“DYNAMIC INTERLINKAGES BETWEEN CRYPTOCURRENCIES AND STOCK MARKETS: A COMPARATIVE STUDY OF DEVELOPED AND DEVELOPING ECONOMIES”

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I, **Dawar Butt**, *MBA Student in the Department of Management Sciences, Bahria University, Islamabad, certify that the research work presented in this thesis is to the best of my knowledge my own. All sources used and any help received in the preparation of this dissertation have been acknowledged. I hereby declare that I have not submitted this material, either in whole or in part, for any other degree at this or any other institution.*

Signature ----------

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Abstract

This study examines the dynamic interlinkage amongst top cryptocurrencies i.e. Bitcoin / Ethereum and major equity markets of three developed and three developing economies i.e. Russia, USA, China, India, Pak and Bangladesh. The data has been taken from 1 Jan 2018 to 31 Dec 2024. Research applies 12 bivariate Vector Autoregressive (VAR) models and the Diebold and Yilmaz (2009) connectedness framework to measure return transmission and volatility spillovers. The results reveal that dominant net transmitters of volatility remain Cryptocurrencies, exerting stronger spillover effects than traditional equity markets. USA, China and Russian stock markets show higher level of connectedness with cryptocurrencies. Indian market is a developing market showing more connectedness with cryptocurrencies and act as both transmitter and receiver of greater spillovers. Pakistan and Bangladesh Stock markets are generally seen as net receivers of shocks. Major geopolitical disruptions and pandemics like COVID-19 cause spillover intensities. In general, cryptocurrencies have emerged as strong financial assets having great potential of shaping the interlinked dynamic market thereby reducing broadening benefits and shaping up new challenges for the management of risk and oversight regulations. The study contributes to compare financial literature and proposes practical implications for policymakers, regulators and investors in both emerging and advanced economies.

Contents

Chapter 1

INTRODUCTION

Lately cryptocurrencies have evolved as an influential component of financial global landscape. Bitcoin and Ethereum have been seen as a practical financial investment by individuals and institutions. Founded on the basis of block chain technology, offers transparency, decentralization and freedom from old styled financial intermediaries. This marks a shift in financial markets which are transformative and borderless. But cryptocurrencies still remain as a high-risk asset because of their uncertainty and volatility of formalized regulatory frameworks.

Consider a conversant scenario: Equity markets fall sharply due to political stress whereas Bitcoins jumps 20% overnight. Equity markets have served as an important pillar of economic stability whereas cryptocurrencies thrive on innovation and decentralization. The conflicting dynamics of equity markets and cryptocurrencies make them interlinked and both operate together where impact of one market has an impact on the other.

Both the markets influence, interact and overlap each other thereby causing serious challenges to conventional financial theories. These opposing dynamics emphasizes on the fact that traditional financial markets and cryptocurrencies cannot operate independently.

Even though cryptocurrencies are emerging as a new and relatively high-risk asset class, importance of stock markets cannot be denied. Stock markets form the backbone of the strategies of institutional investments. USA, Russia and China being the developed markets are deeply integrated, very liquid and well-structured into wider economic systems. On the other hand, Pakistan, India and Bangladesh

being the developing markets have higher exposure to global shocks, regulatory issues and lower liquidity. As the interconnectivity amongst the global financial systems has increased, it has become important rather than option to understand how traditional and digital markets respond to each other.

Various researches have been carried out on the cryptocurrencies and traditional financial markets but most of the analysis have been carried out developed economies independently. Because of this a significant research gap continues to exist for studying how the digital assets and stock markets interact with each other in the developing economies. Higher exposure to global shocks, lower liquidity and regulatory issues may lead to fluctuating patterns of unpredictability and return transmission.

This study intends to address the gap by probing how cryptocurrencies i.e. Ethereum and Bitcoin corelate with stock markets across 3 developed (Russia, China and USA) and 3 developing countries (Pakistan, Bangladesh and India). The research discovers how the level of development of countries affects the relativity between traditional equity markets and cryptocurrencies.

Not just the comparison of the performance, the study also aims to highlight how evolving digital markets and traditional systems of finance exist with each other, balance or even contest with each other in the age of advancement adopted by technology. Today because of the evolved social media, world is connected very strongly and the financial shocks are transmitted across the globe within minutes and digital wallets heavily impact the conventional banking. In this situation, in depth knowledge of the interlinkage between the two asset classes is very important for both the investors and policymakers.

A theoretical gap that explains the mechanisms of finance that govern these interactions continues to exist. The previous studies cater for the diversifying the benefits, volatile behaviors and hedging potential but they lack a well-structured framework which captures conflicting dynamics across

different economical contexts. Generally, the previous researchers have remained more focused on either the individual markets or the broad global view and no meaningful differences across developed and developing economies have been highlighted.

This ambiguity has created real world challenges for the investors. Generally, the guidance is available related to the developed economies and very little researches addresses the issue of relatively less developed financial economies, where volatility, regulatory constraints and market inefficiencies can significantly influence investment outcomes.

Cryptocurrencies performances are affected in different countries because of the variances in the economic stability, regulations and financial modernization. Digital or modern asset have gained more popularity and acceptance in the developed countries by both individual financers and financial institutions whereas the developing countries face economic and structural issues which affects the behavior of cryptocurrencies more as compared to the stock markets. These aspects rightly point out the need for an analysis comparing how the Bitcoin and Ethereum interact with the major equity markets i.e. S&P 500 across various economic situations.

1.1 Statement of the Problem

In last 15 years, the digital currencies i.e. Bitcoin and Ethereum have transformed from hypothetical digital instrument to financial assets which are being traded globally, progressively interrelating with traditional markets of stocks. Even though the growth of digital asset class has been very rapid and an increased amalgamation with global finance, knowledge of how digital assets class is linked with the equity markets still remains very limited especially across the states which are at difference economic development stages. Most of the existing literature focus and emphasizes on either cryptocurrencies or stock markets separately, or keeps more focused on the interlinkage in the developed countries i.e.

USA and Europe and offers limited literature on how this interlinkage behaves in less developed or emerging markets.

This generates a critical gap for both practice and theory. From theoretical point of view, the existing evidence is insufficient on how the volatility spillovers and return transmission between stock markets and cryptocurrencies behave differently across developing and developed economies. From the practical aspect, the developing countries like India, Pakistan and Bangladesh do not have a clear guidance for the investors and policymakers that whether the cryptocurrencies act as asset multiplier when brought in comparison with the stock markets. Furthermore, crisis sensitive and time varying nature of theselinkages has not been adequately explored using connectedness frameworks such as Diebold and Yilmaz (2009), especially in a comparative setting.

Therefore, this study properly highlights and addresses the lack of literature available on the dynamic interlinkage between the leading cryptocurrencies i.e. Ethereum and Bitcoin and stocks markets in the developing and developed countries. Returns and volatility across the developing and developed markets are especially scrutinized in the study and whether the course and strength of these fluctuations vary by the level of financial and economic growth of the market.

The research gap in this thesis was identified through a critical review of existing literature on cryptocurrencies and stock markets. While prior studies extensively examine cryptocurrencies or equity markets in isolation, and some explore their interlinkages, most of this evidence is concentrated on developed economies such as the USA and Europe. As a result, there is limited understanding of how the relationship between cryptocurrencies and stock markets differs across countries at different stages of economic development. Although Diebold and Yilmaz (2009) introduced a seminal connectedness framework to measure return and volatility spillovers across financial markets, their original work was methodological in nature and primarily applied to traditional financial assets, such

as stock, bond, and foreign exchange markets. Their subsequent extensions (e.g., Diebold & Yilmaz, 2012; 2014) further refined spillover measurement but did not focus on cryptocurrencies, which emerged as a significant asset class only later. While more recent studies have adopted the Diebold&Yilmaz framework to analyze cryptocurrency&stock market linkages, these studies are largely singlecountry focused, such as focusing turkey (Alkan, B. 2020) and Thailand (Phetcharat, N. 2023). Cryptocentric or concentrated on developed markets, offering limited comparative insight across different stages of economic development. Importantly, Diebold and Yilmaz themselves did not examine whether spillover intensity, direction, and net connectedness differ systematically between developed and developing economies, nor did they analyze these relationships in a comparative and crisis-sensitive setting involving both digital and traditional assets. Therefore, a clear research gap exists in applying the Diebold&Yilmaz connectedness framework to comparatively assess timevarying return and volatility spillovers between cryptocurrencies and stock markets across developed and developing economies, which this study explicitly addresses.

1.2 Theoretical background

The basis of theoretical study lies on the spillover and contagion dynamics, intersection of diversification theory and timeseries connectedness models. Markowitz in 1952 proposed a Modern Portfolio theory (MPT) which show the conventional method for analyzing the contribution f different assets to portfolio return and risk. The theory states, overall portfolio risk can be reduced by investors by keeping assets whose returns are wrongly correlated. In this context, cryptocurrencies like Ethereum and bitcoin are seen as uncommon types of investment. They might help diversify a portfolio because, in the past, they have not moved in the same way as regular stock markets. But research studies don’t really agree on whether they really help with modification or not. Some studies also suggest that in various conditions Bitcoin proposes as a a shock absorber or a reliable option.

