SOCIAL PRISM

Volume 3(3), 2026, 59-78
Online ISSN: 3006-8886
Print ISSN: 3006-8878

Oil Price Uncertainty and Stock Market Returns in Pakistan: Investigating the Interactive Role of FDI and FPI in the KSE-100 Index

Huzaifa Saleem[1], Muhammad Muzammil[2]

[1]*Research Scholar, Karachi University Business School, University of Karachi, Pakistan,*
Email: huzisaleem1234@gmail.com
[2]*Assistant Professor, Karachi University Business School, University of Karachi, Pakistan,*
ORCID: https://orcid.org/0009-0004-2066-1954 , Email: muhammad.muzammil@uok.edu.pk

Abstract

The uncertainty in oil prices is one of the most important threats to financial markets all over the world, especially in oil importing emerging economies like Pakistan. For this study, it was decided to study how oil price uncertainty affects the returns of Pakistani KSE-100 stocks, and how Foreign Direct Investment (FDI) and Foreign Portfolio Investment (FPI) moderate the effect of uncertainty on return on equities, and how macroeconomic factors mediate the effect of uncertainty on returns on KSE-100 stocks in Pakistan. The study employed Quantitative and explanatory research design and secondary time series data source was used including from Pakistan Stock Exchange (PSX), State Bank of Pakistan (SBP), World Bank and International Oil Market (IOM) databases. Econometric methods such as regression analysis, ARDL modeling, moderation analysis and mediation testing were used to investigate the relationships between the variables and come up with results and insights. The results indicated that the degree of uncertainty in oil price has significant and negative impact on the KSE-100 stock market returns through the channel of macroeconomic instability and impact on investors' confidence. This study adds to the financial economics literature by linking the oil price uncertainty, foreign investment flows, and macroeconomics under one umbrella for the case study of Pakistan. The results have important policy, investment and regulatory implications for promoting market stability and sustainable investments in the presence of uncertainty.

Keywords: Oil Price Uncertainty, KSE-100 Index, Foreign Direct Investment (FDI), Foreign Portfolio Investment (FPI), Macroeconomic Factors, Stock Market Returns, Pakistan Stock Exchange (PSX), Emerging Economies.

Introduction

Background of the Study

With oil price uncertainty as an important macroeconomic area of concern, there is no doubt that this has been one of the most influence macroeconomic conditions for financial markets, especially the macroeconomic developments for emerging economies which have high levels of dependence on energy and external vulnerability. Not only production costs, inflation pressure, exchange rate stability, but also investors' sentiment, have significant impacts on the returns of the stock markets in response to fluctuations in crude oil prices (Salisu & Adediran, 2020; Bouri et al., 2020; Mensi et al., 2021; Jiang et al., 2023; Shahzad et al., 2021). Price fluctuation of oil in

Received 07 April 2026; Revised 24 April 2026; Accepted 01 May 2026; Published (online) 08 May 2026
Attribution 4.0 International (CC BY 4.0)
Corresponding Author Email: huzisaleem1234@gmail.com
DOI: https://doi.org/10.69671/ socialprism.3.3.2026.142

Online ISSN: 3006-8886
Print ISSN: 3006-8878

Pakistan leads to uncertainty of economic activities and financial systems, as in a developing country like Pakistan, it is very important that a lot of energy is used from oil, which means prices movement can affect the economy and financial systems of Pakistan (Khan et al., 2022; Raza et al., 2021; Tufail & Batool, 2020). Energy-intensive sectors are the most significant sectors of the market structure, making the Pakistan Stock Exchange (PSX) price sensitive to external disturbance and harshness in Oil market (Waheed et al., 2020; Hassan et al., 2021). Past research has indicated that oil price fluctuations have great impact on the stock market in developing countries, both in terms of market developments, investment decisions and market capitalization (Basher et al., 2018, Chang et al., 2019).

It is worthwhile to mention that the stock market industry plays a crucial role in Pakistan's economic and financial development in the areas of capital formation, mobilization of funds for investments and company financing. Founded as a result of the unification of stock exchanges from Karachi, Lahore, and Islamabad, the Pakistan Stock Exchange is the chief firm amidst Pakistan's biggest financial institution (Hassan et al., 2024; Ibrahim et al., 2025; Khan et al., 2023; Raza et al., 2023; Abbas et al., 2023). Stock market performance is widely considered as the most favored indicator of listed companies' performance, as the KSE-100 Index is based on listed companies' capitalization and financial strength of the top 100 listed companies from across all the sectors (Waheed et al., 2023; Burney et al., 2024; Ahmed et al., 2022; Shah et al., 2023; Zubair et al., 2022). Overall, the PSX has been very volatile in recent years soaring from one extreme to another on account of macroeconomic volatility, high inflation, depreciation in exchange rate, political uncertainty and external financial shocks (Tufail et al., 2023; Khan et al., 2024; Siddique et al., 2022; Hassan et al., 2023; Rasheed et al., 2022). Industrial regulation and the SEC's guidelines are also under intense scrutiny due to alleged conflicts of interest, significant restrictions on the independent evaluation of investment products, and the agency's inadequate understanding of traditional and hybrid stock markets.The regulatory environment within the industrial sector is also facing challenges, which is why this is currently under a close watch by the shareholders' community. Challenges are reportedly faced due to conflicts in interest and significant restrictions on the independent evaluation of investment products, coupled with the agency's limited understanding of traditional and hybrid stock markets.

Problem Statement

The uncertainty of oil prices has become one of the main obstacles faced by emerging economies, especially for oil-importing countries like Pakistan as fluctuations in global crude oil prices significantly affect the efficacy of monetary and fiscal policies, inflation rates, exchange rates, industrial production, as well as financial stability and stability of banks and other institutions (Mensi et al., 2023; Salisu et al., 2022; Jiang et al., 2023). In recent years the Pakistan Stock Exchange (PSX in particular the KSE-100 Index) has been highly volatile starting from external shocks in the economy, rising energy prices, geopolitical uncertainties, and macroeconomic instability (Hassan et al., 2024; Abbas et al., 2023). Previous studies have investigated the link between oil prices and stock market returns, but much of the existing literature considers the impact of oil prices and stocks market returns together without giving due attention to their interactive effect on the stock market reaction (Ghosh and Adamu, 2019; Al Saafin et al., 2018; Zubair et al., 2018; Rasheed et al., 2022; Shahzad et al., 2022).

Online ISSN: 3006-8886
Print ISSN: 3006-8878

Research Questions

RQ1. Does oil price uncertainty influence return on stocks in the Pakistan stock exchange-100 Index?

