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A Bibliometric Analysis of Exchange Rate Fluctuations

Loso Judijanto[1], Khairul Nur Adli[2]
[1] IPOSS Jakarta, Indonesia and losojudijantobumn@gmail.com
[2] Sekolah Tinggi Ilmu Ekonomi TRIGUNA Tangerang and khairulnuradli1996@gmail.com

ABSTRACT

The present paper applies bibliometric analysis to the research dedicated to fluctuations of exchange rates with the purpose to investigate the intellectual structure, thematic development, and international collaborative trends of the field. On the basis of Scopus indexed papers and with the help of visualization software (VOSviewer), it performs keyword co-occurrence, citation, co-authorship and country-level collaborations analysis. The results prove that the field is characterized by predominance of macro-financial issues, namely exchange rates, financial markets, volatility, and monetary policy, gradually embracing forecasting, risk management, and econometrics. The analysis of overlay and density confirms the tendency towards the transition from traditional macroeconomic interpretations of the phenomenon to forecasting and computational approaches. The analysis of citations suggests the multidisciplinary nature of the knowledge base, as it includes not only economics and finance, but also environmental and complex system studies. Finally, the network analysis reveals the prevalence of the US and China as global research centers, as well as the secondary importance of Europe and participation of emerging economies.

Keywords: *Exchange Rate Fluctuations, Bibliometric Analysis, VOSviewer, Financial Markets, Collaborations Analysis*

1. INTRODUCTION

The changes in exchange rates have always been considered among the most important economic issues since such changes have a significant effect on competitiveness of trade, capital movements, the behavior of inflation, effectiveness of the monetary policy, and macroeconomic stability [1]. In today's increasingly interconnected world economy, the exchange rates act as one of the key transmission channels of the effects caused by the economic disturbances throughout the world and different regions. Changes in the exchange rates have an impact on the prices of goods and services, affecting the competitiveness of exports, import activities, and international investments [2], [3]. Hence, the issue of exchange rates changes has become of crucial importance for all who try to forecast economic events and avoid possible financial losses [4]–[6].

The importance of changes in exchange rates has become more relevant after the adoption of flexible exchange rate systems by countries due to the collapse of the Bretton Woods system. In case of floating exchange rates, the value of currency is driven by market mechanism, which renders it very responsive to changes in the underlying economy, political events, differences in interest rates, and sentiments of investors. Literature related to this subject matter has grown significantly and includes a variety of theoretical models such as PPP, IRP, Monetary Model, Portfolio Balance Theory, and Behavioral Finance approach. This literature has tried to explain the determinants, implications, and predictability of exchange rate movements [7], [8].

In recent times, global economic occurrences have increased academic interest in exchange rates movements. Global financial crises that took place in 2008, the European sovereign debt crisis, the outbreak of the COVID-19 virus, geopolitical crises, and changes in the monetary policies of the largest central banks have led to high levels of volatility in the foreign exchange market. These occurrences have made researchers explore not only the effects of macroeconomic factors but also the impact of uncertainties, financial globalization, digitalization, and new technologies on currency

movements. Additionally, advancements in data science and analytics have resulted in a more elaborate analysis of exchange rate movements, creating a diversified and multi-disciplinary research environment [9].

Due to an increasing amount of scientific literature related to the topic of exchange rates, it becomes more complicated for researchers to understand the intellectual structure of the discipline, the history of its development, key publications and scientists, etc. Conventional literature review is often limited by a particular theory, country, or period of time and may fail to reflect the full evolution of the field of study. Bibliometric analysis represents a method of mapping scientific literature based on such elements as publications, citations, keywords, and co-authorships. Using bibliometric methods allows researchers to obtain a comprehensive insight into the evolution of the field, its dominating topics, and future perspectives [10].

Several bibliometrics have already been conducted on finance, economics, sustainability, innovation, international business, and many other fields. Nonetheless, although extensive research has been carried out in regard to exchange rate changes, there is not much literature dedicated to bibliometric analysis concerning the intellectual evolution and topic structure of this research area. Current papers are more focused on presenting empirical data and engaging in theoretical discussions than offering an overview of the research field. Consequently, it is quite relevant to conduct bibliometric analysis in regard to exchange rate changes because it will help to understand the process of scientific interest growth, find leading contributors and organizations involved in this area, identify current and emerging topics, and serve as a guide for further studies in international finance and macroeconomics [10].

