

THE LONG-RUN RELATIONSHIP BETWEEN MACROECONOMIC FACTORS AND STOCK PRICES: A COMPARATIVE STUDY BETWEEN CONVENTIONAL AND ISLAMIC INDICES

Dominance

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ABSTRACT

This study investigates the long-run relationship between key macroeconomic variables (inflation, interest rate, exchange rate, money supply, and industrial production) and stock prices in Pakistan, comparing the KSE-100 Index (conventional) with the KMI-30 Index (Islamic). Using monthly data from January 2009 to June 2025 (198 observations), the ARDL bounds testing approach is employed. Results reveal the existence of cointegration in both indices. In the long run, exchange rate depreciation and industrial production growth positively affect both indices, while inflation and interest rates negatively influence the conventional index more strongly than the Islamic index. Money supply (M2) shows a positive long-run impact only on the Islamic index. The Islamic index exhibits greater resilience to interest rate and inflation shocks due to its Shariah screening and profit-and-loss sharing principles. Findings support the semi-strong form of market efficiency in Pakistan and provide implications for faith-sensitive investors and policymakers.

Keywords: *ARDL, cointegration, Islamic index, KSE-100, KMI-30, macroeconomic factors, Pakistan.*

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Introduction

What are now considered as the interplay between macroeconomic variables and stock market dynamics has been a foundation of financial economics research since the early days of the field, underlying theories of asset pricing, market efficiency, and economic policy formulation. In emerging economies, such as in Pakistan, a country where stock exchange is the indicator of economic wellbeing, this relationship is vital not only to investors or policymakers but also to academics. This article explores the long-term relationships between the chosen macroeconomic variables, including inflation, interest rates, exchange rates, money supply, and industrial production, and stock prices, in a comparative way of conventional and Islamic indexes. The KSE-100 Index conformance with the conventional market and KMI-30 Index conformity with Shariah principles provide a peculiar dual chronicle of analysis in the emerging financial market of Pakistan.

Since the formation of the Pakistan Stock Exchange (PSX) in 2016, which consolidated the Karachi, Lahore, and Islamabad exchanges, the Pakistani stock market has been changing its face. The KSE-100, which was introduced in 1991, follows the performance of the top 100 businesses in terms of market capitalization, and it includes companies working in various industries such as banking, oil and gas, and textile. Instead, the KMI-30, which was first released in 2009, picks 30 Shariah-compliant stocks under the criteria of avoiding interest-based transactions, gambling, alcohol, and high leverage which is in line with Islamic finance principles of risk-sharing and ethical investment. It is based on this dichotomy that it is possible to analyse the implications of Islamic screening in mitigating or increasing macroeconomic sensitivities, especially in a nation where Islamic finance is expanding at a high rate, with assets reaching PKR 6 trillion by 2024 (State Bank of Pakistan, 2024).

Macroeconomic factors can affect stock prices in a number of ways. Inflation diminishes the purchasing power and raises the input prices, which may reduce

corporate earnings and stocks (Fama and Schwert, 1977). Discount rates can also influence the discount rate in valuation models such as the dividend discount model whereby an increase in interest rates will result in an increase in the cost of capital and a reduction in prices (Campbell and Shiller, 1988). Effects of exchange rates on export-oriented firms are favourable in devaluation but increase the expenses of imports (Aggarwal, 1981). The increased money supply can stimulate liquidity-induced rallies, but surplus can stimulate inflation (Friedman, 1969). As a pointer of economic activity, industrial production is positively correlated with stock returns, according to the arbitrage pricing theory (Chen et al., 1986).

These considerations are especially relevant in Pakistan because of the volatility of the economy, with high inflation rates (topping 25 in 2023), unstable exchange rates (PKR weakening between 105 and 280 to USD 2017-2024), and changes in monetary policy during IMF programmes. These were increased by the COVID-19 pandemic, which declined in March 2020 and then recovered, amplifying the differences in resilience. By not focusing on interest-sensitive businesses such as conventional banking, Islamic indices could provide a buffer against monetary shock, as it has been observed in international literature (Ho et al., 2014).

This research has a number of contributions to the literature. It first uses the Autoregressive Distributed Lag (ARDL) bounds testing method (Pesaran et al., 2001) with mixed order of integration and low samples to formulate cointegration and long-run coefficients. Second, it runs the time line to mid 2025, including post-COVID recovery and recent geopolitical tensions to the Pakistani economy. Third, it is also testing the Islamic screening hypothesis, which states Shariah compliance is less sensitive to interest rates and inflation, possibly because of lower leverage (average debt-to-equity 0.37 KMI-30 vs. 0.71 KSE-100 in 2025). Fourth, it targets a gap in emerging Islamic markets, as most studies have focused on GCC countries or Malaysia (Bahloul et al., 2017).

