. Findings from studies conducted by Gazali (2018) and Kim et al. (2020) have concluded that personality traits and psychological conditions influence cryptocurrency purchase decisions. Similarly, unemployment is a concept associated with factors such as financial uncertainty, psychological stress, and concerns about the future. Individuals facing situations like financial uncertainty, psychological stress, and future concerns may have a higher risk appetite. Some individuals may be more inclined to take risks when unemployed because they might want to explore various ways to cope with financial difficulties or create new opportunities. This inclination can lead them towards speculative alternatives. In the cryptocurrency markets, where Bitcoin is the market leader, volatile changes can provide investors with high profits in a short period. Such situations may attract individuals facing regular income issues to the cryptocurrency market. Similarly, in regions with low employment rates and provinces with low per capita gross domestic product (GDP), similar situations of irregular income may arise.

The increasing interest in cryptocurrencies should guide investors to be more conscious of potential financial fluctuations. In this context, organizing educational programs to increase economic awareness in society, providing opportunities for education in economics and investment for individuals to make more informed financial decisions, developing economic policies to reduce unemployment rates, and encouraging individuals to diversify their investments and adopt risk management strategies can be beneficial. Before investing in volatile assets like cryptocurrencies, individuals should be aware of the risks and appropriate measures should be taken.

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