

Joseph, Aleena; Geetha E; Radhakrishnan, Rohith; Jain, Raksha

## Article

# Macro-financial nexus: a systematic review on the impact of macroeconomic factors on bank stock returns

Cogent Economics & Finance

## Provided in Cooperation with:

Taylor & Francis Group

*Suggested Citation:* Joseph, Aleena; Geetha E; Radhakrishnan, Rohith; Jain, Raksha (2024) : Macro-financial nexus: a systematic review on the impact of macroeconomic factors on bank stock returns, Cogent Economics & Finance, ISSN 2332-2039, Taylor & Francis, Abingdon, Vol. 12, Iss. 1, pp. 1-24, <https://doi.org/10.1080/23322039.2024.2354101>

This Version is available at:

<https://hdl.handle.net/10419/321491>

### Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

### Terms of use:

*Documents in EconStor may be saved and copied for your personal and scholarly purposes.*

*You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.*

*If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.*



<https://creativecommons.org/licenses/by/4.0/>

# Macro-financial nexus: a systematic review on the impact of macroeconomic factors on bank stock returns

Aleena Joseph, Geetha E, Rohith Radhakrishnan & Raksha Jain

To cite this article: Aleena Joseph, Geetha E, Rohith Radhakrishnan & Raksha Jain (2024) Macro-financial nexus: a systematic review on the impact of macroeconomic factors on bank stock returns, Cogent Economics & Finance, 12:1, 2354101, DOI: [10.1080/23322039.2024.2354101](https://doi.org/10.1080/23322039.2024.2354101)

To link to this article: <https://doi.org/10.1080/23322039.2024.2354101>



© 2024 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group.



Published online: 15 May 2024.



[Submit your article to this journal](#)



Article views: 1900



[View related articles](#)



[View Crossmark data](#)



Citing articles: 1 [View citing articles](#)

# Macro-financial nexus: a systematic review on the impact of macroeconomic factors on bank stock returns

Aleena Joseph , Geetha E , Rohith Radhakrishnan  and Raksha Jain 

Department of Commerce, Manipal Academy of Higher Education, Manipal, India

## ABSTRACT

The performance of bank stocks exhibits a country's overall financial health and signals economic growth. Therefore, understanding the interaction of macroeconomic factors on bank stock returns is crucial for the valuation of financial assets, especially in a highly volatile stock market. Although macroeconomic factors and their impact on bank stock returns have been extensively investigated, there is still a dearth of comprehensive review articles in this domain. To address this lacuna, we conducted a systematic review to identify the macroeconomic determinants driving bank stock returns. Through a systematic search, 64 articles were identified from two electronic databases for literature synthesis based on inclusion and exclusion criteria from 1980–2023. The review posits valuable insights into the macroeconomic factors that influence bank stock returns, the nuances of the variables' effects and the methodologies employed in these studies. The key macroeconomic factors identified include interest and exchange rate sensitivity, which has been studied extensively; however, the impact of monetary policies, gold prices and oil prices needs further investigation. Subsequently, the study documents various bank-specific characteristics that influence the relationship between macroeconomic factors and bank stock returns.

## ARTICLE HISTORY

Received 22 August 2023  
Revised 7 May 2024  
Accepted 7 May 2024

## KEYWORDS

Bank stock returns; interest rate; exchange rate; oil prices; macroeconomic factors; asset pricing

## REVIEWING EDITOR

David McMillan, University of Stirling, United Kingdom

## SUBJECTS

Economics; Finance; Business, Management and Accounting

## JEL CLASSIFICATION



E00; G20; G21; G28

## 1. Introduction

The banking sector plays a crucial role in the smooth functioning of any economy, serving as an intermediary between savers and borrowers, promoting economic growth and stability (Atukalp, 2021; Balani, 2019; Thorbecke, 2021). The performance of these institutions is intricately linked to the overall economic condition, making the relationship between banks and macroeconomic factors critical. These macroeconomic factors have a substantial impact on banks at both the organisational and market levels. At the institutional level, the maturity composition of assets and liabilities determines how these factors influence banks' profitability. At the market level, macroeconomic factors have a direct impact on the pricing of bank stocks (Choi et al., 1992).

Understanding the sensitivity of bank stocks to macroeconomic factors is vital for various stakeholders, including policymakers and investors. This sensitivity plays a role in banking regulation, asset allocation, monetary policy, portfolio selection, banking health assessment, and economic implications (Aggarwal et al., 2006; Akella & Chen, 1990; Akella & Greenbaum, 1992; Akhtaruzzaman et al., 2014; Ballester et al., 2011). Thus, integrating these factors in models examining BSR is vital since they directly affect bank returns and costs (Choi et al., 1992; Elyasiani & Mansur, 2004).

The intricate interplay between macroeconomic variables and bank stock returns (BSR) has long piqued the curiosity of researchers in finance and economics (Kasman et al., 2011; Sukcharoensin, 2013). It originates from the inherent vulnerability of banks to variations in macroeconomic factors, including

**CONTACT** Geetha E  [geetha.e@manipal.edu](mailto:geetha.e@manipal.edu)  Department of Commerce, Manipal Academy of Higher Education, Manipal, India

© 2024 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group.

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited. The terms on which this article has been published allow the posting of the Accepted Manuscript in a repository by the author(s) or with their consent.

interest rates (Akhtaruzzaman et al., 2014; Ekinci, 2016; Elyasiani et al., 2020; Killins et al., 2021; Tamakoshi & Hamori, 2014; Viale & Madura, 2014), inflation (Zaini et al., 2018), monetary policies (Altavilla et al., 2018; Patsoulis, 2022; Thorbecke, 2021) and, exchange rates (Gounopoulos et al., 2013; Yakup, 2022). Thus, understanding the intricate relationship between these factors and BSR has important practical implications.

The motivation for our study stems from two reasons. First, there is a significant gap in the literature, marked by discrepancies among the empirical evidence (Elyasiani & Mansur, 2004; Sukcharoensin, 2013). Although various studies have examined the relationships between macroeconomic variables and BSR, the lack of a unified explanation has posed an opportunity to synthesise such studies for an explicit understanding of these relationships. These literature discrepancies motivate this study, which aims to consolidate all inconsistencies among the studies and understand the underlying causes of these contradictions.

The second critical motivation is the absence of dedicated review articles on this specific topic dealing with macroeconomic variables and BSR. While several other studies have empirically investigated the links between macroeconomic variables and BSR, a comprehensive synthesis of such findings is sparse. This fragmented and insufficient setting emphasises the originality and significance of our study. Our systematic review aims to overcome this substantial gap by explaining the tangled interplay between macroeconomic determinants and BSR.

Given the significance of this study and the need for a thorough and unbiased synthesis of the existing literature, the purpose of this systematic review is to identify the macroeconomic factors influencing BSR. A rigorous and transparent analysis has been undertaken to understand the relationship between macroeconomic variables and bank stock returns and to identify different methodologies employed in these studies. The review intends to identify and synthesise the results of all relevant studies published to date through a comprehensive search from relevant databases. Our goal is to identify the various macro factors and to draw sound conclusions about their effect on bank stock returns, providing valuable insights to investors, policymakers, and other stakeholders interested in this critical subject. The decisions taken by these stakeholders are influenced by how well banks perform under pressures from different macroeconomic variables. The study answers the following research questions:

RQ1) What are the different macroeconomic variables impacting bank stock returns?

RQ2) What methodologies are employed by the researchers in analysing the effect of macroeconomic variables on bank stock returns?

RQ3) What are the effects of these variables on the stock returns of the bank?

Therefore, the primary objective of this study is to identify the macroeconomic factors impacting BSR. This systematic review delves into the intricate relationships between macroeconomic variables and BSR, thereby contributing to the existing body of literature by documenting the relationship between variables. The study expects that macroeconomic variables like interest rate (IR), exchange rate, inflation and monetary policies will have a significant impact on bank stock returns. The findings of the review provide valuable insights to investors, policymakers, and stakeholders by unravelling the mysteries and uncertainties characterising this domain, thereby improving decision-making processes and promoting a better understanding of the complex interplay between banking and macroeconomics. It also helps the researchers to identify the methodologies employed in analysing the relationship between these variables.

The succeeding sections of the paper are framed as follows. The methodology section, which delves into the details of the search strategy, followed by the results section, which reports the major findings of the study. The next is the discussion section, wherein the study provides potential future research directions followed by the conclusion.

## 2. Methods

A systematic review of the macroeconomic factors and bank stock returns relation was conducted to identify the macroeconomic factors influencing bank stock returns and comprehend the effects these

variables have on the returns. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) standards are adopted for conducting the systematic review (Liberati et al., 2009), and the research article of Pahlevan-Sharif et al. (2019) has been referred to understand the systematic review reporting in social science research.

## 2.1. Search strategy

The research papers for conducting systematic review were retrieved from two databases, Scopus and Web of Science. The initial search was done on 4 August 2022, and the last search was performed on 17 May 2023. A protocol was developed with the inclusion and exclusion criteria. The title, abstract, author names and affiliations, journal, author keywords, and year of publication were exported and maintained in an Excel sheet. Two independent reviewers individually examined the papers with adherence to the protocols. Disagreements between the authors were then discussed and settled. A third reviewer's opinion was obtained in the case of unresolved issues. The detailed search strategy conducted in two databases is explained below:

In the Scopus database, the search was conducted within 'title-abstract-keywords'. 'Bank\* stock return\*' or 'bank\* equity return\*' and 'macro\* factors' were the first set of keywords used, and that resulted in 3 documents. The new keywords were added at each search to retrieve more documents. When the keyword 'bank stock\*' was added to the second search, 9 articles appeared in the results. 32 papers were generated when 'macro factors' was changed to 'macro\*'. 38 DOCUMENTS were returned in the search after adding 'bank return\*'. 38

When the 'interest rate\*' variable was added, 123 articles appeared in the search results. The number of documents returned by the search increased to 132 when the search term 'exchange rate\*' was added. The findings rose to 133 and 139 when 'foreign exchange risk' and 'inflation' were subsequently included.

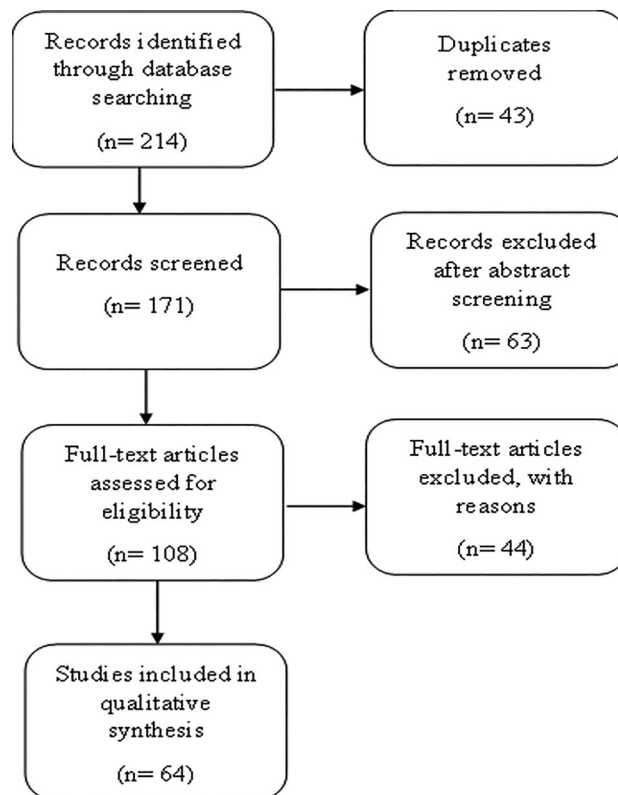
Following the addition of the variable 'GDP', 153 articles were produced, and 164 documents were generated by including the variables 'money supply' or 'monetary policy'. Additionally, the inclusion of the terms 'oil price', 'FDI', 'FII', and 'gold price' in combination with other keywords led to 167 articles. It still displayed 167 documents after the keywords 'FDI' and 'FII' were deleted, indicating that these terms are not present in the title, abstract, or keywords.