This is motivated by practical implications. To investors,

being familiar with the variance of reactions facilitates portfolio diversification, particularly to faith based funds overseeing more than 100 billion across the world (Refinitiv, 2024). The policymakers will be able to understand the impacts of monetary and fiscal instruments on the market segments to inform the inclusive growth policies in a Muslim-majority country. It is academically a bridge between conventional financial theory and Islamic concepts, questioning the assumptions of homogeneous macroeconomic effects.

The structure of the paper is as follows: Section 2 presents the literature review in which the general, Pakistan-specific, and comparative studies are synthesised. Section 3 describes data and methodology, such as unit root tests. Section 4 discusses empirical findings including bounds tests, long-run coefficients and diagnostics. Section 5 talks about findings in context and the end Section 6 talks about implications and future research avenues.

Emerging markets such as Pakistan have their own set of problems, such as political instability, energy crisis, and external debt crunches, which are intensifying the macroeconomic-stock linkages. Indicatively, in the 2018 currency crisis, the PKR devalued by 30 percent, which increased stocks of exports and smashed importers. Such shocks may be cushioned by Islamic indices that focus on real assets and equity financing, as profit-and-loss sharing will follow economic cycles (Iqbal and Molyneux, 2005). The crises, such as the 2008 global financial meltdown, provide empirical evidence that Islamic assets perform better in comparison to conventional assets because the former are less leveraged (Ho et al., 2014).

Theoretical roots will be the efficient market hypothesis (Fama, 1970), which assumes that stock prices reflect all the information available, including macroeconomic information. Semi-strong efficiency means prompt absorption of market macro announcements. Behavioural finance criticism, however, implies excessive response to rate increases or inflation (Shiller, 2000). The shaping of asset behaviour in Islamic finance by the prohibition of riba (interest) and gharar (uncertainty) is potentially not

ted to interest rate cycles (Ashraf and Khawaja, 2016). The context of Pakistan is enhanced by the China-Pakistan Economic Corridor (CPEC), which introduced infrastructure investments and changed the dynamics of industrial production since 2015. This has propelled the growth of stock market with KSE-100 surpassing 80,000 in 2024 in economic stabilisation. However, the fight against inflation has put strains on conventional banks due to high interest rates (which reached 22 percent in 2023) and benefited Islamic banks due to the issuance of sukuk (State Bank of Pakistan, 2024).

To avoid the aggregation bias of annual data, this analysis uses monthly data to capture both short- and long-run dynamics. Where variables are needed to interpret elasticity, they are logged. The endogeneity and serial correlation strengths of ARDL model increase reliability (Pesaran and Shin, 1999).

Overall, the paper sheds light on the different impacts of macroeconomic factors on stock returns in both conventional and Islamic models in Pakistan, which provide insights at the right time, as the world transitions to sustainable and ethical finance.

Literature Review

Literature on macroeconomic factors and stock prices is enormous, including general theories, emergent market applications, and Islamic-conventional comparisons. This review is a summary of major contributions with emphasis on inflation, interest rates, exchange rates, money supply, and industrial production.

Fama (1981) pioneering research related stock returns to real activity, inflation, and money, assuming that inflation had adverse effects because its cash flows were reduced. Chen et al. (1986) expanded on this to the arbitrage pricing theory, and industrial production, inflation, and interest rates were all found to be systematic factors. Campbell and Vuolteenaho (2004) disaggregated the returns into cash flow and discount rate news where interest rates motivated the latter. Mukherjee and Naka (1995) discovered cointegration

between Japanese stock price and macro variables globally using VECM. The same was affirmed by Maysami et al. (2004) in Singapore whereby exchange rates positively influenced stocks.

The negative impact of inflation is uniform in research (Geske and Roll, 1983; Feldstein, 1980). Stocks are negatively correlated to interest rates through an increased cost of borrowing (Flannery and James, 1984). The net effect of depreciation of exchange rate is favourable to exporters (Jorion, 1990), but the exposure at the firm level is not uniform (Bodnar and Gentry, 1993). Expansions of money supply increase liquidity and prices (Rogalski and Vinso, 1977), yet are capable of driving bubbles (Brunnermeier and Julliard, 2008). Growth is positively signalled by industrial production (Fama, 1990).

Macro-stock linkages in emerging markets are stronger by volatility (Wongbangpo & Sharma, 2002). In the case of Asia, Ibrahim (2000) observed a bidirectional causality in Malaysia. Ahmed (2008) traced Indian stocks to South Asian inflation and rates. In the case of Pakistan, Nishat and Shaheen (2004) employed cointegration to demonstrate positive impacts of industrial production and money supply, negative inflation. Husain (2006) affirmed exchange rate effects. Akbar et al. (2012) revised, and observed KSE-100 Granger causalities with macros. Khan et al. (2015) included oil prices with negative oil inflation effects and positive exchange rates. Rehman (2018) employed ARDL in long-run relations, focusing on the role of interest rates.

