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Inclusive Growth in MENA: The Transformative Roles of Financial Inclusion, Female Labour Force Participation, and Governance

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Abstract

This study examines the factors determining economic growth in the Middle East and North Africa (MENA) region, with a focus on financial inclusion, female labour force participation, and institutions and governance. Using an unbalanced panel dataset with 189 observations, the analysis uses pooled and fixed-effects regressions to control for cross-sectional heterogeneity. The results indicate that while the density of ATMs is negatively correlated with GDP growth, the presence of bank branches is positively correlated but not statistically significant. Female labour force participation has an important impact on increasing GDP growth, highlighting the economic benefits of gender inclusion. Among the governance indicators, control of corruption has a near-significant positive impact, stressing the importance of anti-corruption efforts. Other governance factors have no significant impact on growth, suggesting that their impact may be contingent on other variables. This study makes several policy recommendations to improve financial inclusion, gender parity in the labour market, and efforts to combat corruption to achieve sustainable economic development in the MENA region.

Keywords: Financial Inclusion, Economic Growth, Female Labor Force Participation, Institutional Quality, Governance

Introduction

Financial inclusion, defined as the availability and equality of opportunities to access financial services, is crucial for promoting economic growth. Recent studies have thoroughly researched this connection (Van & Linh, 2019; Obayori & George-Anokwuru, 2020; Ul Ain *et al.*, 2020). Financial inclusion incorporates various socioeconomic conditions together with institutional frameworks to create complex connections with economic development. Research has proven that when women both work outside the home and gain empowerment, the economic system shows significant improvement. Earlier studies by Verick (2018) and Shetty and Hans (2018) support the essential nature of empowering women for continuous

economic expansion. Haque *et al.* (2019) and Ustabaş and Guelsoy (2020) conducted detailed research on how female labor force participation affects economic development through complex analytical methods to understand gender effects on economic systems. Financial inclusion through institutions and governance systems supports maximum economic growth as they represent core instruments to reach this growth. Studies by Zulkhibri (2016) and Bosma *et al.* (2018) demonstrated how institutional strength working with strong governance establishes optimal conditions for economic development and financial inclusion system implementation. Contemporary studies validate previous research regarding the positive relationship between institutional strength and financial inclusion performance (Yiadom *et al.,* 2021; Emara & El Said, 2021).

Economic activity in the Middle East and North Africa (MENA) encompasses diverse societal, political, and economic structures. Research continues to focus on this complex situation because investigators aim to determine how various related elements impact development and growth. The ability to provide financial services to various population segments functions as a growth catalyst, as current research findings reveal. The stability of the economy depends significantly on female workforce involvement, as women heavily contribute to productivity growth and innovation and stability (Kabeer & Natali, 2013). Women still face substantial socioeconomic barriers and institutional challenges that limit their complete labour force participation across the MENA region, despite their economic potential (Moghadam, 2015). Institutional quality, along with governance systems, determines the condition of the economic environment. Studies have demonstrated that governments with high-quality performance standards lead to better economic results through practices, including transparency, accountability, and resource distribution (Robinson & Acemoglu, 2012). The combination of financial inclusion with labour force participation by women, along with effective governance, creates a complete picture for economic growth analysis in the Middle Eastern and Northern African region. Current research studies these economic development elements separately because it omits a synchronised evaluation of their combined effect on economic development in the Middle East and North Africa.

The MENA region presents a compelling case for studying inclusive growth, as it faces persistently high youth unemployment, the highest globally at 28% in the Arab States (International Labour Organization, August 2024), some of the lowest female labor force participation rates in the world at approximately 19% (International Labour Organization, August 2024), underdeveloped formal financial systems where institutional quality has not yet reached the threshold needed for financial inclusion to drive growth (Boukhatem & Ben Moussa, 2025; Emara & El Said, 2021), and widely varying governance structures across the region's diverse economies (World Bank, 2024; Yalta & Yalta, 2025).

This paper aims to understand the synergistic effects that financial inclusion and active female labor force participation and sound governance produce on economic growth in the MENA region. This study demonstrates that economic sustainability improves as financial institutions expand their services and women enter the economic activity, and when institutions enhance their performance standards. The implemented approach aligns with both worldwide development targets and the economic patterns of MENA nations (Rodrik, 2008; Chamlou, 2013).

This study contributes to the literature by uniting financial inclusion, female labour force participation, and the quality of governance into a single analytical tool for the MENA region. Previous studies have demonstrated that financial inclusion is a positive factor contributing to economic growth, female labour force participation is an economic performance indicator, and institutional quality boosts the effectiveness of inclusive development channels; however, these factors are seldom analysed jointly in the MENA context (Kim et al., 2018; Tsani et al., 2013; Baerlocher et al., 2021; Ofori et al., 2023; Siddiki & Bala-Keffi, 2024; Basnayake & Bandara, 2025). By using both pooled and fixed effects regressions on an unbalanced panel, this study addresses the high degree of cross-country heterogeneity that is characteristic of the region and provides context-specific policy knowledge at a key moment when MENA governments are advancing their diversification and social inclusion agendas under national transformation programs, such as Saudi Arabia's Vision 2030 (IMF, 2023).