Though studies about exchange rate changes have grown considerably during the last few decades, there has been an increased fragmentation of research into different theories, methodologies, and geographies. The proliferation of publications has resulted in problems in comprehending the intellectual framework, identifying research streams that influence future studies, and determining new trends. In addition, there is little available evidence concerning the publication trends, prominent authors, key journals, collaboration patterns, and keywords related to the topic of exchange rate fluctuations. Therefore, conducting a bibliometric analysis is required in order to review the existing knowledge base in its entirety. This study aims to analyze the scientific landscape of exchange rate fluctuation research through a comprehensive bibliometric approach.

2. METHODS

For this research, the bibliometric analysis method will be used to analyze the scientific literature about exchange rate fluctuations. Bibliometric analysis refers to a methodology of research, which allows to assess publication patterns, intellectual structure and research trends in a particular area by analyzing bibliographic data [10]. The data used in this study were retrieved from the Scopus database, which is one of the biggest and most comprehensive abstract and citation databases of scholarly literature. Scopus was chosen due to its broad coverage of high-quality journals in such disciplines as economics, finance and business studies and the reliability of data for bibliometric research. The necessary publications were identified by applying the keyword string "exchange rate fluctuations" to their titles, abstracts and keywords. The search was limited to articles, conference papers, reviews and book chapters indexed in the Scopus database. Following the data collection stage, bibliographic records were exported to CSV format, including the information on authors, titles, abstracts, keywords, citations, affiliations and publication sources.

The gathered data were processed through the VOSviewer program, which is a popular method of building and presenting bibliometric networks [11]. The following analysis was

performed using VOSviewer: keyword co-occurrence analysis, co-authorship analysis, citation analysis, and bibliographic coupling. Keyword co-occurrence analysis was carried out to detect important themes and clusters in the literature on exchange rate fluctuations. The citation analysis was done to discover the leading publications, authors, and sources, while the co-authorship analysis helped to reveal collaboration patterns between scientists. Moreover, the overlay visualization technique was used to find emerging themes according to the year of publication, and density visualization was used to detect the most researched themes.

3. RESULT AND DISCUSSION

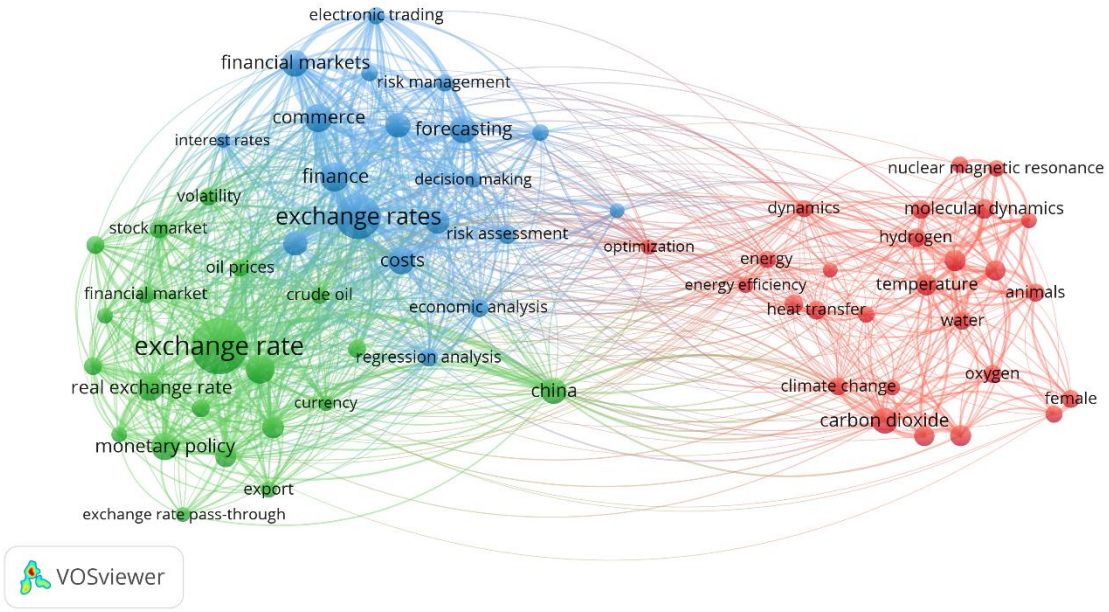

Figure 1. Network Visualization
Source: Data Analysis Result, 2026

Figure 1 shows how the body of knowledge on exchange rate variability can be understood in terms of the intellectual structure of the area based on the co-occurrence mapping of keywords. In this map, we see three major clusters represented by different colors – green, blue, and red. These clusters correspond to different thematic perspectives on the issue studied in the literature. The closeness of nodes and their density show how strong relations between different concepts are, and their size indicates the popularity of the keyword.