(Dyhrberg, 2016). While some other studies also propose that it's not as reliable shock absorber because of its high unpredictability, its compassion towards world events and a speculative nature. (Bouri et al., 2017, Gil-Alana et al., 2020). These different opinions shows that why it is important to study how cryptocurrencies perform in different countries. Developed and developing countries have very diverse rules, market size, and investor behavior, so cryptocurrency can perform differently in each place.

Apart from diversification, the connection between cryptocurrencies and stock markets can also be understood through the idea of spillovers. This means that when something big occurs in one market, it effects the other markets. Like change in values, worldwide events, or news can easily move from one market to the other. Research also shows that during difficult times like COVID-19 pandemic or any political stress markets became more connected. Assets that generally don't move together may suddenly start reaching in the same way. (Ibrahim et al., 2023; Alkan & Cicek, 2020). How one market disturbs another are diverse in rich and developing countries because their fiscal systems are not similar. Things like how easily assets can be bought or sold, who invests, how exposed the country is to the worlds, and how constant the rules are all make a difference. (Makridis et al., 2023). Cryptocurrencies are traded worldwide. They have no vital control and their prices variate rapidly. That is why they frequently send shocks to other markets. Furthermore, stock markets in developing countries usually absorb these shocks more effortlessly, so they often became receiver of instability. (Bouri et al; 2022). These notions explain why it is important to check whether cryptocurrencies affect stock markets differently in countries with different financial development levels.

To study these relations, the study uses the Diebold and Yilmaz (2009) method. This method studies how markets pass shocks to other markets by using a model called VAR. This model looks at how every variable is affected not only by its own past actions but also by the past actions of other variables. It shows the two way and overdue connections between monetary markets. Using FEVD,

the Diebold- Yilmaz method tells us how much of an asset's forthcoming uncertainty comes from shocks in other markets. This helps measure how much effect goes "to" and "from" every market, as well as the overall connectedness of the whole system.

This way is generally utilized to study equity and crypto interactions and regularly emphasizes on the fact that stock markets tend to act as net recipients of volatility especially in the developing economies whereas the latter are widely noted as solid volatility transmitters (Londono & Tellez, 2019; Zhang et al., 2021). Bivariate (VAR) model used in this study aligns with the stated theory and allows for a distinctly identified bilateral spillover dynamics amongst both the markets i.e. crypto and each stock markets.

Cryptocurrencies continue to exist as a high-risk asset in developed countries and markets and acts as effective hedges against the currency rate depreciation or inflation in the growing or developing markets (Liu & Tsyvinski, 2021). Cryptocurrencies are growing as a real competitor for the traditional asset classes having characteristics hybrid in nature as technological revolutions, digital currencies and commodities. These diverse characteristics replicate the different nature of world financial systems and highlight the requirement of carrying out the comparative analysis of emerging and developed markets.

The theoretical perspective offers a detailed and comprehensive base for assessing the response of various stock markets to the changes in the cryptocurrencies across different economies, which supports the main objective of this particular research of comparing volatility spillovers and return dynamics across various markets across the globe which includes USA, China, Russia, India, Pakistan and Bangladesh.

1.3 Research Objectives

There are generally two research objectives of underlying research.

1. To assess the return differences between cryptocurrencies and traditional stock markets in developed and developing countries.
2. To analyze and compare the patterns of returns and volatility spillovers between cryptocurrencies and stock markets in developed and developing countries.

1.4 Research Questions

There are generally two research questions of underlying research.

1. Does the return of cryptocurrency have impact on equity markets of developed and developing economies?
2. How do the return dynamics and volatility spillovers between cryptocurrencies and traditional stock markets differ across developed and developing countries?

1.5 Significance of the Study

This research is important for academics, finance professionals, and policy makers because it explains how cryptocurrencies interact with stock markets in countries with different levels of financial developments. Most global studies on digital assets focus on developed countries, which leaves a gap in understanding how these links work in emerging markets where rules are weaker, markets are smaller, and economic volatility is higher be comparing six different economies i.e. USA, Russia, China, Pakistan, India and Bangladesh. This study enhances the existing literature of comparing financial assets and generally provides a wider and a meaningful view where it remains specific in comparing the cryptocurrencies with stock markets.

The study uses the Diebold and Yilmaz (2009) framework of connectedness and provides a real time analysis of how returns and volatility move between cryptocurrencies i.e. Bitcoin & Ethereum and stock markets i.e. USA, China, Russia, Bangladesh, India & Pakistan. Cryptocurrencies are relatively in an evolution phase and continuously evolving whose role is yet to be fully comprehended by the traditional markets. The study uses the daily log returns along with twelve bivariate (VAR) models and shows how much fluctuations occur to stock markets of three developed and three developing economies due to changes occurring in cryptocurrencies. The findings of study provide guidance to the investors to understand whether the investments in digital assets increases their portfolios or put them under an extra risk when simultaneously invested with stocks. The developing countries having comparatively having less stable market and where currencies often have the tendency of losing value, these findings provide a clear knowledge to understand whether Bitcoin and Ethereum (Cryptocurrencies) act as hedges diversifiers, simply speculative assets.

The study provides help to the regulatory and policy making bodies in the countries where the cryptocurrencies are on the rise without having strong centralized oversight. By pointing out the fluctuations, strength and directions of spillovers, the analysis shows the increased systematic risk brought in by cryptocurrencies during global crisis. The in-depth analysis provides help to the policy making bodies to formulate better terms for investor protection, market monitoring, taxation and general financial stability. As the world has become a global village and markets are more dependent on one another, it has become important to understand how crypto and stock markets influence each other for formulation of effective financial regulations.

The study adds on to the ongoing debate about continuous evolving status of cryptocurrencies in the financial systems where it provides the context on the digital assets which have moved beyond of just being called as the speculative assets to influencing other investment markets as well. The fact of cryptocurrencies being called as net volatility transmitters highlights their reputation and counters all

previously existing views about cryptocurrencies that treated them as separate entity from traditional financial systems.

Finally, the research is systematically valued because it establishes the worth of the VAR – FEVD connectedness approach for studying interaction between markets. The context here offers future researchers can enhance the literature by working with high frequency data, nonlinear methods & multi variate models. By filling practical, empirical and theoretical gaps, the study provides a well-structured knowledge on how cryptocurrencies and stock markets have an impact on each other and both coexist in the rapidly changing financial environment on daily basis globally.

1.6 Structure of the Thesis

The thesis includes five major chapters; each of them contributes to the creation of the clear vision of the research topic:

1. Introduction: This chapter describes the background of the study, the purpose of the study, the research questions, and the organization of the thesis.
2. Literature Review: The chapter uses literature reviews of past research on the dynamic relationship between cryptocurrencies and stock markets in developed and developing economies.
3. Methodology: This section outlines the research design, data employed in the study, variables together with methods used to address research questions.
4. Results and Analysis: Here the study presents the empirical results, explains what they mean, and discusses their implications and reliability.
5. Conclusion and Recommendations: The final chapter contains the summary of the key results, presentation of theoretical and practical results, and recommendations on the further research.

LITERATURE REVIEW

The literature review is a critical synthesis of a contemporary literature concerning Dynamic Interlinkages Between stock markets and cryptocurrencies: A Comparative Study of Developed and Developing Economies. This part of the study aims to provide a detailed comprehension of theoretical frameworks, empirical methodologies and key findings practically in the field.

2.1The Evolution of Cryptocurrencies

As the world is advancing with every passing day, cryptocurrencies have evolved as a new phenomenon in the concept of money (Allen & Bryant, 2019). Cryptocurrencies denote a transformative jump in the financial evolution, similar to the internet which has transformed communication. As cryptocurrencies are in a continuous evolution process and are yet to be fully integrated into conventional finance, their evolution is critical in understanding the interface they have with traditional markets.

“Virtual Currencies” and “crypto assets” are the terminologies which are generally used as interchangeable for cryptocurrencies. The European Banking Authority (2014) defines the crypto assets as digitally stored precious units which are not issued by the central bodies and banks but are broadly accepted in modernized transactions i.e. automated transactions. Cryptocurrencies, as described by Harvey & Tymoigne (2015), are the digital units which can be transferred without any centralized regulatory body or oversight (Стойка 2021).

The basis of this technology can be traced back to the 1980’s, when David Chaum initially steered safe and secure means for digital linkage. Initially digital currencies were not able to gain success i.e. b money whereas, PayPal flourished. Bitcoin was introduced in 2008 by Santoshi Nakamoto and

launched in 2009, which laid the foundation stone for the modern cryptocurrency (Arslanian & Fischer, 2019) and since then many more have gained limelight i.e. Ethereum & Dogecoin.

The digital currency operates on the block chain technology ledger and wallets work in similar manner as ATM but use an exclusive digital address. The hallmark of cryptocurrency especially Bitcoin which has a capped supply (Jokic et al, 2019) has been lower transaction fees, transparency, decentralization and inflation resistance. These positive features have given rise to the cryptocurrency's narrative despite ongoing worries about illicit use and speculative trading.

