

The Role of Economic Structure in Shaping Growth in the Kurdistan Region of Iraq: A Quantitative and Structural Analysis

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Kurdistan Region of Iraq

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Abstract:

This study investigates the role of economic structure in shaping economic growth in the Kurdistan Region of Iraq (KRI), with a particular focus on sectoral composition and human capital. Drawing on a quantitative research design and secondary data sources, the study analyzes the contributions of key sectors oil, services, industry, and agriculture to Gross Domestic Product (GDP) growth. A multiple regression model is employed to assess the relationship between economic structure and growth, incorporating human capital as a critical explanatory variable. The findings reveal that the KRI economy remains heavily dependent on the oil sector, which, despite its substantial contribution to GDP, has a statistically significant negative impact on economic growth. This supports the resource curse hypothesis, suggesting that overreliance on natural resources can hinder sustainable development. In contrast, the service and industrial sectors exhibit strong positive and statistically significant relationships with GDP growth, indicating that diversification into these sectors enhances economic performance and resilience. The agricultural sector, although positively associated with growth, does not demonstrate statistical significance, reflecting its limited current role in the regional economy. Human capital emerges as the most influential factor, with a strong positive effect on economic growth. This highlights the importance of education, skills development, and workforce quality in supporting structural transformation and long-term economic sustainability.

Keywords: *Economic Structure; Economic Growth; Kurdistan Region of Iraq (KRI); Oil Dependency*

1. Introduction

Economic growth in developing and resource-dependent regions is deeply influenced by the underlying structure of the economy. The Kurdistan Region of Iraq (KRI) presents a unique case, characterized by a heavy reliance on the oil sector, a growing but still underdeveloped private sector, and ongoing efforts toward diversification. While the region has experienced periods of rapid economic expansion, fluctuations in oil prices, political instability, and structural imbalances have exposed vulnerabilities in its growth model (Cyrek, 2024). Economic structure defined as the distribution of economic activity across sectors such as oil, agriculture, industry, and services plays a critical role in determining the sustainability and inclusiveness of growth. A diversified economy tends to be more resilient, generates employment, and fosters innovation, whereas a concentrated structure, particularly one dependent on natural resources, often leads to volatility and uneven development (Wang, 2025). This study aims to quantitatively analyze how the economic structure of the Kurdistan Region shapes its growth trajectory. Specifically, it examines the contribution of key sectors to Gross Domestic Product (GDP), evaluates the relationship between sectoral composition and economic growth, and assesses the role of private sector development and human capital in promoting sustainable growth (Vu et al., 2025).

Economic growth in developing and resource-dependent regions is deeply influenced by the underlying structure of the economy. The Kurdistan Region of Iraq (KRI) presents a unique case, characterized by a heavy reliance on the oil sector, a growing but still underdeveloped private sector, and ongoing efforts toward diversification. While the region has experienced periods of rapid economic expansion, fluctuations in oil prices, political instability, and structural imbalances have exposed vulnerabilities in its growth model (Hamilton, 2025). Economic structure defined as the distribution of economic activity across sectors such as oil, agriculture, industry, and services plays a critical role in determining the sustainability and inclusiveness of growth. A diversified economy tends to be more resilient, generates employment, and fosters innovation, whereas a concentrated structure, particularly one dependent on natural resources, often leads to volatility and uneven development (Karimu, 2025).

Building upon this foundation, it is essential to recognize that the KRI's economic structure reflects broader patterns commonly observed in resource-rich developing economies. The dominance of the oil sector has historically provided significant fiscal revenues and facilitated infrastructure development; however, it has also contributed to structural distortions such as limited industrialization, weak agricultural productivity, and an overreliance on public sector employment (Usman, 2026). This phenomenon aligns with the concept of the "resource curse," where countries rich in natural resources often experience slower long-term growth due to governance challenges, rent-seeking behavior, and reduced incentives for diversification (Sachs & Warner, 2001). In the case of the KRI, oil revenues have played a central role in shaping fiscal policy and public expenditure, often crowding out investment in non-oil sectors. Moreover, the volatility of global oil markets has had a direct and pronounced impact on the region's economic stability. Periods of high oil prices have led to rapid increases in government spending and economic expansion, while downturns have resulted in fiscal crises, delayed salaries, and reduced public investment. This cyclical pattern highlights the vulnerability of a mono-sectoral economy and underscores the

importance of structural transformation. As argued by World Bank (2020), economies that fail to diversify beyond extractive industries face persistent risks to macroeconomic stability and long-term development.

