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Research Article

OIL PRICE FLUCTUATIONS AND ITS IMPACT ON BALANCE OF PAYMENT: EVIDENCE FROM PAKISTAN

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Abstract

The objectives of this this study is to investigate the relationship between oil prices, money supply, inflation rate, exports, real exchange rate and balance of payment of Pakistan using 40 years' time series data sourced from World Bank's World Development Indicators and International Monetary Fund. Balance of payment served as dependent variable while money supply, foreign direct investment, inflation rate, exports and real exchange rate acted as independent variables. The study used econometric techniques such as Correlation Matrix, ARDL and Error Correction Models to estimate short-and-long-term relationship between variables. The findings of ARDL Model reveal that foreign direct investment, and exports exert positive impact on the balance of payments, while money supply, inflation rate, real effective exchange rate, and oil prices adversely influence it, suggesting controlling these variables to keep the balance of payment favorable.

Keywords: Balance of payment; Oil price; Inflation Rate; Real Effective Exchange Rate; Money supply; Foreign Direct Investment.

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1.Introduction

1.1 Balance of Payment

The balance of payments refers to a proper record of all economic transactions between a country's residents and the rest of the world during a specified period, functioning as a crucial economic indicator that highlights a country's external financial position (Yang, Zhang, Xiang & Yang, 2023). Yang et al. (2023) argue that that traditional method for dividing BOP stages were not correct and that determinants such as resource endowment, industrial set-up, and financial growth play critical roles in determining a country's balance of payment, which is consists of three main components: the current account, which consists of trade in goods and services, investment income, and transfers; the capital account, which records ownership transfers of non-financial assets; and the financial account, which documents cross-border investment flows and financial assets (Sultani & Faisal, 2024). Recent study of Sultani and Faisal (2024) reveal that GDP growth exerts positive long-run impacts on balance of payments, while public spending has negative impacts. It indicates how fiscal policy impacts trade balance. Khan (2023) concludes that monetary policy alone cannot rectify balance of payments issue because domestic interest rates, domestic credit and exchange rates show negative link with net foreign assets in developing countries. It suggests that Central banks should coordinate monetary tools with other policy instruments to achieve sustainable BOP stability. The theoretical framework developed by Yang et al. (2023) emphasizes that income gaps persist not only across different BOP stages but also within them, specifically at primary stages, revealing that conventional mechanism may obscure important heterogeneities among economies at similar development levels.

1.2 Oil prices and balance of payment (BOP)

Oil-importing countries such as Pakistan face severe macroeconomic vulnerability to global oil price volatility, with transmission effects permeating through trade balances, inflation, and economic growth. Recent empirical analysis by Abbasi & Shaikh 2024; Azhar & Awan (2021) confirms that during fiscal years 2021-22 and 2022-23, Pakistan spent over 50 percent of its export earnings on crude oil and petroleum products imports, severely straining the balance of payments and necessitating external borrowing while triggering currency devaluation and inflationary spikes. The findings of Abbasi & Sheikh (2024) based on Vector autoregressive modeling of quarterly data from 1961-2022 corroborates that oil price shocks exert a significant negative impact on GDP and investment, while simultaneously having positive impact on inflation through both supply-side cost-push mechanisms and exchange rate depreciation channels. The supply-side effects manifest through rising production costs that reduce profit margins, prompting firms to defer investment plans, cut wage bills, and reduce output. However, Pakistan shows partial resilience attributable to remittance inflows received from about ten million overseas Pakistan working in the Gulf countries (Gul & Awan, 2017). This stabilizing effect is supported by fuel subsidies that partially shield domestic consumers from global price spiral, though such practices strain fiscal space. Empirical analysis by Aslam & Awan, (2018). emphasizes asymmetric dynamics, whereby high oil prices generate larger short-term multipliers than deflationary effects, and suggests strategic diversification toward renewable projects, and electric vehicle adoption to reduce long-term import dependency.

1.3 Inflation rate and BOP

The persistent high inflation rate exerts pressure on balance of payments of Pakistan. High inflation erodes the exports' competitiveness, making them in-competitive in Global markets, while simultaneously making imports cheaper, thereby widening the trade deficit. The current account deficit demands higher foreign exchange reserves for financing imports, exerting downward pressure on the Pak rupee and escalating external debt servicing costs. Recent studies substantiate this dynamic. The State Bank of Pakistan's "Annual Report 2022-23" clearly links inflation to a loss of export competitiveness and a surge in import bills, emphasizing its adverse impact on the current account. Moreover, a working paper of the Pakistan Institute of Development Economics (PIDE, 2023) on "Inflation and External Stability" proves that inflationary shocks significantly worsen the trade balance, producing a vicious cycle of currency depreciation and imported inflation. World Bank's Pakistan Development Update (April 2024) also reveals how high inflation and associated macroeconomic instability pose critical challenges to Pakistan's external sector sustainability.