After the initial search, the results were again filtered based on specific criteria. Filtering the documents based on the subject area of 'Economics, Econometrics and Finance'; 'Business, Management and Accounting' reduced the number of articles to 152. The only document types taken into consideration were articles and reviews. The study includes the final journal publications regarding the publishing stage and source type. Language restrictions were put in place, and therefore, only documents written in English were chosen. There was no restriction on the open access or year of publication – all articles, regardless of the year or access, were selected. Furthermore, no restrictions were placed on the journal based on the quarter to which they belonged. There were 135 documents after the filters.

Since the final search string employed in the Scopus database produced the greatest number of documents, the same was also used in the Web of Science (WoS) database. There were 67 articles in the search results. The search turned up one review article. It was initially rejected as it did not relate to the scope of our inquiry. Therefore, only articles are considered while filtering the document types, resulting in 60 research papers. When the results were once more filtered by the subject areas of economics, business finance, management, and business, the number of articles remained the same. Furthermore, when the English language filter was applied, the number of articles dropped to 58.

## 2.2. Data extraction and study selection process

This study scrutinised 214 articles (including initial and final searches). The study selection procedure is explained in detail with the help of a flowchart (Figure 1). 193 documents (Scopus and WoS) were downloaded into an Excel sheet for initial screening. Thirty-nine duplicate files were removed. Finally, 154 papers were available for abstract screening. After the abstract screening, 56 articles were excluded as they did not fall into the context of our research. Some of these studies focused on bank stock prices rather than the returns, few focused on the relationship between bank-specific factors and the returns, and yet another few were on insurance companies, etc. The remaining 98 articles were considered for



**Figure 1.** Flow chart of study selection process.

reviewing the full text. The articles for which no abstract was available (4 articles) were also considered for full-text review. The review focused on identifying the macroeconomic variables influencing BSR and the significance and direction of the effect. Additionally, an attempt has been made to identify the various methodologies used in those studies. After the full-text review, 39 articles were excluded. The non-availability of the full articles (3), studies which fall out of the context of our enquiry, such as the effect of off-balance sheet derivatives on BSR determinants of interest rate (IR) risk in banks, studies examining the impact of bank-specific factors, etc., were the reasons for excluding these studies.

In the last search conducted on 17th May 2023, a total of 21 articles (Scopus-12, WoS-9) were downloaded. The same search strategy and filters used in the initial search were employed. However, articles published in 2022 and 2023 were only included. 4 duplicates were removed, and 17 papers were selected for abstract screening, out of which 10 were considered for full-text review, and 5 were selected. Finally, considering the initial and final search, 64 articles were included in the literature synthesis.

### 3. Results

This section provides a critical analysis of our findings, addressing the three research questions proposed in this study. We explore the key characteristics of the articles, like the most cited articles, prolific authors, geographical distribution, and keyword analysis within these studies under review, shedding light on the features and attributes of the articles. Following this, we identify the methodologies employed by researchers in analysing the influence of macroeconomic factors on BSR. Lastly, we present a comprehensive analysis of the effects of these factors on the stock returns of banks.

#### 3.1. Data description

This section provides a comprehensive examination of the most cited articles, prolific authors, geographical distribution, and keyword analysis within the studies under review, providing insights into the characteristics and attributes of the articles under consideration.

### 3.1.1. Most cited articles

Table 1 displays the most cited articles in the field of bank stock returns based on the total number of citations received. The article titled 'Sensitivity of bank stock returns distribution to changes in the level and volatility of interest rate: a Garch-M model', authored by Elyasiani and Mansur (1998) in the Journal of Banking and Finance, is the most globally cited, accumulating a total of 151 citations at an average rate of 5.593 citations per year. Following closely is the article 'The sensitivity of bank stock returns to market, interest, and exchange rate risks' with 131 citations. Interestingly, both articles share the same author and have been published in the same journal.

### 3.1.2. Most prolific authors

Table 2 represents the most prolific authors based on the number of articles published and the total number of citations received. Elyasiani E topped the list with 5 publications and 321 citations, followed by Mansur I with 4 publications and 189 citations.

### 3.1.3. Geographical distribution of sample banks

Table 3 provides an overview of sample banks, shedding light on the concentration of these studies from various geographical regions. Notably, many of these studies are centred on banks in the United States.

Additionally, a few authors, like Elyasiani et al. (2020), have conducted cross-country comparisons in their studies involving countries such as the US, UK, Japan and Europe. Similarly, Tamakoshi and Hamori (2014) included banks from Greece, Portugal, Italy and Spain. Other studies involving cross-country comparisons encompass the works of Akhtaruzzaman et al. (2014) (US and Australia), Gounopoulos et al. (2013) (US, UK, Japan), Elyasiani and Mansur (2003) (US, Japan and Germany). Crouzille et al. (2006) took samples from nearly 109 European countries, and Yakup (2022) included banks from 10 countries in their study. Bessler and Kurmann (2014) selected commercial banks from Europe and the US, while Goldberg and Kabir (2002) selected the central banks of Belgium and Japan.

### 3.1.4. Word cloud

Figure 2 represents the word cloud generated from the Author's keywords. The figure highlights that the significant research on bank stock returns was centred around interest rate risk, monetary policies, economic growth, financial crisis and macroprudential regulations.

## 3.2. Methodological approaches

One of the objectives of this review was to identify the various methodologies researchers employed in analysing the influence of macroeconomic factors on BSR. These methodologies include 'Vector Auto-Regressive Fractionally Integrated Moving Average (VARFIMA)' (Ehouman, 2020), 'diagonal dynamic conditional correlation multivariate GARCH (diagonal DCC-MGARCH) model' (Akhtaruzzaman et al., 2014; Elyasiani et al., 2020), 'event study' (Aharony et al., 1986, 1988; Altavilla et al., 2018; Gumanti et al., 2015; Patsoulis, 2022; Vaz et al., 2008), 'GARCH' (Ekinci, 2016; Elyasiani & Mansur, 2003, 2004, 2005; Saporoschenko, 2002; Sukcharoensin, 2013), 'Cross-correlation function (CCF) using a two-step procedure involving AR-GARCH in the first step and causality-in-variance and causality-in-mean tests using weighted CCF values as the second step' (Tamakoshi & Hamori, 2014), 'two-state Markov regime-switching intertemporal capital asset pricing model' (Viale & Madura, 2014), 'Seemingly Unrelated Regression (SUR)' (Aggarwal et al., 2006; Kwan, 1991; Mamun & Hassan, 2014), 'Ordinary Least Squares (OLS)' (Atindéhou & Gueyie, 2001; Bessler & Kurmann, 2014; Booth et al., 1985; Fraser et al., 2002; Igan et al., 2023; Kilic et al., 1998; Ureche-Rangau & Burietz, 2010; Wetmore & Brick, 1998), 'heteroskedasticity-based GMM estimation technique (HBET)' (Küçükocaoğlu et al., 2013), VAR-BEKK (Gounopoulos et al., 2013) are various methodologies used in this study. 'Parametric and non-parametric methods' (Ballester et al., 2011), 'EGARCH' (Jain et al., 2011; Verma & Jackson, 2008) 'GARCH-M' (Bharati et al., 2006; Elyasiani & Mansur, 1998; Faff et al., 2005; Tai, 2005); 'Iterated Nonlinear Seemingly Unrelated Regression model' (Azeez et al., 2006), 'Switching regime model' employed by Godfeld and Quandt (1973) (Dennis & Jeffrey, 2002), the 'Fixed-effect model' (Killins et al., 2021), 'tri-variate version of the asymmetric GARCH-



**Table 1.** Most cited articles.

Author	Year	Title	Source	Total citation	TCpY
Elyasiani E, Mansur I	1998	Sensitivity of the bank stock returns distribution to changes in the level and volatility of interest rate: a Garch-M model	Journal of Banking and Finance	151	5.593
Elyasiani E	1992	The sensitivity of bank stock returns to market, interest and exchange rate risks	Journal of Banking and Finance	131	3.97
Peydró JI	2018	Monetary policy and bank profitability in a low interest rate environment	Economic Policy	106	15.143
Brunetti C	2019	Interconnectedness in the interbank market	Journal of Financial Economics	74	12.333
Booth Jr, Officer Dt	1985	Expectations, interest rates, and commercial bank stocks	Journal of Financial Research	59	1.475
Madura J	2002	Sources of bank interest rate risk	Financial Review	57	2.478
Saunders A, Aharony J, Swary I	1988	The effects of DIDMCA on bank stockholders' returns and risk	Journal of Banking and Finance	38	1.027
Saunders A	1986	The effects of a shift in monetary policy regime on the profitability and risk of commercial banks	Journal of Monetary Economics	38	0.974
Aharony J, Swary I	1986	The effects of a shift in monetary policy regime on the profitability and risk of commercial banks	Journal of Monetary Economics	38	0.974
Tai Cs	2000	Time-varying market, interest rate, and exchange rate risk premia in the US commercial bank stock returns	Journal of Multinational Financial Management	37	1.48
Brunetti C	2008	Markov switching Garch models of currency turmoil in Southeast Asia	Emerging Markets Review	30	1.765
Elyasiani E, Mansur I	2004	Bank stock return sensitivities to the long-term and short-term interest rates: a multivariate Garch approach	Managerial Finance	22	1.048
Madura J	2000	Effect of federal reserve policies on bank equity returns	Journal of Financial Research	22	0.88
Staikouras SK	2013	Exchange rate risk and the equity performance of financial intermediaries	International Review of Financial Analysis	19	1.583
Saunders A	1995	Bank Risk and Real Estate: An Asset Pricing Perspective	The Journal of Real Estate Finance and Economics	17	0.567

Source: Biblioshiny and Authors.

BEKK model' (Tanin et al., 2022) and 'unconditional quantile regression' (UQR) (Albaity et al., 2023) are the other methods employed in these studies.

Moussa et al. (2021) used multiple models like the 'Engle-Granger two-step cointegration approach', 'two-state Markov-switching model', 'DCC- FIAPARCH (1,d,1) model', 'ARCH' and 'GARCH models' techniques. Other multi-models employed include 'OLS' and 'GARCH' (Kasman et al., 2011), 'OLS' and 'EGARCH' (Lael Joseph & Vezos, 2006), 'MGARCH', 'nonlinear seemingly unrelated regression (NSUR) through GMM and pricing kernel (PK)' approach by Dumas and Solnik (1995) (Tai, 2000), 'OLS' and 'GLS' (generalised-least squares) (Harris et al., 1991), 'SUR', 'non-parametric: Spearman's rank correlation', 'event study', 'OLS' and 'SUR' (Akella & Greenbaum, 1992), 'OLS' and 'event study' (Binici & Köksal, 2013), 'Event study' and 'SUR' (Crouzille et al., 2006) and 'Conditional Autoregressive Range' (CARR) model and 'Time-Varying Parameter- Vector Autoregressive' (TVP-VAR) based Diebold-Yilmaz Connectedness Index (Yakup, 2022).

In the subsequent section, we present a detailed analysis of our findings, addressing the research questions related to identifying the macroeconomic factors and their impacts on BSR.

### 3.3. Macroeconomic factors influencing BSR

The main focus of this study is to identify the macroeconomic factors and their effects on BSR. The full-text review of the articles identified **gold price** (Moussa et al., 2021), **interest rates** (Aggarwal et al., 2006; Aharony et al., 1986; Akella & Chen, 1990; Akella & Greenbaum, 1992; Akhtaruzzaman et al., 2014; 2014; Ballester et al., 2011; Bharati et al., 2006; Booth et al., 1985; Booth & Officer, 1985; Ekinci, 2016; Elyasiani et al., 2020; Elyasiani & Mansur, 1998, 2004; Faff et al., 2005; Fraser et al., 2002; Killins et al., 2021; Kwan, 1991; Lynge & Zumwalt, 1980; Mei & Saunders, 1995; Tamakoshi & Hamori, 2014; Tarhan,



**Table 2.** Most prolific authors.

Authors	No. of articles	Total citations
Elyasiani E	5	321
Mansur I	4	189
Booth JR	3	68
Madura J	3	86
Officer DT	3	68
Saunders A	3	93
Aharony J	2	76
Ariff M	2	16
Brunetti C	2	104
Hassan MK	2	6

Source: Biblioshiny and Authors.

