

## Article

# A Burst Bubble In Financial Stock Market Causes Financial Contagion And Volatility Spillover: A Statistical Overview

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### Abstract

This piece aims to give readers an up-to-date review of the literature on financial contagion and volatility spillover as it pertains to the stock market by classifying prior literature into distinct categories to provide an extensive bibliography. From different databases, over 200 high-quality research articles were collected to meet the article's requirements. For the study, we have extracted top-cited research publications between 1969 and 2022 from the different reputed databases of Wos and Scopus. We enlighten what occurrence makes a crisis a "burst bubble". This study has the potential to plot future directions for rigorous future research by academics, aspiring researchers, and other significant local and international stakeholders.

**Keywords:** Burst bubble, Financial Stock Market, Financial Contagion, Literature review, Volatility Spillover.

**JEL Classification:** C00, F30, G01, G15, O50

## 1. Introduction

The global financial market is one of the most critical financial stock markets that impact a country's market and economy. For the past three decades, global financial markets have been subjected to shocks and crises that began in a single country, or shock market, and quickly spread to others (Billio and Pelizzon, 2003; Carrieri et al., 2013; Abad and Chulia, 2016; Bian et al., 2020; Doidge et al., 2020). The interconnectedness of the financial markets

has been the focus of several theoretical and empirical investigations, making it one of the most well-liked fields of study in finance. The region of market integration is often discussed when discussing how financial markets interact (Bekaert and Mehli, 2019; Kearney and Poti, 2006; Hardouvelis et al., 2006; Carrieri et al., 2007; Kearney and Lucey, 2004; Erb et al., 1996). To that purpose, this article presents an overview of significant research that examined the worldwide spread of the crisis's shocks, focusing on the routes via which this spread occurred. Although it is complicated to compile all relevant findings reported in the literature and take into account every study published to date, considering the scope of the research area under review in this paper, we are confident that our work will lead to a better understanding of information transmission mechanisms and the channels through which they occur.

A difficulty with the method of new knowledge production in the larger field of finance serves as another impetus for our work. Similar findings are being reported in increasing studies, although each one's contribution is typically small. Lagoarde-Segot (2015) raised the issue of paradigm unity by posing questions to finance academics concerning the methods and goals of financial research. Although the nature of the research topics investigated in this field often goes beyond positivist philosophical presumptions, the available studies show no, or only limited, efforts to address these epistemological concerns before putting the quantitative data exercises into practice. As a result, the quantity of research articles with very little scientific innovation is growing. To better conceptualize certain phenomena in the literature, this research also tries to emphasize them.

The spread of negative consequences produced by market shocks or crises is called financial contagion. Excessive synchronization, often known as herd mentality, is the basis of most infectious illnesses. Volatility is a statistical measure of a stock's unpredictable price. Volatility spillover occurs when the volatility returns of one market influence the volatility returns of another market. Whether the news is good or bad, it always impacts volatility, and if two markets are linked, the influence will extend over a channel. Money, stock, and commodity markets are constantly vulnerable to the vagaries of the economy and other financial and non-financial influences.

Two complex issues are the idea of contagion and adequate testing procedures for establishing whether or not contagion has been identified. Many theoretical and empirical studies have been conducted on financial market interconnectivity, one of finance's most prominent topics of inquiry. Interactions between financial markets are often defined regarding market integration and geographical location. Only a few instances are Bodart et

al. (2005), Fijorek et al. (2021), Billio and Pelizzon (2003), Baele et al. (2010), and Bekaert and Harvey (2003). Over the last 30 years, both developing and advanced economies have experienced financial crises, including the 1992 Exchange Rate Mechanism (ERM) attack, the 1994 Tequila Crisis, the 1997 Mexican Peso East Asian Crisis, the 1998 Russian Collapse, the 1999 Brazil Crisis, the 2000 Technology Crisis, the 2007-2009 Global Financial Crisis (GFC), and the current COVID-19 Pandemic (2019 novel coronavirus). Like the Asian currency crisis, which began in Thailand and spread to other East Asian countries in 1997, the Global Financial Crisis (GFC) began in the US subprime debt market, spread rapidly across global financial markets, caused global financial disasters, and eventually led to the financial system's collapse and widespread social unrest. The natural research stream emphasized the financial crises' contagion mechanism, and this tendency seems to be mirrored in the financial markets. Several academics, including Baele et al. (2010), Bodart et al. (2005), and Sarcinelli (1999), have characterized contagion as an unusually high degree of connectivity across markets after a shock in one country. The Hong Kong financial crisis, like the Asian financial crisis of 1997, expanded to the stock markets of Brazil, Canada, Germany, and South Africa. During the Mexican crisis of 1994, the stock markets of Mexico, Argentina, Brazil, and China all suffered. Most studies categorize contagion channels as "fundamental induced" (which includes FDI and international trade) or "investor induced" (which excludes these elements) (Wang et al., 2021). Wealth constraints in the emerging stock market and the rebalancing habit of portfolios in established markets contribute to investor-induced contagion. Economic fundamentals drive financial contagion (significant transitory and short-term linkage), built on various equilibria based on endogenous liquidity and investor psychology. Such shocks result in portfolio reshuffling and changes in exchange rate regimes (Bodart et al., 2005; Wang et al., 2021). Volatility spillover arises when risk management indicates a causal relationship between current volatility and earlier volatility shocks in a particular market. As stated by (Dewandaru et al., 2016; Dornbusch et al., 2000), a financial crisis has shown either financial contagion or interdependence, with the difference between fundamental-based and pure contagion being detailed in depth. Pure contagion happens when the disaster's shockwave spreads swiftly and broadly throughout the country of origin. A shift in mentality that is not based on fundamental economic changes has the potential to reverse the crisis and restore investor confidence. Several crises in the 1990s drew attention to the concepts of contagion and spillover, and these events emphasized the need to know about and prepare for such disasters. Since then, scholars have invested time and attention into their work, resulting in an unprecedented number of research during the previous decade to fifteen years. We discovered that past research on the financial stock market had focused on univariate and bivariate generalized autoregressive conditional heteroscedasticity (GARCH) models as an econometric