The financial crisis of 2008 has been vital for sparing the generation of Bitcoin, offering a good second option in response to the drawbacks of traditional banking systems (Anselmi & Petrella, 2023). In 2015, introduction of Ethereum boosted the ecosystem by presenting smart contracts, which systemize contracts without mediators. This innovation encouraged an increase of altcoins and expanded applications of blockchain technology (Charfeddine et al, 2022). Today cryptocurrency is not just an asset class but also forms as essential components of decentralized finance (DeFi), various digital applications (Makridis et al, 2023) and governance systems.

2.2 Cryptocurrency: A Transformative Asset Class

The definition of financial assets has been redefined significantly after the evolution of cryptocurrencies. The arrival of Bitcoin in 2008 was a landmark and the start of the new era having decentralization quality and peer to peer methods of transferring value (Glaser et al., 2014). Crypto market had crossed the figure of $783 billion in 2021, which clearly points towards its significant global financial growth.

Cryptocurrencies are based on the block chain technology which is very safe, secure & transparent through the use of cryptographic consensus mechanisms. The two currencies i.e. Bitcoin and Ethereum are its top implementations, eliminating the requirement for traditional mediators (Garriga et

al., 2018). More widely, blockchain technology removes the reliance on institutions and is more focus on algorithm driven governance, emphasizing the fact that cryptocurrencies are not just another form of money but a different and evolving asset class (Xu et al., 2017).

The markets trends clearly show the transformation. From 2017 to 2019, the figure of cryptocurrencies has increased from 69 to over 2,200. Even though the share of Bitcoin was not on the rise but the overall increase in the liquidity and interest of the investor showed people were gaining confidence in the possible potential of these digital assets and the innovation moving them. But this does not deny the fact that cryptocurrencies continue to remain as volatile. However, studies highlight their potential as a portfolio diversifier during the market stress (Dyhberg, 2016), whereas others thoughtfulness against the risks stemming from rumor and supervisory uncertainties (Bouri et al., 2017).

2.3 Cryptocurrency and Financial Assets

The growing integration of cryptocurrencies into universal fiscal systems has attracted a great deal of scholarly attention. Bitcoins high unpredictability continues to trigger discussion about whether it should be regarded as a currency, an investment asset, or somewhat in between (Conlon., 2020). Though Bitcoin propose advantages such as liquidity, easy global transmissions, and some safety against currency devaluation, it still falls short of vital monitory qualities like steady prices and reliable value preservation.

Numerous studies categorize Bitcoin primarily as a speculative asset, frequently comparing it more with the gold than to outdated fiat currencies. The instability is higher than both, and study increasingly points to Bitcoin having a fusion nature that merges features of each (Kwapień, 2021).

Even so, counting Bitcoin to investment groups may occasionally improve risk adjusted returns, relaying on the market setting and the period being studied. In certain circumstances, Bitcoin acts like a hedge or even a safe heaven, nevertheless this design is unpredictable and cannot continually be dependent upon (Watorek, 2021). For instance, research led throughout the COVID-19 pandemic

testified mixed results on whether Bitcoin worked as a safe heaven, with consequences changing across areas and time frames (Gil-Alana, 2020). Overall, prevailing literature directs that Bitcoin acts more like risk asset. It seems to propose more worth as a modification tool rather than serving as a dependable safe heaven.

2.4 Stock Market Dynamics and Interconnectedness

By today's high level of economic globalization, stock markets round the world have become extra linked than ever. Collective financial situations and the movement of assets across boundaries have wired these connections (Al-Mohamad et al., 2020). An issue in a single provincial market can now spill over to other regions creating interdependencies and complex interdependence (Wen et al., 2019).

This interconnected structure is slowly being created in emerging markets especially BRICS economics (Khalfaoui et al., 2023). The relationship between cryptocurrencies and these markets is crucial to consider in organizing affected groups and risk management, primarily under the conditions of high uncertainty.

2.5 The Role of Cryptocurrencies in Financial Crises

Inquisitiveness has slowly increased in knowledge about the behavior of cryptocurrency, in phases of fiscal pressure. In the case of COVID-19, a number of old markets were suffering drastically, but Bitcoin usually reacted the opposite. Such contradictory price trends help to understand that Bitcoin role in the economic organization is increasing, yet again it is complex (Ibrahim et al., 2023).

Market uncertainty avers should eventually encourage spillover impact on different classes of assets. These spillovers are manifested in both revenues and instability and they are most evident when major international upheavals like COVID-19 and the Russia Ukraine war occur (Alkan and Cicesek, 2020; Lehnert, 2022). Many studies also have reported that these spillovers distress are not long-lasting they

adjust with time, which highlights the need to keep track of risk and address it more effectively (Bouri et al., 2022).

The most notable inconsistency in the current literature is that most studies focus primarily on established markets and primarily on Bitcoin. This often leaves the broader cryptocurrency ecosystem and the functionality of area specific directories in emerging markets (Joshi et al., 2022). This gap identifies as primary path that future studies still have yet to search.

2.6 Volatility Spillovers and Risk Management

It is crucial to consider the nature of instability flowing between the cryptocurrencies and the traditional monetary markets when dealing with risk. Even though cryptocurrencies can be used to diversify portfolios, they are also very unpredictable, and hence may pose a significant risk especially when markets are under pressure (Zhang et al., 2021).

The contemporary modelling strategies including PBM and dynamic alteration models show that an adjustment in foreign exchange tariffs, interest value, and inflation may impact the behavior of stakeholders in regard to cryptocurrencies. This effect is primarily observable in the economy where cash devaluation is being faced (Liu and Tsyvinski, 2021). As an illustration, Bitcoin has been at times used as a border in such countries as Argentina or Zimbabwe, in case of financial uncertainty. The new econometric models such as example (GARCH, BEKK-GARCH, MS-GARCH) provide further proof that shocks in the cryptocurrency markets extend to other markets and vice versa. This affiliation tends to be sensitive to broader economic circumstances; it might be biased by geopolitical expanses (Kayal & Dutta, 2024).

As instability in chief cryptocurrencies i.e. Bitcoin, Ethereum and Litecoin continues to surge, it highlights the increasing interrelation of these digital resources. This trend strengthens the requirement

for stakeholders, managers and policy makers to comprise cryptocurrency related features when evaluating risk and creating macroeconomic calculations (Kao et al., 2024).

2.7 Gaps in Literature and Emerging Research Areas

Although study on cryptocurrencies and their associations with outdated fiscal markets has full-grown, numerous significant gaps still persist. A huge part of current studies emphasizes primarily on settled economies particularly the US and Euro zone. In contrast, developing markets are not studied as carefully, even though their financial situations, monitoring systems, and market performance are relatively diverse and can lead to exclusive conclusions.

Most of the existing work also focusses deeply on Bitcoin, with only inadequate consideration on Ethereum and the very petite on further digital assets that are more extensively used. Additional problem is that countless studies depend on broad universal indices in place of area specific ones, which makes it firmer to comprehend how cryptocurrency performance fluctuates across businesses and economic setting (Makridis et al., 2023).

One main area that remains understudied is the contrast of crypto currency revenues with outdated stock markets revenues, especially when looking at alterations between advanced and emerging economies. Since this contrast is limited in current research, are understanding of in what way cryptocurrencies can contribute to portfolio modification and how well they purpose as hedging gears in both firm and unstable markets remain unfinished (Ibrahim et al., 2023).

Even though numerous studies inspect volatility spillovers across different asset classes, only a rare one explores how these spillovers modify over time or in what way they perform during important universal events like COVID-19 pandemic or geopolitical stiffnesses like the Russia Ukraine war. These instable and repeatedly complex relationships mainly the differences amid progressive and evolving markets still requires deeper examination (Zhang et al., 2021).

Another gap concerns the role of macro-economic reasons like exchange rates, price rises, and interest rate in determining cryptocurrency performance and stakeholder's conduct. Even though certain existing research has begun to undertake such issues, overall findings continue to remain scattered and often lack unity in different domains and age groups.

To fill these gaps, the study is a comparison of incomes of Bitcoin and Ethereum against the stock markets of 3 developed countries (Russia, USA and China) and 3 developing countries (India, Pakistan and Bangladesh). Analyzing the manner of these assets executing and interacting in various financial conditions, the research objective to provide more robust and additional detailed insights into investment prospects, risk characteristics, and portfolio implications (Bouri et al., 2022).

In the future, future studies would use high frequency statistics, more advanced econometric technique, and machine learning gears to help in the future. These methods can help get nonlinear designs and indicate better predictions of market performance. These practices would help especially to comprehend the dynamism of the etching of cryptocurrency markets and to recover their growing position in the universal monetary formations.

2.8 Research Hypothesis

H1: The return of cryptocurrencies has a significant impact on equity markets of developed and developing economies.

Chapter 3

METHODOLODY

This section outlines the research design, data sources, variables and methods of analysis of understanding the dynamic relationship between cryptocurrencies and stock market in the developed economies as well as the developing economies. The procedure applied in this study will ensure that this study remains rigorous, effective and consistent.

