“Impact of macroeconomic factors on bank stock returns: Empirical evidence from India”

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ARTICLE INFO	Aleena Joseph, Geetha E. and Kishore L. (2025). Impact of macroeconomic factors on bank stock returns: Empirical evidence from India. *Investment Management and Financial Innovations*, *22*(1), 416-428. doi:10.21511/imfi.22(1).2025.31
DOI	http://dx.doi.org/10.21511/imfi.22(1).2025.31
RELEASED ON	Wednesday, 19 March 2025
RECEIVED ON	Monday, 02 December 2024
ACCEPTED ON	Thursday, 06 March 2025

JOURNAL	"Investment Management and Financial Innovations"
ISSN PRINT	1810-4967
ISSN ONLINE	1812-9358
PUBLISHER	LLC “Consulting Publishing Company “Business Perspectives”
FOUNDER	LLC “Consulting Publishing Company “Business Perspectives”

NUMBER OF REFERENCES	NUMBER OF FIGURES	NUMBER OF TABLES
92	0	6

BUSINESS PERSPECTIVES

LLC "CPC "Business Perspectives"
Hryhorii Skovoroda lane, 10,
Sumy, 40022, Ukraine

www.businessperspectives.org

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IMPACT OF MACROECONOMIC FACTORS ON BANK STOCK RETURNS: EMPIRICAL EVIDENCE FROM INDIA

Abstract

The interplay between stock market performance and economic risk is a central concern in financial economics, as macroeconomic variables have a considerable impact on investment decisions and stock pricing. This relationship is particularly critical for bank stocks, as their performance is a key indicator of a country's financial health. While extensive research has explored bank stock returns in developed economies, there exists a significant gap in understanding this dynamic within developing countries like India, particularly amid macroeconomic fluctuations underscored by the COVID-19 pandemic. Given the substantial investments in bank stocks by Indian investors, this study aims to examine the impact of macroeconomic factors on Indian bank stock returns. The study employs quarterly data from 2013–14 to 2022–23, with macroeconomic data sourced from the CMIE Economic Outlook and bank stock returns data obtained from the Bloomberg database. Using an Ordinary Least Squares regression model, the findings reveal that interest rate ($\beta = 0.3069$), inflation ($\beta = 0.1644$), GDP ($\beta = 0.1928$) and COVID-19 ($\beta = 0.5737$) exert significant positive effects on bank stock returns, while the exchange rate ($\beta = -0.7440$) has a substantial negative impact. The results highlight the sensitivity of bank stock returns to macroeconomic volatilities, with the pronounced impact of the COVID-19 pandemic further highlighting the effects of economic crises. The findings emphasize the need for incorporating these factors into the bank stock returns model, offering valuable insights for investors, banks, and financial regulators.

Keywords bank stock returns, interest rate, exchange rate, inflation, COVID-19, asset pricing, emerging country, India

JEL Classification E00, G20, G21

Received on: 2nd of December, 2024
Accepted on: 6th of March, 2025
Published on: 19th of March, 2025

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Conflict of interest statement:
Author(s) reported no conflict of interest

INTRODUCTION

Investment decisions in the stock market hinge on several factors, with macroeconomic variables playing a substantial role. Stock price movements often reflect the incorporation of these indicators, making these variables crucial to stock market pricing. Given the pivotal role of banks in the economy and their stock performance as indicators of economic growth, it is critical to understand the factors determining bank stock returns (BSR).

However, empirical research on BSR has predominantly focused on developed economies (Joseph et al., 2024; Shehab, 2023; Yusof & Majid, 2007), leaving a gap in understanding this relationship in developing economies like India. Furthermore, the financial disruptions instigated by the COVID-19 pandemic highlighted banking institutions' vulnerability to systematic risks, emphasizing the importance of assessing their resilience under macroeconomic stress. The Basel III regulations further highlight the significance of managing such risks, particularly those caused by fluctuations in interest rates (IR), inflation, and exchange rates (ER).

http://dx.doi.org/10.21511/imfi.22(1).2025.31

The growing prominence of bank stocks among Indian investors, evidenced by the substantial increase in mutual fund investments in the sector (Securities and Exchange Board of India, n.d.), emphasizes the need to understand the impact of macroeconomic factors. Understanding these dynamics is vital for informed portfolio selection and risk management due to their substantial impact on returns (Lan & Phuong, 2023).

1. LITERATURE REVIEW AND HYPOTHESES

Macroeconomic factors significantly influence bank stock prices due to the inherent sensitivity of banks to volatilities in macroeconomic indicators such as IR, inflation, and ER. Banks play a crucial role in financial intermediation, making them vulnerable to macroeconomic fluctuations. Understanding the influence of these macroeconomic variables on stock returns is critical for stakeholders, including investors, policymakers, and regulators, as these factors directly affect bank performance and stock returns. This necessitates the incorporation of macroeconomic factors in models assessing bank stock returns (BSR).

The early asset pricing model, like the capital asset pricing theory (CAPM) developed by Sharpe (1964), primarily focused on market risks in explaining the stock return sensitivity. However, CAPM faced criticism for ignoring the wider economic factors. To address this limitation, subsequent models such as Merton (1973) integrated 'economic fluctuations' into his intertemporal capital asset pricing model. Long (1974) further stressed the inclusion of 'state' variables that indicate economic conditions in equity asset pricing. Building on this foundation, Ross (1976) proposed the Arbitrage Pricing Theory (APT), a multi-factor model that emphasized the role of multiple factors in determining stock returns (Cho et al., 1984; Lone et al., 2021). APT asserts that 'economy-wide factors influence the returns on all securities', a paradigm that has been empirically validated in various contexts (Nai-FU Chen, 1983; Rjoub et al., 2009). Unlike CAPM, APT incorporates the influence of macroeconomic factors on asset returns and demonstrates greater explanatory power (Bower et al., 1984; Priestley, 1996). Consequently, modern financial theory has emphasized the role of systematic factors on asset returns, demonstrating how changes in these broader economic variables directly shape stock market performance (Chen et al., 1986; Clare & Thomas, 1994).