instrument for analyzing data such as return histories (Akhtaruzzaman et al., 2021; Cho et al., 2009; Finance and 2012; Zouari et al., 2014). Several additional GARCH models, including the Diebold-Yilmaz model, the DCC GARCH, the asymmetric DCC-GARCH (ADCC) model, the VAR model (Akhtaruzzaman et al., 2021), the MS-GJR-GARCH model (Mwamba et al., 2021), and the Markov-Switching GARCH model (Ghorbel and Jeribi, 2021), are also (Banerjee and Feinstein, 2021; Kocaarslan et al., 2018). Sidhu et al., (2021) analyzed that unit root tests are concerned with the return; after that, the further test can unit forecasting can be done. An indirect study shows that Volatility Spillover, measured by Variance, is a significant constraint of these family models (Fijorek et al., 2021). The volatility transmission from Hong Kong to the United States in 2000-2001 was investigated using a heterogeneous autoregressive distributed lag (HAR-DL) structural break (Jung and Maderitsch, 2014).

It has been revealed that GARCH family models cannot account for the tail behavior of the marginal distribution (Wang and Feng, 2020). However, the Copula family has trustworthy models. Complex networks, such as those based on stock linkages, derivative price correlations, and investor sentiment, have been widely used in financial markets. Chen et al., 2021; Chen et al., 2021; Fang et al., 2019; Gaffeo et al., 2019; Jeong et al., 2019; Lee et al., 2018; Leon et al., 2019; Menezes and Oliveira, 2015; Wang and Feng, 2020; Wen et al., 2019). An increasing body of research (Chouliaras et al., 2017; Haley and Sigler, 1996; Huang and Wang, 2020; Lee et al., 2018; Zhou et al., 2016) reveals that diverse national stock markets have similar trends over many crises, with more considerable variances between developed and developing nations. Furthermore, there are widely recognized forms of multivariate models for financial time series, which is the topic of financial copula modeling. The copula model is a typical technique for examining causal links between variables. Copula modeling, applicable to risk and survival studies, makes it easier to investigate tail dependency. Financial contagion and boom-bust cycles are examples of what economic and financial modeling may learn from copula modeling. In bivariate copula modeling, many copulas are available to represent the relationships within a dataset and the possibility of outliers.

### **1.1 Covid-19, Russia- Ukraine crises and Financial Stock Market**

Researchers found significant financial contagion during the COVID-19 crisis as several economies and their stock markets were impacted concurrently. Many significant stock indices had declines of more than 30% in the first quarter of 2020, according to (Ding et al., 2021). Fear grips investors worldwide due to market failures (Jiang et al., 2022; Su, 2021; Wang et al., 2022). On the one hand, individual mainland investors, who tend to be more

immature, tend to overreact to market declines (Corbet, 2014; Corbet et al., 2018; Corbet and Gurdgiev, 2019). After the COVID-19 pandemic broke out, risk spillovers from European and American stock markets to stock markets dramatically increased, while those from Asian stock markets decreased (Liu et al., 2022; Samitas et al., 2022); Fu and Qiao, 2021; Liu et al., 2021). According to Uddin et al., (2022), the COVID-19 epidemic significantly influenced the analyzed markets (Hong Kong, China, Japan, and Korea).

Indonesia's stock market was severely impacted by COVID-19 in the Asian market (Indrayono, 2021; Mugiarni et al., 2021). In their investigation of the COVID-19 pandemic's effects on Shanghai Stock Exchange (SSE) index returns and volatility (Nsour et al., 2022), they found that both the epidemic and the 2008 financial crisis had a negative effect on market returns, with the pandemic's effects on volatility being more pronounced. The number of daily COVID-19-confirmed cases in Vietnam has been shown to have a detrimental effect on public and corporate market stock returns (Lin and Hung, 2021; Prasad et al., 2021). (Liu et al., 2020) examined historical data for the Nifty and Sensex in India and found that the stock market there was unstable throughout the outbreak. They found evidence that stock returns declined during the COVID-19 era when they compared the COVID-19 period's performance to the pre-COVID-19 period. The rapidly growing COVID-19 epidemic has rocked the world's capital markets (Chopra and Mehta, 2022). According to (Al-Nassar et al., 2022), the dynamic correlations between the leading and small and medium-sized enterprise (SME) markets are primarily positive and have grown significantly during the COVID-19 epidemic, particularly in Saudi Arabia. This suggests that adding SME stocks to a leading stock portfolio enhances risk-adjusted return, mainly during quiet market periods. Although the recent Russia-Ukraine crisis impacted the European economy adversely, which opened opportunities for some countries and threats to other countries (Kakran, 2022; Yousaf et al., 2022), time-varying parameter vector autoregressive (TVP-VAR used by Adekoya et al., (2022), Using Merton (1974) model by Bougias et al., (2022), MF-DFA (Multifractal Detrended Fluctuation Analysis) method used by Gaio et al., 2022 observed impact on stocks.

