ISSN: 2663-5798 || Arab Journal for Scientific Publishing

الإصدار السابع – العدد الرابع والستون
تاريخ الإصدار: 2 – شباط – 2024م

www.ajsp.net

"Econometric Insights into Sectoral Dynamics and Economic Factors in Saudi Arabia: Assessing Impacts and Resource Utilization"

Researcher:

Marwan Ghabban

https://doi.org/10.36571/ajsp641

ISSN: 2663-5798 || Arab Journal for Scientific Publishing

الإصدار السابع – العدد الرابع والستون
تاريخ الإصدار: 2 – شباط – 2024م

www.ajsp.net

Abstract:

Examining the interdependencies between different critical variables, this research probes the complex dynamics of the Saudi Arabian economy. The research provides ideas on the impact of various economic factors on Saudi Arabia's economy based on an exhaustive literature analysis. These factors include manufacturing value added, unemployment rates, agricultural water withdrawals, and economic diversification. Using data collected between 2003 and 2022, the multiple regression model incorporates the following factors: spending on education, value added manufacturing, freshwater withdrawals, employment in the service sector, GDP growth, labor force participation, oil rents, value added services, and unemployment rates. Outside shocks are captured via dummy variables for the 2008 recession and the 2020 COVID-19 pandemic. Findings highlight the importance of manufacturing as a driver of economic development, since value added in manufacturing has a significant effect on GDP growth. The research shows that unemployment rates are susceptible to outside shocks, such the COVID-19 epidemic, which had a significant impact. In addition, it stresses the significance of sustainable practices by demonstrating the complex connection between freshwater withdrawals for agriculture and overall freshwater management. The study sheds light on the complex Saudi economic landscape, even though several variables were found to be statistically unimportant following further analysis. Contributing to a better knowledge of the Saudi Arabian economy, these findings have implications for evidence-based policymaking and strategic decision-making. Further investigation and study are needed to further understand the complex economic links that have been found, since this study does fill certain gaps in the literature.

Introduction

1.1. Project Highlight

A strategic drive towards diversification and reform has characterized Saudi Arabia's modern economic environment, mirroring a worldwide trend away from resource-based economies. In this context, manufacturing takes on more significance in the economic development of the Kingdom. The goal of this study is to shed light on the interplay between manufacturing's rapid expansion and the banking industry's high rate of bad loans. In order to grasp the larger effects of economic diversification on financial stability, it is essential to have a firm grasp on this connection. Understanding the repercussions of Saudi Arabia's efforts to reduce its dependency on oil revenues on the financial industry is of utmost importance. The project's goal is to maintain a strong and resilient financial system by analyzing the relationship between the Manufacturing Value Added (% of GDP) and the Non-Performing Loans to Total Gross Loans ratio. The study also looks at the complex interplay of factors that has an effect on the jobless rate in Saudi Arabia. The goal here is to understand the socioeconomic factors that influence employment dynamics by focusing on the Unemployment Rate (as a percentage of the labor force) and the Labor Force Participation Rate (as a percentage of the working-age population). By looking into this complicated subject, the study adds to the broader conversation on labor market dynamics, providing insights that might guide policy actions targeted at ensuring sustainable job possibilities.

1.2. Research Aim

The primary goal of this study is to use econometric analysis to shed light on the sectoral dynamics and economic factors that are influencing Saudi Arabia's progress towards a more diversified and resilient economy. To lay the groundwork for evidence-based policy recommendations, this initiative seeks to advance our theoretical knowledge of the complex interplay between the chosen areas. The study's overarching goal is to better understand the Saudi economy by elucidating the underlying patterns and causal relationships through a combination of theoretical frameworks and empirical data. Through a lens focused on manufacturing, financial stability, unemployment, and water resource management, the purpose is not only to diagnose existing difficulties but also to identify opportunities and potential pathways for sustainable economic growth.

Theoretically speaking, this study fits well with current conversations about sustainable development and broadening the economy on a global scale. The results will likely have implications beyond Saudi Arabia, providing useful information for other countries facing comparable problems. This project aims to contribute to the academic discussion on economic diversification and resource utilization in the twenty-first century by answering the research topics indicated above. The specific research questions to be tackled in the project include:

1. What is the effect of GDP growth on Manufacturing, Services and Agriculture, forestry & fishing added value growth?
2. What are the factors influencing unemployment rates in Saudi Arabia?
3. What is the effect of annual freshwater withdrawals in agriculture on total freshwater withdrawals in KSA?
4. Examining the Effects of Non-Oil Economic Diversification on KSA's GDP: Opportunities and Barriers.

Literature Review

2.1. Overview of Relevant Studies

To grasp the bigger picture of the economy, it's important to look at how GDP growth affects the value-added growth of important industries like manufacturing, services, and agriculture, forestry, and fishing. Research in this area has helped to clarify the complex interrelationships between various fields. Significantly, Wang and Luo (2019) provide a theoretical framework for assessing the effectiveness of diversification strategies in strengthening economic stability by providing a thorough analysis of diversification indices. The larger effects of GDP growth on the dynamics of different sectors can be better understood thanks to their research. Furthermore, similar dynamics are investigated by Shahzad et al. (2022) in developing countries, with a focus on how banking sectors might be quickly impacted by changes in manufacturing. Their research primarily concerns the banking sector, but it adds to our knowledge of how GDP growth—particularly in manufacturing—could affect financial stability and other related areas. When studying how different industries are affected by GDP growth, it is crucial to take sectoral dynamics and economic diversification into account, as shown in these studies. Furthermore, the research conducted by Feng & Goli (2023), explores the intricacies of enhancing value added in the manufacturing sector and its implications for maintaining financial stability. The study underscores the significance of diversification in order to ensure long-term economic resilience.

In the context of unemployment in Saudi Arabia, Deepak et al, (2015), study provides insights into the socio-economic factors that impact the rates of unemployment. The results of their study indicate a multifaceted interaction among levels of education achieved, engagement in the labor force, and the dynamics of the employment market. Moreover, Elbanna et al (2023); Ramady, (2013), research offers a comprehensive examination of the impact of governmental policies on the reduction of unemployment, proposing alternative policy measures to tackle the issues encountered by the labor market in Saudi Arabia. Within the realm of water resource management, an investigation conducted by Faye (n.d), delves into the ramifications of agricultural water withdrawals on the overall volume of freshwater withdrawals. The results of their study highlight the significance of using sustainable agriculture methods in order to guarantee the accessibility of water resources for the wider populace. Furthermore, the study conducted by Ruane & Rosenzweig, (2019) explores the worldwide ramifications of water scarcity, providing valuable perspectives on new approaches to enhance water utilization in the agriculture industry.

