



Liquidity Spillovers at frequency domain in financial markets: A literature review

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Resumen

El presente estudio tiene como objetivo analizar la evolución y las tendencias actuales de la investigación sobre los desbordamientos de liquidez en los mercados financieros, haciendo hincapié en su papel crucial en la transmisión de las perturbaciones y su impacto en la estabilidad financiera en diversas economías. Se recopilaron y examinaron un total de 472 artículos relevantes de la base de datos Web of Science (WoS), que abarcaban el periodo comprendido entre 2005 y 2024. Los datos se analizaron utilizando el software VOSviewer y Biblioshiny del paquete Bibliometrix de R, lo que nos permitió crear un mapa científico de los temas principales dentro de este campo de estudio. Los resultados revelan tendencias de crecimiento en la investigación sobre la transmisión de los desbordamientos de liquidez, junto con el análisis de conceptos clave, países que contribuyen significativamente a este campo de investigación y redes de colaboración entre investigadores. Diversos estudios destacan que los desbordamientos de liquidez actúan como medio de transmisión de contagios que intensifican la inestabilidad de los mercados y las crisis financieras, al tiempo que afectan en gran medida a la resistencia del sistema. La presente investigación mejora la comprensión de la dinámica del contagio de liquidez, subrayando su importancia para la teoría económica y sus implicaciones para la elaboración de políticas reguladoras destinadas a preservar la estabilidad del sistema financiero mundial.

Palabras clave: Desbordamientos de liquidez, contagio, conectividad, estabilidad financiera.

Abstract

This study aims to analyze the evolution and current research trends regarding liquidity spillovers in financial markets, emphasizing their crucial role in the transmission of shocks and their impact on financial stability across various economies. A total of 472 relevant articles were gathered and examined from the Web of Science (WoS) database, spanning the time frame from 2005 to 2024. The data were analyzed using VOSviewer software and Biblioshiny from the Bibliometrix R-package, enabling us to create a science mapping of the primary topics within this field of study. The findings reveal trends of growth in research on the transmission of liquidity spillovers, along with the analysis of key concepts, countries contributing significantly to this field of research, and collaboration networks among researchers. Various studies emphasize that liquidity spillovers act as a means of transmitting contagions that intensify market instability and financial crises, while greatly impacting the resilience of the system. The present research enhances the understanding of liquidity contagion dynamics, underscoring its importance for economic theory and its implications for crafting regulatory policies aiming to preserve the stability of the global financial system.

Keywords: Liquidity spillovers, contagion, connectedness, financial stability.

1. Introduction

The transmission of liquidity spillovers among financial markets emerges as a critical area of research in economics, mainly due to its potential to disrupt interconnected economies, exacerbating financial crises. Recent studies have highlighted the impact of liquidity shocks in passing along impacts, from one market to another. This phenomenon amplifies the challenges posed by volatility risk during downturns (Inekwe, 2020). This matter is especially important in a globalized context where growing financial connections between emerging markets and developed markets increase the chance of contagion, since economic decisions in each market are influenced by actions taken in others. (Longstaff, 2010; Smimou and Khallouli, 2016; Grillini et al., 2022). The strong connections between markets allow liquidity effects to move quickly among them. This can increase risks, leading to “liquidity spirals” which may threaten the stability of the financial system as a whole (Brunnermeier and Pedersen, 2009; Smimou and Khallouli, 2016). Properly understanding the factors that cause these liquidity spillovers is essential for creating policies to maintain stability (Upper, 2011; Eross et al., 2016).

In this research, a bibliometric analysis of the subject in questions was performed, analyzing key contributors and collaboration patterns in liquidity spillovers. By employing dynamic visualization tools such as VOSviewer and Bibliometrix, academic production was examined, allowing the identification of relevant findings in terms of important themes and methodological frameworks in the current literature. This study offers an exploration of liquidity contagion dynamics, highlighting their significance in the financial field from a theoretical and practical approach.

In order to conduct this study, a total of 472 articles were collected and analyzed. The literature in question was published between 2005 and 2024 and gathered from the Web of Science database. Through this bibliometric approach, this study aims to expose a comprehensive analytical framework allowing the understanding of liquidity spillovers and their impact on the stability of the financial system. As an objective, it is proposed to deepen the existing academic knowledge from both practical and theoretical key points, providing relevant findings for future research in this field that shows an increasing interest.