The susceptibility of stock returns to macroeconomic factors is well documented. Chen et al. (1986) confirmed this relationship, which was later corroborated in the Indian context by Basu and Chawla (2012), who highlighted that macroeconomic factors such as exchange rates, inflation, gold prices, market returns, and wholesale price index, influence the returns. Tallman (1989) further reinforced the need to analyze the macroeconomic sensitivity of stock returns. This established theoretical framework provides strong support for empirical investigations into the relationship between macroeconomic factors and BSR.

Among macroeconomic factors, interest rate (IR) is widely regarded as a key macroeconomic determinant of BSR (Bharati et al., 2006; Viale & Madura, 2014; Wetmore & Brick, 1998). The heightened sensitivity of financial firms to IR, compared to their non-financial counterparts, stems from their intermediary role and the regulatory frameworks governing them (Akhtaruzzaman, Docherty, & Shamsuddin, 2014; Booth & Officer, 1985; Lynge & Zumwalt, 1980).

Several studies document the sensitivity of BSR towards long-term interest rates (LTR), including Akella and Chen (1990), Elyasiani and Mansur (1998), Wetmore and Brick (1998), Atindéhou and Gueyie (2001), Akhtaruzzaman, Shamsuddin and Easton (2014) and Bessler and Kurmann (2014). Others, such as Kwan (1991), Verma and Jackson (2008), Fraser et al. (2002), Lynge and Zumwalt (1980) and Elyasiani et al. (2020), and Elyasiani and Mansur (2004), highlight the substantial influence of both short-term (STR) and LTRs. Although Elyasiani and Mansur (2004) and Ballester et al. (2011) also report the sensitivity towards LTR and STR, their findings emphasize the stronger influence of LTRs. Conversely, Booth and

Officer (1985), Booth et al. (1985), Lael Joseph and Vezos (2006), Vaz et al. (2008), Jain et al. (2011), and Sukcharoensin (2013) find banks are more sensitive to STRs. However, Dennis and Jeffrey (2002) and Ekinci (2016) reported insignificant or weak effects of IR on BSR, indicating mixed evidence.

The changes in the yield curve are also considered as a proxy for IR. Booth et al. (1985), Akhtaruzzaman, Docherty, and Shamsuddin (2014), Elyasiani et al. (2020), and Killins et al. (2021) reported the substantial effects of yield curve changes on BSR. Booth et al. (1985) stated that the level and slope of the term structure significantly influence BSR, while curvature has insignificant effects. Akhtaruzzaman, Docherty, and Shamsuddin (2014) reported similar findings, observing a significant negative influence of the level factor (changes in LTR), a positive effect of slope, and an insignificant effect of curvature. Elyasiani et al. (2020) corroborate these findings, with the level and slope exerting a stronger influence than curvature.

Unlike other studies, Bessler and Kurmann (2014) conducted a cross-country analysis and observed that European banks are less IR-sensitive compared to US banks. This indicates that regulatory and macroeconomic conditions of a country influence the IR sensitivity of banks. Consequently, it is important to analyze banks' IR sensitivity within specific macroeconomic contexts, particularly in developing countries like India, where banks perform a crucial role.

While prior research focused mainly on the IR sensitivity of BSR, the exchange rate fluctuations also significantly influence BSR. Atindéhou and Gueyie (2001), Chamberlain et al. (1997), Choi et al. (1992), and Wetmore and Brick (1994) emphasized the need to incorporate ER fluctuations into BSR models. The significant relationship between the ER and BSR is further reported by Gounopoulos et al. (2013), Harris et al. (1991), Tai (2005), and Wetmore and Brick (1998).

However, the findings relating to this relationship are mixed. While Choi et al. (1992), Atindéhou and Gueyie (2001), Elyasiani and Mansur (2003), Lael Joseph and Vezos (2006), Jain et al. (2011), and Ekinci (2016) reported that ER has a significant positive effect on BSR, Kasman et al. (2011) found a negative effect and Dennis and Jeffrey (2002) and Saporoschenko (2002) reported insignificant effects. Yakup (2022) highlighted the impact of ER fluctuations on foreign banks within a country.

Inflation and GDP are additional factors influencing BSR. The theoretical background (Dermine, 1985, 1987; Fischer & Modigliani, 1978; Kessel & Alchian, 1960) establishes inflation's significant impacts on the market value of banks compared to non-financial firms (Lajeri & Dermine, 1999; Zaini et al., 2018). Empirical findings such as Ichsani et al. (2019) report that GDP and inflation significantly impact property and real estate sectors' stock returns and recommend further exploring this relationship in other sectors. Lan and Phuong (2023) affirmed GDP's significant influence on BSR. Similarly, Shehab (2023) reported that GDP has significant positive effects on stock returns in Oman, with inflation having insignificant effects. However, these variables received limited attention in BSR literature, particularly in the Indian context (Joseph et al., 2024).

The COVID-19 pandemic created unprecedented economic disruptions, severely impacting corporate sectors (Lan & Phuong, 2023), heightened the banking sector's critical role in sustaining economic activity by supplying essential funds. However, these interventions led to an accumulation of non-performing assets, making financial institutions particularly vulnerable and the most affected during any crisis (Bhatia & Gupta, 2020; Demirgüç-Kunt et al., 2021). Prior research confirms pandemics' profound effects on stock prices (Chen et al., 2007; Ichev & Marinč, 2018; Loh, 2006). The COVID-19 pandemic led to a major downturn in global stock markets (Al-Awadhi et al., 2020; Baker et al., 2020; Mazur et al., 2021) with Asian markets experiencing more severe declines in returns than others (Liu et al., 2020). In India, Singh and Neog (2020) confirmed the adverse impact of COVID-19 on stock markets, while Sehgal and Gupta (2021) reported a particularly sharp effect on banking stocks. Given the limited empirical focus on COVID-19's impact on Indian BSR (Joseph et al., 2024), this study incorporates COVID-19 as a dummy variable to capture its effects.

http://dx.doi.org/10.21511/imfi.22(1).2025.31

The intricate relationship between macroeconomic factors and BSR has remained a focal point of interest in finance and economics, driven by banks' susceptibility to changes in key macroeconomic indicators like IR, inflation, and exchange rates. Understanding these dynamics is crucial for both theoretical knowledge and practical decision-making.