The economic ramifications of diversification efforts in the Gulf region, particularly in Saudi Arabia, were examined in research conducted by Horschig, (2016); Al Naimi, (2022). The research conducted by the authors underscores the importance of adopting a well-rounded strategy towards diversification, which entails considering both the potential advantages and obstacles involved. Furthermore, the research conducted by Wang & Luo (2019), presents a comprehensive examination of diversification indices, presenting a theoretical structure for evaluating the efficacy of diversification tactics in bolstering economic stability.

2.2. Development of Hypotheses and Research Gaps

Drawing upon the existing body of literature, a number of hypotheses can be formulated. Firstly, it is postulated that there exists a positive correlation between the increase in manufacturing value added (% of GDP) and the rise in the percentage of non-performing loans to total gross loans in Saudi Arabian banks within the manufacturing sector. The aforementioned hypothesis is based on the notion that the swift expansion of the manufacturing industry has the potential to give rise to financial susceptibilities that may subsequently materialize within the banking sector. Secondly, with regards to the issue of unemployment, it is postulated that there is a complex and interrelated connection between the rate of unemployment (expressed as a percentage of the labor force) and the rate of labor force participation (expressed as a percentage of the working-age population). The theory suggests that various factors, including education, government policies, and initiatives to diversify the economy, play a role in the complex dynamics of unemployment in Saudi Arabia.

Furthermore, within the realm of water resource management, the hypothesis posits that there exists a positive correlation between the percentage of agricultural water withdrawals in relation to the overall water withdrawal and the total volume of freshwater withdrawals per capita. This hypothesis is based on the understanding that the use of water in agriculture may have wider ramifications for the overall availability of freshwater resources in the Kingdom. The evaluation of non-oil economic diversification postulates that there exists a positive correlation between an augmentation in the diversity index and both the GDP growth rate and the non-oil GDP growth rate. This hypothesis posits that a greater degree of economic diversification is likely to have a favorable impact on the overall rate of economic growth.

Despite the extensive literature available, there are still gaps in study that remain unaddressed. Although prior research provides useful insights, there exists a necessity for more intricate analyses that take into account contextual characteristics unique to Saudi Arabia. Moreover, the intricate relationship between these variables requires a thorough comprehension of their reciprocal impacts, highlighting a deficiency in the existing body of knowledge that this study seeks to rectify.

Model Specification (Multiple Regression)

3.1. Nature of the Data

The dataset utilized in this study consists of a time series, encompassing annual observations spanning from 2003 to 2022. Every observation in the dataset represents significant economic indicators pertaining to Saudi Arabia. These indicators encompass a wide range of variables, including but not limited to education expenditure, agricultural value added, freshwater withdrawals, employment in services, GDP growth, labor force participation, manufacturing value added, oil rents, services value added, and the overall unemployment rate.

3.2. Explanation and Description of Variables

The variable "Edu_Exp" represents the adjusted savings for education spending as a percentage of Gross National Income (GNI). The variable in question quantifies the proportion of Gross National Income (GNI) that is dedicated to expenditures on education. This metric offers valuable insights about a nation's commitment to the development of human capital. The variable of interest is "Agriculture, forestry, and fishing, value added (% annual growth)" which measures the annual growth rate of value added in the sectors of agriculture, forestry, and fishery. This variable serves as an indicator of the level of dynamism within the agriculture industry in Saudi Arabia, as measured by the yearly growth percentage.

The variable of interest is "Annual freshwater withdrawals, agriculture (% of total freshwater withdrawal)." The variable in question represents the proportion of total freshwater withdrawals that are allocated specifically for agricultural purposes. This variable provides valuable information regarding the utilization of water resources within the agricultural sector. The variable of interest in this study is the yearly freshwater withdrawals, measured in billion cubic meters. By quantifying the aggregate freshwater withdrawals, this metric offers a comprehensive perspective on the nation's overall water utilization. The variable Empl_Serv represents the proportion of total employment that is accounted for by the services sector. This metric serves as an indicator of the services sector's importance within the labor market.

The variable GDP (GDP growth (annual %)) is a crucial indicator that represents the annual growth rate of the Gross Domestic Product. It serves as a significant measure of the overall economic performance. The Labor_Part, also known as the labor force participation rate, refers to the percentage of the entire population between the ages of 15 and 64 that is actively engaged in the labor force. This indicator offers valuable insights into the dynamics of a country's labor market by reflecting the proportion of the working-age population that actively participates in the labor force. "Manufacturing, value added (% annual growth)", which measures the annual growth rate of value added in the manufacturing sector. This statistic quantifies the yearly percentage increase in value added within the manufacturing sector, providing valuable insights into the sector's level of vitality. The variable "Oil Rent" represents the proportion of GDP that is derived from oil rents. It serves as an indicator of the oil sector's impact on the total economic output.

Serv_Value Added, specifically focusing on the yearly growth rate of services' value added expressed as a percentage. This variable offers valuable insights into the functioning of the services industry by indicating the yearly increase percentage of value added in this sector. "Unemployment, total (% of total labor force)." This measure, which denotes the proportion of the overall labor force that is without employment, holds significant importance as an indicator of labor market dynamics and the overall economic well-being.

Furthermore, the model will incorporate two dummy variables to accommodate external shocks. The variable "Dummy_2008" represents the year 2008, which is associated with the worldwide recession. The binary variable in question assumes a value of 1 specifically for the year 2008, while taking on a value of 0 for all other years. Its purpose is to measure

the influence of the global economic slump on Saudi Arabia's economic statistics. The variable "Dummy_2020" represents the year 2020, specifically during the COVID-19 epidemic. This is because the first case in Saudi Arabia was detected in March 2020 by the Ministry of Health. The binary variable assumes a value of 1 exclusively for the year 2020, while taking on a value of 0 for all other years. This variable serves to capture the distinct economic difficulties brought about by the COVID-19 epidemic.

