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The Effects of Gold and Oil Prices on Saudi Arabia's GDP from 2001 to 2023

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Abstract

Purpose: The purpose of this study is to examine how fluctuations in oil and gold prices have influenced Saudi Arabia's GDP from 2001 to 2023. Given the country's status as one of the world's largest oil exporters, its economic stability is closely tied to changes in oil prices. While gold plays a less central role, it still impacts the economy by shaping investor confidence and serving as a safe haven during times of uncertainty.

Materials and Methods: The study employs a detailed analysis of historical trends and economic indicators to explore the relationship between oil and gold prices and their effects on GDP. A multiple linear regression model is used to examine these relationships. Factors such as inflation and investment patterns are considered to assess the strength and implications of these correlations.

Findings: The findings reveal that oil prices have a significant and direct impact on Saudi Arabia's GDP growth, with an increase in oil prices being associated with a substantial decrease of 6.52 units in GDP. This underscores the country's economic reliance on oil exports. On the other hand, gold prices positively contribute to GDP, with an increase of 2.20 units, highlighting their role in influencing economic factors such as inflation, investment trends, and investor sentiment. These results underscore the vulnerabilities associated with commodity price fluctuations and their substantial impact on economic performance.

Implications to theory, Policy and Practice: To address these challenges, the study recommends that policymakers focus on stabilizing oil and gold prices to mitigate economic volatility. Additionally, achieving the goals of Vision 2030 is essential, emphasizing the need to diversify the economy and reduce dependence on oil. Strengthening economic resilience and fostering sustainable growth strategies are critical steps toward ensuring long-term prosperity.

Keywords: *Saudi Arabia, GDP, Oil Prices, Gold Prices, Economic Growth, Inflation, Investment Trends*

JEL Codes: *Q33, E31, O11, F40, G15*

INTRODUCTION

In this study, we will study the extent of the impact of oil and gold prices in the Kingdom of Saudi Arabia, and we will explain the extent of their impact and how they affect, starting with the economy of the Kingdom of Saudi Arabia, which depends on basic materials and commodities, the subject of the impact of oil and gold prices on economic performance is a subject of great importance, considering that Saudi Arabia is one of the largest oil exporting countries in the world. Therefore, the gross domestic product of the Kingdom of Saudi Arabia is greatly affected by changes in oil prices, which is a necessary source for Saudi Arabia to maintain stability in the economy. Gold also comes with fewer impact, but gold is considered an asset for investors and a good stock reserve, and gold prices can affect economic indicators.

This study aims to analyze the extent to which the GDP of the Kingdom of Saudi Arabia affects the change in oil and gold prices and to understand the relationship between oil and gold prices in economic growth, especially in the presence of the goal of the Kingdom's Vision 2030 to diversifying the economy to reduce dependence on oil revenues the Saudi economy. In this study, we seek to show the importance of oil and gold prices over GDP, as oil and its products are among the most important factors affecting the Saudi economy and gold is one of the most important assets for Saudis since ancient times. We also seek to clarify the importance of continuing to diversify sources of income for Saudi Arabia to provide a more sustainable economic environment.

This study will provide a definition of the flexibility of the Saudi economy and clarify the weaknesses that may occur in the context of reducing Saudi Arabia's dependence on oil. In analyzing and determining the degree of correlation and causality, this study will use quantitative analysis to consider data from 2001 to 2021 on the variables of GDP, the consumer price index, savings, and gold and oil prices. The study will also analyze the extent to which these variables are related to external variables such as global markets and technological developments. The study seeks to provide suggestions for adopting a new economic approach in the Kingdom of Saudi Arabia and understanding the extent to which variables are affected in the Saudi economy.

Problem Statement

The economy of Saudi Arabia is heavily dependent on the price of oil and Current research confirms the strong correlation between oil prices and economic development in Saudi Arabia. However, there are some concepts regarding how fluctuations in gold prices also affect economic dynamics. Therefore, not enough is known about the relationship between oil and gold prices, especially in uncertain economic times. This study examines the impact of both commodities, gold and oil, on the Saudi economy to understand the extent of the impact and attempt to minimize the impact. Furthermore, global factors such as geopolitical tensions, market volatility, and economic sanctions compound these challenges, making it even more crucial for Saudi Arabia to adapt to external influences. The findings of this study will provide valuable insights for Saudi policymakers, guiding them in developing strategies to stabilize the economy and reduce dependency on oil, thus fostering sustainable economic growth.

