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Impact of Macroeconomic Indicators on Stock Market Performance: Evidence from Nepal

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Abstract

Background: The stock market is a critical indicator of economic activity, reflecting both investor sentiment and macroeconomic conditions. Understanding the relationship between stock market performance and macroeconomic variables is essential for policymakers, investors, and financial analysts. **Objective:** This study aims to analyze the relationship between the Nepal Stock Exchange (NEPSE) and key macroeconomic variables, including deposits, reserve money, liquidity, and lending interest rates, to determine their short-term and long-term effects on market performance. **Methods:** Using time-series data from 2005 to 2024, this study applies the Auto-Regressive Distributed Lag (ARDL) model to examine both short-term and long-term equilibrium relationships. The model assesses the impact of macroeconomic indicators on NEPSE while controlling for external economic shocks. **Findings:** The results indicate that NEPSE exhibits strong momentum, with past values significantly influencing current market trends. Lending interest rates have a significant negative impact, suggesting that higher borrowing costs discourage stock market investment. Liquidity and deposits do not have an immediate effect on NEPSE but show significant lagged effects, implying delayed investor responses. Reserve money initially reduces NEPSE due to

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inflationary concerns but later contributes to market recovery. The model's high R-squared value and significant F-statistic confirm its predictive strength. However, external shocks, political instability, and global economic fluctuations remain unmodeled. **Conclusion:** The study highlights the complex interactions between macroeconomic variables and stock market performance, emphasizing the role of monetary policy in shaping investor behavior. The findings provide valuable insights for policymakers in designing strategies to stabilize and promote stock market growth. **Novelty:** This study contributes to the literature by utilizing the ARDL model to capture both short-term and long-term dynamics in NEPSE, offering a comprehensive analysis of market behavior. It also suggests future research directions, including incorporating foreign exchange rates and investor psychology to improve predictive accuracy.

Keywords: Nepal Stock Exchange (NEPSE), Auto-regression Distributed Lagged (ARDL), Econometric Model, Macroeconomic Variables
JEL Classification Codes: G11, G12, G14, G41

Introduction

A stock market is a venue where investors can purchase and sell investments. The stock market plays a crucial role in a country's financial system. The activities of stock market influence the investment decisions and economic growth of the nation. Stock market serves as a barometer of economic activity and investor sentiment in Nepal. The volatility of stock market and its sensitivity to macroeconomic fluctuations raise concerns regarding the stability and predictability of NEPSE. Despite its importance, there is limited empirical evidence on the interdependencies between NEPSE and macroeconomic. One of the most important challenges is determining the appropriate model to capture these dynamic relationships accurately. Existing economic models may not fully account for the complexities of financial markets. The macroeconomic variables significantly influence stock prices in Singapore (Maysami & Koh,2000). Similarly, Fama (1981) analyzed that stock returns are influenced by changes in economic fundamentals.

The study includes the macroeconomic variables such as Deposit, Reserve Money, and Lending interest Rates, and Liquidity as regressors and stock market performance as dependent variable. The reserve money represents the total money supply in the economy and influences liquidity and investment activities. Liquidity, referring to the availability of cash and liquid assets, impacts investor sentiment and overall market stability (Thapa,2023a). Shrestha & Bhatta (2018) analyzed “the relationship between NEPSE fluctuations and variables such as the Consumer Price Index (CPI), broad money supply, and Treasury bill rates, concluding that inflation significantly affects stock market performance”. Deposits also contribute to investment inflows, supporting credit availability and facilitating financial sector growth. analyze the NEPSE fluctuation to CPI, broad money, and Treasury bills, suggesting that inflation has a significant effect on market performance. Deposit plays a role in determining investment inflows which support to provide loan facility and develops the financial activities.

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Research objectives

This study is to analyze the relationship, and the assess the impact between Nepal Stock Exchange (NEPSE) performance and key macroeconomic variables, including deposits, reserve money, liquidity, and lending interest rates by using Auto-regression Distributed Lagged (ARDL).

Review Of Literature

Coleman, K. and Frank, A. (2008) depicted that lending rates from deposit money banks have a negative impact on stock market performance and are a key impediment to corporate growth in Ghana. Although inflation has a negative impact on stock market performance, there is a lag period. Additionally, investors benefit from exchange-rate losses owing to domestic currency depreciated. It necessitates the application of advanced econometric methods such as the VEC model. Naka et al. (1991) applied an "Auto-regression Distributed Lagged (ARDL) to analyze the relationship between stock markets and macroeconomic factors in Japan, finding significant long-term associations. Identifying the optimal lag length and understanding the long-run and short-run interactions among these variables is crucial for effective policy formation and financial planning".

