

The impact of human development and oil rent on women's employment in MENA region. Dynamic Panel data analysis (1991-2022)

KIHAL Besma ¹,

¹ National Institute for Research in Education (Algeria). besma.kihal@inre.dz

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Abstract:

This study examines how human development changed women's economic engagement in 15 MENA nations between 1991 and 2022. Economic and social indicators were also assessed, such as the fertility rate, oil rent, and GDP per capita. The study finds that oil rent negatively influences female economic involvement. In contrast, the human development index has a positive and significant impact using dynamic panel methods, precisely the CS-ARDL approach. The fertility rate and GDP per capita have no discernible influence. The study makes policy suggestions to enhance the status of women in this region.

Keywords: women employment, human development, oil rent, MENA, dynamic panel data.

JEL Classification Codes: J16, O13, Q32.

1. INTRODUCTION

Women's economic participation is crucial to a country's social and economic development (Andlib & al., 2022). It promotes women's empowerment, the improvement of individual living standards, and the reduction of poverty and gender inequality (Duflo, 2012; Shuangshuang & al., 2023). Several factors contribute significantly to the integration of women into economic activity, including the level of education, life expectancy, social norms, infrastructure development, and the overall level of economic development (Shuangshuang & al., 2023; Verick, 2014; Bloom al., 2009; Andlib & al. 2022).

Human development, assessed through improvements in education, health, and living conditions, is a crucial indicator of a country's socio-economic progress, particularly women's employment (UNDP, 2018). Indeed, differences in development reflect a variety of factors, including differential possibilities for access to work, health care, and education (UNDP, 2018). Despite progress in human development and efforts to empower women in the Middle East and North Africa (MENA) (Moghadam, 2013; Selwaness & Krafft, 2020; Spierings & al., 2010; Abdel-Rahman & al., 2023), this region still has the lowest female employment rates among middle-income areas. Women's economic participation rate in MENA remains well below the global average despite initiatives to strengthen women's role in the labor market (Assaad & al., 2020). In 2022, only 19.56% of women aged 15 and over were active in the employment market, compared with a world average of 39.73% (ILO, 2024). This situation raises important questions about the dynamics specific to this region, the dominant rentier economic structure, and the increased vulnerability of women in the job market, especially given the effects of the COVID-19 crisis on female employment in several MENA countries, which caused an economic slowdown (Khamis & al., 2021; Abdel-Rahman & al., 2023).

In light of this finding, this study examines the relationship between human development and women's employment in MENA countries. More precisely, the research aims to answer the question: How does human

development affect women's employment in MENA nations? This issue is in line with existing work on the obstacles to women's employment in the region (Assaad & al., 2020; Rashid, 2016; Selwaness & Krafft, 2020) while shedding new light on the specific role of human development, oil rent, gross domestic product per capita, and the fertility rate.

Hypotheses: The central hypothesis suggests that human development positively affects women's employment in MENA countries, as suggested by economic research. However, the research aims to test this hypothesis in the specific context of the MENA region and explore potential nuances of this relationship.

Research Objective: The principal objective is to examine the relationship between female labor market involvement and human development in 15 MENA nations, focusing on both the short and long-run effects of socioeconomic factors, such as oil rent, GDP per capita, and the fertility rate, over the period 1991–2022. A particular emphasis is placed on the effect of oil income on women's employment.

The Importance of the Research: This study is essential as it sheds new light on how human development affects female employment in the MENA region, addressing key socioeconomic barriers and regional dynamics. The findings offer critical insights for policymakers, supporting creating more inclusive and equitable public policies that promote balanced socioeconomic development.

Research Limits: The study is limited to 15 MENA countries from 1991 to 2022 (31 years) and focuses on specific socioeconomic indicators.

Research methodology: To address the central question, a descriptive approach was adopted to analyze the theoretical framework of the impact of socioeconomic factors on women's employment. In addition, an econometric approach was used to assess the dynamic relationship between human development and women's labor market participation in MENA countries.

Study content: There are three sections to the remainder of the paper. A survey of the literature on women's jobs is presented in the second section. The empirical study's methodology is explained in the third section, which

also presents the sample, the many variables examined, and the findings, emphasizing the patterns seen and the regional differences. The final section, Results and Discussion, presents the main findings. The Conclusion follows, summarizing the key insights, discussing the study's limitations, and proposing recommendations for future research.

