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Economic and Human Development Trajectories in Iraq (1980–2023): A Historical Data Analysis

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This study aims to examine the long-term trajectory of economic and human development in Iraq over the period 1980–2023 using a time-series econometric approach. The analysis employs the Vector Autoregression (VAR) model to explore the dynamic relationships among key macroeconomic and development indicators, including oil production, GDP per capita, unemployment, and the Human Development Index (HDI).

The empirical results reveal a significant bidirectional relationship between oil production and GDP per capita, indicating the central role of the oil sector in shaping Iraq's economic performance. In contrast, the findings show a negative dynamic interaction between unemployment and the Human Development Index, suggesting that higher unemployment rates are associated with weaker human development outcomes.

Furthermore, the results indicate that oil shocks exert persistent effects on both economic growth and social development indicators. The impulse response functions and variance decomposition analysis provide additional evidence of structural vulnerabilities and cyclical fluctuations that have characterized Iraq's economic trajectory, particularly in the post-conflict and post-invasion periods.

Overall, the study contributes to the empirical literature by offering a comprehensive long-term assessment of the interaction between economic performance and human development in a resource-dependent economy. The findings highlight the importance of economic diversification and structural reforms aimed at enhancing economic resilience and promoting inclusive development. The originality of this research lies in integrating economic and human development dimensions over four decades, capturing the cumulative

Keywords: Iraq, VAR model, Human Development, Oil production, Economic growth, Unemployment.

Introduction

The trajectory of economic and human development in Iraq represents one of the most complex development experiences in the Middle East. Over the past several decades, the country has undergone repeated economic, political, and institutional disruptions that have significantly influenced its macroeconomic performance and social development outcomes. Since the establishment of the modern Iraqi state following the dissolution of the Ottoman Empire, Iraq's economic structure has been strongly shaped by its natural resource endowment—particularly oil—alongside episodes of political instability and institutional transformation (Isenstadt & Rizvi, 2008).

The discovery of large oil reserves during the twentieth century positioned Iraq as a key actor in the global energy market and created expectations of sustained economic prosperity. Oil revenues rapidly became the primary source of public income and a central driver of economic activity. However, reliance on oil revenues also created structural challenges for the Iraqi economy, including exposure to global oil price volatility and limited diversification of productive sectors. As a result, fluctuations in oil production and international oil prices have often translated directly into changes in government revenues, investment levels, and overall economic growth.

In addition to the structural dependence on oil revenues, Iraq has experienced several major economic and political shocks that have influenced its development path. Armed conflicts, international sanctions, and institutional transitions have periodically disrupted economic activity and weakened public institutions. These events have contributed to fluctuations in key macroeconomic indicators such as gross domestic product (GDP), unemployment, and inflation. At the same time, these economic changes have affected broader development

outcomes, including improvements in education, healthcare, and living standards as captured by the Human Development Index (HDI) (Shukor, Klazinga, & Kringos, 2017).

Despite Iraq's substantial natural resource wealth, improvements in human development indicators have not always followed the same trajectory as economic growth. In resource-dependent economies, increases in national income do not necessarily translate into proportional improvements in social welfare. Institutional effectiveness, fiscal management, and the allocation of public resources play crucial roles in determining how economic growth contributes to broader development outcomes.

From this perspective, analyzing the interaction between macroeconomic performance and human development indicators is essential for understanding the long-term development trajectory of Iraq. Oil production remains the dominant driver of economic activity, while labor market dynamics and inflation reflect structural conditions within the broader economy. These macroeconomic factors interact with social development outcomes, making it important to analyze their dynamic relationships over time.

Previous empirical studies have often examined individual aspects of Iraq's economic performance, such as the relationship between oil revenues and economic growth or the effects of oil price fluctuations on fiscal stability. However, many of these studies rely on static econometric models that do not fully capture the dynamic interactions and feedback mechanisms among macroeconomic variables and development indicators. Consequently, there remains a need for empirical research that simultaneously examines the relationships between economic growth, oil production, labor market conditions, and human development outcomes within a dynamic modeling framework.

To address this gap, the present study analyzes the dynamic relationships between oil production, GDP, unemployment, inflation, and the Human Development Index in Iraq over the period 1980–2023 using a Vector Autoregression (VAR) model. This approach allows the study to capture the mutual interactions among economic variables and to assess how shocks in one variable influence others over time.

