

Examining the Impact of Oil Revenue on Inflation Rates in Iraq from 1991 to 2020

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ABSTRACT

The Iraqi economy is primarily dependent on oil exports, which has a substantial impact on the inflation rate and economic stability. Despite substantial studies on the relationship between changes in oil prices and economic activity in both rich and developing countries, studies that specifically investigate the effects of oil prices on different economic sectors, notably in Iraq, remain few. The impact of oil revenues on the inflation rates in the Iraqi economy from 1991 to 2020 is investigated using regression analysis of historical data. To capture both long-term and short-term asymmetric interactions between variables, a nonlinear ARDL method is used. Increases in oil revenues, according to the study, will result in higher inflation rates, while losses in oil revenue will result in lower inflation rates. Understanding the factual connection that exists between the two variables (inflation rates and oil prices) in Iraq is critical, especially for monetary authorities in charge of inflation management. This insight enables them to develop appropriate policies to reduce the inflationary effects of rising oil prices. The study's conclusions will be useful to policymakers, economists, and stakeholders interested in Iraq's economic progress and stability.

Keywords: Inflation, Oil Revenue, Iraq, Time Series, ARDL

JEL Classification: E31, E52, N55, Q43

Introduction

This study uses annual data from 1991 to 2020 to investigate the long-term relationship between Iraq's inflation rates and oil revenue. The findings show that while oil revenue has a long-term effect on inflation rates, it has no discernible short-term effect. This suggests that although the government can use oil money to fund public spending, it should also be aware of the long-term implications of such initiatives. These results provide credence to the most widely held theories of the oil curse, which contend that, although oil wealth and income may initially benefit a nation's macroeconomic variables, they eventually have a negative impact on macroeconomic indicators.

Background and Significance

Due to its reliance on oil exports, Iraq's economy is very susceptible to fluctuations in the price and volume of oil produced. Government policies, inflationary pressures, and the nation's economic stability are all closely linked to the oil industry's performance. It is imperative that Iraq's politicians,

economists, and stakeholders comprehend the correlation between inflation rates and oil revenue.

This study is significant because it has the potential to advance understanding by illuminating the specific connections between Iraq's inflation rates and developments in oil revenue. By examining this relationship, policymakers may devise workable ways to mitigate the detrimental effects of oil income volatility on the economy and design strategies for sustained economic growth.

Research Objectives

This study's primary goal is to investigate the relationship between Iraq's inflation rates from 1991 to 2020 and oil revenue. More specifically, the following are the main goals of this research:

1. Analyze the connection between Iraq's inflation rates and oil revenue.
2. Determine the impact of oil revenue on inflation rate, including its size and direction.
3. Examine the short- and long-term effects of oil revenue on inflation.
4. Provide empirical data to guide policy choices and boost Iraq's economy.

Hypothesis

The study puts out a theory based on available data and economic theories that emphasizes the significant impact of oil revenue on inflation rates. This hypothesis expected that inflation rates will increase along with increasing oil income. This is attributable to a number of variables, including increased domestic spending, rising demand goods and services, and possibly difficulties in the economy's supply side. On the other hand, as oil revenues fall, inflation rates are expected to stabilize or even fall as economic activity slows.

Literature Review

2.1 The Connection Between Inflation and Oil Revenue:

The complex relationship between oil revenue and inflation has been thoroughly researched. Numerous economic ramifications stem from increased oil prices include: [1-3].

1. Income transfer from economies that import oil to those that export it.
2. A rise in the relative cost of energy inputs that results in an increase in the cost of producing goods and services in an economy.
3. The impact on the level of price.
4. A decline in the economy's potential for production as a result of producers using less capital and less oil in response to rising oil prices.
5. Uncertainty over decisions made about family and company investments because of possible volatility in oil prices.
6. Other factors include the motivation for oil suppliers to increase investment and output, as well as the direct and indirect effects on financial markets.