The construction of the multiple regression model will involve the incorporation of these variables, including the utilization of dummy variables, in order to examine the associations and interdependencies among them. The proposed model aims to offer a comprehensive framework for evaluating the influence of many factors, such as the manufacturing sector, unemployment, water resource management, and economic diversification, on the overall economic dynamics of Saudi Arabia. It takes into account the potential impact of external shocks that may occur within the chosen time period.

Results and analysis

4.1. Descriptive statics

Table 1: Descriptive Statistics

	ANNUAL_FRESHWAT_WITHD	AGR_FRESHWATER_WITHD	AGR_VALUE_ADDED	EDU_EXP	EMPL_SERV	GDP	LABOR_PART	MAN_VALUE_ADDED	OIL_RENT	SERV_VALUE_ADDED	UNEMP_TOTAL_LABOUR
Mean	22.28	84.53	3.12	7.19	70.95	4.04	56.64	5.76	35.85	5.30	5.83
Median	22.30	83.87	2.90	7.19	70.12	3.97	56.70	7.56	37.47	5.89	5.68
Max	23.38	88.28	10.03	7.19	77.29	11.24	61.41	13.04	54.09	8.87	7.45
Min	20.60	81.56	-1.66	7.19	69.03	-4.34	53.47	-8.51	15.98	-2.84	5.08
Std. Dev.	0.87	2.54	2.46	0.00	2.45	3.94	2.54	5.19	11.95	3.16	0.51
Skewness	-0.21	0.24	0.76	NA	1.87	-0.04	0.42	-1.13	-0.11	-0.89	1.80
Kurtosis	2.00	1.59	4.50	NA	5.20	2.88	1.90	4.08	1.57	3.25	6.56
Jarque-Bera	0.98	1.85	3.79	NA	15.66	0.02	1.59	5.21	1.74	2.71	21.32
Probability	0.61	0.40	0.15	NA	0.00	0.99	0.45	0.07	0.42	0.26	0.00
Sum	445.66	1690.69	62.49	143.72	1418.97	80.84	1132.80	115.30	716.96	105.98	116.57
Sum Sq. Dev.	14.50	123.05	114.79	0.00	113.61	295.17	122.73	512.52	2711.17	189.98	4.91
Observations	20	20	20	20	20	20	20	20	20	20	20

4.1. Scatter plot of the Dependent and independent variables

4.1.1. RQ1

ISSN: 2663-5798 || Arab Journal for Scientific Publishing
الإصدار السابع – العدد الرابع والستون
تاريخ الإصدار: 2 – شباط – 2024م
www.ajsp.net