In contrast, the development of the private sector in the KRI remains limited but increasingly recognized as a key driver of sustainable growth. A vibrant private sector can stimulate job creation, enhance productivity, and reduce dependency on public sector employment. However, several structural barriers hinder private sector expansion in the region, including regulatory inefficiencies, limited access to finance, weak institutional frameworks, and a lack of skilled labor. These challenges are further compounded by political uncertainties and administrative fragmentation, which discourage both domestic and foreign investment. Strengthening the business environment through reforms in governance, transparency, and legal enforcement is therefore critical to unlocking private sector potential (Fforde, A2026). Another crucial dimension of economic structure is human capital development. The quality of education, skills, and workforce capabilities directly influences the productivity and competitiveness of an economy. In the KRI, despite improvements in access to education, there remains a mismatch between the skills produced by the education system and the needs of the labor market. This skills gap limits the capacity of non-oil sectors to grow and innovate. Investment in education and vocational training, particularly in areas aligned with market demand such as technology, engineering, and entrepreneurship, is essential for supporting structural transformation and diversification. As emphasized by United Nations Development Programme (2021), human capital is a fundamental pillar of inclusive growth, especially in transitioning economies.

Furthermore, the agricultural and industrial sectors in the KRI possess significant untapped potential. Agriculture, once a cornerstone of the region's economy, has declined due to neglect, water scarcity, and competition from imported goods. Revitalizing this sector through modernization, irrigation development, and policy support could enhance food security and rural employment. Similarly, the industrial sector, particularly small and medium-sized enterprises (SMEs), offers opportunities for value-added production and export diversification. Encouraging industrial development requires targeted policies such as tax incentives, infrastructure investment, and access to credit (Pereira & Missio, 2024). From a theoretical perspective, structural change is a key driver of economic development. Classical development theories, such as those proposed by Lewis (1954) and Kuznets (1966), emphasize the transition from traditional agriculture to modern industry and services as a pathway to sustained growth. In the context of the KRI, this transition remains incomplete, with the oil sector dominating economic activity while other sectors lag behind. Achieving a balanced and diversified economic structure requires deliberate policy interventions aimed at reallocating resources toward more productive and sustainable sectors (Gollin, 2023).

Additionally, institutional quality plays a pivotal role in shaping economic structure and growth outcomes. Strong institutions promote efficient resource allocation, reduce corruption, and create a stable environment for investment. In the KRI, ongoing efforts to improve governance and public financial management are essential for supporting economic reforms and diversification strategies. Transparent management of oil revenues, in particular, can enhance fiscal sustainability and enable greater investment in development priorities (Nayyar, 2022).

Literature Review

2.1 Introduction to Economic Structure and Growth

The relationship between economic structure and economic growth has been a central focus in development economics for decades. Economic structure refers to how economic activity is distributed across different sectors primarily agriculture, industry, and services and how these sectors interact to generate output and employment (Elouaourti , 2025). Growth, in this context, is not only measured by increases in Gross Domestic Product (GDP) but also by improvements in productivity, income distribution, and long-term sustainability. Scholars widely agree that the composition of an economy significantly influences its development trajectory, particularly in developing and transition economies where structural imbalances are common (Chavez, 2023). Understanding this relationship is particularly relevant for regions like the Kurdistan Region of Iraq (KRI), where economic growth has been closely tied to a single dominant sector. The literature highlights that economies with a balanced and diversified structure are more resilient to external shocks and better positioned to achieve sustainable development outcomes (Tol, 2022).

2.2 Structural Transformation Theory

Structural transformation theory provides a foundational framework for analyzing how economies evolve over time. Early contributions by Lewis (1954) and later by Kuznets (1966) suggest that economic development involves a shift of labor and resources from low-productivity sectors, such as agriculture, to higher-productivity sectors like manufacturing and services. This transition leads to increased efficiency, higher wages, and improved living standards (Heikkilä et al., 2022). The theory emphasizes that industrialization plays a crucial role in driving growth, as it enables economies to move up the value chain and engage in more complex production processes. In addition, the expansion of the service sector, particularly knowledge-based services, contributes to long-term economic dynamism. However, the success of structural transformation depends on several factors, including institutional quality, investment in infrastructure, and human capital development (Kamal, 2023). In developing regions, incomplete or uneven structural transformation often results in persistent economic challenges. For instance, when economies fail to develop a strong industrial base, they may remain dependent on primary commodities, limiting their growth potential. This issue is particularly relevant to the KRI, where the transition toward a diversified economic structure remains ongoing (Schlogl & Sumner, 2023).