The global financial crisis (GFC) caused due to the Lehman brother's bankruptcy filing triggered a new era of extreme instability with extraordinary turbulence, acting as a burst bubble that created a confidence and liquidity crisis that quickly became systemic that expanded from the structured marketplace to stock markets, and subsequently the whole financial system displaying a very significant degree of interconnectivity (Baldi et al., 2016). The following is a lengthy explanation based on the sixth section: The justification is the focus of part 2, while the paper's objective(s) is/are the focus of section 3. In section 4, data

and methods are explained. Section 5 provides a thorough categorization and a discussion of the literature review based on an empirical investigation. The insight and thorough analysis connected to this paper's findings and conclusion were concentrated in Section 6, which will aid future research operations.

## **2. The study's justification**

Globalization opens the doors for trading on an international level under the regulations of the World Trade Organization (WTO). Globalization has allowed investing globally as investors have the potential to invest globally. Risks are hedging against the different types of financial risks, and to maximize profits, investors and portfolio managers invest in international cross-border markets, and their funds are differentiated. If the cross-border financial market follows the efficient market hypothesis (EMH) theory, then other market investments will fail and will not provide profits. Portfolio managers investigate the financial contagion and volatility spillover in the market between the shock and foreign markets to resolve such issues and identify the current actual position of financial markets. The existing literature review conducted by Seth and Panda (2018) collected papers from 1990-2015, So it is crucial to update the existing literature and future research agenda.

Although some studies show that contagion and spillover in the context of some financial crises but some found zero evidence. Therefore, the present study is based on the review of literature conducted to know the researcher's research undertaken based on the global financial stock market and to frame such study into an easy access and detailed understanding.

## **3. The study's objective**

The main objective of this study is to synthesize and arrange the existing literature on financial contagion and volatility spillovers by systematically analysing earlier works to better comprehend the phenomena issue, present research gaps in the literature, and publish publications that address those gaps.

## **4. Data and research methodology**

Concerning the financial stock market, this part focuses on providing earlier empirical research on financial contagion and volatility spillover. Initial keyword searches for the study of prior research included Burst Bubble, Financial Contagion, Volatility Spillover, and

Stock Market. About 200 research articles were screened based on the criteria in order to achieve the goals. The research articles were gathered from various academic research journals using the Google Scholar search engine, and the study’s goal required a lot of citations from databases including Scopus, Web of Sciences, ABS or ABDC-listed publications , and core relevant journals. The years represented in these journals span from 1969 to 2022.

The systematic classification used for the statistical analysis of the literature review is as follows:

- Statistical tools utilized in example research articles.
- The clustering of papers based on the publication year (from 1969 to 2022).
- The studies were categorized by country (Author’s first country).
- The period during which data samples were obtained.
- The total number of stocks, indexes, or variables used as a sample.

### 5. Statistical literature review on financial contagion and volatility spillover

This section shows the results of the literature review. Figure 1.1 and 1.2 shows the structure literature review of this study.

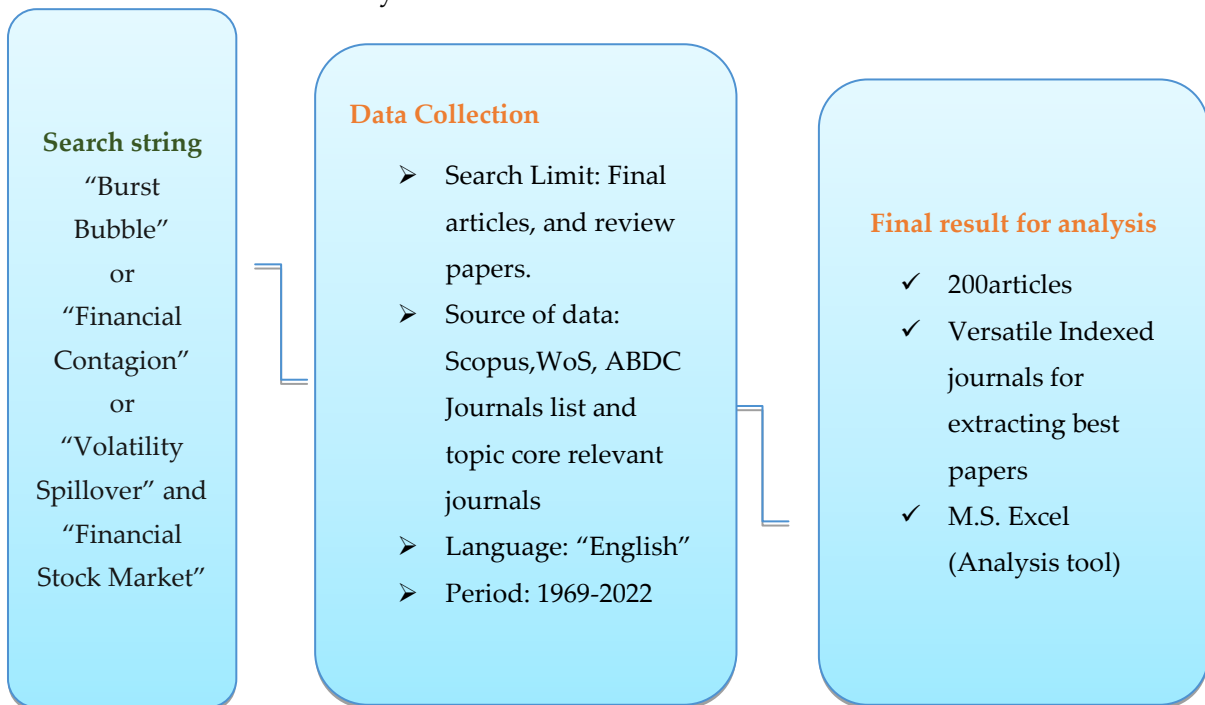


Figure 1.1: Aerial view of the framework using search strings, data collection, and methodology.