The green cluster corresponds to the fundamental macroeconomics and monetary-finance aspect of exchange rate analysis. Key terms like "exchange rate," "monetary policy," "real exchange rate," "stock market," and "oil prices" imply a major focus on macro-financial linkages and the dynamics of the external sector. This cluster highlights classic economic themes, including the relationship between exchange rates and trade flows, commodities, and monetary policy transmission effects. The centrality of "exchange rate" within this cluster suggests that this concept is the basic construct tying several subthemes together.

Blue cluster denotes a focus on financial markets and modeling. The usage of terms like "financial markets," "forecasting," "risk management," "decision-making," "regression analysis," and "electronic trading" demonstrates a strong methodology-oriented and finance-focused approach. The existence of this cluster shows that there is quite an amount of literature which interprets exchange rates dynamics in terms of forecasting and risk management using quantitative

techniques like time series forecasting and econometrics regressions. There is also a connection between blue and green clusters denoting a macroeconomic perspective in analyzing exchange rates.

The red cluster is distinctive in structure and constitutes a peripherally located yet intellectually intriguing interdisciplinary cluster, which is predominantly made up of physical science and engineering terminology like “temperature,” “carbon dioxide,” “molecular dynamics,” “energy efficiency,” and “heat transfer.” The distance of the red cluster from the central economic clusters indicates that it is more methodology and data-related rather than conceptually related to exchange rate theory. Nevertheless, its linkages through bridging terms (“optimization,” “dynamics,” etc.) show the spread of computer modeling and system analysis in various fields, including economics.

The network demonstrates that research on exchange rate fluctuations is no longer confined to classical economic and financial analysis but has expanded into computational and cross-disciplinary domains. The dominant intellectual core remains anchored in macroeconomic policy and financial market behavior, while methodological innovation increasingly draws from econometrics, optimization, and complex systems modeling. The presence of an interdisciplinary peripheral cluster suggests emerging methodological borrowing rather than theoretical integration. This structure indicates both consolidation in traditional exchange rate theory and diversification in analytical approaches used to study it.