Hayes (2012) depicted the Efficient Market Hypothesis, arguing that stock prices reflect all available information, making it difficult to predict stock movements. Naka, Mukherjee, and Tufte (1991) found significant relationships between macroeconomic variables and the Indian stock market performance. Pesaran et al. (2001) developed bound testing approaches for analyzing long-run relationships in financial markets. Poudel (2019) used an ARDL approach to explore stock return and trading volume relations in the Nepalese stock market. Muthike & Sakwa (2012) explored the predictive power of macroeconomic indicators on stock exchange index trends in Nairobi. Haq & Larsson (2016) applied an ARDL approach to analyze stock market returns and macroeconomic indicators. Fama (1981) showed that stock returns are influenced by inflation and money supply. Thapa (2019) explored a study to examine the factors that influence stock prices with reference to commercial banks in Nepal from 2008 to 2018. The study reveals that the accessibility of liquidity significant affects the performance of the Nepalese stock market. Mohnot et al. (2024) examined asymmetric macroeconomic relationships in Malaysian stock markets.

Furthermore, the associations between NEPSE and macroeconomic variables remains an open question. Understanding whether changes in deposits, reserve money, and liquidity drive stock market movements, or vice versa, is essential for implementing effective monetary and fiscal policies.

Several studies have examined the relationship between stock markets and macroeconomic indicators using econometric techniques. More recently, Thapa (2023) utilized a VAR model to analyze the causal relationships between NEPSE and macroeconomic indicators. The results of the VAR model research revealed a significant amount of persistence in the market index, indicating that it is heavily influenced by its own past (lag) values. Other factors, such as the consumer price index (CPI) and the money supply (MS), had no immediate impact on the stock

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market index, although exchange rates (EXR) and remittances (REMIT) had marginal but potentially significant correlations. The results concludes that lending interest rates and deposits significantly influence stock market movements. Mital et al. (2023) identified a correlation between macroeconomic indicators (exchange rate, wholesale price index, index of industrial production, foreign portfolio investments, crude oil prices) and stock market indices (Nifty 50 and Sensex). The unit root test, cointegration test, and error correction model are used. The study revealed that crude oil is the only independent macroeconomic variable that significantly affects the NSE Nifty 50 stock index. The remaining independent factors had no impact on the NSE Nifty 50 or BSE Sensex. Dahal et al. (2024) examined factors impacting stock prices of Nepalese commercial banks, emphasizing the role of liquidity and reserve money. Naik and Reddy (2024) investigated macroeconomic determinants of stock market liquidity in emerging markets.

Despite the growing interest in the relationship between stock market performance and macroeconomic indicators, several gaps remain in the existing literature. Most studies on stock market dynamics focus on developed or large emerging economies, leaving a gap in understanding how macroeconomic factors influence NEPSE. While some studies explore the impact of macroeconomic indicators on stock markets, few have systematically determined the optimal lag length for NEPSE using rigorous econometric techniques like VAR. There is limited evidence on the relationships between NEPSE and macroeconomic variables, making it unclear whether stock market changes influence macroeconomic factors or vice versa. By addressing these gaps, this study aims to provide empirical insights that can guide policymakers, investors, and researchers in better understanding the Nepalese stock market's behavior and its linkages with macroeconomic variables.

Research Methods

This study employs quantitative and inferential statistics research methodology with the time series data. It applies Auto-regression Distributed Lagged (ARDL) model to analyze the influence selected macroeconomic variables and stock market performance in Nepal. The data collection from World Bank, NEPSE, NRB, SEBON, and other institutions. The study employed monthly data during the 2005 to 2024. The total 203 observations are included in the study. The data are collected by applying a judgmental sampling method. Data are calculated in the Excel, and EViews- 12 for time-series regression analyses. The study uses inferential statistics to investigate the impact of macroeconomic variables on stock market performance. An econometric model is employed to analyze the impact of selected macroeconomic indicators on stock prices, aiming to assess their influence and interrelationships. The Auto-regression Distributed Lagged (ARDL) is chosen for its ability to handle variables with different integration levels. The optimal lag length is determined using various criteria, including Akaike Information Criterion (AIC), Schwarz Criterion (SC), and Hannan-Quinn Criterion (HQ). Based on these criteria, lag 2 is selected as the optimal choice.