RQ2. How is the oil price uncertainty linked with Pak's macroeconomic stability?

RQ3. Is Foreign Direct Investment (FDI) the moderator of relationship between oil price uncertainty and stock market returns in Pakistan?

RQ4. Foreign Portfolio Investment (FPI) dampens the effect of oil price volatility on the stock market return in Pakistan?

Objective of the Study

The purpose of this study is to establish the objectives.

- To analyze how the uncertainty over oil prices affects the stock market returns of KSE-100 Index in Pakistan.
- To study the linkage between the oil price volatility and macroeconomic issues of financial market impact on Pakistan.
- To examine the moderating effect of Foreign Direct Investment (FDI) between oil price uncertainty and stock market returns.
- To assess the moderating effect of Foreign Portfolio Investment (FPI) between oil price uncertainty and stock market returns in case of Pakistan.

Literature Review

The oil price risk is among the most prominent and important macro-economic quantities in financial economics as it affects the economic growth, industrial production, inflation and investor confidence directly with fluctuations in the price of crude in the world. Oil is an essential energy source for both developing and developed economies, and oil-related uncertainty and oil price fluctuation are prone to create market volatility (Mensi et al., 2023; Salisu et al., 2022; Jiang et al., 2023). In recent literature, oil price uncertainty has been revealed to have a significant impact on the stock market beyond changing consumption patterns and production cost (Naeem et al., 2021; Umar et al., 2023). Oil price volatility adds extra costs in emerging economies like Pakistan due to high reliance on imported oil and limited foreign reserves (Hassan et al., 2024; Burney et al., 2024). Previous research also suggests that the sustained oil shocks harm economic stability, corporate confidence and development of the financial sector in importing countries, where energy prices have a substantial impact on the industry (Basher et al. 2018; Chang et al. 2019). As such, oil price uncertainty has emerged as a key element in the analysis of the behaviour of the financial markets and macroeconomic instability in emerging stock markets.

Theoretical Foundation

Arbitrage Pricing Theory (APT)

The present paper is essentially based on the Arbitrage Pricing Theory (APT), as major underpinning theory for explaining the relationship between macroeconomic variables and stock mar-

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Print ISSN: 3006-8878

ket returns was developed by Ross (1976). We argue that stock returns are determined not just by a single market-risk factor (Fama, 1981; Ross, 1976), but by several more. This is indeed appropriate to a study of how uncertainty in oil prices affects stock returns, how foreign investment in stocks affects the performance of those markets, and how the stock market responds in the presence of various foreign investors. In this study, oil price uncertainty is considered as a macroeconomic risk factor which directly affects investor's expectation, the cost of production, the inflationary pressure, and the volatility of the Pakistan stock exchange (Pakistan KSE-100 Index) (Mensi et al., 2023; Salisu et al., 2022; Jiang et al., 2023). Empirically, oil price changes and general economic uncertainty in developed countries have been found to have significant impacts on stock markets in emerging nations (Nazlioglu et al., 2023; Umar et al., 2023; Burney et al., 2024) due to the close association between macroeconomic instability and the profitability of firms and investment decisions of investors.

Efficient Market Hypothesis (EMH)

This study uses the first supporting theory, Efficient Market Hypothesis (EMH) Fama (1970) that has been developed to explain how financial markets react to newly released and external economic activity. EMH states that all the marketable information would be reflected in the stock price, which means that fluctuations in oil prices, inflation rates, exchange rates, and foreign investment inflows, would immediately lead to changes in the return of stocks. The uncertainty surrounding the oil price in Pakistan is a significant amount of market information which can impact investor expectations and stock valuation behavior in Pakistan's KSE-100 Index (Hassan et al., 2024; Raza et al., 2023; Waheed et al., 2023). Empirical evidence from recent period shows that emerging stock markets tend to respond quickly to the exogenous economic shocks, due to the fact that investors react rapidly when the situation of uncertainty and market risk occurs (Nazlioglu et al., 2023; Mensi et al., 2023; Burney et al., 2024).

International Capital Flow Theory

This study, the second supporting theory is The International Capital Flow Theory that explains foreign investment investment circulation between countries and its effect on the financial stability and economic growth. Foreign capital mobility, including FDI and FPI is theorized to be motivated by economic opportunities, returns, market stability and investor confidence in the hosting economies (Obstfeld & Taylor, 2004; Stiglitz, 2000). Foreign investment is extremely vital in Pak because it is a source of capital resources, enhances liquidity and boosts the development of the stock exchanges in Pak (Rasheed et al., 2022; Wanke et al., 2024; Singh, 2024). Still, predictions of price volatility in oil and macroeconomic factors may lead foreign investors to curb investment in emerging markets and capital costs to exit emerging markets (Nazlioglu et al., 2023; Abbas et al., 2023; Burney et al., 2024). The recent empirical studies reveal that the oil price, exchange rate stability, inflation, and political situation are factors taken into consideration by international investors in their decision to invest in any stock market including PSX (Mensi et al., 2023; Hassan et al., 2024). In this regard, International Capital Flow Theory is essential and actually plays an important role in justifying this study. In this context, the International Capital Flow Theory is of the special significance as it explains how foreign capital inflows can moderate the impact of uncertainty in oil prices on returns of the stock market in Pakistan.

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Empirical Study

The thesis that uncertainty of oil prices plays a significant role in the returns of the stock markets is substantiated by several studies, especially in emerging markets, where the financial market is more susceptible to external shocks. Oponents of this point of view contend that price volatility of oil causes harder businesses, inflation, and financial uncertainty, which hurts company earnings and investor trust (Mensi et al., 2023; Salisu et al., 2022; Jiang et al., 2023). An increase in the price of crude oil in countries that import more oil, like Pakistan, leads to a rise in oil import costs, which hurts industrial productivity, and consequently the ability of the stock market to steadily perform (Burney et al., 2024; Hassan et al., 2024). Empirical evidence over the last decade shows that stock markets have responded poorly to oil price volatility due to the price uncertainty associated with oil prices being viewed as a macroeconomic risk factor which affects prospects of future earnings and economic activity (Nazlioglu et al., 2023; Shahzad et al., 2022). Previous theoretical and empirical research also confirms the finding that oil prices are an important determinant of stock price returns and overall market efficiency in developing countries (Basher et al., 2018; Ross, 1976). It is widely recognised that oil price uncertainty is a major factor shaping the financial instability and “tensions in the stock markets”.