3.1 Overlay Visualization

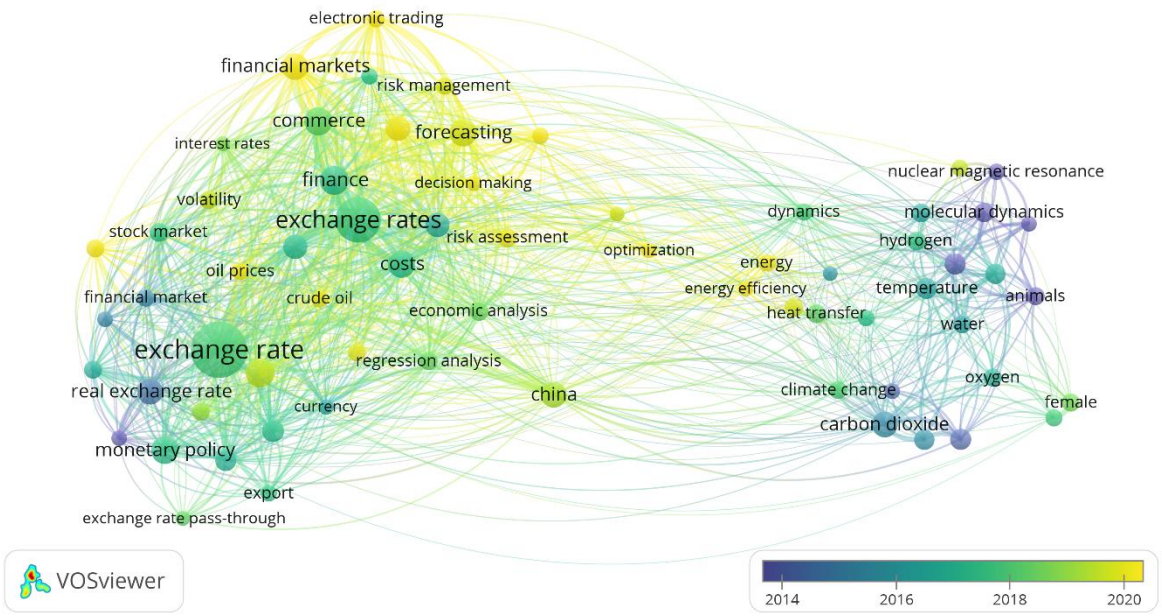

Figure 2. Overlay Visualization

Source: Data Analysis Result, 2026

Figure 2 below shows a VOSviewer overlay map of keywords co-occurrence in studies of exchange rates fluctuations, where the color of each node refers to its average year of publication (blue denotes earlier, about 2014, while yellow indicates a later date, about 2020). The structural center of this network is clearly centered on the keyword "exchange rate" and related macro-financial concepts like "finance," "financial markets," "monetary policy," and "volatility." The centrality of these nodes reflects the fact that the original body of research revolves around macroeconomic fundamentals and financial market interaction as the basic explanatory mechanism for exchange rates.

There is an apparent time trend within the cluster formation process. The earlier papers (blue–purple hues) have been clustered around more conventional macroeconomic theories like monetary policy transmission, exchange rate pass-through and the simple interactions in the financial market. As the color tends towards green and yellow, the literature gets more practical in nature, dealing with topics such as forecasting, risk management, optimization and decision making. It seems to indicate a move from more descriptive or econometric methods towards more predictive ones as knowledge of exchange rate fluctuations increases. In the latest phase (nodes colored yellow), we can see that there is more focus on practical applications of finance, especially in such fields as electronic trading, forecasting, risk evaluation, and interactions between economy and energy (for example, prices for oil). The emergence of the node "China" shows that more attention is paid to the influence of emerging countries on exchange rate studies.

3.2 Citation Analysis

Table 1. The Most Impactful Literatures

Citations	Authors and year	Title
2142	[12]	Assessing the eddy covariance technique for evaluating carbon dioxide exchange rates of ecosystems: Past, present and future
2089	[13]	Sea level and global ice volumes from the Last Glacial Maximum to the Holocene
1448	[14]	Sea-level fluctuations during the last glacial cycle
1058	[15]	Learning and expectations in macroeconomics
647	[16]	Interpreting, measuring, and modeling soil respiration
624	[17]	Capital flows and the risk-taking channel of monetary policy
605	[18]	Compensatory water effects link yearly global land CO 2 sink changes to temperature
577	[19]	Continuous generation of single photons with controlled waveform in an ion-trap cavity system
555	[20]	Experimental investigation of the nonlinear response of turbulent premixed flames to imposed inlet velocity oscillations
543	[21]	Price manipulation in the Bitcoin ecosystem

Source: Scopus, 2026

Table 1 shows the most significant works based on citation analysis with an extremely multidisciplinary background focused more on environmental science, climatic systems and biophysical models rather than traditional exchange rates economics. One of the highest cited papers written by [12] concerning eddy covariance and CO2 exchanges demonstrates the methodological background for fluxes measurements in complicated systems, whereas other highly cited works such as [13] and [14] are concentrated on sea-level changes and ice volume changes that show the importance of research of long-term environmental changes. Other less cited but significant works cover macroeconomic theories and financial systems like [15] and [17] who deal with the issues of macroeconomic expectations and capital flows dynamics correspondingly. Recent influential papers include [21] and demonstrate the transition into digital finance systems like cryptocurrencies.