1.4 Foreign Direct Investment and BOP

Foreign Direct Investment (FDI) plays a dual role and often time-dependent impact on the balance of payments in developing countries like Pakistan. The empirical research reveals that initially FDI provides immediate support to the financial account, increasing foreign exchange reserves and easing external financing pressures. However, its long-term impact on the current account is not encouraging. Market-seeking FDI, focused on domestic production, may face problem of profit repatriation and increased imports of capital goods, potentially worsening the current account over time. Conversely, export-oriented FDI can strengthen a country's export capacity, improve its trade balance, and facilitate technology

transfer, leading to a more sustainable external position. Recent analyses highlight this complexity. The State Bank of Pakistan's "Annual Report 2022-23" disclose that while FDI inflows support the financial account, but their role in export growth and import substitution is critical for a positive net effect on the overall balance of payments. Similarly, the World Bank's Pakistan Development Update (April 2024) reveals that FDI in export-oriented sectors, such as textiles and technology, is crucial for foreign exchange earnings, which are needed to service external debts and stabilize the external account. Furthermore, UNCTAD's World Investment Report 2023 points out that for countries like Pakistan, attracting FDI into productive, greenfield projects is more beneficial for long-term balance-of-payments stability than mergers and acquisitions or short-term speculative activities in the Stock Market, which may not expand the export base. This is the reason that most of the studies so far conducted identified negative relationship between FDI and economic growth in Pakistan (Yilin Zhang, Cheng, Qingsong, (2019).

1.5 Real Exchange Rate and BOP.

Empirical findings confirm that fluctuations in Pakistan's real exchange rate (often measured by the Real Effective Exchange Rate, REER) significantly influence its balance of payments (BOP). A higher (appreciated) REER—indicates a stronger rupee relative to trading partner currencies—tends to make exports less competitive and imports cheaper, which can worsen the trade balance (State Bank of Pakistan, 2025b; Business Recorder, 2025). Conversely, depreciation of the REER can enhance export competitiveness by reducing relative export prices and the trade deficit, which supports external account. Although much of the academic research

has focused on trade balance rather than the full balance of payments, studies employing ARDL and Error-Correction frameworks find that real exchange rate deterioration is related to improvements in trade balance, which is a key driver of the BOP—particularly when exports respond positively and imports contract to price competitiveness (Arif Naqvi et al., 2023; Liaqat, 2025). Recent research proves that negative movements in the real exchange rate with major trading partners can deteriorate trade balances, further affecting overall external balances (Raza, & Lin, (2021; Hashmi, 2024).

1.6 Money supply and BOP

The money suppl plays a critical role in shaping Pakistan's balance of payments (BOP) because it influences domestic demand, inflation, import, and external competitiveness. Hard evidence confirms that expansionary money supply can exert both short-run and long-run impacts on the BOP. For instance, various empirical analysis reveal that increases in money supply improves balance of payments in the short-term, but it exerts a negative impact in the long run, as excess liquidity may increase local demand, trigger imports, and erode external balances over time. Given Pakistan's structural dependence on imported oil and machinery, a rapid expansion in money supply without commensurate export increase can weaken the BOP by increasing external outflows (Ahmed, Bhutto & Kalhoro, (2019); Ahad & Anwer, (2020); Arif Naqvi et al., (2023); Hussain & Iqbal, (2023).

1.7 Objectives of Study

In the light of above discussion, the primary objectives of this study are the following: -

- To study the impact of oil prices on balance of payment in the developing countries like Pakistan.
- To investigate the influence of exports on balance of payment.

- To examine the relationship between real exchange rate and balance of payment.
- To analyze the association between inflation rate and balance of payment.
- To analyze the link between money supply and balance of payment.
- To examine the impact of Foreign Direct Investment on balance of payment.

1.8 Research Questions

To explore these objectives, we must address the following research questions: -

RQ1: How oil prices influence the balance of payment in developing countries like Pakistan?

RQ2: What is the impact of exports on balance of payment of a country like Pakistan?

RQ3: What is link between inflation rate and balance of payment?

RQ4: What is correlation between money supply and balance of payment?

RQ5: What is the impact of foreign direct investment on balance of payment?

RQ6: What is association between real exchange rate and balance of payment?

The rest of paper is organized in the following sections: Section 2 reviews relevant literature, identify research gap and develop hypotheses. Section 3 illustrates research design, data and variables as well as analytical techniques and model specification. Section 4 discusses empirical results, and the paper concludes by discussing findings, policy implications, limitations, suggestions for further research and conclusions in section 5.

1.9 Contribution and Novelty of the Study

This research contributes significantly to the balance of payments literature by developing an integrated and country-specific empirical framework that examines

the effects of oil prices, inflation, foreign direct investment, real exchange rate movements, exports and money supply on Pakistan's overall balance of payments. Unlike prior empirical research that emphasizes trade balance or single explanatory variables, this research adopts a holistic BOP perspective, identifying both real and monetary transmission channels through a unified ARDL modeling approach. The novelty of study lies in its ability to detach short-term adjustment dynamics from long-term structural equilibrium, thereby providing more new insights into how macroeconomic shocks disrupt Pakistan's external accounts. Furthermore, by including oil price shocks and monetary variables along with external competitiveness, the study fills the gap between the monetary approach to the balance of payments and structural dependency theories related to developing economies. The findings offer policy-relevant evidence for coordinating exchange rate management, monetary supply, energy diversification, and export-related investment strategies, thereby contributing very useful original insights that are both theoretically grounded and empirically sound and robust.

