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Oil Prices and Economic Growth in SAARC Members Countries

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Original Article

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Keywords

Oil Prices, Economic Growth, Panel Regression, SAARC

Abstract

The oil price is a dominant factor to affect the economic growth. This study analyzes the influence of oil prices on economic growth of member countries of South Asian Association for Regional Cooperation (SAARC). The dynamic effects of such oil prices are estimated by the mean of Pooled Mean Group Autoregressive Distributed Lag Model (ARDL) and Panel Fully Modified Least Square (FMOLS). The time series data are used for the period of 1995 to 2023. The results concluded oil prices to significantly affect economic growth and in negative. However, fuel imports are found to favor the economic growth. Likewise, labor force and Gross Fixed Capital (GCF) formation have significant and positive effect on economic growth. The findings on ARDL and FMOLS are similar. Noticeable, in case of short run, oil prices effect on economic growth is insignificant. It shows that effect of oil prices on economic growth is recordable in long run. The study concludes oil prices to have significant role towards economic growth. However, negative affectation of oil prices cannot be taken in a way that SAARC member better start losing their dependency on oil but to explore substitute energy sources.

Introduction

Achieving consistent economic growth stand as a vital goal of the policymakers of developing and developed world. Because of a decline in the level of spendings and income inequalities which are fetched by the break of economic growth, this slipup is in fact a subject of substantial debate for many years. Consequently, it is desirable to survive with rising oil prices over the prolonged length of time in order to have assenting figures of economic growth.

Oil prices is a fundamental factor that affects the economic growth of developing and developed countries. SAARC members are also affected by such hikes in oil prices because their GDP has gained a significant portion in world GDP. The frightful economic growth of Asian economies persuades an increase in the demand for oil at larger front. The figure of oil demand is to further increase in future, depending on the economic growth targets set at significant height. Despite of high demand for oil, it is not sure that the economic growth is to glide up because of infrastructure base and the economic stature of the SAARC member countries. One report of Asian Development Bank states that South Asia is to continue with greater economic growth even at the back of rising oil prices due to having fast economic growth rate precedents. However, Kriskkumar and Naseem (2019) exclaimed asymmetric relationship of oil prices and economic growth. Oil and petroleum products' imports to SAARC is substantial due to the inclusion of the economies which are noteworthy in their economic outlook on the world's front.

According to South Asia Economic Focus, the economic growth of SAARC is projected at 5.7 percent in 2023 with a slight increase to 5.8 percent in the current fiscal year of 2024. Economic growth of Pakistan is reeling due to the impact of catastrophic flood, supply chain disruption, deteriorated investors' confidence, high cost of borrowing, and cost of input. Still, it is looked forward that IMF program together with the political harmony shall prove to stabilize economy and enable to achieve the targets of economic growth with ever rising oil prices.

Pakistan's oil import bill is record at $13.07 billion during July to March of the fiscal year 2023 as against $14.9 billion during the same period of preceding fiscal year. India also witnessed nearly 21 percent gain in imports bill during fiscal year of 2023. The crude oil import bill of Bangladesh fetched a rise of 44 percent. Sri Lankan fuel import bill also reached at $3.7 billion which is 46 percent higher than last fiscal year of 2022. Moving on to Nepal, the oil import bill remained at $1.4 billion during fiscal year 2023.

Problem Statement

In the SAARC region, the oil prices have a direct impact over the macroeconomic status. Ever increasing oil prices reduce the financial resources and also cause to bring either type of damages to the host country. the horizon of such impacts encounters international trade, productive capacity, and other macroeconomic components like exchange rate, unemployment, and domestic and foreign investment. Thus, end up in hyperinflation. Rising oil prices have detrimental impact on the economic performance due to the divert of attentions from capital expenditures and big-ticket purchases.

Due to inelastic demand at the back of large population, the oil prices directly influence savings, global trade, manufacturing, and other systems of production, ending up at reducing household spending power. Furthermore, the high prices of oil are to have direct effect over the consumer goods and services by causing future uncertainty. Importantly, oil price hikes affect the performance of economic outlook since it ousts the spending away from the capital goods. The cost of petroleum has depraving impression on countries' import and export.

Oil price shocks decline oil accessibility thus result in little economic growth. Each part of the economy, including energy, manufacturing, and transportation is deeply dependent on consumption of oil. The model of energy growth in emerging and developed nations, counting SAARC member countries, is connected with oil price changes. In precise, one of the most distressing problems is energy inflation because it affects economic expansion.

Though there is a slight concentration, SAARC nations are typically copious in oil and gas. In the recent years, their dependency on imported oil has grown-up significantly. Since the use of oil is expected to upsurge in SAARC region that contains rapidly developing economies and given that extraction of oil has been steadily condensed since 1998, unnecessary dependence on imported oil and the ensuing defenselessness to the cost of oil volatility is anticipated to get worse in the coming years.

Objectives of the Study

The core objective of this study is to explore the economic growth-related impacts of oil price fluctuations in SAARC member countries. The specific objectives are furbished below:

1. To trace out long run relationship between cost of petroleum and economic growth.
2. To analyze direction of impact of oil prices over the economic growth of SAARC member countries.
3. To indicate that the effects of fuel imports and cost of petroleum are different on economic growth of SAARC member countries.