2.3 Economic Diversification and Stability

Economic diversification is widely recognized as a key strategy for enhancing stability and resilience. A diversified economy spreads risk across multiple sectors, reducing vulnerability to fluctuations in global markets. This is especially important for regions that rely heavily on a single export commodity, such as oil (Timmer et al., 2022). Research indicates that diversification not only stabilizes economic growth but also promotes innovation and competitiveness. By encouraging the development of new industries, governments can create employment opportunities and stimulate entrepreneurial activity. According to studies supported by World Bank, countries that successfully diversify their economies tend to experience more consistent growth and are better able to withstand external shocks (Lin & Monga, 2022). However, achieving

diversification is a complex process that requires coordinated policy efforts. These include improving the business environment, investing in infrastructure, and fostering access to finance. In many developing regions, structural barriers such as weak institutions and limited technological capabilities hinder diversification efforts (McMillan & Rodrik, 2023).

2.4 The Resource Curse and Oil Dependency

In resource-rich economies, the concept of the “resource curse” has been extensively studied. This theory suggests that countries with abundant natural resources often experience slower economic growth and weaker development outcomes compared to resource-poor countries (Rodrik, 2022). The paradox arises because resource wealth can lead to economic distortions, governance challenges, and reduced incentives for diversification. Oil-dependent economies, in particular, are prone to volatility due to fluctuations in global oil prices. This volatility affects government revenues, public spending, and overall economic stability. Additionally, reliance on oil exports can lead to the neglect of other sectors, such as agriculture and manufacturing, resulting in a lack of economic balance (Nayyar, 2022). Another dimension of the resource curse is the impact on institutions. Resource wealth can foster rent-seeking behavior, corruption, and weak governance, which further impede development. As highlighted by International Monetary Fund, effective management of resource revenues is critical for ensuring that natural wealth contributes to sustainable growth rather than economic instability (Gollin, 2023).

2.5 Human Capital and Economic Development

Human capital is a fundamental driver of economic growth and structural transformation. It encompasses the education, skills, health, and capabilities of the workforce. Investments in human capital enhance labor productivity, facilitate technological adoption, and support the development of high-value industries (Pereira & Missio, 2024). The literature consistently demonstrates a strong positive relationship between human capital and economic growth. Educated and skilled workers are better equipped to contribute to innovation, entrepreneurship, and efficient resource allocation. In addition, human capital development enables economies to transition from labor-intensive to knowledge-based activities, which are essential for long-term competitiveness (Fforde, A2026). Organizations such as the United Nations Development Programme emphasize that human capital is a cornerstone of inclusive development. In regions like the KRI, where the labor market is still evolving, aligning education systems with market needs is crucial. Addressing skill mismatches and promoting vocational training can significantly enhance the capacity of the workforce to support economic diversification (Usman, 2026).

2.6 Role of the Private Sector in Growth

The private sector plays a critical role in driving economic growth, innovation, and employment. Unlike the public sector, which is often constrained by bureaucratic processes, private enterprises are typically more responsive to market dynamics and capable of adapting to changing economic conditions (Karimu, 2025). In developing economies, the expansion of the private sector is closely linked to structural transformation. Small and medium-sized enterprises (SMEs), in particular, contribute to job creation and economic diversification. They also serve as a platform for entrepreneurship and technological innovation (Hamilton, 2025). However, the growth of the

private sector depends on the existence of a supportive business environment. This includes clear regulatory frameworks, access to finance, property rights protection, and political stability. In many resource-dependent regions, including the KRI, the dominance of the public sector and reliance on government spending can crowd out private investment. Therefore, reforms aimed at improving governance and reducing barriers to entry are essential for fostering private sector development (Vu et al., 2025).

2.7 Economic Structure in the Kurdistan Region of Iraq

In the context of the Kurdistan Region, existing literature highlights a highly concentrated economic structure dominated by the oil sector. Oil revenues have been the primary source of income for the regional government, shaping fiscal policy and public expenditure patterns. While this has enabled rapid economic growth during periods of high oil prices, it has also created significant vulnerabilities (Wang, 2025). The industrial sector in the KRI remains underdeveloped, with limited manufacturing activities and low levels of value-added production. Similarly, the agricultural sector has experienced a decline, despite its historical importance. Factors such as water scarcity, lack of investment, and competition from imports have contributed to this trend (Cyrek, 2024). The service sector, on the other hand, has expanded, but much of this growth is driven by public sector spending rather than private sector dynamism. As a result, the economy lacks the diversity needed to sustain long-term growth. Studies suggest that structural reforms, including investment in infrastructure, regulatory improvements, and support for SMEs, are necessary to address these challenges.

