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FOREIGN DIRECT INVESTMENT, INSTITUTIONAL QUALITY, AND ECONOMIC GROWTH IN THE ARAB MAGHREB UNION: THE ROLE OF ABSORPTIVE CAPACITY AND GOVERNANCE CHALLENGES

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ABSTRACT

This paper examines the direct impact of FDI inflows and institutional quality on the economic growth of the Arab Maghreb Union (AMU) countries from 1996 to 2022. The study also evaluates whether institutional quality influences the relationship between FDI and growth by incorporating an interaction term between FDI and institutional quality. Institutional quality is measured using the control of corruption score of the Worldwide Governance Indicators (WGI). The analysis is based on panel data estimation models, with the Hausman test used to determine the best model, either the Fixed-Effects Model (FEM) or the random effects model (REM). The results indicate that FDI inflows do not have a significant impact on economic growth in AMU countries. Additionally, institutional quality does not directly influence economic growth, reflecting the underdevelopment of institutions in the region. Instead, the coefficient of the interaction term is negative and significant, suggesting that institutional quality negatively impacts the FDI-growth relationship. Inflation and the labor force index are found to have a significant and positive influence on economic growth. Surprisingly, the human capital index exerts a negative effect on economic growth in AMU countries. The policy implications of these findings include the need for policymakers in AMU countries to pay specific attention to the development of human capital and improving absorptive capacities, from institutional quality, to perceive FDI as a growth driver.

Keywords: Foreign Direct Investment, Institutional Quality, Economic Growth, Arab Maghreb Union.

INTRODUCTION

The countries of the Arab Maghreb Union (AMU) face persistent challenges in achieving sustainable economic growth, a prerequisite for meeting the United Nations' 2030 Sustainable Development Goals (SDGs) (Adeosun et al., 2020). Even with reforms designed to open up trade and encourage foreign direct investment (FDI), the region's average GDP growth rate remains stagnant at 2.14 percent (World Bank, 2024), significantly below the levels required to address unemployment, poverty, and institutional development. This sluggish growth trajectory raises critical questions about the drivers of economic progress in a region characterized by youthful demographics, vast natural resources, and strategic proximity to European markets. FDI has long been touted as a catalyst for growth in developing economies, promising technology transfer, job creation, and productivity spillovers. However, AMU nations have struggled to leverage FDI effectively, attracting only 3.5% of global FDI inflows in 2021 (World Bank, 2024).

Compounding this issue is the region's institutional fragility. AMU countries rank among the lowest globally in institutional quality, with an average control of corruption score of 0.78 (WGI, 2024). Weak institutions exacerbate risks for investors, undermine domestic absorptive capacity, and stifle the potential for FDI to stimulate growth. While studies on other regions highlight the conditional role of institutional quality in mediating impact of FDI (Ullah et al., 2022; Saidi & Ochi, 2023), the AMU context remains underexplored, with prior research focusing narrowly on macroeconomic factors. In the theoretical review, the neoclassical "exogenous growth" theory, proposed by Solow (1956), suggests that FDI stimulates economic growth only in the short run, as diminishing returns on capital eventually lead to a long-term equilibrium or steady state (Ait Soussane et al., 2022). In contrast, the endogenous growth model (Romer, 1986; Lucas, 1988; Barro, 1991; Grossman & Helpman, 1991; Sala-I-Martin & Barro, 1995) addresses the gaps in earlier theory by emphasizing that technological innovation and advancements are key drivers of FDI's sustained positive impact on economic growth. This new theory posits that economic growth is inherently endogenous, shaped by internal factors such as knowledge accumulation and technological progress, rather than external constraints.

Therefore, the endogenous growth models highlight the significance of inward FDI as a critical driver of economic growth, as it transfers superior knowledge and technology into the host country's production process (Lee et al., 2024). Moreover, the endogenous theory claims that FDI inflows can stimulate long-run economic growth by increasing a country's physical and human capital, boosting R&D, and transferring expertise (Lucas, 1988; Romer, 1986). The new growth theory underscores the critical significance of the indirect effects of FDI, particularly those stemming from technology spillovers and efficiency gains, as instrumental drivers of economic advancement (Elkomy et al., 2016). Siddikee and Rahman (2021) position FDI as a prominent conduit of financial resources and technological expertise for developing economies. However, the empirical evidence remains inconclusive, reflecting a persistent lack of consensus within the existing body of research. Several researchers have reported that FDI has a positive impact on economic growth (Akadiri et al., 2020; Sarker & Khan, 2020; Vukmirović et al., 2021). Others argued that FDI negatively impacts growth, leading developing economies to face the challenge of FDI risks (Huang et al., 2024; Shittu et al., 2022).