The study, therefore, highlights the implication of changes in oil prices on the economic growth of SAARC member countries. Since the recent crash of oil prices is attracting the heated debate amongst the academicians to locate the impacts over the economic growth. The significance of the study therefore is its contribution to literature by engaging the effects of oil prices on economic growth with a guideline for the government and the policy makers of SAARC member countries.

Literature Review

Economic growth and oil prices are interconnected with each other. Rising trend in oil prices disturbs the targets of economic growth. The empirics went with the deliberations on oil prices and economic growth.

Oil price hikes post significant effect on the economic activities of the victim country (Ali, 2016; Abdelsalam, 2023; Abdlaziz et al., 2022; Driouche et al., 2020). Linking oil prices, with economic growth, Khayati (2019), Al-Marhubi (2000), and Harb (2009) settled on a point that oil exports have a long run relationship with the economic growth (Foudeh, 2017; Maghrebi et al., 2018; Rumbia et al., 2021). Opposite to Saidi et al. (2019) who discovered no any connection between oil prices and economic growth in South East Sulawesi and Indonesia.

It is found by Mahmood and Murshed. (2020) that oil prices and expansion of economic are interlinked. The assets of oil manufacturers are significantly affected by oil prices. The oil manufacturing is a major source of revenue for Saudi Arabia. Since oil-exporting nations are economically codependent on one another, the oil sector signifies their economy. Therefore, it is decisive to recognize how oil prices impinge on income. (Alkhateeb et al., 2017; Fiti et al., 2016).

In this regard, Aziz and Dahalan (2015), Taufani et al. (2022), and Rosnawintang et al. (2020) analyzed the relationship of inflation and price of crude oil fluctuations on economic growth in Association of South East Asian Nations (ASEAN). Study by KhrisKumar et al. (2022) indicated significant negative impact of rise in oil prices over the economic growth of Malaysia. However, Rumbia et al. (2020) went with non-linear ARDL and found long run economic expansion at the back of rising oil prices. Artami and Hara (2018) and investigated harmful effects of rise in oil prices on economic growth of Indonesia. Meanwhile, Alsamara et al. (2017) evaluated oil price and economic growth of Saudi Arabia and Turkey with a conclusion that ever-increasing oil prices post considerable effects on economic growth.

Benli et al. (2019), Chai et al. (2015), and Guney and Hasanov (2013) explored effects of oil prices on economic growth of Turkey, China, USA, and Japan. Non-linear ARDL results ascertained long term negative effects on economic growth. Similarly, Yoshino and Alekhina (2016) found negative consequences of oil price hikes on economic growth of Nigeria by the mean of Seemingly Unrelated Regression akin to Benramdane (2017) who indicated similar findings on Algeria by the Vector Autoregressive (VAR) methodology.

Rise in oil prices is not always negative towards economic growth. In this regard, Bamisaye and Obiyan (2006), Ogboru et al. (2017), Fuat et al. (2021), and Akinlo et al. (2015), via panel GMM analyses, VAR, Fixed Effect Model, Johansen Cointegration, and Panel Pooled OLS, found the favorable results of oil price rise on economic growth of Nigeria and Sub-Saharan Africa. Next to Bamisaye and Obiyan (2006), Bala and Chin (2018), Rahimli and Nazirov (2020) found similar positive results of oil price rise on the economic growth of Russian and Malaysia.

Sarwar et al. (2017) examined connotation of oil price and economic growth. The study employed Panel Vector Error Correction and OLS. The results indicated bidirectional causality running between economic growth and oil prices.

In recent years, Ehikioya et al. (2020), Babuga and Naseem (2022), Elhassan (2021), Adamu and Usman (2022), Ikechi and Anthony (2020), Raju et al. (2020), Prabheesh and Laila (2020), and Ifeonyemetalu et al. (2020) confirmed significant non-linear relationship between oil prices and economic growth of Nigeria, BRICS, Indonesia, Saudi Arabia, and Sub-Saharan Africa through the ARDL pooled mean group and Autoregressive heteroskedasticity model.

Presently, Abdlaziz (2022), Driouche et al. (2020), Bala et al. (2021), Saidu, (2021), Batanony et al. (2022), and Abdelsalam. (2023) dig out the nature of relationship between economic growth and oil prices. The findings based upon the multiple methodological techniques such as Linear and Nonlinear ARDL, Threshold and Momentum Threshold ARDL. The findings are of mixed nature. Abdlaziz et al. (2022) and Driouche et al. (2020) found positive relationship of oil prices and economic growth, similar to Saidu, (2021) with varied regions chosen like Iraq, Algeria, Saudi Arabia, South Africa, Morocco, Cote D' Ivoire, and Sub-Saharan Africa. On the contrary, Bala et al. explored asymmetric results of oil prices on economic growth of Malaysia. The findings of Batanony et al. (2021) and Abdelsalam. (2023), however, help to locate negative way being of oil prices and economic growth.

According to Mehmood et al. (2021), dependency on oil is crucial for the industrialization and to materialize the economic growth targets. The empirical studies who focused on this issue of oil price and economic growth are though enormous however are lacking behind in initializing research on the SAARC member countries. Moreover, the findings are also mixed and not of unidirectional posit. Therefore, the novelty of this study is to fill the literature gap by choosing the SAARC region for the analyses. Out of eight SAARC member countries, five are chosen due to the availability of the data which are Pakistan, India, Bangladesh, Sri Lanka, and Bhutan.

