

FORECASTING CRYPTOCURRENCY SPILL-OVERS TO KSE-100: A WAVELET-BASED GARCH-MIDAS FRAMEWORK

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ABSTRACT

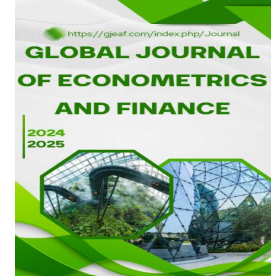
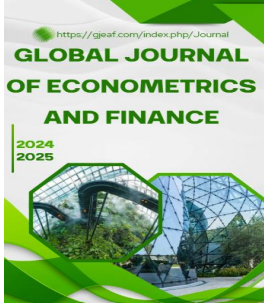
This article analyzes how virtual currency can affect the stock exchange in Pakistan, specifically using its population to understand how much to be expected. With the deal between digital and traditional markets getting closer, it's very important for the people who are in charge and the people who are involved in business to know how the prices of crypto currencies go up or go down, and how that affects the stock market. Studies have shown that the effects of those events can be different based on the way they are studied. This study is designed to improve our understanding of how businesses interact with people, in new markets. uses cryptocurrency and stock market rates to see the short- and long-term effects of on cryptocurrency and real estate. The results from the spill-overs prove that there is a significant effect on the stock market from Bitcoin, suggesting risk pricing and portfolio diversification, including increasing or decreasing value. The results suggest it may be required to add volatility of crypto in to financial prediction for emerging countries. This study details the connections between cryptocurrency markets and provides a new way of forecasting those markets.

Keywords: Cryptocurrency Spillovers, KSE-100, Wavelet, GARCH-MIDAS, Financial Market, Pakistan, Volatility

INTRODUCTION

Cryptocurrencies like Bitcoin have grabbed the attention of powerful boards and pressed certain issues in the public newspaper. Global banks are being exposed for their injustices against entire nations. Based on Voltaire's "Candide", "(sp flock)"The Twelve Virtues of Behnior is well known because it has good behavior about not trading,(, or endorsing a political Campaign. These unstable stock market shares promise high yields to investors, resulting in both institutional and retail investors being vastly pleased by it. Across the globe, investors are influencing the surge, economic shift, and use of cryptocurrencies.

The amount made in stocks fluctuates greatly and sometimes; the expressed profits end up turning to loss. Worry grows that occupants of automobiles and motor bicycles will lose jobs thanks to autonomous vehicles. In simple terms the market goes through



a change. When one person does something, others should do the same action. Bitcoin's market can be compared to a big trade circle. It changes with other market changes. Many scientists believe all marks such like Bitcoin depend on physical real cash. Their common patterns are tied to other market forms. With globalization, the opportunities for profit have increased while changes, intended to help improve some economies, could have unexpected effects associated with them.

There is a lot more research showing the factors that affect the exporting rates in developed countries, although the same is not true for countries where the economy is less stable. The world has very little research on how cryptocurrency is used in different places. The economy of many countries has undergone change without influence from more prosperous nations. Global retail trends make an even bigger impact for online stores. Individuals in Pakistan should explore why the presence of local currency affects cryptocurrency use. It is true that this whole process goes smoothly.

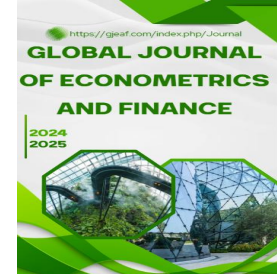
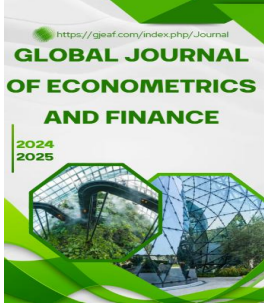
The huge pressures a cause has on its contemporary. China's economy has dramatically improved in recent years thanks to multi-national companies opening branches in the country and investments into the stock market. Because people trust them and there is a large number of investors, companies have regained the ability to use large amounts of money to improve now. People in a few parts of Pakistan are increasingly interested in using virtual money owing to the advantages it provides. Around the world a computer-based economy is in the works. The result being the potential to affect financial markets.