**Table 3.** Geographical distribution of sample banks.

Country	No. of articles
USA	29
Australia	4
Turkey	3
Japan	3
Indonesia	2
Canada	2
South Korea	1
Thailand	1
Spain	1
France	1
Germany	1

Source: Authors Compilation.



**Figure 2.** Word cloud.

Source: Word cloud map developed by authors using Biblioshiny.

1987; Vaz et al., 2008; Verma & Jackson, 2008; Viale & Madura, 2014) **monetary policies** (Aharony et al., 1986; Altavilla et al., 2018; Binici & Köksal, 2013; Gumanti et al., 2015; Kaen et al., 1997; Küçükkocaoglu et al., 2013; Madura & Schnusenberg, 2000; Mamun & Hassan, 2014; Patsoulis, 2022; Thorbecke, 2021; Ureche-Rangau & Burietz, 2010), **macroprudential policies** (Aharony et al., 1988; Igan et al., 2023), **oil price volatility** (Albaity et al., 2023; Ehouman, 2020; Tanin et al., 2022) and **exchange rate** (Gounopoulos et al., 2013; Harris et al., 1991; Tai, 2005; Yakup, 2022) as the different macro variables impacting bank stock returns. **Financial crises** also influence the returns (Crouzille et al., 2006).

Few authors used multiple macro factors, including the interest rate and exchange rate (Atindéhou & Gueyie, 2001; Bessler & Kurmann, 2014; Choi et al., 1992; Dennis & Jeffrey, 2002; Elyasiani & Mansur, 2003, 2005; Jain et al., 2011; Kasman et al., 2011; Kilic et al., 1998; Lael Joseph & Vezos, 2006; Saporoschenko, 2002; Sukcharoensin, 2013; Tai, 2000; Wetmore & Brick, 1998), Interest rate and inflation (Lajeri & Dermine, 1999), interest rate, inflation and exchange rate (Zaini et al., 2018), land price, money supply, inflation, exchange rate and GDP (Azeez et al., 2006) in analysing the sensitivity of banks and found these factors impacted returns.

Next, we explore the intricate relationship between macroeconomic variables and BSR, attempting to bridge the gap between empirical results and established theoretical foundations. We begin by

exploring the renowned theories to understand the fundamental mechanisms by which these variables influence the performance of bank stocks. The popular capital asset pricing theory (CAPM) by Sharpe (1964) primarily focused on the sensitivity of stock returns to market risks but ignored broader economic factors. Merton (1973) addressed this constraint by including 'economic fluctuations' in his intertemporal capital asset pricing model. Long (1974) further underlined the importance of 'state' variables signalling the economic conditions and the vital role of the term structure of IR in equity asset pricing.

Ross (1976) further refined the theoretical ground by introducing the Arbitrage Pricing Theory (APT), a multi-factor model that recognised the pricing of several components in stock returns (Cho et al., 1984). Subsequent studies supported this paradigm, proving its greater explanatory power over the CAPM (Bower et al., 1984; Priestley, 1996). The APT theory has also received empirical validation in terms of the impact of macroeconomic factors on asset returns, as observed by Chen (1983) and Rjoub et al. (2009).

Nai-fu Chen et al. (1986) affirm the influence of the country's macroeconomic factors on stock returns, which Basu and Chawla (2012) further validated in the Indian context. They established that macro factors such as exchange rate, inflation, gold price, market return and wholesale price index influence the returns. Tallman (1989), upon reviewing existing asset pricing theories, emphasised the need for further research into the impact of macroeconomic conditions on stock returns. Thus, the established theoretical framework indicates that macroeconomic factors have a considerable impact on stock returns. This emphasises the significance of testing and understanding this relationship to create valuable information for policymakers, regulators, and investors.

Our comprehensive review descends into this vital relationship, critically analysing the findings among studies investigating the intricate interplay between macroeconomic factors and bank stock returns (BSR). Although studies demonstrate a significant connection between these factors, further exploration is required to disentangle the nuances and inconsistencies within this interrelationship.

### 3.3.1. Interest rate

Interest rate (IR) is a key macroeconomic factor that significantly influences BSR (Bharati et al., 2006; Viale & Madura, 2014; Wetmore & Brick, 1998). While Akella and Chen (1990), Elyasiani and Mansur (1998), Wetmore and Brick (1998) and Bessler and Kurmann (2014) document the sensitivity of BSR towards long-term interest rates (LTR), Verma and Jackson (2008), Fraser et al. (2002), Lynge and Zumwalt (1980) and Elyasiani et al. (2020) highlighted the substantial influence of both short-term (STR) and long-term rates. Although Elyasiani and Mansur (2004) and Ballester et al. (2011) also report the sensitivity of BSR towards LTR and STR, their results reported a stronger influence from LTRs.

This disagreement is further exacerbated by contrasting findings from Lael Joseph and Vezos (2006) and Sukcharoensin (2013) stating that banks are sensitive to STRs. Booth and Officer (1985), Booth et al. (1985), Vaz et al. (2008), Jain et al. (2011), and Akhtaruzzaman et al. (2014) also reported similar findings regarding the IR-BSR relationship. The inconsistencies further extend to studies like Dennis and Jeffrey (2002) and Ekinci (2016), who reported insignificant or weak effects of IR on BSR. This spectrum of influences underlines the context-specific factors that shape this dynamic.

The choice of IR variables (LTR/STR), the samples considered, the bank size, the asset-liability maturity mismatch and the bank characteristics can be the contextual factors that require attention while examining the IR sensitivity of banks.

The complexity of the IR-BSR relationship further extends to the inconsistencies in the direction of their relationship, ranging from positive effects to negative effects. While Akella and Chen (1990) found a positive relationship between LTR and BSR, Elyasiani and Mansur (1998), Atindéhou and Gueyie (2001), and Akhtaruzzaman et al. (2014) observed a negative relationship between the two variables. Fraser et al. (2002) and Elyasiani and Mansur (2004) reported a negative relation between BSR and changes in IRs (STR and LTR). However, Elyasiani and Mansur (2004) found the relationship positive when the IR volatilities (STR and LTR) are considered. The direction of this relationship varies depending on the model employed (whether STR or LTR is used in the model), shifting from positive to negative when considering BSR volatilities and IR volatilities.

Similarly, when considering STRs and BSR, Booth et al. (1985) and Vaz et al. (2008) found a positive relation between STRs and BSR while Jain et al. (2011) reported significant negative influence. Akella and Chen (1990) noted contrasting results across subperiods, observing a negative impact during the

initial subperiod and a positive during the second subperiod, indicating the influence of period-specific factors influencing the STR-BSR relationship.

The inconsistency in this relationship is further observed by Lael Joseph and Vezos (2006), where the direction of the relationship differs for individual banks but remains negative when considering the portfolio returns. Sukcharoensin (2013) also reported mixed results between STRs and BSR across different banks. Interestingly, Verma and Jackson (2008) found a positive effect of STR on BSR. However, Ballester et al. (2011) find that both STR and LTR exert a negative influence on the returns. These findings suggest the potential effects of bank size and individual bank characteristics on the direction of the BSR-IR relationship.

While the direction of the relationship between IR and BSR is inconsistent, the complexity goes beyond only positive or negative effects to actual, expected or unexpected IRs. Kwan (1991) found that unexpected STR has a considerable negative effect, while unexpected LTR has a positive impact. These variations in the results can be attributed to the maturity mismatch in the assets and liabilities. Atindéhou and Gueyie (2001) have also confirmed the negative impact of unexpected IR on BSR. Booth and Officer (1985) stated that BSR is sensitive to actual, expected and unexpected short-term interest rates independent of the market rate effects.

Additionally, changes in the yield curve (a proxy for IR) have been proven to have a considerable impact on BSR (Booth et al., 1985; Elyasiani et al., 2020; Killins et al., 2021). Booth et al. (1985) stated that the curvature of the term structure is not a significant determinant of the BSR, but the level and slope are. Akhtaruzzaman et al. (2014) also reported similar results with the level factor (changes in LTR) exerting significant negative influence, which is explained by the positive duration gaps in banks' lending and borrowing. They also found a significant positive effect of the slope and an insignificant effect of curvature on BSR. Elyasiani et al. (2020) also found that the level and slope had higher impacts on returns compared to the curvature. Killins et al. (2021) also observed the positive effects of the changes in yield curve spread on BSR. This complex nature of IR influence emphasises that future studies should evaluate multiple factors rather than focusing merely on their absolute level.

Unlike other studies, Bessler and Kurmann (2014) undertook a cross-country analysis and observed that European banks are less IR-sensitive compared to US banks, indicating that regulatory and macro-economic conditions of a country can influence the IR sensitivity of banks. Akhtaruzzaman et al. (2014) and Tamakoshi and Hamori (2014) noticed spill-over effects of interest rates influencing BSRs in other countries. Akhtaruzzaman et al. (2014) documented the spill-over effect of US LTR on the BSR of Australian banks. They concluded that Australian bank stocks are IR sensitive while US banks show insignificant relation. Tamakoshi and Hamori (2014) noticed the spillover effect of long-term Greek bond rate changes influencing BSR in Portugal, Italy, and Spain.

The analysis of the IR sensitivity of BSR revealed that banks exhibit higher IR sensitivity compared to non-financial firms (Booth & Officer, 1985; Lynge & Zumwalt, 1980). This higher IR sensitivity may stem from the significant leverage the bank has or the direct effect of the monetary policies on these institutions. However, the review documented mixed and contrasting results relating to the IR sensitivity of BSR. Few authors argued that banks are more sensitive to long-term interest rates than short-term interest rates, but the results of other studies disagree with this. The inconsistencies in the direction of the relationship among these variables are the next contradiction in the results.

Moreover, IR sensitivity varies depending on the use of actual, expected and unexpected values of IR as well as the use of proxy variables of IR. Overall, the findings suggest the possibility of other factors influencing the relationship between these variables. Factors such as the choice of IR variables (LTR/STR), differences in sample size, the period considered, and the model employed can significantly affect the relationship between IR and BSR (Ballester et al., 2011). Additionally, bank-specific characteristics like the bank size, proportion of interest and other incomes and maturity mismatch in the assets and liabilities (Akhtaruzzaman et al., 2014; Elyasiani & Mansur, 2004; Kwan, 1991) can influence this relationship. The difference in the economic conditions, the extent of hedging activities, off-balance sheet activities, international spillovers and contagion effects can potentially contribute to the contradictions in the results.

Future research analysing the IR sensitivity of BSR should consider the factors mentioned above. A logical selection of the IR variables aligned with the maturity mismatch between assets and liabilities can reduce the influence of such mismatches. The maturity mismatch significantly influences whether LTR or STR influences BSR and impacts the sensitivity of BSR towards actual, expected or unexpected

interest rates. Therefore, it is crucial to consider the maturity mismatch of assets and liabilities before selecting the IR variable. Additionally, incorporating suitable control variables can help address the impact of period-specific factors. Conducting event studies can also provide additional insights into the period-specific factors. Sampling banks based on their size can facilitate analysing the effects of bank size on the IR-BSR relationship. Future researchers can also investigate the moderation effects of bank size or include it as a control variable in analysing this relationship. Moreover, considering the macroeconomic conditions of the country, the economic cycles, international spill-over effects and contagion effects can also provide additional insights into the relationship between IR and BSR.

### 3.3.2. *Exchange rate*

Exchange rate changes also significantly impact BSR. Gounopoulos et al. (2013), Harris et al. (1991), Tai (2005), and Wetmore and Brick (1998) all observed a significant relationship between exchange rates and returns. The relationship between fluctuations in the exchange rate and BSR is mixed. Choi et al. (1992), Atindéhou and Gueyie (2001), Elyasiani and Mansur (2003), Lael Joseph and Vezos (2006), Jain et al. (2011) and Ekinci (2016) found a significant positive influence of exchange rates on BSR. In contrast Kasman et al. (2011) reported a negative impact of exchange rates on returns. Dennis and Jeffrey (2002) and Saporoschenko (2002) observed that exchange rate changes have an insignificant effect. Yakup (2022) found that the exchange rate between the USD and the Turkish currency has a significant effect on the returns of foreign banks in their home country's stock exchanges. Bessler and Kurmann (2014) found that the exchange rate has a significant negative impact on returns for US banks but an insignificant effect on European banks.