3.3 Density Visualization

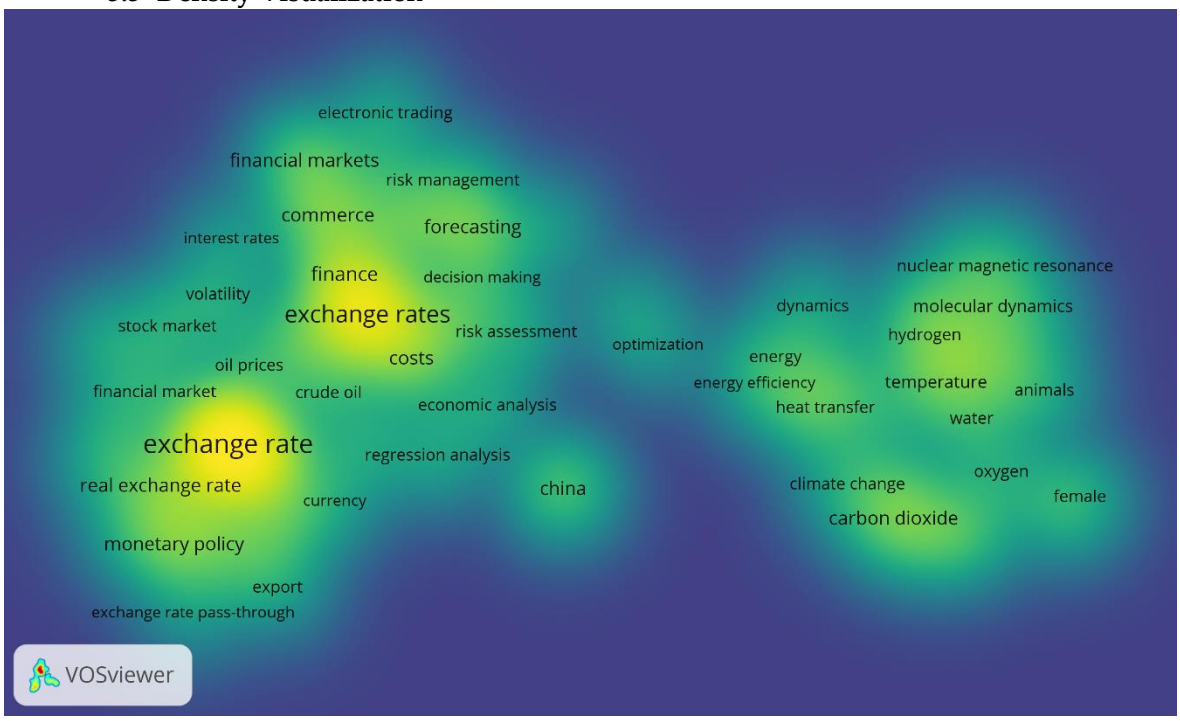

Figure 3. Density Visualization
Source: Data Analysis Result, 2026

The conceptually based density visualization demonstrates the concentration of studies on exchange rate changes, with yellow-colored zones showing higher density, whereas blue-colored zones show lower density. It is evident from the map that there is a clear central cluster of terms related to "exchange rate" and "exchange rates," implying that the field is structurally grounded in the concepts of core macro-finance. Other high-density terms surrounding this central cluster include "finance," "volatility," "financial markets," and "monetary policy." This implies that the highest density area of study of the field is associated with the relationship between exchange rate changes and the financial system.

Another density cluster that is equally important is related to the concepts like "forecasting," "risk assessment," "decision making," and "regression analysis." This shows that an important part of the literature discusses practical approaches to modeling exchange rates and not their theoretical formulation. The close proximity of this cluster to the main node related to exchange rates means that there is great integration of theoretical and empirical approaches. On the periphery, there is a clearly discernible group of terms that deal with issues such as the physical sciences and the environment like "temperature," "carbon dioxide," "molecular dynamics," and "energy efficiency." However, these terms have lesser density and are distinctly separated structurally from the core concepts of economics.