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Results and Discussions

The table 1, VAR Lag Order Selection Criteria, presents statistical measures used to determine the optimal lag length for a Vector Autoregression (VAR) model. It includes endogenous variables such as NEPSE, Reserve money, Deposit, Liquidity, and Landing interest rate with a constant term (C) as an exogenous variable. The table evaluates different lag structures (0 to 3 lags) using several criteria, including Log-Likelihood (LogL), Likelihood Ratio (LR), Final Prediction Error (FPE), Akaike Information Criterion (AIC), Schwarz Criterion (SC), and Hannan-Quinn Criterion (HQ).

Table 1

Lag Order Selection criteria

VAR Lag Order Selection Criteria

Endogenous variables: NEPSE RESERVEM DEPO LIQ LIR Exogenous variables: C

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-8815.562	NA	4.35E+36	98.55377	98.64280	98.58987
1	-7571.638	2404.456	5.30E+30	84.93451	85.46871	85.15112
2	-7438.136	250.5964	1.58e+30*	83.72219*	84.70156*	84.11932*
3	-7413.930	44.08570*	1.59E+30	83.73106	85.15559	84.30869

* Indicates lag order selected by the criterion

The AIC, FPE, and HQ criteria suggest that Lag 2 is the optimal choice, as they yield the lowest values at this lag. A lower AIC and FPE indicate better predictive performance with minimal overfitting, HQ also provides additional confirmation. Meanwhile, the SC criterion favors Lag 2 as well, although its value slightly increases at Lag 3. The Likelihood Ratio (LR) test, however, suggests that Lag 3 might be more appropriate, as the test statistic at this lag (44.09) indicates a significant improvement over Lag 2. Considering all criteria, Lag 2 is the most suitable choice, as it balances predictive accuracy and model simplicity. The consistency of AIC, FPE, and HQ in selecting Lag 2 strengthens this conclusion, while the LR test's preference for Lag 3 does not provide enough justification for additional complexity.

Table 2

ARDL Model with 2 lags of Deposits, Reserve Money, Liquidity, Lending Interest Rate

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
NEPSE(-1)	0.89	0.028	32.016	0.000
DEPO	0.00	0.000	0.064	0.949
DEPO(-1)	0.00	0.000	-1.944	0.054
DEPO(-2)	0.00	0.000	2.394	0.018
RESERVEM	0.00	0.000	-1.741	0.084
RESERVEM(-1)	0.00	0.000	1.679	0.095
LIQ	0.00	0.000	0.878	0.381
LIQ(-1)	0.00	0.000	-1.713	0.089
LIQ(-2)	0.00	0.000	3.107	0.002

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LIR	-17.45	5.409	-3.225	0.002
C	103.11	62.338	1.654	0.100
R-squared	0.9809	F-statistic	874.86	
Adjusted R-squared	0.98	Prob(F-statistic)	0.00	
AIC	12.16	Schwarz criterion	12.36	
Durbin- Watson Stat	1.96	Hannan-Quinn criter.	12.24	

Source: Author calculation by using Eviews-12

The table 2, ARDL model, estimates the relationship between NEPSE (Nepal Stock Exchange Index) and various financial indicators, such as Deposits, Reserve Money, Liquidity, and Lending Interest Rate. The model was selected (ARD: 1, 2, 1, 2, 0) based on the Akaike Information Criterion (AIC). The aim of this model is to minimize model complexity while maximizing goodness of fit. The R-squared (98.09%) of the variation in NEPSE is explained by the model. It indicates an excellent fit. Similarly, the adjusted R-squared value of 98%, which accounts for the number of predictors, remains very high, further confirming the both model's explanatory power. Additionally, the F-statistic of 874.86 is highly significant (p = 0.0000), meaning the overall model is statistically strong. The Durbin-Watson statistic, at 1.96, is close to the ideal value of 2. It suggests minimal to no autocorrelation in the residuals. Therefore, the model explains nearly all variations in NEPSE, making it highly predictive. And there are no major issues with residual autocorrelation, reinforcing the reliability of the results. The Lagged NEPSE (Momentum Effect) coefficient for is 0.8862, with a p-value of 0.000. It indicates a highly significant and strong positive relationship. This suggests that the previous month's NEPSE value heavily influences the current period. The stock market exhibits strong momentum, meaning that if NEPSE rises, it tends to keep rising due to investor sentiment and market inertia. Deposits in the current period show no significant effect on NEPSE (coefficient = 0.0000159, p-value = 0.9492). However, the first lag has a nearly significant negative impact (coefficient = -0.000538, p-value = 0.0536), while the second lag has a significant positive effect (coefficient = 0.000510, p-value = 0.0178) *(Author calculation by using Eviews-12)*. Therefore, there is no immediate effect of deposit changes on NEPSE. However, the first lag's negative impact might be due to increased savings reducing stock investments. Even though, the second lag's positive impact suggests that increased deposits eventually lead to higher market investments.