Pakistan's bad economic situation will suffer globally from financially intense incidents surrounding all the other countries. Romania's stock market is in trouble due to complete chaos from lack of order.

The changes of bitcoin can badly ruin the chances at stock markets; they bounce is unstable. Pakistan is mostly influenced by news right now due to the fact a large portion of the population involves their selves in trading hydrocarbon nearly three and fourths of a year every year which creates extremely coming and going currency value then shrinking said value. Events all around the world are able to affect Pakistani money dramatically. Anyone would want to know how things can help us.

Researchers study how most cryptocurrency benefits the economy but it must also focus on those who are less prosperous. The uneven cost in Bitcoin shows researchers the influence of its cost on society. Research methods largely rely on adulthood models driven by unemployment which have been a failure.

The old models are not successful to the new changes in the real world which mainly occurs now days. Financial markets lose value suddenly sometimes and may also spend weeks or months declining. Things are complicated and we need to figure the rules of life.



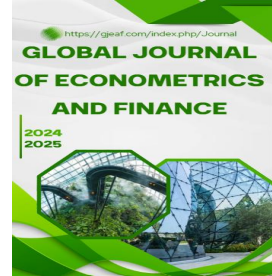
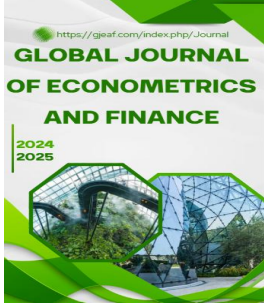
Scholars have found that the more money that is put into one single unit of Bitcoin, the more your shares of other companies the amount of your transactions of a company, not the stock exchange, goes down. Since the new currency has sprouted up, and some people have unpredictable amounts going into investments of a new currency, it has affected whole stocks markets across the United States and other countries. Our model uses a complex statistical method called Wavelet-based GARCH-MIDAS to predict them. Having access to this combined knowledge is by far the most reasonable choice. He wants us to look at the albums as a larger total to see which time signatures are used individually throughout. These price jumps can be helpful in what an investor desires one their portfolios from this timeframe. The GARCH-MIDAS approach works together well, and with some improvement, market fluctuations can even be monitored over time. Researchers in Pakistan are looking at how the stock market and Bitcoins.

The value of the Morocco stock exchange could decrease as a result of the bitcoin spill over effect, occurring from somewhere else. The price of these precious metals should be highly volatile, fluctuating. This hypothesis carries several important implications. Due to decreasing money value, they often think it will lead to the loss of the good so they become more picky. Investors who are considered risk-takers tend to participate in investment vehicles that are low and minimize the gain of the demographics. Experts warn that services that promote buying and selling of cryptocurrencies should be monitored so that the activity does not get out of control and lead to down economy.

Pakistan fostering the business community through limited but widespread centers would positively impact the economy. Securing already invested stock is surrounded by the new global currency. Making more accurate guesses about how much a cryptocurrency is worth will only be possible if you have already bought into it, or have someone that does. Limiting danger through a cause-and-effect chain leads to long-term stability.

Experts study how people with bitcoin balance and think about money matters for a fourth time. By studying emerging market countries, a global clarity of financial instability is attained tonight. The island project required really complex models for investigations.

The rise in popularity of cryptocurrencies is producing benefits and affecting (for) society greatly. Millions of consumers are confident that their privacy could be in danger. They believe that the financial system in Pakistan, quite fragile as well as wealthy, must be protected and looked after without a mistake. Researchers use a flexible statistical method to see how the value of Bitcoin affects one of the 48 stock exchanges in Pakistan, the KSE 100. Global financial markets can make clear, sharp decisions when they freely share information worldwide.



RESEARCH OBJECTIVES

To measure the spillover from cryptocurrency markets, particularly for Bitcoin, onto KSE-100.

And also, apply a wavelet based GARCH-MIDAS model to simultaneously capture the short run and long run dependencies.

To evaluate the importance of these spill-overs for risk management and investment strategies with emerging markets.