Research Objective

The main objective of this study is to study how the economy in the Kingdom of Saudi Arabia is affected by changes in gold and oil prices, especially in some variables that this study will address:

1. To evaluate the contribution of oil and gold prices to the overall GDP of Saudi Arabia.

2. To analyze the impact of fluctuations in oil and gold prices on CPI in Saudi Arabia.
3. Analyze the correlation between gold and oil prices with savings variables, GDP, and CPI.
4. To offer recommendations and policy implications for stabilizing oil and gold prices to support sustainable economic growth in Saudi Arabia.

Research Questions

- What is the impact of oil prices on the GDP of Saudi Arabia?
- How do fluctuations in gold prices relate to changes in Saudi Arabia's GDP?
- How much do fluctuations in gold price affect consumer behavior and investments in Saudi Arabia?
- How do savings changes influence the oil and gold markets, and what is their subsequent effect on Saudi Arabia's GDP?

Relevance and Importance of the Research

The study will focus on the economic variables in Saudi Arabia in terms of how the variables of gold and oil prices affect the stability of the country. The results of the study will benefit investors and economists as it will provide them with a more comprehensive understanding of the opportunities and risks associated with the global gold and oil markets. The study aims to gain a greater understanding of the economy in Saudi Arabia by studying the effects of oil and gold prices.

Literature Review

This literature review seeks to analyze the interactions between the prices of commodities, specifically oil and gold, and the economy with respect to Saudi Arabia. The unique feature of the Kingdom's economy is that it is extremely dependent on oil and is now starting to shift towards gold as a reserve asset. Newer literature, particularly after 2020, adds diversity towards price dynamics of commodities which makes this review richer.

Applicability to Saudi Arabia's Economic Structure

Saudi Arabia is single-handedly one of the largest producers of oil which has enormously shaped the GDP, fiscal policy, and economic stability of the Kingdom in the past. All these factors highlight the importance of oil revenues. With the new focus on economic diversification through Vision 2030, there is an augmented inclination to gold. This literature review aims at providing a comprehensive understanding on how fluctuations of gold and oil prices affects Saudi Arabian economic growth and stability.

Review of Key Studies

(Bildirici, 2018) – "The Effect of Oil and Gold Prices on Oil-Exporting Countries": This particular study analyzes how the prices of commodities affect financial markets, specifically between the years 2015 and 2021. It is useful for our study because it studies the economic conditions and how one is able to model investor behavior and the market's reaction towards it: in this case, Saudi Arabia's gold and oil prices and their effects on the GDP. The findings discussed in this study allow us to design a methodology that takes into consideration the Saudi economy, which, in turn, informs our study.

(Bildirici, 2018) – "The Effects of Oil and Gold Prices on G7 Countries": This study, although focusing on developed economies, provides insightful comparative analysis on the instability in the price of products and the volatile economic state. The investigation into the G7 country's

economic conditions and their integration with the Saudi's economic model in regard of gold price changes phenomenon make its use self-evident because of the country's strong economic focus on oil and the growing efforts towards gold exploration.

(Lubis, 2021) - "The Effect of Oil Prices, Gold, and Exchanges on JCI During the Covid-19": This research illustrates the importance of gold in ARIMA and GARCH/ARCH models by using gold as a stabilizing asset in an economic crisis. This is relatively important for Saudi Arabia as well as it argues for gold's ability to provide economic diversification during uncertain times when oil prices appreciate.

(Raza, 2016) - "The Asymmetric Impact of Gold and Oil Prices on Stock Markets in Emerging Markets": This study reveals a variance of responses towards commodity price changes amongst newly industrialized nations which also hints that Saudi Arabia does not have a one-size-fit-all economic model. Recognizing these discrepancies is important because it assists in estimating certain ramifications on Saudi Gross Domestic Product which is why gold merits a closer examination in economic analysis.

(Tursoy, 2018) - "The Impact of Gold and Crude Oil Prices on the Stock Market in Turkey": This research employs the ARDL model to ascertain both immediate and delayed effects of changes in commodity prices on economic growth. Its conclusions significantly strengthen the justification of the hypothesis of the current study, especially with regard to the relations of oil and gold with the GNP of Saudi Arabia.

(Bekzhanova, 2023) - "The interrelation of gold and oil price changes and stock returns of Kazakhstan's energy companies": This study sheds light on how gold price changes impact market operations as well as the behavioral patterns of consumers. It is important for Saudi Arabia because it can assist in formulating plans for economic diversification as well as enhancing structural resilience.