This study will be presented as follows: Starting with a review of the existing literature and exposing key points in terms of liquidity spillovers proposed by different authors in financial areas. The following section describes the methodology employed in this research that allowed us to collect the articles analyzed. In third place, the results are presented considering the bibliometric analysis performed and therefore exposing relevant findings in terms of literature trends. Finally, the study concludes with the conclusions that aim to evaluate the contributions of this research.

2. Literature Review

The transmission of liquidity spillovers across financial markets has been a phenomenon of widespread analysis in the financial literature, in order to properly understand the dynamics of these shocks. These spillovers have the potential to trigger or worsen financial crises. Therefore,

their analysis appears as a relevant subject for economic stability. Employing a wide panel of countries, Inekwe (2020) explores how liquidity shocks are transmitted across various financial markets. The results presented provide evidence of the connectedness of liquidity across economies and within financial markets. The significance of this analysis during crisis periods is emphasized by Chuliá et al. (2020), whose research indicates that liquidity commonality reaches its highest levels directly following significant market declines, during periods of crises.

Liquidity transmission has gained significant traction in the academic domain, analyzing its consideration as a main channel of contagion between markets (Grillini et al., 2022). For instance, Smimou and Khalloul (2016) pointed out that this phenomenon is especially influential in financial markets, which serves a critical role in transmitting contagion between economies. These effects are primarily due to the case of the majority stock markets globally reaching a high level of financial integration. The evidence provided by Mamou and Khallouli (2016) propose supporting evidence of the existence of liquidity amplified co-movements, which can either emanate from internal liquidity shocks or those induced by economic fundamentals along with exogenous factors.

Numerous studies have explored the concept of contagion. In this sense, contagion has been numerously defined as the increase in cross-market linkages that comes after a shock to a particular market (Forbes and Rigobon, 2002; Longstaff, 2010). The academic relevance of the examination of this phenomenon has increased considerably, and as exposed by Eross et al. (2016), there are profound implication for banking regulation and the establishment of safety nets that are able to deal with liquidity crises. In this light, Upper (2011) corroborates that contagion assessment is critical to the efficiency and stability of the financial system. In fact, research focused on contagion in financial markets has identified four potential channels that

allow contagion to spread. These channels are correlated information, liquidity, flight-to-quality and the risk channel. Scholars such as Longstaff (2010), Guidolin et al. (2015), and Smimou and Khallouli (2016) have widely exposed these transmission channels. Grillini et al. (2022) noted that the information channel arises when a shock in one market is interpreted as economic news. This can have an impact on prices by changing the equilibrium in other markets and forcing investors to adjust their attitudes and beliefs. Caballero and Kurlat (2008) explain that under the flight-to-quality channel, contagious losses may occur derived from investors liquidating their assets down the chain of liquidity as losses arise in assets or portfolios that cannot be liquidated (see also Gonzalo and Olmo; 2005).

According to Acharya and Pederson (2005), contagion may be also transmitted via the risk premium channel whereby a negative shock in one market leads to higher risk premia in other markets, implying that the risk premia come from a time-varying nature. The liquidity channel, introduced by Brunnermeier and Pederson (2009), is defined as a spillover mechanism initiated in one market and diffused to another due to “liquidity spirals” between the market liquidity and the funding liquidity. Market liquidity can be formally defined as a measure of ease of trading. It includes the cost of buying and selling a security, while funding liquidity is associated with both the securities and the trading agents (Grillini et al., 2022).

In the financial markets, all channels cannot bear the same importance, some factors must be considered. A collateralized debt obligations study and its contagion effects on the other markets, by Longstaff (2010), concluded that the contagion is prevalent in the financial market. Liquidity channel and risk premium channel were found to be the main causes of the contagion spread, as opposed to the correlated information channel. Academic literature has long identified the relevance of accurately studying the role of contagion. For instance, Andrikopoulos et al.

(2014) explained that the efficacy of contagion effects through the speed at which they occur, and the magnitude of their impact relates to economic fundamentals is of significant relevance in assessing the informational and valuation efficacy of stock markets.