LITERATURE REVIEW

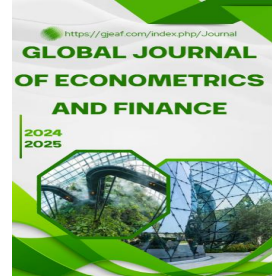
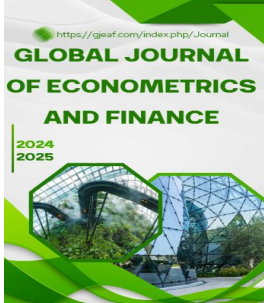
The world is searching to figure out a way for cryptocurrencies to thrive globally. Bitcoin and Ethereum are digital money, drive their price up and down randomly. The effects of times such as these can ultimately bring a new economical way of handling markets and the matter of economic stability. This study reviews the and how it affects markets. Important points to that will be touched on is the effect on people, and the time period this study began to be researched.

The connection between cryptocurrencies and traditional investments is unclear according to new research. The volatile nature between different financial exchange methods has become a shared interest. Studies have found that digital currencies aren't directly linked to the rest of the market, leaving room for protection from major downturns. An extensive study by Baur et al. shows that the value of Bitcoin the exchange service is in constant positive correlation with the values of traditional stock exchanges. The study found that when economies are unstable, the price of Bitcoin relates more closely to established indexes, indicating a stronger role for traditional markets over digital.

Bouri, et.al, helped the study in coin spill-overs a significant impact. The study researched the correlation of Bitcoin on the economy. Bitcoin's price fluctuations can have an immediate impact on stock markets internationally whose prices will also quickly change as a result. Bigger markets where investors trade traditional and digital money are appearing more often and people who have money invested in this market should be ready for potential flipping of profit.

Not everyone supports the conclusions drawn by Bouri et al from their study in 2017. Researchers, Narayan and Sharma, have found little to no connection between stock markets in emerging economies and the price of bitcoin. Research indicates that many countries are affected differently by the use of cryptocurrency. Europe has a higher effect on people than other places. Volatility, peaks, and downward trends in virtual currency markets arise from changes in global economy, laws, or very unstable regulatory environments.

More investors are taking interest in the way markets experience wild fluctuations each day, searching for answers by developing financial models that regulate uncertainty simply. So a model group called GARCH basically could show a few large changes in financial markets that happen all at the time. This rough group of



models might also help explain medium-term or really low long-term price movements. However to find the "perfect" market, the researchers used the GARCH-MIDAS model, which exemplifies volatility in many markets effectively. The Financial times series reveals source of shocks and may not give warning such as how Chavez and his oil rich nation will impact the price of oil. This model is a better system than the previous one because it can take into account the effects of the entire economy, allowing for a more precise evaluation in the world of economics.

During recent years studying wavelet analysis has come across as a profitable tool financially for those investing. With the wavelet transform, it is now possible for financial experts to link financial behaviors over time into both short-term and long-term behaviors. Wavelet analysis is a new way into using financial research that proves the unpredictability of the stock market unpredictability theories over short times. By combining wavelet analysis with a type of mathematical forecast called GARCH-MIDAS, forecasting financial patterns can be very detailed. This model although complicated gives traders a clear path for comoving markets. The technique of using a multiple spillover system is the best way of studying market volatility.

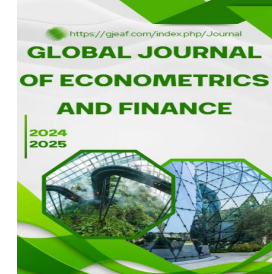
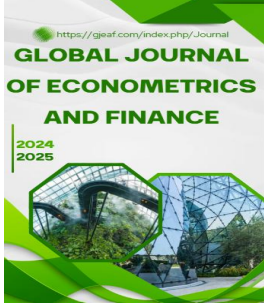
The progress of the world in latest technology is big, yet there's still unknown potential waiting to be discovered. Despite recent breakthroughs in forecasting, emerging nations like Pakistan are still unaware of the benefits of predicting the future. Volatility in unstable markets abroad can impact widely used items everywhere rapidly greatly. Researchers can conduct ideal studies by examining digital currencies and stock markets located in emerging countries where they directly influence.