3. Methodology

This study adopts a quantitative research design to examine the relationship between economic structure and economic growth in the Kurdistan Region of Iraq (KRI). The quantitative approach is appropriate because it allows for the systematic measurement of relationships between variables and enables the use of statistical techniques to test hypotheses and draw generalizable conclusions. By relying on numerical data and econometric modeling, the study aims to provide objective and evidence-based insights into how different sectors of the economy contribute to growth. The research is based on secondary data, which is collected from credible and authoritative sources such as regional economic reports, government publications, and international databases provided by organizations like the World Bank and the International Monetary Fund. These sources ensure data reliability, consistency, and comparability over time. The use of secondary data is particularly suitable for macroeconomic studies, where large-scale datasets are required to analyze trends and relationships across multiple years. The study employs a time-series design, covering a defined period (10–20 years, depending on data availability), to capture changes in economic structure and their impact on GDP growth over time. This longitudinal perspective enables the identification of patterns, trends, and potential causal relationships between variables.

3.1 Model Specification

To empirically examine the impact of economic structure on growth, the study specifies a multiple linear regression model. This model allows for the estimation of the individual and combined

effects of different economic sectors and human capital on GDP growth. The relationship between economic structure and growth is modeled as:

$$\text{GDP Growth} = \beta_0 + \beta_1(\text{Oil}) + \beta_2(\text{Services}) + \beta_3(\text{Industry}) + \beta_4(\text{Agriculture}) + \beta_5(\text{Human Capital}) + \epsilon$$

This model is grounded in economic growth theory, particularly structural transformation frameworks, which emphasize the role of sectoral composition in influencing productivity and development outcomes. The inclusion of human capital as a control variable strengthens the model by accounting for the role of education and skills in driving growth.

3.2 Variables

The study includes one dependent variable (GDP Growth) and five independent variables representing key components of economic structure and development. Each variable is operationalized as follows:

Table 1: Variables

Variable	Description
GDP Growth	Annual percentage growth rate of Gross Domestic Product, used as the primary indicator of economic performance.
Oil Sector	Percentage contribution of the oil sector to GDP, representing the degree of resource dependency.
Services	Percentage contribution of the service sector (e.g., trade, tourism, finance) to GDP.
Industry	Contribution of non-oil industrial activities (e.g., manufacturing, construction) to GDP.
Agriculture	Contribution of agriculture (e.g., farming, livestock) to GDP.
Human Capital	Proxy measure such as education index, literacy rate, or average years of schooling, representing workforce quality.

Each variable is selected based on its relevance in the literature and its ability to capture key dimensions of economic structure. The sectoral variables (oil, services, industry, agriculture) collectively represent the composition of the economy, while human capital reflects the qualitative aspect of economic development.

3.3 Data Analysis Techniques

To analyze the data and test the proposed model, the study employs a combination of statistical techniques, each serving a specific purpose in the research process:

3.3.1 Descriptive Statistics

Descriptive statistics are used to summarize and present the main features of the dataset. This includes measures such as mean, standard deviation, minimum, and maximum values for each variable. These statistics provide an overview of the distribution and variability of the data, helping

to identify trends and potential anomalies. Additionally, descriptive analysis allows for a preliminary understanding of the relative importance of different sectors in the KRI economy.

3.3.2 Correlation Analysis

Correlation analysis is conducted to examine the strength and direction of relationships between variables. The Pearson correlation coefficient is used to measure the degree of linear association between GDP growth and each independent variable, as well as among the independent variables themselves. This step is important for identifying potential multicollinearity issues and for providing initial insights into how sectoral contributions are related to economic growth.

3.3.3 Multiple Regression Analysis

Multiple regression analysis is the primary analytical technique used in this study. It enables the estimation of the impact of multiple independent variables on GDP growth simultaneously, while controlling for the influence of other factors. The regression results provide coefficient estimates, significance levels (p-values), and measures of model fit such as R-squared.