Integration with Research Objectives

Every and any research will always have a purpose, and the overarching objective is achieved through validating key hypotheses filling gaps in existing literature and making informed methodological decisions. Undoubtedly, these studies provide substantiation towards achieving the study objectives.

- To scrutinize the input oil and gold prices make towards the overall GDP of Saudi Arabia, (Bildirici, 2018) and (Tursoy, 2018) econometric analysis have constructed the contours of the analyzed GDP contributions.
- To determine what the relationship of Saudi Arabia's CPI has with the changes in oil and gold prices, Studies by (Lubis, 2021) and (Raza, 2016) provide an overview of price change and its effects on other measures of economic activity including CPI.
- To ascertain the relationship of gold and oil prices with savings, GDP, and CPI, Emerging markets (Lunt, 2016) and Kazakh energy firms (Bekzhanova, 2023) serve as comparison for correlation analysis and this data is rich.
- To provide Saudi Arabia policy assets to regulate oil and gold price fluctuations and attain sustainable economic growth, The Economic sobering measures provided in other studies lend credence for attend policy recommendations.
- The conclusions reached in the review show that oil and gold have shaped the economy of Saudi Arabia intricately. While combining older studies with more recent ones, the study seeks to ensure that studies on Saudi Arabia's economic transformation provide value to the empathic investors and policymakers through thorough understanding the interplay of commodity prices in economic strategy and policy formation.

Research Design and Methods

The purpose of this research is to examine the effects of gold and oil prices on Saudi Arabia's GDP through a structured approach. This will include the following steps:

Research Problem

Investigating the influence of oil and gold prices on the GDP of Saudi Arabia involves various challenges, including insufficient data availability, intricate causal relationships, methodological difficulties, temporal fluctuations, and regional disparities. Oil serves as a fundamental component of the Saudi economy, meaning that changes in its price can significantly affect economic outcomes. Although gold is not as critical as oil, its price movements can still impact investor sentiment and capital inflows. A thorough understanding of these interactions is crucial for formulating effective economic policies.

Problem Statement

Saudi Arabia's economy is predominantly reliant on oil, with a strong correlation between oil price fluctuations and the nation's economic development. Extensive research has confirmed the critical role that oil prices play in driving the growth and stability of the Saudi economy.

However, there are emerging ideas suggesting that fluctuations in gold prices may also influence the country's economic dynamics, yet this relationship remains largely underexplored. In particular, during periods of global economic uncertainty, the potential combined impact of both oil and gold price volatility on Saudi Arabia’s economy is not well understood. This gap in understanding creates a significant challenge in accurately assessing the full range of factors that affect the nation's economic stability.

Thus, there is a need for a more comprehensive analysis of the relationship between oil and gold prices and how they collectively shape Saudi Arabia's economic performance. This study seeks to investigate the influence of both commodities oil and gold on the Saudi economy, to gain deeper insight into the extent of their impact and identify strategies to minimize the negative effects of price volatility in these sectors.

Research Questions

- What is the impact of oil prices on the GDP of Saudi Arabia?
- How do fluctuations in gold prices relate to changes in Saudi Arabia's GDP?
- How much do fluctuations in gold prices affect consumer behavior and investments in Saudi Arabia?
- How do savings changes influence the oil and gold markets, and what is their subsequent effect on Saudi Arabia's GDP?

Objectives

1. To evaluate the contribution of oil and gold prices to the overall GDP of Saudi Arabia.
2. To analyze the impact of fluctuations in oil and gold prices on CPI in Saudi Arabia.
3. Analyze the correlation between gold and oil prices with savings variables, GDP, and CPI.
4. To offer recommendations and policy implications for stabilizing oil and gold prices to support sustainable economic growth in Saudi Arabia.

Hypothesis Study

H. = There is a significant impact of oil and gold prices on the GDP growth of the Kingdom of Saudi Arabia.

Study Methodology

Multiple linear regression

$Y = \beta_{\bullet} + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$

Where Y= GDP

X_1= Oil prices.

X_2 = Gold price.

X_3 = CPI.

X_4 = Savings.

Hypothesis Study

H $_{\bullet}$ = There is a significant impact of oil and gold prices on the GDP growth of the Kingdom of Saudi Arabia.

Sub Hypothesis

1. There is a negative relationship between oil prices and the GDP of Saudi Arabia.
2. There is a positive relationship between gold prices and the GDP of Saudi Arabia.
3. There is a positive relationship between the CPI and the GDP of Saudi Arabia.
4. There is a positive relationship between savings and the GDP of Saudi Arabia.