Research Problem

Despite Iraq's vast oil resources and periods of economic growth driven by oil revenues, the country continues to face significant challenges in achieving balanced and sustainable development. While increases in oil production have contributed to higher national income,

the extent to which this economic growth translates into improvements in human development remains unclear. In particular, fluctuations in oil production, inflation, and unemployment may influence the broader economic system and affect development indicators such as education, health, and living standards.

Therefore, the central research problem of this study lies in understanding how macroeconomic dynamics—particularly oil production, economic growth, inflation, and unemployment—interact with human development outcomes in Iraq over the long term. Examining these relationships is essential for identifying the structural factors that shape Iraq's development trajectory and for evaluating whether oil-driven economic growth contributes effectively to improvements in human welfare.

Research Hypotheses

Based on the theoretical literature on resource-dependent economies and macroeconomic dynamics, the study formulates the following hypotheses:

H1: Oil production has a significant positive effect on economic growth (GDP) in Iraq.

H2: Inflation contributes to fluctuations in unemployment levels.

H3: Economic growth positively influences human development outcomes, although the effect may occur with a time lag.

H4: Macroeconomic shocks—particularly those related to oil production and inflation—play a significant role in explaining variations in GDP and HDI over time.

1. Literature Review

During the last two decades, an important research site has discovered the dynamics of extensive economic and development in Iraq and the broad Middle East region, focusing on issues such as oil addiction, GDP -ustability, inflation trends and institutional fragility. Several studies implemented the Timeetrical Models to examine these subjects, but still clear functions and relevant boundaries remain. For example, Rajbi Koyaki (2022) used degradation and LMDI techniques to assess CO and emissions in 12 countries in the Middle East, highlighting energy intensity and population growth as prominent contributors, but apart from Iraq's internal growth structure and long-lasting oil-GDP-manifestics. Corresponding Shukor et al. , A wide range of regional studies used short-term data sets

(usually less than 25 years), either limited to a period in 2003 or limited to cross-sectional or panel settings (eg 2010), neglects the historical development of Iraq's development path since Iran-Iraq war**.**

In addition, most of the Iraq-centered studi-like-like, al-Atrachchi (2019), Al-Tai (2021) and Abbas et al. , Some studies (eg Mahdi and Al-Yasiri, 2018) used were at 2005 oil prices and inflation, but ignored development indicators such as Human Development Index (HDI), unemployment or productivity. Geographical boundaries also persist; While countries such as Saudi Arabia, Jordan and Iran have been studied more well with advanced panels, Iraq is wide, historically with a view to deep and multi-cage modeling frames.

Unlike these previous tasks, the current study stands out by using a six-stage unlimited VAR approach, covering a broad historical period from 1980 to 2023-IS occupies several economic controls, including war, restrictions, reconstructions and stabilization. The model also includes oil production, GDP, inflation, unemployment and HDI, which is intended to measure both economic results and human welfare - rare modeling in literature. Contrary to the dynamic interaction tracking, unlike the pre-spacious previous studies on the OLS or Sam-Ecology, the study uses a strong dynamic analysis in principle and empirical behavior, the study applies to impulsive reaction functions (IRF), forecasting error variations (Fevd) and interval choice criteria. In addition, it eliminates cosmic intervals by using four decades of annual data. 10-20 years scope provides a specific IRAQ-centered empirical history free from the index and regional aggregation bias for most functions with a scope of 20 years.Unlike these previous tasks, the current study stands out by using a six-stage unlimited VAR approach, covering a broad historical period from 1980 to 2023-IS occupies several economic controls, including war, restrictions, reconstructions and stabilization. The model also includes oil production, GDP, inflation, unemployment and HDI, which is intended to measure both economic results and human welfare - rare modeling in literature. Contrary to the dynamic interaction tracking, unlike the pre-spacious previous studies on the OLS or Sam-Ecology, the study uses a strong dynamic analysis in principle and empirical behavior, the study applies to impulsive reaction functions (IRF), forecasting error variations (Fevd) and interval choice criteria. In addition, it eliminates cosmic intervals by using four decades of annual data. 10-20 years scope provides a specific IRAQ-centered empirical history free from the index and regional aggregation bias for most functions with a scope of 20 years.