Previous literature has identified the need for research on the contagion transmission of liquidity in financial markets and its eventual effect on various economic factors. Illustrating this idea, Brockman et al. (2009) have identified the impact of liquidity in security markets considering the definition of this element not only by the expected stock prices but also by stock returns themselves. Additionally, Bekaert et al. (2007) suggest that, consistent with the perspective on liquidity as a price factor, unexpected disturbances impacting liquidity can be positively linked to contemporaneous return shocks, and negatively to dividend yield shocks. This further supports the argument standing that liquidity shocks will have far-reaching consequences across the financial markets, both in asset pricing and stability of the market, as pointed out by Brunnermeier and Pederson (2009). On the contrary, Longstaff (2009) reports episodes of liquidity shocks transmission within an economy's asset classes, rather than across economies. This implies that the effects of liquidity contagion can be more confined and associated with specific market conditions in a country's financial setting.

Various studies have focused on liquidity contagion effects and its impact on both regional and international markets (Brockman et al., 2009; Andrikopoulos et al., 2014; Amihud et al., 2015). Most studies are oriented to the understanding of large financial markets including the Eurozone and developed economies. A study by Grillini et al. (2022) evidenced contagion among Eurozone nations and established the most prominent transmitters of liquidity shocks being Germany, France and Italy during financial turbulence. The peripheral nations receive the shocks too; yet simultaneously, they may also act as strong transmitters due to the source of the

shock being domestic. Moreover, macroeconomic effects have been introduced on the analysis of liquidity shocks. For instance, Ellington (2018) examines the relationship between financial market illiquidity and macroeconomic dynamics, revealing that illiquidity shocks led to a decrease in annual GDP growth and inflation in the United Kingdom during the 2008 recession.

Amihud et al. (2015) identified that markets open to foreign investors and integrated with the global financial markets, exhibit a higher illiquidity premium. They also found that the adoption of the euro as the common currency in some European countries impacted on the increase of the commonality of illiquidity premium in those countries, even after the regional market returns were considered. Additionally, Andrikopoulos et al. (2014) provide evidence of liquidity contagion, and volatility among G7 stock markets. Finally, Smimou and Khallouli (2016) analyze illiquidity contagion in the Eurozone, finding causal peer relationships during the global financial crisis.

In terms of Emerging Markets, although studies have been conducted, a much more interconnected market landscape has not been taken into account. For instance, Bekaert et al. (2007) focus their research on 19 emerging equity markets, where liquidity effects can be especially strong, and argue that local market liquidity can affect expected returns in emerging markets and that local systematic liquidity risk is more important in empirical terms than local market risk. Mendoza et al. (2023) analyze the connectedness of stock markets in developed and emerging economies through liquidity, identifying not only several developed markets as the main transmitters of liquidity disturbances but also the role of emerging markets that can transmit and facilitate liquidity disturbances; nevertheless, they also point out certain emerging markets with higher containment of financial contagion as they are less vulnerable to disturbances. Given this scenario, the study of liquidity propagation as a channel of contagion in

Latin American stock markets emerges as an interesting area of study and one yet to be extensively explored. Especially in the light of recent disturbances such as the COVID-19 pandemic, taking into account that substantial declines in market liquidity in different markets are exacerbated by these turbulent periods (Smimou and Khallouli, 2016), in accordance with the recent crises and the globally tight interconnection of stock markets (Bekaert et al., 2007).

3. Method

The bibliometric-mapping research is selected to develop a proper analysis of scientific production regarding liquidity spillovers. This method allows us to identify trends, patterns and relations among the existing knowledge, from a quantitative and qualitative perspective. The data used was collected from the Web of Science (WoS) database, considering the rigorous selection of journals, high quality of information, and recognition in the academic community. For data collection, quality criteria were determined in the information filtering process. In this case, the search was limited to articles in English and classified in SSCI or ESCI, with a time range between 2005 and 2024, and a manual filtering was performed.

The data collection process was conducted in a structured manner. Initially, we undertook an exploratory analysis, examining the existing datasets within the Web of Science (WoS) database. The search focused primarily on the concepts Liquidity and Spillovers; therefore, the search equation was as follows: (liquidity AND spillovers) OR (liquidity AND contagion). We

started with a search that yielded 938 articles. In the second phase, we conducted a detailed manual review of the database to identify articles relevant to our subject. This process helped us streamline the dataset, resulting in a refined collection of 472 articles for analysis.