2.Review of Literature

A substantial body of literature identifies oil price volatility as a critical determinant of Pakistan's external imbalance. Abbasi and Shaikh (2024) used quarterly data from 1961–2022 and a VAR framework, demonstrate that spike in global oil price significantly deteriorate Pakistan's current account because it sharply increases the import bill and causes depreciation pressure on the domestic currency. Similarly, Abbasi and Ahmed (2024) find asymmetric effects of oil price fluctuation, indicating that oil price increases generate stronger negative impacts on external balances than the positive effects arising from price declines. Their findings highlight Pakistan's vulnerability as an oil-importing economy, where rising energy costs directly translate into higher foreign exchange outflows and external

financing needs. These conclusions are reinforced by international evidence reviewed by UNCTAD (2023), which stresses that oil-importing developing economies experience prolonged BOP stress during sustained global energy price increases. Gul & Awan, 2017; Hussain, Faridi, and Hussain (2022) empirically confirm that rising international oil prices and exchange rate depreciation significantly fuel domestic inflation in Pakistan. High inflation, in turn, erodes export competitiveness by raising domestic production costs relative to trading partners. Pakistan Institute of Development Economics (Qurat-Ul-Ain, & Tufail, 2013; Sarwar; Awan, Kalsoom (2014). PIDE, 2023) provides empirical evidence that inflationary shocks worsen the trade balance by increasing imports and reducing export volumes, thereby intensifying current account deficits. The State Bank of Pakistan (2023) further emphasizes that inflation-induced loss of competitiveness has been a recurring factor behind Pakistan's persistent external imbalances, particularly during periods of macroeconomic instability.

Academic literature on foreign direct investment (FDI) suggests a more nuanced and time-dependent relationship with the BOP. According to the State Bank of Pakistan (2023), FDI inflows provide short-term relief to the financial account by augmenting foreign exchange reserves; however, their long-run impact on the BOP depends on whether FDI is export-oriented or market-seeking. Malik and Maryam (2024) conclude that exchange rate volatility and inflation uncertainty significantly deter FDI inflows in Pakistan, indirectly weakening the BOP by limiting stable external financing. In the same way, UNCTAD (2023) argues that Pakistan's historical reliance on market-seeking FDI has limited its contribution to

export expansion, while profit repatriation and import-intensive investment projects have, in some cases, worsened the current account over time.

Another important factor that affects the performance of the external sector of Pakistan is the movement of the real exchange rate (RER). Arif Naqvi et al. (2023) finds that an appreciation of the real effective exchange rate (REER) makes exports less competitive and raises imports, thus deteriorating the trade balance, which is the major component of the BOP. Liaqat (2025) also confirms these results using the ARDL approach and finds that a depreciation of the real exchange rate improves the trade balance of Pakistan in the long run, but the cost of adjustment in the short run is still important. Hashmi (2024) further explores these results and finds that the negative bilateral real exchange rate movements between Pakistan and its major trading partners are an important factor that cumulatively deteriorates the BOP.

The exports are central to BOP sustainability. Abbasi and Shaikh (2024) plead that rising oil prices and inflation negatively influence export growth by escalating input costs and weakening firms' global competitiveness. The World Bank (2024) highlights that Pakistan's export base remains narrowly concentrated in primary goods or in low value-added sectors, making export earnings very low to offset rising import and debt-servicing obligations. According to the State Bank of Pakistan (2023), weak export responsiveness to exchange rate depreciation further constrains the effectiveness of currency adjustment as a BOP stabilization tool.

2.1 Identified research gap.

Although the current literature has been able to point out the major determinants, such as oil prices, inflation, FDI, exchange rates, and exports, that influence the balance of payments situation of Pakistan, there still remains a substantial research gap in the absence of a comprehensive empirical model that is able to incorporate their joint interdependence and feedback relationships. Most of the literature has

been able to examine the individual variables or has been restricted to the trade balance component of the BOP, which fails to capture the intricate transmission mechanisms and time-dependent relationships that jointly influence the overall BOP situation. Moreover, there exists a substantial methodological gap in the utilization of sophisticated econometric techniques that can distinguish between the joint impact of macroeconomic policies and evaluating the structural influence of export diversification on the overall BOP sustainability

2.2 Hypotheses development

Based on the above gaps, the following testable hypotheses can be formulated:

H1: High oil prices negatively correlate with balance of payment in Pakistan.

H2: Exports of goods and services positively associated with balance of payment.

H3: Foreign Direct Investment positively correlates with balance of payment.

H4: Real exchange rate positively associated with balance of payment.

H5: Money supply positively correlates with balance of payment.

H6: High inflation rate negatively correlates with balance of payment.

2.3 Conceptual Model

Based on these hypotheses, we have developed the following conceptual model:

Fig 1: Hypothesized Model

3. Research Methodology

The research design of this study is based on time series data spanning from 1981 to 2021, which was collected from World Bank's World Development Indicators (WDI), State Bank of Pakistan, Pakistan Bureau of Statistics and Pakistan Economic Survey and employed econometric techniques such as descriptive statistics, Correlation Matrix, ADF unit root test, ARDL Model and Error Correction Model (ECM) to estimate relationship between explanatory variables such as oil prices, inflation rates, exports, foreign direct investment, real exchange rate and explained variable, balance of payment. The variables were selected from established studies. The data sources and econometric techniques are authentic and have extensively been used by researchers. To check endogeneity bias, multi-collinearity, serial correlation and heteroskedasticity in the model we used different

diagnostic tests to identify these issues. The model of this study is specified as below:

$$BOP = f(MS, INF, FDI, OP, EXPT, REER) \quad (1)$$

Where,

BOP = Balance of Payment

MS = Money Supply

INF = Inflation

FDI = Foreign Direct Investment

REER = Real Effective Exchange Rate

OP = Oil Price

EXPT= Export

The econometric form of equation is given as:

$$BOP = \alpha_0 + \alpha_1 MS + \alpha_2 INF + \alpha_3 FDI + \alpha_4 REER + \alpha_5 OP + \alpha_6 EXPT + \mu_i$$

$$\alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5, \alpha_6, >0 \quad (2)$$