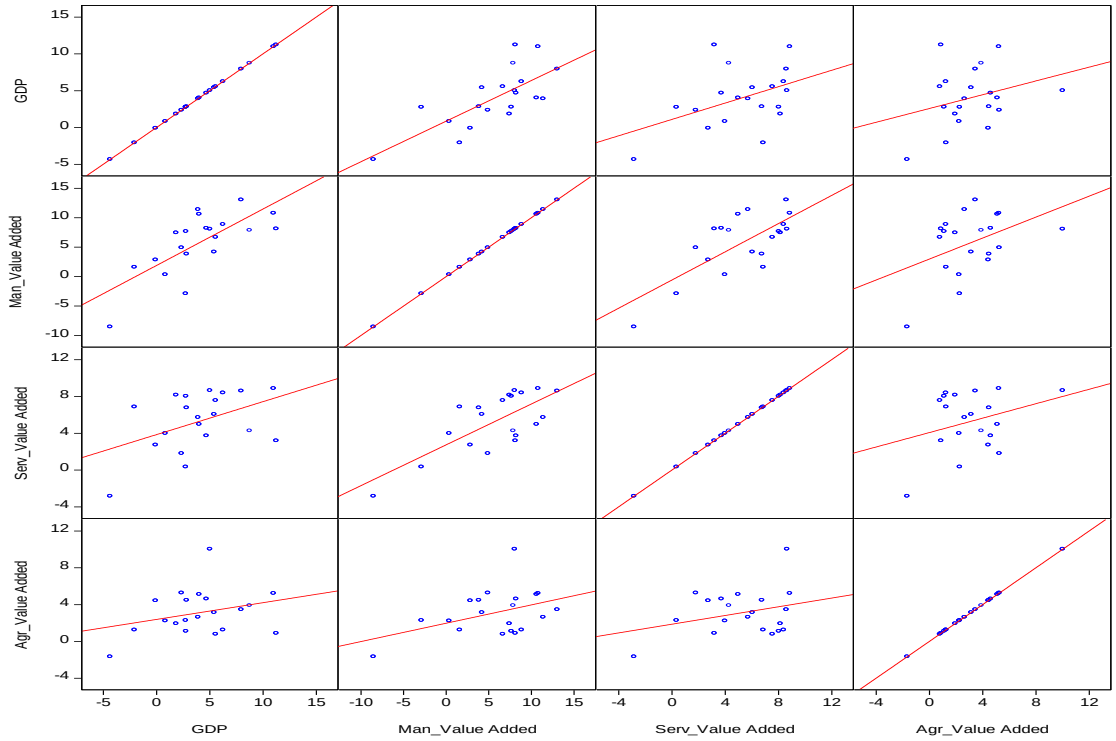

Figure 1

4.1.2. RQ2

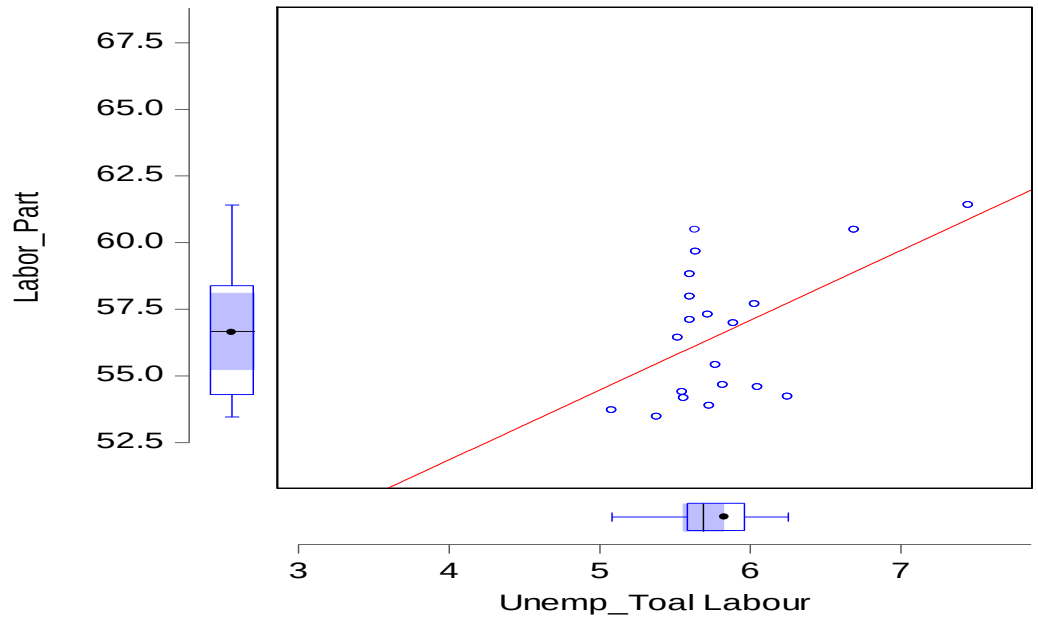

Figure 2

ISSN: 2663-5798 || Arab Journal for Scientific Publishing
الإصدار السابع – العدد الرابع والستون
تاريخ الإصدار: 2 – شباط – 2024م
www.ajsp.net

4.1.3. RQ3

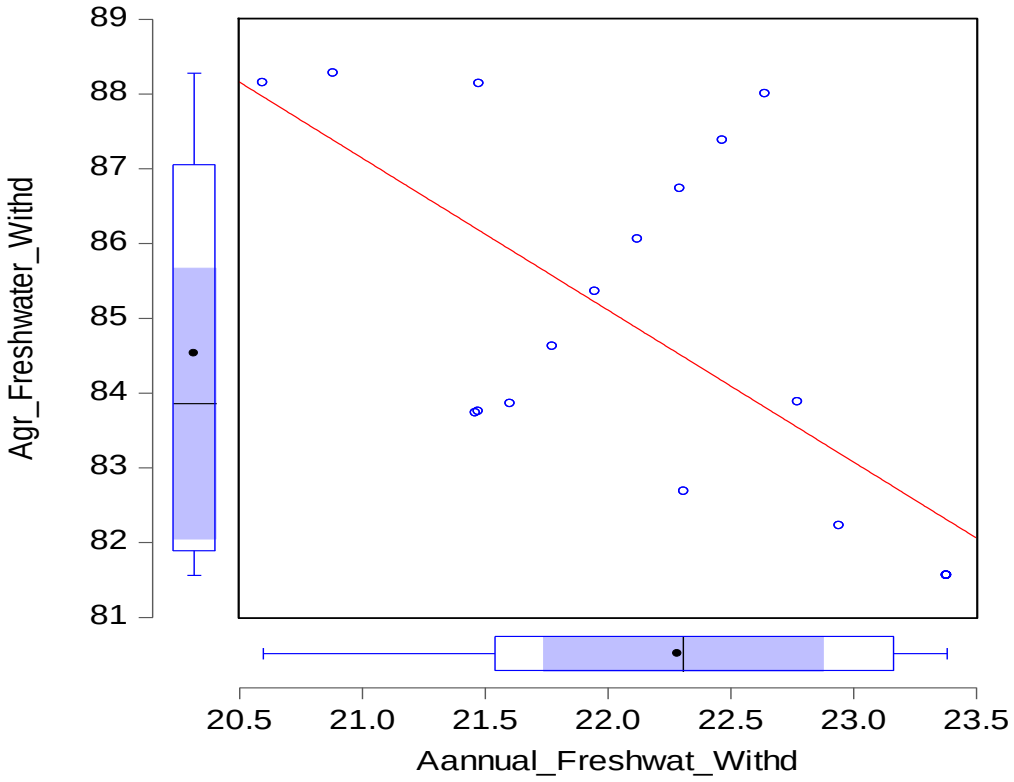

Figure 3

4.1.4. RQ4

ISSN: 2663-5798 || Arab Journal for Scientific Publishing
الإصدار السابع – العدد الرابع والستون
تاريخ الإصدار: 2 – شباط – 2024م
www.ajsp.net