Descriptive Data Analysis

Table 1: Descriptive Data Analysis

	GDP	Oil Price	Gold Price	CPI	Savings
Mean	6.05	64.60	1119.20	114.79	2.30
Median	6.69	65.23	1251.92	110.15	2.18
Maximum	1.11	99.67	1943.00	137.40	4.44
Minimum	1.84	25.98	271.19	97.70	4.93
Standard Deviation	2.69	23.91	531.97	13.85	1.06

Estimation Output

Table 2: Estimation Output

Variable	Coefficient	Significance
C	9.32	Insignificant
Oil-Prices	-6.52	Significant
Gold prices	2.20	Significant
CPI	9.30	Insignificant
Savings	2.52	Significant

Estimated Regression Equation

$Y = 9.32 - 6.52\ X1 + 2.20\ X2 + 9.30X3 + 2.521418\ X4 + \varepsilon.$

$\beta\bullet$ = the intercept, y will equal 9.32 When $X1$, $X2$, $X3$ and X4 are equal to zero.

$\beta 1$ = if $X1$ (Oil prices) increases by one unit, Y (GDP) will decrease by 6.52, holding the other values constant.

$\beta 2$ = If $X2$ (Gold prices) increases by one unit, Y (GDP), will increase by 2.20, holding the other values constant.

$\beta 3$= If $X3$ (CPI) increases by one unit, Y (GDP) will increase by 9.30, holding the other values constant.

β 4 = If X4 (Savings) increase by one unit, Y (GDP) will increase by 2.521218, holding the other values constant**.**

Table 3: Testing the Significance of Regression Coefficients

$H_\bullet = \beta_1$	$= 0$	$H_1 = \beta_1$	$\neq 0$
$H_\bullet = \beta_2$	$= 0$	$H_1 = \beta_2$	$\neq 0$
$H_\bullet = \beta_3$	$= 0$	$H_1 = \beta_3$	$\neq 0$
$H_\bullet = \beta_4$	$= 0$	$H_1 = \beta_4$	$\neq 0$

T-test

Table 4: t-test

Variable	**t-statistical probability**	**Significance**
C	0.468	Insignificant
Oil-Prices	0.0020	Significant
Gold prices	0.0027	Significant
CPI	0.4761	Insignificant
Savings	0.0003	Significant

The probability (t-statistics) of

$X1 = 0.0020 < 0.05$

$X_2 = 0.0027 < 0.05$

$X4 = 0.0003 < 0.05$

Reject $H\bullet$, $\beta 1$, $\beta 2$, and $\beta 4$ are statistically significant

The probability (t-statistics) of

$X3 = 0.4761 > 0.05$

Do not reject $H\bullet$, $\beta 3$ is statistically insignificant

Confidence Interval Test

Table 5: Confidence Interval at 95%

Variables:	**Low**	**High**	**Significance**
C	-1.71	3.58	Insignificant
Oil-Prices	-1.03	-2.73	Significant
Gold-Prices	87374238	3.54	Significant
CPI	-1.75	3.61	Insignificant
Savings	1.35	3.69	Significant

At 95%:

$X1$: -1.03 < $\beta 1$ < -2.73.

$X2$: 87374238 < $\beta 2$ < 3.54.

$X4$: 1.35 < $\beta 4$ < 3.69.

Reject H•, $\beta 1$, $\beta 2$, and $\beta 4$ are statistically significant.

$X3$: -1.75 < $\beta 3$ < 3.61.

Do not reject H•, $\beta 3$ is statistically insignificant

The Overall Significance of the Estimated Model of the F Test

The probability (F-statistics) is 0.000000 < 0.05. Reject H•, and based on that the overall model is statistically significant**.**

The Value of *R2*

94.5% means that the variation in the dependent variable Y (GDP) is explained by the $X1$ (oil price), $X2$ (gold price), $X3$ (CPI), and $X4$ (savings). This indicates that Oil prices, gold prices, CPI, and Savings significantly impact Saudi Arabia's GDP.

ε Explains 5.49% of Saudi Arabia's GDP.