The general form of ARDL regression model is as:

$$Y_t = \alpha_0 + \beta_1 Y_{t-1} + \delta_1 X_{t-1} + \sum_{j=1}^{n-1} a_j \Delta Y_{t-j} + \sum_{j=0}^{m-1} b_j \Delta X_{t-j} + \varepsilon_t \quad (3)$$

Where: ε_t: Error term. While Y_t is explained by lagged values of itself is autoregressive part of model and X_t has a "distributed lag" element. In some cases, the distributed lag part of the existing value of X_t itself expelled from the model's structure. Thus, based on equation 3, we can specify models in ARDL form as:

$$\Delta(BOP)_t = \beta_0 + \beta_1 (MS)_{t-1} + \beta_2 (INF)_{t-1} + \beta_3 (FDI)_{t-1} + \beta_4 (REER)_{t-1} + \beta_5 (OP)_{t-1}$$

$$\beta_6(EXPT)_{t-1} + \sum_{i=1}^{n_1} \delta_1 \Delta(\mathrm{BOP})_{t-i} + \sum_{i=0}^{n_2} \delta_2 \Delta(MS)_{t-i} + \sum_{i=0}^{n_3} \delta_3 \Delta(FDI)_{t-i} + \sum_{i=0}^{n_4} \delta_4 \Delta(\mathrm{REER})_{t-i} + \sum_{i=0}^{n_5} \delta_5 \Delta(OP)_{t-i} + \sum_{i=0}^{n_6} \delta_6 \Delta(EXPT)_{t-i} + \varepsilon_t \quad (4)$$

In equation 4 parameter α_i are long run coefficient and the coefficient δ_i are short run parameter of ARDL model. ε_t is white noise error term and Δ is the first difference operator.

4. Results

4.1. Descriptive Statistic

Table 1 summarizes the central tendency, dispersion, and distributional properties of the study variables over the period 1981–2021. The mean and median values are close for most variables, indicating stable distributions, except for FDI, REER, and BOP, where noticeable differences suggest higher volatility and asymmetry over time. The standard deviation is particularly high for REER, oil prices (OP), and BOP, reflecting substantial fluctuations in exchange rates, international oil markets, and Pakistan's external account during the sample period.

The skewness results indicate that most variables are positively skewed (MS, INF, FDI, REER, and OP), implying longer right tails and the presence of extremely high values, whereas exports (EXPT) and BOP are negatively skewed, suggesting occasional large downturns. The kurtosis values reveal that FDI and REER are highly leptokurtic, indicating sharp peaks and fat tails, while the remaining variables exhibit either near-normal or moderately leptokurtic behavior.

The Jarque–Bera statistics and corresponding probability values show that FDI, REER, and BOP significantly deviate from normality at conventional significance levels, whereas MS and EXPT follow a normal distribution. Overall,

the descriptive results highlight considerable variability and non-normal behavior in key macroeconomic variables, justifying the use of advanced econometric techniques in subsequent analysis.

Table 1

Descriptive Analysis (1981-2021)

Variables	**MS**	**INF**	**FDI**	**REER**	**OP**	**EXPT**	**BOP**
Mean	47.114	8.069	0.913	125.920	44.938	13.292	-7920000000.0
Median	45.388	7.768	0.681	115.465	31.300	13.426	-3060000000.0
Maximum	62.378	20.286	3.668	237.505	111.630	17.271	1010000000.0
Minimum	34.799	2.529	0.103	96.486	13.270	8.257	34900000000.0
Std. Dev.	7.090	3.762	0.786	37.797	30.423	2.377	9130000000.0
Skewness	0.384	0.744	2.240	1.752	0.906	-0.208	-1.291
Kurtosis	2.132	3.920	7.636	4.879	2.643	2.306	3.789
Jarque-Bera	2.242	5.101	69.286	26.354	5.689	1.090	12.150
Probability	0.326	0.078	0.000	0.000	0.058	0.580	0.002
Obser.	40	40	40	40	40	40	40

Source: Author's Calculations

4.2. Correlation Analysis

Table 2 reports the pairwise correlations among the study variables for the period 1981–2021. The results show that the balance of payments (BOP) has a strong positive association with exports (0.673), indicating that higher export performance is closely linked with improvements in the external balance. In contrast, BOP is moderately and negatively correlated with money supply (-0.381), real effective exchange rate (-0.495), and oil prices (-0.333), suggesting that monetary expansion, currency appreciation, and rising oil prices tend to exert pressure on Pakistan's external account. The relationship between BOP and inflation (-0.160) is weak and negative, while the association with foreign direct investment (0.010) is positive but negligible, implying a limited direct linkage in the short run. Overall, the correlation matrix indicates no excessively high correlations among the explanatory variables, reducing concerns about multicollinearity and supporting their joint inclusion in the empirical model.

Table 2:

Correlation Matrix (1981-2021)

Variables	BOP	MS	INF	FDI	REER	OP	EXPT
BOP	1.000						
MS	-0.381	1.000					
INF	-0.160	0.164	1.000				
FDI	0.010	0.472	0.396	1.000			
REER	-0.495	-0.448	-0.146	-0.426	1.000		
OP	-0.333	0.631	0.281	0.327	-0.384	1.000	
EXPT	0.673	-0.441	0.312	0.131	-0.205	-0.404	1.000

Source: Author's Calculations

The correlation analysis results are shown in Figure 3.