Thus, the research interval for the address of this study is both temporary (43 years of longitudinal coverage), function (using unlimited VAR), relevant (instead of regional average instead of regional average) and developmentally (HDI as an endogenous macro - development result). This adds important value to the important value of literature and gives political decision makers a historical anchor, forward -looking and internal understanding of Iraq's economic human development path.

2. Methodology And Econometric Framework

The study uses a time series approach with several floors based on the Vector Authoragressive (VAR) model to detect internalization between the macroeconomic and human development indicators of Iraq. The acting models integrate the model specification, hypothesis design, interval selection, estimate and dynamic influence analysis. The equations and procedures with explanatory clarity to guide the relevant researchers are detailed below.

3. Model Specification: Var(P)

The general form of the VAR model with p lags is expressed as follows:

$$Y_t = \alpha + B_1 Y_{t-1} + B_2 Y_{t-2} + ... + B_p Y_{t-p} + \varepsilon_t \quad \ldots\ldots\ldots\ldots 1$$

Where:

• Y_t is a (k × 1) vector of endogenous variables at time t:

$$Y_t = [GDP_t, HDI_t, Unemp_t, Infl_t, OilPro_t]'$$

• B_i (i = 1 to p) are (k × k) coefficient matrices representing the impact of the i-th lag of each variable on all equations.

• α is a (k × 1) vector of intercept terms.

• ε_t is a (k × 1) vector of serially uncorrelated white noise error terms.

4. **Var System Equations (Expanded)**.

Each endogenous variable is modeled as a function of its own lagged values and the lags of all other variables. For example:

$GDP_t = \alpha_1 + \sum (\beta_{1i}\_GDP \times GDP_{t-i}) + \sum (\beta_{1i}\_HDI \times HDI_{t-i}) + \sum (\beta_{1i}\_Unemp \times Unemp_{t-i}) + \sum (\beta_{1i}\_Infl \times Infl_{t-i}) + \sum (\beta_{1i}\_OilPro \times Oilproof_{t-i}) + \varepsilon_{1t}$……2

This form is repeated for each dependent variable (HDI, Unemployment, Inflation, Oil Production). Each equation allows for rich feedback effects.

5. Matrix Form Of The Var (4) System.

Assuming p = 4, the full system can be written as:

$Y_t = \alpha + B_1 Y_{t-1} + B_2 Y_{t-2} + B_3 Y_{t-3} + B_4 Y_{t-4} + \varepsilon_t$ ……3

This formulation captures dynamic interdependence and allows shocks in one variable to affect all others over time. The unrestricted nature of VAR makes it suitable for systems with feedback and simultaneous causality.

6. Methodological Steps.

- a. Visual inspection and trend analysis of all variables (1980–2023).
- b. Stationarity testing using Augmented Dickey-Fuller (ADF); all variables differenced once to achieve I(1).
- c. Optimal lag length selection based on AIC, HQIC, and FPE (result: p = 4).
- d. Estimation of the unrestricted VAR(4) system using OLS for each equation.
- e. Impulse Response Functions (IRFs) to assess dynamic shock propagation.
- f. Forecast Error Variance Decomposition (FEVD) to evaluate the explanatory power of shocks over time.

7. Results: Time-Series Trend Analysis.

In order to initiate empirical analysis, the study examines long -term trends in Iraq's extensive economic and human development indicators in a period 1980-2023. In particular, five important variables were selected based on their relevance to the socio -economic structure of Iraq: gross domestic product (GDP), Human Development Index (HDI), unemployment, inflation (estimated by GDP -Defaulator) and oil production. All series are annual and were collected from official sources including the World Bank and UNDP.

Figure 1 Figure 5 Imagine the annual development of each variable. Real GDP (Figure 1) reveals remarkable fluctuations in conflict, limitations and period of reconstruction after the war. HDI (Figure 2) shows a small but stable improvement, shows step -by -step benefits in

education, health and living standards. Unemployment (Figure 3) shows cycles with instability in the labor market. Inflation (Figure 4) was particularly unstable during the limitations of the 1990s. Oil production (Figure 5), the most important source of income of Iraq, experienced a sharp decline during the conflict and after improvement after 2003.