Similar to the findings of IR sensitivity of BSR, the sensitivity to exchange rate also provides contrasting and mixed results. These contradictions arise from the varying risk exposures of banks, particularly small and large banks with varied risk profiles. Furthermore, factors such as the time period considered, the nature of the banks, the use of actual or forecasted rates, and the strength of the home currency relative to the foreign currency also influence this relation.

### 3.3.3. *Monetary policies*

Monetary policy announcements are made depending on the economic conditions of a country. Since these policies have a direct effect on banks, the changes in policies also have a significant impact on BSR. Findings of Kaen et al. (1997) and others (Altavilla et al., 2018; Binici & Köksal, 2013; Gumanti et al., 2015; Küçükkocaoglu et al., 2013; Madura & Schnusenberg, 2000; Mamun & Hassan, 2014; Thorbecke, 2021) documents the significant effect of monetary policy announcements and unexpected changes on BSR. Thorbecke (2021) observed that a drop in the policy rates affected the returns while Gumanti et al. (2015) reported significant abnormal returns during monetary policy announcements, indicating BSR's susceptibility to unexpected monetary policy changes. Binici and Köksal (2013) found that changes in reserve rates affected BSR, with an increase in rates reducing returns.

Madura and Schnusenberg (2000) also documented the significant relationship between BSR and federal reserve policy announcements. A decrease in the interest rates has significant negative relation with the returns, while the increase in rates also showed negative but less significant relation. Kaen et al. (1997) also found that the effect of the German central bank policy changes significantly impacted German banks' stock returns. A rate increase resulted in negative returns, while a decrease had positive returns. Aharony et al. (1986) reported the presence of unusual returns for bank stocks during the week of the announcement. The outcomes revealed a negative correlation between the returns and the unexpected interest rates and the variability of the rates. Mamun and Hassan (2014) also analysed the effect of monetary policy shocks (changes in federal fund rates) on bank equity returns. Their findings provided that BSR are volatile only to the unforeseen changes in the monetary policies. Ureche-Rangau and Burietz (2010) observed that among the monetary policy changes during the US subprime crisis, only changes in interest rates impacted the returns. However, Patsoulis (2022) reported that monetary policy announcements during the covid-19 pandemic had little or no significant effect on BSR.

To recapitulate, BSR is susceptible to monetary policy changes, specifically to unexpected policy changes. This significant influence stems from the direct impact of these policies on the bank. However, the direction and magnitude of this relationship cannot be generalised as it depends on the country-

specific policy elements and the prevailing macroeconomic conditions during the policy announcements. Therefore, policymakers and other regulatory bodies should pay careful attention during such significant policy announcements.

### **3.3.4. Macroprudential policies**

While IR and monetary policy have a substantial impact on BSR, studies by Aharony et al. (1988), Faff et al. (2005), and Aggarwal et al. (2006) show that the regulatory environment and macroprudential rules also have a considerable impact on BSR. Igan et al. (2023) also found a significant association between macroprudential policies and BSR. And also, the constituents of the policy determine the upward or downward movement of BSR. The regulatory changes, such as bank liberalisation, have influenced the relationship between interest rates and BSR. Faff et al. (2005) observed a shift from a positive to a negative relationship between interest rates and BSR following deregulation. Aggarwal et al. (2006) found that bank stocks were sensitive to short and long-term rates before liberalisation but only to unexpected short-term rates afterwards. Aharony et al. (1988) analysed the interest rate sensitivity of banks after the announcement of the Depository Institutions Deregulation and Monetary Control Act (DIDMCA) in the US. The banks' stocks exhibited lower sensitivity to interest rates prior to the act's announcement compared to the period following its implementation.

These studies demonstrate that macroprudential policies like liberalisation, deregulation or new regulations may not directly influence BSR, but they can modify the IR and BSR relationship. This, in fact, supports our understanding of other factors influencing the interest-rate sensitivity of BSR. Moreover, the effect of these policies varies depending on whether it is demand-side (credit-related) or supply-side (restrictions imposed on banks) policies.

### **3.3.5. Gold price and oil price**

Emerging areas of research also provide insights on previously underexplored relationships. Moussa et al. (2021) reported a positive relationship between the gold price and BSR. This aligns with the previous findings of Basu and Chawla (2012) on the relationship between gold price and stock returns. Therefore, the gold price-BSR relationship warrants further examination across different bank types and countries.

Similarly, Ehouman (2020), Tanin et al. (2022), and Albaity et al. (2023) emphasised the significant effect of oil prices on BSR in oil-exporting countries, particularly for conventional banks. This relationship is also influenced by factors such as the country's economic conditions and the type of bank (conventional vs. Islamic).

### **3.3.6. Other macroeconomic factors-inflation, GDP, land price, financial crises**

Lajeri and Dermine (1999) and Zaini et al. (2018) identified inflation as an additional factor influencing BSR, specifically for banking firms compared to non-banking firms. Azeez et al. (2006) underlined the importance of a comprehensive analysis that takes into account multiple macroeconomic factors, such as land prices, money supply, and GDP, as they discovered that land prices have an independent influence on BSR regardless of other macroeconomic factors. Crouzille et al. (2006) analysed BSR sensitivity to financial crises and documented that BSR reacted differently to crises in different regions. The significant effect of the financial crisis on the return sensitivity of banks suggests the possibility of contagion effects.

Interestingly, Goldberg and Kabir (2002) examination of central bank stocks (Belgium and Japan) found that macroeconomic factors had no impact on their stock returns. This can be explained by the fact that central banks typically do not list their stocks for public trading.

In conclusion, understanding the relationship between macroeconomic factors and BSR requires a multidimensional approach that extends beyond IR and monetary policy. The regulatory environment, exchange rate fluctuations, inflation, and other factors like land prices, money supply, and GDP all play a crucial role in this dynamic, highlighting the complexities and context-specificities. Furthermore, emerging research areas, such as the relationship between gold and oil prices, offer promising avenues for further investigation. Incorporating these diverse influences, we can acquire a more comprehensive



understanding of the factors impacting BSR, facilitating informed decisions by policymakers, regulators, and investors.

However, it is essential to recognise the contradictions in the findings of different studies, specifically while investigating the relationship between variables like IR, exchange rates and BSR. Therefore, the results highlight the importance of analysing these relationships while considering the nature of the financial institutions, the economic conditions of a country and the regulatory framework (Table 4).

## 4. Discussion

This review aims to elucidate or facilitate the influence of macroeconomic variables on BSR. This review commenced with employing bibliometric analysis to identify relevant characteristics of studies under review, we identified the key characteristics, such as the most cited articles, most prolific authors, and the geographical distribution of sample banks. The analysis indicated that the 'Sensitivity of bank stock returns distribution to changes in the level and volatility of interest rate: a Garch-M model', by 'Elyasiani E' and 'Mansur I' (1998), is the most globally cited article with 151 citations, highlighting IR sensitivity as a prominent theme. 'Elyasiani E' and 'Mansur I' are the most prolific authors contributing to this research area, with 5 and 4 publications each and a total citation of 321 and 189 each. Studies are predominantly focused on US banks, indicating a lack of studies conducted in emerging market contexts. The word cloud analysis further validated IR, monetary policy, economic growth, and financial crisis as the central themes in bank stock returns' research.

Moving forward, we addressed the three key research questions relating to the sensitivity of BSR towards macroeconomic factors. The first research question attempts to identify the factors influencing BSR, which revealed that IR, exchange rates, monetary and macroprudential policies, inflation, gold price, GDP, and oil price are the most significant factors influencing BSR. While the IR sensitivity received significant attention, the impact of other factors, such as oil price, gold price, inflation, and GDP, remain underexplored.

The second research question focused on the methodological approaches employed in these studies. While various methods were used, OLS, GARCH and event study methods were the most prevalent. For examining the impact of macroeconomic variables on BSR, the heteroskedasticity-based GMM method (HBET), developed by Rigobon and Sack (2004), has been proposed as an alternative to event study. This is because event studies are susceptible to biases, as stated by Küçükkocaoğlu et al. (2013). However, this review highlights the superiority of EGARCH models over OLS models in capturing the BSR sensitivity, finding support in the work of Lael Joseph and Vezos (2006).

The third research question explored the relationship between macroeconomic factors and BSR. While all identified factors- IR, exchange rate, monetary policies, inflation, gold price, oil price and GDP- had a significant impact on BSR, the magnitude and direction of this relationship are inconsistent. These inconsistencies emerge from various contributing factors. The observed relationship can be influenced by the variations in sample size, time period, and modelling approaches employed (Azeez et al., 2006; Elyasiani & Mansur, 2004). Furthermore, bank-specific factors like bank size and capital ratio can also influence the direction of this relationship (Fraser et al., 2002; Mamun & Hassan, 2014; Verma & Jackson, 2008; Viale & Madura, 2014). Nevertheless, the effect of bank size on BSR sensitivity to macroeconomic factors remains subject to disagreements (Fraser et al., 2002; Madura & Schnusenberg, 2000; Viale & Madura, 2014).

The return sensitivity of BSR to IR changes is also affected by the choice of IR proxies, use of unexpected values, and maturity composition of bank assets and liabilities (Akella & Greenbaum, 1992; Akhtaruzzaman et al., 2014, 2014; Elyasiani & Mansur, 2004; Kasman et al., 2011; Kwan, 1991). However, using IR derivatives can help control the susceptibility of BSR to IR and monetary policy changes (Mamun & Hassan, 2014; Tarhan, 1987). The exchange rate sensitivity of BSR is also determined by the extent of banks' international operations, the banks' nature and the use of actual and expected rates (Harris et al., 1991; Yakup, 2022). Additionally, the response to oil price volatility is determined by the type and nature of banks as well as the economic conditions of a country (Ehouman, 2020; Tanin et al., 2022).

To summarise, the review provided valuable insights into the macroeconomic factors that influence BSR, the effect of these variables on the returns and the methodologies employed in these studies.

**Table 4.** Summary of findings.

Authors	Title	Macro factors	Methodology	Findings
Moussa W., Mgadmi N., Regaieg R., Bejaoui A.	The relationship between gold price and the American financial market	Gold price	multi-model - Engle-Granger two-step cointegration approach, two-state Markov-switching model, DCC-FIAPARCH (1,d,1) model, ARCH and GARCH models	The positive association between the gold price and US bank stock returns
Killins R.N., Egly P.V., Batabyal S.	The impact of the yield curve on bank equity returns: evidence from Canada	Interest rate	fixed effect model	There is a positive relationship between the yield curve, the proxy for interest rate and the bank stock returns.
Thorbecke W.	Non-traditional monetary policy and the future of the financial industries	Monetary Policy	Multiple regression	A drop in the short-term rates and the spread (the difference between long and short-term rates) adversely affected the returns.
Ehouman Y.A.	Volatility transmission between oil prices and banks' stock prices as a new source of instability: lessons from the United States experience	Oil Price	Vector Autoregressive Fractionally Integrated Moving Average (VARFIMA) model	The volatility in the shale oil prices has a significant impact on BSR.
Elyasiani E., Hasan I., Kalotychou E., Poulisis P.K., Staikouras S.K.	Banks' equity performance and the term structure of interest rates	Interest rate	DCC-MGARCH	The changes in the yield curve, that is, the level, slope, and curve, significantly impact bank stock returns.
Altavilla C., Boucinha M., Peydró J.-L.	Monetary policy and bank profitability in a low interest rate environment	Monetary Policy	Event Study	The change in monetary policies also significantly impacts BSR
Zaini V.I., Sadalia I., Fachrudin K.A.	The effect of external and internal factors on stock return with price to book value as moderation variables in banking companies in Indonesia stock exchange	Interest rate, Inflation and Exchange rate	Least squares, path analysis	Interest rates, exchange rates, and inflation have a significant negative influence on the returns of Indonesian banks.
Ekinci A.	The effect of credit and market risk on bank performance: evidence from Turkey	Interest rate, Exchange rate	GARCH	The exchange rate has a significant positive influence on BSR in Turkey, while the interest rate has an insignificant effect.
Gumanti T.A., Lestari A.R., Puspitasari N.	Central bank announcements on interest rate changes and stock prices of Indonesian banking industry	Monetary Policy	Event study method	The results indicated the presence of significant abnormal returns in bank stocks during the announcement dates.
Tamakoshi G., Hamori S.	Causality-in-variance and causality-in-mean between the Greek sovereign bond yields and southern European banking sector equity returns	Interest rate	Cross-Correlation Function	The long-term Greek government bond rates significantly affected the BSR in Portugal, Italy, and Spain, indicating an international volatility spill-over effect.
Viale A.M., Madura J.	Learning banks' exposure to systematic risk: evidence from the financial crisis of 2008	Interest rate	two-state Markov regime-switching intertemporal capital asset pricing model	certain bank-specific factors influence the direction of the relationship between the returns and the interest rates. The sensitivity to interest rates depends on the size of the banks. The interest rate sensitivity varies directly with the variations in the net interest income and inversely with capital ratios for large banks. With small banks, interest rate sensitivity is directly related to the changes in net interest income, but non-interest income shows an inverse relationship.
Mamun A., Hassan M.K.	What explains the lack of monetary policy influence on bank holding companies?	Monetary Policy	Seemingly Unrelated Regression model	short-term and long-term rates influence the returns