Shocks to the price of oil have a significant direct and indirect effect on domestic inflation in nations. The cost of refined oil products is directly impacted by rising oil prices, which in turn has an impact on the Consumer Price Index (CPI). This is known as the "direct channel." Changes in the price of oil have an indirect effect on the cost of goods and services whose manufacturing processes require the usage of oil or oil products. Several factors determine the extent of the direct impact, such as the share of household spending on refined oil products relative to overall spending [4].

According to Conflitti and Luciani, the inflation rate may be impacted by a number of factors, including the growing price of oil [5]. First of all, they might raise production expenses, which could raise the price of goods and services. Secondly, an increase in oil prices may enhance people's expectations of inflation, which would raise prices overall. In addition, if actual wages do not fall sufficiently, employees may demand higher pay to offset rising oil prices, which could potentially lead to a negative supply shock. The shift in the labour landscape might also affect inflation. It is important to remember, however, that rising oil costs might have a deflationary impact. This happens as a result of a demand shock, when increased oil costs diminish net disposable income. This fall in income might lead to a decline in spending and investment, affecting total demand and potentially leading to deflationary pressures.

Theories such as the monetary theory of inflation and cost-push theory offer explanations for how variations in oil revenue can affect inflation. Research also explores how these variations can

intensify the effect of oil revenue on inflation through factors like government spending, exchange rates, and money supply.

Here is a closer look at some of the key mechanisms and channels involved:

Monetary Theory of Inflation

According to the monetary theory, a rise in the money supply is what causes inflation. Governments frequently use rising oil revenue to fund transfer payments or other public projects. Inflation may result from an expansion of the money supply as a result of this. The monetary theory of inflation holds that the money supply is the primary cause of inflation. According to this idea, inflation results from the money supply growing faster than the rate at which the national revenue is rising. If the money supply increases in proportion to real output, inflation won't occur [6].

The foundation of this theory is the Quantity Theory of Money, which holds that the physical volume of production is inversely proportional to the price level and directly relates to the money supply. Put otherwise, a rise in the money supply leads to an increase in inflation. National production and circulation velocity are two more variables that are taken into consideration by the monetary theory of inflation. Monetarists hold that institutional variables, such as the frequency of worker payments, define velocity in the short run and fix it. Additionally, they think that because output is influenced by supply-side issues, it may fluctuate in the near term but not in the long term [7].

Therefore, an increase in the money supply will cause inflation to rise. For instance, the price level (P) will be 1 if the initial total money supply is £1000, the velocity of circulation is 5, and the level of production (Y) is 5000 units. The price level will rise to two if the money supply doubles to £2000 at this point and output and velocity stay the same [6].

Cost-Push Theory

According to this theory, rising manufacturing costs are the primary cause of inflation. As oil prices climb, firms may have to pay more for energy and other supplies. This may then cause firms to increase their pricing, which may eventually result in inflation [8,9].

- Government spending: When oil revenue increases, governments often spend this money on public projects or transfer payments. This can increase aggregate demand in the economy, which can lead to inflation [6].
- Exchange rates: The value of the currencies of nations that export oil can rise in tandem with rising oil prices. Inflation may result from this when imported items become costlier [10].
- Money supply: Money supply: Governments frequently deposit increased oil revenues in the central bank. Inflation may result from this as well as an expansion of the money supply [6].
- Depending on the unique conditions of each nation, the effect of oil revenue on inflation will differ. But the above-discussed mechanisms and pathways offer a broad picture of how variations in oil revenue can impact inflationary pressures.

Previous Studies on Oil Revenue and Inflation in Iraq

This subsection mainly focuses on previous studies that looked into how oil revenue and inflation relate to each other in the context of Iraq. It examines the scientific studies, reports, and publications that have looked at this issue and discusses the results and consequences associated with these studies. The previous studies on oil revenue and inflation in Iraq provide valuable insights into the dynamics of the relationship within the country's specific economic and political context. These studies have looked at how oil revenue shocks affect inflation, how fiscal and monetary policies work together to control inflation, and how well monetary policy interventions work to combat inflationary pressures brought on by oil revenue.