Following the collection of research data, a bibliometric analysis was conducted using the VOSviewer application alongside Biblioshiny, which serves as a web interface for the Bibliometrix R-package.

4. Results

4.1. Performance Analysis

Based on the data collected, a descriptive analysis of the existing knowledge is developed. Figure 1 presents the evolution of research concerning liquidity spillovers, based on the data subjected to bibliometric analysis in this study. The 472 articles produced are distributed from 2005 to 2024. The dynamics of publication per year suggest a growing interest in the research topic due to the sustained increase especially since 2012.

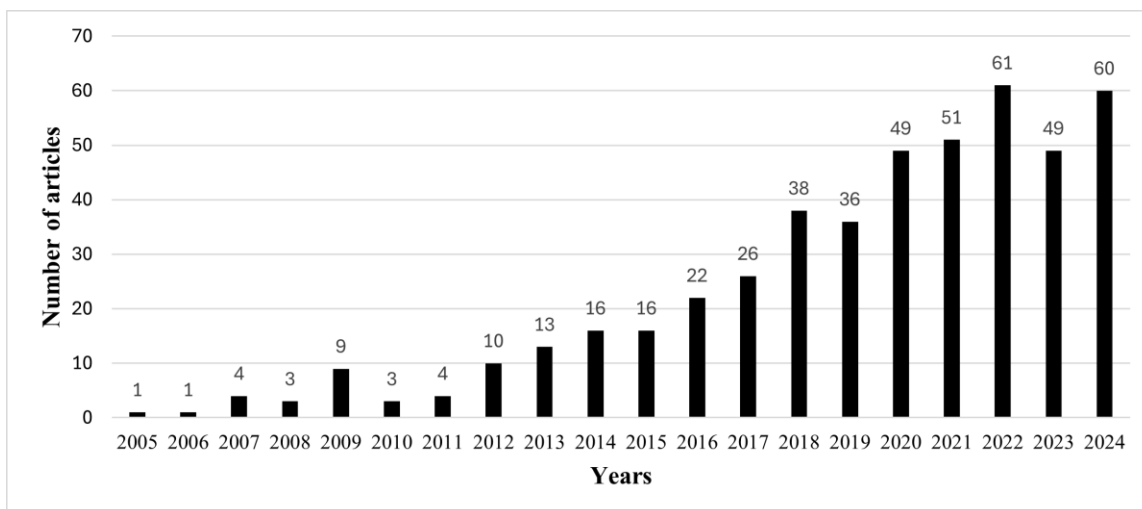


Figure 1. Dynamics of publication per year on liquidity spillovers.

Source: Author's own work with the data retrieved from WoS database

According to Figure 2, the dynamics of publication by country regarding Liquidity spillovers worldwide illustrate a substantial contribution from both China and the USA. Notably, China stands out as the leader in this research area, having published more than 250 articles on liquidity spillovers. This remarkable output highlights China's predominant influence and active engagement in advancing knowledge within this field. Furthermore, European countries are also noticeably active contributors, reflecting a diverse international interest in the study of liquidity spillovers.