The Value of Adjusted *R2*

The independent variables, $X1$ (oil price), $X2$ (gold price), $X3$ (CPI), $X4$ (savings), explain approximately 93.2% of the variance observed in the dependent variable Y(GDP), Adjusted for inflation**.**

Problem Diagnostics

Heteroscedasticity Test

Table 6: Heteroscedasticity Test

H.	Homoskedasticity
prob. Chi-square (4)	0.18

The prob. Chi-square (4) = 0.18 > 0.05, so do reject H., and the model is Heteroskedasticity

Autocorrelation Test

Bureusch-Godfrey Serial Correlation LM Test

Table 7: Bureusch-Godfrey Serial Correlation LM Test

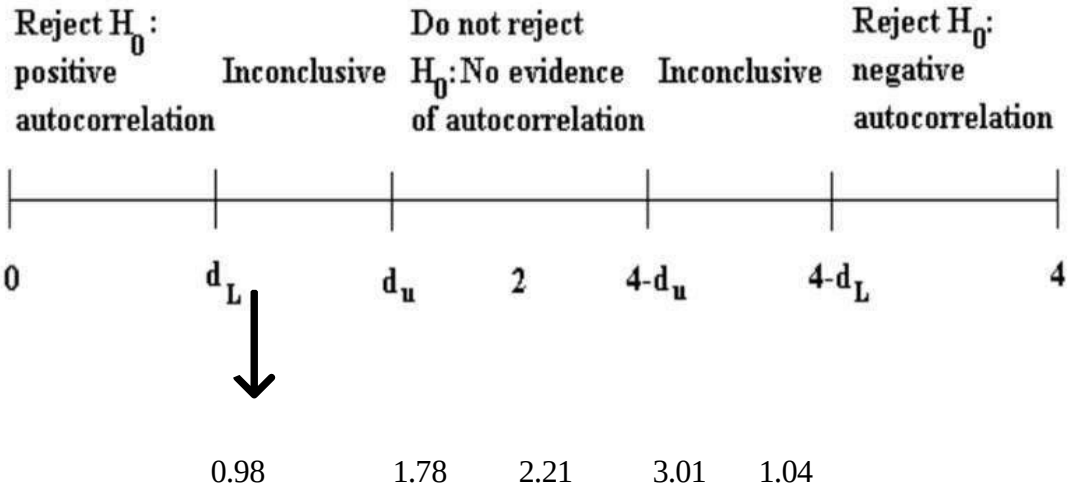
***H*.**	**No serial correlation**
Prob F (2, 16)	0.026

Prob F (2, 16) = 0.026 < 0.05, do not reject H. so there is no autocorrelation between the error terms

Durbin-Watson d-test

Table 8: Durbin-Watson d-test

D-Calculated	1.04
K (Number of variables)	4
N (Time series)	23
D-lower	1.78
D-upper	0.98



0.98 1.78 2.21 3.01 1.04

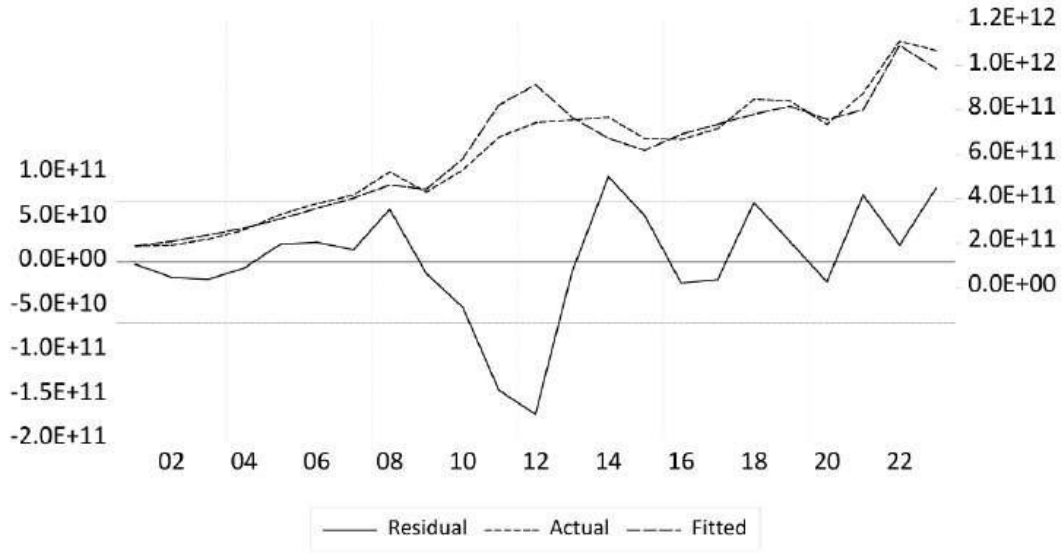
The test does not indicate a specific result. We cannot be sure about the absence or presence of autocorrelation between the error terms. dL<dc<du 0.98 < 1.04< 1.78