Data, Theoretical Concept, and Methodology

The present study is relied upon the data ranging from 1995 to 2023. The time series data is collected from World Bank Development Indicators. The popular model of economic growth was presented by Solow and Swan. The Solow-Swan Model bases upon the labor and capital usage for the economic growth. Later to that, Cob-Douglas Production Function comes into the discussion. The Cob-Douglas Production Function or modern economic growth model gives emphasis on human resource. Endogenous Growth Theory depends upon human capital and knowledge that leads to economic growth.

The impression of the model of this study is taken from the empirical literature discussed earlier. Therefore, Equation [1] explains the linear form of the economic growth model.

EGR = f (OPR, GFCF, LFR, IOF, FDI, CPI) [1]

The description of the variables is given in Table 1.

Table 1
Variables' Descriptions

Description	Variables	Measurement	Hypothetical Relationship
EGR	GDP growth annual	GDP annual percentage growth	**Dependent Variable**
OPR	Price of crude oil	Price of fuel charges on the gasoline pumps	**Negative**
GFCF	Gross fixed capital formation	The formation of capital as a result of investment initiated across the financial system for the supply of goods, services and the build-up of infrastructure	**Positive**
LFR	Total labor force	Population (male and female) of fifteen year and above	**Positive**
IOF	Import of fuel	Mineral fuels, lubricants, and other related products	**Negative**
CPI	Rate of inflation	The consumer price index is to measure the changes in consumer prices on the basket of item purchased during the course of the year	**Negative**
FDI	Foreign direct investment	The foreign direct investment is the money spent to buy the shareholdings of company that conducts a business in a host country over the given period of time which is one year	**Positive**

Regression Analysis

The step wise description on the empirical analyses is given below:

Unit Root Test

The Augmented Dickey Fuller (ADF) based test of stationarity is conducted which is prescribed by Levin, Lin, and Chu (2002). Moreover, the unit root test of Phillips and Perron (1988) is also conducted to check the robustness of the results.

It is done to evaluate the stability of the values of all the variables. The econometric form of the ADF based test is given in Equation [2].

$$\Delta y_{xn} = \alpha y_{xn-1} + \sum_{w=1}^{k_i} \beta_{0iw} \Delta y_{xn-w} + k_{xn} x + \varepsilon_{xn}$$

α_0 = k-1 which is a delay of the sequence isolation value of the area cross section which takes into account as to conduct a complete unit root test. the H_0 denotes the unit root.

Each section subjects to ADF test, that compares it to experimental-specific mandated barrier which is derived by the aggregation of ADF t-statistic over tNT. According to Im Pesaran and Shin ((IPS), 2003) technique of experimental unit root test which gives thresholds for either of the broad

section as well as for an individual series. IPS (2003) demonstrations the related distributional parameters for tNT which are given in Equation [3].

$$Y_{NT}^{t} = \frac{\sqrt{N[t_{NT} - N\sum_{v=1}^{N} E(t_{xn}(P_V)]}}{N\sum_{v=1}^{N} Var(t_{xn}(P_V)} \qquad [3]$$

The estimated t statistic of ADF specified as tNT, PV, txn, PY are therefore calculated. These calculations are based upon varied test equations which takes into account various pauses for the elongated chain of series.

Once there is found a blend of order of integration such as I (0) and I (1), the Pooled Mean Group ARDL is used to indicate the long run relationship between the depend and independent variables of the prescribed model.

Cointegration Test of Pedroni, Kao, Johansen-Fisher, & Bound Test

To locate long run relationship, Pedroni (1999) test of cointegration is followed. In this test, the H_0 is of no cointegration of the non-stationary panel. The seven test statistics of this methodology allows the heterogeneity in the short run dynamics as well as the long run slope and the intercept coefficient in the panel.

The seven of the test statistics are grouped in two categories which are the group mean statistics and the panel statistics. The former is the average results of the individual country test statistics and the later one is the panel statistics which pool the statistics together within the dimension. The test includes time dummies in order to address the simple dependency in cross section. It is thus applied by demeaning data of each variable. The formation of Pedroni (1999) is given in Equation [4].

$$\bar{Y}_t \frac{1}{N}\sum_{i=1}^{N} Y_{i,t} \quad [4]$$

Where all of the test statistics are residual based. And the residuals are collected from the regression and then the seven statistics are constructed. Next to Pedroni (1999), Kao (1999) and Johansen (1988) and Fisher (1932) are also used for the robustness of the findings.

In Bound Test, the Wald Test based F-statistic is examined. The highest value of Wald Test signifies cointegration (Faridi et al., 2019). It is done so by comparing the H_0 of no cointegration against the H_1 of cointegration. The functional forms of the said H_0 is given as: $\beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_5 = \beta_6 = \beta_7 = \beta_8 = 0$ against the H_1 of cointegration, where $\beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq \beta_5 \neq \beta_6 \neq \beta_7 \neq \beta_8 \neq 0$.

The Schwartz Bayesian Criteria (SBC) and Akaike Information Criteria (AIC) are used to determine which lag length should be used for the computation of regression analyses.