These trends serve as a basis for further economic modeling and justify the need to test for stability before using Vector Autoresting (VAR) framework.

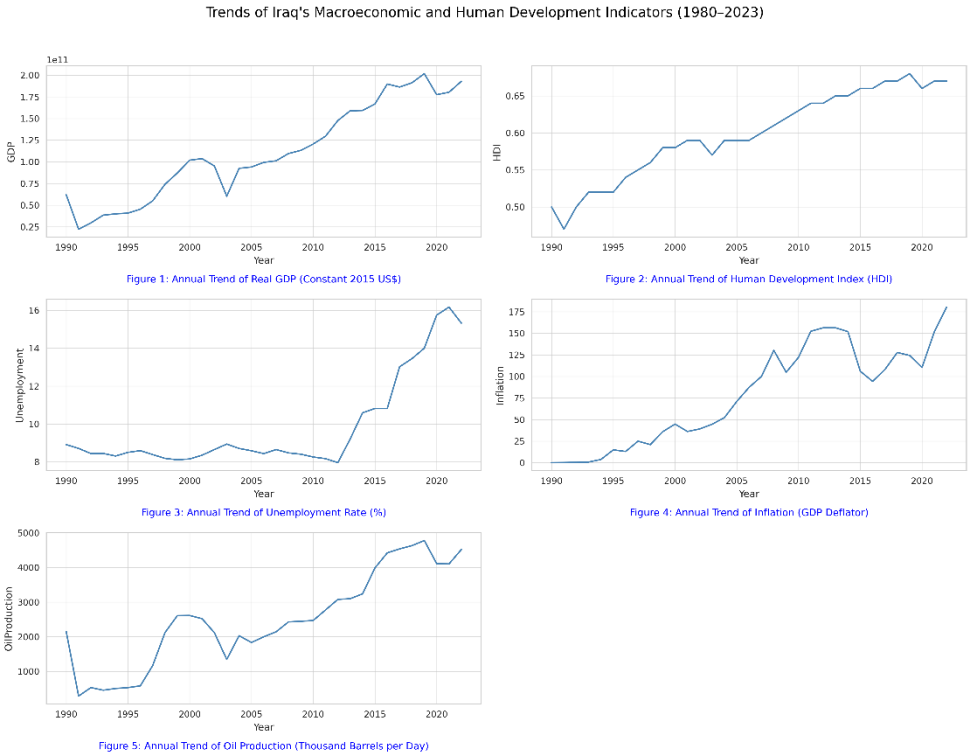

Figure .no .1.Trends of Iraq's macroeconomic and human development indicators (1980-2023).

8. Stationarity Testing And Data Transformation.

Before estimating a multi -veteran series model such as Vector Authoragration (VAR), it is important to ensure that the data chain is stable. Non-stimulating time chain can have spontaneous regression results, where the relationship between variables seems statistically important due to shared trends instead of the real cause (Anders, 2015). To end this, the study used the impregnated Dicy form (ADF) test to evaluate the stability of the five core variables: Real GDP, Human Development Index (HDI), unemployment, inflation (GDP deflator) and oil production.

The first result, as shown in Table 1, suggests that all variables are non-stable as their level. In particular, ADF test figures for each series are not able to reject the disabled hypothesis on a unit route with traditional levels of importance (P-human> 0.05). This indicates that the chain shows stochastic trends, which can worry the classic conclusion until it is properly converted. To solve the problem, all variables were subjected to the first -order difference, which was a standard approach to motivating stability by removing long -term trends. The separate series was then reassessed using the ADF test. As presented in Table 2, most variables achieve -Ie, GDP, HDI, inflation and oil productions stability at 1% level of significance after separation. However, unemployment remained non-dominated, frequent structural or target-related issues in the labor market figures. Alternative treatment, such as further differences or coincidence -based models (eg Vecm), can be detected whether the variable should be maintained in the system. Changing variables in the stable chain ensures the strength and validity of later was -estimates. The next step involves determining the optimal interval length for the VAR model using the information criteria installed in the next step.