Oil Price Uncertainty and Stock Market Returns

This is supported by several studies, which have shown that uncertainty of the prices of oil can have substantial effect on stocks market returns particularly in emerging and oil importing economies like Pakistan. Researchers have opined that fluctuations in crude oil prices have negative implications in terms of rising production expense, inflation rate, and uncertainty and risks to the economy, which impact negatively on the profitability of the firms and investor confidence in stock markets (Mensi et al., 2023; Salisu et al., 2022; Basher et al., 2018; Chang et al., 2019). Pakistan is an energy-constrained nation with a highly vulnerable economy, especially in terms of industrial productivity, which is a direct result of high oil prices due to its dependency over imported energy resources (Burney et al., 2024; Hassan et al., 2024). In a recent empirical study, Nazlioglu et al. (2023) and Shahzad et al. (2022) show that stock markets are negatively affected by an increase in oil price volatility of oil due to their perception of such fluctuation as a measure of macroeconomic instability and economic slowdown. Other theoretical approaches relying on the Arbitrage Pricing Theory (APT) also indicate that oil prices can be considered systematic risk factors that can affect asset pricing and the returns of stocks in other financial sectors (Ross, 1976; Fama, 1981).

Oil Price Uncertainty and FDI

The proponents of the moderating effect of Foreign Direct Investment (FDI) suggest that foreign capital inflows can mitigate the adverse effect of oil price volatility on the stock market returns as it increases the market confidence, market liquidity and economic stability. Long-term foreign investment typically promotes industrial productivity, infrastructure growth and technological development, which enhance the robustness of the financial market in times of economic uncertainty (Al-Delawi et al., 2023; Wanke et al., 2024; Adeyi et al., 2019; Paul & Feliciano-Cestero, 2020). Investment inflows into the energy, banking, and telecommunication sectors have been found to be beneficial for the stock market development and investors trust in Pakistan (Hassan et al., 2024; Abbas et al., 2023). Other recent studies suggest that the foreign direct investment in

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Print ISSN: 3006-8878

the economies with stable FDI boosts financial confidence and financial market sustainability in the long run, so these economies can sustain external shocks like oil price fluctuation (Singh, 2024; Burney et al., 2024). Other studies also report that, within emerging economies, FDI is found to increase financial market stability and to help reduce economic uncertainty (Stiglitz, 2000; Chang et al., 2019).

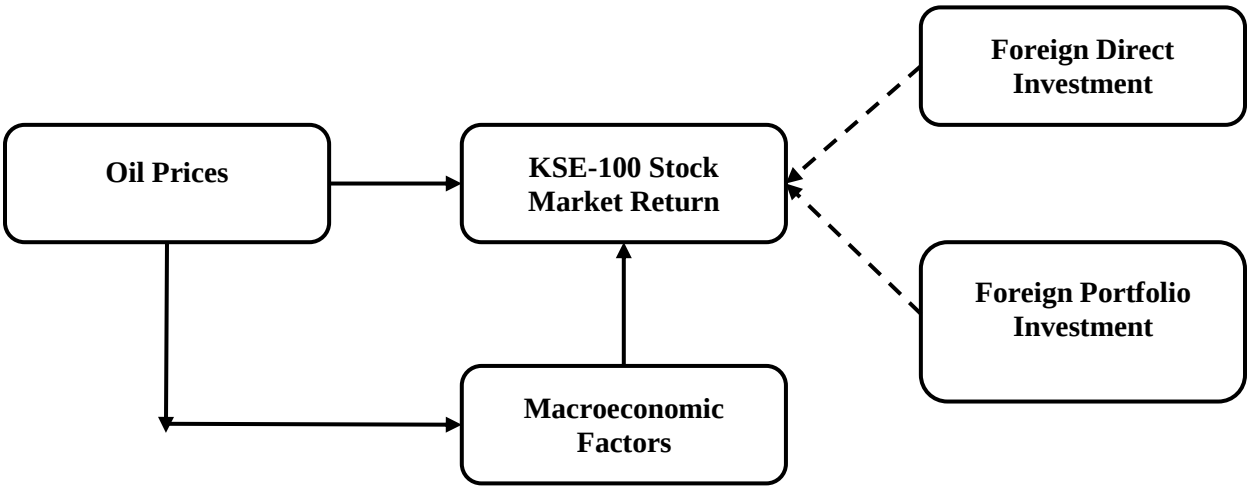


Figure 1 Conceptual Framework

Hypothesis Development

Oil Price Uncertainty and KSE-100 Stock Market Return

Uncertainty in oil prices is seen as one of the key macroeconomic risk factors affecting the performance of the stock market, especially in oil importing economies like Pakistan. The volatility in global crude oil prices adversely impacts investors' confidence, stock market returns, and reduces the profitability of industries due to the rise in production and transportation costs alongside inflationary pressures (Mensi et al., 2023; Salisu et al., 2022; Basher et al., 2018; Chang et al., 2019). The stock market is quite sensitive to oil shocks in Pakistan, as oil prices have a direct impact on manufacturing, energy and transportation sectors which are highly represented on the KSE-100 Index (Burney et al., 2024; Hassan et al., 2024). Furthermore, recent empirical studies indicate that market uncertainty resulting from uncertainty about future oil prices can increase market volatility and deter investors from equity markets (Nazlioglu et al., 2023; Shahzad et al., 2022). Hence, the oil price uncertainty is likely to significantly affect the stock market returns in Pakistan.

Oil Price Uncertainty and Macroeconomic Factors

Oil price uncertainty has a significant impact on macroeconomic conditions as oil price fluctuations have direct impacts on inflation, exchange rates, trade balances and economic productivity. In developing countries like Pakistan, fluctuations in the price of crude oil affect the demand for goods and services, as they require it to be imported and increase the price of goods and services resulting in inflationary pressure, which affects the economic stability and reduces purchasing power (Ahmed & Huo, 2023; Tufail et al., 2023; Mensi et al., 2023; Umar et al., 2023).

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Macroeconomic Factors and KSE-100 Stock Market Return

It is a well-known fact that macroeconomic variables like inflation, exchange rates and interest rates are significant influences on the stock market. These variables directly impact investor confidence, industrial productivity and corporate profitability. The macroeconomic instability has caused volatility in the financial market and has hampered the profit-making potential of the stock market in Pakistan due to high inflation and depreciation of the exchange rate (Rasheed et al., 2022; Burney et al., 2024; Khan et al., 2024; Abbas et al., 2023). A negative macroeconomic environment has a negative influence on the performance of the stock market in accordance with recent literature (Hassan et al., 2024; Mensi et al., 2023). The importance of macroeconomic variables as systematic risk factors which can affect asset pricing and investor expectations in financial markets has also been suggested by earlier theoretical research (Ross, 1976; Fama, 1981). Thus, macroeconomic variables are likely to have large impact on KSE-100 stock market returns in Pakistan.