2. Literature review

Numerous studies have recently focused on women's economic engagement, demonstrating the growing significance of this topic for social and economic advancement. Various economic, social, and cultural factors influence women's labor market involvement. This literature review is organized into two subsections. The first section examines social variables, specifically the fertility of women and the growth of humans. Economic factors are examined in the second subsection.

2.1 Women's employment and social factors

The job market participation of women is a multifaceted phenomenon shaped by a range of societal, political, and economic considerations. It is intimately related to human development, encompassing income, education, and health. Women's economic emancipation depends on human development, as assessed by the UN Human Development Index (HDI). Improved human development, particularly regarding health and living conditions, is positively connected with higher rates of female labor market involvement, according to research by Klasen and Lamanna (2009). These results are corroborated by Duflo's (2012) research, which demonstrates the substantial influence that investments in women's health—especially in reproductive health care—have on their capacity to engage in the labor market.

Furthermore, gender disparities in human development might impede economic growth, yet advancements in this field encourage a more significant participation of women in the workforce (Seguino, 2000). Moreover, Gary Becker's theory of human capital, which he created in 1964, asserts that investing in education and training raises people's productivity and, as a result, their involvement in the labor market. Becker claims that to increase their chances of earning money in the future, women

and men alike invest in their human capital.

Indeed, women's jobs are greatly influenced by human development, especially as it relates to education. Spierings & al. (2010) looked at macro- and micro-level factors that influence women's employment and underlined how crucial women's education is. According to their findings, contextual factors like the education level of their partner, the state of the economy, the makeup of the labor market, urbanization, and the strength of local customs all influence how much education impacts a woman's employment. These results are supported by Verick's (2014) research on emerging nations, which emphasizes the value of high-quality education beyond the secondary level in enhancing women's employment opportunities. The author emphasizes that overcoming the social and economic obstacles that prevent women from entering the workforce requires education.

However, between 2000 and 2017, Assaad & al. (2020) drew attention to an interesting paradox in four MENA nations: Algeria, Egypt, Jordan, and Tunisia. Although women's educational attainment has increased, their labor market participation rate has remained low and stable. The authors attribute the phenomena to the evolving opportunity structures that educated women in the region face, as opposed to conventional contextual variables like gender discrimination or societal norms. In several MENA nations, Krafft and Assaad (2020) discovered a positive correlation between labor market involvement and educational attainment. However, they also pointed out that this link is not constant throughout the area. In order to increase women's employability, Elsayed and Roushdy (2017) emphasized the significance of aligning education with labor market demands.

Furthermore, Abdel-Rahman & al. (2023) concentrated on gender discrepancies in five MENA nations in light of the COVID-19 epidemic and its detrimental effects on employment. The writers emphasized how critical it is to acquire digital skills. Their research revealed that teleworking lowered women's unemployment risk, highlighting the need to create digital infrastructures and related skills to lessen gender disparities in the workforce, especially during difficult times.

Fertility is another crucial aspect that has drawn much attention and is

expected to have a considerable influence on women's economic engagement. Much empirical research has examined the connection between women's job market engagement and fecundity. Bloom & al. (2009) examined, in a panel of 97 developing nations, the impact of fertility on women's jobs from 1960 to 2000. According to their findings, women's participation declines by five to ten percentage points with every extra birth. This study emphasizes the significance of family planning laws in advancing women's economic engagement. Mishra and Smyth (2010) explored the causal link between FLFP and overall fertility rates in the context of OECD countries. Their findings, which show that a 1% rise in total reproduction rate resulted in a 0.4% reduction in FLFP, support the role incompatibility hypothesis. This study sheds light on women's difficulties balancing work and family obligations. In his MENA study, Verme (2015) also emphasized the significance of falling fertility rates as a significant factor contributing to rising WEMP in later stages of economic development. The author notes that these developments have yet to entirely translate into a rise in WEMP, despite a sharp fall in fertility rates in MENA nations. Ahn and Mira (2002) investigated this link in OECD nations and found a negative correlation, especially in those with less developed work-family balance laws. These studies demonstrate the intricate connection between women's jobs and fertility, highlighting the importance of balance between work and family policies in advancing women's employment.