Therefore, this study aims to analyze the impact of macroeconomic factors on Indian BSR. Based on the theoretical background and the extant literature, the following hypotheses are proposed:

H1: IR has a significant effect on bank stock returns.

H2: ER has a significant effect on bank stock returns.

H3: GDP has a significant effect on bank stock returns.

H4: Inflation has a significant effect on bank stock returns.

H5: COVID-19 has a significant effect on bank stock returns.

2. METHODS

This study analyzes the stock returns of the top ten private and public sector banks listed on the National Stock Exchange of India, selected based on market capitalization and data availability during the study period. Including both public and private sector banks provides a comprehensive understanding of the effects of these variables on different ownership structures. The study covers quarterly data from 2013-14 to 2022-23. The macroeconomic data were sourced from CMIE Economic Outlook, while the bank stock returns data from Bloomberg.

The model is grounded in the interrelationship between four key markets: the goods market, the money market, the securities market, and the labor market. However, consistent with previous studies, the labor market is excluded from the model, as Walras's law permits the exclusion of one market. In an open economy, the exchange rate significantly influences stock market movements by accounting for foreign exchange and trade balances (Wongbangpo & Sharma, 2002; Yusof & Majid, 2007). Thus, this study includes the exchange rate in the model to examine its impact on returns. The goods market variables considered are gross domestic product (GDP) and inflation (measured by the Consumer Price Index (CPI)), while the money market variable is the interest rate (long-term government bond rate), and the securities market variable is bank stock returns. Additionally, recognizing the severe disruptions caused by the COVID-19 pandemic, this study incorporates a dummy variable in the model to assess its effects. The descriptions of macroeconomic variables are provided in Table 1.

Table 1. Description of variables

Variable	Description
Bank Stock Returns	Stock Returns of Individual Banks
Inflation	Percentage of Consumer Price Index
GDP	GDP growth rate
Exchange rate	Exchange rate of INR/USD
Interest rate	Long-term (10-year) Govt bond rate
Covid-19	A dummy variable equal to 1 for the years 2020 and 2021 and 0 for all other years

The choice of LTR as the money market variable is grounded in the expectations theory of interest rates (IR), which posits that LTRs represent a weighted average of current and expected future STRs. Additionally, a unit change in LTRs provides a stronger market signal than an equivalent change in STRs, as the former is more stable (Akhtaruzzaman, Shamsuddin, & Easton, 2014; Madura & Zarruk, 1995). Since quarterly BSR is sensitive to LTRs (Akella & Chen, 1990), this study employs long-term government bond rates to examine the IR-BSR relationship.

The regression model used in this study analyzes the impact of macroeconomic variables on BSR. Ordinary Least Squares (OLS) model, fixed effects (FE) and random effects (RE) are commonly employed in panel data analysis. To determine the appropriate model, the Hausman test was conducted to choose between the RE model and the FE models, while the Breusch and Pagan LM test was employed to choose between RE and OLS. The test results confirmed that OLS is the most suitable model for this study. Accordingly, OLS was

employed to assess the effects of macroeconomic factors on BSR. The regression model is provided below:

$$Returns_{it} = \alpha + \beta_1 Interest\ Rate_{it} + \beta_2 Exchange\ Rate_{it} + \beta_3 GDP_{it} + \beta_4 Inflation_{it} + \beta_5 Covid\text{-}19 + \varepsilon_{it}, \quad (1)$$

where *Covid*-19 is a dummy variable taking the value of 1 for 2020 and 2021 and 0 for all other years (Hansen et al., 2024).

3. RESULTS

The study employed a pooled ordinary least squares model (OLS) to examine the impact of macroeconomic variables on BSR. Prior to the regression analysis, diagnostic tests were conducted. The normality tests showed that the data are normally distributed. The Variance Inflation Factor (VIF) test for detecting multicollinearity among variables (Table 2) shows that all the values are less than 5, indicating the absence of multicollinearity. Additionally, the Breusch-Godfrey LM and Breusch-Pagan-Godfrey tests confirmed that the data don't have serial correlation or heteroskedasticity issues.

Table 2. Variance inflation factor

Variable	VIF
Interest Rate	2.73
Exchange Rate	1.09
GDP	1.01
Inflation	2.01
Covid	2.00

Table 3. Descriptive statistics

Variable	Mean	Median	Std. Dev.	Min	Max
Returns	1.020	1.010	0.202	0.371	2.246
Interest Rate	1.980	1.995	0.107	1.776	2.175
Exchange Rate	4.232	4.223	0.088	4.089	4.416
GDP	0.440	0.485	0.890	–2.284	3.116
Inflation	4.933	4.922	0.135	4.680	5.175
covid	0.2	0.2	0.400	0	1

Table 3 shows the descriptive statistics of the variables considered in the study. The average return is 1.02, and the median (1.01) is close to the mean, indicating a symmetrical distribution. The standard deviation of 0.202 indicates moderate variability, with returns varying between 0.371 to 2.246. The IR has a mean of 1.98, a median of 1.995, and a standard deviation of 0.107. The median value of ER is 4.223, which is relatively close to the mean (4.232), and the standard deviation is 0.088, indicating minimal variability in the data. The average GDP and inflation are 0.440 and 4.933. The dummy variable Covid-19 has a mean of 0.2, denoting that 20% of the observations are from the pandemic years (2020 and 2021).

Table 4. Regression results showing the impact of macroeconomic factors on bank stock returns

Variable	Coefficient	Std. Error	t-stat
Interest Rate	0.3069	0.0498	6.16***
Exchange Rate	–0.7440	0.1157	–6.43***
GDP	0.1928	0.0300	6.42***
Inflation	0.1644	0.0440	3.73***
Covid-19	0.5737	0.1062	5.4***
Constant	–0.0252	0.0395	–0.64
F Statistic	25.83		
Prob(F-statistic)	0.0000		

Note: *** represents the significance level at 1%.

Table 4 shows the regression results analyzing the impact of macroeconomic factors on BSR. The results show that the IR exerts a significant positive effect on BSR. A 1% increase in interest rate increases returns by 30.69%, significant at the 1% level. This finding supports our alternative hypothesis (*H1*) that IR has a significant effect on BSR.