Reserve money in the current period has a weakly significant negative effect on NEPSE (coefficient = -0.000430, p-value = 0.0835). However, the first lag exhibits a weakly significant positive effect (coefficient = 0.000546, p-value = 0.0950). Initially, higher reserve money slightly reduces NEPSE, possibly due to inflation concerns. Over time, as the market absorbs additional liquidity, stock prices tend to increase.

Liquidity changes show no immediate effect on NEPSE (coefficient = 0.000329, p-value = 0.3813). However, the first lag has an almost significant negative impact (coefficient = -0.000649, p-value = 0.0886). While the second lag has a strongly significant positive effect (coefficient = 0.001030, p-value = 0.0022). Short-term liquidity changes do not immediately

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affect NEPSE. A small negative effect in the first lag suggests investors initially move funds to safer assets. A strong positive impact in the second lag indicates that increased liquidity eventually supports stock investments. The lending interest rate (LIR) has a strongly significant negative impact on NEPSE (coefficient = -17.4452, p-value = 0.0015). Higher interest rates significantly reduce NEPSE, as borrowing costs increase. It discourages investment in stocks. The strong negative coefficient suggests that a 1% increase in LIR results in a sharp decline in NEPSE.

The major findings of this research are that NEPSE is highly persistent. It means past values strongly influence current values. Lending interest rates (LIR) have a significant negative effect on NEPSE which is also supported by Mital, Sharma, & Manya (2023). It confirms that rising borrowing costs adversely impact the stock market. Liquidity and deposits take time to affect stock prices, which reflects delayed investor reactions. Reserve money influences NEPSE in both directions: initially decreasing it but later increasing it. The model suggests almost all variations in NEPSE, which makes it highly predictive. There is no major issue with residual autocorrelation, which is a good sign for reliability.

The results of this study align with and extend existing literature on the relationship between macroeconomic indicators and stock market performance. Shrestha & Bhatta (2018) highlighted the impact of inflation on stock market fluctuations, while Dahal et al. (2024) emphasized liquidity and money supply. This study reinforces these findings, showing that reserve money initially reduces NEPSE but later leads to a positive effect, reflecting short-term inflationary concerns followed by market recovery. Thapa (2023) found that lending interest rates and deposits significantly influence stock market movements, which this study confirms with a strong negative relationship between lending interest rates (LIR) and NEPSE. Higher borrowing costs discourage investments in stocks, consistent with Naik and Reddy (2024), who examined macroeconomic determinants of market liquidity.

The study verifies Naka et al. (1991) and Haq & Larsson (2016), who used ARDL models to examine stock market responses to macroeconomic indicators. The strong momentum effect in NEPSE aligns with Hayes (2012) and the Efficient Market Hypothesis, indicating stock prices incorporate available information and persist over time. Similar to Thapa (2019), this study finds that deposits and liquidity affect the stock market with a lag, reflecting delayed investor reactions. The model's high R-squared and significant F-statistic reinforce its predictive accuracy. Compared to Poudel (2019), this study further identifies a delayed but significant impact of liquidity and deposits on stock prices. The strong negative impact of LIR on NEPSE aligns with Mohnton et al. (2024), who found that higher borrowing costs lead to sharp market declines.

Conclusions

The study addresses critical issues regarding the stability and predictability of the Nepalese stock market. The persistent influence of past NEPSE values suggests a strong momentum effect, implying that historical stock prices significantly shape future trends. The application of an Auto-Regressive Distributed Lag (ARDL) model applies understanding of associations

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between NEPSE and macroeconomic variables. However, the study also identifies gaps in empirical literature, particularly in determining the optimal lag length and the impact between stock market performance and macroeconomic indicators. The findings highlight that lending interest rates (LIR) have a significant negative impact on NEPSE. It confirms that higher borrowing costs discourage stock investments. Liquidity and deposits influence stock prices with a lag, reflecting delayed investor reactions. Reserve money initially exerts a negative effect on NEPSE, likely due to inflationary concerns, but later contributes positively as market liquidity stabilizes. However, this study relies on secondary data, which may contain measurement errors or inconsistencies. Additionally, while ARDL is effective in handling different integration levels, alternative models like the Vector Error Correction Model (VECM) could provide deeper insights into long-term equilibrium relationships. The study primarily focuses on Nepal's stock market, limiting the generalizability of findings to other emerging economies with different financial structures and policy environments. The relevance of these findings extends to policymakers, investors, and financial analysts. Future research can explore additional expanding the analysis to regional stock markets would provide comparative insights, helping to generalize the findings across different economic contexts.

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