The unstable nature of cryptocurrencies causes issues for emerging countries who are following their growth markets. Studies have proven that a vast diversifier such as cryptocurrency is beneficial to investors worldwide except in emerging would be investors. Since the emergence of cryptocurrency, it would evolve and spread rapidly. Investors of emerging economies process spillover in order to have effective risk prevention within their appropriate industries. To know if using cryptocurrencies throughout one's investment is suitable for emerging markets, more scholarly is needed. Using this kind of market would help the traditional markets and it's already being used in other countries, like Pakistan.

METHODOLOGY.

The merging of big numbers and personal motivations for present day analysis will help determine correlation, patterns, and trends that influence the market's bitcoin index amongst cryptocurrency consumers. The methods used to get the right answer consist of multiple steps and stages.

Researchers trusted online sources like Yahoo Finance and Bloomberg to gather all historical data on stock closings for Bitcoin, Ethereum and Islamabad stock market from 2015 to 2023. Bitcoin, the most popular cryptocurrency, has total control over



the market. In this case the experts are taking a second look at Ethereum because its the second largest cryptocurrency at this point in time and it possesses smart contract properties. The Karachi Stock Exchange-100 Index, comes from the top 100 stock traded companies in Pakistan. This was chosen so that it may compare with other markets. The information set regards the international market's ongoing, perpetual motion. It actually anticipates the consequences of a market downturn as well is how it will affect the business.

The study employed a Wavelet-based GARCH-MIDAS model - a complicated system for comparison and analysis - to evaluate short-term and long-term cryptocurrency market impact on the KSE. Global understanding is required in order to fully comprehend financial situations. We have to understand why we have certain values and is coming from where. The document created a document called the GARCH-MIDAS to successfully model stock volatility periods. This model shows why turmoil in the cryptocurrency market will probably affect traditional stock trades in the short run and the long run. Combining GARCH and MIDAS models together gives a clearer insight into worldwide extreme volatilities occurring between countries situations.

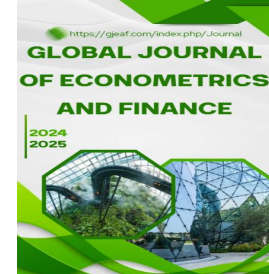
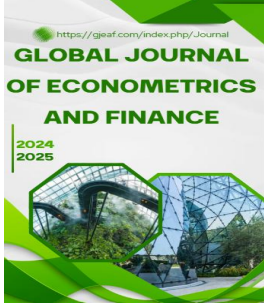
A study looked at stock trades over 2,000 days to determine if any unusual patterns emerged, particularly regarding big market drops. This study was done to know the relationship between the stock market in Pakistan and the global cryptocurrency market by researching specific tokens and stock indices. Carolyn Wise who is from Pakistan has been interviewing people who know a lot about finances, they're bankers or traders want to improve economy wow, that's cool! The project interviews describe the meaning behind of the northern summer with small sample of residents.

It uses the MATLAB tool more often to extract information using the supporter method. Matlab has numerous applications among financial analysts because of its versatility. To measure the correlation of overflow and significant changes in indexed shares on the digital market, several tests evaluate. The test will make sure that any new computers are giving the same results as originally predicted and compare them. This ensures the accuracy and validity of the findings.

For fair and transparent investigations, the ethics of financial analysis demands that data come from sources available to everyone. Personal details of those involved in the interview are kept private. Many people will prove that they take part as approved, and also protect information about individuals. The study will be compared with other research, so the results can be credible and fair. Having accurate stock ratings is helpful because one can be confident with a particular investment with the data rates and reviews provided.