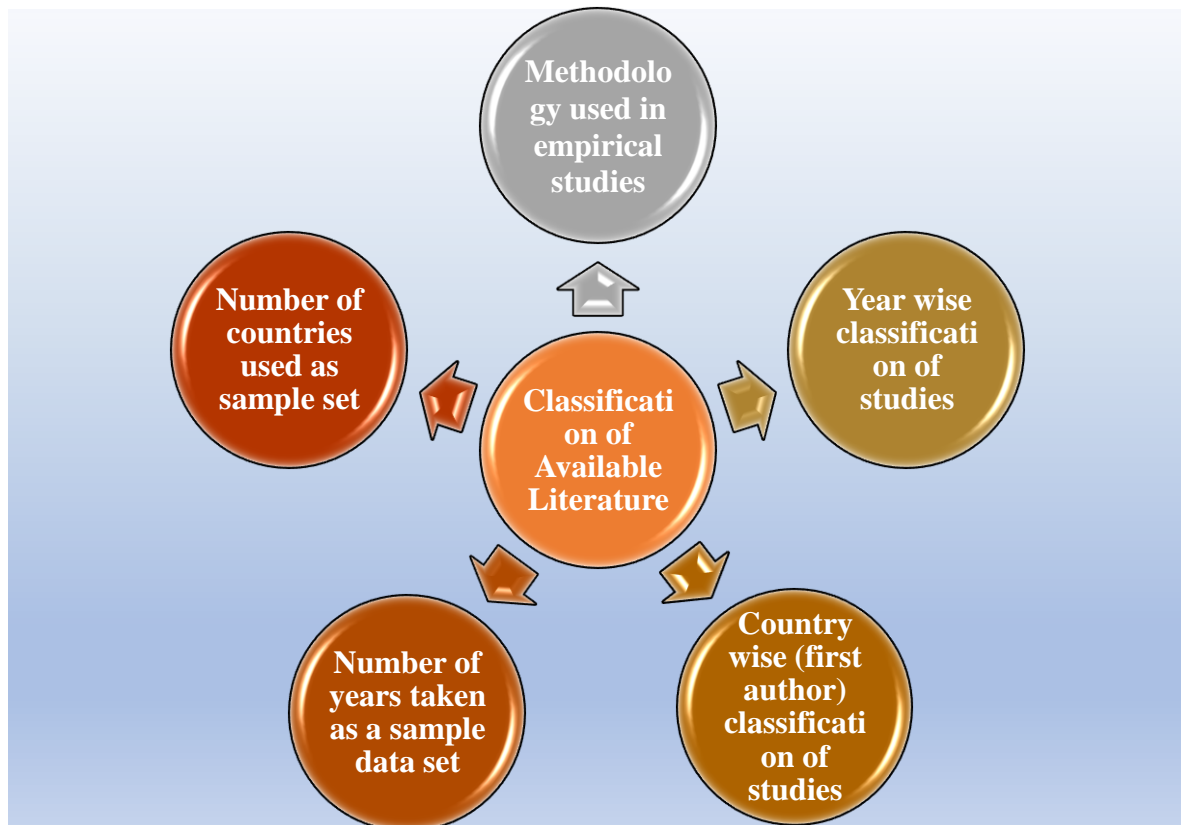


Figure 1.2: Core base for classification of past literature.

**5.1 Econometric tools used in sample research papers**

Different authors have used abundant time series methods in different studies for detailed and perfect results, as Table 1 (Figure 2) exhibits the prevalence of used econometric tools implemented for data analysis. It was found that most of the researchers (37%) used individually different types of models. DCC GARCH/ ADCC GARCH model is widely used in the (24.50%) study to check the financial contagion and volatility spillover along with the combination of specific other models. Post-COVID-19, researchers shifted to different hybrid models, i.e., the mixture of Copula, mixtures of GARCH, a hybrid of wavelets models, etc.

**Table 1: Methodology used in the different empirical studies.**

Econometric tools	Frequency of applied
DCC GARCH/ ADCC GARCH	49
AG-DCC	3
ARMA GARCH	5
E-GARCH	5
ARCH model	2
Multi-horizon wavelet transformation	2
Co-Integration/DCC-Co-Integration	3

Bivariate correlation analysis/ CPS correlation analysis	2
Latent Factor Model (LFM)/Factor Model	3
COVAR Approach	4
VAR framework/ VAR Model	17
DSDM (Dynamic Spatial Durbin Model)	2
Discrete Wavelet	2
Wavelet Model/ Hybrid Wavelet (Mixtures of wavelets)	10
Hybrid Copula	15
DMC-EVT Copula	2
Other	74