Table no. 1. ADF Test Results for Variables in Level Form

Variable	ADF Statistic	p-value	Critical Values	Stationary
GDP	-0.244	0.9331	{'1%': -3.653519805908203, '5%': -2.9572185644531253, '10%': -2.6175881640625}	No
HDI	-2.8385	0.053	{'1%': -3.661428725118324, '5%': -2.960525341210433, '10%': -2.6193188033298647}	No
Unemployment	2.1451	0.9988	{'1%': -3.7529275211638033, '5%': -2.998499866852963, '10%': -2.6389669754253307}	No
Inflation	-0.4061	0.9091	{'1%': -3.653519805908203, '5%': -2.9572185644531253, '10%': -2.6175881640625}	No

OilProduction	-0.4952	0.893	{'1%': -3.653519805908203, '5%': -2.9572185644531253, '10%': -2.6175881640625}	No

Author's calculations based on the dataset used in the study and estimated using EViews

Table no. 2. ADF Test Results after First Differencing

Variable	**ADF Statistic**	**p-value**	**Critical Values**	**Stationary**
GDP	-7.0195	0.0	{'1%': -3.661428725118324, '5%': -2.960525341210433, '10%': -2.6193188033298647}	Yes
HDI	-8.6158	0.0	{'1%': -3.661428725118324, '5%': -2.960525341210433, '10%': -2.6193188033298647}	Yes
Unemployment	-0.8991	0.7883	{'1%': -3.7238633119999998, '5%': -2.98648896, '10%': -2.6328004}	No
Inflation	-4.6257	0.0001	{'1%': -3.661428725118324, '5%': -2.960525341210433, '10%': -2.6193188033298647}	Yes
OilProduction	-6.9919	0.0	{'1%': -3.661428725118324, '5%': -2.960525341210433, '10%': -2.6193188033298647}	Yes

Author's calculations based on the dataset used in the study and estimated using EViews

9.Lag Length Selection for Var Model.

Before estimating Vector Authoragressive (VAR) model, it is necessary to determine the optimal interval length, as the choice of layer significantly affects the efficiency and reliability of the model estimates. The leg length affects the degree that the model can capture dynamic interaction and temporary dependence between the variables. Reducing the

model by choosing a very low gap can lead to bias, while excessive intervals can increase standard defects and reduce the model parsimony (Litcate, 2005).

To determine the most appropriate interval order, this study used several standard selection criteria, including:

-AC Information Criteria (AIC)

-Hannan -quinn Information Criteria (HQIC)

-Finnal Prediction Earr (FPE)

-Bayesian Information Criterion (BIC)

These criteria were used on the stable, first -discriminated chain of the five core variables: real GDP, HDI, unemployment, inflation and oil production. Due to the limited number of annual comments, the maximum possible interval was calculated based on the number of parameters and the degree of freedom.

The results of the choice of interval length are indicated in Table 3. AIC, HQIC and FPE unanimously indicated an optimal interval length of 4, indicating a sufficient structure to capture short -term dynamics and temporary causes. On the other hand, the more conservative bic interval of 0 favored, which reflects its tendency to punish the model complexity more heavy. Given the consensus between AIC-based criteria and the exploration goal with the model, the last length of 4 was used for the latter VAR estimate.

Table. no .3 Optimal Lag Length Selection Based on Information Criteria

Criterion	**Selected Lag**
AIC	4
BIC	0
HQIC	4
FPE	4

Author’s calculations based on the dataset used in the study and estimated using Eviews

10. Estimating The Var Model.

Following stability change and interval choices, a vector authoragressive (VAR) model was estimated using the first-discriminated data and an interval length of four (4), which supported by Akaike Information Criteria (AIC), Hannan-Cin (HQIC) and finally predicted errors (FPE). The model was jointly captivating the endogenous relationships between five main indicators: Real GDP, Human Development Index (HDI), unemployment, inflation and oil production.

Recovery reveals the objections from the output study many statistically important dynamic mutual addiction:

- Oil production was found to be a significant positive effect on the actual GDP as indicated by statistically important coefficient for L1. Oil production ($p < 0.05$). This hypothesis supports H1, which suggests that oil production is a primary driver of Iraq's GDP.

- Lagged values of GDP and HDI also show answer effects, although their statistical significance varies at intervals. Particularly affected HIP GDP negatively with marginal significance ($p \approx 0.09$) which possibly reflected the cost of social investments before the return.