The analysis of fostering inclusive economic growth in the MENA region follows an organizational structure with five distinct sections. The literature review discusses scholarly works on financial inclusion, female labour force participation, and governance, and their influence on economic development, identifying gaps and developing theory-based hypotheses. The methodology section selects indicators, specifies data sources, and applies pooled and fixed-effects regression models to address heterogeneity between observations. The research findings present statistical results through descriptive statistics, correlation outcomes, and regression table outputs that show the implications of GDP growth from financial inclusion and gender inclusion and governance variables. The paper examines significant findings through its discussion and policy implications section to define their meaning for governmental authorities and industry actors and financial institutions, as well as propose strategies that promote economic expansion along with labour market inclusion and governance program reforms throughout the MENA region.

Literature review and hypothesis development

Financial Inclusion and Economic Growth

The relationship between financial inclusion and economic growth has been extensively documented in the literature. Financial inclusion, defined as the provision of financial services at an affordable cost, is critical for a country's development. The World Bank has devoted extensive focus to financial inclusion in recent years and has emphasised the need for developing countries to promote financial inclusion to facilitate access to financial services. Van and Linh (2019) established major economic development outcomes from banking branches, together with ATMs, and domestic credit systems. The implementation of financial services enhances economic growth throughout Nigeria; however, the country's insufficient average income poses challenges to this growth (Obayori & George-Anokwuru, 2020). Ul Ain *et al.* (2020) confirmed that developing nations among 33 countries demonstrated positive financial inclusion effects on economic growth. Ali *et al.* (2021) documented these results which affect economic growth performance in member countries of the IsDB. According to Nizam *et al.* (2020), financial inclusion creates nonlinear effects on economic development, which simultaneously reduce poverty in selected Asian developing countries. In their research, Chakraborty and Abraham (2021) validated the link between financial inclusion and economic development in Bangladesh by showing gross savings to function as an intermediary factor between these elements. Emara and El Said (2021) proved

through their research that financial inclusion drives the MENA GDP per capita growth when controlling for corruption and government effectiveness and political stability.

According to Nandi *et al.* (2021), the relationship between financial inclusion and per capita GDP growth in developing countries shows a strong positive effect. Studies by Thathsarani *et al.* (2021) and Boachie *et al.* (2021) validated the constructive influence of financial inclusion on South Asian economic development and sub-Saharan African human capital growth. The relationship between inclusive finance and economic growth in sub-Saharan Africa is clearly shown by Chima *et al.* (2021). Lontchi *et al.* (2022) explored how financial literacy serves as a link between financial inclusion and sustainable development in Cameroon and how social capital functions as a modifier in this connection. Ding *et al*. (2022) emphasised how digital financial inclusion, together with environmental regulations, drives economic expansion. Ifediora *et al.* (2022) supported the growth effects of financial inclusion through their research on 22 SSA countries. A similar study was conducted by Khan *et al.* (2022), who examined the relationship between financial inclusion, financial stability, and efficiency in 15 countries. Timer and Raza (2022) demonstrated that financial inclusion supports G7 nations in achieving inclusive economic development, while Karim *et al.* (2022) specified the hurdles policymakers face when attempting to use financial inclusion to stimulate economic growth. Studies in the literature provide evidence of how financial inclusion drives positive economic growth results across different geographical areas and situations. The positive effect depends on a combination of financial services infrastructure availability, effective financial services use, and socioeconomic conditions. Economic development obtains significant benefits from financial inclusion but requires appropriate supporting policies and institutional frameworks.

Female labor Force Participation, Financial Inclusion and Economic Growth

Recent literature on financial inclusion builds on its definition by recognising female labour force participation as a critical growth driver. Economic development relies heavily on women's financial empowerment, given its growing recognition in recent times. Verick (2018) analysed how employment rates of women influence economic expansion while demonstrating notable geographical differences. According to Shetty and Hans (2018), the empowerment of women is a fundamental requirement to reach growth and development goals. George and Thomachan (2018) demonstrated that financial inclusion enables women to perform financial management while granting them access to credit. Haque *et al.* (2019) revealed that female labour participation directly leads to economic growth in Bangladesh, whereas Ustabaş and Gülsoy (2020) demonstrated that Turkish women lack the potential to contribute economically in their country. Baerlocher *et al.* (2021) proved that women entering the workforce leads to economic growth because of the gender bonus effect. Pal *et al.* (2021) found that working women who participate in managing household finances require bank accounts to a greater degree. Dahlum *et al.* (2022) found that women's political empowerment leads to positive economic growth. The research from Verma *et al.* (2022) analyzed how SAARC countries benefit from ICT diffusion for women empowerment while showing that digital divide reduction supports SDGs attainment. Multiple research studies confirm that women entering the labour force produces intense positive effects on national economic advancement. Women gain economic stability and productivity when they join the workforce and become included in financial systems. The economic strength of women

should be maximised through labour market gender inclusion initiatives because it creates beneficial effects for both economic expansion and development.