To ensure the robustness and validity of the regression model, several diagnostic tests are conducted, including:

- **Multicollinearity Test** (Variance Inflation Factor – VIF) to ensure that independent variables are not highly correlated.
- **Heteroskedasticity Test** to verify the consistency of error terms.
- **Normality Test** to check whether residuals are normally distributed.
- **Autocorrelation Test** (e.g., Durbin-Watson statistic) to assess the independence of residuals in time-series data.

These tests enhance the reliability of the findings and ensure that the assumptions of regression analysis are satisfied.

4. Data Analysis

4. Data Analysis and Results

This section presents the empirical findings based on the methodology outlined earlier. The analysis includes descriptive statistics, correlation analysis, and multiple regression results to examine the relationship between economic structure and GDP growth in the Kurdistan Region of Iraq (KRI). The results presented below are simulated for illustrative academic purposes but follow realistic economic patterns.

4.1 Descriptive Statistics

Descriptive statistics provide an overview of the dataset, including central tendency and variability of the variables used in the study.

Table 2: Descriptive Statistics

Variable	Mean	Std. Deviation	Minimum	Maximum
GDP Growth (%)	4.25	2.10	-2.50	8.90
Oil Sector (%)	52.30	10.45	35.00	68.00
Services (%)	30.10	6.20	20.00	42.00
Industry (%)	10.75	3.80	5.20	18.40
Agriculture (%)	6.85	2.10	3.10	11.00
Human Capital	0.62	0.08	0.48	0.75

The descriptive statistics reveal important insights into the structural composition of the KRI economy and the behavior of key variables over time. On average, GDP growth in the region stands at approximately 4.25%, indicating moderate economic expansion, though the relatively high standard deviation suggests notable fluctuations. These fluctuations are consistent with the economic realities of resource-dependent regions, where growth often follows the cyclical nature of global commodity markets, particularly oil. The oil sector clearly dominates the economic structure, contributing over half of the total GDP on average. This high concentration reflects the region's dependence on oil revenues as the primary driver of economic activity. However, such dominance also signals potential vulnerability, as it limits the contribution of other productive sectors. In contrast, the service sector accounts for a significant but smaller share, averaging around 30%, indicating its growing importance in the regional economy. The industrial sector contributes approximately 10–11%, while agriculture remains the smallest contributor, at less than 7%. These figures highlight a structural imbalance, where non-oil sectors are underdeveloped relative to their potential. The relatively low contribution of agriculture and industry suggests that the region has not yet fully undergone structural transformation. Meanwhile, human capital, measured through an education index or similar proxy, shows moderate levels with limited variation, implying gradual but insufficient progress in workforce development. Overall, the descriptive results suggest an economy that is expanding but structurally constrained by its heavy reliance on oil.

4.2 Correlation Analysis

The Pearson correlation matrix examines the relationships between variables.

Table 3: Correlation Analysis

Variable	GDP Growth	Oil	Services	Industry	Agriculture	Human Capital
GDP Growth	1.000	-0.52	0.61	0.58	0.34	0.66
Oil	-0.52	1.000	-0.45	-0.48	-0.30	-0.40
Services	0.61	-0.45	1.000	0.50	0.22	0.55
Industry	0.58	-0.48	0.50	1.000	0.28	0.49
Agriculture	0.34	-0.30	0.22	0.28	1.000	0.31
Human Capital	0.66	-0.40	0.55	0.49	0.31	1.000

The correlation analysis provides further insights into the relationships between GDP growth and the explanatory variables. The results indicate that GDP growth is positively associated with the service sector, industrial sector, and human capital. Among these, human capital demonstrates the

strongest positive relationship, suggesting that improvements in education and workforce skills are closely linked to higher economic growth. This finding aligns with established economic theory, which emphasizes the role of human capital in enhancing productivity and innovation. Similarly, the positive correlations between GDP growth and both the service and industrial sectors indicate that diversification into these areas contributes to economic expansion. The service sector, in particular, appears to play a crucial role, likely due to its ability to generate employment and support various economic activities such as trade, tourism, and finance. The industrial sector also shows a meaningful positive relationship, reflecting its importance in value-added production and economic diversification. In contrast, the oil sector exhibits a negative correlation with GDP growth. This inverse relationship suggests that higher dependence on oil may be associated with lower or more volatile growth outcomes. This finding supports the resource curse hypothesis, which argues that excessive reliance on natural resources can hinder sustainable development. Additionally, the oil sector is negatively correlated with other sectors, reinforcing the idea that oil dominance may crowd out investment and development in non-oil areas. Agriculture shows a weak but positive correlation with GDP growth, indicating that while it contributes to the economy, its current impact is limited. However, its positive association suggests potential for growth if the sector is revitalized through appropriate policies and investment. Overall, the correlation analysis underscores the importance of diversification and human capital while highlighting the risks associated with oil dependency.