2.2 Women's employment and economic factors

Several studies have examined the connection between women's employment and economic progress, most notably using the U-shaped curve theory. Verme (2015) provided evidence supporting this theory for the MENA area, demonstrating that female labor force participation rates (WEMP) first decrease as GDP per capita rises and subsequently rise at higher economic development levels. Verick (2014) also noted this U-shaped link in developing nations. According to his research, participation rates rise in low-income nations because of subsistence activities, fall in middle-income countries as men move into the industry, and rise in high-income countries due to improved education and rising service demand. In

their analysis of the BRICS nations, Shuangshuang & al. (2023) found a favorable link between GDP and WEMP, underscoring the significance of general economic growth in enhancing women's involvement in the workforce. These investigations emphasize how crucial the economic environment is in influencing women's employment prospects. However, they also show how complicated this relationship is and how it varies depending on the economic development level of a nation.

Many theoretical and empirical research have examined the impact of oil rent on women's involvement in the workforce in the MENA region. According to Ross (2008), there are detrimental effects on women's employment due to the "Dutch disease" phenomenon frequently induced by oil booms. His research indicates that the tradable goods sectors of agriculture and industry in rentier countries give way to non-tradable industries like construction and services. This shift significantly harms women since they have historically been overrepresented in industries that deal in marketable products. By evaluating the social, cultural, and economic elements influencing women's jobs in Arab nations, Moghadam (2013) has expanded on this analysis. Her research demonstrates that one of the most significant obstacles to women's labor market integration is their reliance on oil and the ensuing lack of economic diversification. The author also points out that oil profits have the power to uphold traditional social conventions, which further restricts women's capacity to engage in the economy. These researches emphasize the necessity for economic diversification policies to support women's employment by highlighting the intricate link between oil earnings and women's job opportunities in the MENA area.

3. Empirical study

Research Population and Sample: This study examines the economic participation of women across fifteen MENA countries: Algeria, Libya, United Arab Emirates, Turkey, Tunisia, Bahrain, Iran, Jordan, Iraq, Egypt, Mauritania, Kuwait, Saudi Arabia, Morocco, and Qatar. The analysis covers the period from 1991 to 2022. Data processing and analysis were conducted using STATA 17 software.

The specific economic and social characteristics of these countries justify the choice of region. The public sector often dominates these economies and is dependent on natural resources. In addition, these countries are characterized by a wealth of natural resources, demographic growth, a young population, and disparities in levels of development. Female employment rates are still among the world's lowest, notwithstanding the advancements made in the right to education and the aspects of gender equality, particularly for women (ILO, 2024).

Variables and sources: Referring to Table 1, women's employment, measured by their economic participation, is the dependent variable (WEMP). The independent variables include the Human Development Index (HDI) as a proxy for overall well-being and quality of life, the female fertility rate (FERT), GDP per capita, and the level of oil rent as a percentage of the nation's GDP (RENT).

Table 1. Description and sources of variables

Variable	Description	Source
Female employment rates (WEMP)	Represents the percentage of the female population ages 15 and older who are employed.	World Development Indicators (www.databank.worldbank.org)
Human Development Index (HDI)	Reflects a composite measure of average achievements in critical aspects of human development, including life expectancy, education, and income.	United Nations Development Programme (UNDP) (www.hdr.undp.org)
Fertility rate (FERT)	Measures the average number of children born per woman.	World Development Indicators (www.databank.worldbank.org)
GDP per capita	Reflects the gross domestic product divided by the midyear population.	World Development Indicators (www.databank.worldbank.org)
Oil rent (RENT)	Represents the level of oil rent as a percentage of the nation's GDP.	World Development Indicators (www.databank.worldbank.org)

Study model: The following panel model's estimation serves as a base for the empirical analysis:

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$$WEMP_t = \alpha + \beta_1 HDI_{i,(t)} + \beta_2 FERT_{i,(t)} + \beta_3 GDPpercapita_{i,(t)} + \beta_4 RENT_{i,(t)} + u_{i,(t)} + \varepsilon_{i,(t)}$$

Where $u_{i,t}$ is the individual effect; ε_t is the error term; indices “i” represent the nation and “t” the year.

We adopt a dynamic panel data approach to identify short-run and long-run trends and factors influencing women's employment in the MENA region. This method allows for capturing cross-country variations and provides an in-depth perspective on the impact of human development and other socioeconomic factors on women's economic participation. Several tests will be conducted to select the most appropriate model, considering the specific characteristics of our sample (N=15, T=31): homogeneity test, unit root tests, and cross-sectional dependence test.