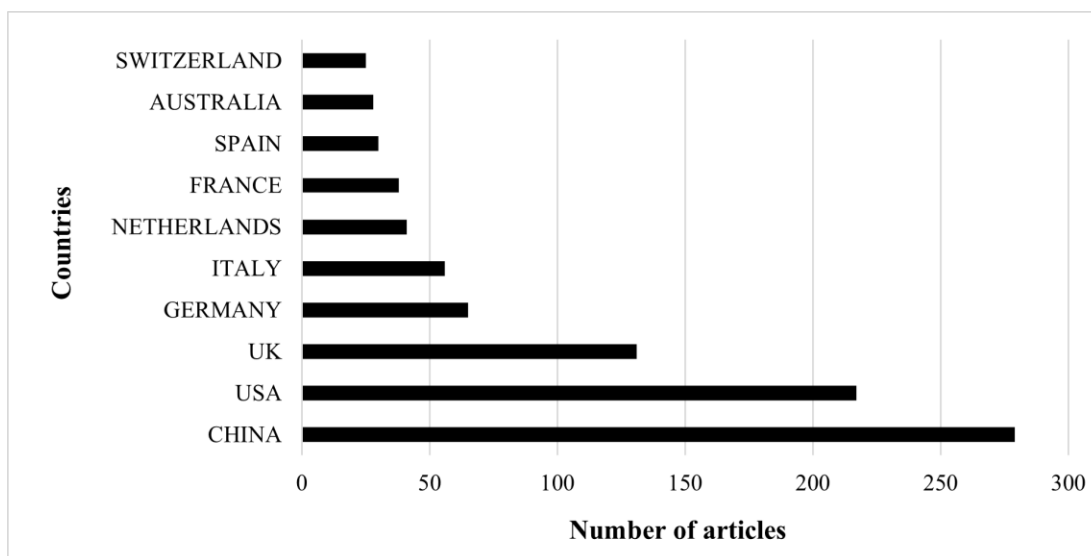


Figure 2. Dynamics of publication by country on liquidity spillovers.

Source: Author's own work with the data retrieved from WoS database

Building upon the previous analysis, a detailed examination has been undertaken regarding the countries of corresponding authors among the ten most significant contributors in this field, with a particular focus on the publication type specifically, whether it involves international or local collaboration. The SCP (Single Country Publications) collaboration metric from Biblioshiny indicates a country's internal scientific output, while the MCP (Multiple Country Publications) metric reflects the outcomes of international collaboration.

Figure 3 illustrates these metrics, derived from the number of documents collected from the Web of Science database and analyzed using the Bibliometrix R-package. The findings indicate that China, as the foremost contributor in the area of liquidity spillovers, displays a higher percentage of single-country publications. This pattern is also observed in the USA and the United Kingdom. Conversely, countries such as Australia, Canada, and Switzerland show a greater inclination toward international collaboration.

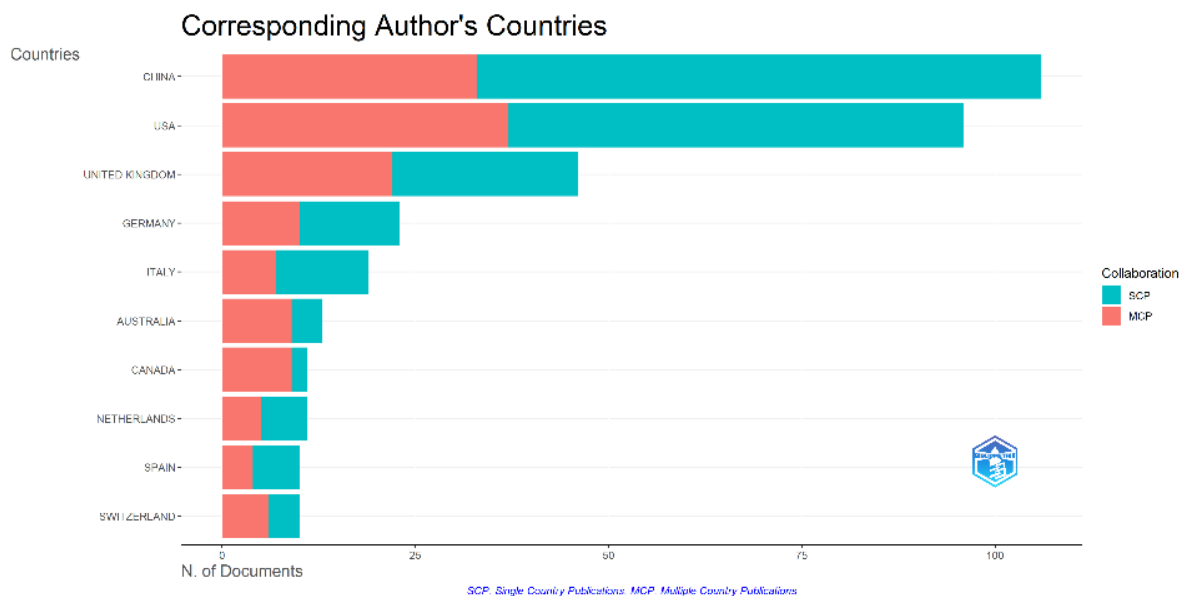


Figure 3. Corresponding Author's Countries on liquidity spillovers.