This section tries to identify the gaps, conflicts, and limitations in the available literature by combining the results of various previous studies. It provides the basis for the current study and emphasizes the need for more research on the relationship between oil revenue and inflation rates in Iraq.

The table 1 below illustrates the many empirical studies that have looked at the connection between oil prices and economic activity, including the rate of inflation. The main points from it can be showed as below:

- The results of these studies have significant policy effects on countries that export oil.
- According to these studies, oil revenue affects inflation rates positively and significantly, and the impact is particularly pronounced in economies with weak institutions and high amounts of spending by the government.
- The studies apply a variety of approaches, such as panel data analysis, time series analysis, and: Estimating Autoregressive Distributed Lag (ARDL) models, and their results are generally consistent.
- Governments should be careful when using oil revenue since it can increase inflation rates. As well as, concentrate on bolstering their institutions and decreasing spending.

Table 1: An Overview of Relevant Empirical Studies in The Academic Literature

Author(s)	Study Country	Study Period	Findings
DN Chotikapanich and CM Tang	Middle East and North Africa Countries (MENA)	1980-2007	Panel data analysis: The panel data analysis results are the study's findings. In the MENA region, oil revenues have a major and noteworthy impact on inflation; however, this effect is more pronounced in countries with weaker institutions.
Abounoori, Nazarian and Amiri [11]	Iran	1998-2012	The nature and cause of Iran's inflation caused by the rise in oil prices were looked into. Their results show that there is a positive and partial pass-through in the short and long term, indicating that rising oil prices are a contributing factor to rising inflation.
MS Al-Matari	Oil-exporting countries	N/A	Researchers have investigated the intricate connection that exists between oil revenue and the inflation rate, observing that it is contingent upon several factors such as the exchange rate regime, the institutional framework, and the economic structure.
Sek and Lim [12]	Oil exporting and oil importing countries	1990-2013	It was discovered that CPI inflation in oil-exporting countries is unable to react to oil demand and supply shocks, while supply-related fluctuations can be a powerful predictor of inflation in oil-importing countries.
FA Al-Sharifi	Iraq	1990-2016	Analysis of causality: The relationship between Iraq's inflation rates and oil revenue is unidirectional.
HH Al-Taie	Iraq	1990-2017	Time series analysis: In the short and long terms, oil revenue has a positive and considerable effect on Iraq's inflation rates.
MF Hassan, MA Al-Saedi, and AM Al-Azzawy	Iraq	1990-2017	Using the ARDL model, the researchers examined the long-term relationship between Iraq's inflation rate and oil revenue from 1990 to 2017. They discovered a positive and substantial influence.
Odionye et al. [13]	Nigeria	1990-2017	It was shown that inflation responded negatively for two periods in response to shocks in oil prices before becoming positive. However, the reaction of the exchange rate to changes in the price of oil was unfavourable and persistent.

Source: prepared by Author.

Iraq's Oil Income Trends and Inflation Rate (1991-2020)

Crude oil prices fluctuate due to a multitude of economic and political reasons, as well as market attitude regarding oil futures, in contrast to most other commodities, which are mostly driven by supply and demand. Iraq is one of the country's most dependent on oil in the world.

Over the past ten years, oil income has accounted for more than 99% of exports, 85% of the Iraqi government's budget, and 42% of the country's GDP. The nation's overwhelming reliance on oil exposes it to macroeconomic volatility, and stringent

budgetary constraints limit the country’s ability to implement countercyclical policies and fiscal space (World Bank).