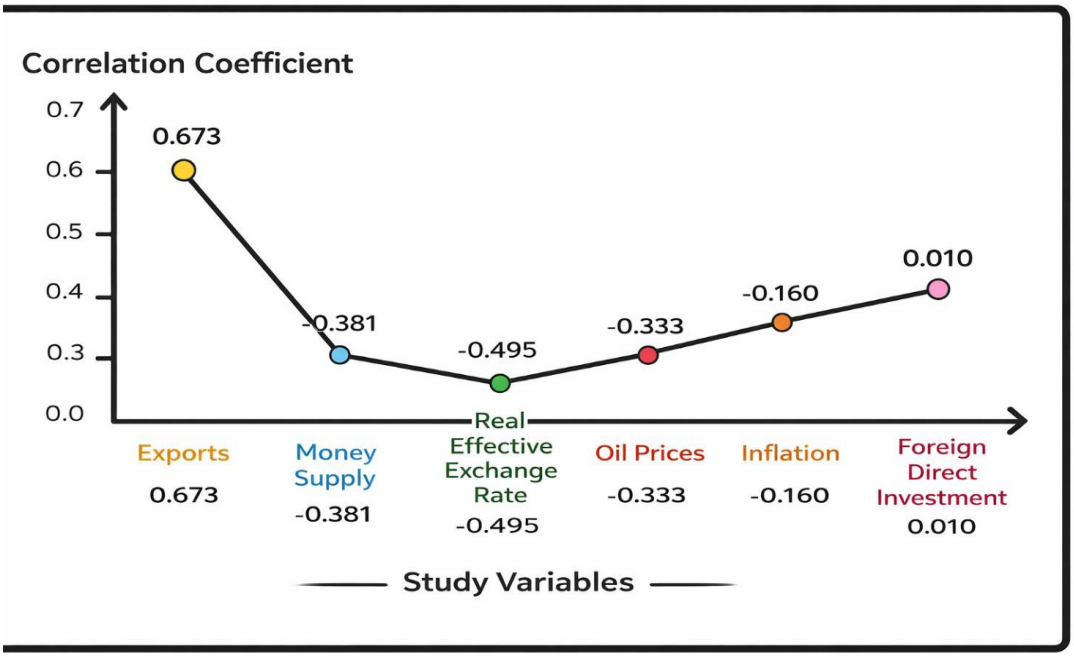

Fig 3: Pairwise correlations among the study variables.

4.3. ADF Unit Root Test

Table 3 presents the outcomes of the ADF unit root test. It is found that all the variables used in a study are integrated at order 0 and 1 so that we can conclude that ARDL approach is an appropriate technique for the estimation of parameters.

Table 3:

Result of ADF Unit Root Test

Variables	**Level**		**1st Difference**		**Outcomes**
	t-stat.	**Prob.**	**t-stat.**	**Prob.**	
BOP	--	--	-6.1401	0.0000	I (1)
MS	--	--	-5.2491	0.0001	I (1)

INF	-3.0354	0.0403	--	--	I (0)
FDI	-3.0815	0.0365	--	--	I (0)
REER	-4.6287	0.0006	--	--	I (0)
OP	--	--	-6.6754	0.0000	I (1)
EXPT	--	--	-6.4324	0.0000	I (1)

Source: Author's Calculations

4.4 Bound Test Analysis

To examine the long run cointegration between variables in a model, ARDL bound test is applied and its outcomes are presented in Table 4. The results show that the value of F-statistic 9.4573 is statistically significant, suggesting long-run cointegration between variables. We can further proceed with the long-run analysis of parameters by using ARDL method.

Table 4:

Bound Test Estimates (1981-2021)

Null Hypothesis: No long-run relationships exist		
Test Statistic	**Value**	**K**
F-statistic	9.4573	6
Critical Value Bounds		
Significance	**I0 Bound**	**I1 Bound**
10%	2.12	3.23
5%	2.45	3.61
2.5%	2.75	3.99
1%	3.15	4.43

Source: Author's Calculations

4.5. ARDL Long-Run Analysis

The ARDL long-run estimates of impact of oil price fluctuation and other variables on balance of payments in Pakistan. Table 5 portrays the outcomes of ARDL long-run model. The dependent variable is balance of payments while the independent variables are Money Supply (MS), Inflation Rate (INF), Foreign Direct investment (FDI), Real Effective Exchange Rate (REER), Oil Prices (OP) and Exports (EXPT). This model is suitable for estimating small samples of the variable integrated at mixed level.

Table 5:

ARDL Long-Run Estimates (1981-2021)

Dependent Variable: BOP				
Selected Model: ARDL (3, 2, 0, 1, 0, 0)				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
MS	-0.2682	0.0621	-4.3135	0.0002
OP	-0.0229	0.0090	-2.5282	0.0185
INF	-0.2607	0.0785	-3.3205	0.0029
FDI	0.2453	0.4381	0.5600	0.5806
REER	-0.0898	0.0102	-8.7365	0.0000
EXPT	0.3698	0.1740	2.1253	0.0440
C	16.4962	5.2959	3.1148	0.0047

Source: Author's Calculations

The ARDL model reveals that money supply negatively and significantly is related to the balance of payments. The coefficient value of the money supply implies that

one unit increases in money supply leads to decrease the balance of payments by -26.82%. When money supply increases, the prices of essential items also increase so that people may buy more imported goods. Increase in imports of a country causes deterioration in the balance of payments. These results support the study of Udayanga (2019), who also identified negative relationship between money supply and balance of payment. Similarly, core variable, oil prices fluctuations, is also negatively and significantly related to the balance of payments. The coefficient value of the oil prices suggests a one unit increases in the Oil prices is associated with balance of payment by -2.29%. Oil price increase has adverse impact on balance of payments of Pakistan because it increases imports bill consists of high amount of oil payments in US dollar term as reported by Arif Naqvi et al., (2023); Hussain, S., & Iqbal, A. (2023).