The ER coefficient of –0.7440 indicates that any increase in ER would lead to a reduction in BSR with a 1% significance level, thereby accepting the second hypothesis (*H2*). This strong negative relationship suggests that currency depreciation adversely impacts banks, possibly due to increased costs for foreign-denominated borrowings and a decline in investor confidence.

GDP (0.1928) and inflation (0.1644) exhibit positive effects on BSR, both significant at the 1% level. A 1% increase in GDP leads to a 19.28% rise in BSR, reflecting the broader economic growth that boosts banking activities and profitability. Similarly, rising inflation, often associated with increased lending rates and asset values, positively affects bank stock returns, validating the third (*H3*) and fourth (*H4*) hypotheses.

http://dx.doi.org/10.21511/imfi.22(1).2025.31

The dummy variable for COVID-19 (0.5737) shows that the pandemic years (2020 and 2021) had a significant positive impact on BSR. This indicates that despite initial disruptions, the banking sector demonstrated resilience during the pandemic years, supported by government interventions and robust financial policies, leading to market confidence. Thus, the fifth hypothesis (*H5*) is also accepted at a 1% significance level. Overall, the findings confirm that all the macroeconomic variables considered significantly influence BSR.

Sector-wise regression analysis (Tables 5 and 6) highlights notable differences in sensitivity to macroeconomic variables. In both public and private sector banks, all macroeconomic variables except inflation have significant effects on BSR. Although inflation is a significant determinant of the public-sector BSR, it has a positive but insignificant impact on the private-sector BSR. The exchange rate coefficients show the negative effects on BSR in both sectors. A 1% increase in the exchange rate reduces public-sector bank stock returns by 84.23% and private-sector bank stock returns by 64.56%. On average, a 1% change in ER leads to a 74.40% decrease in BSR for the overall banking sector.

Comparing the coefficients of the independent variables between the two sectors, it is evident that the public sector banks exhibit higher sensitivity to changes in macroeconomic variables than private sector banks. This suggests that macroeconomic fluctuations impact public sector BSR more than their private sector counterparts.

Table 5. Regression results showing the impact of macroeconomic factors on public sector bank stock returns

Variable	Coefficient	Std. Error	t-stat
Interest Rate	0.3495	0.0742	4.71 ***
Exchange Rate	–0.8423	0.1724	–4.89***
GDP	0.2723	0.0447	6.09***
Inflation	0.2633	0.0656	4.01***
Covid-19	0.6314	0.1582	3.99 ***
Constant	–0.0713	0.0589	–1.21
F Statistic	18.26		
Prob(F-statistic)	0.0000		

Table 6. Regression results showing the impact of macroeconomic factors on private sector bank stock returns

Variable	Coefficient	Std. Error	t-stat
Interest Rate	0.2643	0.0655	4.04 ***
Exchange Rate	–0.6456	0.1521	–4.25***
GDP	0.1133	0.0395	2.87 ***
Inflation	0.0655	0.0579	1.13
Covid-19	0.5161	0.1395	3.70***
Constant	0.0208	0.0519	0.4
F Statistic	9.70		
Prob(F-statistic)	0.0000		

4. DISCUSSION

The predominant focus of research on developed countries, the growing popularity of bank stocks among investors, the economic disruptions caused by the COVID-19 pandemic and the Basel III guidelines emphasizing the management of systematic risks in banks provided the background for analyzing the macroeconomic sensitivity of BSR. Consequently, this study hypothesized that IR, exchange rate, GDP, Inflation, and COVID-19 have a significant influence on BSR. The key findings are summarized below:

The first hypothesis (*H1*) examined the IR sensitivity of BSR, particularly to LTR. The findings reveal that LTR has a significant positive impact on BSR. Although the results are consistent with the literature (Akella & Chen, 1990; Bessler & Kurmann, 2014; Elyasiani & Mansur, 1998; Wetmore & Brick, 1998), only Akella and Chen (1990) reported a positive effect of LTR on BSR. This similarity can also be based on the fact that, except for Akella and Chen (1990) (quarterly data), all others used monthly or weekly (Wetmore & Brick, 1998) returns in their model. This cannot be ignored, as multiple factors such as the period of study, the differences in sample size and the regulator and macroeconomic conditions influence the relationship between IR and BSR (Ballester et al., 2011; Joseph et al., 2024). The results are consistent for public and private sectors, with public sector banks (0.3495) being more IR-sensitive than private sector banks (0.2643), possibly due to the prominent role played by the public sector banks in the economy. Factors such as the size of the banks, owner-

ship structure and hedging activities might also influence this relation (Joseph et al., 2024).

The results of the second hypothesis (*H2*) revealed a significant negative impact of the ER on the BSR. Among all variables, the exchange rate has the highest impact, with a one per cent increase, would reduce BSR by 74.40%. The exchange rate coefficient is –0.8423 for public sector banks is –0.8423, and –0.6456 for private sector banks, with public sector banks being more sensitive to exchange rates, although both are significant at 1%. The negative impact of ER aligns with Kasman et al. (2011) and Bessler and Kurmann (2014), but contradicts the studies indicating the positive effect (Atindéhou & Gueyie, 2001; Choi et al., 1992; Ekinci, 2016; Elyasiani & Mansur, 2003; Jain et al., 2011; Lael Joseph & Vezos, 2006) or insignificant effects (Dennis & Jeffrey, 2002; Saporoschenko, 2002). These contradictions can be attributed to factors such as strength of the home currency relative to the foreign currency, varying risk exposures of banks, (particularly of the small, medium and large banks) and the nature of the banks (Joseph et al., 2024). The greater exchange rate sensitivity of public sector banks further confirms that the nature/the ownership structure of the banks influences this relationship. Yakup (2022) notes that the exchange rate sensitivity varies across banks. The extent of international activities, foreign currency transactions, holding foreign currency-denominated corporate bonds and lending, borrowing with unhedged foreign positions and transactions with businesses engaged in international operations also influence this relationship (Atindéhou & Gueyie, 2001; Azeez et al., 2006; Choi et al., 1992). Banks with zero foreign operations may be unaffected by exchange rate changes (Choi et al., 1992). Therefore, banks with foreign capital must manage the current exchange rate risk both in their home countries and the countries in which they operate (Yakup, 2022).