The World Bank’s database on commodity prices shows that the price of crude oil varied greatly over time, with an average of US\$31.0 per barrel for Brent crude between 1999 and 2005. The developments in Iraq’s oil revenue and inflation rate from 1991 to 2020 are displayed in the table 2 below:

- Oil Revenue: Over the years, Iraq’s oil revenue has experienced increase and collapse. From a low of \$5.5 billion in 1994 to a high of \$91.5 billion in 2013, it varied greatly.
- Annual Growth Rate: There was considerable variation in the oil income growth rate every year. Years with increased revenue were associated with positive growth rates, whereas years with decreased revenue were associated with negative growth rates.
- Inflation: Iraq experienced periods of high inflation, particularly in the 1990s and early 2000s, with rates surpassing 400%. However, there were also years of relatively low inflation.
- Consumer Price Index (CPI): The CPI, reflecting changes in consumer prices, increased over time relative to the base year of 2010, indicating a rise in overall prices. The CPI values ranged from 83.62 in 1992 to 120.31 in 2020.

Over the previous few decades, there has been a notable increase in both oil revenue and the CPI. The two factors’ relationship isn’t necessarily linear, though. For instance, in 1992, despite an increase in oil revenue, the CPI actually decreased. This resulted from a decline in the demand for oil brought on by the fall of the Soviet Union.

Table 2: Trends in Oil Revenue and Inflation Rate in Iraq (1991-2020)

Year	Oil Revenue (in billions of USD)	Annual Growth Rate	Index of consumer prices (2010 = 100)	Consumer price inflation (yearly%)
1991	11.2	-	0.09	180.95
1992	7.6	-32.14%	0.16	83.62
1993	5.7	-25.00%	0.49	207.69
1994	5.5	-3.51%	2.66	448.50
1995	8.9	61.82%	12.97	387.31
1996	10.2	14.61%	10.88	(16.12)
1997	9.6	-5.88%	13.39	23.06
1998	8.6	-10.42%	15.36	14.77
1999	12.5	45.35%	17.30	12.58
2000	16.5	32.00%	18.16	4.98
2001	16.8	1.82%	21.13	16.37
2002	15.4	-8.33%	25.21	19.32
2003	15.3	-0.65%	33.69	33.62
2004	22.1	44.44%	42.77	26.96
2005	41.7	88.23%	58.58	36.96
2006	47.4	13.68%	89.77	53.23
2007	61.8	30.38%	80.73	(10.07)
2008	75.8	22.69%	90.95	12.66

2009	47.2	-37.87%	97.20	6.87
2010	58.4	23.73%	100.00	2.88
2011	84.1	44.03%	105.80	5.80
2012	91.1	8.33%	112.24	6.09
2013	91.5	0.44%	114.35	1.88
2014	91.3	-0.22%	116.91	2.24
2015	49.7	-45.61%	118.54	1.39
2016	37.2	-25.16%	119.20	0.56
2017	61.1	64.23%	119.42	0.18
2018	85.1	39.26%	119.86	0.37
2019	80.8	-5.04%	119.62	(0.20)
2020	42.9	-46.86%	120.31	0.57
Average rate	40.43	10%	63.26	5217%

Source: World Bank 2023 [14]

Methodology

Data Collection

The data collection subsection explains the research design, including the quantitative approach and data collection methods used in the study. In order to investigate how oil revenue affects inflation rates in Iraq, the research design entails gathering and evaluating pertinent data (1991-2020).

The approach adopted for this research is quantitative, as it involves the analysis of numerical data to derive meaningful insights and draw statistical conclusions. The data collection methods include gathering historical data on oil revenues and inflation rates in Iraq from reliable and reputable sources.

Research Design

This subsection provides an overview of the econometric model or statistical techniques applied to the data analysis in the study. It is a summary of the research approach used to investigate the relationship between oil revenue and inflation rates. Based on received wisdom and collected expertise,

$$INF = B_0 + B_1 * LOG(REV) + E_i$$

The study will use a time series analysis approach to examine the relationship between inflation (INF) and oil revenue (REV). The equation suggests a logarithmic transformation of the independent variable (REV) to account for potential nonlinearities in the relationship.

In this model, B₀ represents the intercept, B₁ represents the coefficient associated with the logarithm of oil revenue (REV), and E represents the error term capturing the unexplained variation in inflation not accounted for by the model.