Table 9: Actual and Fitted Residuals as a Table

obs	Actual	Fitted	Residual	Residual Plot
2001	1.8E+11	1.9E+11	-2.4E+09	
2002	1.9E+11	2.1E+11	-1.7E+10	
2003	2.2E+11	2.4E+11	-2.0E+10	
2004	2.6E+11	2.7E+11	-7.0E+09	
2005	3.3E+11	3.1E+11	2.0E+10	
2006	3.8E+11	3.5E+11	2.3E+10	
2007	4.2E+11	4.0E+11	1.4E+10	
2008	5.2E+11	4.6E+11	5.9E+10	
2009	4.3E+11	4.4E+11	-1.3E+10	
2010	5.3E+11	5.8E+11	-5.1E+10	
2011	6.8E+11	8.2E+11	-1.4E+11	
2012	7.4E+11	9.1E+11	-1.7E+11	
2013	7.5E+11	7.7E+11	-1.2E+10	
2014	7.7E+11	6.7E+11	9.6E+10	
2015	6.7E+11	6.2E+11	5.2E+10	
2016	6.7E+11	6.9E+11	-2.4E+10	
2017	7.1E+11	7.3E+11	-2.0E+10	
2018	8.5E+11	7.8E+11	6.7E+10	
2019	8.4E+11	8.2E+11	2.3E+10	
2020	7.3E+11	7.6E+11	-2.2E+10	
2021	8.7E+11	8.0E+11	7.6E+10	
2022	1.1E+12	1.1E+12	1.9E+10	
2023	1.1E+12	9.8E+11	8.3E+10	

As a Graph

Actual and Fitted Residuals as a Graph Figure



Research Design

This research will utilize a mixed-methods approach, incorporating quantitative and qualitative elements. The primary focus will be on quantitative analysis to assess the correlation between oil and gold prices with GDP growth. Simultaneously, qualitative methods will explore the influence of political and regulatory factors on economic perceptions and policies. Data will be sourced from the World Bank, The Ministry of Statistics in Saudi Arabia, and Macrotrends. The data collected will be correlational**.**

Methods and Sources

Using multiple linear regression analysis, the research will analyze data where the independent variables are gold prices, oil prices, CPI, and savings. The dependent variable is economic growth, which is typically measured using indicators such as Gross Domestic Product (GDP). Therefore, GDP will be employed as the dependent variable, with data collected from the World Bank, the Ministry of Statistics in Saudi Arabia, and Macrotrends. Using a time series of 2001-2023**.**

FINDINGS

The findings indicate that oil and gold prices significantly affect the Gross Domestic Product (GDP) of the Kingdom of Saudi Arabia. A negative relationship between oil prices and GDP has been confirmed, demonstrating that increases in oil prices substantially influence economic performance. Additionally, it has been established that gold prices have a lesser impact compared to oil prices; however, they still affect economic indicators such as inflation and investment behavior. The analyses also revealed that savings rates play a crucial role in these economic dynamics, and inflation does not play a crucial role in these economic dynamics. Consequently, the study does not reject the main hypothesis of the research.

CONCLUSION AND RECOMMENDATIONS

Conclusion

This study highlights how oil and gold prices affect Saudi Arabia's economic growth, especially

as the country works to diversify income sources under Vision 2030. It suggests that stabilizing these prices is crucial for sustainable growth and emphasizes the importance of understanding their effects on inflation and savings.

The project looks into how these prices impact Saudi Arabia's GDP. Since the country relies heavily on oil, grasping these dynamics is key for smart policymaking. Gold, as a safe haven during uncertain times, adds another layer of insight.

Quantitatively, the findings reveal that a 1% increase in oil prices is associated with a significant decrease of 6.52 units in GDP, while gold prices positively contribute with an increase of 2.20 units, underscoring the substantial impact of these commodities on economic performance.

The findings aim to clarify how price volatility affects economic stability, helping with better fiscal planning and resource management. The goal is to improve policies for diversification, support sustainable growth, and manage price swings effectively. This research could challenge current views on the economy's sensitivity to price changes, offering a fresh perspective. It might also inspire further studies on global markets and emerging Gulf economies, laying the groundwork for exploring diversification and GDP impacts.