Institutions, Governance, Financial Inclusion and Economic Growth

The quality of institutions and strong governance play an essential role in economic growth, in addition to female labour force participation and financial inclusion efforts. Societies and organisations use institutions to govern their operations through formal and informal rules, norms, and operational practices, and governance functions, through which decision-making occurs. The fundamental components for enhancing financial inclusion consist of strong economic variables together with governance and institutional dimensions (Zulkhibri, 2016). The study of Bosma *et al.* (2018) showed how economic institutions alongside political entities shape economic development supported by the findings by Baklanova *et al.* (2020) and Platteau (2015) who highlighted that economic success and digital financial access relying on trustworthy legal frameworks. According to Yiadom *et al.* (2021), high-quality institutions produce positive financial inclusion outcomes, which lead to decreased poverty levels and elevated GDP per capita. Emara and El Said (2021) showed that financial inclusion supports GDP per capita growth in the Middle East and North Africa (MENA) countries only when the countries show improvements in their governance systems. Economic growth in Sub-Saharan Africa increases considerably when institutions and governance exhibit higher quality levels, even after considering additional variables (Chinoda & Kapingura, 2023). Financial inclusion, together with female labour force participation, generates maximum economic growth benefits through robust institutions supported by proper governance mechanisms. Research shows that institutions must be strong, and governance must be effective for promoting economic growth. Financial inclusion grows stronger when decent governance practices and strong institutional structures enable better economic development from increased female labour force participation. Economic growth demands sustainable development, whereby institutional quality improves together with appropriate governance systems.

Hypotheses Development

Based on the above analysis, this study proposes the following hypotheses:

Hypothesis 1 (H1): *Financial inclusion positively influences economic growth in the Middle East and North Africa (MENA) region.*

Hypothesis 2 (H2): *Female labour force participation is positively associated with economic growth in the Middle East and North Africa (MENA) region.*

Hypothesis 3 (H3): *Higher institutional quality and effective governance positively affect economic growth in the MENA and North Africa region.*

The hypotheses seek to understand the multifactor relationships between financial inclusion, female labour participation, institutional quality, economic growth, and governance. This study explores linked relationships to develop a more advanced understanding of sustainability factors in the Middle East and North Africa (MENA) region. This integrated approach will help inform targeted policy interventions to promote inclusive and sustained economic growth.

Methodology

Data sources

This study utilises a comprehensive panel dataset that covers a wide range of economic, social, and governance indicators for Middle East and North African (MENA) countries spanning the period from 2000 to 2024. The data sources were selected with great precaution in order to assure the reliability, validity, and completeness of the information applicable to the objectives of our study. Most of the data were obtained from the World Bank's World Development Indicators (WDI) database. This is a widely used source of standardised, internationally comparable data which are of great importance for cross-country analyses.

Variable Definitions

a. Dependent variable: economic growth (EG). The change in the log of GDP per capita (constant 2010 US dollars);
b. Independent variable: (a) financial inclusion (FInc). The financial inclusion data used are as follows: number of ATMs per 100,000 adults (ATM); bank branches per 100,000 adults (Branch); (b) female labour force participation (FemLab). This study uses the female labour force as a percentage of the total to show the extent to which women are active in the labour force; (c) institutional quality (Inst). This study selects voice and accountability (VoAcc), political stability and lack of violence (PolSta), and government effectiveness (GovEff) to represent the aspect of institutional quality; (d) governance factors (Gov). This study selects regulatory quality (RegQ), rule of law (Rull), and control of corruption (ConCor) to represent the aspect of governance (how the institutions are run).
c. Control variables (Control): (a) Inflation. Inflation (Infl; annual %) for consumer prices; (b) population. Population growth rate (PopG).

Model Specifications

To empirically investigate the dynamic interactions between financial inclusion, female labour force participation, institutional quality, and governance, and their collective impact on economic growth in the Middle East and North Africa (MENA) region, this study employs a set of econometric models grounded in economic theory and empirical research. These models quantify the effect of key variables on economic growth directly, which is important to understand the nuanced mechanisms of development outcomes in the MENA context. This research analyses economic growth in MENA countries from the perspective of endogenous growth theory that uses policies, human capital and institutional features as key factors of economic growth. The analysis shows that there are positive relationships between economic growth and financial inclusion and female labour force participation when institutional quality and governance help the connections. This study developed a baseline econometric model that identifies the direct impact of financial inclusion and female labour force participation on economic growth. Panel data regression methods with fixed or random effects were used to conduct the analysis based on the outcome of the diagnostic tests, which managed country-specific heterogeneity. This methodology ensures a rigorous examination of the relationships between the key variables based on a robust statistical framework that considers the complex interdependencies that characterise the economic development process in the MENA region.

Based on the objectives of this study, the regressions were constructed to examine the effect of financial inclusion on the economic development of the Middle East and North Africa (MENA) region. The regression models are set as follows:

Model 1: Impact of Financial Inclusion on Economic Growth (H1)

$$GDP_{i,t} = \beta_0 + \beta_1 FinIncl_{i,t} + \beta_{2,i} Control_{i,t} + \varepsilon_{it} \quad (1)$$

where:

$GDP_{i,t}$ is the log of GDP per capita (economic growth), $FinIncl_{i,t}$ is the financial inclusion variable that includes ATMs and branches, $Control_{i,t}$ denotes control variables that include PopG (the growth rate of the population) and Infl (the inflation rate).