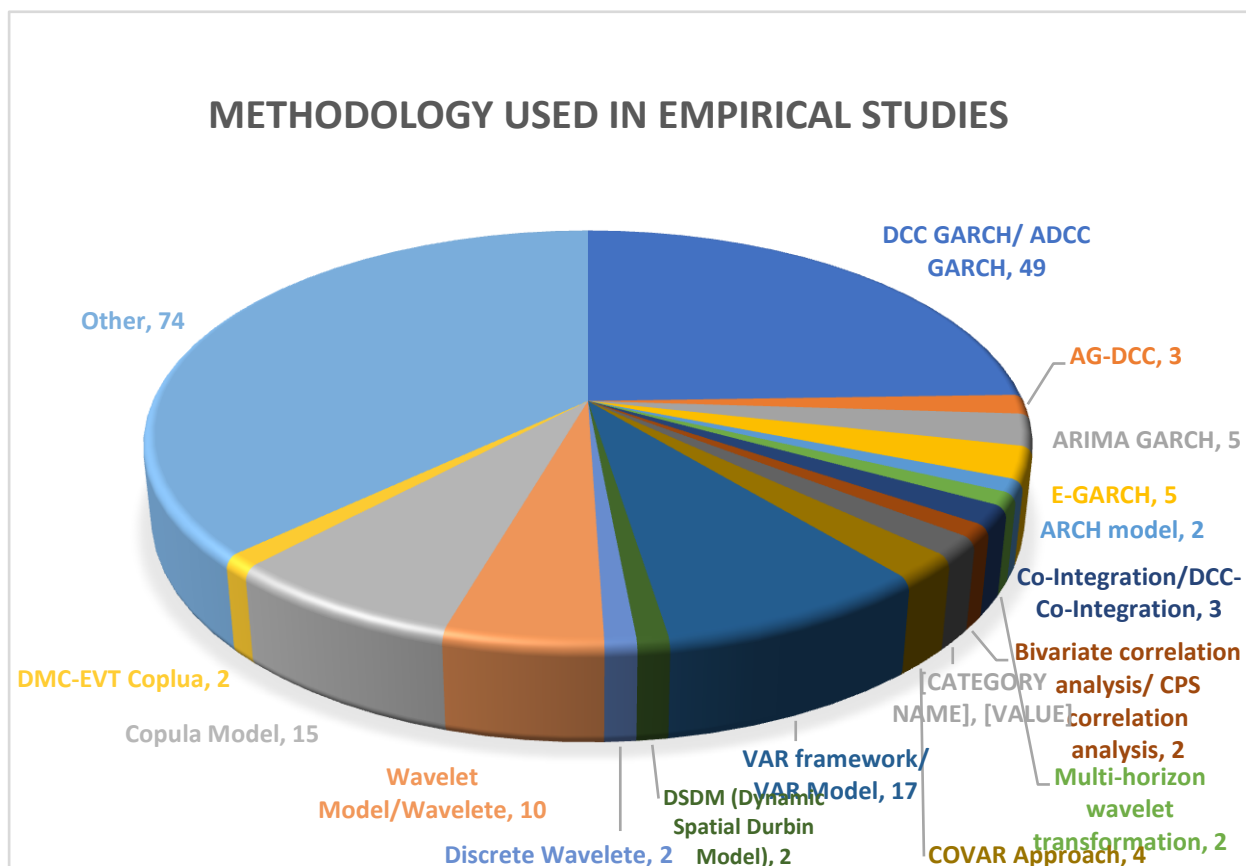


Figure 2: Methodology adopted in sample papers for data analysis(Author’s calculations).

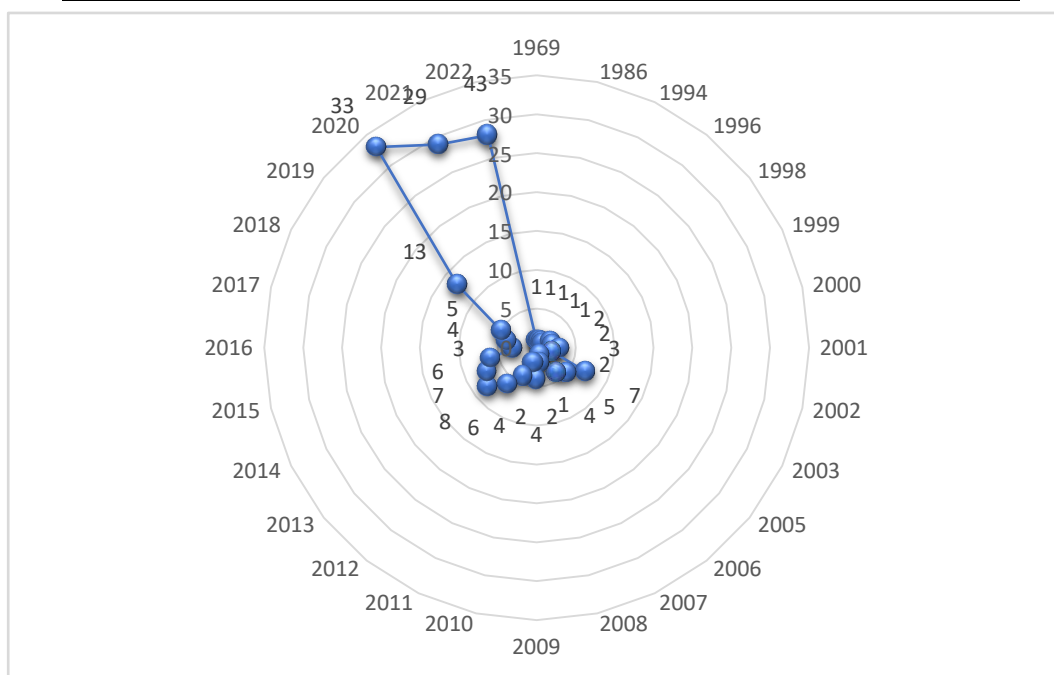
### 5.2 Classification of studies based on year of publication.