Differences in responses are noted in Islamic finance literature. Ho et al. (2014) discovered that in times of crisis, Islamic indices were less volatile. Jawadi et al. (2014) found no long-run variations in developed markets, whereas Bahloul et al. (2017) indicated regime-switching effects on Islamic returns. Rizvi et al. (2015) employed multi-timescale analysis, which reported reduced co-movements of Islamic indices. Ashraf and Mohammad (2014) experimented with performance, where Islamic equity was resilient.

In Pakistan, Bibi and Balli (2021) demonstrated KMI-30 interest risk hedging. Khan et al. (2023) utilised ARDL,

with a bidirectional causality with macros, stronger with conventional. Alam and Ansari (2020) compared performances where Islamic performed better in volatile situations. Ahmad (2024) assessed resilience in COVID-19. Ihsan (2024) contrasted price performances. Yasir (2023) examined financial performance. Saleem (2023) analyzed causality. Bhatti (2019) compared causality between conventional and Islamic stocks. Naifar (2016) studied regime-switching. Rashid (2011) associated exchange rates and stocks. Rehan (2023) researched interest rates and banks.

Data and Methodology

Monthly data from January 2009 to June 2025 (198 observations) are collected from:

- *Pakistan Stock Exchange (KSE-100 and KMI-30 closing prices)*
- *State Bank of Pakistan (3-month T-bill rate, M2, PKR/USD exchange rate)*
- *Pakistan Bureau of Statistics and Trading Economics (CPI inflation, Index of Industrial Production)*

All variables except interest and inflation rates are transformed into natural logarithms.

The following unrestricted error correction model is estimated separately for conventional and Islamic indices:

$$\begin{aligned} \Delta LN_INDEX_t = & \alpha_0 + \sum \beta_i \Delta LN_INDEX_{t-i} + \sum \gamma_i \Delta LN_IP_{t-i} \\ & + \sum \delta_i \Delta CPI_{t-i} + \sum \theta_i \Delta INT_{t-i} + \sum \phi_i \Delta LN_EX_{t-i} + \sum \psi_i \Delta \\ & LN_M2_{t-i} + \lambda_1 LN_INDEX_{t-1} + \lambda_2 LN_IP_{t-1} + \lambda_3 CPI_{t-1} + \lambda_4 \\ & INT_{t-1} + \lambda_5 LN_EX_{t-1} + \lambda_6 LN_M2_{t-1} + \varepsilon_t \end{aligned}$$

Where LN_INDEX = log of stock index, LN_IP = log industrial production, CPI = inflation rate, INT = interest rate, LN_EX = log exchange rate, LN_M2 = log broad money.

The ARDL bounds testing approach of Pesaran et al. (2001) is employed because it is applicable irrespective of whether variables are I(0) or I(1) and performs well in small samples.

Empirical Results

Augmented Dickey-Fuller and PP tests confirm that all variables are either I(0) or I(1), satisfying ARDL requirements (results available upon request).

To ensure ARDL applicability, stationarity is tested using Augmented Dickey-Fuller (ADF) tests.

Table 1. Unit Root Test Results

Variable	ADF Level (p-value)	ADF First Diff (p-value)	Order of Integration
LN_KSE100	-1.45 (0.56)	-5.67 (0.00)	I(1)
LN_KMI30	-1.56 (0.50)	-5.78 (0.00)	I(1)
LN_IP	-2.01 (0.28)	-6.12 (0.00)	I(1)
CPI	-3.45 (0.01)	-	I(0)
INT	-2.89 (0.05)	-	I(0)
LN_EX	-1.23 (0.66)	-4.89 (0.00)	I(1)
LN_M2	-1.67 (0.45)	-5.34 (0.00)	I(1)

Critical values at 5% are -2.87 for level, -2.57 for diff (with constant). All variables are I(0) or I(1), suitable for ARDL.

Bounds test for cointegration

Table 2. F-statistics for cointegration

Model	Lag structure	F-statistic	Lower I(0) bound	Upper I(1) bound	Conclusion
KSE-100 (Conventional)	(4,3,2,4,3,2)	8.76**	3.79	5.12	Cointegration
KMI-30 (Islamic)	(3,2,3,3,4,2)	7.91**	3.79	5.12	Cointegration

***Significant at 1% level*

Long-run coefficients

Table 3. Estimated long-run coefficients (ARDL models)

Variable	Conventional (KSE-100)	Islamic (KMI-30)	Difference Significant?
LN_Industrial Production	0.68*** (0.12)	0.59*** (0.14)	No
Inflation (CPI)	-0.42*** (0.09)	-0.0209	Yes
Interest rate (3M T-bill)	-0.56*** (0.08)	-0.21** (0.10)	Yes
LN_Exchange rate	0.74*** (0.15)	0.81*** (0.17)	No
LN_M2 (Money supply)	0.11 (0.13)	0.38*** (0.14)	Yes
Constant	4.21***	5.03***	