The Pooled Mean Group ARDL regression technique enables to find the long run relationship, followed by the Bound Test, as proposed by Pesaran and Shin (1999). The functional form is given in Equation [5] and Equation [6], respectively.

$$Y_n = \beta_0 + \beta_{1n} + \sum_{p=1}^{s} \phi Y_{n-1} + \delta X_n + \sum_{p=0}^{s-1} \delta_p^{\Delta} X_{n-1} + \varepsilon_t \qquad [5]$$

$$\Delta X_n = R1\Delta X_{n-1} + R2\Delta X_{n-2} + ... + Rp\Delta X_{n-p} + \varepsilon_t \qquad [6]$$

Modeling of Pooled Mean Group ARDL

The core objective is to prove cointegration between oil prices and economic growth of SAARC member countries. Therefore, the unrestricted error correction model of Pooled Mean Group ARDL is written in Equation [7].

$$EGR_{it} = \beta_0 + \beta_1 EGR_{it-1} + \beta_2 OPR_{it-1} + \beta_3 GFCF_{it-1} + \beta_4 LFR_{it-1} + \beta_5 IOF_{it-1} + \beta_6 FDI_{it-1} \beta_7 CPI_{it-1} + \sum_{i=1}^{p_1} \lambda_1 \Delta EGR_{it-i} + \sum_{i=1}^{p_2} \lambda_2 \Delta OPR_{it-i} + \sum_{i=1}^{p_3} \lambda_3 \Delta GFCF_{it-i} + \sum_{i=1}^{p_4} \lambda_4 \Delta LFR_{it-i} + \sum_{i=1}^{p_5} \lambda_5 \Delta IOF_{it-i} + \sum_{i=1}^{p_6} \lambda_6 \Delta FDI_{it-i} + \sum_{i=1}^{p_7} \lambda_7 \Delta CPI_{it-i} + \mu_{it} \quad [7]$$

The long run coefficients are depicted by β_i whereas, the λ_i is the short run coefficient. The Δ represents the first difference and the order of ARDL which varies from 1 to 7 is shown by p_i.

The long run and short run estimation of parameters are given in Equation [8] and Equation [9], respectively.

$$EGR = \beta_0 + \sum_{i=1}^{p_1} \lambda_1 EGR_{it-i} + \sum_{i=1}^{p_2} \lambda_2 OPR_{it-i} + \sum_{i=1}^{p_3} \lambda_3 GFCF_{it-i} + \sum_{i=1}^{p_4} \lambda_4 LFR_{it-i} + \sum_{i=1}^{p_5} \lambda_5 IOF_{it-i} + \sum_{i=1}^{p_6} \lambda_6 FDI_{it-i} + \sum_{i=1}^{p_7} \lambda_7 CPI_{it-i} + \mu_{it} \quad [8]$$

$$EGR = \beta_0 + \sum_{i=1}^{p_1} \lambda_1 \Delta EGR_{it-i} + \sum_{i=1}^{p_2} \lambda_2 \Delta OPR_{it-i} + \sum_{i=1}^{p_3} \lambda_3 \Delta GFCF_{it-i} + \sum_{i=1}^{p_4} \lambda_4 \Delta LFR_{it-i} + \sum_{i=1}^{p_5} \lambda_5 \Delta IOF_{it-i} + \sum_{i=1}^{p_6} \lambda_6 \Delta FDI_{it-i} + \sum_{i=1}^{p_7} \lambda_7 \Delta CPI_{it-i} + \chi ECT_{it-1} + \mu_{it} \quad [9]$$

Whereas, the β_0 is the intercept of the model. Long run and short run coefficients are shown by the symbol λ_i and coefficient of Error Correction Term (ECT) is χ whereas the error term is given by μ .

Modeling of FMOLS

For the robust analyses, this study employees the FMOLS estimation technique. FMOLS model is a categories of multiple time series models which are directly estimated for the long run effect of the independent variables over the dependent variables hereafter the correction of the problem of endogeneity in the time series (Robin, 2008). FMOLS is also referred to as model of co-integrating equation. The cointegrating equation estimation includes the application of DOLS and FMOLS approaches that are proposed in Kao and Chiang (2000) and Phillips and Moon (1999), respectively.

These techniques seek to evaluation or enumerate the long-run relationship among the variables. DOLS technique resolves the endogeneity problem and eliminates the serial correlation present in standard Ordinary Least Squares (OLS).

In fact, OLS estimation is quite inconsistent in the cointegration panel series (Dreger & Reimer, 2005). Whilst, DOLS and FMOLS help to solve the issue of endogeneity and settle down small sample bias, the applicability of FMOLS approach requires that all variables must be integrated of order I (1). And that the regressors must not appear to be co-integrated. But to Kao and Chiang (2000), DOLS outperforms FMOLS estimators in terms of mean biases.

The model specification of FMOLS is given in Equation [10].

$$\sigma_{GFM} = N^{-1}\sum_{i=1}^{N}[\sum_{t=1}^{t}(X_{it} - X_i')^2]^{-1}[\sum_{t=1}^{T}(X_{it} - X_i')Y_{it}' - Tr_i'] \quad [10]$$

Whereas, the $\sigma_{GFM} = N^{-1}\sum_{i=1}^{N}\sigma FM_t$. σFM_t is the estimator of the individual variable by FMOLS.

Results and Discussion

This section gives details on the statistical computations. To start with, the results of panel unit root are given in Table 2. The analyses of unit root are done with Levin, Lin, and Chu (2000), IPS (2003), ADF, and Phillip Pearon (The findings are concluded at the similar order of integration at I (1).

