Exchange rate volatility knowledge base: Bibliometric study

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ABSTRACT

Exchange rate volatility continues to shape global economies in profound ways, affecting everything from international trade and investment decisions to overall financial stability as markets become more interconnected. While researchers have produced a wealth of studies—building on classics like Purchasing Power Parity and relying heavily on tools such as Generalized Autoregressive Conditional Heteroskedasticity (GARCH) and Vector Autoregression (VAR) models—few have stepped back to map the entire field systematically. This study applied a bibliometric review to examine the exchange rate volatility knowledge base. The data was collected from the Scopus Database, including a sample set of 336 articles based on Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA)'s systematic review techniques. The findings show that there has been increasing interest in this research area, evidenced by the increase in articles published. Based on this analysis, the United States, the United Kingdom, and Germany are the most prolific in providing information to the research on exchange rate fluctuations by way of articles published in the three peer-reviewed journals most commonly referenced: the Journal of Econometrics, the Journal of International Money and Finance, and the Journal of forecasting. Several gaps were uncovered, such as research published on emerging countries, the limited number of collaboration networks that exist between some authors (and countries), and new areas of research that are gaining importance in the evolving financial markets, including digital currencies and innovations in fintech. By delivering a clear, visually engaging overview, this review solidifies the knowledge base on exchange rate volatility and inspire more inclusive, innovative, and practically relevant future work. In view of this, researchers should expand studies on exchange rate volatility to underexplored regions, especially Africa and Latin America, to better understand institutional and economic influences. Incorporating advanced methods like machine learning and big data analytics can enhance prediction models and practical applications of exchange rate volatility theory in global contexts.

Keywords*:* Bibliometric Analysis, Exchange Rate Volatility, Financial Markets, Foreign Exchange

I. INTRODUCTION

In today's interconnected world, exchange rate volatility plays a pivotal role in shaping global economies. As financial markets grow ever more linked, sudden and sometimes unpredictable swings in currency values catch the attention of economists, investors, and policymakers alike. These fluctuations—driven by macroeconomic indicators and geopolitical events to speculative trading and central bank decisions—create real uncertainty (Bush & Gabriela, 2021; Ozturk & Huseyin, 2009). What makes a currency deviate from its expected value isn't just differences in economic growth; political instability and the actions of market participants often play a big part (Ramoni-Perazzi & Héctor, 2022). Such volatility can hamper a country's ability to compete in global trade, deter foreign investment, and complicate fiscal planning.

The intellectual roots of understanding exchange rates go back centuries, with Purchasing Power Parity (PPP) serving as a cornerstone. Early thinkers like Ricardo and Wheatley laid the groundwork, but it was Cassel in 1918 who formalized the idea into absolute and relative forms. Absolute PPP suggests that exchange rates should reflect the ratio of price levels between countries, essentially making a basket of goods cost the same everywhere when converted to a common currency. The relative version, meanwhile, focuses on how inflation differences drive changes in exchange rates over time (Mussa, 1984). More recent work has shown how market forces can disrupt purchasing power, leading to amplified volatility when one currency's value shifts sharply against others (Karanasos & Hunter, 2022).

While there is no shortage of theoretical and empirical studies on exchange rate volatility, surprisingly few efforts have systematically mapped the entire field. This is where bibliometric analysis comes in—a powerful way to reveal patterns in publications, highlight influential authors and works, and uncover connections across the literature (Zupic & Tomaž, 2015). Though bibliometrics has been widely used in finance and economics, a truly comprehensive review focused solely on exchange rate volatility has been limited (Aria & Corrado, 2017).

In recent years, a handful of studies have started to fill this gap, but each has its limitations. For example, Flores-Sosa et al. (2022a) provided one of the first dedicated bibliometric overviews, showing a clear rise in publications, identifying top contributors, and outlining major themes. Naeem et al. (2022) took a methodological systematic review at exchange rate studies, pinpointing autoregressive models as a dominant approach and urging future reviews to go beyond counting papers to explore how ideas, methods, and policy insights have evolved.

Gulati (2023) examined exchange rate predictability in his methodological systematic review, finding that traditional tools like GARCH and VAR models dominate, while newer methods such as machine learning remain rare—suggesting the field could benefit from more innovation. Lal and Rai (2022) mapped how volatility affects international trade, again noting heavy reliance on GARCH and VAR, with relatively little attention to policy implications. Şahin and Bil (2024) compared volatility research across asset classes (currencies, stocks, commodities) and recommended more tailored, asset-specific analyses since drivers of volatility differ markedly between markets.

Together, these studies highlight common challenges: single-database biases that may marginalize global voices (Flores-Sosa et al., 2022a; Naeem et al., 2022), an overdependence on established econometric models that might stifle fresh thinking (Gulati, 2023), and the added value of blending quantitative metrics with deeper content analysis. Inspirational examples, like Chen and Lingling (2021) mapping of volatility spillovers, show how clustering and visualization can bring the knowledge structure to life.

With global finance becoming more complex and both developed and emerging markets increasingly vulnerable to shocks, understanding exchange rate volatility has never been more urgent (Kennedy, 2016). Bibliometric analysis offers a structured way to trace intellectual progress, spot influential works and authors, identify trending topics, and reveal lingering gaps (Donthu et al., 2021). This study aims to map the knowledge base from the Scopus-indexed journals from 1993 through 2025. By visually mapping the landscape and exploring how the field has adapted to changing financial realities, this review seeks to strengthen and broaden our collective knowledge of exchange rate volatility.

1.1 Research Objectives

i. To analyze trends in academic publications over time on exchange rate volatility.
ii. To analyze common keywords and thematic connections among publications and shifts in concepts over time.
iii. To identify the leading contributors on exchange rate volatility research
iv. To analyze patterns of academic collaboration on exchange rate volatility research
v. To identify areas of exchange rate volatility research that have not been studied.

II. LITERATURE REVIEW

Exchange rate volatility has been a central concern in international finance for decades, as researchers try to make sense of what drives it, what it affects, and how best to measure it. At the heart of many early explanations lies Purchasing Power Parity (PPP). In its absolute form, PPP argues that exchange rates should reflect differences in price levels between countries—so the same basket of goods costs the same everywhere once converted at the prevailing rate. The relative version, on the other hand, focuses on how inflation differences push exchange rates to adjust over time (Mussa, 1984). When these relationships break down, volatility often follows, and recent studies show how market shocks to one currency's purchasing power can ripple out and intensify swings against others (Karanasos & Hunter, 2022).

Beyond theory, a large body of empirical work has explored the real-world triggers and consequences of volatility. Macroeconomic indicators, geopolitical tensions, speculative trading, and central bank decisions all play a role (Bush & Gabriela, 2021). Political instability and corruption can add further fuel, while differences in economic growth alone don't tell the whole story (Ramoni-Perazzi & Héctor, 2022). The fallout is tangible: higher volatility tends to hurt export competitiveness, scare off foreign investors, and make fiscal planning harder (Ozturk & Huseyin, 2009). It can even spill over into stock markets, amplifying broader financial uncertainty—especially in countries deeply tied to global markets (Kennedy, 2016).

Despite thousands of studies, the field has only recently started to step back and ask: what does this sprawling literature actually look like as a whole? This is where bibliometric analysis shines. By examining patterns in publications, citations, and author networks, it helps reveal who shapes the conversation, which ideas dominate, and how the field has evolved (Donthu et al., 2021; Zupic & Tomaž, 2015). Tools like those described by Aria and Corrado (2017) have made such mapping easier, yet surprisingly few researchers have turned them toward exchange rate volatility in a comprehensive way.

One of the first to do so was Flores-Sosa et al. (2022a). They documented a clear upward trend in publications, spotlighted leading authors and institutions, and sketched out major research themes. But they also sounded an important

warning: the choice of database matters enormously. When they compared results from Scopus and Web of Science, the lists of top scholars, journals, and countries looked strikingly different. However, Priyan et al., (2023a) found that, the Scopus database has wealthier literature in social sciences, so to be meaningful used in this study. The literature found that, researchers concentrated on wealthier nations while overlooking valuable contributions from emerging economies (Flores-Sosa et al., 2022a).

Naeem et al. (2022) using methodological systematic review took a slightly wider lens, reviewing the broader exchange rate literature while paying special attention to volatility. They found that autoregressive models remain a powerhouse approach and highlighted the most influential authors, journals, and countries. What set their work apart was blending hard numbers with deeper content analysis—tracking not just how many papers appeared, but how theories, methods, and policy ideas developed over time. They argued convincingly that simply counting publications isn't enough; we need to understand the ideas behind them.

Gulati (2023) using methodological systematic review examined research on exchange rate predictability and economic fundamentals and noticed a familiar pattern: GARCH-family models along with VAR approaches dominate the landscape. These tools have delivered solid, consistent results, but their near-monopoly has crowded out newer ideas. Machine learning, hybrid methods, and realized volatility techniques appear only rarely. Gulati's message is that the field could use more experimentation and that future reviews should watch closely for signs of methodological change. However, this was a bit deviated from the pure bibliometric study.