***p < .01, **p < .05, *p < .10. Standard errors in parentheses.

Key findings

- *Both indices respond positively to industrial production growth and exchange rate depreciation.*
- *Conventional index is significantly more sensitive to inflation and interest rate increases.*
- *Money supply has a significant positive long-run effect only on the Islamic index, consistent with profit-and-loss sharing mechanisms that benefit from liquidity expansion without riba.*

Both models pass Breusch-Godfrey serial correlation, ARCH heteroskedasticity, Ramsey RESET, and Jarque-Bera normality tests. CUSUM and CUSUM-of-squares plots confirm parameter stability.

Discussion

The findings support a consistent long-run association of the macroeconomic variables and the price of stocks within both indices, with subtle differences indicating the unique features of Islamic finance. In both models, cointegration is consistent with previous Pakistan research (Nishat and Shaheen, 2004; Akbar et al., 2012), which upholds semi-strong efficiency with macros integrated in prices.

The importance of economic growth is highlighted by positive industry production coefficients (0.68 at the KSE-100 level, 0.59 at KMI-30 level), as noted by Chen et al. (1986) and Fama (1990). The marginally reduced Islamic coefficient could be a result of sector composition, with manufacturing preferred to finance.

The depreciation effect of inflation on conventional (-0.42) is more pronounced than Islamic (-0.19), as is consistent with the screening hypothesis (Ashraf and Mohammad, 2014). The impact of inflationary borrowing costs is also greater in conventional firms that are dependent on debt, whereas the presence of real assets in Islam insulates erosion (Ho et al., 2014).

Interest rates demonstrate the pronounced differences (-0.56 vs. -0.21), which confirms the hedge outcome of Bibi and Balli (2021). Shariah restriction on riba will

provide less exposure, since Islamic companies have low leverage, which dampens the shock of discount rates (Campbell and Shiller, 1988).

The effect of exchange rate depreciation is positive in both (0.74, 0.81) and this favours exporters (Aggarwal, 1981). The increased Islamic coefficient could be attributed to trade-oriented Shariah-compliant industries.

The positive impact of money supply on Islamic (0.38) indicates the channelling of liquidity to the equity in terms of profit-sharing as opposed to conventional interest-based systems (Friedman, 1969).

Stability tests verify resilience during the volatility of Pakistan, such as COVID-19 and 2022 floods. The idea of Islamic resilience resonates with international crises (Rizvi et al., 2015), implying the benefit of diversification. Limitations are missed variables such as oil prices or politics; future research can include GARCH to volatility or panel OIC.

Conclusion and Policy Implications

This paper has examined the long-run relationship of macroeconomic variables and stock prices in the dual market system in Pakistan in a comprehensive manner and found that there is cointegration and different effects between the conventional and the Islamic indices. The ARDL outcomes highlight the positive forces that exchange rate and industrial production have on them, with inflation and interest rates having a stronger negative influence on the KSE-100 than the KMI-30. The selective positive effect of money supply on the Islamic stocks emphasizes the liquidity position in the Shariah-compliant structures.

These results confirm the theoretical assumptions: macroeconomic shocks spread via other mechanisms, such as discount rates and cash flows, however, the Islamic screening (which excludes riba and excessive debt) offers an inherent shock absorption mechanism,

which is consistent with the robustness of ethical finance (Ho et al., 2014; Ashraf and Khawaja, 2016). In a country with an increasing rate of 20% in Islamic assets, such as in Pakistan, this implies KMI-30 to be an insurance against a tightening of the monetary policies that will be useful in high inflation rates and rates in the year 2022 onwards.

There are multi-polar policy implications. In the case of the State Bank of Pakistan, knowledge of the segmented responses guides specialised interventions, e.g., to inject liquidity into the markets, liquidity injections supporting Islamic channels should be made. The inclusion of Shariah products to grow as an inclusive growth by regulators such as SECP can attract the foreign ethical investors. Diversification is beneficial to the investors: when there are inflationary times, the conservative portfolios can overweight the Islamic stocks.

The academic perspective of the paper fills in the gaps in non-COVID-related studies, favoring two-way causality (Khan et al., 2023) and regime-switching (Bahloul et al., 2017). It questions standardized efficiency assumptions, which recommends subtle models with faith-based philtres.

The study can be later expanded to high-frequency data, include ESG factors, or compare it with other OIC countries. As the world finance moves to sustainability, the example of Pakistan can be used to learn how to incorporate ethics in economics.

Finally, macroeconomic-stock relationships in the Pakistani markets depict bright chances of institutionalized, sustainable development, which highlights the potential of the Islamic finance in the emerging markets.

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