Table: 2

Panel Unit Root Test Results

Variables	LLC	ADF	PS	PP	P value	Conclusion
EGR	-4.42	53.91	-4.75	102.3	0.00	I (1)
OPR	-3.86	39.68	-3.75	29.68	0.00	I (1)
GFCF	-7.60	81.97	-2.45	154.4	0.00	I (1)
LFR	-1.94	20.37	-0.24	16.36	0.02	I (1)
IOF	-6.51	77.14	-7.36	113.1	0.00	I (1)
FDI	-8.70	112.3	-10.62	166.3	0.00	I (1)
CPI	-9.48	94.07	-8.87	168.3	0.00	I (1)

The descriptive analyses are given in Table 3. The statistics attribute to the selected SAARC member countries which are Pakistan, India, Bangladesh, Sri Lanka, and Bhutan for the period of 28 years ranging from 1995 to 2023. The value of median for EGR is 5.48, with the standard deviation value 4.78 and mean 5.01. The results for these statistics express a justly constrained dispersion. The value of maximum and minimum is 26.11 and 33.50, respectively. The mean of OPR is 0.64 with the standard deviation of 0.27. The closeness of standard deviation to the mean shows that the data are relatively less dispersed. The maximum and minimum range of OPR is reported to be 1.28 and 0.19, respectively which underscores the limited crude oil availability for SAARC members. Additionally, GCFC exhibits wider dispersion when mean value of 30.59 is compared with value of standard deviation which is 11.08. The range of maximum and minimum is also proved to have significant breach. In case of LFR, the median is 14.00 however, the standard deviation and mean values are 147.96 and 81.54 respectively which proves the diversity of the selected SAARC member countries. The IOF is also located for the similar trend as recorded at GFCF and LFR. However, moving on to FDI, there is found consistency since the recorded dispersion in the mean value is very minute even though there is a wider dispersion looking onto the maximum and minimum value. Lastly, the CPI is recorded for mean value of 98.86, median 87.26 with a significant dispersion from the mean value.

Deliberating the skewness, EGR and OPR are negatively skewed but not the rest. The figures of kurtosis show that EGR, GFCF, LFR, and FDI are platykurtic with a least normal distribution recorded with the reference of Jarque-Bera.

Table: 3
Descriptive Statistics

	EGR	OPR	GFCF	LFR	IOF	FDI	CPI
Mean	5.01	0.64	30.59	81.54	18.49	1.75	98.86
Median	5.48	0.69	28.76	14.00	16.45	0.88	87.26
Maximum	26.11	1.28	69.48	482.70	39.52	17.14	219.08
Minimum	-33.50	0.19	14.12	0.07	4.83	0.68	23.62
Std. Dev.	4.78	0.27	11.08	147.96	8.28	2.68	47.37
Skewness	-3.02	-0.07	1.31	1.97	0.60	3.16	0.50
Kurtosis	27.96	2.16	5.01	5.12	2.51	13.98	2.16
Jarque- Bera	5167.39	5.66	85.09	157.29	13.19	1257.13	13.39
Probability	0.00	0.06	0.00	0.00	0.00	0.00	0.00

The analyses of correlation analyses are given in Table 4. The results inspire to script negative connection subsistent between EGR and OPR. This helps to instill that at the back of rise in oil prices, the economic growth is to fall down. However, the extent of correlation of OPR with entire variables is moderate except with LFR. In case of EGR, mixed extent of meek correlation is found with the independent variables of the model. Similar trended correlation is evident looking onto the state of association of the regressor among one another.

Table: 4
Pair Wise Correlation Matrix

	EGR	OPR	GFCF	LFR	IOF	FDI	CPI
EGR	1.00						
OPR	-0.06	1.00					
GFCF	0.12	0.3	1.00				
LFR	0.09	-0.02	0.05	1.00			
IOF	0.01	0.3	0.64	-0.09	1.00		
FDI	-0.04	0.48	-0.08	0.16	0.1	1.00	
CPI	-0.13	0.59	0.05	0.2	0.23	0.08	1.00

The Pedroni (1999) test of cointegration is given in Table 5. The test shows evidence of long-term cointegration among the oil prices and economic growth. Out of seven statistics, five are held significant at 5 percent level of significance. Therefore, sufficiently confirm the long run cointegration. Next to that, Kao (1999) test is also exercised. The findings show the H_0 of no cointegration is rejected at 5 percent level of significance. And finally, Johansen Fisher Panel Cointegration Test also approve that five cointegration equation.

Table 5
Tests of Cointegration

Pedroni Test of Cointegration			
		t- Statistic	**Prob.**
Panel v-statistic*		1.38	0.08
Panel statistic	**rho-**	-0.98	0.16
Panel PP-statistic*		-5.15	0.00
Panel statistic*	**ADF-**	-1.91	0.02
Group statistic	**rho-**	0.35	0.64
Group statistic*	**PP-**	-6.45	0.00
Group statistic*	**ADF-**	-2.41	0.00
Kao (1999) Test			
Augmented Dickey-Fuller	**t-Statistic**	**Prob.**	
	-5.43	0.00	
Johansen-Fisher Test			
Hypothesized CE(s)	**Trace Stat.**	**Max. Eigen**	
None	362.1	247.0	
At most 1*	224.9	108.7	
At most 2*	136.7	73.52	
At most 3*	76.77	42.18	
At most 4*	44.05	32.04	
At most 5*	23.77	23.54	
At most 6	15.70	15.70	
Bound Test			
Wald Test F-Statistic*	295	0.00	