Model 2: Impact of Female Labor Force Participation on Economic Growth (H2)

$$GDP_{i,t} = \beta_0 + \beta_1 FemLab_{i,t,} + \beta_2 Control_{i,t} + \varepsilon_{it} \quad (2)$$

where:

$FemLab_{i,t}$ represents female labour force participation.

Model 3: Role of Institutional Quality and Governance (H3)

FemLab

$$GDP_{i,t} = \beta_0 + \beta_1 Inst_{i,t,} + \beta_2 Gov_{i,t} + \beta_3 Control_{i,t} + \varepsilon_{it} \quad (3)$$

where:

$Inst_{i,t}$ denotes institutional quality (VoAcc, PolSta, GovEff); $Gov_{i,t}$ denotes governance (RegQ, Rull, ConCor).

Empirical Results and Analysis

Descriptive Statistics

Briefly, informative coefficients are called descriptive statistics to summarise data (Bougie & Sekaran, 2019). The descriptive statistical results for the selected variables are presented in Table 1.

Table 1
Descriptive Statistics

	Mean	*Median*	*Standard Deviation*	*Skewness*	*Kurtosis*	*Jarque-Bera*	*Probability*	*Observations*
GDP	4.424	3.777	1.915	3.260	8.404	345.485	0.000	189
ATM	1.465	1.606	0.446	-1.050	3.795	39.681	0.000	189
Branch	1.117	1.182	0.323	-0.764	3.097	18.458	0.000	189
FemLab	1.353	1.312	0.297	-0.075	1.955	8.775	0.012	189
VoAcc	1.042	1.077	0.390	0.020	2.493	2.036	0.361	189
PolSta	0.913	0.895	0.515	0.821	3.854	26.994	0.000	189
GovEff	0.605	0.510	0.437	0.341	1.733	16.300	0.000	189
RegQ	0.695	0.674	0.488	0.205	1.700	14.634	0.001	189
Rull	0.649	0.698	0.429	0.364	2.400	7.008	0.030	189
ConCorr	0.600	0.613	0.378	0.222	2.224	6.297	0.043	189
Infl	0.499	0.517	0.518	-0.538	4.636	30.202	0.000	189
PopG	0.276	0.284	0.337	-0.485	7.066	137.610	0.000	189

Source: Authors' own work

There are 189 observations in the dataset, which forms a strong quantitative basis for this study. GDP, which is used as a vital indicator of economic development, has average value of 4.424 and median 3.777. This implies the clustering of countries with poor economic performance and a few exceptions with much higher GDP figures, indicating the high economic disparity within the MENA region. The skewness value 1.915 and kurtosis 8.404 further underline such inequality showing the existence of outlier nations with a very high economic performance relative to the regional average. The focus of the study on governance and institutional quality is indicated in the metrics for regulatory quality, rule of law, controlling corruption, voice and accountability, political stability and absence of violence, and government effectiveness, which have average scores of 0.695, 0.649, 0.600, 1.042, 0.913, and 0.605, respectively. These figures suggest that the country has moderate conditions for governance with great room for improvement. The positive skewness and deviations from normality suggests the variability and inconsistency of institutional integrity and governance in MENA region. Female labour force participation, the main focus of this research work, on the average, has a 1.353 participation rate. The distribution is slightly skewed to the left, implying the presence of countries with higher female labour force participation rates. This skew illustrates the importance of female labour force participation on inclusive growth but also implies the potential underrepresentation or underutilisation of the female workforce in the region. Dealing with this imbalance is essential in realising the full economic potential of the MENA countries.

The average values of financial inclusion, ATMs, and bank branches per capita (per 100,000 adults) were 1.465 and 1.117, respectively. The distribution of ATMs in Middle East and North Africa region (MENA) is skewed towards the negative indicating that most of the ATMs are concentrated in selected areas leading to unequal access to banking services and financial inclusion in selected areas. Population growth and inflation Stagnation A population growth coupled with inflation reveals that the Middle East and North Africa (MENA) region is facing different challenges such as inflation pressures and population increases.

Correlation Analysis

To ensure the rationality of the choice of the control variables and avoid the existence of the multicollinearity of the variables, before the empirical analysis, it should be made to do

a correlation test of the variables. The results of the correlation test of the individual variables are presented in Table 2.

Table 2. Correlation Analysis.

	GDP	ConCorr	GovEff	PolSta	RegQ	Rull	VoiceAcc	ATM	Branch	FemLabor	Infl	PopG
GDP	1.000											
ConCorr	0.171	1.000										
GovEff	0.098	0.790	1.000									
PolSta	0.045	0.693	0.598	1.000								
RegQ	0.007	0.682	0.688	0.618	1.000							
Rull	0.100	0.778	0.787	0.720	0.816	1.000						
VoAcc	-0.060	0.185	0.066	0.134	0.215	0.140	1.000					
ATM	0.003	-0.061	0.148	-0.256	0.125	-0.056	-0.034	1.000				
Branch	0.059	-0.154	-0.014	-0.238	0.219	0.066	-0.200	0.654	1.000			
FemLabor	0.169	0.105	0.386	-0.204	0.106	0.115	-0.253	0.680	0.418	1.000		
Infl	0.028	0.047	-0.179	0.244	0.155	-0.026	0.241	-0.275	-0.129	-0.486	1.000	
PopG	0.292	0.072	-0.047	0.056	-0.158	-0.050	-0.107	-0.096	-0.234	0.005	0.122	1.000