Source: The author using Biblioshiny software.

In addition to analyzing publication dynamics by country, this study evaluates the impact and influence of publications concerning the most cited nations on the relevant topic. According to Figure 4, the USA emerges as the leader, exhibiting a significant margin in citation impact, which reflects its substantial relevance in financial market research. Although China has made the highest contribution, the USA is the most cited country. Therefore, following closely is China, which holds considerable importance in the production and influence of liquidity studies. Furthermore, several European countries, including the United Kingdom, Germany, and Switzerland, demonstrate noteworthy engagement and impact within this domain.

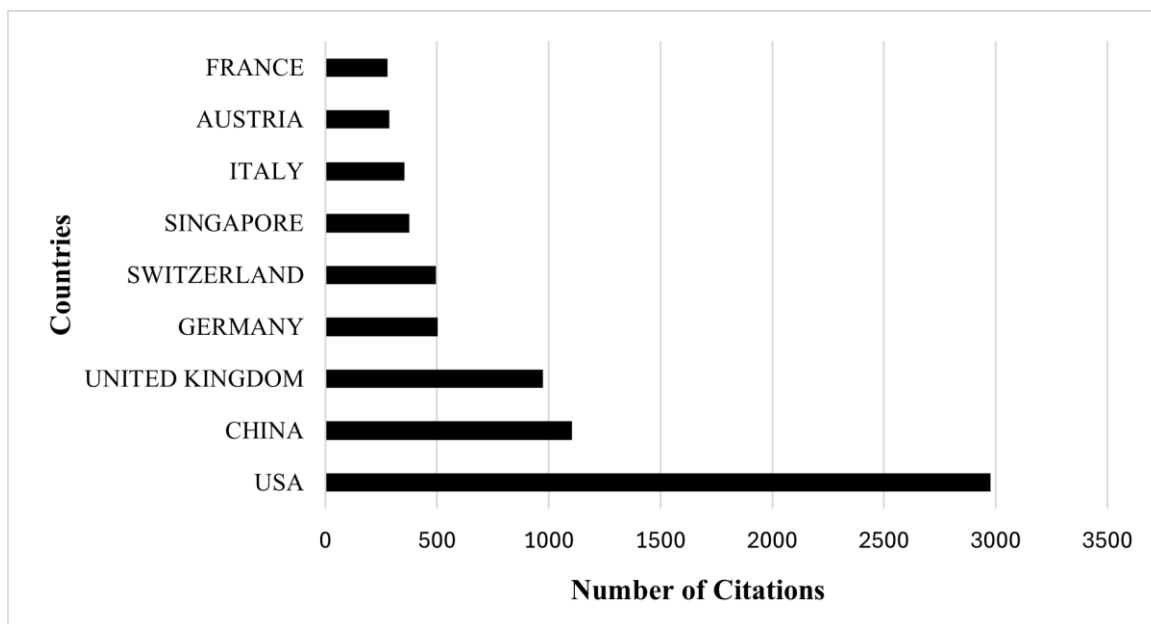


Figure 4. Ten most cited countries on liquidity spillovers.

Source: Author's own work with the data retrieved from WoS database.

Similarly, it is relevant to conduct a detailed analysis of the most cited articles in the field of liquidity spillovers. This analysis will facilitate the identification of key contributors who have exerted a significant academic influence in this area, as well as highlight the primary contributions that have been consistently referenced, thereby enhancing our understanding of the topic. Table 1 provides an overview of the ten most frequently cited articles that explore the concept of liquidity spillovers. These documents are relevant in understanding how liquidity can flow between markets and its impact on financial stability.

Table 1.