For a bigger-picture comparison, Şahin and Bil (2024) mapped volatility research across different asset classes—currencies, stocks, commodities, and more. Shared methods popped up everywhere, but the authors cautioned against treating all assets the same. Currencies respond to macroeconomic forces in ways that company-specific news drives stock volatility, so lumping them together can obscure important differences. They recommended more focused, asset-by-asset analyses.

Work on related topics offers useful lessons too. Chen and Lingling (2021) studied volatility spillovers across markets and used clustering techniques to group similar papers, spotlight foundational works within each cluster, and create visual maps of how ideas connect and grow over time. Their approach shows just how powerful clear visualization can be in making sense of a complex knowledge base.

Taken together, these reviews highlight a few recurring themes. Database choices can unintentionally sidelined voices from developing countries (Flores-Sosa et al., 2022a; Naeem et al., 2022). Heavy reliance on a handful of traditional models may be holding back fresh thinking (Gulati, 2023). And while certain linkages—like volatility and trade—have been studied extensively, others, such as policy implications or asset-specific drivers, still feel underexplored (Lal & Rai, 2022; Şahin & Bil, 2024). Many authors also stress that pairing bibliometric counts with thoughtful content analysis yields richer insights. As global markets grow more interconnected and vulnerable to sudden shocks, these observations underscore why a fresh, comprehensive look at the exchange rate volatility literature feels timely—and necessary.

III. METHODOLOGY

The bibliographic information for this research has been obtained from the Scopus database because of its breadth of peer-reviewed journals in the social sciences as compared to the Web of Science databases (Kasubi et al., 2025; Nyabakora, 2023, 2024; Rwezimula et al., 2025). A detailed search string using Boolean logic, wildcards and synonyms was developed to find publication(s) relevant to the topic being studied. The actual search string submitted on May 3rd, 2025, was made up of the following search string: ("Foreign exchange rate*" OR "Forex rate*" OR "Currency rate*" OR "FX rate*" OR "Rate* of exchange" OR "Conversion rate*" OR "Currency conversion rate*" OR "Mone* exchange rate*") AND ("Instabilit*" OR "Unpredictab*" OR "Varia*" OR "Fluctuation*" OR "Uncertaint*" OR "Inconsistenc*" OR "Changeab*" OR "Irregular*" OR "Dynam*")

Initially 7393 documents were found in Scopus as a result of the search, but after elimination of the documents that did not fit the requirements and those that were considered irrelevant, there were only 336 remaining (Figure 1). The results of this search were limited to English-language, peer-reviewed journals published from 1993 until 2025.

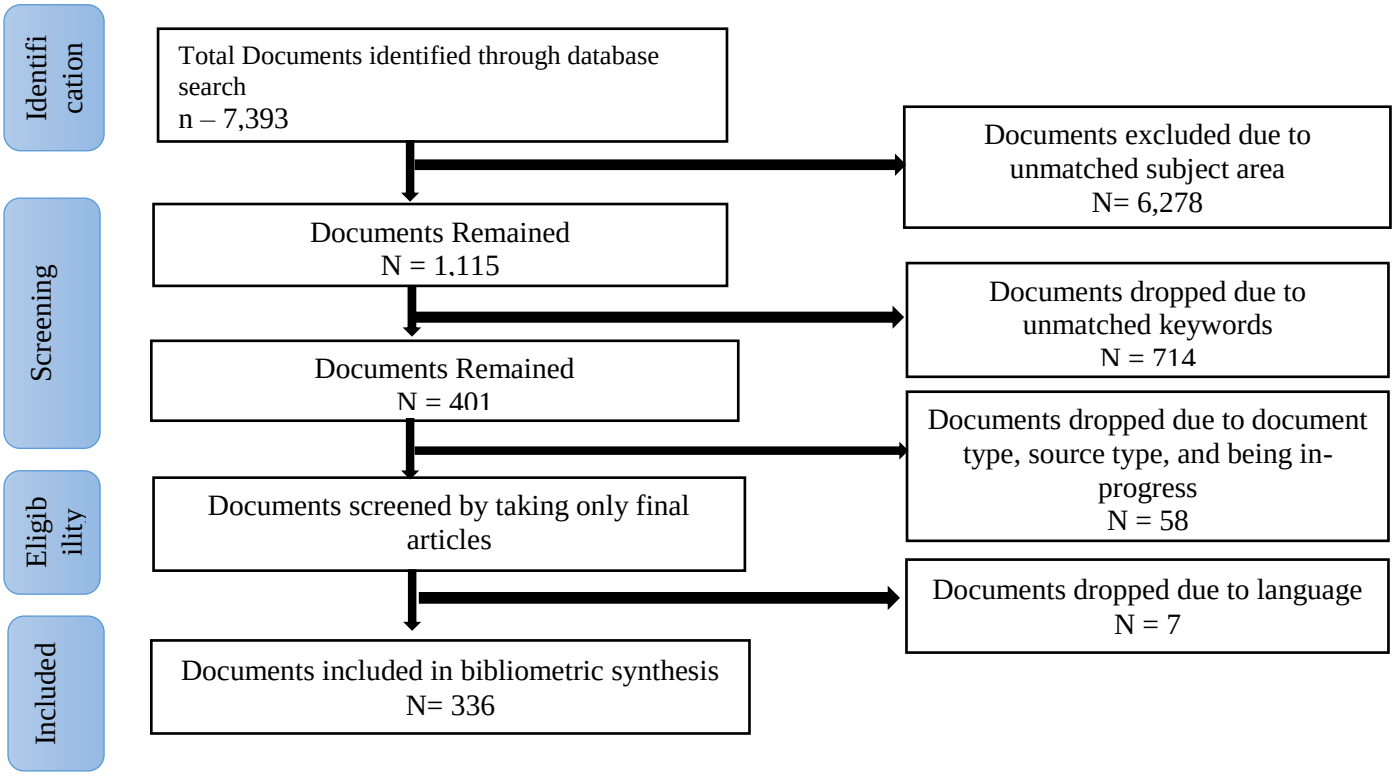

Figure 1
The PRISMA Flow Diagram Explaining Steps in Sampling of Data (Nyabakora, 2024)

IV. FINDINGS & DISCUSSION

4.1 Findings

The following section of the report describes the results obtained from conducting a bibliometric analysis of research papers on exchange rate fluctuations between global economies. From this literature search conducted on the Scopus database (Rwezimula et al., 2025), 336 articles were located with bibliographic information (titles/authors/citations) along with abstracts and keywords, which were all downloaded as reference files for this review. Within this bibliometric study, the authors performed all of the following types of analyses: "visualization of similarities", author co-citation analysis, citation analysis, author co-citation analysis, and keyword co-occurrence analysis. (Nyabakora & Sarah, 2024).

4.1.1 Publication Growth and Trends in Exchange Rate Volatility Evolved Over Time

Over the decades, interest has grown significantly in the topic of exchange rate volatility. From a search of the Scopus database for items on the subject, the researcher found 336 articles which included some level of discussion around the term "exchange rate volatility". The earliest article to be published on this subject was done by Nachane and Ray (1993), who penned the article titled "Modelling Exchange Rate Dynamics: New Perspectives from the Frequency Domain", which was published in the Forecasting Journal. In fact, it was the only article to be published that year dealing with exchange rate volatility, indicating to the researchers that at that time, very little scholarly activity was being done in this field. The second published article in the first two years was written by Joseph (1995), titled "Cointegration, Error-Correction Models, and Forecasting Using Realigned Foreign Exchange Rates," which appeared in the Journal of Forecasting. This year saw three published papers**.**

The two other papers include Takezawa's work "A note on intraday foreign exchange volatility and the informational role of quote arrivals", published in 1995, and Lee and Sullivan's paper entitled "Considering exchange rate movements in economic evaluation of foreign direct investments", which was published in 1995. Two more publications were produced in 1996. There are two clear trends from the inception to the end of this period in that the peak had 29 and 36 publications, respectively, in 2023 and 2024, whereas at the beginning of the period in 1993 and 1994, the counts started with 1 and 0, respectively. We can define the trend of the publications as a strong growth. (Figure 2).