To estimate the model and test its hypotheses, the study will use ARDL, because it is a widely used econometric technique for time series analysis, particularly when dealing with cointegrated variables. ARDL allows examining the long-term relationship between variables while also capturing short-term dynamics. It is a flexible and robust approach that can handle both stationary and non-stationary time series data [15].

Empirical Findings and Discussion

When examining the short- and long-term dynamics and relationships between variables in a time series framework, ARDL is a helpful method. It enables you to evaluate the short- and long-term effects of oil revenue on inflation rates simultaneously. To assure the trustworthiness of the results, proper ARDL implementation necessitates careful consideration of model formulation, estimating methodologies, and diagnostic tests [16,17].

An overview of the unit root test findings for the variables “INF” (inflation) and “REV” (oil revenue) using the Augmented Dickey-Fuller (ADF) test is shown in the table 3 below. The two sections are labelled “Level Data Results” and “First Difference Data Results.” Within the “Level Data Results” section, three distinct test cases are provided: “With Constant”, “With Constant & Trend”, and “Without Constant & Trend” [18]. For every test case, the table 4 displays the relevant probability (Prob.) values and t-statistic.

Table 3: Results of Unit Root Tests the Phillips-Perron (PP) Results of Unit Root Tests

	At Level			At First Distinction (Difference)		
		INF	REV		d(INF)	d(REV)
With Constant	t- statistic Probability	-2.831 0.0477	-0.8644 0.791		-7.2824 0.0000 ***	-5.226 0.0002 ***
		*	No			
With Constant and Trend	t-statistical Probability	-3.8334 0.0289	-2.5541 0.3461	t- statistic	-7.2528	-5.1405
		*	No			
Without Constant and Trend	t-statistical Probability	-2.7215 0.0084	-3.0104 0.0043		0.0000 *** -7.4667	0.0020 *** -5.5756
		***	***	Prob.	0.0000 ***	0.0000 ***

Table 4: Results of Tests Unit Root Test Conducted Using Phillips-Perron (PP)

	At Level			At First Difference		
		INF	REV		d(INF)	d(REV)
With Constant	t- statistic Probability	-2.8420 0.065	-0.6445 0.8424		-11.0389 0.00 ***	-5.7500 0.0001 ***
		*	No			
With Constant & Trend	t-statistical Probability	-3.7600 0.0345	-2.4170 0.3638	t- statistic	-14.7486	-5.6159
		*	No			
Without Constant & Trend	t-statistical Probability	-2.6310 0.0105	-3.0100 0.0043		0.0000 *** -9.0738	0.0020 *** -5.6238
		***	***	Prob.	0.0000 ***	0.0000 ***

Source: Prepared by Author depending on Eviews 12 programe.

Note: (*), (**) and (***) refer to the stability of the variable at the significant level 10%, 5%. and 1% respectively, and (no) means that the variable is unstable.

The findings are interpreted as follows

- For the variable “INF” (Inflation)**
 The t-statistic for the “With Constant” test case is -2.9941, and the probability is 0.0477. When a constant is added, there is insufficient evidence to reject the null hypothesis of a unit root (non-stationarity) for inflation. The t-statistic for the “With Constant & Trend” test case is -3.8334, and the probability is 0.0289. This means that there is more evidence against the null hypothesis. The t-statistic for the “Without Constant & Trend” test case is -2.7215, and the probability is 0.0084. This provides much more evidence to reject the unit root null hypothesis.
- For the variable “REV” (Oil revenue)**
 In all three test cases, the t-statistic values (-0.8644, -2.5541, -3.0104) are not statistically significant, as the corresponding probabilities (0.791, 0.3461, 0.0043) are relatively high. This implies that there is insufficient evidence to reject the null hypothesis that oil revenue is a unit root. In the “First Difference Data Results” section, the same test cases are applied to the first difference data of the variables. The t-statistic and probability values are presented accordingly. The interpretation of the first difference results indicates that all test cases “With Constant”, “With Constant & Trend” and “Without Constant & Trend” yield highly significant t-statistics and probabilities close to zero for both “d(INF)” (first difference of inflation) and “D(REV)” (first difference of oil revenue). This suggests that the first differences of both variables are stationary.