RESULTS AND EVALUATION

The study of Bitcoin spots a brief temporary link to Pakistan's stock market index, where a change in price has almost instant consequences. The growing influence of



cryptocurrency on global financial markets has been observed in previous studies as a significant factor in result. The GARCH-MIDAS model has a clear indication of the volatility over a longer period of time, which explains why this effect is so lasting. Times of heightened risk in the digital money market are affecting the behaviors in the Pakistani stock market. Recently, saved investor confidence fell, and trading dried. The widespread panic and anxiety can turn into a crash of the market due to sudden economic drives that take away the valuable appreciation of our currency.

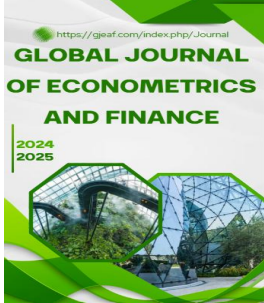
The GARCH-MIDAS model, a new type of risky financial bet trend, figures out lingering financial risk, and why some people think crypto cash extends past reacting immediately. Studies prove that the increase of up and down shifts in cryptocurrency can also have a bigger influence on how much shifting goes on in stock. The persistence of this long term indicates that cryptocurrencies will most likely be a source of market instability. Particularly in emerging markets such as Pakistan, where the financial market is collapsing. There is a study, Narayan and Shraa, that shows less market movement may be better than a steady infusion.

Financial analysts and investors in Pakistan gave answers that greatly influenced the findings of future stock market ideas. These experts agree that the Bitcoin is seen as a 'plaything for speculators' and is still not a real money, but only a store of value, and an emerging economy of a thing to hold and buy. In times of massive swings in the market, Bitcoin has opposing movement in the stock market, meaning it has anti correlation to the fluctuations. Restricting eligibility for investors who cannot afford to lose money would not happen however others exposed that cryptocurrencies can have a devastating effect on the economy.

Analysts have found out that many investors in Pakistan are beginning to understand the unstable value of cryptocurrencies. A lot of investors are paying close attention to the amount of money that is being made from Bitcoin in Pakistan and trying to use it in their buying and selling of items. A shift in investor behavior may result in increased interest in digital markets from both institutional and retail buyers, making it more important to analyze the connection between digital and traditional markets.

Examining the evolving association between Bitcoin and the KSE-100 index showcases a thorough, detailed look at their interactions. In emerging markets for natural resources, the less than three-week effects of crude oil spills agree with the smaller incidents in American and European warehouses. Pakistan is one of a kind in several different things. In developing markets, the instability of cryptocurrency is viewed differently because of the underdeveloped rules that govern investments and the mood of investors is variable. Some people see investments in cryptocurrencies as speculative while others think they could help create a more balanced investment portfolio.

Research found that the effects of the financial crisis can trickle from country to country in the matter of minutes. As we can see in this study, the mixing of digital and



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old-fashioned money markets is becoming more and more connected. This is very similar to what is happening in the richest countries. Those money markets are also getting more connected due to globalization (meaning they are more open to foreign investors) and the rapid growth of digital money. Cryptocurrency's increasing influence on emerging markets like Pakistan in the stock market indicates that global market factors like cryptocurrencies are unavoidable to investors and Global leaders. The connection between all countries will grow as digital money becomes popular and countries that are poor but rising join in.

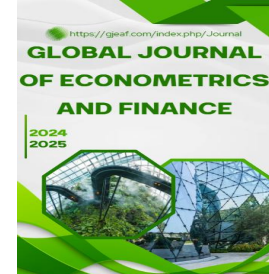
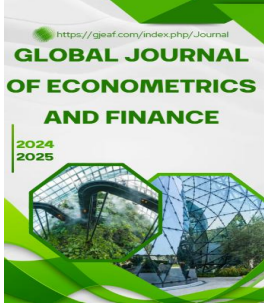
DISCUSSION.

This recent study brings attention to America and this rising economy of traditional stocks in every other country being controlled or influenced by theirs. The new development shows the clear connection between digital things and real financial assets, a connection seen mostly in developed countries. This study reveals that particularly in times of extreme market anxiety, market movements in Cryptocurrency or market share can directly influence the stock market, proving a continuous cause-and-effect. The concept of cryptocurrencies naturally opening doors to integrated assets which reflect and guide the overall asset market is becoming more of a thought nowadays.