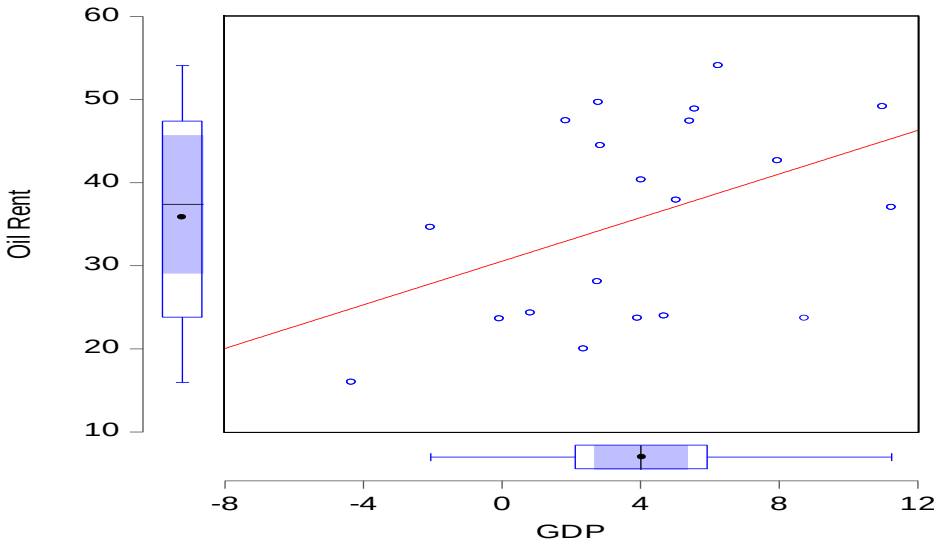

Figure 4

4.2. Correlation

Table 2

	AGR_FRESHWATER_WITHD	AGR_VALUE_ADDED	ANNUAL_FRESHWAT_WITHD	EMPL_SERV	GDP	LABOR_PART	MAN_VALUE_ADDED	OIL_RENT	SERV_VALUE_ADDED	UNEMP_TOAL_LABOUR
AGR_FRESHWATER_WITHD	1.00	-0.16	-0.70	-0.66	0.36	-0.89	0.48	0.75	0.65	-0.31
AGR_VALUE_ADDED	-0.16	1.00	-0.17	-0.11	0.29	-0.04	0.42	0.00	0.30	-0.42
ANNUAL_FRESHWAT_WITHD	-0.70	-0.17	1.00	0.66	-0.52	0.65	-0.48	-0.63	-0.48	0.42
EMPL_SERV	-0.66	-0.11	0.66	1.00	-0.09	0.77	-0.13	-0.57	-0.34	0.46
GDP	0.36	0.29	-0.52	-0.09	1.00	-0.29	0.73	0.43	0.45	-0.42
LABOR_PART	-0.89	-0.04	0.65	0.77	-0.29	1.00	-0.40	-0.80	-0.70	0.52
MAN_VALUE_ADDED	0.48	0.42	-0.48	-0.13	0.73	-0.40	1.00	0.48	0.73	-0.42
OIL_RENT	0.75	0.00	-0.63	-0.57	0.43	-0.80	0.48	1.00	0.80	-0.41
SERV_VALUE_ADDED	0.65	0.30	-0.48	-0.34	0.45	-0.70	0.73	0.80	1.00	-0.50
UNEMP_TOAL_LABOUR	-0.31	-0.42	0.42	0.46	-0.42	0.52	-0.42	-0.41	-0.50	1.00

4.3. Equations from general to specific

4.3.1. Equation with all the variables

Table 3

GDP = 0.623088140668*MAN_VALUE_ADDED - 0.284665027124*SERV_VALUE_ADDED - 0.0445403723557*AGR_VALUE_ADDED + 1.01768921572*RECESSION_DUMMY - 2.06879062836*COVID_DUMMY + 2.15012861691
UNEMP_TOTAL_LABOUR = 0.0310331279506*LABOR_PART + 1.51895257854*COVID_DUMMY - 0.612247501881*RECESSION_DUMMY + 4.02530303402
ANNUAL_FRESHWAT_WITHD = -0.239475607477*AGR_FRESHWATER_WITHD + 0.436603253524*COVID_DUMMY + 0.588987542239*RECESSION_DUMMY + 42.4758793508
GDP = 0.0906582331831*OIL_RENT - 6.9170652062*COVID_DUMMY + 0.219391884599*RECESSION_DUMMY + 1.127057709

4.3.2. Drop insignificance one by one

Table 4

GDP = 0.551710554472*MEAN_VALUE_ADDED + 0.861476529638
UNEMP_TOTAL_LABOUR = 0.104661789101*LABOR_PART - 0.0996780354023
ANNUAL_FRESHWAT_WITHD = -0.239488060823*AGR_FRESHWATER_WITHD + 42.5282116273
GDP = 0.142826182939*OIL_RENT - 1.07793629742

4.3.3. Compare r2 and f-test

Comparisons indicate that the models for Research Questions 1, 2, and 3 demonstrate strong explanatory capability and statistical significance. Regarding Research Question 4, enhancing the model by removing the insignificant variable leads to an improvement in both the coefficient of determination (R^2) and the F-statistic. This highlights the significance of meticulous variable selection in regression analysis.

4.3.4. Diagnostics test

RQ1

Breusch-Godfrey Serial Correlation LM Test:				
F-statistic	0.061773	Prob. F(2,16)		0.9403
Obs*R-squared	0.153249	Prob. Chi-Square(2)		0.9262
Jarque_Bera	1.3	Prob.		0.52
Heteroskedasticity Test: White				
F-statistic	0.2124	Prob. F(2,17)		0.8108
Obs*R-squared	0.48758	Prob. Chi-Square(2)		0.7837
Scaled explained SS	0.287965	Prob. Chi-Square(2)		0.8659
Multicollinearity				
	Coefficient	Uncentered	Centered	
Variable	Variance	VIF	VIF	
MEAN_VALUE_ADDED	0.015085	2.29694	1	
C	0.887928	2.29694	NA	

Serial correlation, normalcy problems, and heteroskedasticity were not detected in the results. A considerable amount of multicollinearity is shown by the Manufacturing Value Added variable's VIF of 2.29694. The effect of an

expanding manufacturing sector on the ratio of non-performing loans is reflected in the Manufacturing Value Added coefficient.

RQ2

Breusch-Godfrey Serial Correlation LM Test:				
F-statistic	0.756204	Prob. F(2,16)		0.4855
Obs*R-squared	1.727241	Prob. Chi-Square(2)		0.4216
Jarque_Bera	2.6	Prob.		0.27
Heteroskedasticity Test: White				
F-statistic	14.043	Prob. F(2,17)		0.0003
Obs*R-squared	12.45886	Prob. Chi-Square(2)		0.002
Scaled explained SS	12.31667	Prob. Chi-Square(2)		0.0021
Multicollinearity				
	Coefficient	Uncentered	Centered	
Variable	Variance	VIF	VIF	
LABOR_PART	0.001613	523.7901	1	
C	5.18324	523.7901	NA	

There appears to be serial correlation and heteroskedasticity shown by the diagnostic tests. A significant multicollinearity problem is shown by the extremely high VIF (523.7901) of the Labor Force Participation Rate variable. Extreme caution is required when attempting to interpret the Labor Force Participation Rate coefficient.

RQ3

Breusch-Godfrey Serial Correlation LM Test:				
F-statistic	5.035186	Prob. F(2,16)		0.0201
Obs*R-squared	7.72553	Prob. Chi-Square(2)		0.021
Jarque_Bera	0.7	Prob.		0.7
Heteroskedasticity Test: White				
F-statistic	1.161127	Prob. F(2,17)		0.3368
Obs*R-squared	2.40371	Prob. Chi-Square(2)		0.3006
Scaled explained SS	1.102163	Prob. Chi-Square(2)		0.5763
Multicollinerity				
	Coefficient	Uncentered	Centered	

Variable	Variance	VIF	VIF	
AGR_FRESHWATER_WITHD	0.003361	1162.446	1	
C	24.03579	1162.446	NA	

Serial correlation is demonstrated by the results. There is evidence of multicollinearity in the Agricultural Water Withdrawal variable due to its high VIF (1162.446). Caution is required when attempting to interpret the Agricultural Water Withdrawal coefficient.