Different studies were collected from different sources, as a yearly number of studies shown in Figure 3 and Table 2. The first article on the financial stock market was published in 1969, and when attention turned to financial crises in the 1990s, a torrent of papers on stock markets was released. Although the contagion word was highly used after 2000, the Asian financial crises (1997) have given thrust, and researchers have started using it frequently. This kind of study first gained favour on a global scale. But after the year 2000, it began to

acquire popularity in India. Most of the publications included in this analysis are from 2019, 2020, 2021, and 2022. to demonstrate the state of the research in this area at the moment as well as the gaps and unexplored areas. Based on a thorough analysis, we discovered that after 2017, research began to shift toward commodity markets, after that COVID-19 created a breath of fresh air in the financial stock market, resulting in the initiation of once more ground-breaking research and the adoption of a slow pace of research following COVID-19.

**Table 2: Collection of studies based on the year of publication**

Years	No of papers	Years	No of papers
1969	1	2009	4
1986	1	2010	2
1994	1	2011	4
1996	1	2012	6
1998	1	2013	8
1999	2	2014	7
2000	2	2015	6
2001	3	2016	3
2002	2	2017	4
2003	7	2018	5
2005	5	2019	13
2006	4	2020	33
2007	1	2021	29
2008	2	2022	43



**Figure 3:Yearly collection of studies used for the publication(Author’s calculations).**

### 5.3 Country-wise (Author’s country) the classification of studies

Table 3, and Figure 4, represent research paper summaries of financial contagion and volatility spillover in the context of the financial stock market based on country-wise classification. Most of the studies conducted examined the USA, China, and Australia. A few authors of emerging (except China) and frontier markets have conducted the study in the context of financial contagion and volatility spillover. A similar trend was observed during and post-COVID-19.

**Table 3: Country-wise (first author’s country) classification of studies.**

Country	Frequency	Country	Frequency	Country	Frequency	Country	Frequency
Africa	1	Estonia	1	Korea	2	Spain	2
Austin	1	France	2	Lithuania	1	Switzerland	2
Australia	16	Germany	5	Malaysia	4	Vietnam	1
Bangladesh	1	Greece	9	Mexico	1	Taiwan	2
Belgium	2	India	10	Mongolia	1	Thailand	1
Brazil	4	Indonesia	1	Morocco	1	Japan	3
British	1	Ireland	2	Netherlands	1	Tunisia	2
Bulgaria	1	Israel	1	New Zealand	1	Turkey	3
Canada	2	Istanbul	1	Pakistan	1	UAE	4
China	35	Italy	8	Philippines	1	UK	2
Colombia	3			Poland	2	USA	18
Ecuador	1	Jordan	1	Romania	3	Venice	1
Egypt	1	Kabul	1	Slovenia	1	Saudi Arabia	2
Sweden	2	Finland	1	Kuwait	2		