The study then analyzed the impact of GDP (*H3*) and inflation (*H4*) on BSR. GDP and inflation have significant positive effects on BSR, with both variables showing significant positive effects on the BSR of public sector banks. For private sector banks, only GDP has a significant effect, while inflation has an insignificant effect. The differential impact of inflation in both sectors can be attributed to the varying effect of inflation depending on the size and book value of the stocks (Simpson & Ramchander, 2012). Additionally, the ability to hedge against inflation and the investor perceptions of inflation as good or bad news significantly impact its effects on the returns (Chiang & Chen, 2023; Knif et al., 2008).

The significant effects of GDP and inflation are consistent with the literature (Azeez et al., 2006; Lajeri & Dermine, 1999; Lan & Phuong, 2023; Zaini et al., 2018). The positive effects of GDP and Inflation align with Zaini et al. (2018) (Inflation) and Lan and Phuong (2023) (GDP). Although the theoretical background (Dermine, 1985, 1987; Fischer & Modigliani, 1978; Kessel & Alchian, 1960) clearly indicates the significant effect of inflation on BSR, the empirical evidence is sparse, even for GDP. Therefore, further studies are required to draw firm conclusions about the effects of these factors across banks and economies (Ichsani et al., 2019; Joseph et al., 2024; Lajeri & Dermine, 1999).

The COVID-19 (*H5*) variable demonstrated a significant positive effect on overall (BSR), with sectoral analysis indicating positive effects for both public and private banks. These findings highlight the pandemic's substantial influence on the banking sector, contrasting with Sehgal and Gupta (2021), who reported negative effects on Indian BSR over a short forty-day period focusing on the initial market shock, analysing market indices and fluctuations in individual bank stock prices. In contrast, this study, utilizing a longer time frame and regression analysis, captures the pandemic's long-term effects and the market's gradual recovery.

This study's results align with Dharani et al. (2023), who documented positive returns for Indian BSR during the lockdown phase, and Ncube et al. (2023) noted significant positive returns in the financial sectors of the Nigerian and Zimbabwe stock exchanges post-lockdown. Their findings also revealed that many stocks in South African and Nigerian markets exhibited significant positive abnormal returns during the COVID-19 period, with the financial sector appearing as one of the most resilient in sub-Saha-

http://dx.doi.org/10.21511/imfi.22(1).2025.31

ran stock markets. Furthermore, research in sub-Saharan Africa, G20, and other emerging economies showed a rapid rebound within months despite initial negative returns (Kumar et al., 2021; Ncube et al., 2023).

While the initial phase of the pandemic had detrimental effects due to lockdowns and social distancing measures in Australia, the USA, India and other international markets, the subsequent government stimulus packages considerably contributed to market recovery (Alam et al., 2021; Ashraf, 2020; Baker et al., 2020; Huy et al., 2020). In India, the negative mean returns during the pre-lockdown phase turned positive during the lockdown, fueled by investor optimism and Foreign Institutional Investments (FIIs), and Foreign Direct Investments (FDI) inflows resulting in improved stock market performance (Bhama, 2022; Modi, 2020). Furthermore, the ban on short selling helped to stabilize the market and increase investor confidence (Chandrasekhar & Ghosh, 2021). Notably, India's stock market recovery outpaced other Asian nations, with investors perceiving market declines as opportunities for long-term investment (Aggarwal et al., 2022; Chandrasekhar & Ghosh, 2021).

Despite the literature supporting the positive long-term impact of COVID-19 on BSR, contradictions exist due to methodological differences with studies considering factors such as death rates, confirmed cases, and lockdowns to examine the pandemic's effect (Albaity et al., 2022; Alam et. al., 2021; Baker et. al., 2020) and geographic variations with developed countries experiencing more severe effects compared to developing nations and variations across sectors (Singh & Shaik 2021; Alam et al., 2021; Izzeldin et al., 2021; Mazur et al., 2021).

The findings of this study substantiate the theoretical framework and empirical literature, reinforcing the notion that macroeconomic factors significantly influence BSR. The variation in coefficients between public and private sector banks can be attributed to the critical role of public sector banks in the economy. Consequently, this study enhances our understanding of macroeconomic factors' influence on BSR in India, thereby contributing to the existing empirical literature.

Given that this study focuses solely on the macroeconomic impacts, there are notable research gaps highlighted by the findings and limitations that future researchers could address. For instance, while this study conducted a portfolio analysis, future researchers could extend this by examining the effects on individual banks within both the public and private sectors, offering a more granular understanding of how macroeconomic factors influence specific banks. Additionally, this study utilised quarterly data, hence, future researchers could consider using alternative timeframes, such as weekly or monthly data, for their analyses.

Furthermore, future research could examine whether hedging activities and the extent of foreign operations influence the relationship between BSR, IR and ER. Additionally, analyzing how holding assets and liabilities in foreign currencies and issuing corporate bonds in foreign capital markets influence the exchange rate-BSR relationship could yield useful insights.

The impact of monetary policies on BSR provides another avenue for future research. Although this study employed dummy variables to examine the effects of COVID-19, future studies could conduct event studies to assess the influence of various monetary and fiscal policies on BSR during economic disruptions. The role of FDI and FII inflows in aiding the recovery of the Indian stock market during the COVID-19 pandemic (Modi, 2020) prompts further investigation into these factors' influence on returns.

Future research should investigate how the COVID-19 pandemic has affected other significant bank characteristics, like asset quality, capital adequacy, and funding costs, as well as their resulting impact on returns. While this study performed a sectoral analysis, it did not investigate the effects of ownership structures on BSR. Future researchers could examine the impacts of bank size, market capitalisation, and other microeconomic or bank-specific factors on BSR, thereby extending the scope of this research to provide an extensive analysis of the risks embedded in BSR. Finally, given the limited literature on BSR in emerging economies, conducting cross-country analyses could yield valuable insights.