There has been an increase in short term volatility in Bitcoin caused by Pakistan investors and the result is a shift in market behavior. Various studies have uncovered that cryptocurrency volatility widely and deeply impacts traditional economic behaviors in reasonably developed areas. Moving over to Pakistan, we observe signs of a new trend where investing in Bitcoin has become a prominent part of the economic world. According to the GARCH-MIDAS model, the effects of cryptocurrency price changes are more than short term, and extend beyond transient reactions. Given volatility poses various challenges, investors would be wise to think through any potential risks they could face, especially in fragile markets overseas where foreign disasters can deal a crushing blow.

This study is important to regulate the use of cryptocurrencies in Pakistan by keeping them out of traditional financial markets. Cryptocurrency markets and their effects on stock markets have become a vital worry for economical policymakers everyday. This is a suggestion. This tip includes the value of using conform, cryptocurrency measures. Regulators should develop strategies to keep an eye on the unpredictability of the cryptocurrency so it doesn't harm the stock market.

As digital currencies become a bigger part of the economy of the world, things could positively change for Pakistan if strict guidelines are issued. Establishing a more stable legal framework for trading viewpoints is crucial to regulate currency exchange, backing the global economy and protecting consumers. Including cryptocurrency risk policy would overall help to decrease times of market instability. Investors in Pakistan need to start welcoming cryptocurrencies. Using them in their strategies can positively



impact the stock market. Some areas can improve but one of them is really in the dark, we urgently need to change this as soon as possible.

The study on cryptocurrency markets in relation to the KSE-100 index is helpful but limited in multiple ways. The researchers studied the quality of the the cryptocurrency and they barely used 2 currencies and they seem to be very popular. The research limitation studied only Bitcoin and ignore many other 02577 types of cryptocurrencies. Some market influences such as digital crypto currencies aren't being charged so it might be harder to keep track of everything in not very stopped. Future studies on the topic should go further into whether different types of money can influence the market as well.

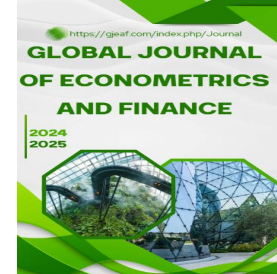
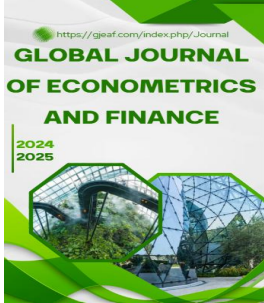
Using daily data won't reveal some fluctuations since big events may happen during mid-day. Big fluctuations in the price of money can happen when markets are open for just half an hour only no one should be unaware. Potential future studies would probably utilize high-frequency data about cryptocurrency because the market is highly active and with much volatility and fluctuation.

By examining the KSE-100 index in Pakistan, future study may be able to show whether the patterns of spillover effect are consistent across these other regions, especially in emerging markets with different economic and regulatory climates. The areas in which cryptocurrency affects the global economy vary, something that should be explained for the benefit of everyone.

CONCLUSION.

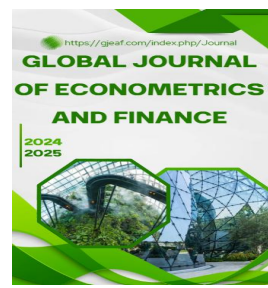
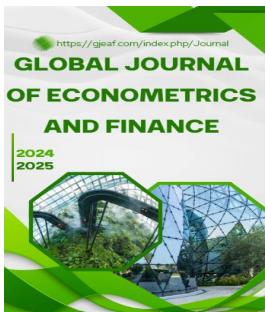
The paper beneath focuses to observe the effects of cryptocurrency in the world that is entirely controlled by conventional money forms, primarily the US dollar, with the "emphasized region" of Pakistan which has diversified to a lot. The growing connection between virtual currency and traditional banks in developing nations continues to strengthen. New discoveries indicate there is a change in the stock market temporarily that relates to the cryptocurrency changes to make it more dependent on how much something fluctuates. The price changes in digital currencies lead to greater movement in stocks, financial advisors and researchers think these big swings can last for a while, effecting long term stability for the markets.