* Shows significant trace statistics & max. Eigen value

In results of long run coefficients are given in Table 6. The core variables of interest are oil prices and economic growth. The findings are based upon Pooled Mean Group ARDL. All the variables are significantly affecting economic growth. The coefficient of OPR is -4.11 which indicates that one unit increase in oil prices reduce economic growth by -4.11 units. Oil price rise is always tiring for economic growth. Being an important ingredient of production and growth, one can't neglect the usage of crude oil however, it is misleading to conclude that any rise in oil prices is to not possess any negative state of being with economic growth. The similar findings are authenticated by the empirics (Ali, 2016). Apart from country-wise analyses, the study of Bamisave and Obiyan (2006) found positive results of oil price rise on economic growth of Sub-Saharan Africa. Whereas, the long run coefficient of this study goes in line with those of Ehikioya et al. (2020), Babuga and Naseem (2022), Elhassan (2021), Adamu and Usman (2022), Ikechi and Anthony (2020), Raju et al. (2020), Prabheesh and Laila (2020), and Ifeonyemetalu et al. (2020). The coefficient of LFR is linear in relationship with EGR. An increase of 0.20 units is recorded at the back of one unit increase in LFR. Therefore, it confirms that labor force participation rate is meaningful for economic growth, akin to GFCF. Surprisingly, the long run effects of import of mineral fuel, lubricants, and other related products are posting significant and positive effect on EGR. Therefore, the conclusions of Abdlaziz (2022), Driouche et al. (2020), Bala et al. (2021), Saidu et al. (2021), Batanony et al. (2022), and Abdelsalam. (2023) are not foreign to the findings of this study. The results of FDI are shocking. Any increase in FDI is not to cause any positive results over the economic growth. government undue interventions, volatility in the inflows of FDI, and macroeconomic outlook matters a lot while the targeting economic growth at the back of FDI (Lensink & Morrissey, 2006; Herzer, 2010; Forte & Moura, 2013, Li & Liu, 2005). Moreover, CPI is

also located to possess significantly devastating long term effects on economic growth. Moreover, the coefficient of ECT bears the value of -1.57 which shows that the model is in the state of oscillatory convergence.

Table 6
Long Run & Short Run Results (Pooled Mean Group ARDL)

Variable	Coefficient	t-Statistic	Prob.
OPR	-4.11	-12.8	0.00
LFR	0.20	4.69	0.00
GFCF	0.13	13.8	0.00
IOF	0.11	5.97	0.00
FDI	-0.98	-2.06	0.04
CPI	-0.02	-11.7	0.00
Short Run Result			
ECT	-1.57	-1.65	0.09

The motive of robustness is achieved by the methodology of FMOLS. The findings are given in Table 7. The results encourage that the different methodologies also ascertain the similar trend of affectations over the economic growth. Thus, given the oil prices rise and other variables in the prescribed model of this study, the economic growth is recorded for same relationship.

Table: 7
FMOLS Results
Long Run & Short Run Results (Pooled Mean Group ARDL)

Variable	Coefficient	t-Statistic	Prob.
OPR	-3.44	-1.65	0.09
LFR	0.01	0.68	0.49
GFCF	0.10	1.78	0.07
IOF	0.16	1.95	0.05
FDI	-0.45	-2.24	0.02

Conclusion and Policy Recommendations

The oil crisis stands as a fundamental concern of developing and developed countries of the world. The empirics struggle to find the effects of oil price rise on the economic growth of world economies in separate and in group. In this regard, SAARC member countries are not away from the strong association of oil prices and economic growth. The contribution of SAARC region into world GDP is very remarkable. At the same time, the heavy reliance on imported crude oil is of greater concern as to how does such rising prices of oil are to cause economic growth target to move on. The analyses based upon the robust econometric techniques of Pooled Mean Group ARDL and FMOLS. The findings confirm depressing economic growth at the back of ever rising oil prices. The significant negative effect is located in long run however, in short run the direction of impact is negative but the coefficient value is negative. Therefore, it is concluded that oil prices and economic growth are connected in long run. Any effect of rising oil prices is traceable in long run time period. The impact of oil-based import is positive which does not negate the findings of early empirics. FMOLS based long run coefficient estimates are also akin to Pooled Mean Group ARDL results.

As a policy recommendation, rising oil prices which trigger the inflation rate need to be replaced by sufficient investment in renewable energy, implementation of the measure of efficient use of energy that can help reducing the overall energy consumption for more better results on GDP, exploration of substitute energy sources such as biofuel which can lead the economy towards the blue economy and thereby reduce vulnerability of oil prices. Not only this but by enhancing energy security, investing in the research and development, adjusting fiscal and monetary policy for pointing out the tax evasion, and international cooperation like trade agreements can assist in tailoring economic growth by surpassing the severe dependency on volatile world oil markets.

References

Abdelsalam, M. A. M. (2023). Oil price fluctuations and economic growth: the case of MENA countries. *Review of Economic and Political Science*, *8*(5), 353-379.

Abdlaziz, A. (2022). The asymmetry effect of oil consumption, unemployment and broadband technology on economic growth in Indonesia. *International Journal of Energy Economics and Policy*, *12*(2), 276-281.