CONCLUSION

The study aimed to analyze the impact of macroeconomic factors on Indian BSR. The findings demonstrate that interest rates, inflation, GDP, and the COVID-19 pandemic have significant positive effects on BSR, whereas the exchange rate has a considerable negative impact. The varying effects of these variables on public and private sector banks suggests that ownership structures and the distinct role of public sector banks in the economy could have a significant impact on the macro-BSR relationship. The positive effect of COVID-19 on BSR is consistent with prior research that demonstrated the pandemic's differential effects across economies and sectors, as well as the resilience of stock markets driven by government stimulus packages, FDI and FII inflows, and investor optimism.

The substantial influence of macroeconomic factors on BSR underscores the importance for investors to consider these factors while making investment decisions, portfolio selection, and risk management strategies. The findings also suggest that bank stocks offer diversification benefits, as their returns demonstrated resilience even during the COVID-19 pandemic. However, banks should adopt robust risk management practices, particularly in hedging against interest rate and exchange rate volatility, while maintaining sufficient capital reserves in accordance with Basel III regulations. Furthermore, bank stock performance amid macroeconomic fluctuations provides useful insights for enhancing banking regulations and health assessments, as it reflects banks' effectiveness in managing market risks. Regulators and policymakers should consider the macroeconomic sensitivity of BSR when formulating policies targeted at mitigating financial risks, stabilizing financial markets, and strengthening the resilience of the banking sector and broader financial infrastructure during economic downturns.

Given the differential effects of the macroeconomic variables on public and private sector banks, future studies could investigate the role of ownership structures on the macro-BSR relationship, providing a deeper understanding of bank performance dynamics in emerging markets.

AUTHOR CONTRIBUTIONS

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ACKNOWLEDGMENT

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.

http://dx.doi.org/10.21511/imfi.22(1).2025.31

REFERENCES

1. Aggarwal, M., Bamba, M., & Bansal, I. (2022). Empirical Insights Into COVID-19 Impact on BSE Sectoral Returns. *Thailand and the World Economy, 40*(2), 127-144. Retrieved from https://so05.tci-thaijo.org/index.php/TER/article/view/258998
2. 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
3. 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
4. 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
5. Alam, M. M., Wei, H., & Wahid, A. N. M. (2021). COVID-19 outbreak and sectoral performance of the Australian stock market: An event study analysis. *Australian Economic Papers, 60*(3), 482-495. https://doi.org/10.1111/1467-8454.12215
6. Al-Awadhi, A. M., Alsaifi, K., Al-Awadhi, A., & Alhammadi, S. (2020). Death and contagious infectious diseases: Impact of the COVID-19 virus on stock market returns. *Journal of Behavioral and Experimental Finance, 27,* 100326. https://doi.org/10.1016/j.jbef.2020.100326
7. Albaity, M., Mallek, R. S., & Mustafa, H. (2022). Bank Stock Return Reactions to the COVID-19 Pandemic: The Role of Investor Sentiment in MENA Countries. *Risks, 10*(2), 43. https://doi.org/10.3390/risks10020043
8. Ashraf, B. N. (2020). Economic impact of government interventions during the COVID-19 pandemic: International evidence from financial markets. *Journal of Behavioral and Experimental Finance, 27,* 100371. https://doi.org/10.1016/J.JBEF.2020.100371
9. 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
10. 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
11. Baker, S. R., Bloom, N., Davis, S. J., Kost, K., Sammon, M., & Viratyosin, T. (2020). *The Unprecedented Stock Market Reaction to COVID-19, 10*(July), 742-758. https://doi.org/10.1093/rapstu/raaa008
12. Ballester, L., Ferrer, R., & González, C. (2011). Linear and nonlinear interest rate sensitivity of Spanish banks. *Spanish Review of Financial Economics*, *9*(2), 35–48. https://doi.org/10.1016/j.srfe.2011.09.002
13. 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
14. 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
15. Bhama, V. (2022). Macroeconomic variables, COVID-19 and the Indian stock market performance. *Investment Management and Financial Innovations, 19*(3), 28-37. https://doi.org/10.21511/imfi.19(3).2022.03
16. Bharati, R., Nanisetty, P., & So, J. (2006). Dynamic gap transformations : Are banks asset – transformers or brokers ? or both ? *Quarterly Review of Economics and Finance, 46,* 36-52. https://doi.org/10.1016/j.qref.2004.07.008
17. Bhatia, P., & Gupta, P. (2020). Sub-prime Crisis or COVID-19: A Comparative Analysis of Volatility in Indian Banking Sectoral Indices. *FIIB Business Review, 9*(4), 286-299. https://doi.org/10.1177/2319714520972210
18. 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
19. 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
20. Bower, D. H., Bower, R. S., & Logue, D. E. (1984). *Arbitrage Pricing Theory and Utility Stock Returns, 39*(4), 1041-1054. https://doi.org/10.1111/j.1540-6261.1984.tb03891.x
21. Chamberlain, S., Howe, J. S., & Popper, H. (1997). The exchange rate exposure of U.S. and Japanese banking institutions. *Journal of Banking and Finance, 21*(6), 871-892. https://doi.org/10.1016/S0378-4266(97)00002-2
22. Chandrasekhar, C., & Ghosh, J. (2021, February 8). Irrational exuberance: The rise and rise of stock markets. *The Hindu Business Line*. Retrieved from https://www.thehindubusinessline.com/opinion/columns/c-p-chandrasekhar/irrational-exuberance-the-rise-and-rise-of-stock-markets/article33784964.ece
23. Chen, M. H., Jang, S. C. (Shawn), & Kim, W. G. (2007). The impact of the SARS outbreak on Taiwanese hotel stock performance: An event-study approach. *International Journal of Hospitality Management, 26*(1), 200-212. https://doi.org/10.1016/J.IJHM.2005.11.004

24. Chen, Nai-Fu, Roll, R., & Ross, S. A. (1986). Economic Forces and the Stock Market. *Journal of Business, 59*(3), 383-403. Retrieved from https://www.jstor.org/stable/2352710

25. Chen, Nai-Fu. (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

26. Chiang, T. C., & Chen, P. Y. (2023). Inflation risk and stock returns: Evidence from US aggregate and sectoral markets. *The North American Journal of Economics and Finance, 68,* 101986. https://doi.org/10.1016/j.najef.2023.101986