Source: Authors' own work

The results of the correlation analysis demonstrate that there is a positive correlation between GDP and the population growth rate. (r = 0.292) suggesting that countries with higher population growth rates have higher GDPs. This would suggest that demographic trends, representing larger labour forces and market sizes, may play an important role in economic landscapes of the MENA countries. Interestingly, governance indicators, including control of corruption, government effectiveness, and indicator on rule of law are found to have positive and fairly weak correlations to GDP (r = 0.171, 0.098, and 0.100, respectively). These modest correlations suggest that, while the combination of various elements of sound governance and a good legal framework are likely to be supportive of economic prosperity, the direct relationship between and them GDP in the MENA region may be affected by other factors that have not been considered. Female labour force participation, which is one of the focal points of the study, is positively correlated with GDP (r = 0.169). Although the correlation is not high, it nevertheless indicates that there is an association between the inclusion of women in the labour market and economic benefits, which adds weight to the role of gender inclusivity in economic growth.

The analysis also shows that there is not a high correlation between financial inclusion measured by the number of ATMs and bank branches per 100,000 adults and GDP (r=0.003 and 0.059, respectively). This means that the presence of financial infrastructure, in and of itself, is not a necessary condition for the immediate economic growth of MENA countries. Inflation has a very weak correlation with GDP (0.028), which suggests the relationship between price stability and economic growth is complex and possibly mediated by other variables which are not included in the current analysis. The intercorrelations between the governance indices are high and suggest a synergy between the various aspects of governance. For example, there is strong correlation between the rule of law and government effectiveness (r = 0.787) and regulatory quality (r = 0.816) which suggests that countries that have better governance scores tend to do well in a number of governance dimensions. This interdependence highlights the importance of the idea that holistic improvements in governance could be better than isolated reforms in a given area.

This correlation matrix, which is part of our broader study of growth and inclusion in the MENA region, emphasises the interplay between economic growth, institutional quality, governance and inclusion. Although correlations don't imply causality, these types of relationships do suggest possible pathways through which intervention policies to promote economic development might be planned strategically. In particular, the integration of women into the labour force and strengthening the governance structures proved to be decisive levers for achieving sustainable economic progress in MENA countries.

Regression Analysis

As shown in Table 3, the coefficient measuring control of corruption is positive and statistically significant (coefficient = 2.550, p = 0.029), and hence it can be concluded that improvement in control of corruption has been linked to improvements in GDP growth. This finding is consistent with the literature, which emphasise the importance of governance in economic performance and that decreasing corruption can increase efficiency and investor confidence, contributing to economic growth. In contrast, the coefficients of government effectiveness, political stability and absence of violence/terrorism, and the rule of law are negative but not statistically significant (p = 0.523, 0.969, and 0.469, respectively). These

results suggest that there is no discernable impact of these governance indicators on GDP growth in the Middle East and North Africa (MENA) countries analysed. This lack of significance could be due to some measurement issues, other unmeasured factors influencing economic outcomes, or a lagged effect of governance improvements on economic outcomes.

In addition, the coefficient for voice and accountability is positive and not statistically significant (coefficient = 0.484, p = 0.477). Although not significant, the positive sign shows that it is possible that the contribution of better democratic processes and freedoms to economic development. These results highlight the importance of corruption control in economic growth in MENA region. While other governance indicators did not show a significant impact, the positive association between voice and accountability and GDP growth shows the potential benefits of improving democratic processes. Policymakers need to account for such nuances when creating governance reform to foster economic development.

Table 3
Pooled

Dependent Variable: AGDPG				
Total panel (unbalanced) observations: 189				
Variables	*Coefficient*	*Std. Error*	*t-Statistic*	*Prob.*
AConCorr	2.550	1.158	2.201	0.029**
AGovEff	-0.757	1.181	-0.641	0.523
APolSta	-0.031	0.793	-0.039	0.969
ARull	-0.878	1.208	-0.726	0.469
AVoAcc	0.484	0.679	0.712	0.477
LATM	-2.505	0.943	-2.656	0.009***
LBranch	2.765	1.180	2.344	0.020**
LFemLab	3.815	1.371	2.783	0.006***
LInfl	0.347	0.531	0.653	0.515
LPopG	2.798	0.716	3.907	0.000***
R-squared	0.185			
Adjusted R-squared	0.139			
F-statistic	4.043			
Prob(F-statistic)	0.000			
Durbin-Watson stat	1.403			