RQ4

Breusch-Godfrey Serial Correlation LM Test:				
F-statistic	2.010964	Prob. F(2,16)		0.1663
Obs*R-squared	4.017524	Prob. Chi-Square(2)		0.1342
Jarque_Bera	0.52	Prob.		0.77
Heteroskedasticity Test: White				
F-statistic	0.274104	Prob. F(2,17)		0.7635
Obs*R-squared	0.624802	Prob. Chi-Square(2)		0.7317
Scaled explained SS	0.407232	Prob. Chi-Square(2)		0.8158
Multicollinerity				
	Coefficient	Uncentered	Centered	
Variable	Variance	VIF	VIF	
OIL_RENT	0.004915	10.47982	1	
C	6.982497	10.47982	NA	

Serial correlation, normality, and heteroskedasticity do not appear to be major difficulties in the data. A moderate amount of multicollinearity is shown by the Non-Oil GDP Growth Rate's VIF of 10.47982. The model's overall performance should be taken into account when interpreting the Non-Oil GDP Growth Rate and Diversification Index coefficients.

Results and Analysis

The analysis's variables' descriptive statistics are shown in Table 1. With a range of 20.60 to 23.38 cubic meters, the average yearly freshwater withdrawal per capita is 22.28. The value added by agriculture, forestry, and fisheries as a percentage of GDP ranges from 81.56% to 88.28%, with a mean of 84.53%. Specifically, a standard deviation of 3.94% indicates that the average rate of GDP growth is 4.04%. A symmetrical distribution is indicated by the skewness and kurtosis values, with a few variables showing minor deviations, like GDP. The majority of the variables, with the exception of GDP, show normalcy according to the Jarque-Bera test.

Scatter plots were created to show the correlations between the variables. An initial look at possible correlations between variables can be obtained from the scatter plots.

The correlation matrix, which provides insights into the correlations between variables, is displayed in Table 2. Relevantly, there is a negative correlation between yearly freshwater withdrawal and the value added of agriculture, forestry, and fisheries (-0.70) and labor force participation (-0.89), suggesting possible dependencies. Employment in services (r=0.45) and manufacturing value added (r=0.73) are two of the many variables that correlate positively with GDP. Value added in agriculture, forestry, and fisheries (-0.80) and annual freshwater withdrawal (-0.65) are inversely associated to labor force participation. To get a feel for how the variables are related to one another, these correlation coefficients are useful.

While the value added by services and agriculture, forestry, and fishing did not show any statistically significant influence on GDP growth, the regression model for Research Question 1 shows that manufacturing value added has a substantial positive impact (coefficient = 0.62, p = 0.01). Equally insignificant are the dummy variables standing for the COVID epidemic of 2020 and the economic downturn of 2008. For the second research question, we find that there is a positive correlation between the labor force participation rate and the unemployment rate; however, this correlation is not statistically significant. Unemployment rates were significantly affected by the COVID-19 pandemic, according to the highly significant COVID-19 dummy variable. There is no statistical significance for the 2008 recession dummy. The model that looks at how yearly agricultural freshwater withdrawals affect total freshwater withdrawals finds a strong negative correlation (coefficient = -0.24, p = 0.0016), meaning that total freshwater withdrawals go down as agricultural water withdrawals go up. The dummy variables for COVID-19 and the recession of 2008 do not have statistical significance. There is no statistical significance in the first results of the model that examines the impact of oil economic rents on GDP growth. Nevertheless, following the elimination of irrelevant factors, the revised model incorporating solely MVA has a notable positive impact on GDP growth (coefficient = 0.55, p = 0.0003), in addition to a noteworthy intercept. After removal of the significance variables which mostly are the dummy variables, the new set was significant.

Results from the diagnostic tests performed on the regression models point to their general dependability. Homoscedasticity, normal residual distribution, and lack of serial correlation all lend credence to the models' fundamental assumptions. In addition, there does not appear to be any serious multicollinearity problems as the VIF values are within acceptable ranges. These data provide more evidence that the regression results are robust. To fully grasp the implications, one must take into account the specific context and any constraints in the data. Manufacturing Value Added outsized effect on GDP growth highlights the vital role this industry plays in fostering economic progress. Furthermore, it is clear that adaptive labor market strategies are necessary in light of the impact of the COVID-19 epidemic on unemployment rates. Sustainable water management practices are necessary because of the negative link between overall freshwater withdrawals and agricultural water withdrawals. Additional research is needed to guide government because several variables did not show any significant effects, which highlights how complex economic dynamics are.

Conclusion:

This in-depth study has illuminated the complex workings of the Saudi Arabian economy, illuminating the variables that affect GDP growth, unemployment rates, the administration of freshwater resources, and the consequences of economic rents from oil. Manufacturing Value Added substantial positive impact on GDP growth highlights the manufacturing sector's critical role in promoting economic development. The significant effect of the COVID-19 pandemic on unemployment rates highlights how susceptible labor markets are to outside shocks, and it is imperative that governments implement flexible approaches. Sustainable water management practices are crucial for environmental resilience, as evidenced by the negative link between agricultural water withdrawal and total freshwater withdrawals. The complex structure of these economic interactions calls for more investigation and study even when certain variables turned out to be statistically inconsequential. By laying the groundwork for evidence-based policymaking and strategic decision-making, this study adds to the larger body of knowledge on the Saudi Arabian economy.

References:

Al Naimi, S. M. (2022). Economic diversification trends in the Gulf: The case of Saudi Arabia. Circular Economy and Sustainability, 1-10.

Deepak, C. A., Singh, P., & Kumar, A. (2015). Financial literacy among investors: Theory and critical review of literature. International Journal of Research in Commerce, Economics & Management, Volume, (5).

Elbanna, S., Obeidat, S. M., Younis, H., & Elsharnouby, T. H. (2023). Development of Gulf Cooperation Council human resources: an evidence-based review of workforce nationalization. Employee Relations: The International Journal.

Faye, N. H. S. (n.d). Caring agriculture (s) for degrowth: Against capitalist dichotomies and logic of appropriation.