*(continued)*



**Table 4.** Continued.

Authors	Title	Macro factors	Methodology	Findings
Bessler W., Kurmann P.	Bank risk factors and changing risk exposures: capital market evidence before and during the financial crisis	Interest rate and Exchange rate	Ordinary Least Squares	Interest rate and BSR have a positive association. European banks are less sensitive to interest rates than US banks. The exchange rate has a significant negative influence on US banks but an insignificant impact on European banks' returns. And further, they found that the risk exposures of small and large banks are different.
Akhtaruzzaman M., Shamsuddin A., Easton S.	Dynamic correlation analysis of spill-over effects of interest rate risk and return on Australian and us financial firms	Interest rate	Dynamic conditional correlation GARCH model	Australian banks' stock returns are more interest rate sensitive than US banks. The former is sensitive to both domestic and foreign interest rates, and the relationship is negative, while the latter is insensitive to any of those.
Sukcharoensin P.	Time-varying market, interest rate and exchange rate risks of Thai commercial banks	Interest rate and Exchange rate	GARCH	banks are more sensitive to short-term interest rates than long-term ones. The direction of influence showed contrasting results. For some banks, the interest rates showed a positive effect, while for others, it showed a negative impact. The exchange rate risk has a negative impact on small bank stock returns, while large and medium banks are unaffected.
Küçükkocaoğlu G., Ünalmiş D., Ünalmiş T.	How do banks' stock returns respond to monetary policy committee announcements in Turkey? Evidence from traditional versus new monetary policy episodes	Monetary Policy	Heteroskedasticity-based GMM estimation technique	The stock returns reacted significantly to monetary policy announcements
Binici M., Köksal B.	Do bank stockholders share the burden of required reserve tax evidence from Turkey?	Monetary Policy	Event study	The increase in the reserve rate and the monetary policy requirement reduced the BSR. Further, the effect of an increase or decrease in the rates on BSR is not symmetric.
Gounopoulos D., Molyneux P., Staikouras S.K., Wilson J.O.S., Zhao G.	Exchange rate risk and the equity performance of financial intermediaries	Exchange rate	VAR-BEKK model	The changes in exchange rates of foreign and home currencies impact BSR. More importantly, the variations in the foreign currencies impacted the returns.
Ballester L., Ferrer R., González C.	Linear and nonlinear interest rate sensitivity of Spanish banks	Interest rate	Parametric: - Two-index linear regression model, Non-parametric tests	Interest rates negatively impact BSR and claimed that non-parametric tests provide more precise results than parametric tests.
Jain A., Narayan P.K., Thomson D.	The relationship between exchange rates, interest rates and Australian bank returns	Interest rate and Exchange rate	EGARCH	There is a significant negative relationship between interest rates and stock returns. The relation between exchange rate and return is positive.
Kasman S., Vardar G., Tunç G.	The impact of interest rate and exchange rate volatility on banks' stock returns and volatility: evidence from turkey	Interest rate and Exchange rate	Ordinary Least Squares and GARCH	Interest rates and exchange have a strong negative influence on returns
Ureche-Rangau L., Burietz A.	Is there a link between the American S&L Crisis of the 80s and the Subprime Crisis? An analysis of bank returns	Monetary Policy	Event study	Among the monetary policy changes during the crisis period (savings and loans institutions and the subprime crises) in the US, only changes in interest rates impacted the returns.
Verma P., Jackson D.O.	Interest rate and bank stock returns asymmetry: evidence from U.S. banks	Interest rate	EGARCH	Short-term and long-term rates influence the returns
Vaz J.J., Ariff M., Brooks R.D.	The effect of interest rate changes on bank stock returns	Interest rate	Event Study	The increase in interest rates positively affected the returns

*(continued)*

Table 4. Continued.

Authors	Title	Macro factors	Methodology	Findings
Lael Joseph N., Vezos P.	The sensitivity of US banks' stock returns to interest rate and exchange rate changes.	Interest rate and Exchange rate	Ordinary Least Squares and EGARCH	There is a positive relationship between the exchange rate and BSR. Further, they identified a decline in the interest rate sensitivity of banks.
Bharati R., Nanisetty P., So J.	Dynamic gap transformations: are banks asset - transformers or brokers? Or both?	Interest rate	GARCH-M model	Interest rate volatilities significantly impacted the returns.
Azeez A.A., Yonezawa Y., Herath S.K.	Land prices and its effect on the Japanese bank stocks	Land price, Money supply, Inflation, Exchange rate and GDP	Iterated Non-Linear Seemingly Unrelated Regression model	Land prices, money supply, inflation, exchange rate, and GDP significantly impacted the returns. Land prices influence the returns independent of other macro factors.
Tai C.-S.	Asymmetric currency exposure of us bank stock returns	Exchange rate	GARCHM model	BSR is affected by exchange rate changes
Elyasiani E., Mansur I.	The association between market and exchange rate risks and accounting variables: a GARCH model of the Japanese banking institutions	Interest rate and Exchange rate	GARCH	Interest rate and the exchange rate have a significant impact on the returns. The exchange rate has a positive effect on the returns. The sensitivity of BSR towards the exchange rate is stronger than interest rates.
Faff R.W., Hodgson A., Kremmer M.L.	An investigation of the impact of interest rates and interest rate volatility on Australian financial sector stock return distributions	Interest rate	GARCHM model	Regulatory changes made by the government have a significant effect on returns, which further changed the direction of the relationship between interest rates and returns.
Aggarwal R., Jeon B.P., Zhao X.	Bank exposure to interest rate risks during financial liberalization: evidence from South Korea	Interest rate	Seemingly Unrelated regression model	when banks and financial markets are liberalised, the interest rate sensitivity of banks is reduced. Prior to the liberalisation, bank stocks were sensitive to both short and long-term rates and expected and unexpected rates, but post-liberalisation, they were only sensitive to unexpected short-term rates. The direction of these sensitivities might depend on the maturity mismatch between the assets and liabilities of the bank balance sheet, and the significance depends on the volatilities in the regulatory and financial markets.
Elyasiani E., Mansur I.	Bank stock return sensitivities to the long-term and short-term interest rates: a multivariate GARCH approach	Interest rate	MGARCH	Both interest rates and volatilities significantly impact the returns. They found a negative relationship between BSR and the changes in interest rates and volatilities in BSR and volatilities in interest rates. However, the relation is positive in the case of BSR, and volatilities of interest rates are considered.
Elyasiani E., Mansur I.	International spillover of risk and return among major banking institutions: a bivariate GARCH model	Interest rate and Exchange rate	Bivariate GARCH model	The exchange rate has a significant positive impact on BSR in all the countries, while the long-term interest rates have insignificant negative effects.
Saporoschenko A.	The sensitivity of Japanese bank stock returns to economic factors: an examination of asset/liability differences and main bank status	Interest rate and Exchange rate	GARCH(1,1) with AR(1) error modelling	The long-term interest rates had a significant negative relationship with the returns. The analysis revealed that Japanese banks are not very sensitive to exchange rate changes.
Dennis S.A., Jeffrey A.	Structural changes in Australian bank risk	Interest rate and Exchange rate	Switching regression method	The interest and exchange rates showed a weak relationship with the returns compared to the earlier studies.

(continued)

**Table 4.** Continued.

Authors	Title	Macro factors	Methodology	Findings
Fraser D.R., Madura J., Weigand R.A.	Sources of bank interest rate risk	Interest rate	Ordinary Least Squares	There is a negative relation between bank stock returns and the changes in interest rates. The relation is affected by certain bank-specific characteristics.
Goldberg L.G., Kabir R.	The stock market performance of the central banks of Belgium and Japan	GDP, Industrial production, Inflation, Money supply, Gold price, Unemployment rate, Discount rate and Exchange rates.	Event study, univariate and multivariate regression	The macroeconomic factors do not influence the stock returns of the central banks
Atindéhou R.B., Gueyie J.-P.	Canadian chartered banks' stock returns and exchange rate risk	Interest rate and Exchange rate	Pooled Ordinary Least Squares	There exists a negative relationship between interest rates and the returns in individual banks and portfolio banks. The result is similar when unexpected interest rates are used. The exchange rates also show a significant relationship with the returns. The returns were more sensitive to the exchange rate with the US Dollar, with a positive relation but less susceptible to the basket G10 country currencies.
Tai C.-S.	Time-varying market, interest rate, and exchange rate risk premia in the US commercial bank stock returns	Interest rate and Exchange rate	Multivariate GARCH-M approach	Interest rates and exchange rates have a significant impact on US bank stock returns. Among market, interest and exchange rates, interest rate is the major determinant of BSR.
Madura J., Schnusenberg O.	Effect of federal reserve policies on bank equity returns	Monetary Policy	Multiple regression	There is a significant relationship between BSR and the Federal Reserve policy announcements. A decrease in the interest rates has a significant negative relation with the returns, while the increase in rates also showed a negative but less significant relation.
Lajeri F., Dermine J.	Unexpected inflation and bank stock returns: the case of France 1977-1991	Interest rate and Inflation	ARIMA Model, Ordinary Least Squares	Banks are sensitive to interest and inflation, while non-banking firms are sensitive only to interest rates. So, banks' stock return generating process includes yet another variable, inflation, apart from the interest rates.
Wetmore J.L., Brick J.R.	The basis risk component of commercial bank stock returns	Interest rate and Exchange rate	Ordinary Least Squares	Banks are sensitive to interest and exchange rate risks
Kilic O., Hassan M.K., Tufte D.R.	An empirical investigation of U.S. bank risk and the Mexican peso crisis	Interest rate and Exchange rate	Ordinary Least Squares	Interest rates and foreign exchange rates had significant impacts on the returns.
Elyasiani E., Mansur I.	Sensitivity of the bank stock returns distribution to changes in the level and volatility of interest rate: a GARCH-M model	Interest rate	GARCH-M model	Long-term interest rates have a significant negative association with returns. The results also showed that interest rate volatility significantly impacts returns.
Kaen F.R., Sherman H.C., Tehranian H.	The effects of Bundesbank discount and Lombard rate changes on German bank stocks	Monetary Policy	Multivariate Regression Model	the effect of the German central bank policy changes, especially the changes in the rates at which the central banks lend loans to the banks, on the bank stock returns in Germany. The results indicated that an increase in the rates resulted in negative returns, while a decrease in the rates had positive returns.
Choi J.J., Elyasiani E., Kopecky K.J.	The sensitivity of bank stock returns to market, interest and exchange rate risks	Interest rate and Exchange rate	ARIMA Model, OLS, pooled time-series cross-section	The interest and exchange rates significantly impact the returns, but the exchange rate has a significant independent influence on the returns apart from the interest rate and the market return.

*(continued)*

Table 4. Continued.