H1: Oil price uncertainty significantly affects KSE-100 stock market returns in Pakistan.

H2: Oil price uncertainty significantly affects macroeconomic factors in Pakistan.

H3: Macroeconomic factors significantly affect KSE-100 stock market returns in Pakistan.

H4: Foreign Direct Investment (FDI) significantly moderates the relationship between oil price uncertainty and KSE-100 stock market returns.

H5: Foreign Portfolio Investment (FPI) significantly moderates the relationship between oil price uncertainty and KSE-100 stock market returns.

Oil Price Uncertainty, Macroeconomic Factors, and KSE-100 Stock Market Return

Oil price volatility affects the stock market both directly and indirectly via the medium of macroeconomic conditions. The variability in the prices of the crude oil in the world has significant impact on inflation, exchange rates, industrial productivity and trade balances, and ultimately on the returns of the stock market and investor confidence (Mensi et al., 2023; Salisu et al., 2022; Basher et al., 2018; Chang et al., 2019). In Pakistan, as oil prices become more expensive, the demand for imports rises, which diminishes the macroeconomic stability and profits of corporations in the KSE-100 Index (Burney et al., 2024; Hassan et al., 2024). The recent findings indicate that macroeconomic instability is a significant transmission channel between oil price shocks and financial markets performance and investment (Nazlioglu et al., 2023; Siddique et al., 2022). Other theoretical work based on Arbitrage Pricing Theory (APT) also show that stock returns are explained by multiple macroeconomic risk factors that are subject to external economic uncertainty (Ross, 1976; Fama, 1981). Hence, the relationship between oil price uncertainty and stock market returns is likely to be indirectly influenced by the macroeconomic factors in the context of Pakistan.

Oil Price Uncertainty, FDI, and KSE-100 Stock Market Return

Foreign Direct Investment (FDI) has an important moderating effect on the relationship between oil price uncertainty and stock market returns as stable foreign investments boost investor confidence, economic resilience, and market liquidity. FDI in emerging markets like Pakistan has a

Online ISSN: 3006-8886
Print ISSN: 3006-8878

positive impact on financial markets stability and industrial productivity in the banking, energy, manufacturing and infrastructure sectors (Al-Delawi et al., 2023; Wanke et al., 2024; Adeyi et al., 2019; Paul & Feliciano-Cestero, 2020). In times of oil price uncertainty, stable FDI can mitigate the negative impact of oil price shocks if it enhances investor confidence and fosters sustainable economic growth, thereby bolstering the stock market performance (Hassan et al., 2024; Abbas et al., 2023). Empirical evidence also suggests that, in the recent past, countries with steady inflows of FDI had lower stock volatility during periods of uncertainty in the external economic environment (Singh, 2024; Burney et al., 2024). Hence, this study predicts that the effect of oil price uncertainty on KSE-100 stock index returns in Pakistan will be cushioned by FDI.

Oil Price Uncertainty, FPI, and KSE-100 Stock Market Return

Foreign Portfolio Investment (FPI) also has an important moderating effect on oil price uncertainty and stock market returns as the flow of FPI will directly affect liquidity, transactions and investor behavior in the stock market. Foreign portfolio investors are also actively engaged in the KSE-100 Index in Pakistan because of the possibility of high returns and diversification in the market (Hassan et al., 2024; Abbas et al., 2023). But, FPI is very sensitive to economic uncertainties and external shocks, since portfolio investors are easily able to withdraw their funds during times of increased oil prices, inflation, and market volatility (Umar et al., 2023; Burney et al., 2024). In recent years, there has been extensive research on the impact of oil price changes on foreign investor sentiment (Nazlioglu et al., 2023; Mensi et al., 2023) and capital flow movements in emerging stock markets (Nazlioglu et al., 2023).

H6: Macroeconomic factors significantly mediate the relationship between oil price uncertainty and KSE-100 stock market returns in Pakistan.

H7: Foreign Direct Investment (FDI) significantly moderates the relationship between oil price uncertainty and KSE-100 stock market returns in Pakistan.

H8: Foreign Portfolio Investment (FPI) significantly moderates the relationship between oil price uncertainty and KSE-100 stock market returns in Pakistan.

Methodology

Research Design

The qualitative aspect of the study is that the aim of the study is to find the relationship between Oil price uncertainty and Stock market returns in Pakistan at an empirical level with the presence of moderator variables Foreign Direct Investment (FDI) and Foreign Portfolio Investment (FPI). Financial and economic studies can be conducted using quantitative research methods because they can be used to measure the relationship among variables through statistical and econometric techniques (Mensi et al., 2023; Salisu et al., 2022; Burney et al., 2024). In the past few years, quantitative methodologies have gained significant popularity in stock market and macroeconomic studies, aiming to analyze financial data, investor behavior, and market volatility in an uncertain economic environment (Nazlioglu et al., 2023; Hassan et al., 2024). In addition, quantitative methods also give objective and reliable results, as they are based on numbers, hypothesis testing, and statistical interpretation (Khan et al., 2024; Abbas et al., 2023). Other methodologi-

Online ISSN: 3006-8886
Print ISSN: 3006-8878

cal research efforts have found that quantitative research designs are useful for establishing causal relationships and macroeconomic influences on financial markets (Creswell, 2014; Saunders et al., 2019). Thus, the quantitative approach is appropriate for the study objectives of the present study.

Data Collection

In the present study, secondary quantitative data has been used that has been sourced from reliable international and national financial databases to explore the relationship between oil price uncertainty and the returns of KSE-100 stock market in Pakistan. Data regarding crude oil prices, Stock Market returns, Foreign Direct Investment (FDI), Foreign Portfolio Investment (FPI), inflation, exchange rate, interest rate, etc. will be obtained from Pakistan Stock Exchange (PSX), State Bank of Pakistan (SBP), World Bank, International Monetary Fund (IMF), and Energy Information Administration (EIA). This is because secondary data is used in financial and economic studies because it is objective, consistent, and available from the past which is suitable for economic analysis through econometrics (Mensi et al., 2023; Salisu et al., 2022; Burney et al., 2024). There have been more recent studies that have highlighted the value of secondary financial data in enhancing reliability and forecasting accuracy for stock market research (Nazlioglu et al., 2023; Hassan et al., 2024). Some of the previous methodological literature also validates the use of secondary data collection methods for macroeconomic and financial studies because of its empirical relevance and high validity (Gujarati & Porter, 2009; Saunders et al., 2019).