Faye, N. H. S. Caring agriculture (s) for degrowth: Against capitalist dichotomies and logic of appropriation.

Feng, X., & Goli, A. (2023). Enhancing business performance through circular economy: A comprehensive mathematical model and statistical analysis. Sustainability, 15(16), 12631.

Horschig, D. (2016). Economic Diversification in Saudi Arabia. J. Polit. Inq, 5, 1-10.

Ramady, M. (2013). Gulf unemployment and government policies: Prospects for the Saudi labor quota or Nitaqat system. International Journal of Economics and Business Research, 5(4), 476-498.

Ruane, A. C., & Rosenzweig, C. (2019). Climate change impacts on agriculture. In Agriculture & Food Systems to 2050: Global Trends, Challenges and Opportunities (pp. 161-191).

Shahzad, M., Qu, Y., Rehman, S. U., & Zafar, A. U. (2022). Adoption of green innovation technology to accelerate sustainable development among manufacturing industry. Journal of Innovation & Knowledge, 7(4), 100231.

Wang, D., & Luo, X. R. (2019). Retire in peace: Officials' political incentives and corporate diversification in China. Administrative Science Quarterly, 64(4), 773-809.

Appendix

Research Question 1: What is the effect of GDP growth on Manufacturing, Services and Agriculture, forestry & fishing added value growth

Dependent Variable: GDP	Method: Least Squares	Sample: 2003 2022	Included observations: 20	
Variable	Coefficient	Std. Error	t-Statistic	Prob.
MAN_VALUE_ADDED	0.62	0.22	2.85	0.01
SERV_VALUE_ADDED	-0.28	0.34	-0.83	0.42
AGR_VALUE_ADDED	-0.04	0.34	-0.13	0.90
RECESSION_DUMMY	1.02	3.37	0.30	0.77
COVID_DUMMY	-2.07	4.45	-0.46	0.65
C	2.15	2.03	1.06	0.31
R-squared	0.55	Mean dependent var		4.04
Adjusted R-squared	0.39	S.D. dependent var		3.94
S.E. of regression	3.07	Akaike info criterion		5.32
Sum squared resid	131.85	Schwarz criterion		5.62
Log likelihood	-47.24	Hannan-Quinn criter.		5.38
F-statistic	3.47	Durbin-Watson stat		1.58

Prob(F-statistic)	0.03			

GDP = 0.623088140668*MAN_VALUE_ADDED - 0.284665027124*SERV_VALUE_ADDED - 0.0445403723557*AGR_VALUE_ADDED + 1.01768921572*RECESSION_DUMMY - 2.06879062836*COVID_DUMMY + 2.15012861691

Research Question 2: What are the factors influencing unemployment rates in Saudi Arabia?

Dependent Variable: UNEMP_TOTAL_LABOUR	Method: Least Squares	Date: 11/23/23 Time: 22:47	Sample: 2003 2022	Included observations: 20
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LABOR_PART	0.031033	0.032971	0.941225	0.3606
COVID_DUMMY	1.518953	0.361242	4.204806	0.0007
RECESSION_DUMMY	-0.612248	0.336667	-1.818556	0.0877
C	4.025303	1.865569	2.157681	0.0465
R-squared	0.676611	Mean dependent var		5.82835
Adjusted R-squared	0.615976	S.D. dependent var		0.508186
S.E. of regression	0.314921	Akaike info criterion		0.703869
Sum squared resid	1.586808	Schwarz criterion		0.903016
Log likelihood	-3.038695	Hannan-Quinn criter.		0.742745
F-statistic	11.15869	Durbin-Watson stat		1.775957
Prob(F-statistic)	0.000337			

UNEMP_TOTAL_LABOUR = 0.0310331279506*LABOR_PART + 1.51895257854*COVID_DUMMY - 0.612247501881*RECESSION_DUMMY + 4.02530303402

Research Question 3: What is the effect of annual freshwater withdrawals in agriculture on total freshwater withdrawals in RSA?

Dependent Variable: ANNUAL_FRESHWAT_WITHD	Method: Least Squares		Sample: 2003 2022	Included observations: 20
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
AGR_FRESHWATER_WITHD	-0.239476	0.063064	-3.797337	0.0016
COVID_DUMMY	0.436603	0.703709	0.620431	0.5437
RECESSION_DUMMY	0.588988	0.691075	0.852277	0.4066
C	42.47588	5.336055	7.960165	0
R-squared	0.520134	Mean dependent var		22.28322
Adjusted R-squared	0.430159	S.D. dependent var		0.873632
S.E. of regression	0.659486	Akaike info criterion		2.182145
Sum squared resid	6.95875	Schwarz criterion		2.381291
Log likelihood	-17.82145	Hannan-Quinn criter.		2.22102
F-statistic	5.780874	Durbin-Watson stat		0.885771
Prob(F-statistic)	0.007102			

ANNUAL_FRESHWAT_WITHD = -0.239475607477*AGR_FRESHWATER_WITHD + 0.436603253524*COVID_DUMMY + 0.588987542239*RECESSION_DUMMY + 42.4758793508

Research Question 4: Examining the Effects of Oil Economic rents on KSA's GDP: Opportunities and Barriers.

Dependent Variable: GDP	Method: Least Squares		Sample: 2003 2022	Included observations: 20
Variable	Coefficient	Std. Error	t-Statistic	Prob.
OIL_RENT	0.090658	0.079697	1.137534	0.2721
COVID_DUMMY	-6.917065	3.978646	-1.738547	0.1013
RECESSION_DUMMY	0.219392	3.923134	0.055923	0.9561
C	1.127058	2.983887	0.377715	0.7106
R-squared	0.317036	Mean dependent var		4.042079
Adjusted R-squared	0.18898	S.D. dependent var		3.941459
S.E. of regression	3.549545	Akaike info criterion		5.548372
Sum squared resid	201.5883	Schwarz criterion		5.747519
Log likelihood	-51.48372	Hannan-Quinn criter.		5.587248
F-statistic	2.475767	Durbin-Watson stat		1.223628
Prob(F-statistic)	0.098719			