3.1 Preliminary analyses

In this subsection, we present our study's descriptive statistics and preliminary analyses. We begin by examining the statistics and correlations between variables, enabling us to identify our sample's main characteristics and relationships. Next, we will conduct various tests to detect initial trends and potential patterns. These tests are crucial for laying the foundations for further investigations and guiding our future empirical research.

3.1.1 Statistics and correlations

Table 2 shows the descriptive data (1991–2022). The WEMP variable has a mean value of 27.05, varying from 8.62 to 63.74. Qatar is credited with having the highest WEMP value in 2022.

Table 2. Descriptive Data

Variable	Mean	Std. Dev.	Min	Max	Skewness	Kurtosis
WEMP	27.055	12.712	8.625	63.746	.6096673	2.526377
HDI	.708	.106	.402	.937	-.510564	2.867789
FERT	3.065	1.049	1.334	6.044	.8711473	3.053534
GDP percapita	12418.98	16875.2	22.85037	98041.36	2.363546	9.305185
RENT	17.748	16.874	0	65.158	.7658722	2.719209

Source : Author's compilation

The HDI has a standard deviation of 0.106 and an average of 0.708, ranging from 0.402 to 0.937. The fertility rate ranges from 1.33 to 6.04

children per woman, with a standard deviation of 1.04 and an average of 3.06. This variability reflects differences in the demographic dynamics of the countries studied. The GDP per capita ranges from 22.85 to 98,041. It indicates a significant wealth and economic development disparity among the countries considered. Lastly, the oil rent varies from 0 to 61.15. The variability in the RENT values reveals significant disparities between the countries studied. These disparities may be attributed to different economic structures and levels of development.

Furthermore, the skewness and kurtosis values in Table 2 are below 3 and 10, respectively, indicating that the study sample is normally distributed (Kline, 2015). Regarding data dispersion, some variables exhibit significant variability. Hence, a logarithmic transformation of the variables is necessary.

Table 3 shows the findings of the correlation matrix and multicollinearity test. According to this table, WEMP has a favorable association with HDI, GDP per capita, and RENT at the 1% level. In contrast, WEMP presents a negative and significant relationship with FERT at the 1% level. Table 3 also reveals that no correlation coefficient exceeds 0.8, indicating no severe multicollinearity issues between the variables (Tabachnick & al., 2007). Moreover, the outcomes of the VIF test are well below the threshold value of 10 (Hair & al., 2010), confirming no major multicollinearity problems among the independent variables. The average VIF value of 2.08 is significantly below the critical value of 10, indicating the absence of multicollinearity in the model.

Table 3. Pairwise correlations and VIF estimation

Variables	(1)	(2)	(3)	(4)	(5)
(1) WEMP	1.000				
(2) IDH	0.530*	1.000			
(3) FERT	-0.431*	-0.694*	1.000		
(4) GDPpercapita	0.766*	0.657*	-0.431*	1.000	
(5) RENT	0.149*	0.314*	0.012	0.309*	1.000
VIF	-	3.09	2.17	1.80	1.27
Tolerance	-	0.323118	0.460266	0.556929	0.784892

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source : Author's compilation

3.2 Diagnostic tests:

3.2.1 Slope homogeneity test:

To verify the heterogeneity of slopes, we apply the Pesaran & Yamagata (2008) test, which posits under the null hypothesis that all slope parameters are homogeneous, meaning that all slope coefficients are identical across cross-sectional units. The null hypothesis of slope parameter homogeneity is excluded since the Delta test has a p-value lower than 0.05 (Table 4).

Table 4. Pesaran & Yamagata test for slope homogeneity

Pesaran & Yamagata test	Statistique value	P-value
Delta	23.196	0.000
adj	25.733	0.000

Source: Author's compilation

3.2.2 Pesaran CD test:

We use the Pesaran CD test to determine whether there is a cross-sectional dependence of errors. The null assumption of this test suggests cross-sectional independence. As demonstrated in Table 5, all variables show cross-sectional dependence of errors since the p-value for each variable is <5%. Thus, the null hypothesis is rejected.

Table 5. Pesaran CD test analysis

Variable	CD-test (p-value)
WEMP	20.803*** (0.000)
HDI	51.729*** (0.000)
FERT	46.204*** (0.000)
GDP percapita	49.667*** (0.000)
RENT	33.037*** (0.000)

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: Author's compilation

3.2.3 Unit root test:

Before conducting the unit root analysis, it is essential to determine

the optimal lag length. It is achieved by estimating multiple specifications for each unit root test and selecting the optimal lag by identifying the values of p and q that minimize both the AIC and BIC across all specifications (see Table 6).