3.1 Research Design

This research uses the quantitative and comparative research framework, depending on day-to-day figures from 2018 to 2024 to examine how bitcoin and Ethereum cooperate with stock markets in 6 established and emerging countries. Twelve separate bivariate VAR models were assessed to discover the link between each cryptocurrency and each stock index by using the Diebold and Yilmaz (2009) connectedness method. The Forecast Error Variance Decomposition (FEVD) technique is then applied to approach return and volatility spillovers, assisting to identify whether cryptocurrencies perform as spreaders or receivers of shocks across diverse markets.

3.2 Data Sources

The statistics used for this research was gathered from dependable fiscal podiums like Yahoo Finance, Coin Market Cap, Investing.com and the federal reserve exchange rate data base. Day-to-day concluding amounts for Bitcoin, Ethereum, and the selected Stock guides from USA, Russia, China, India, Pakistan & Bangladesh were assembled for the years 2018 to 2024. All values not initially quoted in USD were changed using everyday exchange rates from the national reserve to uphold steadiness across markets.

3.3 Variables

Variable	Proxy	Data Source	Reference
Independent	Bitcoin Returns	Coin Market Cap, Yahoo Finance	Bouri et al. (2017)
	Ethereum Returns		Corbet et al. (2018)
Dependent	BSE (India) Returns	BSE India, Pakistan Stock Exchange, Dhaka SE, S&P Global, Shanghai Stock Exchange, Moscow Exchange Group	Kumar et al. (2022)
	KSE 100 (Pakistan) Returns		Rizwan et al. (2023)
	DSEX (Bangladesh) Returns		Uddin et al. (2021)
	S&P 500 (USA) Returns		Yarovaya et al. (2022
	SSE Composite (China) Returns		Ji et al. (2019)
	MOEX (Russia) Returns		Dyhrberg (2016)

3.4Theoretical Framework

This research is made on two key theoretical grounds: Modern Portfolio Theory (MPT) & Spillover Theory. Collectively, these frameworks propose a sturdy foundation for studying how cryptocurrencies interrelate with outdated stock markets. Modern Portfolio theory presented by Markowitz (1952), stresses how modification assists in reducing investment risk. Conferring to MPT, stakeholders can increase their risk adjusted revenues by holding a group of assets that do not move effortlessly together. In this research, MPT directs the inspection of whether possessions like Bitcoin & Ethereum can improve modification when paired with stock directories from both advanced and emerging economies. Spillover theory is also applied to enlighten how stocks and unpredictability travel across monetary markets.

A specific theory that is relevant in this research is the VAR model to be employed in this study that quantifies the impact of movements in cryptocurrency returns and unpredictability on, or the effect of fluctuations in stock markets. Together, these speculative perspectives constitute a foundation of comprehending a performance of returns and volatility relations in various financial environments.

3.5 Analytical Techniques

In the research, a series of bivariate Vector Autoregressive (VAR) models are implemented in order to monitor the relationship between cryptocurrencies and stock markets with respect to the time span. Directional spillovers, net spillovers and overall level of market connectedness are calculated using these VAR models on the basis of the Forecast Error Variance Decomposition (FEVD) framework based on the Diebold and Yilmaz (2009) connectedness framework. Descriptive statistics, log returns change and stationarity trial are also done to ensure the results are precise and accurate.

In this thesis, David Gabauer's online VAR connectedness platform[1] was used to analyze the relationship between cryptocurrencies and stock markets using the Diebold and Yilmaz (2009) framework. The platform directly estimates VAR models and calculates spillover measures such as directional (TO/FROM), net, and total connectedness indices, along with graphical outputs. Although VAR models can also be estimated using software like EViews, the Gabauer platform was preferred because the data could be analyzed and interpreted within the same system, making the process faster and more consistent.

3.6Model specification

In order to investigate dynamic interdependences between stock markets and cryptocurrencies in developed and emerging economies, this experiment uses the Vector Autoregressive (VAR) model

1 https://davidgabauer.shinyapps.io/connectedness_approach/

which is a powerful time-series econometric model that seeks to model the dynamic interrelations among other

1 https://davidgabauer.shinyapps.io/connectedness_approach/

related variables. The VAR model is specially applied in the financial series of returns because it enables each variable at the same time to be affected by its own lags as well as the historical innovations of other variables, which creates a complete image of unidirectional spillover impacts.

In the context of this research, the VAR framework is used to analyze how the returns of major cryptocurrencies Bitcoin (BTC) and Ethereum (ETH) interact with traditional stock indices from both developed and developing markets. The model is specified to identify how shocks or innovations in the cryptocurrency market influence stock market returns and conversely, how equity market movements feed back into cryptocurrency performance over time.

Formally, the model is expressed as:

$$Y_{t=} A_1 Y_{t-1} + A_2 Y_{t-2} + \ldots\ldots\ldots\ldots + A_p Y_{t-p} + \varepsilon_t$$

Where:

Model Details	**Explanation**
Y_t	Log returns of cryptocurrency & stocks markets
$A_{1,} A_2 \ldots\ldots A_P$	Coefficient matrices
$Y_{t-1}, Y_{t-2}, \ldots\ldots\ldots, Y_{t-p}$	Lagged vectors
p	Lag length
ε_t	Error term (represents unexpected shocks)

In this study, a bivariate VAR model is estimated separately for each country cryptocurrency pair, resulting in a total of twelve estimations (Bitcoin S&P500, Bitcoin Bombay Stock exchange, Bitcoin

Moscow Stock Exchange, Bitcoin Shanghai Stock Exchange, Bitcoin KSE100, Bitcoin Dhaka Stock Exchange and corresponding pairs with Ethereum). The design separates the bilateral associations between every stock index and every cryptocurrency, which might enable the determination of pair specific spillover dynamic without confounding multivariate effects.

All VARs are calculated against logarithmic returns series, which are calculated as the natural log of price relatives:

$$rt = \ln(\frac{P_t}{P_{t-1}})$$

Where: -

Details	**Explanation**
Ln	Log Natural
Rt	Log return at time t
P_t	Price at time t
P_{t-1}	Price at time t-1

This normalizing makes the variances more normalized and the distributions of the returns are more symmetric and estimable. Daily log returns are used such that the results will be more indicative of even a short-term volatility.

The bivariate VAR model can help a great deal in uncovering the time-dependent causality and transmission of digital versus traditional asset classes. It shows whether historical returns of cryptocurrencies play a significant part in further movement of stocks and vice versa. This framework

can especially be applied to understand the differences in financial contagion and flow of information in the context of various economic settings such as between developed markets (such as the U.S.) and emerging markets (such as Pakistan or Bangladesh).

The appropriateness of VAR models in estimating crypto equity linkages has been empirically confirmed by studies like Londoño and Téllez (2019) and Phetcharat and Sethi (2023) among others, indicating their potential to find both directional and magnitude-based relationship between financial assets. In line with these results, it has been in this paper that we have used the VAR model to address the issue of whether cryptocurrencies are transmitters or receivers of volatility and the effect they exert on developed and developing economies is different.

To conclude, this modeling framework allows accurately estimating the role of cryptocurrencies (BTC and ETH) in the interaction with equity markets in different financial settings, which a strong basis of the subsequent Forecast Error Variance Decomposition (FEVD) and reliance analysis within the framework of Diebold and Yilmaz (2009) methodology. 1 2 x bivariate VAR will be as follows: -

Cryptocurrencies	**Developing**			**Developed**		
	Pakistan	**India**	**Bangladesh**	**USA**	**Russia**	**China**
BTC	KSE 100	BSE	DSEX	S&P 5	MOEX	SSE
ETH						

3.7 Data Analysis Plan

The research practical examination has been aided by the usage of David Gabauer Connectedness Method that utilizes Diebold and Yilmaz (2009) framework based on the Vector Autoregressive (VAR) model of connectedness. Bivariate Vector Autoregressive (VAR) models were performed using the

David Gabauer VAR connectedness software, Forecast Error Variance Decomposition (FEVD) calculated and the directional (TO/ FROM), net and Total Connectedness Indices (TCI) produced. The software also generates dynamic connectedness graphs and network visualization, which enables the research to observe how the spillover designs change over time between markets.

Microsoft excel was used in data grounding activities like calculating log returns, changing exchange rates and handling missing observations. Excel was also used to shape summary statistics and arrange the data circles before importing them into the connectedness tool. Using excel for preprocessing collectively with the David Gabauer VAR connectedness tool guaranteed both precision and orientation with the methodological structure proposed by Diebold and Yilmaz (2009).

3.8 Limitations

This research has quite a few limitations that must be recognized. First, it depends on Bivariate VAR Models, which study relations among two variables at a time. While being beneficial, this method cannot entirely capture the additional complex connections that may happen in a multivariate market setting. Second, the analysis emphases only on two cryptocurrencies and six stock indices, means that other digital possessions and global markets which may affect connectedness are not involved. Lastly, the research does not include macroeconomic indicators or controlling features, both of which might further form the connection between cryptocurrency and equity markets across nations.