Authors	Title	Macro factors	Methodology	Findings
Kwan S.H.	Re-examination of interest rate sensitivity of commercial bank stock returns using a random coefficient model	Interest rate	Seemingly Unrelated regression model	Commercial bank stock returns and unexpected interest rates, both short-term and long-term, are related. The maturity composition of assets and liabilities explains the effect of unexpected interest rates on BSR.
Harris J.M., Wayne Marr M., Spivey M.F.	Exchange rate movements and the stock returns of U.S. commercial banks	Exchange rate	Ordinary Least Squares, Generalised least squares model	banks' stock returns are sensitive to exchange rate changes. Bank stock sensitivity is correlated to the degree of foreign operations of the banks, which is measured using the number of foreign branches and the ratio of foreign deposits to total assets.
Akella S.R., Chen S.-J.	Interest rate sensitivity of bank stock returns: specification effects and structural changes	Interest rate	two-factor model	BSR is sensitive to long-term government rates and not to short-term rates. The econometric model used and the study period significantly influence the interest rate sensitivity
Aharony J., Saunders A., Swary I.	The effects of DIDMCA on bank stockholders' returns and risk	Monetary Policy	Event study	The announcement of the Depository Institutions Deregulation and Monetary Control Act (DIDMCA) of March 1980 resulted in abnormal returns for all the banks (group of money-centre, regional and thrift). Analysing the interest rate sensitivity, the banks were less sensitive to interest rates prior to the act announcement compared to the period after.
Tarhan V.	Unanticipated interest rates, bank stock returns and the nominal contracting hypothesis	Interest rate	Seemingly Unrelated regression model, Spearman's rank correlation and event study	BSR and unexpected interest rates have a significant statistical relationship. The relationship between the maturity mismatch between assets and liabilities of the banks and their interest rate sensitivity is non-existent. The implications of the nominal contracting hypothesis are not significant in determining bank stock returns.
Aharony J., Saunders A., Swary I.	The effects of a shift in monetary policy regime on the profitability and risk of commercial banks	Interest rate	Event study	There were unusual returns for bank stocks during the week of the announcement. When the unusual returns were divided into two parts, one related to unanticipated interest rates and the other independent, the outcomes revealed a negative correlation between the returns and both the unexpected interest rates and the variability of the rates.
Booth J.R., Officer D.T.	Expectations, interest rates, and commercial bank stocks	Interest rate	pooled cross-section, time-series regression	BSR is sensitive to actual, expected, and unexpected interest rates independent of the market rate effects. Additionally, bank stocks are highly sensitive compared to non-financial firms.
Booth J.R., Officer D.T., Henderson G.V.	Commercial bank stocks, interest rates, and systematic risk	Interest rate	Ordinary Least Squares	There is a positive relation between the changes in interest rates and bank equity values.
Lynge M.J., Jr., Zumwalt J.K.	An empirical study of the interest rate sensitivity of commercial bank returns: a multi-index approach	Interest rate	multi-index model	bank stocks are more highly interest-rate sensitive than non-financial stocks.
AKELLA, SR; GREENBAUM, SI	Innovations in interest-rates, duration transformation, and bank stock returns	Interest rate	Ordinary Least Squares; Seemingly Unrelated regression	bank stocks are responsive to unexpected interest rate changes, and this sensitivity can be explained by the variations in the maturities of assets and liabilities

(continued)

**Table 4.** Continued.

Authors	Title	Macro factors	Methodology	Findings
MEI, JP; SAUNDERS, A Akhtaruzzaman, Md; Docherty, Paul; Shamsuddin, Abul	Bank risk and real-estate - an asset pricing perspective Interest rate, size and book-to- market effects in Australian financial firms	Interest rate Interest rate	Generalised method of moments (GMM) Generalised method of moments (GMM)	The interest rates significantly impact BSR. The results indicated that interest rate changes significantly negatively impacted bank stock returns. They stated that the negative sensitivity is related to the positive duration gap (lend longer than and borrow short-term). The curvature is not a significant determinant of the BSR. The Fama-French model is not a suitable model for Australian bank stock returns. The changes in interest rates and term spread (slope) are priced in BSR.
Crouzille, Celine; Lepetit, Laetitia; Tarazi, Amine	Reaction of European bank stock prices to events of the Asian and Russian financial crises	Financial Crises	event study and seemingly unrelated regression	The results indicated that BSR did not react to Asian crises but significantly reacted to Russian crises. Their results also suggested the possibility of contagion effects among banks.
Igan D.; Mirzaei A.; Moore T.	Does macroprudential policy alleviate the adverse impact of COVID-19 on the resilience of banks?	Macroprudential Policy	Ordinary Least Squares	There is a significant association between macroprudential policies and BSR. The upward or downward movement of the returns also depends on the components of these policies.
Tanin T.I.; Hasanov A.S.; Shaiban M.S.M.; Brooks R.	Risk transmission from the oil market to Islamic and conventional banks in oil- exporting and oil-importing countries	Oil Price	trivariate version of the asymmetric GARCH-BEKK model,	Oil prices significantly influence the bank stocks in oil-exporting countries and conventional banks in both oil-exporting and oil- importing countries compared to Islamic banks
Ari Y.	The CARR-volatility connectedness between USD/TRY and foreign banks in Turkey: evidence by TVP-VAR	Exchange rate	Conditional Autoregressive Range (CARR) model, Time- Varying Parameter- Vector Autoregressive (TVP-VAR) based Diebold–Yilmaz Connectedness Index	the stocks of banks operating abroad were significantly impacted by the exchange rate volatilities of the specific country in which they operate
Albaity, M; Mallek, RS; Mustafa, H	Heterogeneity of investor sentiment, geopolitical risk, and economic policy uncertainty: do Islamic banks differ during covid-19 pandemic?	Oil Price	unconditional quantile regression (UQR)	The oil price has a significant positive impact during low volatility periods, and in high volatility periods, the relation is negative and insignificant. Also, the relation between Islamic BSR and oil prices was found to be negative.
Patsoulis, P	Abnormal stock returns of Greek banks during covid-19: an event study	Monetary Policy	Event Study, nonparametric generalised rank (GRANK) test	Monetary policy announcements during the COVID-19 pandemic have little or no significant effect on BSR

Additionally, through this review, we also identified the role of maturity composition, bank characteristics, the effect of foreign operations, off-balance sheet activities and hedging activities of banks in determining the sensitivity of BSR towards macro factors. However, it is essential to acknowledge the inconsistencies observed in some studies and the need for further exploration while addressing these limitations to enhance our understanding of these relationships. Therefore, this discussion section is further extended to provide a more comprehensive exploration of potential avenues for future research.

#### 4.1. Future research directions

It is crucial for a systematic review to identify the potential research areas that not only expand theoretical frameworks but also provide practical insights to policymakers, regulators, and banking institutions.

Therefore, this section details the prospective future research directions that can help advance the present state of knowledge in this area of study.

#### **4.1.1. Interest rate**

This review demystified the inconsistencies in the relationship between IR and BSR in terms of LTR or STR, expected, unexpected or actual interest rates, and the direction of their relationship. It was observed that contextual factors such as the choice of the IR variable, the samples considered, the bank size, the asset-liability maturity mismatch and the bank characteristics influence their relationship. As a result, future researchers should consider these factors while examining the sensitivity of BSR towards IRs. Analysing the influence of asset-liability maturity mismatch on the IR-BSR relationship can be a potential avenue for future research. Moreover, the type and ownership of banks, and the bank-specific factors should receive special attention while examining the IR sensitivity of banks. Additionally, the impact of unexpected, expected, level, curvature and slope of the yield curve emphasise that future studies should evaluate multiple factors rather than focusing merely on their absolute level.

To entangle the complexity within the direction of the IR-BSR relationship, future researchers should pay significant attention to the period-specific factors while examining this relationship. Conducting event studies will help understand the period-specific events influencing this dynamic. Understanding these factors will guide policymakers and regulators in framing suitable policies. Additionally, examining the impact of the hedging activities of banks' IR-BSR relationship can be the scope of future research.

The review also highlights the predominant focus on developed countries, indicating the scope for future researchers to extend this analysis to developing countries or emerging market contexts. Since the regulatory and macroeconomic conditions of a country can influence the IR-BSR relationship. Furthermore, investigating the effects of spillovers on banks from strategically important nations would improve our comprehension of the global dynamics at work.

#### **4.1.2. Exchange rate**

The potential cause for the contradictory results in the BSR-exchange rate relationship arises from the varying risk exposures of banks, particularly small and large banks with varied risk profiles. Factors such as the time period considered, the nature of the banks, the use of actual or forecasted rates, and the strength of the home currency relative to the foreign currency also influence this relation.

Thereby, future researchers can analyse the exchange rate sensitivity of banks engaged in international banking operations. Investigating how exchange rate risk mitigation strategies modify this relationship is a potential area for future research. An empirical study could shed light on how the relationship varies across different bank sizes, ranging from small, medium, and large banks, as well as ownership structures. Furthermore, exploring the variation in effects across different regulatory frameworks offers another dimension for exploration in future studies.

#### **4.1.3. Monetary policy**

BSR is susceptible to monetary policy changes, specifically to unexpected policy changes. Since the direction and magnitude of this relationship depend on the country-specific policy elements and the prevailing macroeconomic conditions during the policy announcements, conducting event studies during these announcements can reveal greater insights into how these announcements affect BSR dynamics. This will provide useful insights to policymakers and other market participants. Furthermore, a comparative analysis of various monetary policies could reveal which policies have the most impact on BSR, guiding future policy decisions.

#### **4.1.4. Macprudential policy**

This review identified that macroprudential policies like liberalisation, deregulation or new regulations may not directly influence BSR, but they can modify the relationship between, for instance, IR and BSR. Therefore, during significant macroprudential policy announcements or regulatory changes, researchers should not only investigate their direct effects but also analyse how they modify the relationship between other variables, both macroeconomic and bank-specific.

#### **4.1.5. Gold price and oil price**

Given that gold accounts for a significant portion of a country's reserves and that banks often hold large amounts of gold as collateral for loans, investigating the influence of gold price changes on BSR is vital. Similarly, oil price volatility can have a considerable impact on a country's economy, necessitating an examination of its effect on financial institutions closely linked with the economy. However, there has been limited research on these variables, despite their substantial influence in the present economy. Addressing this gap involves examining their influence on individual banks and making cross-country comparisons.

Future studies could analyse the impact of these variables on the BSR of both oil-exporting and oil-importing countries, as well as both developed and emerging economies. Furthermore, conducting a cross-country comparison can shed light on how these effects vary under different regulatory environments. Longitudinal studies can provide insights into the trends and relationship between these variables and BSR over longer periods, enabling regulators, policymakers and financial institutions to make informed decisions.

#### **4.1.6. Other macroeconomic factors**

Inflation, land prices, money supply and GDP are 'other macroeconomic factors' found to influence BSR. Given the limited attention paid to these variables, researchers can broaden their scope by incorporating these variables in the models analysing the macroeconomic factors influencing BSR. Examining the impact of different inflationary measures on BSR is also a scope for future research. Additionally, land price variations and their association with BSR require special attention due to their substantial significance as collateral held by banks, warranting further inquiry into the relationship between BSR and the price changes of other bank-owned collaterals.

In conclusion, this review suggests future research avenues while investigating the relationship between macroeconomic factors. The need to incorporate the effect of factors like bank size, type and nature of banks, and accounting ratios and BSR is crucial. Subsequently, we urge researchers to analyse the impact of off-balance-sheet activities, the extent of international operations, and the hedging activities of banks in influencing this relationship. Moreover, the independent influence of land prices on BSR, which is time-varying in nature, requires further investigation and study. The review observed the predominant focus on developed countries, particularly among the USA banks, in existing research. Future researchers can integrate data from developing economies to obtain a more comprehensive understanding of BSR. This will provide significant insights into how BSR sensitivity varies across diverse economic settings. While IR sensitivity appeared as a central theme in this review, the impact of factors like gold price, oil price, GDP, and the influence of the financial crisis and pandemic received the bare minimum attention. Additionally, the interaction of foreign direct investment (FDI) and foreign institutional investment (FII) with BSR remains largely unexplored within this context. Building on this, the review emphasis on incorporating macroeconomic factors, and include bank-specific factors to provide a more comprehensive understanding of BSR drivers. This comprehensive approach will reveal the various factors that influence the performance of bank stocks.