27. 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://ideas.repec.org/a/cup/jfinqa/v19y1984i01p1-10_01.html

28. 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 and Finance, 16*(5), 983-1004. https://doi.org/10.1016/0378-4266(92)90036-Y

29. Clare, A. D., & Thomas, S. H. (1994). Macroeconomic Factors, the APT and the UK Stockmarket. *Journal of Business Finance & Accounting, 21*(3), 309-330. https://doi.org/10.1111/j.1468-5957.1994.tb00322.x

30. Demirgüç-Kunt, A., Pedraza, A., & Ruiz-Ortega, C. (2021). Banking sector performance during the COVID-19 crisis. *Journal of Banking and Finance, 133.* https://doi.org/10.1016/j.jbankfin.2021.106305

31. 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

32. Dermine, J. (1985). Inflation, Taxes and Banks' Market Values. *Journal of Business Finance and Accounting, 12,* 65-73. https://doi.org/10.1111/j.1468-5957.1985.tb00079.x

33. Dermine, J. (1987). Measuring the market value of a bank, a primer. *Finance, 8,* 91-107. Retrieved from https://flora.insead.edu/fichier-sti_wp/Inseadwp1986/86-35.pdf

34. Dharani, M., Hassan, M. K., Huda, M., & Abedin, M. Z. (2023). Covid-19 pandemic and stock returns in India. *Journal of Economics and Finance, 47*(1), 251-266. https://doi.org/10.1007/s12197-022-09586-8

35. 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. Retrieved from https://ideas.repec.org/a/eco/journ1/2016-02-9.html

36. 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, 22*(5), 535-563. https://doi.org/10.1016/S0378-4266(98)00003-X

37. 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

38. 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

39. Elyasiani, E., Hasan, I., Kalotychou, E., Pouliasis, P. K., & Staikouras, S. K. (2020). Banks' equity performance and the term structure of interest rates. *Financial Markets, Institutions and Instruments, 29*(2), 43-64. https://doi.org/10.1111/fmii.12125

40. Fischer, S., & Modigliani, F. (1978). Towards an understanding of the real effects and costs of inflation. *Review of World Economics, 114*(4), 810-833. https://ideas.repec.org/p/nbr/nberwo/0303.html

41. Fraser, D. R., Madura, J., & Weigand, R. A. (2002). Sources of Bank Interest Rate Risk. *Financial Review, 37*(3), 351-368. https://doi.org/10.1111/0732-8516.00002

42. 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

43. Hansen, S., Charifzadeh, M., & Herberger, T. A. (2024). The impact of IFRS 9 on the cyclicality of loan loss provisions. *Journal of Corporate Accounting and Finance, 35*(2), 37-49. https://doi.org/10.1002/jcaf.22669

44. 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

45. Huy, D. T. N., Loan, B. T. T., & Anh, P. T. (2020). Impact of selected factors on stock price: A case study of Vietcombank in Vietnam. *Entrepreneurship and Sustainability Issues, 7*(4), 2715-2730. https://doi.org/10.9770/jesi.2020.7.4(10)

46. Ichev, R., & Marinč, M. (2018). Stock prices and geographic proximity of information: Evidence from the Ebola outbreak. *International Review of Financial Analysis, 56,* 153-166. https://doi.org/10.1016/J.IRFA.2017.12.004

47. Ichsani, S., Widajatun, V. W., Mawarnie, D., & Hertina, D. (2019). Macroeconomic effect to stock returns in property and real estate companies. *Journal of Advanced Research in Dynamical and Control Systems, 11*(3), 1013-1020. Retrieved from https://www.scopus.com/record/display.uri?eid=2-s2.0-85069519954&origin=inward&txGid=a71688eaa54354c0fd5d2e03a1c06976

48. Izzeldin, M., Muradoğlu, Y. G., Pappas, V., & Sivaprasad, S.

http://dx.doi.org/10.21511/imfi.22(1).2025.31

(2021). The impact of Covid-19 on G7 stock markets volatility: Evidence from a ST-HAR model. *International Review of Financial Analysis, 74,* 101671. https://doi.org/10.1016/J.IRFA.2021.101671

49. 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

50. Joseph, A., Geetha, E., Radhakrishnan, R., & Jain, R. (2024). Macro-financial nexus: a systematic review on the impact of macroeconomic factors on bank stock returns. *Cogent Economics and Finance, 12*(1). https://doi.org/10.1080/23322039.2024.2354101

51. 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

52. Kessel, R. A., & Alchian, A. A. (1960). The Meaning and Validity of the Inflation-Induced Lag of Wages Behind Prices. *American Economic Review, 50*(1), 43-66. Retrieved from https://www.jstor.org/stable/1813461

53. Killins, R. N., Egly, P. V., & Batabyal, S. (2021). The impact of the yield curve on bank equity returns: Evidence from Canada. *Quarterly Review of Economics and Finance, 81,* 319-329. https://doi.org/10.1016/j.qref.2021.06.016

54. Knif, J., Kolari, J., & Pynnönen, S. (2008). Stock market reaction to good and bad inflation news. *Journal of Financial Research, 31*(2), 141-166. https://doi.org/10.1111/j.1475-6803.2008.00235.x

55. Kumar, R., Bhatia, P., & Gupta, D. (2021). The impact of the COVID-19 outbreak on the Indian stock market - A sectoral analysis. *Investment Management and Financial Innovations, 18*(3), 334-346. https://doi.org/10.21511/imfi.18(3).2021.28

56. 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

57. 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/10.1108/03074350610641193

58. Lajeri, F., & Dermine, J. (1999). Unexpected inflation and bank stock returns: The case of France 1977-1991. *Journal of Banking and Finance, 23*(6), 939-953. https://doi.org/10.1016/S0378-4266(98)00121-6

59. Lan, L. P., & Phuong, D. K. (2023). Impacts of COVID-19 Pandemic on the Price Volatility of Listed Commercial Bank Stocks in Vietnam. *Business Perspectives and Research,* 1-13. https://doi.org/10.1177/22785337231172606