Chapter 4

RESULTS AND ANALYSIS

4.1 Data Analysis

Table: 4.1.1 Descriptive Statistics of Log Returns

Table 4.1.1 shows the descriptive statistics show that average daily returns across all markets are close to zero, which is typical for financial return series. All markets exhibit very low variance, indicating relatively small daily fluctuations, except cryptocurrencies (Bitcoin and Ethereum), which are visibly more volatile.

The skewness values indicate that most return distributions are negatively skewed meaning more frequent small gains and occasional large losses. Dhaka Stock Exchange is positively skewed, suggesting the opposite pattern. All skewness values are statistically significant.

The excess kurtosis values are strongly positive and highly significant across all assets, confirming fat tailed distributions where extreme returns occur more often than under normality. This is supported by the highly significant Jarque Bera (JB) statistics, which decisively reject normality for all markets.

The ERS stationarity test values are significant for every series, indicating that all return series are stationary, as expected for log return data.

Finally, the Q (10) and Q^2 (10) tests show significant autocorrelation in both returns and squared returns for most markets, suggesting the presence of linear dependence and volatility clustering, consistent with financial time-series behavior.

Statistic	Bitcoin	Ethereum	Bombay SE	Moscow SE	Shanghai SE	KSE 100	S&P 500	Dhaka SE
Mean	0.00144	0.00163	0.00026	0.0000559	0.0000092	0.00013	0.00034	-0.00013
Variance	0.00134	0.00215	0.00010	0.00039	0.00009	0.00018	0.00010	0.00017
Skewness	0.015	-0.037	-1.330	-2.536	-0.271	0.436	-0.600	8.219
Ex Kurtosis	6.808	4.013	26.976	60.106	9.658	39.521	20.371	302.099
JB	4938.724	1716.011	78283.05	387643.411	9968.152	166490.36	44366.88	9752216.73
ERS	-2.264	-6.231	-22.191	-16.581	-6.183	-7.053	-2.724	-18.020
Q(10)	18.702	28.435	27.274	32.313	13.812	44.913	69.953	20.484
Q^2 (10)	76.935	230.288	436.281	499.707	43.032	446.052	1188.405	6.369

Table 4.1.2: Forecast Error Variance Decomposition (Connectedness Table)

Table 4.1.2 shows the connectedness table shows a high degree of cross market spillovers, confirming that shocks in one market transmit meaningfully to others. Bitcoin and Ethereum exhibit the largest "TO" spillovers (51.15% and 52.56%, respectively), indicating they are the dominant transmitters of return shocks in the system. In contrast, traditional equity markets particularly Bombay Stock Exchange, Shanghai Stock Exchange, KSE100 and Dhaka Stock Exchange display relatively higher "FROM" values, implying they are net recipients of shocks.

The same can be said about Moscow Stock Exchange and S&P500 which transmit significant spillovers, just not as much as the cryptocurrencies do, which implies that crypto markets have a greater systemic impact than single stock markets. The values of the Inc. Own remain large in each of the markets thus reflected that own market shocks continue to provide most of the variance of their forecast error.

The row of NET connectedness is very clear that Bitcoin, Ethereum, Moscow Stock Exchange and S&P 500 are net transmitters and Bombay Stock Exchange, Shanghai Stock Exchange, KSE 100 and Dhaka Stock Exchange are net receivers. The general value of TCI (Total Connectedness Index) of approximately 26-29% represents an average degree of interconnectedness between sampled or selected stock markets.

Statistics	Bitcoin	Ethereum	Bombay SE	Moscow SE	Shanghai SE	KSE 100	S&P 500	Dhaka SE	FROM
Bitcoin	54.54	37.12	0.60	1.46	0.87	0.40	4.12	0.89	45.46
Ethereum	36.99	54.53	0.66	1.31	0.98	0.51	4.09	0.94	45.47
Bombay SE	2.55	3.31	73.95	5.01	4.30	1.30	8.17	1.41	26.05
Moscow SE	2.24	2.08	4.50	76.34	3.50	0.97	8.71	1.66	23.66
Shanghai SE	1.79	2.19	4.86	3.57	80.71	1.75	4.32	0.82	19.29
KSE 100	0.60	0.77	1.46	1.97	1.97	90.12	1.62	1.50	9.88
S&P 500	5.53	5.53	4.53	8.37	2.82	1.17	70.73	1.31	29.27
Dhaka SE	1.46	1.57	1.50	1.87	0.87	1.70	1.30	89.74	10.26
TO	51.15	52.56	18.10	23.56	15.31	7.81	32.33	8.53	209.34
Inc Own	105.69	107.09	92.05	99.90	96.02	97.92	103.07	98.27	cTCI/ TCI
NET	5.69	7.09	-7.95	-0.10	-3.98	-2.08	3.07	-1.73	29.91/ 26.17
NPT	6.00	7.00	3.00	4.00	2.00	1.00	4.00	1.00	

Fig. 4.1.3: USD of Cryptocurrencies and Stock Markets Trend Analysis (2018–2024)

The trend analysis presented in Figure 4.1.3 shows that there are apparent disparities in the price development of cryptocurrencies and stock markets of the world. Bitcoin and Ethereum are highly volatile and characterized by steep increases and declines, and speculative forces and accelerated market cycles. Major stock indices like S&P500, Shanghai stock exchange and KSE100 on the other

hand have smoother and more gradual trends, which are typical of more general economic and policy influenced market behavior.

There are observable declines in Moscow Stock Exchange and Bombay Stock Exchange in the 2020-time frame of the pandemic, but a gradual rise in both Dhaka Stock Exchange and Shanghai Stock Exchange. All in all, the figure demonstrates that cryptocurrencies have a much bigger price variation, but stock markets have more predictable long term growth trends, which upholds the structural divergence of these types of assets.

Figure 4.1.4: Directional Spillovers Transmitted TO Other Markets

Figure 4.1.4 shows how each market varies in time in terms of the spillovers it sends to the other system. Cryptocurrencies particularly Bitcoin and Ethereum exhibit a systematic and more extreme spillover transmission, which is a confirmation of their involvement in the transmission of major shocks. The levels of spillover in equity markets are also relatively lower and more stable and

periodically higher in times of important global events like the pandemic and instances of geopolitical or economic uncertainties.

Both Moscow Stock Exchange and S&P 500 have observable short-term spikes, which denote instances where the two markets played strong transmitters at any given time. Conversely, emerging markets such as Dhaka Stock Exchange, Bombay Stock Exchange and KSE100 are the ones that retain the lowest transmission levels throughout the period.

In general, this figure shows that the work of cryptocurrencies is extremely dynamic in terms of spillover transmission, and the vast majority of stock markets are medium or weak shock senders.

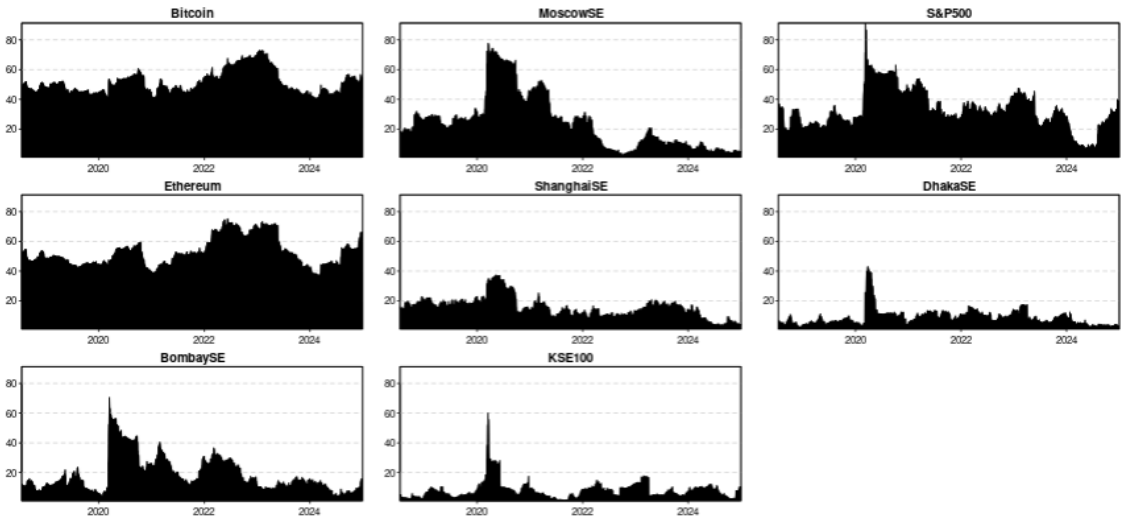


Figure 4.1.5: Directional Spillovers Received FROM Other Markets

Figure 4.1.5 reveals how time-varying number of shocks are being received by each market to the remainder of the system. The findings also demonstrate that stock markets especially Bombay Stock Exchange, Shanghai Stock Exchange, KSE100 and Dhaka Stock Exchange, are always getting larger

spillovers, and it proves their existence as net shock receivers. Their external welcome peaks when it comes to major world events, and there are obvious spikes around the COVID-19 2020 and the following economic turbulence.

Bitcoin and Ethereum, on the other hand, have more favorable and consistent spillovers, which supports the fact that they are more likely to be net transmitters than net receivers. There are moderate spillovers received by Moscow Stock Exchange and S&P500, and temporary surges represent the shocks related to geopolitics and macroeconomics.