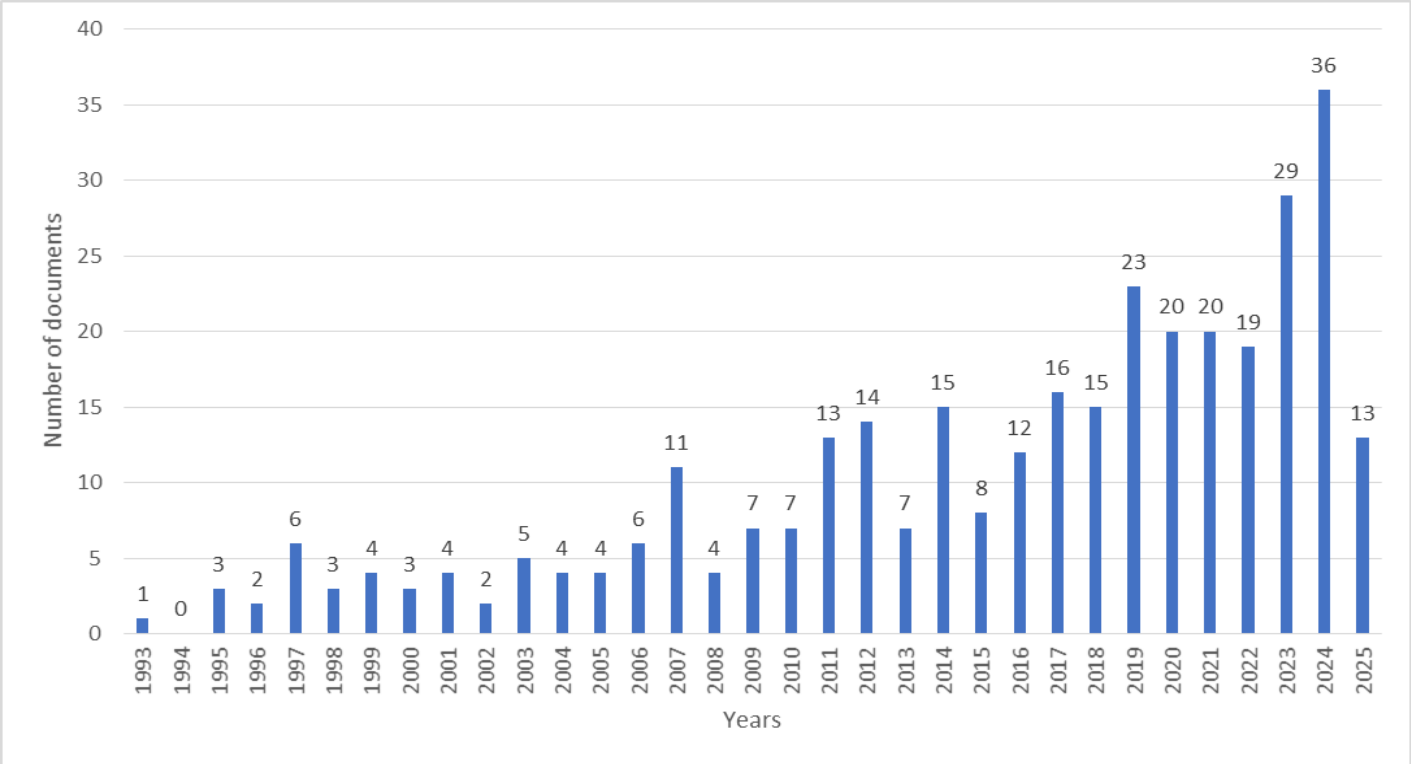

Figure 2
Evolution of Exchange Rate Volatility Literature, 1993–2025 (N = 336).

The trend occurred in groups using the entire database to conduct timestamps of document counts and found a total of 336 published documents during the time frame between 1993 and 2025. The first group, representing the years from 1993 to 2012 (103 documents), exhibited a clear upward trending number with an 11.2% increase from group one to group 2 (100(116-103)/116), and there was a 0.8% increase (100(117-116)/117) for group 2 from 2013-2020 (116 documents) to group 3 from 2021-2025 (117 documents). The significant spikes were in 2023 and 2024 (Figure 2). The reason for these significant surges is likely related to scholars focusing more attention toward papers during global financial crises or currency-changing events in developing nations.

4.1.2 The General Keyword Growth on Exchange Rate Volatility

The frequency and interrelationship of keywords in published articles about changes in exchange rate volatility over the years were investigated with VOSviewer and correlated through keyword co-occurrence analysis using full counting to determine which keyword was occurring together with "exchange rate" 5 or more times, from 1658 total possible keywords, where 76 keywords met this criterion, as demonstrated in Figure 3 and Table 1.

"Foreign exchange rate" was the most common keyword, with 42 occurrences, and is considered one of the primary concepts in financial economics, while "exchange rate" and "foreign exchange volatility" were next, with 38 and 11, respectively, as well as "conventional stock market", with 8 occurrences. The persistent interest in the relationship, determination and behavior of exchange rates in the financial literature on a global basis. (Fukui et al., 2023). In VOSviewer, a “chronological keyword map” (Figure 3) displaying 1658 co-words was created with a threshold of at least 20 co-occurrences (Eck & Waltman, 2017). The chronological co-word analysis looks at the keyword distribution through time based on the document's publishing date. The bubble size (frequency), color (themes), and location (location) are all used to interpret this map (relationship to other topics).

The emergence of other keywords appearing in Figure 3, such as “exchange rates”, conventional stock market”, “covid-19 pandemic”, “gold prices”, “economic policy uncertainty”, and “interest rates”, illustrates an increase in academic literature exploring how predictive modelling tools will be used to anticipate fluctuations in the currency market over time. Volatility and inflation are shown to be volatile correlations to current research connecting volatility to increased price stability, especially within developing and high-volatility markets (Engel & West 2005). It is also evident that both “exchange rates” and “foreign exchange volatility” represent key areas of research concentrated around the price movements of currencies based on timing and differences in market structure. The overlaps between capital markets and exchange rate relationships can be attributed to a convergence of several research fields in a manner similar to how emerging markets have developed significantly in the past (Bekaert & Harvey, 2017).

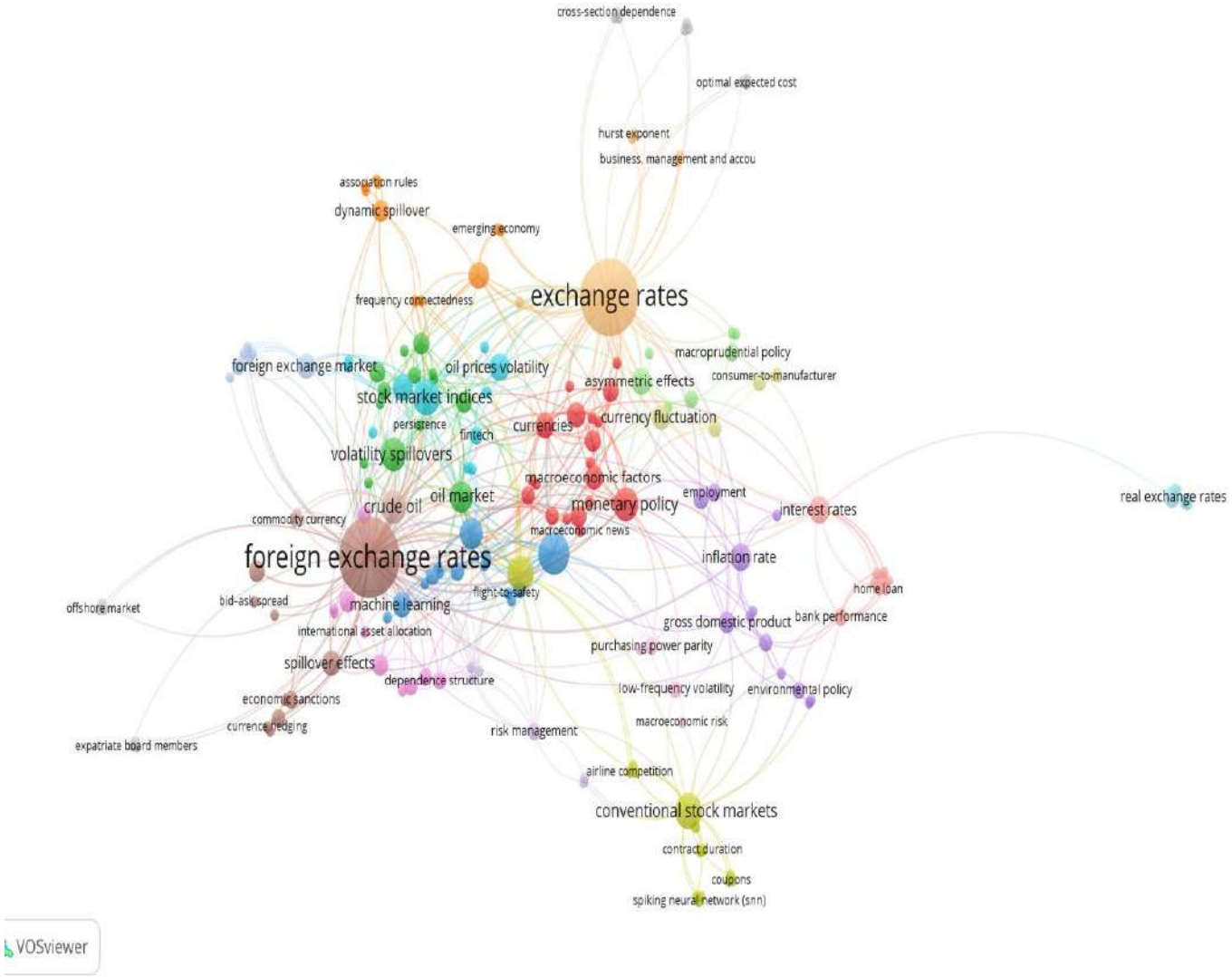

Figure 3
Author Keywords Co-Occurrence Network, Minimum 5, (N = 1658).