3.4 Co-Authorship Analysis

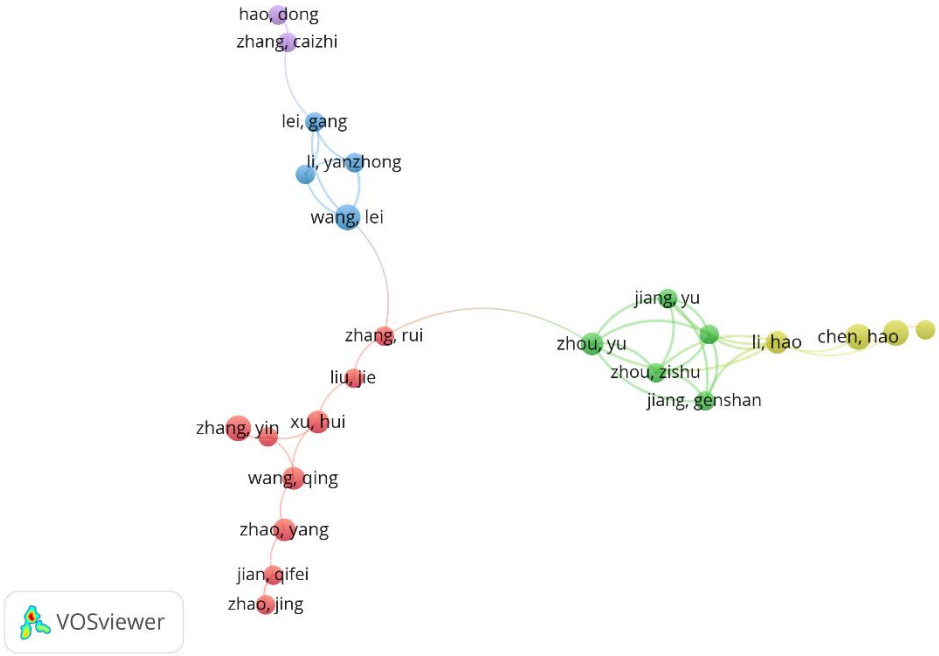

Figure 4. Author Visualization
Source: Data Analysis Result, 2026

Figure 4 where nodes indicate individual authors and links reflect collaboration strength. The structure is clearly segmented into several relatively distinct clusters, suggesting the presence of multiple research groups with limited cross-collaboration across clusters. On the left side, a red cluster (e.g., Zhang Yin, Xu Hui, Wang Qing, Zhao Yang) appears as a tightly connected group, indicating frequent internal collaboration but weaker external linkage. Above it, a smaller blue cluster (e.g., Lei Gang, Li Yanzhong, Wang Lei) forms another localized collaboration group, also relatively insular in structure. In contrast, the central green cluster (e.g., Zhou Yu, Zhou Zishu, Jiang Genshan, Jiang Yu) functions as a major collaborative hub with higher node density and stronger internal connectivity. This cluster also acts as a bridging structure, linking to other groups and suggesting a more influential or productive research team within the network. The presence of multiple interconnected edges within this cluster indicates repeated co-authorship patterns and a more stable research collaboration structure. On the right side, the yellow extension cluster (e.g., Li Hao, Chen Hao) appears more peripheral and weakly connected compared to the central group, indicating either newer entrants or less integrated authors within the broader research community.

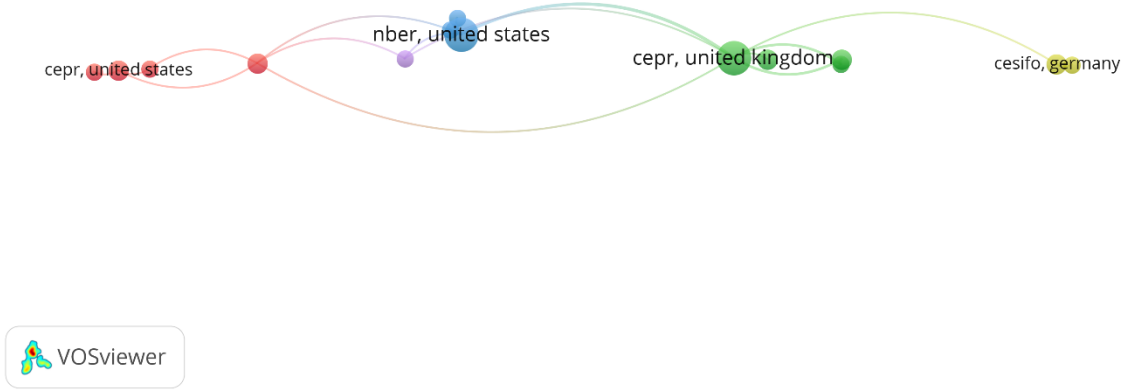

Figure 5. Institution Visualization
Source: Data Analysis Result, 2026

Figure 5 depicts an institutional co-occurrence or co-citation network centered on major economic research organizations, where node size and connections reflect relative influence and relational proximity within the literature on exchange rate fluctuations. The structure is highly linear and hierarchical, dominated by four key institutions: CEPR (United States), NBER (United States), CEPR (United Kingdom), and CESifo (Germany). The central positioning of "CEPR, United Kingdom" suggests it functions as a bridging hub connecting the transatlantic research ecosystem, particularly linking European and U.S.-based knowledge production networks. The left side of the network is anchored by CEPR (United States), which connects directly to NBER (United States), indicating a strong domestic intellectual linkage within U.S. macroeconomic and financial research. NBER, in turn, occupies a transitional position, acting as a conduit between U.S.-based research production and European institutional frameworks. This configuration reflects the historically dominant role of U.S. research institutions in shaping empirical macroeconomics, particularly in exchange rate and international finance studies.