On the whole, the figure indicates that conventional equity markets are more prone to exogenous shocks, whereas cryptocurrencies are more independent and are more of a source than a destination of volatility transmission.

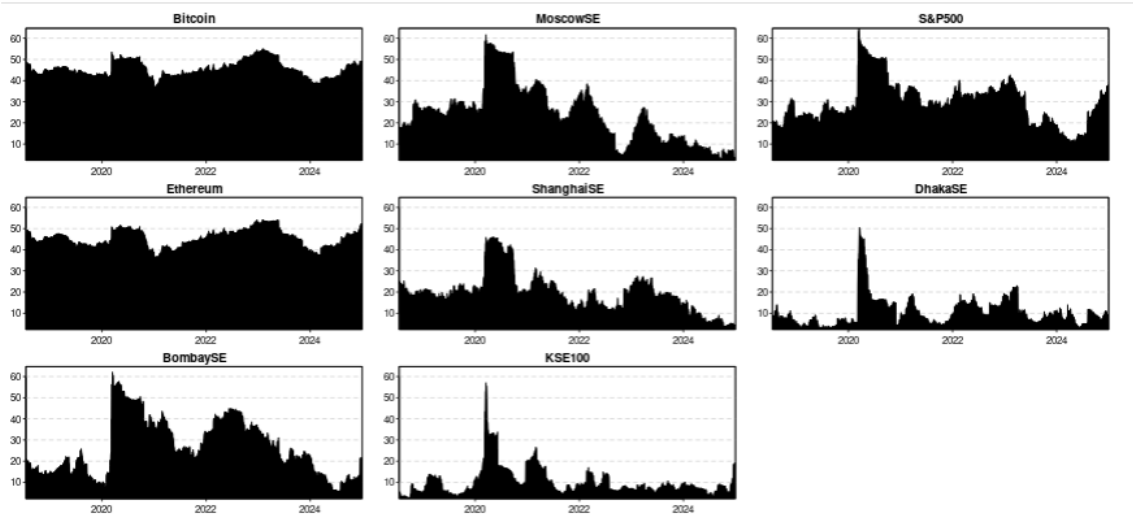


Fig 4.1.6: Net Total Directional Connectedness.

Figure 4.1.6 shows the net total directional connectedness, which shows the extent to which each market is a net transmitter of shocks or a net receiver of shocks in the long run. Bitcoin and Ethereum

maintain a positive net connectedness, which means that they majorly impart volatility to other markets. Their high upward spikes particularly in 2021-2022 affirms their dominance in the case of system wide spillovers.

Conversely, most of the stock markets especially Bombay Stock Exchange, Shanghai Stock Exchange, KSE100 and Dhaka Stock Exchange exhibit continuously negative net connectedness indicating that they are the primary receivers of the global system shocks. There are temporary positive surges which are seen when major disruptions happen in the world but these markets soon revert to net receiver positions.

Moscow Stock Exchange and S&P500 are in the positive and negative zone and these represent the times when they temporarily pass shocks but they are generally affected by the global and regional events.

The total figure shows clearly that, in terms of their structure, cryptocurrencies are a dominant set of net transmitters and traditional equity markets are a set of net receivers, concentrating on their structural position in global financial connectedness.

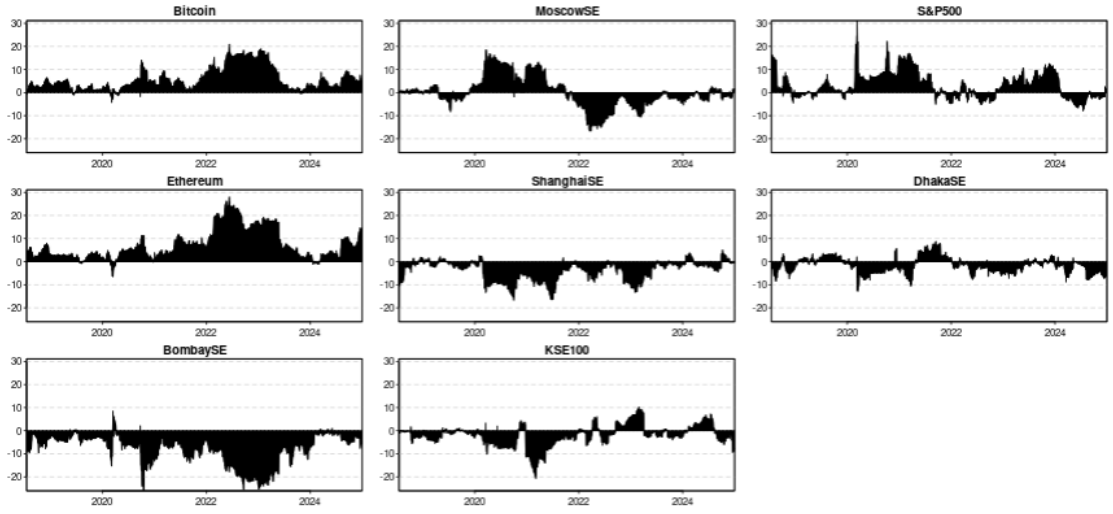


Figure 4.1.8: Globalization Index (TCI) (2019-2025)

The cryptocurrency and global stock market TCI are shown to vary with time in Figure 4.1.7. In the 2018-2019 season, the TCI is still moderate, which means that the transmission of spillover between markets is rather free and constrained. Early 2020 is dramatic with a sharp spike, with connectedness increasing above 60% due to the high rates of cross-market shocks during the outbreak of COVID-19. The phase is the most interdependent systemically in the sample.

After reaching its peak in the year 2020, connectedness decreases slowly but remains at a high level until 2021 and 2022, coinciding with major world events like cryptocurrency booms, policy uncertainty and inflation pressures. Since the middle of 2022, the TCI has stabilized at a moderate level, but still above the level before the pandemic, which indicates that the structural integration between the cryptocurrencies and the stock markets has become stronger over time.

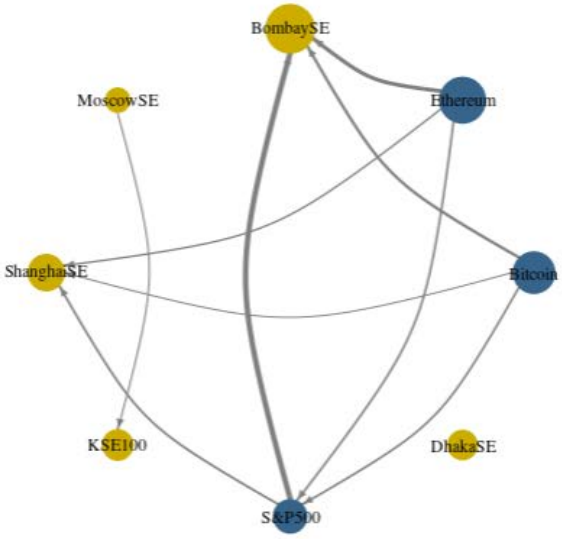
In general, the figure indicates that connectedness is very susceptible to global shocks and cryptocurrency volatility contributes greatly to increasing systemic spillovers. The continuing moderate-to-high connectedness following 2021 indicates the increasing interconnection between digital asset markets and traditional financial markets.

Figure 4.1.8: Network Plot

Figure 4.1.8 offers a graphical depiction of how shocks stream across markets. The system evidently displays Bitcoin, Ethereum and the S&P500 located as vital nodes, representing their central role in transmission of spillovers to further markets. The heavier and more frequent outgoing links from these possessions replicate their stronger impact in the structure.

In disparity, markets such as Bombay Stock Exchange, Shanghai Stock Exchange, KSE100 and Dhaka Stock Exchange appear on the edge with mostly inward networks, stressing their role as net receivers of shocks rather than transmitters. Moscow Stock Exchange inhabits a middle place, getting spillovers whereas also passing some onward.

Generally, the network visual approves a classified connectedness structure, where cryptocurrencies and the S&P500 act as main shock transmitters, whereas most evolving stock markets continue to rely upon and more exposed to exterior instability.



4.2 Discussion of findings

The results of this research evidently illustrates that cryptocurrencies, particularly Bitcoin & Ethereum, act as main foundation of volatility across worldwide fiscal markets. Their constantly high net spillover values show that shocks instigating in cryptocurrency markets spread extensively to stock markets. This imitates the rising impact and incorporation of digital assets within the wider economic organizations and confirms that cryptocurrencies are no longer remote hypothetical tools but active drivers of market performance.

Based on the empirical results obtained from the VAR (FEVD) connectedness analysis using the Diebold and Yilmaz (2009) framework, the study accepts hypothesis one (H1), which states that cryptocurrency returns have significant impact on the equity markets of developed and developing economies. The findings provide strong evidence that returns and volatility originating from Bitcoin and Ethereum are transmitted to stock markets, as reflected by significant directional spillovers, net connectedness measures, and the Total Connectedness Index (TCI).