- The interval effects of unemployment were mostly insignificant, and the series remained non-stable even after the first variation. This weakens empirical support for H2, a hypothesis on inflation on unemployment. Further analysis may require alternative specifications or treatment for this variable.

- Inflation and volatility in oil prices did not show a strong direct impact on GDP or HDI within the current model structure, opposite hypothesis H4. These effects can be displayed through the conditions of interactions or external shaking, which will be investigated using the impulse response functions (IRF) in the next step.

The model provides a strong empirical base to continue with dynamic reaction analysis. The next step will imagine the impulse response tasks (IRF) to evaluate oil production, inflation or to evaluate the shock in GDP how to propagate through the economic and human development system over time.

Table.no. 4: Estimated Coefficients of the VAR Model (Lag = 4)

Regressor	GDP	HDI	Unemployment	Inflation	OilProduction
const	14153976079.4066	0.0122	-0.2387	8.2187	285.5465
L1.GDP	-1.0178	-0.0	0.0	0.0	-0.0
L1.HDI	-1132504270169.637	-1.055	-20.6794	1551.7734	-26661.0248
L1.Unemployment	-12784987317.678	-0.0062	0.3811	-5.3858	-236.4782
L1.Inflation	-30943807.1622	-0.0001	0.0016	0.0072	-0.0122
L1.OilProduction	54185341.8685	0.0	-0.001	-0.0445	1.5814
L2.GDP	0.3565	-0.0	0.0	-0.0	0.0
L2.HDI	-723183938294.5822	-0.387	8.6135	43.7974	-10549.5732
L2.Unemployment	12643497979.2843	0.0037	-0.358	-7.8875	296.8651
L2.Inflation	123614668.8333	0.0001	-0.0026	-0.1599	-0.7475
L2.OilProduction	-9504855.1891	0.0	-0.0002	0.0367	-0.665
L3.GDP	-1.4738	-0.0	0.0	0.0	-0.0
L3.HDI	-39567849963.4367	0.0795	-3.3186	968.423	-10916.004
L3.Unemployment	-15391087189.552	-0.013	0.5359	-13.9263	-347.0768
L3.Inflation	39960257.9591	0.0001	0.002	-0.0187	1.7135
L3.OilProduction	45999055.0232	0.0	-0.0008	-0.0533	0.9803
L4.GDP	0.3883	0.0	0.0	0.0	0.0
L4.HDI	404953862843.7472	0.2737	-6.657	-1057.1068	10364.19

L4.Unemployment	2087604789.2117	0.0028	0.1796	31.4273	37.3057
L4.Inflation	112419208.6596	0.0001	-0.0157	-0.1257	5.1155
L4.OilProduction	-13144621.5978	-0.0	-0.0009	0.0199	-0.5065

Author's calculations based on the dataset used in the study and estimated using EViews

11.Impulse Response Analysis.

To better understand the dynamic interactions between the macroeconomic and human development of Iraq, the study implemented the Impulse Response Function (IRF) analysis based on the first estimated was (4) model. In IRFS systems, the path detects for the effect of one -time shock for one of the innovations (errors) on current and future values of endogenous variables (Lütkepohl, 2005)

The IRF was calculated for the 10-period horizon and is presented in Figure 6. Each panel shows a variable reaction to the shock of one standard deviation in another, provided other shocks are orthogonal. These results provide valuable insight into the transfer system in Iraq's economy:

- A positive shock of oil production creates immediate and continuous growth in GDP, and strengthens the discovery in Step 4 that oil is the most important engine for economic development in Iraq. The GDP response occurs in the short term (period 2-4) before slowly closes. This strong concept supports H1, which suggests that oil production greatly affects the GDP mobility.

- Inflation messages create weak or insignificant effects on unemployment, and resonate the first ADF result that the unemployment chain is structurally unstable. Therefore, the hypothesis is H2, about the effect of inflation on unemployment, weak empirical support in this context.

- GDP shock generates mild positive reactions in HDI, suggesting that improvement in economic production can lead to better human development results, with delays. However, the HDI response is more frequent than faster, reflecting structural inertia in education, health and welfare systems. - A battle for oil production also affects indirect HDIs, although the response is smaller and delayed. This suggests that oil revenues contribute to development through fiscal transmission channels (eg public spending, welfare), but not

immediately or right. Overall, impulse response tasks confirm that the oil shock is the primary preacher for economic ups and downs in Iraq, while inflation and unemployment shock is more quiet or unclear. These conclusions validate the main structure of the VAR model and strengthen the theoretical basis for oiled economic growth in tenant economies such as Iraq.