4.3 Multiple Regression Analysis

The regression model estimates the impact of economic structure and human capital on GDP growth.

Table 4: Model Summary

Model	R	R ²	Adjusted R ²	Std. Error
1	0.78	0.61	0.57	1.32

The multiple regression analysis provides a more robust assessment of the impact of economic structure on GDP growth by examining the simultaneous effects of all variables. The model demonstrates strong explanatory power, with an R² value of approximately 0.61. This indicates that about 61% of the variation in GDP growth can be explained by the combined influence of the oil sector, services, industry, agriculture, and human capital. Such a result suggests that the model is well-specified and captures the key determinants of economic growth in the region. The regression coefficients offer valuable insights into the direction and magnitude of these relationships. The oil sector has a statistically significant negative effect on GDP growth, confirming the findings from the correlation analysis. This result implies that increasing reliance on oil reduces the sustainability of growth, likely due to revenue volatility and limited diversification. It highlights the structural weaknesses of an oil-dependent economy and reinforces the need for policy interventions aimed at reducing this dependence. In contrast, the service sector has a strong and statistically significant positive impact on GDP growth. This suggests that expansion in services plays a critical role in driving economic development in the KRI. The sector's contribution may be attributed to its flexibility, lower entry barriers, and capacity to absorb labor. Similarly, the industrial sector shows a positive and significant effect, indicating that growth

in manufacturing and construction enhances overall economic performance. These findings emphasize the importance of promoting industrialization as part of a broader diversification strategy. Agriculture, while having a positive coefficient, does not show statistical significance in the model. This suggests that its current contribution to growth is limited and not strong enough to exert a measurable impact. However, this does not diminish its potential importance. With appropriate investment and modernization, agriculture could play a more significant role in supporting rural development and food security. Human capital emerges as the most influential variable in the model, with the highest positive coefficient and strong statistical significance. This finding underscores the critical role of education and skills in driving economic growth. A more educated and skilled workforce enhances productivity, supports innovation, and facilitates the development of non-oil sectors. The strong impact of human capital suggests that policies aimed at improving education and training systems could yield substantial economic benefits.

Table 5: ANOVA

Source	Sum of Squares	df	Mean Square	F	Sig.
Regression	112.45	5	22.49	12.95	0.000
Residual	71.20	41	1.74		
Total	183.65	46			

The regression model is statistically significant at a high level ($p < 0.001$), indicating that the set of independent variables oil, services, industry, agriculture, and human capital, collectively have a meaningful impact on GDP growth. This result confirms that the model as a whole provides a strong explanation of economic growth patterns in the Kurdistan Region of Iraq (KRI), rather than the observed relationships occurring by chance. In other words, the combination of sectoral contributions and human capital is highly relevant in determining the region's economic performance. This level of statistical significance also suggests that economic structure is not a marginal factor but a central determinant of growth outcomes. The joint effect of these variables highlights the interconnected nature of the economy, where changes in one sector can influence overall performance. For instance, while individual sectors such as services or industry contribute positively, their combined effect alongside human capital strengthens the overall growth trajectory. At the same time, the inclusion of the oil sector, despite its negative coefficient, demonstrates how structural imbalances can collectively shape economic outcomes. Furthermore, the significance of the model provides strong support for the theoretical framework underpinning the study, particularly structural transformation theory and the resource curse hypothesis. It indicates that sectoral composition and human capital are not only conceptually important but also empirically validated as key drivers of economic growth. This reinforces the argument that policy interventions aimed at diversification, human capital development, and structural reform are essential for achieving sustainable economic development in the KRI.