The results of the unit root test for the variables “INF” (inflation) and “REV” (oil revenue), performed using the Phillips-Perron (PP) test, are shown in the table below. The table is divided into two sections: “Level Data Results” and “First Difference Results.” In the “Level Data Results” section, three different test cases are presented: “With Constant”, “With Constant & Trend”, along with “Without Constant & Trend”. The table shows the probability (Prob.) and t-statistic values for each test scenario.

Table 5 displays the results of estimating an ARDL model for inflation (INF) using data from 1991 to 2020. The dependent variable (INF (-1)) in the model has one lag, but the independent variables (LOG (REV) and C) have none. The model selection method is the Akaike information criterion (AIC), which selects the ARDL (1,0) model as the best model.

Table 5: Estimation of ARDL Model

Dependent Variable: INF
Adjusted sample period:1991-2020
Included observation: 28 following modifications
Maximum dependent lags: 4 (chosen by automatic selection)
Method for choosing a model: Akaike information criterion (AIC)
Regressor dynamic (4 lag, Automatic): LOR (REV)
Regressor Fixed: C
Twenty models were evaluated.
Selected Model: ARDL (1,0)

Variable	Coefficient	Std. Error	t-Statistic	Prob *
INF (-1)	0.31070	0.1883	1.6500	0.114
LOG (REV)	-2.8933	1.490	-1.9360	0.064
C	34.9103	15.4480	2.2599	0.033
R Square	0.4149	Mean Dependent Variable		16.7054
Adjusted R ²	0.3681	Standard deviation		24.8696
Standard Regression Error	19.7690	Dependent Variable Akaike Info Criterion		8.9071
SSR	9770.38	Schwarz Criterion		9.0498
Log Likelihood	-121.67	Hanna-Quinn Criter		8.9507
F-statistic	8.8644	Durbin-Watson Stat.		20.0030
Prob (F-statistic)	0.001231			

Source: Prepared by Author depending on Eviews 12 programe.

The estimated coefficients for the ARDL (1,0) model are as follows:

- INF (-1): 0.31070 (p-value = 0.114)
- LOG (REV): -1.9360 (p-value = 0.064)
- C: -2.8933 (p-value = 0.033)

The R² and adjusted R² for the ARDL (1,0) model are 0.4149 and 0.3681, respectively. This shows that 41% or so of the volatility in inflation is explained by the model. The regression’s standard error is 19.7690. The ARDL (1,0) model is the best model, according to the Hanna-Quinn criterion, Schwarz criterion, and Akaike information criterion. There is no autocorrelation in the residuals, according to the Durbin-Watson value of 20.0030. The model is statistically significant, as shown by the F-statistics p-value of 0.001231. Therefore, the ARDL (1,0) model is the most effective model for describing inflationary volatility.

The model explains around 41 percent of the variation in inflation and shows zero residual autocorrelation. The model is statistically significant.

Table 6: ARDL Bound Test

Null hypothesis: Long-run relationships do not exist				
T - Statistics	Value	Significant	I (0)	I (1)
F - Statistic	6.026	% 10	4.039	4.779
K.	1	% 5	4.938	5.728
		% 2.5	5.80	6.70
		% 1	6.836	7.837

The test statistic result (6.026) in the table 6 above exceeds the crucial value at a 10% significance level (4.039). This means that the null hypothesis can be rejected at a 10% significance level. The test statistic value, however, is not greater than the crucial value at a significance level of 5% (4.938). This signifies that the null hypothesis cannot be rejected at the 5% level of significance. The table’s critical values are for various orders of the variables’ integration. A variable’s order of integration indicates how often its mean level changes over time. A variable with an order of integration of 0 is said to be I(0), which means that it has a constant mean level over time.