The evidence found in this bibliometric review indicates that while core themes such as exchange rates continue to dominate research focuses, a significant increase has occurred in research on machine learning and econometric providers. Future research, as indicated by the research on implied volatility, spillover effects, and high-frequency data, will likely focus on a detailed real-time view of currency exchange markets and predictive models. This research provides important contributions to the development of research on exchange rates and future empirical analysis (Bahmani-Oskooee & Hanafiah, 2019).

Table 1

Keywords Co-Occurrence on Groups

ID	Label	1993-2012		Label	2013-2020		Label	2021-2025	
		C	OCC		C	OCC		C	OCC
1	Foreign exchange rates	14	43	Foreign exchange rates	17	78	Foreign exchange rates	16	42
2	Exchange rate volatility	8	18	Foreign exchange volatility	10	11	Exchange rates	8	38
3	Forecast accuracy	2	9	Inflation rates	5	11	Foreign exchange volatility	4	11
4	Foreign exchange rate forecasting	3	6	Monetary policy	4	9	Conventional stock markets	2	8
5	Foreign exchange market	6	5	Interest rates	5	8	Covid-19 pandemic	2	8
6	Implied volatility	16	4	Oil price volatility	15	8	Stock market indices	7	8
7	Interest rates	7	4	Exchange rate volatility	20	7	Crude oil	21	7
8	Stochastic volatility	4	4	Financial crisis	18	7	Monetary policy	9	7
9	Artificial neural networks	10	3	Forecast efficiency	3	7	Volatility spillovers	14	7
10	High-frequency data	2	3	Foreign exchange market	2	7	Gold prices	4	6
11	International stock markets	1	3	Volatility spillovers	6	6	Oil market	7	6
12	Long memory	4	3	Conversion rates	1	5	Asymmetric effects	8	5
13	Monetary exchange rate model	2	3	Currency integration	11	5	Economic policy uncertainty	10	5
14	Asymmetric shocks	20	2	Stock markets	2	5	Financial crisis	6	5
15	Asymptotic expansion	4	2	Foreign exchange risk	12	4	Inflation rate	1	5
16	Bank stock returns	7	2	Gross domestic product	13	4	Interest rates	1	5
17	Capital flows	5	2	Hedging strategy	14	4	Oil prices volatility	15	5
18	Conversion rates	4	2	Asymmetric shocks	18	3	Currencies	5	4
19	Currency exchange	15	2	Credit default swap	2	3	Currency fluctuation	12	4
20	Density forecasts	11	2	Currencies	9	3	Foreign exchange market	6	4

Key: C = Cluster, OCC = Occurrences

Based on 3 sub-periods' worth of data, three content categories were established—each identified by their respective years. The first content group's data for the specified timeframe (1993–2012) has been categorized as foreign exchange rate publications (published before 2013), where additional keywords found within the same period have been grouped as well.

From this analysis, it was determined that out of the three sub-periods, only the first two keywords had slightly level of popularity. The first keyword, foreign exchange rates, appeared 43 times as opposed to 18 times for exchange rates volatility. The remaining keywords can be found in Table 1 for this period. The second group shows a cumulative count of 78 occurrences for foreign exchange rate, as well as 11 for foreign exchange volatility for the period of 2013-2020. The other outcomes can be seen in Table 1.

4.2 The Leading Contributors in the Exchange Rate Volatility Knowledge Base

In trying to address the third research question, "What are the most significant authors and countries, as well as what is the most frequently cited source and document, based on research conducted on exchange rate volatility?", we examined a number of factors that contributed to each of these elements. The first of these factors will be examined further in a subsequent section, where we will describe how countries, sources, authors and their associated documents have contributed to developing knowledge about "Exchange Rate Volatility".

4.2.1 Analysis of Five Top Documents, Most Cited in the Exchange Rate Volatility Knowledge Base

To determine how much influence these documents have had on the field, we conducted an assessment of these documents. The following table contains a listing of the top fifteen most cited documents located through Scopus for the period of 1993-2025 and shows which authors had the highest number of citations to their publications. The contributions of each of the five documents are mentioned below**.**

This section tries to exhaust research question number three, which asks, "What are the most influential authors, countries, sources and documents in the area of exchange rate volatility?" This research section provides insight into the contributions of countries, sources, documents, researchers, and their studies in the area of "exchange rate volatility".

Through their publication, Chkili and Nguyen (2014) significantly advanced financial literature by analyzing how currency fluctuations impact stock performance within BRICS nations using a Markov regime-switching framework. The findings illustrate country-specific issues and contradict the conventional belief that similar relationships recur within emerging markets globally. Consequently, many investors and decision-makers can benefit from taking note of this research. In addition to its methodological rigor and real-life application, this work is also widely referenced within the financial services community.

According to their 2016 article, SUI and SUN provided an understanding of how the financial systems of emerging markets are interrelated. They examined the effects that changes in currency exchange rates and changes in the stock markets had on one another during the 2008 global financial crisis. It was found that, emerging markets reacted more strongly to global events than developed markets, so monitoring the linkages between these markets closely is crucial in order to manage the associated risks. Their work has practical implications for investors and policymakers who must understand how these markets interact with one another, particularly during periods of instability. As such, their well-supported findings will continue to be referenced for some time to come in studies of international finance.

Nag and Amit (2002) made a significant contribution to financial forecasting by using an innovative hybrid model that uses artificial intelligence (AI) to predict daily foreign exchange rates. By combining neural networks with genetic algorithms, they were able to create a more effective method of forecasting daily exchanges by optimising the neural network's structure and parameters. This work contributes to the integration of computational methodologies into the analysis of financial data and highlights the potential impact that AI and machine learning technologies can have on economic forecasts. The innovative approach and accuracy of this study have made it a highly cited reference in the areas of financial technologies and economic modelling, and it has influenced many of the future studies looking at AI-based techniques for understanding complex market behaviours.

The paper by Kasman et al. (2011) provides valuable information on how macroeconomic fluctuations affect the banking industry. The authors explored how fluctuations in interest rates and exchange rate volatility impact both the return and risk of bank stocks in Turkey. Furthermore, their findings reinforce the need for strong risk management practices, as well as sound policy action to enhance the stability of the financial sector. The high level of practical relevance and thoroughness demonstrated by this research has established it as one of the most heavily referenced studies within the field of finance, enhancing our overall understanding of how macroeconomic variables behave toward the financial markets and the effect such volatility has on institutional performance.

Rogers's (1997) publication (Table 2), was a very important step in understanding the relationship between foreign exchange rates and interest rates through the introduction of the potential approach. This paper presents an entirely new look at how different maturities of interest rates can affect the movement of currencies by providing a more dynamic and comprehensive way of thinking about the relationship between interest rates and exchange rates. By creating a way to observe the influence of expected future interest rates on the exchange rate over time, Rogers challenges traditional models that have been used to examine the relationship between interest and exchange rates. The development of Rogers' paper combined both theoretical research and empirical evidence in a way that increased the understanding of how currencies move and gave useful implications for managing risk in today's marketplace as well as for forecasting currency movements. The unique ideas presented in Rogers' work have contributed to the large number of citations of this paper and to making it one of the most frequently cited works in the area of international finance.