Table 6. Optimum lag selection

	WEMP		GDP per capita		FERT		HDI		RENT	
	AIC	BIC	AIC	BIC	AIC	BIC	AIC	BIC	AIC	BIC
1	-75.35142	-66.94424	-35.92545	-27.51827	-154.4791	-146.0719	-200.1879	-191.7807	-110.7324	-102.325
2	-74.83646	-63.89809	-41.95854	-31.02017	-146.1279	-135.1895	-189.6214	-178.6831	-102.2841	-91.3457
3	-77.34491	-64.02286	-46.04883	-32.72679	-140.006	-126.684	-180.5541	-167.232	-99.85572	-86.5336
4	-71.53911	-55.98907	-41.48043	-25.93039	-130.8596	-115.3096	-170.928	-155.3779	-93.71753	-78.1674

Source: Author's compilation

Table 6 shows that the best lag length for WEMP and GDP per capita is 3, whereas HDI, FERT, and RENT are 1. These lag lengths will be utilized to identify the existence of unit roots. Given the cross-sectional dependence in the errors, Pesaran's (2007) CIPS test is applicable. Table 7 shows the results:

Table 7. CIPS Unitroot test

Variables	Au niveau		Première différence		Observations
	z	p-value	z	p-value	
WEMP	0.203	0.580	-1.771**	0.038	WEMP is I(1)
HDI	-1.044	0.148	-4.781***	0.000	HDI is I(1)
FERT	-2.613***	0.004	-3.158	0.001	FERT is I(0)
GDP per capita	-2.136**	0.016	-6.928 ***	0.000	GDPpercapita is I(0)
RENT	-3.441***	0.000	-10.651	0.000	RENT is I(0)

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: Author's compilation

The outcomes in Table 7 indicate that all of the series are either I(0) or I(1), with no variables being I(2). WEMP equals I(1). Independent variables are a mixture of I(0) and I (1). Given the cross-sectional dependence in the errors, CS-ARDL is an ideal estimating model.

4. Results and discussion

This section provides our empirical findings and looks into their implications. We first examine the cointegration test to verify the long-run

relationships. We analyze the CS-ARDL model's results, focusing on the long- and short-run dynamics of WEMP and the dependent variable. This analysis allows us to understand the underlying mechanisms and to offer valuable recommendations based on empirical facts.

4.1. Cointegration Test

We use the Pedroni and Westerlund tests to examine the cointegration relationship and estimate the link between the variables. Table 8 shows the outcomes of these analyses.

Table 8. Cointegration test results

Cointegration Test	Statistic	P-value
Pedroni test	3.2109 ***	0.0007
Westerlund test	-1.3892 *	0.0824

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: Author's compilation

The various cointegration tests are shown in Table 8, which suggests a possible cointegration between the studied variables at the 5% and 10% significance levels. Thus, examining these results in more detail might be useful by conducting additional tests to confirm these conclusions.

4.2. Discussion of the CS-ARDL model Results

Given the presence of cross-sectional independence of errors in the classical ARDL panel model, the estimation of the dynamic relationship between WEMP and socioeconomic factors (HDI, FERT, GDP per capita, and RENT) may be biased due to unobserved common factors, such as oil price fluctuations. The CS-ARDL model is, therefore, more appropriate because it corrects for these biases by considering cross-sectional dependencies, thus allowing us to obtain robust estimates better adapted to the context of MENA countries, which are often exposed to common shocks.

Table 9 illustrates long-run research findings for the CS-ARDL model. The analysis concludes that human development positively and significantly affects women's employment at the 10% threshold ($\beta=1.289$, $z=0.720$, $p=0.074$). A rise of 1% in the HDI corresponds to a 1.28% rise in the

WEMP. It underlines that investment in education, better health, and higher incomes can significantly improve women's economic empowerment.

Additionally, the findings on oil rent corroborate Ross's (2008) conclusions that oil-rich nations exhibit lower female participation rates. The results ($\beta = -0.132$, $z = 0.069$, $p = 0.058$) reveal a significant negative association between RENT and WEMP, indicating that a one-unit increase in oil rent is associated with a 13.2% reduction in WEMP.