Further empirical results show that the variable inflation rate is negatively related to the balance of payments. The coefficient value of the inflation rate reveals that a one unit increases in the inflation rate led to decrease the balance of payments by -26.07%. This negative association is justified in the sense that as inflation rate spikes domestic goods become more costly and people that people prefer to buy cheap imported goods, leading to increase the demand for imported goods, resulting in deterioration of the balance of payments. These results are in line with the study of Yousif & Musa (2017) However, the variable, foreign direct investment, is positively related to the balance of payments. It implies that a one unit increase in FDI is likely to improve the balance of payments by 24.53% units. These findings support the studies of (Hussain & Iqbal, (2023); Abbasi & Shaikh, (2024), who also diagnosed positive link between FDI and balance of payment.

The empirical analysis demonstrates that the Real effective exchange rate, is negative and significantly related to the balance of payments because its coefficient

value highlights that as the REER increases by one unit it will lead to decrease the balance of payments by -8.98%. As the exchange rate of a country increases the domestic currency is undervalued, domestic goods became cheaper for the foreigners but in case of developing countries like Pakistan they export than imports and consequently suffers trade deficit and balance of payment problems. These results are also consistent with the study of Bernanke, (2016); Yousif & Musa (2017); Kennedy (2013); and Batool et al., (2015).

The results indicate that the variable exports of goods and services are positively and significantly related to the balance of payments because its coefficient value shows that a one unit increase in exports is associated with improvement of the balance of payments by 36.98%. The positive impact of exports is more pronounced and substantial in the long run as is depicted in Figure 4

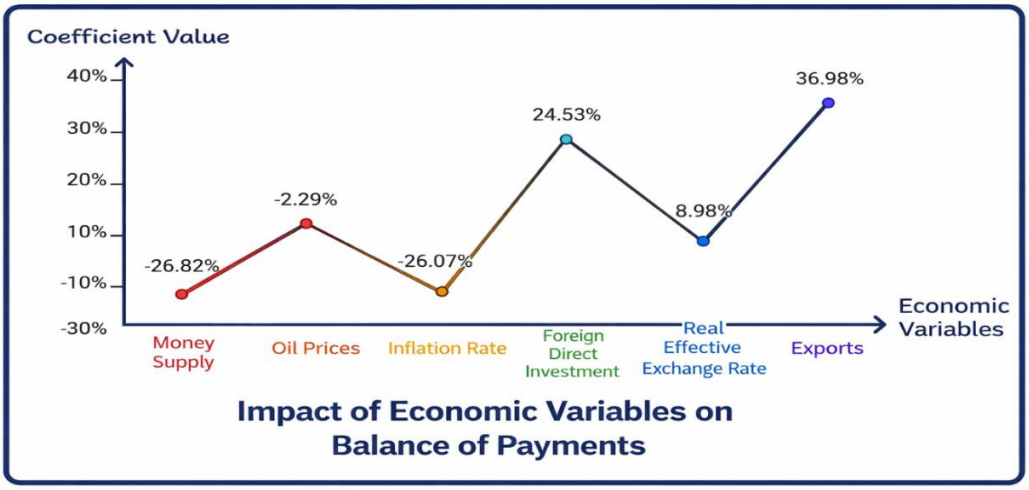

Fig 4: Long-term impact of explanatory variable on balance of payment in Pakistan**.**

4.6. Error Correction Model

This model is used to identify short-term dynamics and speed of adjustment of variables from current to next period of equilibrium. The negative term of ECM (-0.8480) and statistically significant (prob. = 0.000) shows that any disturbances in the short run are corrected at the rate of 84.80 percent in the long-term equilibrium level. All variables have negative relationship with balance of payment except exports in short run as is shown in Table 6.

Table 6:

Error Correction Model estimates.

Variables	Coefficient	Std. Error	t-Statistic	Prob.
D (BOP (-1))	0.1884	0.1362	1.3832	0.1793
D (BOP (-2))	-0.1657	0.1220	-1.3584	0.1869
D(MS)	-0.2674	0.0709	-3.7719	0.0009
D (MS (-1))	0.1847	0.0805	2.2944	0.0308
D(INF)	-0.2828	0.0907	-3.1179	0.0047
D(FDI)	-0.2662	0.4493	-0.5925	0.5590
D(REER)	-0.0191	0.0311	-0.6155	0.5440
D(OP)	-0.0248	0.0101	-2.4539	0.0218
D(EXPT)	0.4012	0.1795	2.2348	0.0350
CointEq (-1)	-0. 8480	0.1685	-5.0326	0.0000

Source: Author's Calculations

4.7. Diagnostic Tests

In the time series data analysis, autocorrelation and heteroscedasticity are assumed to be checked through relevant diagnostic tests. Autocorrelation is checked using serial correlation LM test and its outcomes are presented in Table 7. The results of this test indicate that the value of F-statistics is statistically insignificant (*F-stat.*=

0.1483, *Prob.*= 0.8630) so, the null hypothesis is accepted because there is no autocorrelation in the past and present values of variables used in the Model.