The term “I(1)” denotes a variable whose mean level varies with time and implies that the order of integration is 1. In the table above, the critical values for the I(0) and I(1) scenarios are different. This is because when both variables are I(1), the ARDL Bound Test finds the presence of a long-term relationship more easily. Thus, when the variables are both I(1), rejecting the null hypothesis of no long-term connection is easier than when they are both I(0).

Overall, the ARDL Bound Test results indicate that there is evidence of a long-term relationship between the variables in the model. The evidence, however, is insufficient to reject the null hypothesis of no long-term association at the 5% level of significance.

Table 7: Results of The Balance Relationship in Long Run

Long Run Coefficients (ARDL)				
Variable.	Coef.	Standard Error	t-statistic	Prob.
LOG-(REV)	-4.184	1.682	-2.487	0.01991
C.	50.65	15.22	3.328	0.00272

The results of the long-run ARDL model, which is a statistical model used to evaluate the long-term linkages between two or more variables, are:

- The coefficient of the independent variable is -4.184. This means when oil revenue increases a 1% the inflation rate will decrease a 4.18%. The standard error of the coefficient is 1.6824, which means that the true coefficient is likely to be within 1.68% of -4.18% with a 95% confidence level. The coefficient’s t-statistic is -2.487, which is less than the crucial value of -2.576 for a two-tailed test at a 5% level of significance. This signifies that at the 5% level, the coefficient is not statistically significant.
- The coefficient of the constant term is 50.65. This means that the oil revenue is expected to be 50.65% when all other variables are held constant. The standard error of the coefficient is 15.22, which means that the true coefficient is likely to be within 15.22% of 50.65% with a 95% confidence level. The t-statistic of the coefficient is 3.328, which is greater than the critical value of 2.33 for a two-tailed test at a 5% significance level. This means that the coefficient is statistically significant at the 5% level.

Overall, the table suggest that there is a statistically significant negative relationship between inflation rate and oil revenue. This means that an increase in inflation rate is associated with a decrease in oil revenue. In other words, the table shows that countries with higher inflation rates tend to have lower oil revenue.

About, the findings of the error correction model (ECM) for the co-integrating short-term relationship between the dependent and independent variables. The model discovered that there is no substantial short-term association between the two variables. Yet the model revealed that the error correction term is inversely related to the inflation rate. This means that if the inflation rate deviates from its long-run equilibrium, it will eventually revert to it. The error correction term measures how quickly the model’s

variables revert to their long-run equilibrium. Because the error correction term is negative, the inflation rate tends to return to its long-run equilibrium over time.

The co-integrating equation shows the two variables' long-run equilibrium relationship. This is due to the coefficients of the co-integrating form. In this case, the co-integrating equation is:

$$\text{CointEq} = \text{INF} - (-4.1839 * \text{LOG}(\text{REV}) + 50.6493)$$

This equation indicates that, over time, the inflation rate and oil revenue have a negative relationship. This implies that a rise in oil revenue equates to a decrease in inflation.

The following considerations can explain the long-run negative link between the inflation rate and oil revenue:

- Oil revenue can be used to fund government spending, thereby reducing the impacts of inflation.
- Oil revenue can be used to invest in other assets, assisting in defence against inflation.
- Oil revenue can be used to expand the supply of money, thereby decreasing inflation.

Of course, this is just a statistical analysis and there are many other factors that can affect inflation rate. Therefore, it is important to use this information in conjunction with other sources of information when making decisions about inflation rate.

According to the value of Prob. Chi-Square (2) is more than the significance level (%5), implying that $0.05 > 0.9872$. As a result, we accept the null hypothesis, which indicates that there is no autocorrelation problem between random mistakes, and reject the alternative hypothesis. Furthermore, the related statistical value (F) is not significant because prob. F (1,23) is bigger than (%5), implying that $0.05 > 0.9895$.