## **5. Conclusions**

This systematic review identifies the key macroeconomic factors that influence bank stock returns (BSR), examines their impact on returns, and explores the research methodologies employed. The findings highlight the importance of understanding BSR's sensitivity to these factors for stakeholders, including policymakers and investors, in informing their decision-making processes.

Despite the substantial impact of macroeconomic factors on BSR, the observed inconsistencies in the results underline the need for further research that accounts for the changes in sample size, time period, maturity composition of assets and liabilities, and modelling methodologies. Additional influential factors in this macro-financial relationship include the choice of proxy variables, the hedging activities of the banks, the extent of foreign operations, the type and nature of banks, and the economic conditions of a country. Incorporating these factors into future research could provide more deeper insights.



This review makes significant contributions by demystifying the intricate relationship between macroeconomic factors and BSR, providing valuable insights for researchers, investors, policymakers, and shareholders and ultimately improving decision-making processes. Theoretically, this review fills a gap by addressing the absence of a dedicated systematic review and offers a fresh take on the complex interaction between macroeconomic variables and BSR. The consolidation of methodological approaches and the extensive discussion on future research directions provide significant insights for researchers conducting further analyses of this relationship.

However, this SLR is not free from limitations. First, this study reviewed articles only from two databases, Scopus and WoS. Second, it has considered articles published only in the English language. Third, the articles in-press were excluded, meaning only final published articles were included in the review. Fourth, the review has focused only on the macroeconomic factors influencing BSR. Future researchers can overcome the abovementioned limitations and conduct more refined investigations by considering the influence of bank-specific factors alongside macroeconomic variables on BSR.

## Acknowledgement

Aleena Joseph is a recipient of the Indian Council of Social Science Research Doctoral Fellowship. The article is largely an outcome of the doctoral work sponsored by ICSSR. However, the responsibility for the facts stated, opinions expressed, and the conclusions drawn is entirely that of the authors.

## Disclosure statement

The authors reported no potential conflict of interest.

## Funding

The authors received no specific funding to conduct this systematic review.

## About the authors

**Aleena Joseph** is a research scholar at the Department of Commerce, Manipal Academy of Higher Education in Manipal. The author's research interests encompass corporate finance and banking.

**Dr. Geetha E** is an Associate Professor at the Department of Commerce, Manipal Academy of Higher Education (MAHE) in Manipal. The author's research interests include developmental economics, E-commerce, Innovative Business strategies, Entrepreneurship, Business Finance, Corporate governance, and Banking, with publications in Scopus and ABDC-listed journals.

**Mr. Rohith Radhakrishnan**, Senior Research Fellow from the Department of Commerce, Manipal Academy of Higher Education, Manipal. The author's research interests revolve around the area of earnings management, financial reporting quality and corporate governance.

**Raksha Jain** is a PhD research scholar at the Department of Commerce, Manipal Academy of Higher Education in Manipal, specialising in Business Finance with a current research focus on Agricultural Finance, International Trade and Macroeconomics.

## ORCID

Aleena Joseph  <http://orcid.org/0000-0002-6498-0058>

Geetha E  <http://orcid.org/0000-0002-1346-7641>

Rohith Radhakrishnan  <http://orcid.org/0000-0001-5402-8269>

Raksha Jain  <http://orcid.org/0000-0001-8122-3836>

## References

Aggarwal, R., Jeon, B. P., & Zhao, X. (2006). Bank exposure to interest rate risks during financial liberalization: Evidence from South Korea. *Asia-Pacific Financial Markets*, 12(1), 61–90. <https://doi.org/10.1007/s10690-006-9013-x>

- Aharony, J., Saunders, A., & Swary, I. (1986). The effects of a shift in monetary policy regime on the profitability and risk of commercial banks. *Journal of Monetary Economics*, 17(3), 363–377. [https://doi.org/10.1016/0304-3932\(86\)90063-2](https://doi.org/10.1016/0304-3932(86)90063-2)
- Aharony, J., Saunders, A., & Swary, I. (1988). The effects of DIDMCA on bank stockholders' returns and risk. *Journal of Banking & Finance*, 12(3), 317–331. [https://doi.org/10.1016/0378-4266\(88\)90001-5](https://doi.org/10.1016/0378-4266(88)90001-5)
- Akella, S. R., & Chen, S. (1990). Interest rate sensitivity of bank stock returns: Specification effects and structural changes. *Journal of Financial Research*, 13(2), 147–154. <https://doi.org/10.1111/j.1475-6803.1990.tb00544.x>
- Akella, S. R., & Greenbaum, S. I. (1992). Innovations in interest rates, duration transformation, and bank stock returns. *Journal of Money, Credit and Banking*, 24(1), 27. <https://doi.org/10.2307/1992789>
- Akhtaruzzaman, M., Docherty, P., & Shamsuddin, A. (2014). Interest rate, size and book-to-market effects in Australian financial firms. *Applied Economics*, 46(25), 3005–3020. <https://doi.org/10.1080/00036846.2014.920478>
- Akhtaruzzaman, M., Shamsuddin, A., & Easton, S. (2014). Dynamic correlation analysis of spill-over effects of interest rate risk and return on Australian and US financial firms. *Journal of International Financial Markets, Institutions and Money*, 31(1), 378–396. <https://doi.org/10.1016/j.intfin.2014.04.006>
- Albaity, M., Saadaoui Mallek, R., & Mustafa, H. (2023). Heterogeneity of investor sentiment, geopolitical risk and economic policy uncertainty: do Islamic banks differ during COVID-19 pandemic? *International Journal of Emerging Markets*. <https://doi.org/10.1108/IJOEM-11-2021-1679>
- Altavilla, C., Boucinha, M., & Peydró, J. L. (2018). Monetary policy and bank profitability in a low interest rate environment. *Economic Policy*, 33(96), 531–586. <https://doi.org/10.1093/epolic/eiy013>
- Atindéhou, R. B., & Gueyie, J. P. (2001). Canadian chartered banks' stock returns and exchange rate risk. *Management Decision*, 39(4), 285–295. <https://doi.org/10.1108/EUM0000000005463>
- Atukalp, M. E. (2021). Determining the relationship between stock return and financial performance: an analysis on Turkish deposit banks. *Journal of Applied Statistics*, 48(13–15), 2643–2657. <https://doi.org/10.1080/02664763.2020.1849056>
- Azeez, A. A., Yonezawa, Y., & Herath, S. K. (2006). Land prices and its effect on the Japanese bank stocks. *International Journal of Electronic Finance*, 1(1), 104–117. <https://doi.org/10.1504/IJEF.2006.008840>
- Balani, H. (2019). Assessing the introduction of anti-money laundering regulations on bank stock valuation: An empirical analysis. *Journal of Money Laundering Control*, 22(1), 76–88. <https://doi.org/10.1108/JMLC-03-2018-0021>
- Ballester, L., Ferrer, R., & González, C. (2011). Linear and nonlinear interest rate sensitivity of Spanish banks. *The Spanish Review of Financial Economics*, 9(2), 35–48. <https://doi.org/10.1016/j.srfe.2011.09.002>
- Basu, D., & Chawla, D. (2012). An empirical test of the arbitrage pricing theory – the case of Indian stock market. *Global Business Review*, 13(3), 421–432. <https://doi.org/10.1177/097215091201300305>
- Bessler, W., & Kurmann, P. (2014). Bank risk factors and changing risk exposures: Capital market evidence before and during the financial crisis. *Journal of Financial Stability*, 13, 151–166. <https://doi.org/10.1016/j.jfs.2014.06.003>
- Bharati, R., Nanisetty, P., & So, J. (2006). Dynamic gap transformations : Are banks asset – transformers or brokers ? or both ? *The Quarterly Review of Economics and Finance*, 46(1), 36–52. <https://doi.org/10.1016/j.qref.2004.07.008>
- Binici, M., & Köksal, B. (2013). Do bank stockholders share the burden of required reserve tax evidence from Turkey. *Emerging Markets Finance and Trade*, 49(4), 46–73. <https://doi.org/10.2753/REE1540-496X490403>
- Booth, J. R., & Officer, D. T. (1985). Expectations, interest rates, and commercial bank stocks. *Journal of Financial Research*, 8(1), 51–58. <https://doi.org/10.1111/j.1475-6803.1985.tb00425.x>
- Booth, J. R., Officer, D. T., & Henderson, G. V. (1985). Commercial bank stocks, interest rates, and systematic risk. *Journal of Economics and Business*, 37(4), 303–310. [https://doi.org/10.1016/0148-6195\(85\)90024-4](https://doi.org/10.1016/0148-6195(85)90024-4)
- Bower, D. H., Bower, R. S., & Logue, D. E. (1984). Arbitrage pricing theory and utility stock returns. *The Journal of Finance*, 39(4), 1041–1054. <https://doi.org/10.2307/2327611>
- Chen, N. (1983). Some empirical tests of the theory of arbitrage pricing. *The Journal of Finance*, 38(5), 1393–1414. <https://doi.org/10.1111/j.1540-6261.1983.tb03831.x>
- Chen, N., Roll, R., & Ross, S. A. (1986). Economic forces and the stock market. *The Journal of Business*, 59(3), 383–403. <https://www.jstor.org/stable/2352710>. <https://doi.org/10.1086/296344>
- Cho, D. C., Elton, E. J., & Gruber, M. J. (1984). On the robustness of the roll and ross arbitrage pricing theory. *The Journal of Financial and Quantitative Analysis*, 19(1), 1–10. <https://doi.org/10.2307/2330997>
- Choi, J. J., Elyasiani, E., & Kopecky, K. J. (1992). The sensitivity of bank stock returns to market, interest and exchange rate risks. *Journal of Banking & Finance*, 16(5), 983–1004. [https://doi.org/10.1016/0378-4266\(92\)90036-Y](https://doi.org/10.1016/0378-4266(92)90036-Y)
- Crouzille, C., Lepetit, L., & Tarazi, A. (2006). Reaction of European bank stock prices to events of the Asian and Russian financial crises. *Revue D'économie Politique*, 116(4), 457–469. <https://doi.org/10.3917/redp.164.0457>
- Dennis, S. A., & Jeffrey, A. (2002). Structural changes in Australian bank risk. *Journal of International Financial Markets, Institutions and Money*, 12(1), 1–17. [https://doi.org/10.1016/S1042-4431\(01\)00050-6](https://doi.org/10.1016/S1042-4431(01)00050-6)
- Dumas, B., & Solnik, B. (1995). The world price of foreign exchange risk. *The Journal of Finance*, 50(2), 445–479. <https://doi.org/10.1111/1468-036X.00028>
- Ehouman, Y. A. (2020). Volatility transmission between oil prices and banks' stock prices as a new source of instability: Lessons from the United States experience. *Economic Modelling*, 91(June), 198–217. <https://doi.org/10.1016/j.econmod.2020.06.009>
- Ekinci, A. (2016). The effect of credit and market risk on bank performance: Evidence from Turkey. *International Journal of Economics and Financial Issues*, 6(2), 427–434.