Ten most cited articles on liquidity spillovers

| Authors | Journal | Cited reference | Citations |
|---------------------------|--------------------------------|---|-----------|
| Hameed et al. | The Journal of Finance | Stock Market Declines and Liquidity | 328 |
| Miranda-Agrippino and Rey | The Review of Economic Studies | U.S. Monetary Policy and the Global Financial Cycle | 312 |

| | | | |
|--------------------------|--|---|-----|
| Cetorelli and Goldberg | IMF Economic Review | Global Banks and International Shock Transmission: Evidence from the Crisis | 298 |
| Santarelli and Vivarelli | Industrial and Corporate Change | Entrepreneurship and the process of firms' entry, survival and growth | 295 |
| Hautsch et al. | Review of Finance | Financial Network Systemic Risk Contributions | 286 |
| Luong et al. | Journal of Financial and Quantitative Analysis | How Do Foreign Institutional Investors Enhance Firm Innovation? | 273 |
| Adams and Glück | Journal of Banking & Finance | Financialization in commodity markets: A passing trend or the new normal? | 240 |
| Koutmos | Economics Letters | Return and volatility spillovers among cryptocurrencies | 183 |
| Jotikasthira et al. | The Journal of Finance | Asset Fire Sales and Purchases and the International Transmission of Funding Shocks | 183 |
| Aït-Sahalia et al. | Journal of International Economics | Market response to policy initiatives during the global financial crisis | 117 |

Source: Author's own work with the data retrieved from WoS database

4.2. Science Mapping Analysis

4.2.1. Co-Word Analysis

To embark on our mapping research approach, we developed a co-word analysis using the VOSviewer tool. This analytical framework facilitates an exploration of interactions among various topics within the realm of liquidity spillovers, thereby exposing the thematic relationships between keywords. Through this method, we aim to enhance our understanding of the interconnections present within this field of study. Initially, we selected the keywords with a minimum number of 14 occurrences. Of 2043 keywords, 50 met the threshold. We sifted

through the data to identify and eliminate duplicated words, utilizing the comprehensive Tesouro database as our primary resource. This process enabled us to distill our findings down to 43 distinct keywords, which were grouped into four cohesive clusters for clearer categorization.

Figure 5 provides a visual representation of the clusters formed from the keyword analysis conducted using the VOSviewer tool. This graphical analysis has been instrumental in uncovering the primary topics and subtopics that collectively enrich the research landscape of Liquidity Spillovers. The first cluster centers around the concept of “Liquidity,” serving as the focal point of the research network, which is highly connected to “Contagion”. Within this cluster, we can observe significant emphasis on the impact caused by systematic risks and financial crises, considering their critical roles in the contagion of liquidity across markets. On the other hand, the second cluster delves into the dynamics of liquidity spillovers, exploring the influence of connectedness among financial markets. Cluster three shifts attention to the interaction between market volatility and liquidity spillovers, suggesting a growing interest in the analysis of these relationships through an impulse-response perspective. Finally, cluster four focuses on models that depict the transmission of liquidity shocks and their effects on market performance, particularly in the context of monetary policy influences. This cluster underscores the importance of understanding how policy decisions can shape liquidity dynamics and overall market stability.

Germany, Italy, and France. Furthermore, the inclusion of Latin American and Asian countries signals a burgeoning global interest in understanding the effects of liquidity spillovers.