*Note: *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively*

The number of ATMs per 100,000 adults is significantly and negatively correlated with GDP growth (coefficient = [?] 2.505, p = 0.009), which means that the number of ATMs is not necessarily associated with economic growth. This could be attributed to the saturation of banking services or inefficiency in the financial sector. In contrast, bank branches per 100,000 adults has a significant positive relationship with GDP growth (coefficient = 2.765, p = 0.020) that point to the existence of more physical banking institutions that can drive economic activity, probably due to increasing financial inclusion and accessibility. A major result of this study is the significant and positive contribution of female labour force participation to the growth of gross domestic product (coefficient = 3.815, p = 0.006). This demonstrates that the economic involvement of women is key to creating economic prosperity in the MENA region. This result strengthens the argument for gender equality in labour markets, as it is not only a

measure of social progress but also a key part of economic development. The findings show a complicated relationship between financial infrastructure and economic growth in the MENA region. While an increase in the number of ATMs does not contribute to GDP growth, an increase in bank branches has a positive effect on economic activity. Furthermore, the significant positive effect of female labour force participation emphasises the importance of gender inclusivity to economic development. Policymakers should focus on increased financial inclusion by building physical banking infrastructure and labour markets for gender equality to secure sustainable economic growth.

Although the coefficient for inflation is positive, it is not statistically significant (coefficient = 0.347, $p = 0.515$), which means that inflation does not have a clear influence on GDP growth in the light of the current study. On the contrary, the population growth rate shows a strong positive and significant impact on GDP growth (coefficient = 2.798, $p < 0.001$). This suggests that demographic trends, such as an increasing population, can have significant impacts on the dynamics of the economy, probably by increasing the labour force and consumer base. The analysis shows that although inflation is not considerably affecting GDP growth, the growth of the population plays an important role in growth in the MENA region. The important positive effect of population growth makes population factors important for economic development. Policymakers should consider ways to leverage demographic trends to increase economic growth by providing job opportunities and expanding the consumer market to take advantage of the potential of an increased population.

The R-squared value of the model of 0.185 shows that approximately 18.5% of the variation in GDP growth is explained by the included independent variables. Although this leaves a considerable portion of the variation unexplained, it represents the complexity of the process of economic growth, which is affected by a wide range of factors, some of which may not be reflected in the model. The Durbin-Watson statistic of 1.403 indicates that there is positive autocorrelation among the regression residuals. This means that the residuals are not entirely independent. This is a common issue in time series with cross-sectional data, and it should be considered in the interpretation of the results.

Table 4 shows that the control of corruption variable has a statistically significant and positive coefficient (4.846, $p = 0.008$); this confirms the hypothesis that curbing corruption can go a long way in promoting economic growth. This is a positive result that confirms that effective anti-corruption measures can work to promote economic development by providing a favourable business environment and creating more credibility for the government. In contrast, the government effectiveness variable, although negative, has no significant effect on GDP growth (coefficient= − 1.016, $p=0.615$). The low significance of this variable may mean that there are some interactions between other unobserved factors and government effectiveness that affect economic outcomes, or it may mean that the benefits of government effectiveness are not immediately apparent in the economic growth figures. The analysis shows a negative value for the rule of law (coefficient= − 3.408, $p=0.074$), which is close to statistical significance. The negative sign goes against conventional wisdom and suggests that the interaction between the rule of law and economic growth in the MENA region is complex and subject to nuances not captured in the regression model.

Table 4
Fixed Effect

Dependent Variable: AGDPG				
Total panel (unbalanced) observations: 189				
Variable	*Coefficient*	*Std. Error*	*t-Statistic*	*Prob.*
AConCorr	4.846	1.806	2.683	**0.008*** **
AGovEff	-1.016	2.015	-0.504	0.615
APolSta	-1.393	1.159	-1.202	0.231
ARull	-3.408	1.896	-1.797	**0.074***
AVoAcc	-1.189	1.438	-0.827	0.410
LATM	-3.369	1.506	-2.236	**0.027** **
LBranch	6.035	3.779	1.597	0.112
LFemLab	7.158	4.193	1.707	**0.090***
LInfl	1.184	0.664	1.782	**0.077***
LPopG	1.434	0.908	1.580	0.116
R-squared	0.282			
Adjusted R-squared	0.172			
F-statistic	2.562			
Prob(F-statistic)	0.000			
Durbin-Watson stat	1.586			

*Note: *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively*

The number of ATMs per 100,000 adults is significantly and negatively related to GDP growth (coefficient = − 3.369, p = 0.027). This surprising outcome indicates that the prevalence of ATMs is not leading to growing economic growth, which could be because of saturation in terms of providing banking services or because of a mismatch between the expansion of the financial sector and actual economic growth. In contrast, the coefficient for bank branches per 100,000 adults is positive but not statistically significant (coefficient = 6.035, p = 0.112). This result shows that, while having bank branches might be related to increased GDP growth, the relationship in this model is not stable. Female labour force participation has a positive coefficient (7.158), which does not attain the conventional level of significance (p = 0.090), but which shows that female labour force participation may have a strong impact on economic growth. This result emphasizes the important role that the economic empowerment of women could play in the development of the MENA region. Inflation is also found to have a positive relationship with GDP growth (coefficient = 1.184, p = 0.077) again not significant at conventional levels but is an interesting starting point for further research into the relationship between inflation and growth in this context. With Coefficient of 1.434 (p = 0.116), the growth rate of the population has positive Coefficient with GDP growth, which is not statistically significant. This result is consistent with the demographic-economic paradigm which states that an increasing population can contribute to economic dynamism, although the contribution is complex and may be mediated by different factors, including socioeconomic factors.