Recommendations

1. Monitor Inflation: Decision-makers should consider the impact of inflation when making economic decisions due to its vital role in the Saudi economy.
2. Economic Diversification: Continued efforts to diversify the economy away from oil dependence are essential to enhance the Kingdom's economic resilience.
3. Encourage Investment: Policies should be developed to stimulate investment in non-oil sectors to drive economic growth.
4. Price Stability: It is crucial to implement strategies for managing the volatility of oil and gold prices to promote economic stability.

The Saudi government has established the Fiscal Balance Program, which aims to maintain budgetary discipline and stabilize the economy amid fluctuating commodity prices, ensuring a more sustainable economic environment.

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Appendix

Date: 10/16/24 Time: 16:21
Sample: 2001 2023

	GDP	OIL_PRICE	GOLD_PRICE	CPI	SAVINGS
Mean	6.05E+11	64.60696	1119.200	114.7978	2.30E+11
Median	6.69E+11	65.23000	1251.920	110.1500	2.18E+11
Maximum	1.11E+12	99.67000	1943.000	137.4000	4.44E+11
Minimum	1.84E+11	25.98000	271.1900	97.70000	4.93E+10
Std. Dev.	2.69E+11	23.91128	531.9715	13.85520	1.06E+11
Skewness	-0.008656	-0.025540	-0.208473	0.337364	0.035650
Kurtosis	2.117374	1.823749	1.816300	1.598668	2.303747
Jarque-Bera	0.746856	1.328419	1.509365	2.318198	0.469442
Probability	0.688370	0.514680	0.470160	0.313769	0.790791
Sum	1.39E+13	1485.960	25741.60	2640.350	5.28E+12
Sum Sq. Dev.	1.59E+24	12578.48	6225861.	4223.266	2.47E+23
Observations	23	23	23	23	23

Descriptive Data Analysis Figure

Dependent Variable: GDP
Method: Least Squares
Date: 10/17/24 Time: 11:34
Sample: 2001 2023
Included observations: 23

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	9.32E+10	1.26E+11	0.740394	0.4686
OIL_PRICE	-6.52E+09	1.80E+09	-3.611284	0.0020
GOLD_PRICE	2.20E+08	63359014	3.479956	0.0027
CPI	9.30E+08	1.28E+09	0.727826	0.4761
SAVINGS	2.521418	0.556608	4.529969	0.0003

R-squared	0.945041	Mean dependent var	6.05E+11
Adjusted R-squared	0.932828	S.D. dependent var	2.69E+11
S.E. of regression	6.97E+10	Akaike info criterion	52.96249
Sum squared resid	8.74E+22	Schwarz criterion	53.20933
Log likelihood	-604.0686	Hannan-Quinn criter.	53.02457
F-statistic	77.37904	Durbin-Watson stat	1.047399
Prob(F-statistic)	0.000000		

Estimation Output. Figure

Coefficient Confidence Intervals
Date: 10/17/24 Time: 11:35
Sample: 2001 2023
Included observations: 23

		90% CI		95% CI		99% CI	
Variable	Coefficient	Low	High	Low	High	Low	High
C	9.32E+10	-1.25E+11	3.11E+11	-1.71E+11	3.58E+11	-2.69E+11	4.56E+11
OIL_PRICE	-6.52E+09	-9.64E+09	-3.39E+09	-1.03E+10	-2.73E+09	-1.17E+10	-1.32E+09
GOLD_PRICE	2.20E+08	1.11E+08	3.30E+08	87374238	3.54E+08	38111437	4.03E+08
CPI	9.30E+08	-1.29E+09	3.15E+09	-1.75E+09	3.61E+09	-2.75E+09	4.61E+09
SAVINGS	2.521418	1.556224	3.486613	1.352028	3.690809	0.919254	4.123583

Confidence Interval Figure

Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

F-statistic	1.647490	Prob. F(4,18)	0.2059
Obs*R-squared	6.163861	Prob. Chi-Square(4)	0.1872
Scaled explained SS	6.172188	Prob. Chi-Square(4)	0.1867

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 10/17/24 Time: 11:36
Sample: 2001 2023
Included observations: 23

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-8.28E+21	1.20E+22	-0.689694	0.4992
OIL_PRICE	1.29E+20	1.72E+20	0.751953	0.4618
GOLD_PRICE	2.73E+18	6.04E+18	0.451820	0.6568
CPI	1.68E+19	1.22E+20	0.137481	0.8922
SAVINGS	-5.48E+09	5.31E+10	-0.103236	0.9189