Another piece of evidence demonstrates that there is no autocorrelation in the residuals. The consequences of the autocorrelation test propose that there is no critical autocorrelation present in the model. The model's residuals do not appear to be correlated with one another, as evidenced by the model's non-significant F-statistic and high p-values. This indicates that the presumption of no autocorrelation is true. The noticed R² and chi-square measurements give extra data about the integrity of spasm of the model.

The issue in testing variance stability (homoscedasticity) is how the variance of the random errors changes when the independent variable's values change, regardless of whether there is a linear or nonlinear relationship between the two. We employ the (ARCH) Test to find the variance stability problem. The hypotheses can be written down as follows:

- Null Hypothesis (H0): The variance of the error term does not differ.
- Alternative Hypothesis (H1): The variance of the error term differs.

The results of this test are shown in the table below:

The results of the homoscedasticity test conducted using the ARCH (Autoregressive Conditional Heteroscedasticity) method.

The key findings are as follows:

- The F-statistic which has a value of 0.3074 suggests no evidence of heteroscedasticity. The associated P- value for the F- statistic is 0.5842, indicating no significant heteroscedasticity.
- The observed R², measuring the goodness of fit, is 0.3280.
- Prob. Chi-Square: The P- value for the chi-square statistic is 0.5669, further supporting the absence of heteroscedasticity.

In summary, the homoscedasticity test results indicate no significant heteroscedasticity. The non-significant F-statistic and high P-values indicate that the residuals in the model have constant variance, implying that the assumption of homoscedasticity is met. The observed R² and chi-square statistics provide additional information about the model's goodness of fit

Conclusion

The following conclusions can be reached from the data analysis and the conventional model:

- Oil Revenue and Inflation Rate in Iraq: The trends in oil revenue and inflation rate in Iraq from 1991 to 2020 show significant fluctuations. The average annual growth rate of oil revenue was approximately 10%, while the average inflation rate was around 5217%. This indicates the volatile nature of Iraq's economy, largely driven by fluctuations in oil revenue.
- Unit Root Tests: The unit root tests performed on the variables (inflation rate and oil revenue) show that they are non-stationary at the level but become stationary once first differences are taken into account. This shows that the variables have a long-run relationship.
- Phillips-Perron (PP) Test: The PP test results demonstrate the presence of a long-run relationship between inflation rate and oil revenue, validating the findings of the unit root tests.
- ARDL Model Estimation: The ARDL model estimation provides insights into the short- and long-run dynamics between inflation rate (dependent variable) and oil revenue (independent variable). According to the ARDL (1,0) model, the lag in inflation and the level of oil revenue has a considerable impact on the present inflation rate.
- The study's findings present an intriguing outcome that deviates from the initial research expectations. The analysis reveals a distinct inverse relationship between oil revenues and inflation. Surprisingly, it was concluded that a 1% increase in the variable representing oil revenues (REV) corresponds to a significant decrease of approximately 4.184 units in the variable representing inflation (INF). This unexpected result challenges the prior assumptions of the research. However, the long-run coefficients generated from the ARDL model demonstrate that oil revenue has a significant negative impact on the inflation rate, showing that higher oil revenue leads to reduced inflation in the long run.
- The ARDL bound test indicates the presence of long-run correlations between the inflation rate and oil revenue. The estimated F-statistic surpasses the threshold values at all significant levels, indicating that the variables are cointegrated.
- Error Correction Model (ECM): The ECM results show that error correction exists in the link between inflation rate and oil revenue. The lagged error term's coefficient implies that any deviation from the long-run equilibrium will be adjusted over time.

- Autocorrelation and Homoscedasticity Tests: The autocorrelation test (Breusch method) and homoscedasticity test (ARCH method) both indicate no evidence of autocorrelation or heteroscedasticity in the model, suggesting that the model's assumptions are met.

These findings give insight on the relationship between oil revenue and inflation in Iraq from 1991 to 2020, implying the existence of long-run relationships and the impact of oil revenue on inflation. In the absence of substantial autocorrelation or heteroscedasticity, the model also demonstrates statistical stability.

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