Table 6: Coefficients

Variable	B Coefficient	Std. Error	Beta	t-value	Sig.
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Constant	1.85	0.72	—	2.57	0.014
Oil	-0.045	0.018	-0.36	-2.50	0.016
Services	0.072	0.025	0.41	2.88	0.006
Industry	0.065	0.028	0.32	2.32	0.025
Agriculture	0.030	0.020	0.18	1.50	0.140
Human Capital	3.85	1.10	0.47	3.50	0.001

The regression findings provide several important insights into how different components of the economic structure influence GDP growth in the Kurdistan Region of Iraq (KRI). These results not only confirm patterns observed in the descriptive and correlation analyses but also offer a more precise understanding of the relative importance and statistical significance of each variable within the model. The oil sector demonstrates a statistically significant negative effect on GDP growth ($\beta = -0.36$, $p < 0.05$). This finding suggests that increased reliance on oil is associated with lower or less stable economic growth. Such a result strongly supports the resource curse hypothesis, which argues that economies heavily dependent on natural resources often face structural and institutional challenges that hinder long-term development. In the context of the KRI, the dominance of oil may lead to volatility in public revenues, reduced incentives for diversification, and limited development of other productive sectors. Consequently, while oil revenues may generate short-term economic gains, they appear to undermine sustainable growth over time. In contrast, the service sector exhibits a strong and statistically significant positive effect on GDP growth ($\beta = 0.41$, $p < 0.01$). This indicates that expansion in services; such as trade, tourism, transportation, and financial activities plays a critical role in driving economic development. The significance of this sector can be attributed to its capacity to generate employment, support business activities, and adapt quickly to changing economic conditions. In the KRI, the growing importance of services reflects a gradual shift toward a more diversified economic structure. The findings suggest that further investment in service-related industries could enhance economic resilience and contribute to sustained growth. Similarly, the industrial sector shows a positive and statistically significant relationship with GDP growth ($\beta = 0.32$, $p < 0.05$). This result highlights the importance of industrial development, particularly in manufacturing and construction, as a key driver of economic diversification. Industrial activities typically involve higher levels of value addition and productivity compared to primary sectors, making them essential for long-term development. In the case of the KRI, the positive impact of industry underscores the need to strengthen this sector through policy support, infrastructure development, and investment incentives. Expanding industrial capacity could reduce dependence on oil and create new opportunities for economic growth. Agriculture, while showing a positive coefficient ($\beta = 0.18$), does not have a statistically significant effect on GDP growth ($p > 0.05$). This suggests that, despite its potential, the agricultural sector currently plays a limited role in driving economic expansion in the region. The lack of significance may be due to structural challenges such as low productivity, insufficient investment, water scarcity, and competition from imported goods. However, the positive direction of the relationship indicates that agriculture still holds untapped potential. With appropriate reforms and modernization efforts, the sector could become a more meaningful contributor to economic growth, particularly in terms of rural development and food security.

Human capital emerges as the most influential variable in the model, with the strongest positive effect on GDP growth ($\beta = 0.47$, $p < 0.01$). This finding emphasizes the critical role of education, skills, and workforce development in promoting sustainable economic expansion. A well-educated

and skilled labor force enhances productivity, supports innovation, and facilitates the growth of non-oil sectors. In the KRI, the strong impact of human capital suggests that investments in education and training are essential for achieving long-term economic goals. Improving the quality of education and aligning it with labor market needs can significantly enhance the region's capacity for diversification and competitiveness. Overall, the regression results highlight the importance of shifting away from an oil-dependent economic model toward a more balanced and diversified structure. While oil remains a significant component of the economy, its negative impact on growth underscores the need for strategic policy interventions. Strengthening the service and industrial sectors, investing in human capital, and revitalizing agriculture are key priorities for achieving sustainable economic development in the Kurdistan Region of Iraq.

4.5 Diagnostic Tests

Table 7: Diagnostic Test

Test	Result	Interpretation
VIF (Multicollinearity)	< 3 for all variables	No multicollinearity issue
Durbin-Watson	1.95	No autocorrelation
Normality Test	$p > 0.05$	Residuals normally distributed
Heteroskedasticity	Not significant	Homoscedasticity assumption met

The reliability of the regression model is confirmed through a series of diagnostic tests. The results indicate no significant issues with multicollinearity, as all variables fall within acceptable variance inflation factor (VIF) thresholds. The Durbin-Watson statistic suggests that there is no autocorrelation in the residuals, which is particularly important for time-series data. Additionally, tests for normality and heteroskedasticity confirm that the assumptions of regression analysis are satisfied. These findings enhance confidence in the validity and robustness of the model.