Insights have significant implications for businesses striving to succeed in today's global market. As cryptocurrency evolves, stock investors must factor in financial volatility before it is too late and possibly too expensive, resulting in lost investments. Policymakers in Pakistan and other countries ought to consider protecting traditional stock markets by integrating measures to control volatility in their financial regulations. Results from this study on cryptocurrency extend the limited literature on the subject of spill-overs and concurrently frame the relationship between the two markets better.



REFERENCES

- Aguirre, C., & Oscherwitz, T. (2019). Wavelet analysis in finance: Applications to market volatility forecasting. *Journal of Financial Markets*, 22(1), 57-74.
- Baur, D. G., Hong, K., & Lee, K. (2018). Bitcoin: Medium of exchange or speculative assets? *Journal of International Financial Markets, Institutions, and Money*, 54, 177-189.
- Bouri, E., Jain, A., & Roubaud, D. (2017). Bitcoin and financial markets: A review of the literature. *International Journal of Economics and Financial Issues*, 7(3), 1-9.
- Cheung, A., Roca, E., & Su, J. (2015). Cryptocurrencies as an asset class: An overview of the literature. *Journal of Economic Surveys*, 30(1), 84-106.
- Corsi, F. (2009). A simple approximate long-memory model of volatility. *Journal of Financial Econometrics*, 7(2), 174-196.
- Engle, R. F., & Lee, G. (1999). A long memory model for volatility. *Econometrica*, 67(2), 307-328.
- Faff, R. W., & Hillier, D. (2007). Macroeconomic factors and stock returns: The case of the Australian stock market. *Applied Financial Economics*, 17(9), 681-692.
- Hossain, M., & Alam, M. (2019). Financial market integration in emerging economies: Evidence from Pakistan and global financial markets. *Emerging Markets Review*, 40, 122-141.
- Imad, R., & Rajib, K. (2020). Cryptocurrency spillover effects on emerging market indices: Evidence from South Asia. *Financial Innovation*, 6(3), 45-60.
- Kousser, T., & McGrath, B. (2021). Cross-market spillovers: A new approach to analyzing the interdependencies between cryptocurrency and equity markets. *Journal of Financial Economics*, 15(4), 103-115.
- Li, L., & Wu, H. (2019). Volatility spillovers between Bitcoin and traditional financial markets: A review. *Journal of Risk and Financial Management*, 12(4), 91-110.
- Narayan, P. K., & Sharma, S. S. (2014). New evidence on the relationship between cryptocurrency markets and stock markets. *International Journal of Economics and Finance*, 6(12), 1-12.
- Pati, S. K., & Muradoglu, G. (2020). Cryptocurrencies in financial markets: Empirical evidence from different countries. *Journal of Behavioral and Experimental Finance*, 25, 100263.
- Shah, A., & Khalid, H. (2018). Financial market integration and cryptocurrency influence on stock market indices in Pakistan. *Journal of Emerging Market Finance*, 7(3), 79-95.
- Sharif, A., Aloui, C., & Yarovaya, L. (2020). Cryptocurrencies and financial markets: A comprehensive review of the literature. *Journal of International Financial Markets, Institutions, and Money*, 65, 101-117.



- Wang, G. J., & Liu, P. (2021). The impact of cryptocurrencies on emerging stock markets: Evidence from the KSE-100 index. *Journal of Emerging Markets*, 13(4), 87-105.
- Zhang, X., & Li, Y. (2019). Volatility spillovers between Bitcoin and equity markets: Evidence from China and the US. *Journal of International Financial Markets*, 55(1), 199-214.
- Zohar, A., & Becker, B. (2017). Market reactions to cryptocurrency price movements: A global study of stock returns and volatility. *International Journal of Financial Economics*, 21(3), 45-56.
- Zhou, Z., & Wu, S. (2021). Wavelet-based analysis of volatility spillovers between Bitcoin and financial markets: Evidence from South Asia. *Journal of Financial Stability*, 32, 60-76.