60. Liu, H., Manzoor, A., Wang, C., Zhang, L., & Manzoor, Z. (2020). The COVID-19 outbreak and affected countries stock markets response. *International Journal of Environmental Research and Public Health, 17*(8), 1-19. https://doi.org/10.3390/ijerph17082800

61. Loh, E. (2006). The Impact of SARS on the Performance and Risk Profile of Airline Stocks. *International Journal of Transport Economics: Rivista Internazionale Di Economia Dei Trasporti XXXIII*(3), 1000-1022. https://doi.org/10.1400/55242

62. Lone, U. M., Darzi, M. A., & Bhat, S. A. (2021). Macroeconomic State Variables and Stock Market Performance: A Systematic Review and Future Research Agenda. *FIIB Business Review*. https://doi.org/10.1177/2319714521995622

63. 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

64. Lynge, M. J., & Zumwalt, J. K. (1980). An Empirical Study of the Interest Rate Sensitivity of Commercial Bank Returns : A Multi-Index Approach. *Journal of Financial and Quantitative Analysis, 15*(3), 731-742. Retrieved from https://ideas.repec.org/a/cup/jfinqa/v15y1980i03p731-742_00.html

65. Madura, J., & Zarruk, E. R. (1995). Bank Exposure To Interest Rate Risk: a Global Perspective. *Journal of Financial Research, 18*(1), 1-13. https://doi.org/10.1111/j.1475-6803.1995.tb00207.x

66. Mazur, M., Dang, M., & Vega, M. (2021). COVID-19 and the March 2020 stock market crash. Evidence from S&P1500. *Finance Research Letters, 38,* 101690. https://doi.org/10.1016/j.frl.2020.101690

67. Merton, R. C. (1973). An Intertemporal Capital Asset Pricing Model. *Econometrica, 41*(5), 867-887. https://doi.org/10.2307/1913811

68. Modi, J. (2020). *Coronavirus outbreak: The current crisis can be a great opportunity for stock market investors.* Retrieved from https://www.businesstoday.in/opinion/columns/story/coronavirus-outbreak-covid-19-stock-market-current-crisis-great-opportunity-for-investors-253773-2020-04-02

69. Ncube, M., Sibanda, M., & Matenda, F. R. (2023). COVID-19 Pandemic and Stock Performance: Evidence from the Sub-Saharan African Stock Markets. *Economies, 11*(3). https://doi.org/10.3390/economies11030095

70. Priestley, R. (1996). The arbitrage pricing theory, macroeconomic and financial factors, and expectations generating processes. *Journal of Banking and Finance, 20*(5), 869-890. https://doi.org/10.1016/0378-4266(95)00035-6

71. 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

72. Ross, S. A. (1976). The arbitrage theory of capital asset pricing.

Journal of Economic Theory, 13(3), 341-360. Retrieved from http://www.investmentanomalies.com/articles/031.pdf

73. Saporoschenko, 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

74. Securities and Exchange Board of India. (n.d.). *Mutual Fund Investments*. Retrieved from https://www.sebi.gov.in/statistics/mutual-fund/deployment-of-funds-by-all-mutual-funds.html

75. Sehgal, M., & Gupta, S. (2021). Stock markets in changing times: A study of select global market indices and indian banks. *International Journal of Business Analytics, 8*(3), 14-25. https://doi.org/10.4018/IJBAN.2021070102

76. Sharpe, W. F. (1964). Capital Asset Prices: A Theory of Market Equilibrium under Conditions of Risk. *Journal of Finance, XIX*(3), 425-442. https://doi.org/10.1111/j.1540-6261.1964.tb02865.x

77. Shehab, A. Al. (2023). Macroeconomic determinants of stock market returns: Evidence from Oman. *Asian Economic and Financial Review, 13*(11), 801-817. https://doi.org/10.55493/5002.v13i11.4866

78. Simpson, M. W., & Ramchander, S. (2012). Asymmetric and cross-sectional effects of inflation on stock returns under varying monetary conditions. *Applied Financial Economics, 22*(4), 285-298. https://doi.org/10.1080/09603107.2011.610741

79. Singh, G., & Shaik, M. (2021). The Short-Term Impact of COVID-19 on Global Stock Market Indices. *Contemporary Economics, 15*(1), 1-18. https://doi.org/10.2307/2490232

80. Singh, M. K., & Neog, Y. (2020). Contagion effect of COVID-19 outbreak: Another recipe for disaster on Indian economy. *Journal of Public Affairs, 20*(4), 1-8. https://doi.org/10.1002/pa.2171

81. 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. Retrieved from https://ideas.repec.org/a/usm/journl/aamjaf00901_25-45.html

82. Tai, C. S. (2005). Asymmetric currency exposure of US bank stock returns. *Journal of Multinational Financial Management, 15*(4-5 SPEC. ISS.), 455-472. https://doi.org/10.1016/j.mulfin.2005.04.002

83. Tallman, E. W. (1989). *Financial Asset Pricing Theory: A Review of Recent Developments*. Retrieved from https://ideas.repec.org/a/fip/fedaer/y1989inovp26-41.html

84. 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. Retrieved from https://www.businessperspectives.org/images/pdf/applications/publishing/templates/article/assets/2451/imfi_en_2008_04_cont_Vaz.pdf

85. 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

86. 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

87. Wetmore, J. L., & Brick, J. R. (1994). Commercial bank risk: market, interest rate, and foreign exchange. *Journal of Financial Research, XVII*(4), 585-596. https://doi.org/10.1111/j.1475-6803.1994.tb00167.x

88. 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

89. Wongbangpo, P., & Sharma, S. C. (2002). Stock market and macroeconomic fundamental dynamic interactions: ASEAN-5 countries. *Journal of Asian Economics, 13*(1), 27-51. https://doi.org/10.1016/S1049-0078(01)00111-7

90. 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

91. Yusof, R. M., & Majid, S. A. (2007). Macroeconomic variables and stock returns in Malaysia: An application of the ARDL bound testing approach. *Savings and Development, 31*(4), 449-469. Retrieved from https://www.jstor.org/stable/41406464

92. 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. Retrieved from https://www.ijstr.org/final-print/sep2018/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.pdf

http://dx.doi.org/10.21511/imfi.22(1).2025.31