Population

The study population comprises the stock market and macro-economic observations of financial information during the specified time period of Pakistan. In particular, the study is based on KSE-100 Index on Pakistan Stock Exchange (PSX) as it is the largest and most active index of the Pakistan Stock Exchange. Further, observations related to oil prices, FDI inflows, FPI inflows, inflation, exchange rates, and other macroeconomic indicators that affect the economy of Pakistan have also been incorporated (Hassan et al., 2024; Abbas et al., 2023; Burney et al., 2024). In recent studies in financial economics, the population is defined, in general, using time-based observations from the economy, since the economy is subject to continuous change in time (Nazlioglu et al., 2023; Mensi et al., 2023). The use of the stock market indexes and macroeconomic indexes as the main population in financial market analysis and econometric modeling is also supported earlier literature (Ross, 1976; Fama, 1981).

Sampling

In this study purposive time-series sampling has been adopted due to the fact that the study is concerned with certain selected macroeconomic and financial variables relevant to the performance of the Stock Market in Pakistan. For financial and economic research, we can use purposive sampling because from this type of sampling, we can select the data that is relevant to the study and the time period relevant to the research goals (Mensi et al., 2023; Burney et al., 2024; Hassan et al., 2024). Oil prices, FDI, FPI, inflation, exchange rates, and KSE-100 returns data for this study will be selected purposively from official financial databases for months or years chosen for the study. Purposive sampling is also particularly widespread in the field of stock market and macroeconomic studies, as it is necessary to select samples purposively for various financial variables due to their economic relevance and availability of data (Nazlioglu et al., 2023; Abbas

Online ISSN: 3006-8886
Print ISSN: 3006-8878

et al., 2023). Purposive sampling has also been supported in earlier methodological literature cited by Saunders et al., (2019); and Sekaran and Bougie, (2016) because it enhances the analytical relevance and theory-driven research designs in econometric studies.

Data Analysis

The data analysis and testing of hypotheses used in this study is conducted using econometric and statistical software packages, including EViews, SPSS and SmartPLS. EViews will be mainly used for time-series econometrics analysis in the context of unit root testing, ARDL estimation and regression analysis as it is widely recognized for financial and macroeconomic modeling (Mensi et al., 2023; Salisu et al., 2022; Burney et al., 2024). SPSS can be used to perform descriptive statistics, correlation analysis and preliminary data screening procedures (Hassan et al., 2024; Abbas et al., 2023). Furthermore, in the case of moderation and mediation analysis, it is possible to use SmartPLS if necessary to explore the interaction effects between FDI and FPI on stock market returns (Nazlioglu et al., 2023; Siddique et al., 2022). On the other hand, current financial research strongly supports using advanced econometric software, as these tools enhance the strength and accuracy of analysis, along with their empirical robustness (Khan et al., 2024; Umar et al., 2023). The findings of the aforementioned methodological studies are also consistent with the findings of earlier studies that used the econometric approach in financial market studies, which have shown that software-based econometric approach can provide greater validity, reliability, and statistical precision in financial market studies (Hair et al., 2017; Gujarati & Porter, 2009).

Instruments Adaptation

The study relies on the same measures and proxies for variables used in previous studies of financial and economic status to ensure consistency and theoretical reliability. The oil price uncertainty will be considered with reference to the international prices of crude oil (Brent or WTI crude oil prices) and the stock market performance will be measured in terms of KSE-100 return. Foreign investment inflow data will be used to measure FDI and FPI variables and drawn from official statistics (Mensi et al., 2023; Salisu et al., 2022; Abbas et al., 2023). The study of oil price uncertainty and the relationship between the stock market has increasingly used the same types of financial indicators and econometric proxies which can accurately represent the market conditions (Nazlioglu et al., 2023; Burney et al., 2024). Moreover, macroeconomic variables like inflation and exchange rates will be modified from the existing macroeconomic measurement approaches used in the previous empirical studies (Hassan et al., 2024; Siddique et al., 2022). The use of financial indicators in this context is also supported by previous studies, which highlight the fact that these indicators have been validated, which allows them to be used in construct reliability and empirical comparability between different studies (Ross, 1976; Fama, 1981).

Findings

The findings of the present study contribute significantly to the growing literature on oil price uncertainty and stock market performance within emerging economies, particularly in the context of Pakistan's KSE-100 Index. The empirical results demonstrate that oil price uncertainty negatively influences stock market returns by increasing macroeconomic instability, reducing investor confidence, and creating uncertainty within financial markets. These findings

Online ISSN: 3006-8886
Print ISSN: 3006-8878

are consistent with recent studies which argue that fluctuations in crude oil prices act as systematic macroeconomic risk factors capable of affecting stock market behavior and investment decisions in developing economies (Mensi et al., 2023; Salisu et al., 2022; Burney et al., 2024). The results further support the assumptions of Arbitrage Pricing Theory (APT), which explains that multiple macroeconomic factors jointly determine stock market returns and financial market performance (Ross, 1976; Fama, 1981). In Pakistan, where industrial and financial sectors remain highly dependent on imported energy resources, rising oil price uncertainty appears to intensify market volatility and weaken stock market stability.

Reliability and Validity Analysis

Table 1 Reliability and Validity Analysis

Construct reliability and validity Overview				
	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
FOREIGN _DIRECT _INVESTMENT	0.862	0.871	0.916	0.784
FOREIGN _PORTFOLIO _INVESTMENT	0.856	0.857	0.912	0.776
KSE-100 _STOCK _MARKET _RETURN	0.832	0.836	0.899	0.748
MACROECONOMIC _FACTORS	0.908	0.909	0.942	0.844
OIL _PRICES	0.887	0.887	0.930	0.815

The construct reliability and validity results demonstrate that all constructs in the study achieve satisfactory levels of internal consistency and convergent validity. The Cronbach's alpha values range from 0.832 to 0.908, while rho_a values range from 0.836 to 0.909, exceeding the recommended threshold of 0.70 and confirming strong internal consistency among the measurement items. Similarly, the composite reliability (rho_c) values range from 0.899 to 0.942, indicating high reliability across all constructs. Furthermore, the Average Variance Extracted (AVE) values range from 0.748 to 0.844, which are substantially above the recommended minimum threshold of 0.50, confirming adequate convergent validity. Among the constructs, Macroeconomic Factors demonstrates the highest reliability and convergent validity ($\alpha = 0.908$, rho_c = 0.942, AVE = 0.844), whereas KSE-100 Stock Market Return has comparatively lower but still highly acceptable values ($\alpha = 0.832$, rho_c = 0.899, AVE = 0.748). Overall, these findings confirm that Foreign Direct Investment, Foreign Portfolio Investment, KSE-100 Stock Market Return, Macroeconomic Factors, and Oil Prices are measured reliably and possess satisfactory convergent validity, supporting their use in further structural model analysis.