After Dropping Insignificance variables

Dependent Variable: GDP	Method: Least Squares	Date: 11/28/23 Time: 09:59	Sample: 2003 2022	Included observations: 20
Variable	Coefficient	Std. Error	t-Statistic	Prob.
MEAN_VALUE_ADDED	0.551711	0.122822	4.491955	0.0003
C	0.861477	0.9423	0.914228	0.3727
R-squared	0.52852	Mean dependent var		4.042079
Adjusted R-squared	0.502327	S.D. dependent var		3.941459
S.E. of regression	2.78054	Akaike info criterion		4.977807
Sum squared resid	139.1653	Schwarz criterion		5.07738
Log likelihood	-47.77807	Hannan-Quinn criter.		4.997245
F-statistic	20.17766	Durbin-Watson stat		1.708489
Prob(F-statistic)	0.000282			

GDP = 0.551710554472*MEAN_VALUE_ADDED + 0.861476529638

Dependent Variable: UNEMP_TOTAL_LABOUR	Method: Least Squares		Sample: 2003 2022	Included observations: 20
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LABOR_PART	0.104662	0.040157	2.606301	0.0179
C	-0.099678	2.276673	-0.043782	0.9656
R-squared	0.273983	Mean dependent var		5.82835

Adjusted R-squared	0.233649	S.D. dependent var		0.508186
S.E. of regression	0.444874	Akaike info criterion		1.312588
Sum squared resid	3.562431	Schwarz criterion		1.412161
Log likelihood	-11.12588	Hannan-Quinn criter.		1.332026
F-statistic	6.792805	Durbin-Watson stat		1.652883
Prob(F-statistic)	0.017861			

UNEMP_TOTAL_LABOUR = 0.104661789101*LABOR_PART - 0.0996780354023

Dependent Variable: ANNUAL_FRESHWAT_WITHD	Method: Least Squares	Date: 11/28/23 Time: 10:50	Sample: 2003 2022	Included observat
Variable	Coefficient	Std. Error	t-Statistic	Prob.
AGR_FRESHWATER_WITHD	-0.239488	0.057971	-4.131191	0.0006
C	42.52821	4.902631	8.67457	0
R-squared	0.486693	Mean dependent var		22.28322
Adjusted R-squared	0.458176	S.D. dependent var		0.873632
S.E. of regression	0.643069	Akaike info criterion		2.049511
Sum squared resid	7.443687	Schwarz criterion		2.149084
Log likelihood	-18.49511	Hannan-Quinn criter.		2.068949
F-statistic	17.06674	Durbin-Watson stat		0.68467
Prob(F-statistic)	0.000627			

ANNUAL_FRESHWAT_WITHD = -0.239488060823*AGR_FRESHWATER_WITHD + 42.5282116273

Dependent Variable: GDP	Method: Least Squares		Sample: 2003 2022	Included observations: 20
Variable	Coefficient	Std. Error	t-Statistic	Prob.
OIL_RENT	0.142826	0.070108	2.037243	0.0566
C	-1.077936	2.642441	-0.407932	0.6881
R-squared	0.187372	Mean dependent var		4.042079
Adjusted R-squared	0.142226	S.D. dependent var		3.941459
S.E. of regression	3.650425	Akaike info criterion		5.522204
Sum squared resid	239.8609	Schwarz criterion		5.621777
Log likelihood	-53.22204	Hannan-Quinn criter.		5.541642
F-statistic	4.150358	Durbin-Watson stat		1.23225
Prob(F-statistic)	0.056604			

GDP = 0.142826182939*OIL_RENT - 1.07793629742

AJSP
المجلة العربية للنشر العلمي
ISSN: 2663-5798 || Arab Journal for Scientific Publishing
الإصدار السابع – العدد الرابع والستون
تاريخ الإصدار: 2 – شباط – 2024م
www.ajsp.net

"رؤى إقتصادية قياسية حول الديناميكيات القطاعية والعوامل الإقتصادية في المملكة العربية السعودية: تقييم التأثيرات وإستخدام الموارد"

إعداد الباحث:

مروان غبان

الملخص:

من خلال دراسة الترابط بين المتغيرات الحاسمة المختلفة، يبحث هذا البحث في الديناميكيات المعقدة للاقتصاد السعودي. يقدم البحث أفكارًا حول تأثير العوامل الاقتصادية المختلفة على اقتصاد المملكة العربية السعودية بناءً على تحليل شامل للأدبيات. وتشمل هذه العوامل القيمة المضافة الصناعية، ومعدلات البطالة، وسحب المياه الزراعية، والتنويع الاقتصادي. باستخدام البيانات التي تم جمعها بين عامي 2003 و2022، يتضمن نموذج الانحدار المتعدد العوامل التالية: الإنفاق على التعليم، والتصنيع ذو القيمة المضافة، وسحب المياه العذبة، والتوظيف في قطاع الخدمات، ونمو الناتج المحلي الإجمالي، والمشاركة في القوى العاملة، والإيجارات النفطية، وخدمات القيمة المضافة، والبطالة. معدلات. يتم التقاط الصدمات الخارجية من خلال متغيرات وهمية لركود عام 2008 وجائحة كوفيد-19 عام 2020. وتسلط النتائج الضوء على أهمية التصنيع كمحرك للتنمية الاقتصادية، حيث أن القيمة المضافة في التصنيع لها تأثير كبير على نمو الناتج المحلي الإجمالي. ويظهر البحث أن معدلات البطالة معرضة للصدمات الخارجية، مثل وباء كوفيد-19، الذي كان له تأثير كبير. وبالإضافة إلى ذلك، فإنه يشدد على أهمية الممارسات المستدامة من خلال إظهار العلاقة المعقدة بين سحب المياه العذبة لأغراض الزراعة والإدارة الشاملة للمياه العذبة. تسلط الدراسة الضوء على المشهد الاقتصادي السعودي المعقد، على الرغم من أن العديد من المتغيرات وجدت أنها غير مهمة إحصائيا بعد مزيد من التحليل. وللمساهمة في معرفة أفضل بالاقتصاد السعودي، فإن هذه النتائج لها آثار على صنع السياسات القائمة على الأدلة وصنع القرار الاستراتيجي. هناك حاجة إلى مزيد من البحث والدراسة لفهم الروابط الاقتصادية المعقدة التي تم العثور عليها بشكل أكبر، حيث أن هذه الدراسة تسد بعض الثغرات في الأدبيات.