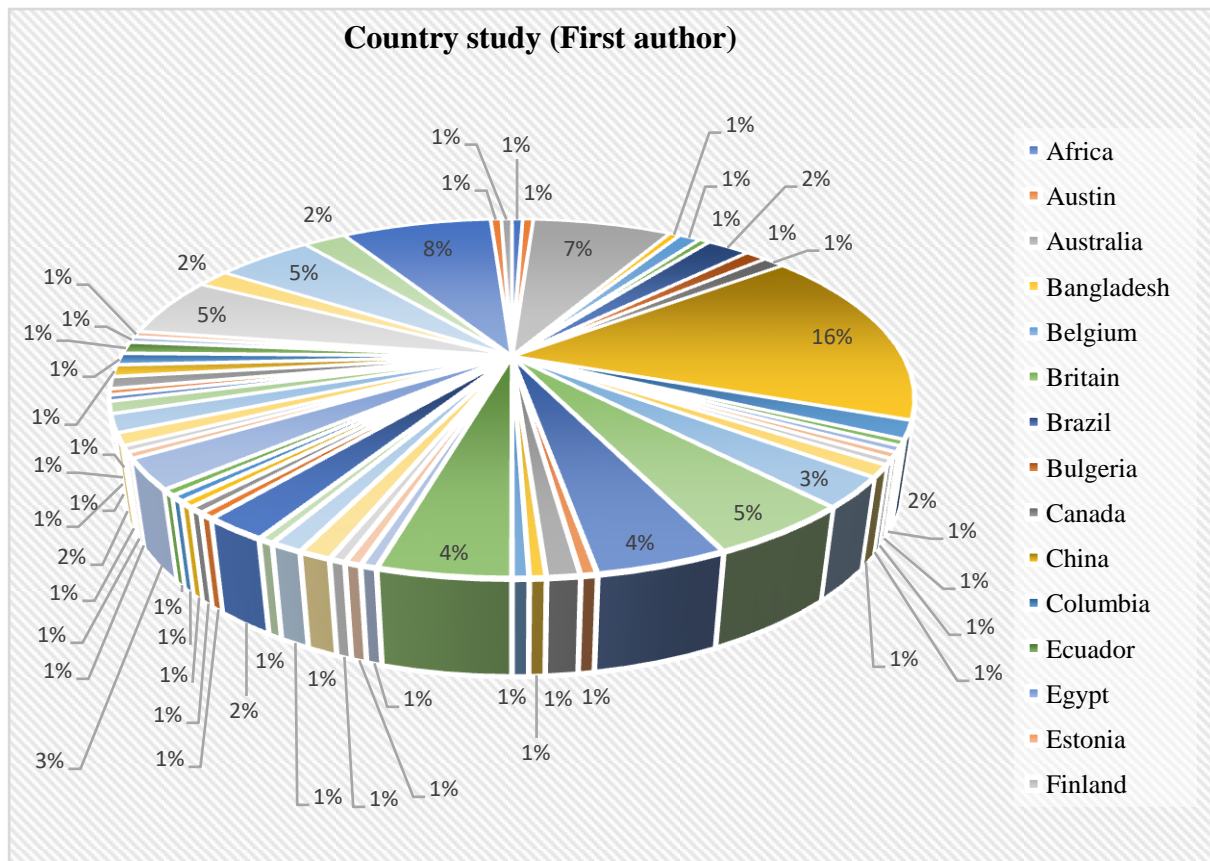


Figure 4: Classification of study based on first author’s country(Author’s calculations).

**5.4 Classification based on the number of years**

Table 4 (Figure 5) shows the different numbers of years used in the form of data for analysis. There are 40 research papers that had taken 6-11 years of data as in their study, followed by 38 papers (12-17 years) and 24 papers (18-23 years). Most authors focused on a lesser number of years as they focused on the particular period of the event (crises) (Campos-Martins and Amado, 2022; Karungu et al., 2021; Maghyereh and Abdoh, 2022; Nsour et al., 2022).

Table 4: Number of Years period in countries used as the sample set.

Number of years	Number of countries	Number of years	Number of countries
1	14	12-17	38
2	17	18-23	24
3	4	24-29	10
4	7	30-35	6
5	6	36-41	2
6-11	40	42-47	1

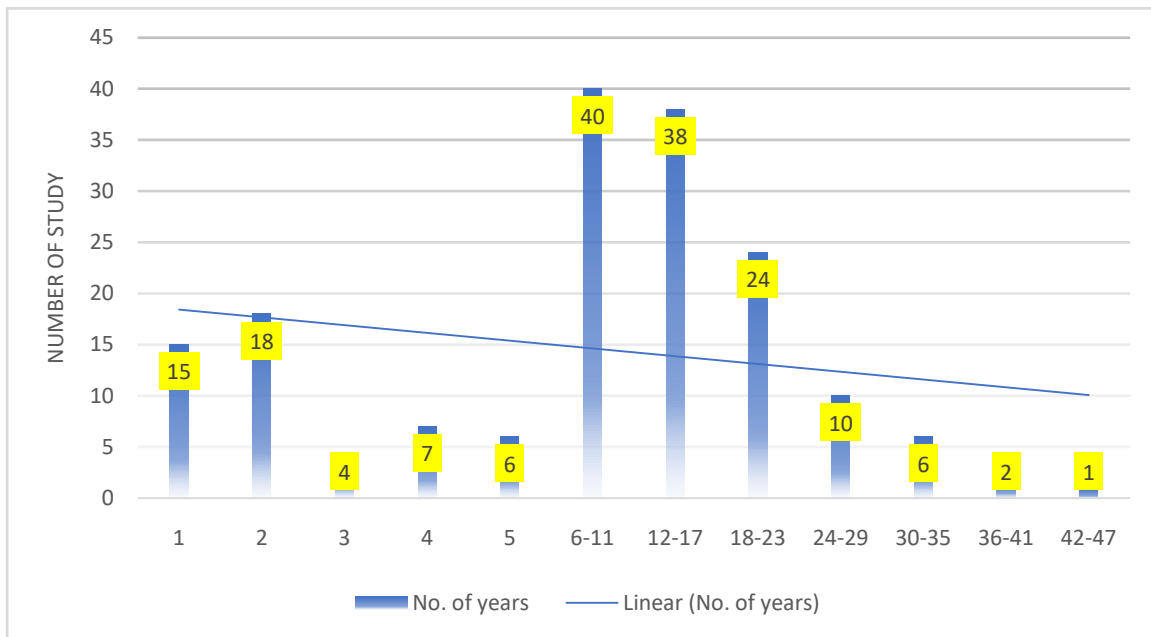


Figure 5: Number of years used as sample data (Author’s calculations).

**5.5 Number of countries plotted in research as sample datasets in different various research papers**

Table 5 and Figure 6 represent the number of countries used. Out of 200 papers, 50 studies considered 6-10 countries, representing the typical average as most authors used these countries. Only one author Liu and Jiang (2020), used 71 countries in their papers, representing the maximum number of countries for analysis through comparison. More countries as sample data create the opportunity for comparative study and more learning opportunity, although it’s sometimes reached in typical situations for comparative study of the channel of contagion and volatility spillover in financial stock markets. The most national and internationally published journal used the 8-10 countries dataset, which showed the authors’ feasibility for analysis and presentation.