Table 2

The Most Cited Documents in Exchange Rates Volatility

SN	Authors	Title	Source title	Citations	Countries
1	Wang Y.-S. (2009)	The impact of crisis events and macroeconomic activity on Taiwan's international inbound tourism demand	Tourism Management	278	Taiwan
2	Chkili and Nguyen (2014)	Exchange rate movements and stock market returns in a regime-switching environment: Evidence for BRICS countries	Research in International Business and Finance	175	Tunisia
3	Härdle and Tsybakov (1997)	Local polynomial estimators of the volatility function in nonparametric autoregression	Journal of Econometrics	158	Germany
4	Bollerslev and Zhou (2002)	Estimating stochastic volatility diffusion using conditional moments of integrated volatility	Journal of Econometrics	152	US
5	Xu L. et al. (2014)	Path to purchase: A mutually exciting point process model for online advertising and conversion	Management Science	142	US
6	Sui and Sun (2016)	Spillover effects between exchange rates and stock prices: Evidence from BRICS around the recent global financial crisis	Research in International Business and Finance	122	US
7	Perdikaki O. et al. (2012)	Effect of traffic on sales and conversion rates of retail stores	Manufacturing and Service Operations Management	118	US
8	Nag and Mitra (2002)	Forecasting daily foreign exchange rates using genetically optimized neural networks	Journal of Forecasting	115	India
9	Hafner and Herwartz (2006)	Volatility impulse responses for multivariate GARCH models: An exchange rate illustration	Journal of International Money and Finance	112	Belgium
10	Gabauer D. (2020)	Volatility impulse response analysis for DCC-GARCH models: The role of volatility transmission mechanisms	Journal of Forecasting	104	Austria
11	Lee and Long (2009)	Copula-based multivariate GARCH model with uncorrelated dependent errors	Journal of Econometrics	103	US
12	Kasman S. et al. (2011)	The impact of interest rate and exchange rate volatility on banks' stock returns and volatility: Evidence from Turkey	Economic Modelling	90	Turkey
13	Rogers L.C.G. (1997)	The potential approach to the term structure of interest rates and foreign exchange rates	Mathematical Finance	88	UK
14	Awartani B. et al. (2016)	The connectedness between crude oil and financial markets: Evidence from implied volatility indices	Journal of Commodity Markets	86	UK
15	McDowell W.C. et al. (2016)	An examination of retail website design and conversion rate	Journal of Business Research	83	US

4.2.2 The Most Cited Countries in the Exchange Rate Volatility Knowledge Base

In order to evaluate how concentrated interest in the subject of exchange rate volatility has been geographically, we conducted a country-by-country evaluation of the countries and origins of authors of works on the subject. There was a total of 68 countries represented by authors included in this research, covering the global perspective of exchange rate volatility (Table 2). Based upon the findings, the 20 countries have been referenced by authors of the research on exchange rate volatility most frequently were determine. The overwhelming majority of countries referenced for research on this subject came from developed countries, particularly those in North America and Europe. The US is by far the leading country, with a total of 1405 references, and demonstrates its importance as an authority and contributor to international finance research.

The next highest number of references was from the UK, with a total of 810. India's representation is also noteworthy with 171 references; however, there were also other countries that made contributions as well: 144 from Pakistan, as outlined in Table 2. The growing representation of authors from developing and emerging countries reflects an increasing interest by academics in exchange rate volatility in these geographic regions. This large percentage representation of authors from developed countries reinforces previous bibliometric studies on finance research and can be linked to an increased level of access through greater institutional resources, increased levels of collaborative international research, and increased funding resource.

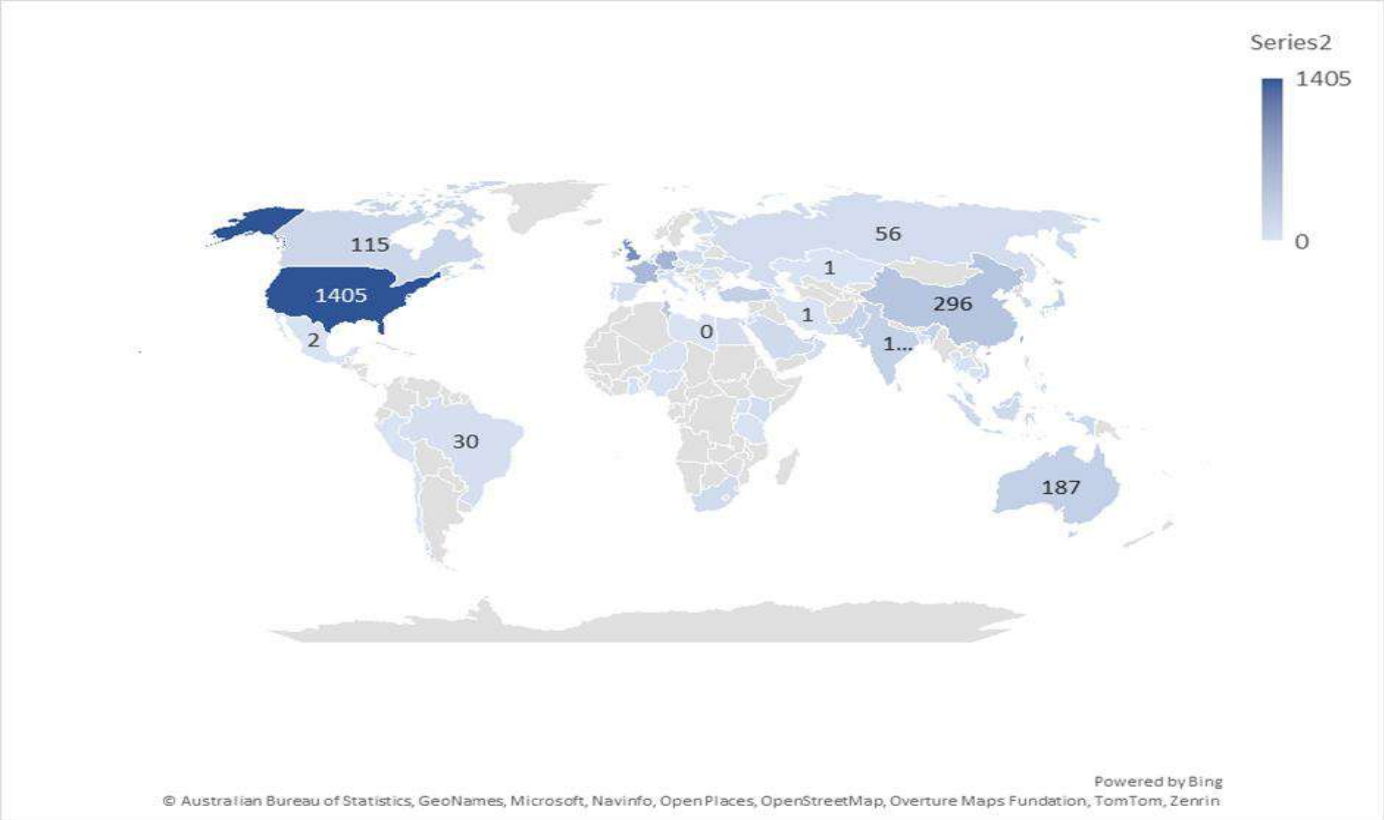

Figure 4
Most Cited Countries in Exchange Rate Volatile

4.2.3 Analysis of the Most Contributing Publication Sources

In order for researchers and practitioners to stay current with the most current developments and research in the field, as well as to determine which journals are most likely to accept their work and which may be more receptive to their research topics, this analysis disseminates the most contributing journals in exchange rate volatility literature. The 336 publications on exchange rate volatility came from 194 different sources.

Nonetheless, the majority of sources with multiple publications accounted for 72% of the entire corpus. More than 10% of the sources with multiple publications were among the top twenty, as indicated in Table 3. With 14 articles and 116 citations, the Journal of Economics was the most productive source. Nevertheless, of the 4,727 total citations in all the sources, 34 (not attached) had no citations, and the top twenty most prolific sources accounted for more than 46% of the total citations. With 12 publications, the Journal of Forecasting comes in second, followed by the Journal of International Money and Finance with 11 documents. Table 3 displays the other sources.

Table 3
Sources with High Number of Documents

ID	Journal	Documents	Citations
1	Applied economics	14	116
2	Journal of forecasting	12	349
3	Journal of international money and finance	11	414
4	Applied financial economics	8	111
5	Resources policy	8	190
6	Applied economics letters	6	36
7	International journal of finance and economics	6	60
8	Economic modelling	5	138
9	International review of economics and finance	5	33
10	Journal of econometrics	5	468
11	Journal of international financial markets, institutions and money	5	129
12	Indian journal of finance	4	7
13	International review of financial analysis	4	23
14	Investment management and financial innovations	4	13
15	Journal of banking and finance	4	99

4.2.4 The Sources with a High Number of Citations

With 468 citations from 5 publications, the Journal of Econometrics was found to be the most influential source, indicating a high average impact per article. Table 4. This shows how methodological and econometric studies have a significant impact on this field of study. This pattern is consistent with past research indicating that foundational econometric research frequently receives a lot of citations because it offers frameworks and tools that are widely used by other academics.

Table 4

Most Cited Sources

SN	Label	Documents	Citations
1	Journal of econometrics	5	468
2	Journal of international money and finance	11	414
3	Journal of forecasting	12	349
4	Research in international business and finance	4	317
5	Tourism management	1	278
6	Resources policy	8	190
7	Management science	1	142
8	Economic modelling	5	138
9	Quantitative finance	4	130
10	Journal of international financial markets, institutions and money	5	129
11	Manufacturing and service operations management	1	118
12	Applied economics	14	116
13	Applied financial economics	8	111
14	Journal of banking and finance	4	99
15	Journal of business research	2	90

The Journal of International Money and Finance has been a high-quality source of research on international finance and exchange rates, as demonstrated by its citation total of 414 citations from the journal's 11 published papers. Previous studies using bibliometric techniques have suggested that specialized journals like the JiIMF tend to achieve higher citation counts than other generalist journals because they have smaller numbers of authors/readers interested only in their related subjects (Chkili & Nguyen, 2014). Furthermore, the results of this study confirm previous findings that have identified econometric journals and international finance journals as the primary sources of significant research in this field (Chen & Lingling, 2021). Other sources of information could be found in Table 4.