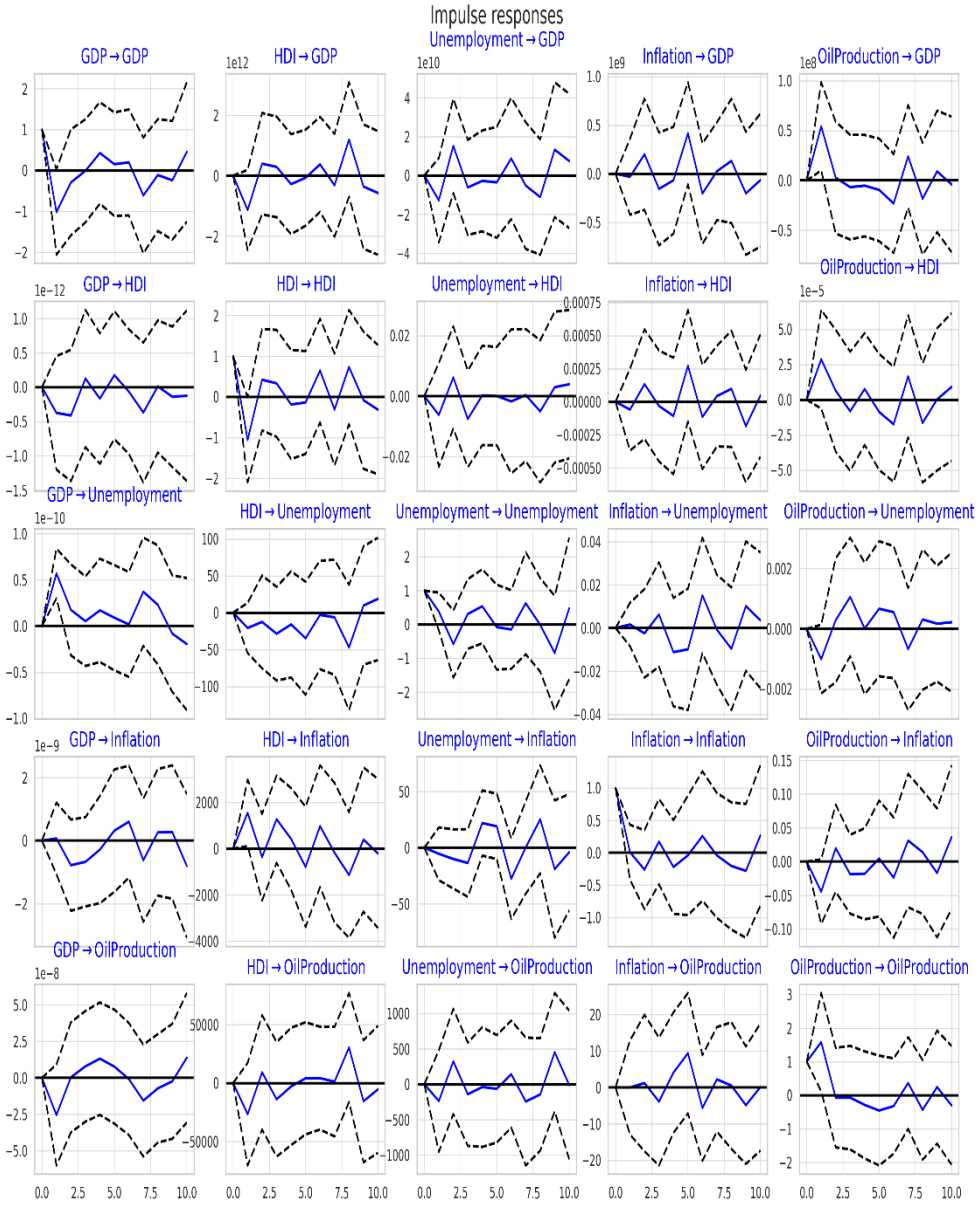

Figure. no.2. Impulse Response Functions from the VAR(4) Model

12. Forecast Error Variance Decomposition (Fevd).

To complement the impulse response analysis, the study performed forecast error variance resolution (FEVD) to determine the relative importance of each structural shock by

explaining the prognosis error variance of the endogenous variables of the model. Fevd provides information that future uncertainty in a variable can be attributed to its own innovations to other variables (Lütkepohl, 2005)