The findings of this study are consistent with existing literature on cryptocurrency&equity market interlinkages. The acceptance of the hypothesis one is supported by earlier studies that document significant return and volatility spillovers from cryptocurrencies to traditional financial markets. Prior research using the Diebold and Yilmaz (2009) connectedness framework finds that cryptocurrencies, particularly Bitcoin and Ethereum, often act as dominant transmitters of shocks to stock markets rather than passive receivers. Studies such as Bouri et al. (2017) and Corbet et al. (2018) report that cryptocurrency returns significantly influence equity market behavior, especially during periods of heightened uncertainty. Moreover, empirical evidence from Ji et al. (2019) and Yarovaya et al. (2022) supports the finding that spillovers intensify during crisis periods, reducing diversification benefits. Consistent with research focusing on emerging markets, the results also align with findings by Rizwan et al. (2023) and Uddin et al. (2021), who show that stock markets in Pakistan and Bangladesh primarily act as net receivers of volatility from cryptocurrency markets. Therefore, the results of this study not only confirm the existence of significant crypto&stock market linkages but also extend the literature by providing comparative evidence across developed and developing economies using a dynamic connectedness framework.

A significant finding narrates the alterations in connectedness between established and emerging economies. Stock markets in advanced countries such as the USA (S&P 500), Russia (MOEX), China (SSE) along with extremely integrated markets like India’s (BSE), demonstrates stronger associations with cryptocurrencies. Such markets transmit and receive the spillovers,which are more financially incorporated, have greater trading volumes, can process data more efficiently, and have stricter market structure. In disparity, other emerging markets like Pakistan (KSE100) and Bangladesh (DSEX) have weaker relations with crypto markets. They usually end up taking volatility as opposed to passing it on

implying that local characteristics are more dominant in shaping their market operations and that global crypto shocks have a lower insufficient role.

The findings also reveal that spillovers change with time and increase tremendously with the ages of universal unpredictability. The Covid-19 epidemic, the Russia Ukraine war and crypto crashes triggered sharp surges in connectedness and showed that over the course of the crisis age, monetary markets became increasingly entangled. This turnaround in performance points to the vulnerability of crypto and outdated markets to external shocks and greater likelihood of contamination in turbulent situations.

In most cases, the study provides significant insights to the stakeholders and policymakers. Since the cryptocurrencies remain to act as a robust transmitter of instability, its ability to provide modification becomes weak, especially during disasters when the stakeholders require the security the most. The spillover effects of the pronounces also stress on the necessity to monitor the cryptocurrency markets as a component of the broader economic constancy estimates, primarily in the countries where the supervisory schemes are still being developed.

Chapter 5

CONCLUSION AND RECOMMENDATIONS

This part will combine the major findings of the study on the dynamic relationships between stock markets and cryptocurrencies in both developed and emerging economies. On the basis of the empirical investigation provided above, it suggests an explicit conclusion and the suggestions to the policy makers, specialists, and future investigators.

5.1 Summary of Key Findings

The findings indicate that cryptocurrencies predominantly Bitcoin and Ethereum are continually acting as primary sources of instability of universal stock markets. Their spill over impacts is more difficult than those that arrive at their intersection with other stock directories which proves that crypto markets have become critical to dictate cross market moves. This demonstrates the increasing impact of cryptocurrencies on the larger fiscal frameworks.

The other notable outcome recounts to the disparity in interrelationship in the existing and developing markets. Established markets with high monetary inclusion including the S&P 500, MOEX, SSE, and India BSE indicate stronger and more frequent linkages with the cryptocurrency markets. This renders them even more vulnerable to shocks that develop out of crypto resources and broader universal sentimental spillovers. The KSE100 and DSEX emerging markets on the other hand show weaker correlation with cryptocurrencies. These markets absorb instability more than emit it, which apes their

lower standard of fiscal incorporation as well as their biased impact on the global crypto market forces.

The findings also indicate that spillover effects change over time and get extremely harder by passing through phases of universal uncertainty. The outbreak of the COVID-19 pandemic, geopolitical strains, and the serious crashes in the cryptocurrency markets cause the spikes in the connectedness. The designs show how the relationship between the cryptocurrency and the equity markets is more closely and more coordinated during the periods of pressure.

Typically speaking, the findings render it obvious that cryptocurrencies are no longer functioning in the form of remote or independent asset. They create robust spill over impacts, reduce the benefit of change within the group, and create an increasing difficulty of economic constancy especially in the nations with an inferior supervisory agenda.

5.2 Conclusion

The study finds out that cryptocurrencies especially Bitcoin and Ethereum have a long-term and consistent impact on universal monetary markets. They act as primary pillars of instability and turnover spillovers, often better than the old stock markets. This shows the level of integration of cryptocurrencies into the universal fiscal systems. Sophisticated and highly correlated markets (S and P 500, MOEX, SSE and India BSE) exhibit more associations with cryptocurrencies due to their progressive market framework and more elaborate fiscal plans, which allow magnifying the shock to blowout. Conversely, the emerging economies such as the KSE100 and DSEX remain more inaccessible and usually receive unpredictability rather transmit it. This reverberates market complexity and regulation and fiscal integration differences across nations.

The study also indicates that the correlation between cryptocurrencies and stock markets is not dynamic it proves to be stronger during the periods of universal stress such as the COVID-19 pandemic and primary geopolitical occurrences. These times indicate greater spillovers and increased risks of contamination, which proves that universal markets get more interconnected in times of strain. On the whole, the results outline that cryptocurrencies have emerged as influential fiscal assets with the ability to dictate performance in the market on an international level. This reduces their usefulness as tools of modification and the need to adopt improved risk managing practices and enhanced monitoring frameworks, especially in the developing markets where the monetary systems are more prone to external shocks.

5.3 Recommendations

According to the results, the research hypothesis is that the stakeholders have to reconsider the approaches to divergence as currently, cryptocurrencies and stock markets are increasingly closely interconnected, especially during universal shocks when divergence is the most prominent. It is also recommended that supervisors and institutional stakeholders should embrace flexible risk managing agendas that may change to modifying spillover designs and to changing phases of market pressure. Before the deeper market incorporation, fiscal authorities in most developing markets need to incorporate cryptocurrency related pointers in fiscal constancy valuation and enhance supervisory mistake. This will help in avoiding external uncertainty from spill over to local markets. The study also emphasizes on the need to coordinate cryptocurrency directive worldwide because digital assets can easily cross borders and cause systematic risk worldwide. They also need to educate the market stakeholders in such a manner that they are not in a position to make bad decisions during such highly volatile times. The policy makers should devise the instrument of crisis focus response with an

acknowledgement that cross market contamination is capable of being reinforced by the cryptocurrency markets. Finally, researchers are empowered to pursue future research with larger sample of cryptocurrencies, more advanced occurrence data, and more progressive connectedness models to model the richer and more complex contagion designs to reflect the current fiscal markets.

5.4 For Future Research

It contains many useful recommendations where future research can develop this work. One alternative would be to include additional asset classes such as commodities, bonds or foreign exchange markets so as to have a broader view of the cross-market spillover and the relationship between the spillover and universal fiscal incorporation. The second option is to expand the sample by local or state specific study that would allow the investigators to make a comparison on the performance of connectedness differently in the advanced, evolving and frontier markets.

Organizational perspective Multivariate or time varying VAR models (TVP-VAR) can be used in future studies to capture the changes in relations over time. The addition of macroeconomic and policy variables including exchange rates, interest rates, inflation, the geopolitical risk pointers can also help to explain what drives changes in spillover intensity. Lastly, the implementation of more liberal network-based techniques would provide an additional insight into the way the interconnectedness in the universal fiscal structure evolves and develops.

REFERENCES

Alkan, B., & Çiçek, S. (2020). Spillover effect in financial markets in Turkey. *Central Bank Review, 20*(2), 53–64. https://doi.org/10.1016/j.cbrev.2020.01.003

Allen, B., & Bryant, S. K. (2019). The market for cryptocurrency: How will it evolve? *Global Economy Journal, 19*(3), 1950019. https://doi.org/10.1142/S2194565919500196

Al-Mohamad, S., Rashid, A., Bakry, W., Jreisat, A., & Vo, X. V. (2020). The impact of BRICS formation on portfolio diversification: Empirical evidence from pre- and post-formation eras. *Cogent Economics & Finance, 8*(1), 1747890. https://doi.org/10.1080/23322039.2020.1747890

Al-Omoush, K. S., Gomez-Olmedo, A. M., & Funes, A. G. (2024). Why do people choose to continue using cryptocurrencies? *Technological Forecasting and Social Change, 200*, 123151. https://doi.org/10.1016/j.techfore.2023.123151

Anselmi, G., & Petrella, G. (2023). Non-fungible token artworks: More crypto than art? *Finance Research Letters, 51*, 103473. https://doi.org/10.1016/j.frl.2022.103473

Antar, M. (2024). Quantile analysis of Bitcoin returns: Uncovering market dynamics. *Journal of Risk Finance, 26*(1), 122–146. https://doi.org/10.1108/JRF-05-2024-0154

Arslanian, H., & Fischer, F. (2019). The basics of cryptography and encryption. In *The future of finance* (pp. 89–93). Palgrave Macmillan. https://doi.org/10.1007/978-3-030-14533-0_7