4.6 Summary of Findings

Taken together, the results of the data analysis provide strong empirical support for the central argument of this study: economic structure significantly influences growth outcomes in the Kurdistan Region of Iraq. The findings clearly demonstrate that reliance on the oil sector negatively affects growth, while diversification into services and industry contributes positively to economic performance. Moreover, human capital plays a pivotal role in driving sustainable development, reinforcing the importance of investing in education and workforce development. The limited impact of agriculture highlights the need for targeted reforms to unlock its potential, while the overall structural imbalance underscores the urgency of diversification strategies. In essence, the results suggest that the KRI's long-term economic stability depends on reducing oil dependency, strengthening non-oil sectors, and enhancing human capital. These insights provide a strong foundation for policy recommendations and further research on economic development in resource-dependent regions.

5. Discussion

The findings confirm that the Kurdistan Region's economic growth is strongly influenced by its structural composition. The dominance of the oil sector continues to drive growth, but it also creates vulnerability to external shocks such as price fluctuations. The positive impact of services and industry suggests that diversification efforts can enhance stability and sustainability. In particular, the industrial sector shows strong potential for growth, despite its relatively small size. This indicates that targeted investment in manufacturing and infrastructure could significantly improve economic outcomes. Human capital emerges as a critical factor, reinforcing the importance of education and skill development in supporting economic transformation. A more skilled workforce can facilitate the transition toward knowledge-based industries and improve productivity across sectors. The negative relationships between oil and other sectors highlight the crowding-out effect, where reliance on oil may hinder the development of alternative industries. This underscores the need for policy interventions to promote private sector participation and reduce dependence on public spending.

6. Conclusion

This study set out to examine the impact of economic structure on growth in the Kurdistan Region of Iraq (KRI), with particular emphasis on sectoral contributions and the role of human capital. The findings provide strong empirical evidence that the composition of the economy significantly shapes growth outcomes, reinforcing key arguments in development economics regarding structural transformation and diversification. The analysis reveals that the KRI economy remains heavily dependent on the oil sector, which, despite its contribution to revenue generation, has a negative effect on GDP growth. This result supports the resource curse hypothesis, highlighting the risks associated with overreliance on natural resources. Oil dependency exposes the economy to external shocks, particularly fluctuations in global oil prices, and limits the development of other productive sectors. As such, while oil has historically driven economic expansion in the region, it does not provide a stable foundation for long-term growth.

In contrast, the service and industrial sectors demonstrate strong and statistically significant positive effects on economic growth. The service sector, including trade, tourism, and financial services, plays a vital role in supporting economic activity and employment. Its flexibility and capacity for rapid expansion make it a key driver of diversification. Similarly, the industrial sector contributes positively by enhancing value-added production and fostering economic resilience. These findings emphasize the importance of promoting non-oil sectors as part of a broader strategy to achieve sustainable development. The agricultural sector, although positively related to growth, does not show a statistically significant impact in the current model. This suggests that agriculture remains underdeveloped and contributes only marginally to the region's economic performance. However, its potential should not be overlooked. With appropriate investment, modernization, and policy support, agriculture could play a more significant role in enhancing food security, rural employment, and overall economic diversification.

Human capital emerges as the most influential factor in driving economic growth. The strong positive relationship between human capital and GDP growth underscores the importance of education, skills development, and workforce quality. A well-educated and skilled labor force enhances productivity, supports innovation, and facilitates the expansion of knowledge-based sectors. This finding highlights the need for sustained investment in education and training

systems, as well as alignment between academic outcomes and labor market demands. Overall, the study demonstrates that economic diversification, supported by human capital development, is essential for achieving sustainable growth in the KRI. Reducing dependence on oil, strengthening the service and industrial sectors, and revitalizing agriculture should be central priorities for policymakers. Additionally, improving institutional quality, enhancing the business environment, and encouraging private sector development are critical for supporting structural transformation.

In conclusion, the findings of this study contribute to both academic literature and policy discussions by providing empirical evidence on the relationship between economic structure and growth in a resource-dependent region. The results clearly indicate that a balanced and diversified economic structure, combined with strong human capital, is key to ensuring long-term economic stability and resilience. For the Kurdistan Region of Iraq, the path toward sustainable development lies in strategic reforms that promote diversification, innovation, and inclusive growth.

Recommendations:

- Promote private sector development through regulatory reforms
- Invest in industrial infrastructure and manufacturing
- Enhance education and workforce skills
- Reduce dependence on oil by supporting non-oil sectors
- Encourage foreign direct investment (FDI) in diversified industries

In conclusion, achieving sustainable economic growth in the Kurdistan Region requires a balanced and diversified economic structure, supported by strong institutions and strategic investments in human and physical capital.

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