Table 5 shows Fevd results for real GDP in 10-period horizon. During the early forecast period, 100% variance in GDP is explained with its own innovations. However, as the horizon expands, the explanatory power of the second variable begins to grow. For example, up to 5 periods, HDI, inflation and oil production contribute to each GDP forecast variance. In particular, the oil production duration explains 5 about 10% of the ups and downs to GDP, which matches the hypothesis H1 and impulse reaction conclusions. Meanwhile, the effect of unemployment is reduced over time, strengthening the statistical weakness of earlier stages, these results highlight the main role of oil and human development factors to design the economic variation in Iraq, while inflation and labor market dynamics play a relatively marginal. Therefore, the VAR-based analysis of Fevd oil trend develops further empirical strength.

Table.no 5. Forecast Error Variance Decomposition for GDP

Forecast Horizon	GDP	HDI	Unemp	Infl	Oil Pro
Period 1	1.0	0.0	0.0	0.0	0.0
Period 2	0.2186	0.7814	0.0	0.0	0.0
Period 3	0.0029	0.0068	0.9903	0.0	0.0
Period 4	0.2262	0.0469	0.5303	0.1966	0.0
Period 5	0.5898	0.211	0.0	0.0998	0.0994

Author's calculations based on the dataset used in the study and estimated using EViews

13. Conclusion.

This study examined the dynamic relationship between key macroeconomic variables and human development indicators in Iraq over the period 1980–2023 using a Vector

Autoregression (VAR) framework. The empirical analysis incorporated five main variables: GDP, the Human Development Index (HDI), unemployment, inflation, and oil production. Prior to model estimation, stationarity tests were conducted and the variables were transformed to ensure appropriate time-series properties. Based on standard information criteria, an optimal lag length of four periods was selected for the VAR model.

The econometric results reveal several important findings. First, the estimation results confirm the first hypothesis (H1), indicating that oil production has a statistically significant and positive impact on economic growth in Iraq. This finding highlights the dominant role of the oil sector in shaping the country's economic performance. The impulse response analysis further demonstrates that positive shocks in oil production lead to a noticeable increase in GDP in the short run, confirming the central importance of oil revenues in driving economic activity.

Second, the results provide partial support for the third hypothesis (H3), which suggests that economic growth influences human development outcomes. The analysis indicates that increases in GDP contribute to gradual improvements in the Human Development Index; however, the effect appears with a time lag, reflecting the slow transmission of economic growth into improvements in education, health services, and living standards.

In contrast, the empirical evidence does not provide strong support for the second hypothesis (H2). The relationship between inflation and unemployment appears weak and statistically insignificant in the estimated model. This suggests that inflation dynamics do not play a major role in explaining labor market fluctuations within the Iraqi economic system during the study period.

Furthermore, the results provide limited evidence for the fourth hypothesis (H4). Although macroeconomic shocks—particularly oil-related shocks—have a measurable effect on GDP, their direct influence on other macroeconomic variables such as inflation and unemployment appears relatively modest within the VAR framework.

The impulse response functions confirm that oil production shocks generate the most significant responses in GDP, while their effect on HDI is indirect and occurs gradually over time. Similarly, the forecast error variance decomposition indicates that oil production and human development variables account for an increasing share of the variation in GDP over longer forecast horizons.

Overall, the findings highlight the structural dependence of Iraq's economy on oil production and demonstrate the delayed transmission of economic growth into human development improvements. While oil revenues remain the primary driver of economic expansion, their impact on broader social development depends on institutional capacity and the effective allocation of public resources.

These results underscore the importance of economic diversification and long-term development policies aimed at reducing excessive reliance on the oil sector. Strengthening non-oil productive sectors, improving labor market efficiency, and directing public investment toward education, healthcare, and infrastructure may enhance the capacity of economic growth to translate into sustainable human development outcomes.

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