4.2.5 The Most Influential Authors in Exchange Rate Volatility

The authors with the most citations related to exchange rate volatility based on the Scopus database are listed in Table 5.

Table 5

The Prolific Authors in Exchange Rate Volatility

ID	Author's name	Documents	Citations
1	Wang, Yu-Shan	1	278
2	Chkili, Walid	1	175
3	Nguyen, Duc Khuong	1	175
4	Härdle, W.	1	158
5	Tsybakov, A.	1	158
6	Bollerslev, Tim	1	152
7	Zhou, Hao	1	152
8	Duan, Jason A.	1	142
9	Whinston, Andrew	1	142
10	Xu, Lizhen	1	142
11	Sui, Lu	1	122
12	Sun, Lijuan	1	122
13	Herwartz, Helmut	2	120
14	Kesavan, Saravanan	1	118
15	Perdikaki, Olga	1	118

The most influential author was Wang, Yu-Shan, who authored the highest number of cited publications (278) for a single publication on this topic; as such, his work was very influential in shaping both the way people think about exchange rate volatility and how they conduct their research into and/or develop current theories in the field. The next most prominent authors were Chkili, Walid, and Nguyen, Duc Khuong, with scores of (175) and (175), respectively. Other top authors included Hardle, W. (158) and Tsybakov, A. (158). The complete list of authors from Table 5 indicates that although many of the authors had only one publication, all of them had relatively high citation counts, which reflects a significant level of influence on the body of knowledge regarding exchange rate volatility.

4.3 Scholarly Collaborations and the Research Networks' Structure in Exchange Rate Volatility

Analysis of citations by multiple authors, commonly referred to as co-citation analysis, is one of the most common bibliometric tools and is used to analyze a research field's intellectual framework through the frequency with which two authors have been cited together in the same area of research (Tan Luc et al., 2022). Co-citation analyses help distinguish between significant contributors and provide researchers with information regarding the emerging themes within an area of study. VOSviewer's co-citation map included a total of 15,772 researchers who had been identified as meeting the conditions of having a minimum of 20 co-citations between them, of whom only 82 researchers met that minimum requirement (Figure 5).

The focus of this analysis was on the top twenty authors with the most co-citations related to exchange rate volatility in the pooled data set of studies about exchange rate volatility; these authors with the highest number of co-citations are believed to have had the largest intellectual impact in the field as evidenced by the results from Boyack and Richard (2010). These twenty authors were placed into three separate clusters based on their co-citation behaviors; therefore, each cluster represented a specific thematic interest in the overall field of study of exchange rate volatility.

The top three co-cited authors in cluster two, according to the original results, were Bollerslev T., with 173 co-citations; Diebold F.X., with 131 co-citations; and Engle R.F., with 91 co-citations. These three individuals played an important role in developing econometric methodologies related to the estimation of the volatility of financial data through their contributions to the development of ARCH and GARCH models (Andersen et al. 2003) and (Engle 1982). Other co-cited authors vary in the amount of co-citation, indicating that there are diverse methodological and thematic contributions made by other co-cited authors to the field.

The other major grouping of authors (Cluster 1), as represented by the red color and co-citation totals, is comprised of K. Rogoff (77), S. Johansen (74), and C.W.J. Granger (67), authors who have undertaken extensive research focused upon macroeconomic fundamentals of exchange rates, cointegration studies, and time series econometrics. Cluster 1 thus comprises the theoretical modelling of the medium- to long-term behavior of exchange rates and the contribution of the aforementioned authors to the long-run properties of exchange rates. The remaining authors shown have been co-cited in relation to this body of work (Figure 5).

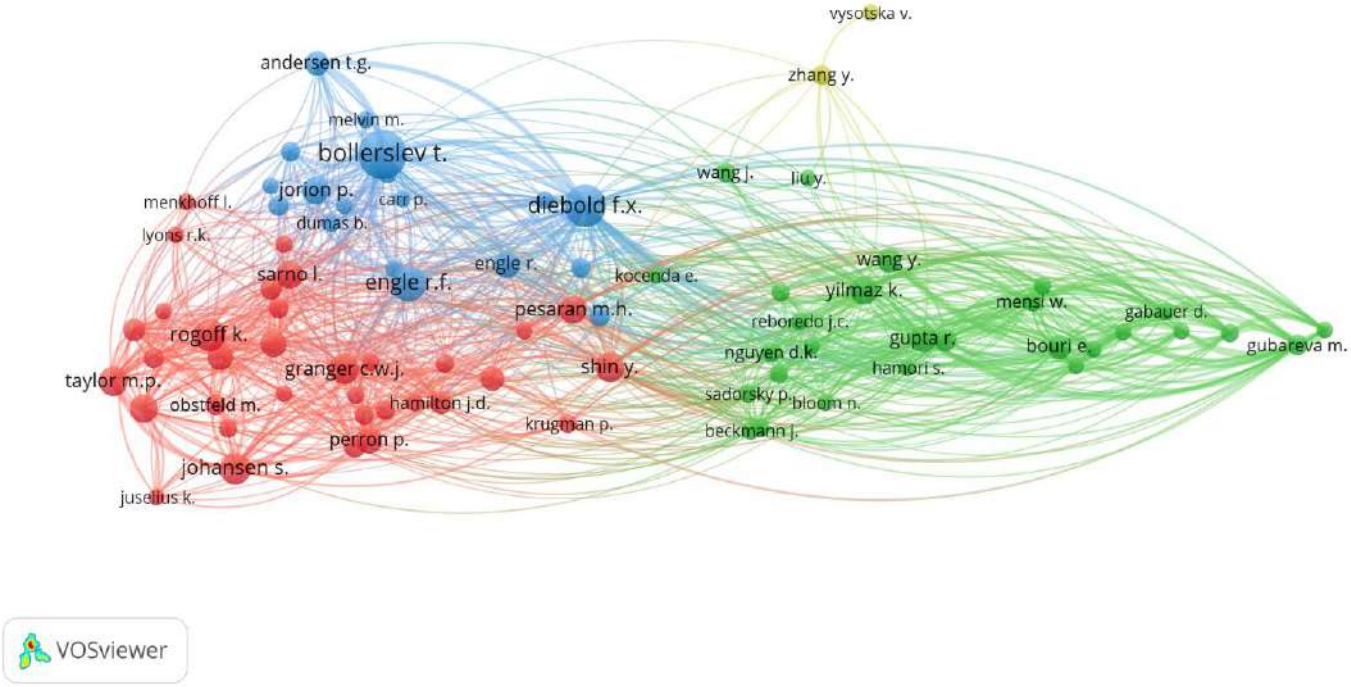

Figure 5
Co-Citations to Cited Authors

The analysis of co-citation patterns reveals that the majority of studies on exchange rate volatility are clustered into three main areas: econometric models for volatility, the identification of deterministic macroeconomic variables and theoretical models, and studies of volatility spillover effects. The themes identified in this analysis reflect those already identified in previous bibliometric studies in the larger area of international finance by Duan et al. (2023).

4.4 Existing Research Gaps and Potential Areas for Future Studies on Exchange Rate Dynamics.

There is a vast body of research related to exchange rate volatility; however, it has not been thoroughly explored. First, there has been substantial reliance on theoretical and econometric approaches but limited use of bibliometric analyses; thus, there is no comprehensive mapping of exchange rate volatility research intellectual architecture or thematic structure (Zupic & Tomaž, 2015; Donthu et al., 2021). Second, the predominant research has been on individual dimensions (e.g., monetary policy shocks, macroeconomic fundamentals) rather than integrated frameworks that capture the interplay of these elements and others, such as political risk, behavioral finance, and global economic interdependence (Bahmani-Oskooee & Scott, 2007). Third, most research has focused on developed countries (e.g., the U.S., the European Union, and Japan), resulting in an uneven geographical representation, especially concerning developing and emerging countries in Africa and other frontier markets that face substantial challenges due to exchange rate volatility (Ozturk & Huseyin, 2009).

Fourth, there has been little to no investigation of the effect of the COVID-19 pandemic, geopolitical issues, and the presence of digital currency as a new means by which to cause external shocks and instability in the exchange rate market, as indicated by the current bibliometric database on exchange rate volatility. It has been noted that this is an area of research that would benefit from a more comprehensive scholarly approach when determining how this knowledge is produced through systematic investigation (Bahmani-Oskooee & Scott 2007). Fifth, the network of co-citations between researchers in the exchange rate market remains largely unexplored, and therefore there is a lack of understanding of how the collaborative nature of this field, across regions, is produced and shared (Aria & Corrado 2017).