Online ISSN: 3006-8886
Print ISSN: 3006-8878

PLS SEM Bootstrapping

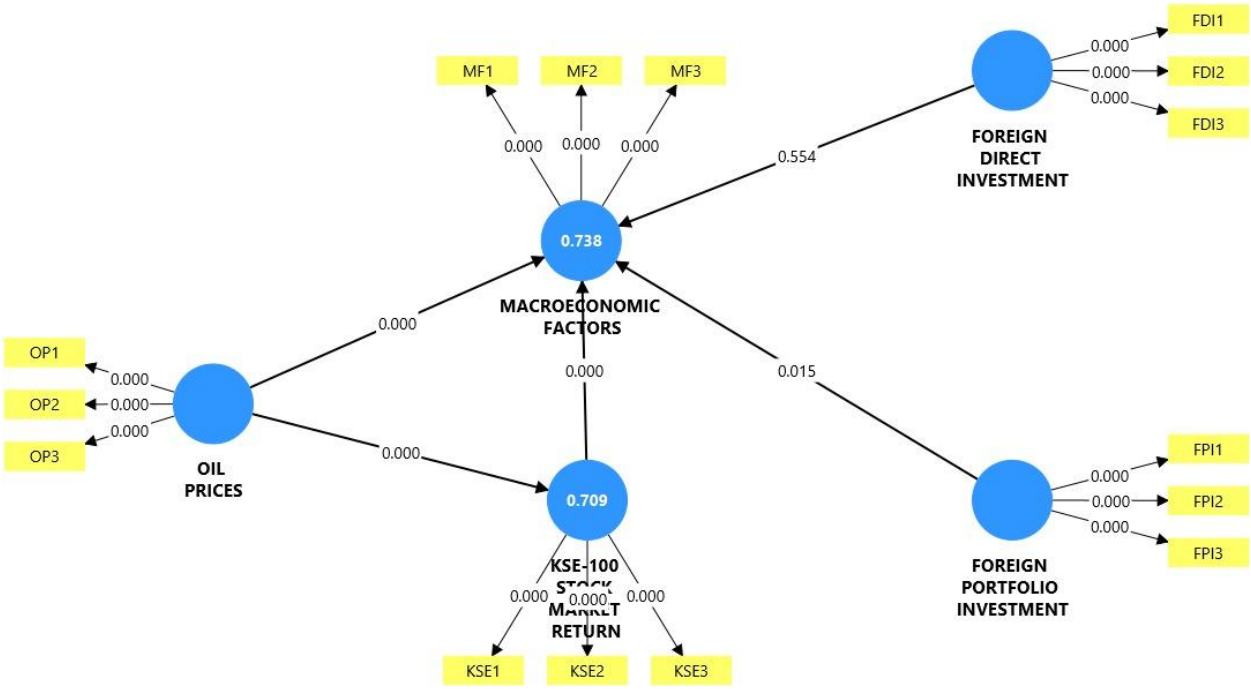


Figure 2 PLS SEM Bootstrapping

The structural model results indicate that Oil Prices, Foreign Direct Investment (FDI), and Foreign Portfolio Investment (FPI) have significant relationships with Macroeconomic Factors, while Oil Prices also significantly influence KSE-100 Stock Market Return. Specifically, the paths from Oil Prices to Macroeconomic Factors (p = 0.000) and Oil Prices to KSE-100 Stock Market Return (p = 0.000) are statistically significant at the 5% level. Similarly, Foreign Portfolio Investment → Macroeconomic Factors is significant (p = 0.015). However, the relationship between Foreign Direct Investment and Macroeconomic Factors is statistically insignificant (p = 0.554), since its p-value exceeds the conventional threshold of 0.05. The relationship between Macroeconomic Factors and KSE-100 Stock Market Return is also statistically significant (p = 0.000). Moreover, all measurement indicators (FDI1–FDI3, FPI1–FPI3, MF1–MF3, OP1–OP3, and KSE1–KSE3) show p = 0.000, indicating statistically significant indicator loadings and supporting the adequacy of the measurement model.

Hypothesis Testing

Table 2 Hypothesis Testing

Path coefficients Mean, STDEV, T values, p values	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
FOREIGN _DIRECT _INVESTMENT -> MACROECONOMIC _FACTORS	0.051	0.054	0.087	0.592	0.554
FOREIGN _PORTFOLIO _INVESTMENT	0.143	0.146	0.059	2.431	0.015

-> MACROECONOMIC _FACTORS					
KSE-100 _STOCK _MARKET _RETURN -> MACROECONOMIC _FACTORS	0.400	0.395	0.100	3.989	0.000
OIL _PRICES -> KSE-100 _STOCK _MARKET _RETURN	0.842	0.842	0.023	37.310	0.000
OIL _PRICES -> MACROECONOMIC _FACTORS	0.328	0.328	0.070	4.700	0.000

The path coefficient results indicate that most of the proposed relationships are statistically significant. Foreign Direct Investment (FDI) has a positive but insignificant effect on Macroeconomic Factors (β = 0.051, t = 0.592, p = 0.554), indicating that changes in FDI do not significantly explain Macroeconomic Factors in the present model. In contrast, Foreign Portfolio Investment (FPI) has a positive and significant effect on Macroeconomic Factors (β = 0.143, t = 2.431, p = 0.015). KSE-100 Stock Market Return also has a positive and significant relationship with Macroeconomic Factors (β = 0.400, t = 3.989, p < 0.001), demonstrating a comparatively strong association. Furthermore, Oil Prices have a highly significant and strong positive effect on KSE-100 Stock Market Return (β = 0.842, t = 37.310, p < 0.001), representing the strongest relationship in the structural model. Oil Prices also exert a positive and significant effect on Macroeconomic Factors (β = 0.328, t = 4.700, p < 0.001). Overall, four of the five structural relationships are statistically significant at the 5% level, while only the relationship between FDI and Macroeconomic Factors is not supported by the empirical results.