Table 7:

Breusch-Godfrey Serial Correlation LM Test

F-statistic	0.1483	**Prob. F (2,22)**	0.8630
Obs*R-squared	0.4922	**Prob. Chi-Square (2)**	0.7818

Source: Author's Calculations

Heteroscedasticity is checked by using Breusch-Pagan-Godfrey test and its outcomes are presented in Table 8. The findings indicate that the value of F-statistic is statistically insignificant (*F-stat.*=0.7748, *Prob.*=0.6697) so that the null hypothesis is accepted because there is no heteroscedasticity in a model and the value of error term is equally distributed.

Table 8:

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.7748	**Prob. F (12,24)**	0.6697
Obs*R-squared	10.3319	**Prob. Chi-Square (12)**	0.5869

Source: Author's Calculations

4.8. Histogram of Normality Test

To test the normality of residuals in a model, Jarque-Bera test of histogram is applied. We can observe from Figure 5 that the value of test is statistically insignificant, thus, we can conclude that the residuals are normally distributed.

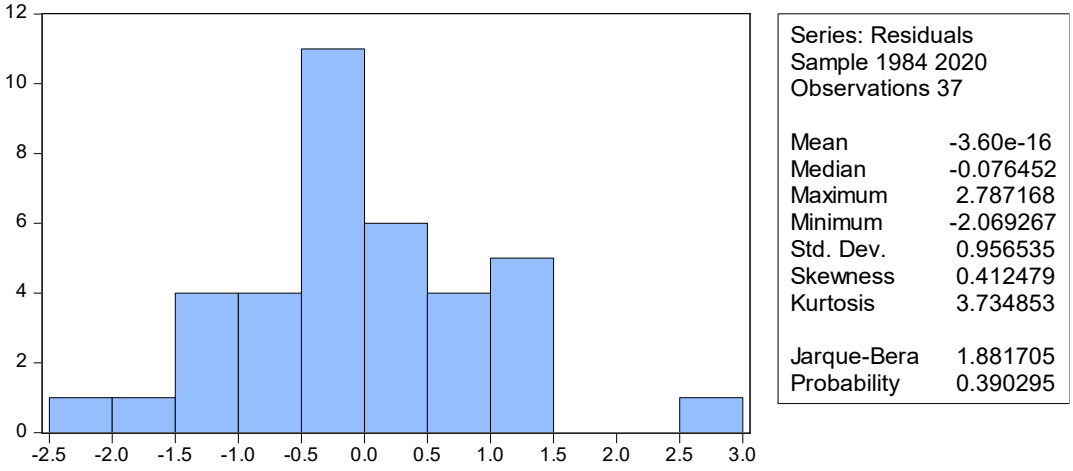

Fig 5: Histogram of Normality Test

Model stability test is conducted by using CUSUM and CUSUM of squares. It can be analyzed from Figure 2 that the estimated line is between the critical lines (red lines) at the 5 percent level of significance so that we can say that the model used in a study is dynamically stable.

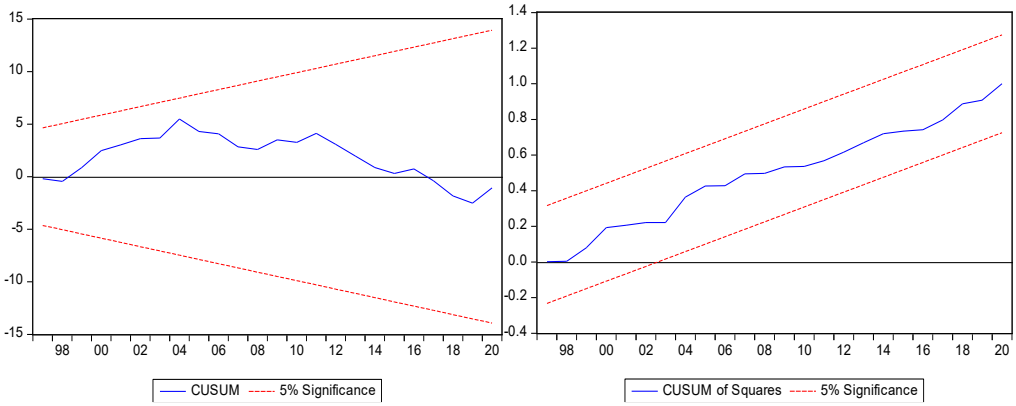

Fig 6: Model Stability Analysis

Source: Author's Calculations

5 Discussions

5.1 Key Findings and Hypotheses testing

The objective of study was to analyze the impact of oil price spike, high inflation rate, real exchange rate volatility, money supply expansion, stagnant Exports, and Foreign Direct Investment on balance of payments of Pakistan. Balance of payment acted as dependent variable, while all other variables served as independent variables. The famous ARDL approach was employed to estimate long-term relationship between these variables. The findings reveal that foreign direct investment, and exports positively related to the balance of payments, while the variables, money supply, inflation rate, real effective exchange rate, and oil prices adversely influence the balance of payments in Pakistan.

When we examine individual impact of each variable, we found that money supply negatively and significantly influences balance of payment. Hence, first hypothesis (**H1)** is rejected because of the lack of empirical support. The next variable, oil prices fluctuations, is found to be negatively and significantly related to the balance of payments because high imports of oil involve payments in dollar, resulting in deterioration of trade balance, which is the main issue of Pakistan's economy because Pakistan spends half of its export earnings on oil imports. Thus, second Hypothesis **(H2)** is rejected due to lack of the support of hard evidence.