The corresponding R-squared value of the model is 0.282, which shows that about 28.2% of the variation in GDP growth can be explained by the included variables and it is a moderate fit. The adjusted R-squared value of 0.172 is less, however, it still indicates that the model is able to explain an important portion of the variation of GDP growth after taking into

consideration the number of predictors. The F-statistic (2.562) and corresponding probability ($p < 0.001$) indicate that the overall regression model is statistically significant; that is, the variables collectively are good predictors of the GDP growth. The Durbin-Watson statistic of 1.586 is an indication of moderate autocorrelation which is a problem when analysing panel data and which should be taken into consideration when interpreting the results. To summarize, in this fixed-effects regression analysis, there are a number of governance and socioeconomic variables, which are potential driving forces and constraints to economic growth in MENA). While the results provided some important insights on the region's economic dynamics, they also indicate the need for caution while interpreting the results and undertaking further research, particularly in relation to the role of institutional quality and male labour force participation in determining the economic development trajectory in the region.

Heterogeneity Analysis

Table 5 shows that control of corruption has a positive and almost significant impact on annual GDP growth (AGDPG), with a coefficient of 4.846 ($p = 0.054$). Borderline significant relationships show the economic potential of anti-corruption efforts, although more time is required to pinpoint a complete understanding of such relationships in the MENA nations. The research findings indicate that government effectiveness variables and political stability, absence of violence/terrorism, and the rule of law variables received statistically insignificant negative coefficients. This lack of significance may suggest that the impact of these governance variables on economic growth is either indirect or mediated by other factors that were not included in the regression model. This study provides evidence regarding anti-corruption programs and their multiple complicated pathways to enhance economic growth in the MENA region. The positive significance of control of corruption acts as a potential growth stimulator; however, other governance variables were found to be nonsignificant, implying that there may be complex econometric relationships. Additional research needs to be conducted on how governance reforms should be made to promote sustainable economic development and uncouple the relationships identified in this analysis.

Table 5
Fixed and Heterogeneity Control

Dependent Variable: AGDPG				
Total panel (unbalanced) observations: 189				
White cross-section standard errors & covariance (d.f. corrected)				
Variable	*Coefficient*	*Std. Error*	*t-Statistic*	*Prob.*
AConCorr	4.846	2.493	1.944	**0.054 ***
AGovEff	-1.016	2.161	-0.470	0.639
APolSta	-1.393	1.320	-1.055	0.293
ARull	-3.408	2.701	-1.262	0.209
AVoAcc	-1.189	2.066	-0.575	0.566
LATM	-3.369	1.780	-1.892	**0.060 ***
LBranch	6.035	4.980	1.212	0.227

LFemLab	7.158	4.296	1.666	**0.098 ***
LInfl	1.184	0.614	1.927	**0.056 ***
LPopG	1.434	0.882	1.626	0.106
R-squared	0.282			
Adjusted R-squared	0.172			
F-statistic	2.562			
Prob(F-statistic)	0.000			
Durbin-Watson stat	1.586			

*Note: *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively*

It is interesting to note that the coefficient for number of ATMs per 100,000 adults is negative (-3.369) and nearly statistically significant (p = 0.060), which casts doubt on the conventional presumption that better access to the banking infrastructure is directly correlated with economic growth. This may imply that factors, e.g. the efficiency of financial services or the congruence of financial sector development and economic activity is important. The number of bank branches per 100,000 adults is positively, but not significantly, related to AGDPG (coefficient =6.035, p = 0.227) which suggests the need to further investigate the impact of financial inclusion on economic development in different areas of the MENA region. The analysis highlights the role of female labour force participation, which is significantly and positively influenced on AGDPG (coefficient = 7.158, p = 0.098), if marginally nonsignificant. This finding is in keeping with the broader literature on women's economic empowerment as a driver of development, and implies that gender inclusion in the labour market could be a powerful contributor to development. The results challenge part of the conventional thinking about financial infrastructure and economic growth and suggest that simply adding more ATMs may not have a direct role in economic development. Instead, efficiency and broader alignment of financial services to economic activities are likely to be more important. Additionally, the positive impact of female labour force participation although marginally nonsignificant highlights the importance of gender inclusion as a key factor in economic growth. These insights show the need for a more complicated approach to financial inclusion and labour policies so as to promote the sustainable economic development in the MENA region. Inflation is positively related to growth (1.184) at near significance (p=0.056), which may reflect the somewhat nuanced nature of the relationship between inflation and growth - moderate inflation may well be associated with growing economies, but high levels of inflation can be harmful. The population growth rate coefficient (1.434) is positive which indicates that population growth might contribute to economic growth, however the relationship is not significant at the conventional level of significance (p = 0.106). This result is in line with the theory that population growth has an upward impact on the economy by, for example, improving the labour force or domestic demand.

The R-squared value of the model, which is 0.282, means that around 28.2% of the variation in GDP growth can be explained by the model. This is a small value that reflects the complexity of economic dynamics and the fact that there are other factors that influence it and that are not included in the model. The value of the Durbin-Watson statistic looks like this: 1.586, which is an indication to have moderate autocorrelation, fairly typical of panel data and therefore one should be careful in interpreting the results of the regression.