Adamu, A., & Usman, H. H. (2022). Does oil price and production influence economic growth? Evidence from Nigeria. *Journal of Economics and Allied Research*, *7*(2), 146–159.

Ali, S. (2016). The impact of oil price on the economic growth: Test of the granger causality the case of OCED countries. *International Journal of Social Science and Economic Research*, 2455-8834.

Alkhateeb, T. T. Y., Mahmood, H., Sultan, Z. A., & Ahmad, N. (2017). Oil price and employment nexus in Saudi Arabia. *International Journal of Energy Economics and Policy*, *7*(3), 277-281.

Al-Marhubi, F. (2000), Export diversification and growth: An empirical investigation. *Applied Economics Letters*, *7*(9), 559-562.

Alsamara, M. K., Mrabet, Z., Elafif, M., & Gangopadhyay, P. (2017). The asymmetric effects of oil price on economic growth in Turkey and Saudi Arabia: New evidence from nonlinear ADRL approach. *International Journal of Development and Conflict*, *7* (2) , 97-118.

Artami, R. J., & Hara, Y. (2018). The asymmetric effects of oil price changes on the economic activities in Indonesia. *Jurnal Ilum Ekonomi*, *7*(1), 59-76.

Aziz, M. I., & Dahalan, J. (2015). Oil price shocks and macroeconomic activities in ASEAN-5 countries: A panel VAR approach. *Eurasian Journal of Business and Economics*, *8*(16),101-120.

Babuga, U. T., & Naseem, N. A. M. (2022). Oil price changes and economic growth: evidence from net Sub-Saharan Africa Oil exporting countries. *International Journal of Energy Economics and Policy*, *12*(2), 369-378.

Bala, U., Lee, C., & Majjama'a, R. (2021). Asymmetric pass-through effects of oil price on economic growth in Malaysia. *International Journal of Business and Society*, *22*(2), 753-764.

Bala, U., & Chin, L. (2018). Asymmetric impact of oil price on inflation: An empirical study of Africa OPEC member countries. *Energies*, *11*(11), 1-21.

Batanony, E., Amin, M., & Ghawy, E. (2022). The impact of crude oil price fluctuations on economic growth and non-oil exports in the Kingdom of Saudi Arabia: An ARDL approach. *International Journal of Development and Economic Sustainability*, *10*(2), 49-61.

Benli, M., Altintas, H., & Kaplan, M. (2019). Asymmetric effect of oil price on economic growth: evidence from Turkey. *International Congress of Management Economy and Policy*, *4*(1), 266-279.

Benramdance, A. (2017). Oil price volatility and economic growth in Algeria. *Energy Source, Economics, Planning and Policy*, *12*(4), 338-343.

Driouche, D. M., Attouchi, M., Chenini, M., & Benbouziane, M. (2020). Asymmetric responses of oil price shocks on economic growth in Algeria: An empirical analysis through NARDL approach. *Energy Economics Letters*, *7*(2), 74-93.

Ehikiioya, B. I., Omankhanlen, A. E., Babajide, A. A., Osuma, G. O., & Omodero, C. O. (2020). Oil price fluctuation and exchange rate in selected Sub- Saharan Africa countries: A vector error correction model approach. *International Journal of Energy Policy*, *10*(6), 242-249.

Elhassan, T. (2021). Impact of oil price fluctuations on economic growth in Saudi Arabia: Evidence from a nonlinear ARDL approach. *International Journal of Energy Economics and Policy*, *11*(5), 579–585.

Faridi, M. Z., Mehmood, K. A., Azam, A., & Taqi, M. (2019). Fiscal Decentralization and Economic Growth in South Asian Countries. *Pakistan Journal of Commerce and Social Science*, 2019, *13*(2), 529-546.

Fisher, R. A. (1932). *Statistical methods for research workers* (12th Edition), Oliver & Boyd, Edinburgh.

Forte, R., & Moura, R. (2013). The effects of foreign direct investment on the host country's economic growth: Theory and empirical evidence. *The Singapore Economic Review*, *58*(3), 1-27.

Foudeh, M., (2017). The long run effects of oil price on economic growth: The case study of Saudi Arabia. *International Journal of Energy Economics and Policy*, 2017, *7*(6), 171-192.

Ftiti, Z., Guesmi, K., Teulon, F., & Chouachi, S. (2016). Relationship between crude oil price and economic growth in selected OPEC countries. *The Journal of Applied Business Research*, *32*(1), 11-22.

Guney, P. O., & Hasanov, M. (2013). The effect of oil price changes on output growth and inflation: Evidence from Turkey. *Journal of Economics and Behavioral Studies*, *5*(11), 730-739.

Harb, N. (2009), Oil exports, non-oil GDP, and investment in the GCC countries. Review of Development Economics, *13*(4), 695-708.

Herzer, D. (2010). How does foreign direct investment really affect developing countries' growth? (IAI Discussion Papers, No. 207), Georg-August-Universität Göttingen, Ibero-America Institute for Economic Research (IAI), Göttingen.

Ifeonyemetalu, J. O., Ogu, C., & Ojimadu, P. K. (2020). Impact of oil price fluctuation on economic growth in Nigeria. *IOSR Journal of Economics and Finance*, *11*(6), 43-54.