4.5 Discussion

This bibliometric review of exchange rate volatility (ERV) research from 1993 to 2025 paints a picture of a vibrant, growing field that has matured considerably—yet still carries some familiar habits and blind spots. The steady rise in publications, especially after 2010, matches what Flores-Sosa et al. (2022a) first noticed: more scholars are

tackling currency swings as global markets knit closer together and crises keep reminding us how disruptive volatility can be (Bush & Gabriela, 2021).

One of the clearest takeaways is how much the field still leans on a handful of trusted tools—GARCH models and their many variations, along with VAR approaches. These methods sit at the heart of the most-cited papers and dominate the networks we mapped. It's easy to see why: they've proven reliable for capturing the clustering and spillovers that define volatility. But this heavy reliance feels very much in line with what Gulati (2023) and Şahin and Bil (2024) described across volatility studies more broadly. The downside? Newer ideas—like machine learning, neural networks, or realized volatility measures—are only just starting to appear, mostly in recent work that hasn't yet gathered many citations. It suggests the field might be stuck in a comfortable groove, missing chances to harness today's data-rich environment.

When we look at the big themes, the strongest clusters revolve around classic questions: what drives volatility macroeconomically, how it hurts trade, and the way it spills into stock markets (Ozturk & Huseyin, 2009; Kennedy, 2016). These areas are well-trodden and richly connected. Yet policy-focused work—turning all those insights into practical advice—remains surprisingly thin, echoing Lal & Rai's (2022) observation that trade-volatility studies often stop at diagnosis rather than prescription. Emerging topics like cryptocurrency swings, climate risks to currencies, or geopolitical shocks show up on the edges, full of potential but not yet woven into the mainstream conversation.

Geographically, output and influence cluster in a few usual suspects—the United States, United Kingdom, and China lead the pack. That pattern tracks with Naeem et al.'s (2022) findings but also underscores the inclusivity worries raised by Flores-Sosa et al. (2022a). Researchers in emerging markets, who often live the real-world consequences of currency turbulence, remain underrepresented in top journals and citation circles—a reminder that expensive database choices and publication barriers can quietly shape whose voices get heard. Therefore, there are needs for case studies on African currencies exchange rate volatility, and regional volatility spillovers, among others.

Tracing the intellectual story through co-citation clusters, a clear arc was seen: from foundational ideas like Purchasing Power Parity (Mussa, 1984), through early econometric breakthroughs, to today's focus on uncertainty and spillovers (Karanasos & Hunter, 2022). The anchors look a lot like the pivotal works by Chen and Lingling (2021) that highlighted in their spillover mapping. Still, the slow arrival of interdisciplinary angles—say, from behavioral finance or network theory—hints at untapped richness.

In the end, the results both confirm and build on earlier reviews. It was revealed the same methodological caution, the same gap between empirical depth and policy relevance, and the same geographic imbalances that others have flagged (Flores-Sosa et al., 2022a; Gulati, 2023; Naeem et al., 2022). Uncovering them could make ERV scholarship not just completer and more forward-thinking, but genuinely more helpful in a world where currency shocks seem to arrive more often than EVER.

No research without limitations, as it is for this study. Using defined search string, and Scopus only limit the use of other themes and databases like Web of sciences, and Google scholars, among others. However, we recognize that this decision may have influenced the outcomes of the search. Another limitation that could have affected the findings of this review is that all the papers included were in English, which means that studies published in other languages, potentially containing valuable insights, may have been excluded.

V. CONCLUSION & RECOMMENDATION

5.1 Conclusion

The research is a bibliometric analysis of the knowledge structure and themes of the exchange rate volatility literature for the period 1993 to 2025 The research is based on 336 Scopus-indexed papers and has shown continued growth in published papers, indicating a sustained interest by academics in the problem of currency stability, and has become a growing part of the field of finance and international business. With the continuing growth of globalization and the liberalization of finance and uncertainty in the financial markets, the additional papers published provide a wide range of new contributions to the understanding of how to analyze exchange rates and the factors that explain changes in exchange rates.

The research has revealed several leaders in the field of exchange rate volatility, such as Bollerslev, Engle, Diebold, and Rogoff, whose econometric work has provided significant contributions, including the development of the ARCH and GARCH models, and has created the foundation for modern econometric models for the modelling and forecasting of exchange rate volatility. The three most cited journals are, in order, the Journal of Econometrics, the Journal of International Money and Finance, and the Journal of Forecasting, which reflect the predominance of empirical and quantitative studies in the examination of exchange rate volatility.

According to existing documentation, money and finance has been a long-standing expansion area for developing markets, including triple-A country (e.g., USA, UK, Germany) studies, which produce vast amounts of documentation on financial economics due to their robust physical infrastructures and research capabilities, and the

continued growth in emerging economies (e.g., India, Pakistan, Turkey) that continue to expand through (long-term) continued development in this area. Highly cited works that have made a significant impact in this area provide significant contributions to financial economics modelling through their forecasting and linking volatility to other macroeconomic variables.

Research published in journal articles and other such research has established itself as a prominent area of study of "exchange rate volatility". The academic landscape in this area continues to grow with more sophisticated digital methodologies and new ideas emerging. One of these will likely continue to be created by the introduction of machine learning, which has the potential to fill in many area gaps related to geographical areas of the world that are often under-represented when considering the developing economies. Through interdisciplinary collaborative works, future research will produce a better understanding of the relationship between all aspects of "exchange rate volatility" and contribute to the scholarly discussion that is based on the keywords established in the keyword correlation analysis. These keywords tell a story of evolution. The field has moved from traditional macroeconomic and parity-based explanations toward richer, market-driven, and network-oriented views. Policy variables sit comfortably alongside spillover and connectedness measures, making the research feel genuinely interdisciplinary—blending international finance, macroeconomics, econometrics, and risk management.

This concentration reflects both maturity in core ideas and exciting new frontiers, especially around volatility transmission, policy uncertainty, and machine-learning forecasting. These emerging areas look poised to guide the next wave of studies, helping the literature stay relevant in an ever-more connected and unpredictable global economy. Combining quantitative econometrics, macroeconomic policy views, and data analysis is poised to continue expanding. Improved methods of study of exchange rate volatility will be made possible using new ways of approaching international cooperation, which will expand beyond the current boundaries of university geographic areas, and new methodologies will add to the body of knowledge available for future study in global finance.

5.2 Recommendation

By reviewing this bibliometric analysis, many recommendations may be offered for enhancing the research on the effects of exchange rate volatility on economies and enhancing the implementation of the theoretical framework of exchange rate volatility into actual applications regarding economics. In addition to expanding beyond the previously stated regions of study and researching lesser-explored geographical areas in terms of exchange rate volatility, researchers may conduct additional analyses on many areas of Africa and Latin America, since these regions currently have very few studies related to exchange rate dynamics and how these dynamics influence the economy. Thus, studying the areas will allow researchers to investigate how such institutional quality, governance, and economic structural characteristics influence exchange rates and therefore increase their understanding of exchange rate dynamics on an international scale.

This bibliometric analysis of the literature in this field provides a number of suggestions to encourage future research on the effects of exchange rate variability on the different economies and to enhance the application of exchange rate variability theory to real-life applications. Researchers in this area should expand their research efforts to include regions where there is limited or no existing research on exchange rate variability and its effects on the economies of that area. For instance, many regions of Africa and Latin America have seen little research on exchange rate dynamics or the relationship between exchange rate dynamics and the economy. By expanding their research focus to these regions, researchers will gain valuable information regarding the influence of institutional quality, governance, and structural economic variables on the variability of exchange rates, thus contributing to our understanding of global exchange rate dynamics. Incorporating different types of research into the models for predicting exchange rate fluctuation will lead to increased accuracy and effectiveness. Some of the methods used in the fields of economics, finance, political economy, and data science, especially the use of machine learning, neural networks, and big data analysis, could greatly improve the ability of models to predict exchange rate volatility.