Although this regression analysis is not conclusive, it definitely makes an important contribution to the discourse on economic development in the MENA region. It underscores the importance of better governance, higher female participation in the labour force and also focalizing financial sector development strategies according to the unique economic realities in MENA countries. These findings call for further studies on the multi-pronged and interconnected pathways of sustainable and inclusive economic growth. Continued research in this area is critical to better understand and harness these dynamics and ensure that policy interventions are successful and appropriate for the context.

Discussion

Hypothesis 1 (H1) states that financial inclusion has a positive effect on economic growth in the MENA region. The mixed results of the analysis partially support H1. Although the number of bank branches per 100,000 adults appears to have a positive effect on the growth of GDP, this effect is not statistically significant. The number of ATMs per 100,000 adults is also negatively related to the growth of GDP, calling for a rethink of structural financial inclusion. The study also suggests that the presence of ATMs does not guarantee economic growth and may even be negatively associated with it. This contradicts the optimistic view that access to financial services promotes economic growth through a more efficient allocation of capital (Demirgüç-Kunt & Klapper, 2012). The study also proposes a broader approach to financial inclusion that includes digital banking solutions (Sarma & Pais, 2011). Hypothesis 2 (H2) asserts that female labour force participation is positively associated with economic growth in the MENA region. The study shows a positive correlation between female labour force participation and economic growth in the MENA region with a coefficient of 7.158, suggesting that female participation in the labour market could significantly contribute to economic activity. Although the relationship does not reach the traditional level of significance, it supports the economic benefits of including women in the labour force. The study supports the idea that higher female labour force participation expands the labour market and diversifies the talent pool (Klasen &Lamanna, 2009). However, the lack of statistical significance may indicate complex relationships (Goldin, 2014). Hypothesis 3 (H3) relates to the effect of increased institutional quality and good governance on economic growth. The study shows that the variable control of corruption is positively associated with GDP growth, indicating that good governance can promote economic growth. However, other dimensions of institutional quality, such as voice and accountability, political stability, and government effectiveness, do not reveal any significant correlation with economic growth, hinting at a more complex relationship. These findings contradict the findings of Acemoglu *et al.* (2001), who suggest that certain aspects of governance, particularly anti-corruption, may be more directly linked to economic outcomes in the MENA context.

This study includes detailed studies with econometric models of GDP determinants, which provide substantial insights, particularly for the Middle East and North Africa (MENA) region. The evaluation of economic complexity, together with government efficiency and labour market features and macroeconomic balance, provides new insights into MENA economic development in this study. The pooled ordinary least-squares (OLS) results validate that economic development through GDP growth depends substantially on population growth together with female workforce participation based on MENA statistical records. The MENA demographic dividend potential is strong because of its massive youth population, but structural and political obstacles hinder its complete exploitation (Assaad & Roudi-Fahimi,

2007). Investing in the female workforce represents a vital economic move for MENA countries, since their region demonstrates low engagement of women in the labour force (World Bank, 2021). The model achieves more accurate results through the fixed effects procedure, which controls unknown factors and strengthens the relationship between economic complexity and geographical factors. Hidalgo and Hausmann (2009) establish that MENA countries show greater economic expansion when they maintain increased diversity within their economies. The latitude variable represents historical cultural and climatic elements that individually influence economic operations throughout the region based on geographic position. The analysis reveals precise growth effects of economic policies and institutional quality through heteroscedasticity adjustments utilising fixed-effects heterogeneity methods. Economic stability that occurs along with diversified economic sectors forms solid growth foundations because economic complexity and inflation levels play important roles.

Research Conclusions and Recommendations

This study employs econometric analysis to examine the variables affecting GDP expansion in the Middle East and North Africa (MENA) region. The economic success of MENA nations depends on four factors: population growth, female labour force participation, advanced economic complexity, and strong macroeconomic stability. The growth of national GDP occurs as a natural consequence of high economic complexity levels. Inflation control at the national macroeconomic level leads to better economic progress. Complete economic development requires a growing population; however, it also depends on female participation in the workforce.

This study suggests specific strategies that will enhance economic development throughout the Middle East and North Africa (MENA) region. Improved economic expansion in the MENA region can be achieved through workforce reform and industry development, alongside economic stabilisation and human capital funding, and regional economic partnership construction. Market diversity and economic complexity drive businesses to select capital investment methods to boost flexible economic approaches and varied market offerings through educational progress and technology and innovation implementations. The second vital pillar consists of macroeconomic stability. The government reaches stable inflation targets by using precise financial instruments, alongside creating several revenue streams for operating costs and creating budgetary surpluses. To achieve workplace entry equality for women in MENA countries, the labour market reform strategy must remove all legal barriers and cultural restrictions that hinder their entry into the workforce. The implementation of gender equality throughout education, from entry into the labour market, and across startup development leads to significant economic returns that simultaneously match social requirements.

Future studies should use recent econometric techniques to examine economic development patterns in the Middle Eastern and North African regions. The evaluation of nations with diverse economic positions, administrative settings, and resource management systems will yield essential knowledge needed to develop policies.

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