The evidence shows that inflation rate is also negative and significantly influences the balance of payments. The negative association between these two variables is justified in the sense that as inflation rate increases domestic goods become more costly so that people buy cheap imported goods, leading to rise balance of payments. Thus, third hypothesis **(H3)** is accepted because hard

evidence supports it. These findings support the findings of Akpansung,(2021); Hussain & Iqbal, (2023); Naser, (2019). Abbasi & Shaikh, (2024). However Foreign direct investment positively and significantly related to the balance of payments. Because the inflow of FDI from other countries leads to improve the balance of payments of host country. Hence, fourth hypothesis **(H4)** is validated by hard evidence. These relationships are corroborated Pönkä & Zheng, (2019); Ahad & Anwer, (2020); Arif Naqvi et al., (2023).

The real effective exchange rate has negative and significant impact on the balance of payments because when the domestic currency is undervalued, domestic goods became cheaper for the foreigners but in case of developing countries like Pakistan they export half of their imports and their exports mainly consist of primary goods, which fetch low price in international markets. So. we can say that increase in exchange rate adversely impacts the balance of payments. Hence, fifth Hypothesis (H5) is accepted. These results are also consistent with the studies of Yousif & Musa (2017); Kennedy (2013); and Batool et al., (2015). Lastly, the exports of goods and services were found positively and significantly related to the balance of payments as the exports increases they lead to improve the balance of payments. Thus, sixth hypothesis **(H6)** is approved by empirical analysis. These results are in line with prior studies such as Ahmed, Bhutto & Kalhoro, (2019); Ahad & Anwer, (2020); Qasim &; Awan, 2020: Arif Naqvi et al., (2023); Hussain, S., & Iqbal, A. (2023). Hussain & Iqbal, (2023); Abbasi & Shaikh, (2024). These studies identified positive link between exports and balance of payment. The results of hypotheses testing are presented in Table 9.

Table 9:
Summary of Hypotheses Testing Results (ARDL Long-Run Estimates)

Hypothesis	**Variable**	**Expected Relationship**	**Empirical Relationship**	**Significance**	**Decision**
H1	Money Supply (MS)	Positive	Negative	Significant	Rejected
H2	Oil Prices (OP)	Positive	Negative	Significant	Rejected
H3	Inflation Rate (INF)	Negative	Negative	Significant	Accepted
H4	Foreign Direct Investment (FDI)	Positive	Positive	Significant	Accepted
H5	Real Effective Exchange Rate (REER)	Negative	Negative	Significant	Accepted
H6	Exports (EXPT)	Positive	Positive	Significant	Accepted

Source: Author's Calculations

5.2 Policy Recommendations

Based on the above discussion, the following recommendations are made to improve Pakistan's balance of payment: -

1. It is recommended that the high oil demand in energy sector must be reduced by opting non-renewable energy sources to meet growing energy demand.

2.It is also recommended that new revenue sources may be discovered to finance the budget to cut down on the unnecessary expenditure because of oil price shocks.

3.There should be energy saving plans by educating the public to stop energy wastage. The discounted oil price should be offered to the transporters to encourage the use of public transport rather than providing subsidy on oil for whole all.

4.Government should impose minimum duties on the import of oil to keep the price stable in the economy. Oil exporting countries should be given rebates to oil importing countries to prevent their economy from economic recession.

5.Strong policy initiatives must be taken to control inflation, fluctuations in real exchange rate, encourage foreign direct investment and boost exports.

These measures will significantly reduce trade deficit and improve balance of payment.

5.3 Limitations and suggestions for new ideas.

Despite offering valuable insights, this study has specific constraints that should be acknowledged. The analysis is based on annual time-series data for Pakistan, which may capture short-run fluctuations and sector-specific dynamics restricting its generalizability to other countries. Further, the study used a few selected macroeconomic variables and does not incorporate other potentially relevant factors like fiscal deficits, external debt, remittances, political instability, or global financial conditions, which are very important from the point of view of their impact on balance of payments. Although the ARDL approach is suitable for mixed

orders of integration, it assumes parameter stability over time, which may not fully capture structural breaks arising from global shocks, economic reforms and change of regimes. These limitations suggest that the findings should be interpreted with caution.

The new researchers may consider using higher-frequency data to understand short-run adjustment processes in the balance of payments. Including additional variables such as fiscal policy indicators, remittances, trade openness, and external debt could give a more comprehensive illustration of external sector performance. Moreover, comparative research across developing economies may also help identify country-specific versus regional patterns. Moreover, future studies could apply advanced econometric techniques that account for structural breaks, nonlinearity, or asymmetric effects, particularly in the case of oil price shocks and exchange rate volatility, to offer deeper policy-relevant insights.

5.4 Conclusion

This study proves that exports and foreign direct investment are the two factions which positively impact balance of payment in Pakistan whereas inflation, oil prices, money supply and effective real exchange exert negative effects. The results confirm that external imbalances in Pakistan are driven by traditional dependence on oil imports, inflationary pressures, and exchange rate volatility, whereas FDI inflows and export growth contribute positively to external stability. Overall, the study underscores the adoption of proactive policies aimed at controlling inflation, managing monetary expansion, reducing reliance on oil imports, and promoting export and foreign direct investment to strengthen Pakistan’s balance of payments

position. Otherwise, Pakistan continues to face balance of payment problems due to growing population and fiscal expansion.

Data Availability statement

The data that supports the findings of the study will be made available by corresponding author on strong request.

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