Attarzadeh, A., Isayev, M., & Irani, F. (2024). Dynamic interconnectedness and portfolio implications among cryptocurrency, gold, energy and stock markets: A TVP-VAR approach. *Journal of Financial Markets, 61*, 100769. https://doi.org/10.1016/j.finmar.2023.100769

Bouri, E., Molnár, P., Azzi, G., Roubaud, D., & Hagfors, L. I. (2017). Is Bitcoin a hedge, a safe haven or a diversifier? International Review of Financial Analysis, 47, 506–519. https://doi.org/10.1016/j.irfa.2016.02.008

Bouri, E., Kristoufek, L., & Azoury, N. (2022). Bitcoin and S&P500: Co-movements of high-order moments in the time-frequency domain. *PLOS ONE, 17*(11), e0277924. https://doi.org/10.1371/journal.pone.0277924

Charfeddine, L., Benlagha, N., & Khediri, K. (2022). An intra-cryptocurrency analysis of volatility connectedness and its determinants: Evidence from mining coins, non-mining coins and tokens. *Research in International Business and Finance, 62*, 101699. https://doi.org/10.1016/j.ribaf.2022.101699

Corbet, S., Lucey, B., Urquhart, A., & Yarovaya, L. (2018). Exploring the dynamic relationships between cryptocurrencies and other financial assets. Economics Letters, 165, 28–34. https://doi.org/10.1016/j.econlet.2018.01.004

Conlon, T., & McGee, R. (2020). Safe haven or risky hazard? Bitcoin during the COVID-19 bear market. *Finance Research Letters, 35*, 101607. https://doi.org/10.1016/j.frl.2020.101607

Стойка, М. (2021). Cryptocurrency–Definition, functions, advantages and risks. *Підприємництво і торгівля, 30*, 5–10

Dyhrberg, A. H. (2016). Hedging capabilities of Bitcoin. Is it the virtual gold? Finance Research Letters, 16, 139–144. https://doi.org/10.1016/j.frl.2015.10.025

Fofack, A. D., Aker, A., & Rjoub, H. (2020). Assessing the post-quantitative easing surge in financial flows to developing and emerging market economies. *Journal of Applied Economics*, *23*(1), 89–105. https://doi.org/10.1080/15140326.2020.1817324

Gil-Alana, L. A., Abakah, E. J. A., & Rojo, M. F. R. (2020). Cryptocurrencies and stock market indices: Are they related? *Research in International Business and Finance*, *51*, 101063. https://doi.org/10.1016/j.ribaf.2019.101063

Goodell, J. W., Alon, I., Chiaramonte, L., Dreassi, A., Paltrinieri, A., & Pisera, S. (2023). Risk substitution in cryptocurrencies: Evidence from BRICS announcements. *Emerging Markets Review*, *54*, 100938. https://doi.org/10.1016/j.ememar.2022.100938

Gubareva, M., Bossman, A., & Teplova, T. (2023). Stablecoins as the cornerstone in the linkage between the digital and conventional financial markets. *The North American Journal of Economics and Finance*, *68*, 101699. https://doi.org/10.1016/j.najef.2023.101699

Hsu, S.-H., Sheu, C., & Yoon, J. (2021). Risk spillovers between cryptocurrencies and traditional currencies and gold under different global economic conditions. *The North American Journal of Economics and Finance*, *57*, 101443. https://doi.org/10.1016/j.najef.2021.101443

Ibrahim, B. A., Elamer, A. A., Alasker, T. H., Mohamed, M. A., & Abdou, H. A. (2023). Volatility contagion between cryptocurrencies, gold and stock markets pre-and-during COVID-19: Evidence using DCC-GARCH and cascade-correlation network. *Journal of International Financial Markets, Institutions and Money*, *85*, 101690. https://doi.org/10.1016/j.intfin.2023.101690

Ji, Q., Bouri, E., Lau, C. K. M., & Roubaud, D. (2019). Dynamic connectedness and integration in cryptocurrency markets. International Review of Financial Analysis, 63, 257–272. https://doi.org/10.1016/j.irfa.2018.12.004

Jokic, S., Cvetkovic, A. S., Adamovic, S., Ristic, N., & Spalevic, P. (2019). Comparative analysis of cryptocurrency wallets vs traditional wallets. *Ekonom*, *65*(3), 65–75.

Joshi, P., Wang, J., & Busler, M. (2022). A study of the machine learning approach and the MGARCH-BEKK model in volatility transmission. *Journal of Risk and Financial Management, 15*(3), 116. https://doi.org/10.3390/jrfm15030116

Kao, Y.-S., Zhao, K., Chuang, H.-L., & Ku, Y.-C. (2024). The asymmetric relationships between the Bitcoin futures' return, volatility and trading volume. *International Review of Economics & Finance*, *89*(Part A), 524–542. https://doi.org/10.1016/j.iref.2023.07.011

Kayal, P., & Dutta, S. (2024). Regime switching and causal network analysis of cryptocurrency volatility: Evidence from pre-COVID and post-COVID analysis. *Digital Finance*, *6*(2), 319–340. https://doi.org/10.1007/s42521-023-00104-x

Kreppmeier, J., Laschinger, R., Steininger, B., & Dorfleitner, G. (2023). Real estate security token offerings and the secondary market: Driven by crypto hype or fundamentals? *Journal of Banking & Finance, 154*, 106586. https://doi.org/10.1016/j.jbankfin.2023.106586

Kumar, D., Anandarao, S., & Dash, S. R. (2022). Spillover and connectedness between cryptocurrency and Indian stock market. Financial Innovation, 8, Article 19. https://doi.org/10.1186/s40854-021-00304

Kwapień, J., Watorek, M., & Drożdż, S. (2021). Cryptocurrency market consolidation in 2020–2021. *Entropy*, *23*(12), 1674. https://doi.org/10.3390/e23121674

Lehnert, T. (2022). Flight-to-safety and retail investor behavior. *International Review of Financial Analysis, 81*, 102142. https://doi.org/10.1016/j.irfa.2022.102142

Lin, M., Liu, Y., & Sheng, V. N. K. (2025). Analysis of the impact of macroeconomic factors on cryptocurrency returns based on quantile regression study. *International Review of Economics & Finance, 97*, 103757. https://doi.org/10.1016/j.iref.2024.103757

Liu, J., Julaiti, J., & Gou, S. (2024). Decomposing interconnectedness: A study of cryptocurrency spillover effects in global financial markets. *Finance Research Letters, 61*, 104950. https://doi.org/10.1016/j.frl.2023.104950

Liu, Y., & Tsyvinski, A. (2021). Risks and returns of cryptocurrency. *The Review of Financial Studies, 34*(6), 2689–2727. https://doi.org/10.1093/rfs/hhaa113

Londoño, J. M., & Téllez, D. (2019). Spillover risks on cryptocurrency markets: A look from VAR-SVAR Granger causality and Student's-t copulas. Journal of Risk and Financial Management, 12(2), 52. https://doi.org/10.3390/jrfm12020052

Makridis, C., Frowis, M., Sridhar, K., & Böhme, R. (2023). The rise of decentralized cryptocurrency exchanges: Evaluating the role of airdrops and governance tokens. *Journal of Corporate Finance*, *79*, 102358. https://doi.org/10.1016/j.jcorpfin.2023.102358

Pan, W., Xie, T., Wang, Z., & Ma, L. (2022). Digital economy: An innovation driver for total factor productivity. *Journal of Business Research*, *139*, 303–311. https://doi.org/10.1016/j.jbusres.2021.09.053

Phetcharat, N., & Sethi, G. (2023). Inter-market mean and volatility spillover dynamics between cryptocurrencies and an emerging stock market: Evidence from Thailand and sectoral analysis. Risks, 13(4), 77. https://doi.org/10.3390/risks13040077

Rizwan, M. F., Sial, M. H., & Majeed, M. T. (2023). Volatility spillover between cryptocurrencies and Pakistan stock market. Journal of Risk and Financial Management, 16(3), 118. https://doi.org/10.3390/jrfm16030118

Uddin, G. S., Yahya, M., & Masih, M. (2021). Spillover effect of cryptocurrency on emerging stock markets: Evidence from Bangladesh. Journal of Economic Studies, 48(6), 1197–1211. https://doi.org/10.1108/JES-09-2020-0476

Watorek, M., Drożdż, S., Kwapień, J., Minati, L., Oswiecimka, P., & Stanuszek, M. (2021). Multiscale characteristics of the emerging global cryptocurrency market. *Physics Reports*, *901*, 1–82. https://doi.org/10.1016/j.physrep.2020.10.005

Yarovaya, L., Matkovskyy, R., & Jalan, A. (2022). Systemic risk and market interdependence between cryptocurrency and equity markets. Journal of International Financial Markets, Institutions and Money, 78, 101552. https://doi.org/10.1016/j.intfin.2021.101552

Yu, X., Huang, Y., & Xiao, K. (2021). Global economic policy uncertainty and stock volatility: Evidence from emerging economies. *Journal of Applied Economics*, *24*(1), 416–440. https://doi.org/10.1080/15140326.2021.1919432