R-squared	0.267994	Mean dependent var	3.80E+21
Adjusted R-squared	0.105326	S.D. dependent var	7.03E+21
S.E. of regression	6.65E+21	Akaike info criterion	103.5251
Sum squared resid	7.96E+44	Schwarz criterion	103.7719
Log likelihood	-1185.539	Hannan-Quinn criter.	103.5872
F-statistic	1.647490	Durbin-Watson stat	1.739430
Prob(F-statistic)	0.205889		

Heteroscedasticity Test Figure

Breusch-Godfrey Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 2 lags

F-statistic	4.577169	Prob. F(2,16)	0.0268
Obs*R-squared	8.370317	Prob. Chi-Square(2)	0.0152

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 10/17/24 Time: 11:36
Sample: 2001 2023
Included observations: 23
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.04E+10	1.07E+11	0.190837	0.8511
OIL_PRICE	9.21E+08	1.59E+09	0.578816	0.5708
GOLD_PRICE	37787442	57447139	0.657778	0.5200
CPI	-4.73E+08	1.10E+09	-0.429252	0.6735
SAVINGS	-0.292897	0.483065	-0.606330	0.5528
RESID(-1)	0.711665	0.241559	2.946132	0.0095
RESID(-2)	-0.456135	0.271938	-1.677348	0.1129

R-squared	0.363927	Mean dependent var	3.45E-05
Adjusted R-squared	0.125399	S.D. dependent var	6.30E+10
S.E. of regression	5.90E+10	Akaike info criterion	52.68396
Sum squared resid	5.56E+22	Schwarz criterion	53.02954
Log likelihood	-598.8655	Hannan-Quinn criter.	52.77087
F-statistic	1.525723	Durbin-Watson stat	1.830384
Prob(F-statistic)	0.232565		

Autocorrelation Test Figure

Excel Data Sheet

year	GD oil price	gold price	CPI	savings
2001	1.84138E+11	25.98	271.19	97.7	49316533333
2002	1.89606E+11	26.19	310.08	98.4	53986666667
2003	2.15808E+11	31.08	363.83	98.8	73095120000
2004	2.58742E+11	41.51	409.53	99.4	1.07791E+11
2005	3.2846E+11	56.64	444.99	100.6	1.59913E+11
2006	3.769E+11	66.05	604.34	103.5	1.86983E+11
2007	4.15965E+11	72.34	696.43	110.2	2.09599E+11
2008	5.19797E+11	99.67	872.37	120.1	2.81626E+11
2009	4.29098E+11	61.95	973.66	125.2	1.64422E+11
2010	5.28207E+11	79.48	1226.66	132	2.3777E+11
2011	6.76635E+11	94.88	1573.16	120.4	3.51343E+11
2012	7.4185E+11	94.05	1668.86	124.7	3.74308E+11
2013	7.53865E+11	97.98	1409.51	128.4	3.45776E+11
2014	7.66606E+11	93.17	1266.06	131.5	3.05905E+11
2015	6.69484E+11	48.66	1158.86	134.5	1.76481E+11
2016	6.66E+11	43.29	1251.92	136.8	1.81561E+11
2017	7.14995E+11	50.8	1260.39	137.4	2.1754E+11
2018	8.46584E+11	65.23	1268.93	106.2	2.93589E+11
2019	8.38565E+11	56.99	1393.34	106.5	2.75762E+11
2020	7.34271E+11	39.68	1773.73	103.77	1.77784E+11
2021	8.74156E+11	68.17	1798.89	105.6	2.64674E+11
2022	1.10857E+12	94.53	1801.87	108.53	4.44486E+11
2023	1.06758E+12	77.64	1943.00	110.15	3.46608E+11

ARE data.xlsx

Final Research Schedule

Research phase	Objectives	Deadline	Responsible students
Abstract		31/10/2024	Aseel Abdulqader
Introduction		10/10/2024	Helah Alsayed
Literature review	- Read and analyze relevant literature - Use new knowledge to refine research questions - Develop theoretical framework	10/10/2024	Helah Alsayed, Aseel Abdulqader
Empirical analysis		17/10/2024	Najla Alshammari, Nourah Alajmi
Conclusion		24/10/2024	Alla Almatar, Reema Almohaya
Writing	- Complete a full thesis draft - Meet with supervisor to discuss feedback and revisions	31/10/2024	Najla Alshammari, Alla Almatar Nourah Alajmi
revision	- Complete 2nd draft based on feedback - Get supervisor approval for final draft - Proofread - Print and bind final work - Submit	05/11/2024	Najla Alshammari, Alla Almatar Reema Almohaya

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