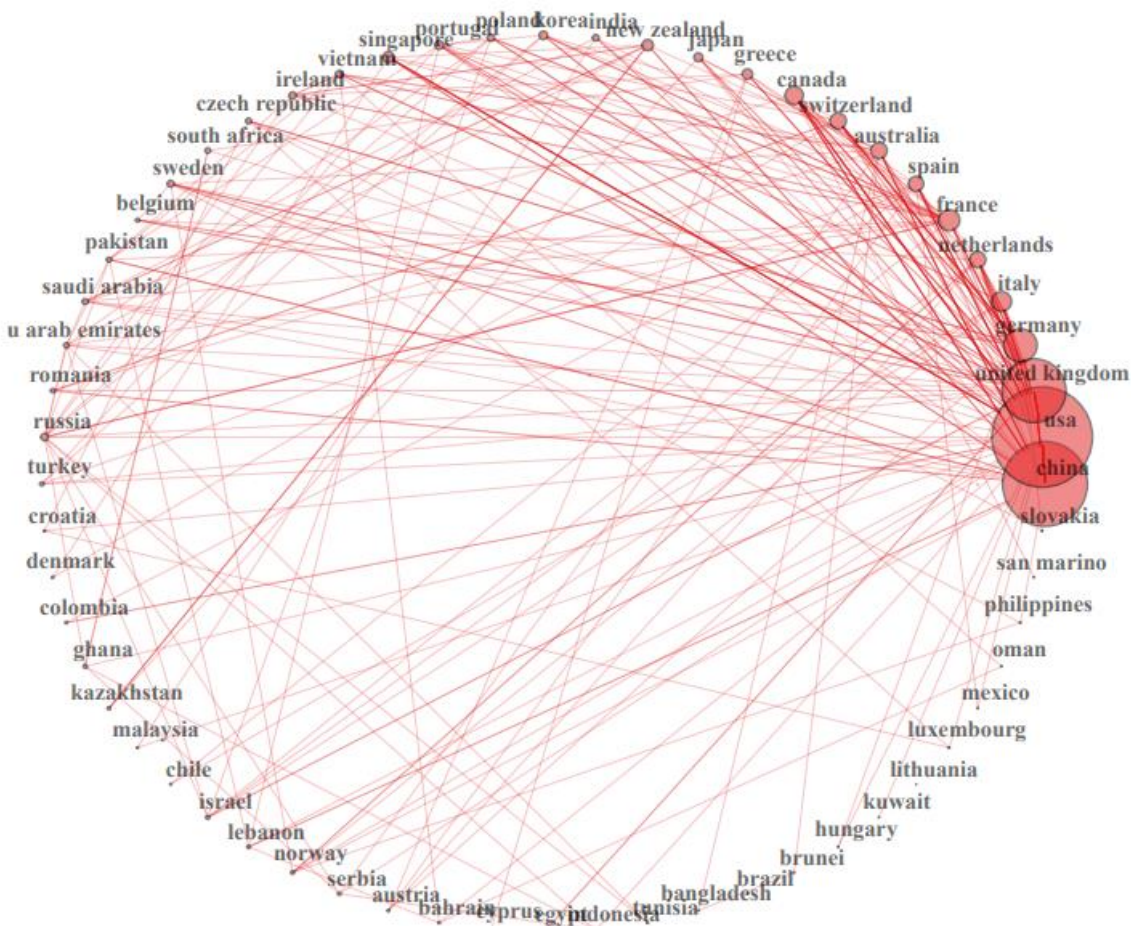


Figure 7. Academic collaboration between countries on liquidity spillovers.

Source: The author using Bibliometrix R-package.

5. Discussion and Conclusions

The aim of this research is to provide a comprehensive analysis of liquidity spillovers in financial markets, considering the huge impact that liquidity contagion can have on global economic stability in terms of financial systems. The literature reviewed seems to indicate that these spillovers act not only as triggers but rather as a very powerful amplifier that has the potential to increase the intensity of a financial crisis. This issue is especially observed during times of economic crisis. These findings are also underlined by Chuliá et al. (2020) and Smimou and Khallouli (2016), exposing how crucial these contagion dynamics are in determining the financial market behavior. In addition, these results suggest that recently spillovers in liquidity have acquired great relevance in the presence of highly interconnected markets whose contagion effects could eventually be transmitted beyond institutional levels to the overall financial context.

The mapping analysis carried out by means of the VOSviewer tool and the Bibliometrix R-package allows us to identify several relevant topics in this research area. The analysis reaches as the most important themes in question the followings: “contagion”, “volatility” and “risk”. These subjects provide evidence of the crucial role of these factors in liquidity shock transmission and prove the need to create a strong regulatory framework so that economies and financial systems manage to avoid such problems (Andrikopoulos et al. 2014; Grillini et al. 2022). Moreover, international collaboration analysis gives evidence of the fact that the USA and China are leading in academic output and citation impacts around the academic world. Hence establishing their lead position at the front in creating and disseminating knowledge on liquidity spillovers.

As we draw to a close, this recent trend in international cooperation on the subject in question, revealing great participation from emerging markets both from Latin America and Asia, sets a milestone in the wide recognition of the high relevance of liquidity spillovers, observed by different economies. As Mendoza et al. (2023) noted, emerging markets not only experienced these shocks coming from liquidity contagion, but they can also be transmitters of these shocks. This is a dual role with significant challenges and opportunities for financial contagion management strategies within the globalized economy. Such findings underline the critical need of formulating policies and continuous monitoring processes in regional and global markets, crucial for sustaining the resilience of the financial system, facing prospective turbulence in the economy.

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