REFERENCES

Andersen, T. G., Bollerslev, T., Diebold, F. X., & Labys, P. (2003). Modeling and forecasting realized volatility. *Econometrica, 71*(2), 579–625. https://doi.org/10.2139/ssrn.267792

Aria, M., & Cuccurullo, C. (2017). Bibliometrix: An R-tool for comprehensive science mapping analysis. *Journal of Informetrics, 11*(4), 959–975. https://doi.org/10.1016/j.joi.2017.08.007

Bahmani-Oskooee, M., & Hanafiah, H. (2019). Who is hurt by dollar-euro volatility in the Euro zone? *International Economics, 159*, 36–47. https://doi.org/10.1016/j.inteco.2019.04.002

Bahmani-Oskooee, M., & Harvey, H. (2019). The J-curve and bilateral trade balances of Indonesia with its major partners: Are there asymmetric effects? *New Zealand Economic Papers, 53*(1), 63–76. https://doi.org/10.1080/00779954.2017.1371207

Bahmani-Oskooee, M., & Wang, S. (2007). Exchange rate volatility and trade flows: A review article. *Journal of Economic Studies, 34*(3), 211–255. https://doi.org/10.1108/01443580710772777

Bekaert, G., & Harvey, C. R. (2017). Emerging equity market volatility. *Journal of Financial Economics, 43*(1), 29–77. https://doi.org/10.1016/S0304-405X(96)00889-6

Boyack, K. W., & Klavans, R. (2010). Co-citation analysis, bibliographic coupling, and direct citation: Which citation approach represents the research front most accurately? *Journal of the American Society for Information Science and Technology, 61*(12), 2389–2404. https://doi.org/10.1002/asi.21419

Bush, G., & León Naranjo, G. (2021). Uncertainty and exchange rate volatility: Evidence from Mexico. *International Review of Economics and Finance, 75*, 704–722. https://doi.org/10.1016/j.iref.2021.04.029

Chen, J., & Yang, L. (2021). A bibliometric review of volatility spillovers in financial markets: Knowledge bases and research fronts. *Emerging Markets Finance and Trade, 57*(5), 1358–1379. https://doi.org/10.1080/1540496X.2019.1695119

Chkili, W., & Nguyen, D. K. (2014). Exchange rate movements and stock market returns in a regime-switching environment: Evidence for BRICS countries. *Research in International Business and Finance, 31*, 46–56. https://doi.org/10.1016/j.ribaf.2013.11.007

Donthu, N., Kumar, S., Mukherjee, D., Pandey, N., & Lim, W. M. (2021). How to conduct a bibliometric analysis: An overview and guidelines. *Journal of Business Research, 133*, 285–296. https://doi.org/10.1016/j.jbusres.2021.04.070

Duan, W., McCann, J. D., & Khalid, A. (2023). How network structure and exchange rate volatility drive the industrial ecosystem towards collapse: A global perspective. *Economic Research-Ekonomska Istraživanja, 36*(1), 1688–1707. https://doi.org/10.1080/1331677X.2022.2092524

Eck, N. J. van, & Waltman, L. (2017). Citation-based clustering of publications using CitNetExplorer and VOSviewer. *Scientometrics, 111*(2), 1053–1070. https://doi.org/10.1007/s11192-017-2300-7

Engel, C., & West, K. D. (2005). Exchange rates and fundamentals. *Journal of Political Economy, 113*(3), 485–517. https://doi.org/10.1086/429137

Engle, R. F. (1982). Autoregressive conditional heteroscedasticity with estimates of the variance of United Kingdom inflation. *Econometrica, 50*(4), 987–1007. https://doi.org/10.2307/1912773

Flores-Sosa, M., Aiello, E., & Martínez-Montoya, J. (2022a). Exchange rate and volatility: A bibliometric review. *International Journal of Finance and Economics, 27*(1), 1419–1442. https://doi.org/10.1002/ijfe.2223

Fukui, E. N. J. S., Jitsuzumi, M., Louphou, C., Fiaschi, L., Kass-Hanna, R., Ilzetzki, E., Isakov, O., Kalemli-Ozcan, S., Maggiori, M., Mendoza, E., Mukhin, D., Obstfeld, M., Furuya, M., Nakamura, E., & Steinsson, J. (2023). The macroeconomic consequences of exchange rate depreciations (pp. 1–107). https://data.nber.org/data-appendix/w31279/

Gulati, V. (2023). Bibliometric review of research on exchange rate predictability and fundamentals. *Finance Research Letters, 58*(1), Article 104228. https://doi.org/10.1016/j.frl.2023.104228 Retrieved from https://repository.li.mahidol.ac.th/handle/123456789/88337

Joseph, N. L. (1995). Cointegration, error-correction models, and forecasting using realigned foreign exchange rates. *Journal of Forecasting, 14*(6), 499–522. https://doi.org/10.1002/for.3980140603

Karanasos, M., Yfanti, S., & Hunter, J. (2022). Emerging stock market volatility and economic fundamentals: The importance of US uncertainty spillovers, financial and health crises. *Annals of Operations Research, 313*(2), 1077–1116. https://doi.org/10.1007/s10479-021-04042-y

Kasman, S., Vardar, G., & Tunç, G. (2011). The impact of interest rate and exchange rate volatility on banks' stock returns and volatility: Evidence from Turkey. *Economic Modelling, 28*(3), 1328–1334. https://doi.org/10.1016/j.econmod.2011.01.015

Kasubi, J. W., Kisumbe, L. A., & Nyabakora, W. I. (2025). Mapping the knowledge base for the impact of artificial intelligence on human resources management: A bibliometric study. *SAGE Open, 15*(3), 21582440251377298. https://doi.org/10.1177/21582440251377298

Kennedy, K. (2016). Exchange rate volatility and its effect on stock market volatility. *Academic Journal of Economic Studies, 1*(1), 37–46. https://doi.org/10.7508/ijhcum.2016.01.005

Lal, M., & Rai, V. K. (2022). Impact of exchange rate volatility on international trade: A bibliometric review. *SSRN*. https://ssrn.com/abstract=4209164 or https://doi.org/10.2139/ssrn.4209164

Mussa, M. (1984). The theory of exchange rate determination. In R. W. Bilson & R. C. Marston (Eds.), *Exchange Rate Theory and Practice* (pp. 13–78). University of Chicago Press. https://www.nber.org/books-and-chapters/theory-exchange-rate-determination

Nachane, D. M., & Ray, D. (1993). Modelling exchange rate dynamics: New perspectives from the frequency domain. *Journal of Forecasting, 12*(5), 379–394. https://doi.org/10.1002/for.3980120502

Naeem, M., Khalid, H. E., & Raza, A. (2022). Bibliometrics literature revise on exchange rate: A future research agenda. *Etikonomi, 21*(1), 41–54. https://doi.org/10.15408/etk.v21i1.22412

Nag, A. K., & Mitra, A. (2002). Forecasting daily foreign exchange rates using genetically optimized neural networks. *Journal of Forecasting, 21*(7), 501–511. https://doi.org/10.1002/for.838

Nyabakora, W. I. (2023). Virtual environments' knowledge base: A bibliometric analysis. *Scientific Visualization, 15*(4), 140–158. https://doi.org/10.26583/sv.15.4.11

Nyabakora, W. I. (2024). The contribution of family businesses to economic growth: A bibliometric review. *SAGE Open*, 1–16. https://doi.org/10.1177/21582440241301423

Nyabakora, W. I., & Sarah, E. M. (2024). Corporate social responsibility knowledge base: A bibliometric analysis. *Modern Finance, 2*(1), 101–120. https://doi.org/10.61351/mf.v2i1.123

Ozturk, I., & Kalyoncu, H. (2009). Exchange rate volatility and trade: An empirical investigation from cross-country comparison. *International Journal of Economic Policy in Emerging Economies, 21*(3), 499–513. https://doi.org/10.1111/j.1467-8268.2009.00220.x

Priyan, P. K., Nyabakora, W. I., & Rwezimula, G. (2023a). A bibliometric review of the knowledge base on capital structure decisions. *Vision, 27*(2), 155–166. https://doi.org/10.1177/09722629221140190

Ramoni-Perazzi, J., & Rodríguez, H. (2022). Exchange rate volatility, corruption, and economic growth. *Heliyon, 8*(12), e12328. https://doi.org/10.1016/j.heliyon.2022.e12328

Rogers, L. C. G. (1997). The potential approach to the term structure of interest rates and foreign exchange rates. *International Journal of Theoretical and Applied Finance, 7*(2), 157–176. https://doi.org/10.1111/1467-9965.00029

Rwezimula, G., Guoxing, Z., & Nyabakora, W. I. (2025). Mapping the knowledge base on visual reality technology and the manufacturing industry. *Scientific Visualization, 17*(1), 1–19. https://doi.org/10.26583/sv.17.1.01

Şahin, Ö., & Bil, E. (2024). Bibliometric analysis of studies published in the field of volatility. *Ege Akademik Bakış, 24*(1), 1–18. https://doi.org/10.21121/eab.922952

Tan Luc, P., Pham, X. L., Angelina, N. H. L., & Bui, T. T. (2022). A co-citation and co-word analysis of social entrepreneurship research. *Journal of Social Entrepreneurship, 13*(3), 324–339. https://doi.org/10.1080/19420676.2020.1782971

Zupic, I., & Čater, T. (2015). Bibliometric methods in management and organization. *Organizational Research Methods, 18*(3), 429–472. https://doi.org/10.1177/1094428114562629