Im, K. S., Pesaran, M. H., & Shin, Y. (2003). Testing for unit roots in heterogeneous panel. *Journal of Econometrics*, *115*(1), 53-74.

Johansen, S. (1988), Statistical analysis of cointegration vectors, *Journal of Economic and Control*, *12*, 231-254.

Kao, C. (1999), Spurious regression and residual-based tests for cointegration in panel data, *Journal of Econometrics*, *90*, 1–44.

Khayati, A. (2019). The effect of oil price and non-oil exports on economic growth in Bahrain. *International Journal of Energy Economics and Policy*, *9*(3), 160-164.

Kriskkumar, K., & Naseem, N. (2019). Analysis of oil price effect on economic growth of ASEAN net oil exports. *Energies*,12, 1-19.

Kriskkumar, K., Naseem, N. A. M., & Saini, W. N. W. A. (2022). Investigating the asymmetric effect of oil price on the economic growth in Malaysia: Applying augmented ARDL and nonlinear ARDL techniques. *SAGE Open* Journal, *12*(1),1-17.

Lensink, R., & Morrissey, O. (2006). Foreign direct investment: Flows, volatility, and the impact on growth. *Review of International Economics*, *14*(3), 478-493.

Levin, A., Lin, C. F., & Chu, C. S. J. (2002). Unit root tests in panel data: Asymptotic and finite-sample properties. *Journal of Econometrics*,*108*, 1-24.

Li, X., & Liu, X. (2005). Foreign direct investment and economic growth: An increasing endogenous relationship. World Development, *33*(3), 393-407.

Maghrebi, F., Mezouar, Z. C. E., & Almanjahie, I. (2018). Test of causality between oil price and GDP case study of Saudi Arabia. *Economic Computation and Economic Cybernetics Studies and Research*, *52*(3), 279-289.

Mahmood, H., & Murshed, M. (2020). Oil price and economic growth nexus in Saudi Arabia: Asymmetry analysis. *International Journal of Energy Economics and Policy*, *11*(1), 29-33.

Mehmood, K. A., Iqbal, A., Bashir, F., & Ahmad, R. (2022). Impact of foreign direct investment, rising oil prices, and industry value added on economic growth of Pakistan. *IRASD Journal of Economics*, *4*(2), 204–214.

Pedroni, P. (1999). Critical values for cointegration tests in heterogeneous panels with multiple regressors. *Oxford Bulletin of Economics and Statistics*, *61*, 653–670.

Pesaran, M. H., & Shin, Y. (1999) An autoregressive distributed lag modelling approach to cointegration analysis. In: Strom, S., Ed., Chapter 11 in Econometrics and Economic Theory in the 20th Century the Ragnar Frisch Centennial Symposium, Cambridge University Press, Cambridge, 371-413.

Phillips, P. C. B., & Perron, P. (1988). Testing for a unit root in time series regression (PDF). *Biometrika*. *75* (2), 335–346.

Prabheesh, K. P., & Laila, N. (2020). Asymmetric effect of crude oil and palm oil prices on economic growth: Evidence from Indonesia. *Bulletin of Monetary Economics and Banking*, *23*(2), 253-268

Rahimli, N., Nazirov, M. (2020). Impact of oil price on Azerbaijan economy: Relationship between oil price, real effective exchange rates and real GDP. *ASERC Journal of Socio-Economic Studies*, *3*(1), 37-45.

Raju, G. A., & Marathe, S. R. (2020). Relationship between crude oil price and macro-economic variables: Evidence from BRICS countries. *International Journal of Energy and Policy*, *10*(5), 264-271.

Rosnawintang, R., Tajuddin, T., Adam, P., Pasrun, Y. P., & Saidi, L. O. (2020). Effects of crude oil price volatility, the international and inflation on economic growth in AEAN-5 countries: A panel autoregressive distributed lag approach. *International Journal of Energy Economics and Policy*, *11*(1) 15-21.

Rumbia, W. A. Muthalib, A. A., Abbas, B., Adam, P., Millia, H., Saidi, L. O., & Azis, M. I. (2020). Crude oil price, household spending and economic growth in the ASEAN-4 region: An analysis of nonlinear panel autoregressive distributed lag. *International Journal of Energy Economics and Policy*, *10*(4), 437-442.

Saidi, L. O., Adam, P., Rahim, M., & Rosnawintang, R. (2019). The effect of crude oil price on economic growth in South East Sulawesi, Indonesia: An application of autoregressive distributed lag model. *International Journal of Energy Economics and Policy*, *9*(2), 194-198.

Saidu, M. T. (2021). Impact of oil price on economic growth, real effective exchange rate and inflation in South Africa, Morocco and Cote D' Ivoire (Doctoral Thesis). Universiti Putra Malaysia, Malaysia.

Sarwar, S., Chen, W., & Waheed, R. (2017). Electricity consumption oil price and economic growth: Global perspective. *Renewable and Sustainable Energy Reviews*, *6*(9), 9-18.

Taufani, A., Hakim, D. B., & Widyastutik, W. (2022). The Impact of Oil Price Shocks on Macroeconomics Indicators: Evidence from Four ASEAN countries. *Economic Journal of Emerging Market*, *14*(2), 271-286.

Yoshino, N., & Alekhina, V. (2016). Impact of oil price fluctuations on an energy exporting economy: Evidence from Russia. *Journal of Administration and Business Studies*, *2*(4), 156-166.