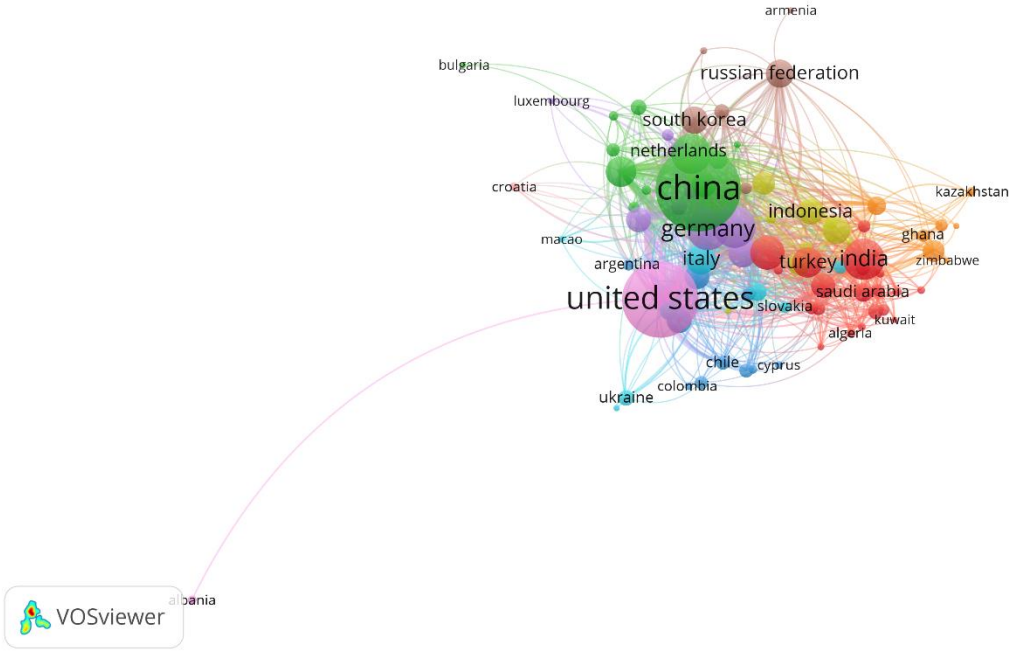

Figure 6. Country Visualization
Source: Data Analysis Result, 2026

Figure 6 shows a country-based co-authorship or collaboration network for the study of exchange rates. The node size and link density denote the degree of influence and international connections of each country within the field of research. The US comes out as the biggest and the most connected node within this network; the country is a central hub within this network that connects to many other developed as well as emerging nations. This shows the significance of the US in terms of conducting and sharing macro financial research. Similarly, China turns out to be the second most significant hub in the network with many connections to countries like Germany, South Korea, Netherlands, and Italy. There is a clearly defined European cluster centered on Germany, Italy, the Netherlands, among others that are well connected and are partially connected through China and the US. There is a strong indication of an established research collaboration network in Europe with some selected connections outside the continent. Similarly, there is an emerging economy cluster in the form of India, Indonesia, Turkey, Saudi Arabia and many more, which is a relatively less defined cluster but one that is participating actively in exchange rate research, with links mainly through China or the US.

CONCLUSION

As seen from this bibliometric review on the topic of exchange rate fluctuations, there is a vividly dynamic and increasingly interdisciplinary scientific area that is centered around a macro-financial core and diverse methodologies. The results of the keyword and density analyses prove that the topic of exchange rates, financial markets, exchange rate fluctuations, and monetary policies constitutes the core of the studied field with the incorporation of advanced forecasting techniques, risk management, and computational aspects becoming increasingly popular in recent years. Also, co-authorship and country networks prove that the knowledge structure is very centralized on a global scale, with the United States and China being at the center and Europe being an important secondary research hub, while developing countries begin to get involved in research activities.

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