- Elyasiani, E., Hasan, I., Kalotychou, E., Poulisis, P. K., & Staikouras, S. K. (2020). Banks' equity performance and the term structure of interest rates. *Financial Markets, Institutions & Instruments*, 29(2), 43–64. <https://doi.org/10.1111/fmii.12125>
- Elyasiani, E., & Mansur, I. (1998). Sensitivity of the bank stock returns distribution to changes in the level and volatility of interest rate: A GARCH-M model. *Journal of Banking & Finance*, 22(5), 535–563. [https://doi.org/10.1016/S0378-4266\(98\)00003-X](https://doi.org/10.1016/S0378-4266(98)00003-X)
- Elyasiani, E., & Mansur, I. (2003). International spillover of risk and return among major banking institutions: A bivariate GARCH model. *Journal of Accounting, Auditing & Finance*, 18(2), 303–330. <https://doi.org/10.1177/0148558X0301800207>
- Elyasiani, E., & Mansur, I. (2004). Bank stock return sensitivities to the long-term and short-term interest rates: A multivariate GARCH approach. *Managerial Finance*, 30(9), 32–55. <https://doi.org/10.1108/03074350410769263>
- Elyasiani, E., & Mansur, I. (2005). The association between market and exchange rate risks and accounting variables: A GARCH model of the Japanese banking institutions. *Review of Quantitative Finance and Accounting*, 25(2), 183–206. <https://doi.org/10.1007/s11156-005-4248-6>
- Faff, R. W., Hodgson, A., & Kremmer, M. L. (2005). An investigation of the impact of interest rates and interest rate volatility on Australian financial sector stock return distributions. *Journal of Business Finance & Accounting*, 32(5–6), 1001–1031. <https://doi.org/10.1111/j.0306-686X.2005.00620.x>
- Fraser, D. R., Madura, J., & Weigand, R. A. (2002). Sources of bank interest rate risk. *Financial Review*, 37(3), 351–367. <https://doi.org/10.1111/0732-8516.00002>
- Goldberg, L. G., & Kabir, R. (2002). The stock market performance of the central banks of Belgium and Japan. *Journal of Economics and Business*, 54(1), 137–152. [https://doi.org/10.1016/S0148-6195\(01\)00053-4](https://doi.org/10.1016/S0148-6195(01)00053-4)
- Goldfeld, S. M., & Quandt, R. (1973). The Estimation of structural shifts by switching regressions. *Annals of Economic and Social Measurement*, 2(4), 475–485.
- Gounopoulos, D., Molyneux, P., Staikouras, S. K., Wilson, J. O. S., & Zhao, G. (2013). Exchange rate risk and the equity performance of financial intermediaries. *International Review of Financial Analysis*, 29, 271–282. <https://doi.org/10.1016/j.irfa.2012.04.001>
- Gumanti, T. A., Lestari, A. R., & Puspitasari, N. (2015). Central bank announcements on interest rate changes and stock prices of Indonesian banking industry. *Investment Management and Financial Innovations*, 12(3), 200–205.
- Harris, J. M., Wayne Marr, M., & Spivey, M. F. (1991). Exchange rate movements and the stock returns of U.S. commercial banks. *Journal of Business Research*, 22(3), 233–242. [https://doi.org/10.1016/0148-2963\(91\)90004-H](https://doi.org/10.1016/0148-2963(91)90004-H)
- Igan, D., Mirzaei, A., & Moore, T. (2023). Does macroprudential policy alleviate the adverse impact of COVID-19 on the resilience of banks? *Journal of Banking & Finance*, 147, 106419. <https://doi.org/10.1016/j.jbankfin.2022.106419>
- Jain, A., Narayan, P. K., & Thomson, D. (2011). The relationship between exchange rates, interest rates and Australian bank returns. *Applied Economics Letters*, 18(10), 967–972. <https://doi.org/10.1080/13504851.2010.520661>
- Kaen, F. R., Sherman, H. C., & Tehranian, H. (1997). The effects of Bundesbank discount and Lombard rate changes on German bank stocks. *Journal of Multinational Financial Management*, 7(1), 1–25. [https://doi.org/10.1016/S1042-444X\(97\)00002-9](https://doi.org/10.1016/S1042-444X(97)00002-9)
- 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>
- Kilic, O., Hassan, M. K., & Tufte, D. R. (1998). An empirical investigation of U.S. bank risk and the Mexican Peso crisis. *Journal of Economics and Finance*, 22(2–3), 139–147. <https://doi.org/10.1007/BF02771484>
- Killins, R. N., Egly, P. V., & Batabyal, S. (2021). The impact of the yield curve on bank equity returns: Evidence from Canada. *The Quarterly Review of Economics and Finance*, 81, 319–329. <https://doi.org/10.1016/j.qref.2021.06.016>
- Küçükkocaoglu, G., Ünalmiş, D., & Ünalmiş, I. (2013). How do banks' stock returns respond to monetary policy committee announcements in Turkey? Evidence from traditional versus new monetary policy episodes. *Economic Modelling*, 35, 536–545. <https://doi.org/10.1016/j.econmod.2013.07.019>
- Kwan, S. H. (1991). Re-examination of interest rate sensitivity of commercial bank stock returns using a random coefficient model. *Journal of Financial Services Research*, 5(1), 61–76. <https://doi.org/10.1007/BF00127084>
- Lael Joseph, N., & Vezos, P. (2006). The sensitivity of US banks' stock returns to interest rate and exchange rate changes. *Managerial Finance*, 32(2), 182–199. <https://doi.org/10.1108/0307435061064193>
- Lajeri, F., & Dermine, J. (1999). Unexpected inflation and bank stock returns: The case of France 1977–1991. *Journal of Banking & Finance*, 23(6), 939–953. [https://doi.org/10.1016/S0378-4266\(98\)00121-6](https://doi.org/10.1016/S0378-4266(98)00121-6)
- Liberati, A., Altman, D. G., Tetzlaff, J., Mulrow, C., Gøtzsche, P. C., Ioannidis, J. P. A., Clarke, M., Devereaux, P. J., Kleijnen, J., & Moher, D. (2009). The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate health care interventions: Explanation and elaboration. *PLoS Medicine*, 6(7), e1000100. <https://doi.org/10.1371/journal.pmed.1000100>
- Long, J. B. (1974). Stock prices, inflation, and the term structure of interest rates. *Journal of Financial Economics*, 1(2), 131–170. [https://doi.org/10.1016/0304-405X\(74\)90002-6](https://doi.org/10.1016/0304-405X(74)90002-6)
- Lynge, M. J., & Zumwalt, J. K. (1980). An empirical study of the interest rate sensitivity of commercial bank returns : A multi-index approach. *The Journal of Financial and Quantitative Analysis*, 15(3), 731–742. <https://doi.org/10.2307/2330406>

- Madura, J., & Schnusenberg, O. (2000). Effect of Federal Reserve Policies on Bank Equity Returns. *Journal of Financial Research*, 23(4), 421–447. <https://doi.org/10.1111/j.1475-6803.2000.tb00754.x>
- Mamun, A., & Hassan, M. K. (2014). What explains the lack of monetary policy influence on bank holding companies? *Review of Financial Economics*, 23(4), 227–235. <https://doi.org/10.1016/j.rfe.2014.09.002>
- Mei, J., & Saunders, A. (1995). Bank risk and real estate: An asset pricing perspective. *The Journal of Real Estate Finance and Economics*, 10(3), 199–224. [https://doi.org/10.1142/9789812795618\\_0006](https://doi.org/10.1142/9789812795618_0006)
- Merton, R. C. (1973). An intertemporal capital asset pricing model. *Econometrica*, 41(5), 867–887. <https://doi.org/10.2307/1913811>
- Moussa, W., Mgadmi, N., Regaieg, R., & Bejaoui, A. (2021). The relationship between gold price and the American financial market. *International Journal of Finance & Economics*, 26(4), 6149–6155. <https://doi.org/10.1002/ijfe.2113>
- Pahlevan-Sharif, S., Mura, P., & Wijesinghe, S. N. R. (2019). A systematic review of systematic reviews in tourism. *Journal of Hospitality and Tourism Management*, 39, 158–165. <https://doi.org/10.1016/j.jhtm.2019.04.001>
- Patsoulis, P. (2022). Abnormal stock returns of Greek banks during COVID-19: an event study. *Applied Economics Letters*, 31(9), 788–793. <https://doi.org/10.1080/13504851.2022.2151971>
- Priestley, R. (1996). The arbitrage pricing theory, macroeconomic and financial factors, and expectations generating processes. *Journal of Banking & Finance*, 20(5), 869–890. [https://doi.org/10.1016/0378-4266\(95\)00035-6](https://doi.org/10.1016/0378-4266(95)00035-6)
- Rigobon, R., & Sack, B. (2004). The impact of monetary policy on asset prices. *Journal of Monetary Economics*, 51(8), 1553–1575. <https://doi.org/10.1016/j.jmoneco.2004.02.004>
- Rjoub, H., Türsoy, T., & Günsel, N. (2009). The effects of macroeconomic factors on stock returns: Istanbul stock market. *Studies in Economics and Finance*, 26(1), 36–45. <https://doi.org/10.1108/10867370910946315>
- Saporoshenko, A. (2002). The sensitivity of Japanese bank stock returns to economic factors: An examination of asset/liability differences and main bank status. *Global Finance Journal*, 13(2), 253–270. [https://doi.org/10.1016/S1044-0283\(02\)00043-1](https://doi.org/10.1016/S1044-0283(02)00043-1)
- Sharpe, W. F. (1964). Capital asset prices: A theory of market equilibrium under conditions of risk. *The Journal of Finance*, 19(3), 425–442. <https://doi.org/10.2307/2977928>
- Sukcharoensin, P. (2013). Time-varying market, interest rate and exchange rate risks of Thai commercial banks. *Asian Academy of Management Journal of Accounting and Finance*, 9(1), 25–45.
- Tai, C. S. (2000). Time-varying market, interest rate, and exchange rate risk premia in the US commercial bank stock returns. *Journal of Multinational Financial Management*, 10(3–4), 397–420. [https://doi.org/10.1016/s1042-444x\(00\)00031-1](https://doi.org/10.1016/s1042-444x(00)00031-1)
- Tai, C. S. (2005). Asymmetric currency exposure of US bank stock returns. *Journal of Multinational Financial Management*, 15(4–5), 455–472. <https://doi.org/10.1016/j.mulfin.2005.04.002>
- Tallman, E. W. (1989). 'Financial Asset Pricing Theory : A Review of Recent Developments', (November).
- Tamakoshi, G., & Hamori, S. (2014). Causality-in-variance and causality-in-mean between the Greek sovereign bond yields and Southern European banking sector equity returns. *Journal of Economics and Finance*, 38(4), 627–642. <https://doi.org/10.1007/s12197-012-9242-y>
- Tanin, T. I., Hasanov, A. S., Shaiban, M. S. M., & Brooks, R. (2022). Risk transmission from the oil market to Islamic and conventional banks in oil-exporting and oil-importing countries. *Energy Economics*, 115(September), 106389. <https://doi.org/10.1016/j.eneco.2022.106389>
- Tarhan, V. (1987). Unanticipated interest rates, bank stock returns and the nominal contracting hypothesis. *Journal of Banking & Finance*, 11(1), 99–115. [https://doi.org/10.1016/0378-4266\(87\)90024-0](https://doi.org/10.1016/0378-4266(87)90024-0)
- Thorbecke, W. (2021). Non-traditional monetary policy and the future of the financial industries. *International Journal of Economic Policy Studies*, 15(1), 5–21. <https://doi.org/10.1007/s42495-020-00044-z>
- Ureche-Rangau, L., & Burietz, A. (2010). Is there a link between the American S&L crisis of the 80s and the subprime crisis? An analysis of bank returns. *International Economics*, 122(2), 57–88. [https://doi.org/10.1016/s2110-7017\(13\)60030-x](https://doi.org/10.1016/s2110-7017(13)60030-x)
- Vaz, J. J., Ariff, M., & Brooks, R. D. (2008). The effect of interest rate changes on bank stock returns. *Investment Management and Financial Innovations*, 5(4), 221–236.
- Verma, P., & Jackson, D. O. (2008). Interest rate and bank stock returns asymmetry: Evidence from U.S. banks. *Journal of Economics and Finance*, 32(2), 105–118. <https://doi.org/10.1007/s12197-007-9004-4>
- Viale, A. M., & Madura, J. (2014). Learning banks' exposure to systematic risk: Evidence from the financial crisis of 2008. *Journal of Financial Research*, 37(1), 75–98. <https://doi.org/10.1111/jfir.12029>
- Wetmore, J. L., & Brick, J. R. (1998). The basis risk component of commercial bank stock returns. *Journal of Economics and Business*, 50(1), 67–76. [https://doi.org/10.1016/s0148-6195\(97\)00054-4](https://doi.org/10.1016/s0148-6195(97)00054-4)
- Yakup, A. (2022). The CARR-volatility connectedness between USD/TRY and foreign banks in Turkey: Evidence by TVP-VAR. *Applied Econometrics*, 67, 5–26. <https://doi.org/10.22394/1993-7601-2022-67-5-26>
- Zaini, V. I., Sadalia, I., & Fachrudin, K. A. (2018). The effect of external and internal factors on stock return with price to book value as moderation variables in banking companies in Indonesia stock exchange. *International Journal of Scientific and Technology Research*, 7(9), 77–82.