In addition, the FERT coefficients indicate a negative but non-significant association with women's employability. The negative impact of FERT diverges from the results of previous empirical studies (Del Boca & al. 2009; Bloom & al., 2009; Mishra and Smyth, 2010; Shuangshuang & al., 2023), which show that lower fertility is a critical factor in increasing women's labor market involvement. It can be linked to contextual or structural differences specific to the countries studied (social and cultural norms). Other variables not included in the model may also affect the relationship between fertility and women's engagement.

Table 9. Long run results

Variables	Coef	Std. Err	P> z
HDI	1.289321*	0.7205632	0.074
FERT	-0.1957752	0.1805443	0.278
GDP percapita	-0.0533963	0.048475	0.271
RENT	-0.1321506*	0.0696812	0.058
CD test	-1.29	-	0.1983

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: Author's compilation

Despite its theoretically important role in women's empowerment, economic development, through its proxy GDP per capita, shows a negative but insignificant effect on WEMP. Several factors, including gender inequalities, disparities between countries, and the structure of labor markets in several nations, could explain this result. Verick (2014) demonstrates that economic development does not always result in greater female participation because of cultural norms or labor-market structure. Gaddis & Klasen (2014) confirmed the U-curve of women's participation,

demonstrating that female participation initially declines with increasing GDP before rising again at higher levels of development. Kabeer (2012) explored the social and structural barriers to women's labor market participation, indicating that GDP growth does not automatically translate into an increase in WEMP.

Table 10. Short run results

Variables	Coef	Std. Err	P> z
HDI	1.548416*	.9216627	0.093
FERT	-.2682424	.2519139	0.287
GDP percapita	-.0718282	.0594991	0.227
RENT	-.1938858	.1027008	0.059
ECT(-1)	-1.43233	.0723919	0.000

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: Author's compilation

The findings of the estimations of the CS-ARDL model in the short term are presented in Table 10. These results show that the HDI variable is positively and significantly associated with WEMP in MENA countries. Oil rent has a significant negative association with WEMP. Moreover, the negative value of the ECT indicates that the system will eventually reach equilibrium. Furthermore, the values of the short-term coefficients, HDI (1.54), FERT(-0.26), GDP per capita(-0.071), and RENT (-0.193), are almost identical to their long-run magnitudes, which could be explained by the reaction of the dependent variable to variations in the explanatory variables.

5. CONCLUSION

Many countries in the MENA region are striving to diversify their economies and enhance women's involvement despite the obstacles of relying on oil revenues and promoting human development. However, studies have yet to explore the combined effect of human development and oil revenues on female jobs in this region. The primary goal is to evaluate the impact of human development, oil rent, gross domestic product per

capita, and fecundity rate on women's employment (WEMP) in the MENA region, using econometric approaches adapted to the specificities of these data, such as heterogeneity and cross-sectional dependencies. The empirical analysis reveals short- and long-run links between the selected variables in the context of the studied countries. In order to meet the requirements of the analysis, the Cross-sectional-autoregressive-distributed lag (CS-ARDL) model is applied, as it effectively captures both short- and long-term interconnections while accounting for cross-sectional dependencies—a critical factor for MENA countries subject to common shocks, such as oil price fluctuations.

This study identifies two central relationships: a favorable and significant connection between human development and women's employment and an adverse correlation between oil rents and women's employment involvement. These findings shed light on the factors affecting women's economic integration in the MENA area, emphasizing the importance of implementing economic policies to enhance human development and diversify sources of income beyond oil revenues.

Based on the findings presented above, we can offer recommendations aimed at enhancing the effectiveness of policies to support women's economic participation in the MENA region as follows:

- **Promote human development:** Investing in women's education across primary, secondary, and tertiary levels is crucial. Enhancing women's health services and improving living conditions through public health and social welfare programs can further boost economic participation.
- **Reduce dependence on oil revenues:** Countries in the region should diversify their economies by investing in alternative industries and promoting innovation and entrepreneurship. Policies promoting female entrepreneurship, such as tax incentives and support programs for women-led businesses, are essential to increasing women's economic participation.
- **Recommendations for future research:** Scholars could use similar datasets to examine further the link between human development, oil

revenues, and female employment, as well as other economic indicators like digital infrastructure, inequality indices, government spending, and technological advancements. Future research could also explore macroeconomic strategies across income levels and regions.

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