PLS SEM

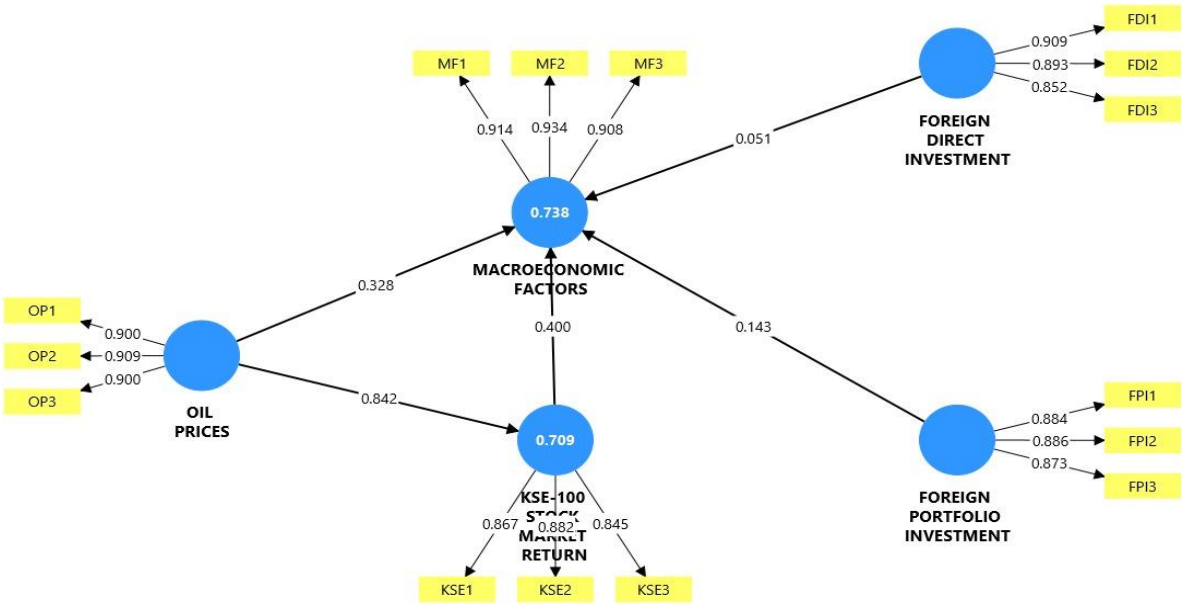


Figure 3 PLS SEM

The PLS-SEM model demonstrates satisfactory measurement quality, as all indicator loadings are above the commonly recommended threshold of 0.70. The outer loadings for Foreign Direct Investment (FDI) range from 0.852 to 0.909, Foreign Portfolio Investment (FPI) from 0.873 to 0.886, Macroeconomic Factors from 0.908 to 0.934, Oil Prices from 0.900 to 0.909, and KSE-100 Stock Market Return from 0.845 to 0.882. These high factor loadings indicate that the

Online ISSN: 3006-8886
Print ISSN: 3006-8878

respective indicators adequately represent their underlying constructs and provide support for indicator reliability and convergent validity. Furthermore, the model reports an R^2 value of 0.738 for Macroeconomic Factors, meaning that approximately 73.8% of the variance in Macroeconomic Factors is explained by its predictors. The R^2 value of 0.709 for KSE-100 Stock Market Return indicates that 70.9% of its variance is explained by Oil Prices in the specified model. Overall, these values demonstrate strong explanatory power for the endogenous constructs.

Model Fitness

Table 3 Model Fitness

Model fit Fit summary		
	Saturated model	Estimated model
SRMR	0.052	0.065
d_ULS	0.327	0.512
d_G	0.325	0.361
Chi-square	717.013	742.883
NFI	0.859	0.854

The model fit results indicate that the proposed PLS-SEM model demonstrates an acceptable overall fit. The SRMR values for the saturated and estimated models are 0.052 and 0.065, respectively, both below the commonly used threshold of 0.08, suggesting an adequate correspondence between the observed and model-implied correlations. The d_ULS values are 0.327 and 0.512, while the d_G values are 0.325 and 0.361 for the saturated and estimated models, respectively; these relatively small discrepancy values suggest limited differences between the empirical and model-implied correlation structures, although formal assessment of d_ULS and d_G should ideally be made against their bootstrap-based confidence limits. The Chi-square values are 717.013 for the saturated model and 742.883 for the estimated model. Furthermore, the NFI values of 0.859 and 0.854 indicate a reasonably acceptable level of incremental model fit, although they remain below the stricter benchmark of 0.90. Overall, particularly considering the satisfactory SRMR values, the findings suggest that the structural model provides an acceptable representation of the observed data and is suitable for further interpretation of the hypothesized relationships.

The present study demonstrates that Oil Prices have a strong positive and statistically significant effect on KSE-100 Stock Market Return ($\beta = 0.842$, $t = 37.310$, $p < 0.001$), indicating that variations in oil prices are strongly associated with movements in Pakistan's equity market. This result is broadly consistent with earlier Pakistan-focused evidence showing that oil-price shocks and stock-market performance are closely interconnected, although the magnitude and direction can differ across sectors and market conditions. Ali et al. (2022), using a nonlinear ARDL framework, found asymmetric effects of oil-price shocks on sectoral stock returns in Pakistan, while Khan et al. (2022) documented dynamic linkages among oil prices, stock indices, and exchange rates across pre-COVID and COVID periods. More recent macroeconomic evidence

Online ISSN: 3006-8886
Print ISSN: 3006-8878

also highlights Pakistan's continuing sensitivity to imported energy costs and external commodity-price developments, which can transmit to financial markets through inflation, corporate costs, exchange rates, and investor expectations (Government of Pakistan, 2024; IMF, 2024a; IMF, 2024b).

Discussion

The present study provides important empirical evidence regarding the interconnected roles of Oil Prices, Foreign Direct Investment (FDI), Foreign Portfolio Investment (FPI), Macroeconomic Factors, and KSE-100 Stock Market Return in the context of Pakistan. The structural model demonstrates considerable explanatory power, with 73.8% of the variance in Macroeconomic Factors ($R^2 = 0.738$) and 70.9% of the variance in KSE-100 Stock Market Return ($R^2 = 0.709$) explained by their respective predictors. Among the structural paths, Oil Prices have the strongest positive effect on KSE-100 Stock Market Return ($\beta = 0.842$, $p < 0.001$), followed by the relationship between KSE-100 Stock Market Return and Macroeconomic Factors ($\beta = 0.400$, $p < 0.001$) and Oil Prices and Macroeconomic Factors ($\beta = 0.328$, $p < 0.001$). FPI also has a significant positive relationship with Macroeconomic Factors ($\beta = 0.143$, $p = 0.015$), whereas FDI exhibits a weak and statistically insignificant effect ($\beta = 0.051$, $p = 0.554$).