**Table 5: Number of years taken for analysis by different authors**

Number of countries	Study	Number of countries	Study	Number of countries	Study
1	30	11-15	30	41-45	1
2	4	16-20	12	51	1
3	9	21-25	7	53	1
4	6	26-30	3	71	1
5	13	31-35	4		
6-10	114	36-40	2		

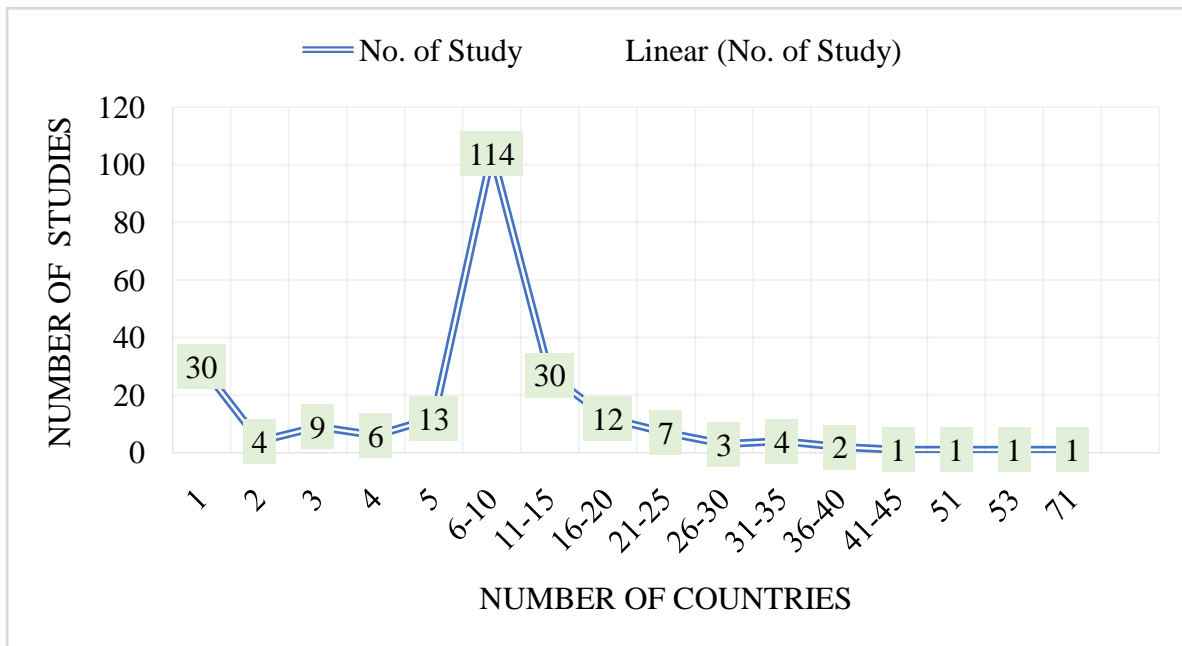


Figure 6: Number of countries used to collect the data(Author’s calculations).

## 6. Results and practical implications

This paper investigated prior research on financial contagion and volatility spillover in the stock market. The main points of earlier written articles are the topic of this study. About 200 research publications from various databases covering the years 1969 to 2022 were utilized in the study, which was then refined based on compatibility to fulfill the main goals of this work as to methodically discouragement. The number of countries used as sample data, the method used by the researchers, the entire time is taken into account for data analysis, and the contribution of each country to the study are a few of the criteria that are looked at. Before COVID-19, most research concentrated on the stock market, but starting in 2019, research in the context of the financial stock market decreased as the researcher began concentrating on the spot and the commodities market. In the most recent study that is accessible, many researchers provide various findings. However, most of them demonstrated contagion and a change in contagion throughout the three significant financial crises of 1990, namely the Tequila crisis in 1997, the Hong Kong crisis in 1997, and the Mexican crisis in 1994. The contagion channel was discussed concerning various nations as a consequence of the GFC, as indicated by (Corsetti et al., 2005) and (Fry et al., 2008). However, a small number of writers during the same crisis era also showed volatility spillover in place of contagion (Briere et al., 2012). There is still room to transfer studies into the context of developing and frontier markets, even if the majority of publications based on financial stock market research work centered on the USA, China, and Australian stock markets prominently. Frontier markets are entirely disregarded in the previously published

articles since there is still a significant research deficit. Conflict in Ukraine, COVID- It is still necessary to investigate the consequences in developing and frontier markets. The present study will provide a direction for future research in the same field for more research in the context of financial crises as well as a lead for creatively providing data for future researchers, academics, policymakers, practitioners, and relevant shareholders. Further research may be conducted by focusing on established, developing, and frontier markets and using the most modern techniques available. 2020 (Bian et al.) (Model DMC-EVT). Future research on the keywords mentioned above may be done in specific databases (Web of Sciences, Scopus, Google Scholar), even if this study is comprehensive of several databases about the relativity and impartiality of this paper. However, this research includes almost all contributing global economies or regions, comparative regional or specialized regional studies may be done in subsequent articles. In the perspective of future agenda, due to the nature of return and volatility transmission linkages that occur in spatial sequences of markets trading at intra-day time intervals, high-frequency data (i.e., more than daily) have not been used extensively in the current contagion research. Several methodological difficulties must be revisited with the advent of new approaches; for example, some early studies neglected to handle heteroscedasticity, therefore a revision using ARCH and copula models is now conceivable. Analysis of return and volatility transmission effects across asset classes is another research avenue worth exploring. There has been little research on volatility spillover in developing and frontier markets, although studies indicate considerable volatility spillover between emerging and mature markets. However, spillover is not necessarily unidirectional, and the influence on developing and frontier economies may vary from the impact on established markets. Furthermore, there has been little research on the volatility spillover between frontier markets. Frontier markets are less established and accessible than developing markets, with characteristics such as low market capitalization, poor liquidity, and high volatility. Because of these factors, volatility spillover in frontier markets may vary from that in developing countries regarding characteristics and effects. Given the growing relevance of developing and frontier economies in the global economy, it is critical to investigate volatility spillover in these countries to better identify possible risks and possibilities.

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