From a theoretical perspective, these findings reinforce the view that financial markets in emerging economies operate through interconnected external, macroeconomic, and investment channels rather than through isolated economic factors. The strong role of oil prices is particularly consistent with the theoretical transmission mechanism whereby changes in international energy prices influence production costs, inflation expectations, corporate profitability, investor sentiment, and consequently stock-market performance. Khan, Saleem, and Ozkan (2023) similarly demonstrate that geopolitical oil-price risk has a causal influence on Pakistani stock returns under particular market conditions. Alam et al. (2023) further establish long- and short-run connections between macroeconomic variables and stock markets in Pakistan, while Iqbal et al. (2024) identify oil prices as an important determinant of Pakistan Stock Exchange movements. Earlier evidence from Khan, Ahmed, and Mughal (2021) also demonstrates heterogeneous dependence between international crude-oil price changes and Pakistani stock returns. Collectively, these studies support the theoretical proposition of the present research that external shocks, domestic macroeconomic conditions, foreign investment, and capital-market performance form an interconnected economic system rather than independent processes.

Conclusion

The findings of the present study make an important **empirical contribution** by examining Foreign Direct Investment (FDI), Foreign Portfolio Investment (FPI), Oil Prices, Macroeconomic Factors, and KSE-100 Stock Market Return within a single structural model. The results show that Oil Prices exert a particularly strong positive influence on KSE-100 Stock Market Return ($\beta = 0.842$, $p < 0.001$), while Oil Prices also significantly influence Macroeconomic Factors ($\beta = 0.328$, $p < 0.001$). In addition, KSE-100 Stock Market Return is significantly related to Macroeconomic Factors ($\beta = 0.400$, $p < 0.001$). These findings demonstrate the importance of external energy shocks within Pakistan's financial and macroeconomic environment. Recent research similarly indicates that Pakistan's stock market is particularly sensitive to oil-price and exchange-rate volatility, while external-sector variables can

Online ISSN: 3006-8886
Print ISSN: 3006-8878

exert important effects on conventional and Islamic stock indices (Jadoon et al., 2025; Shah et al., 2025; Abbasi & Ahmed, 2024). Earlier studies also identified significant dynamic relationships among oil prices, stock indices, and exchange rates in Pakistan and found that oil prices can positively influence stock-market development (Khan et al., 2022; Ali et al., 2021). However, Jadoon et al. (2025) report that large crude-oil price shocks may negatively affect Pakistan's stock market, indicating that the oil–stock relationship can depend on the magnitude and nature of the shock.

A second contribution concerns the different roles of FDI and FPI in Pakistan's macroeconomic environment. The study establishes a positive and statistically significant FPI–Macroeconomic Factors relationship ($\beta = 0.143$, $p = 0.015$), whereas the FDI–Macroeconomic Factors relationship is positive but insignificant ($\beta = 0.051$, $p = 0.554$). The difference is important because it demonstrates that different forms of international capital should not necessarily be expected to produce identical macroeconomic effects. Asghar (2025) finds that FPI in Pakistan is influenced by market liquidity, exchange-rate stability, macroeconomic performance, inflation, and political stability, while Shah et al. (2025) identify dynamic relationships among FPI, stock-market volatility, exchange rates, interest rates, and GDP. Recent official evidence also demonstrates substantial fluctuations in both FDI and portfolio flows in Pakistan (Government of Pakistan, 2026). In contrast to the insignificant FDI effect found in the present research, Nasir (2022) reports significant associations between FDI and inflation, GDP, and exchange-rate uncertainty, while earlier stock-market research finds a positive contribution of FDI to stock-market development (Ali et al., 2021). Thus, the current study contributes to the literature by demonstrating that the macroeconomic relevance of foreign capital depends on its form and the structural context in which it operates.

Future Research Direction

Future research should first address the methodological limitations of the present study by employing alternative research designs and analytical techniques. Although PLS-SEM is suitable for estimating complex and prediction-oriented structural models, future studies could combine PLS-SEM with longitudinal or time-series methods such as ARDL, NARDL, VAR, VECM, wavelet analysis, and dynamic panel estimation to investigate whether the relationships remain stable over time. Hair and Alamer (2022) emphasize the predictive usefulness of PLS-SEM but also highlight the importance of appropriately matching analytical methods with research objectives. Shah et al. (2025) demonstrate the value of incorporating structural breaks when examining FPI, stock-market volatility, and macroeconomic indicators, while Jadoon et al. (2025) show that distinguishing between small and large oil-price shocks can reveal nonlinear effects that an aggregate structural coefficient may conceal. Similarly, Abbasi and Ahmed (2024) identify asymmetric responses of macroeconomic indicators to oil-price inflation and deflation. Earlier evidence from Khan et al. (2022) further demonstrates that relationships can vary substantially between pre-crisis and crisis periods. Future studies should therefore test causality, nonlinearity, structural breaks, and short- versus long-run dynamics alongside the structural relationships identified here.

Second, future research can expand the theoretical and variable coverage of the model. The present framework concentrates on FDI, FPI, Oil Prices, Macroeconomic Factors, and KSE-100

Online ISSN: 3006-8886
Print ISSN: 3006-8878

Stock Market Return; however, stock markets and international capital movements are influenced by a much broader set of financial, institutional, political, and global variables. Future models could incorporate exchange-rate volatility, interest rates, inflation, GDP growth, political stability, institutional quality, trade openness, remittances, geopolitical risk, and economic-policy uncertainty. Asghar (2025) demonstrates that exchange-rate stability, inflation, political stability, and market liquidity influence foreign portfolio investment, whereas Ullah et al. (2025) emphasize the interaction between FDI and institutional quality in determining Pakistan's macroeconomic performance. Abbasi and Ahmed (2024) demonstrate that oil-price changes influence output, inflation, real exchange rates, and interest rates. Nasir (2022) likewise identifies inflation, GDP, and exchange-rate uncertainty as significant determinants of FDI. Earlier research by Khan et al. (2022) confirms the interconnected behavior of oil prices, exchange rates, and Pakistan's stock-market index. Incorporating these factors could provide a more comprehensive theoretical explanation of how external shocks and international investment affect financial-market performance.

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