On the other hand, some researchers have contended that although many empirical investigations show a strong link between FDI and economic growth, it would be overly simplistic to claim that FDI directly drives such growth (Osabohien et al., 2022; Siddikee & Rahman, 2021). This is because the factors

influencing FDI's growth effects vary across countries, and policies effective in one nation may not yield the same results in another. According to Masron et al. (2018) and Thanh et al. (2019), institutional quality has an indirect impact on economic growth through FDI inflow. Thus, the mixed results suggest that the economic growth effects of FDI inflow depend on the host country's absorptive capacity, specifically in terms of the quality of institutions (Gupta et al., 2022; Ullah, Ali, et al., 2022). To clarify, absorptive capacity refers to the degree to which economies can absorb and effectuate recently introduced technologies (Hanafy & Marktanner, 2019). Chengying et al. (2023) conceptualize absorptive capacity as a nation's ability to recognize the value of novel external knowledge, integrate it into existing systems, and leverage it for commercial applications. This construct encompasses a comprehensive set of competencies required to manage the tacit transfer of knowledge elements and adapt externally sourced knowledge to local contexts.

Therefore, to fully realize the advantageous outcomes of FDI inflow, good institutional quality and a favorable business climate are needed (Hadili et al., 2020). In contrast, a weak institutional environment may obscure the positive effects of an open economy and be a significant reason why emerging countries struggle to catch up with high-income countries (Acemoglu & Robinson, 2012; Kar et al., 2019; North, 1992). Thus, Makun (2017) reported that the pathway for stimulating economic growth through opening the economy is not always smooth. As this study highlights, the impact of FDI on economic growth has long been a subject of ongoing debate in academic literature. Also, previous studies on AMU countries have overlooked the role of institutional quality in the FDI-growth nexus. As a result, the current study examines the direct growth effects of FDI inflow and institutional quality, as well as the moderating effect of institutional quality on FDI-economic growth nexus in AMU countries from 1996 to 2022.

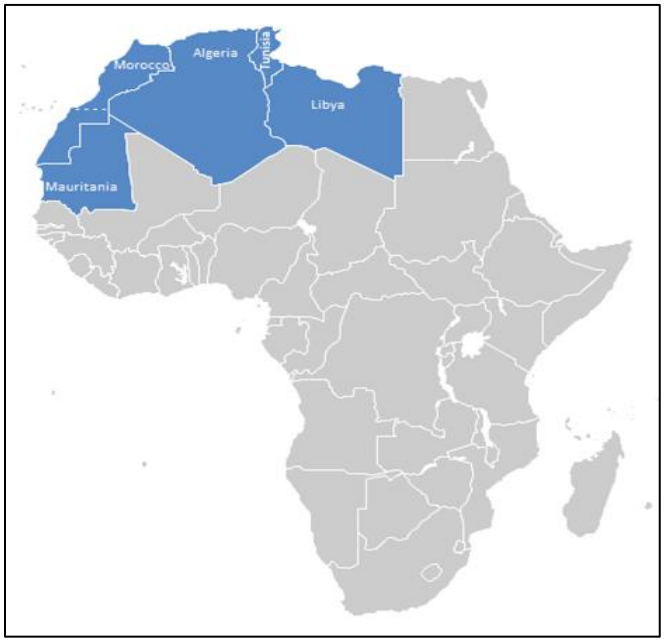
This research examines how institutional quality influences the economic growth impact of FDI in AMU nations. Conceptually, the study anchors this inquiry within absorptive capacity concept, positing that institutions shape the FDI-growth relationship. Methodologically, it employs an interaction term between FDI inflows and institutional quality. Subsequent sections provide an overview of the AMU, review literature on FDI-institutions-growth linkages, detail analytical methods, present empirical results, and conclude with synthesized findings and their scholarly implications.

OVERVIEW OF THE ARAB MAGHREB UNION

As depicted in Figure 1, the Arab Maghreb Union (AMU) operates as an economic and political body across Northwest Africa. Its key location is attributed to its proximity to the European Union; a prominent global economy. It consists of five Muslim Arab nations: Algeria, Libya, Mauritania, Morocco, and Tunisia (Djeflat, 2021). The AMU members are rich nations characterized by substantial youthful demographics and a significant, although underutilized, market (Eregha & Mesagan, 2020; Haouas et al., 2021; Khalfaoui & Derbali, 2021). As shown in Table 1, in 2022, the AMU countries had an aggregate gross domestic product (GDP) of 428.89 billion USD with an average GDP growth rate of 2.14%, and the region's population is 106.27 million spread over a vast territory of 6 million square kilometers (World Bank, 2024).For real investment, in January 2013, the AMU countries launched an investment bank focused on infrastructure development (Worrall, 2017). Figure 2 shows the FDI inflow in African and AMU countries from 1990 to 2022. In particular, between 1990 and 1996, it is difficult to observe the rise in FDI inflows in Africa and AMU. Following several ups and downs, FDI inflows in Africa and AMU grew significantly from USD20.20 billion and USD4.33 billion in 2001 to reach USD60.34 billion and USD12.16 billion in 2008, respectively.

Figure 1

Map of AMU members within the African continent.



Source: United Nations Economic Commission for Africa, 2024.

Table 1

Profile of AMU countries in 2022.

Country	Population (million)	GDP (USD/billion)	GDP per capita	GDP growth (%)	Human Capital Index (HCI)
Algeria	44.90	191.91	4273.9	3.1	0.745
Libya	6.81	45.75	6716.2	-1.2	0.718
Mauritania	4.74	10.38	2190.7	5.2	0.556
Morocco	37.46	134.18	3527.9	1.1	0.683
Tunisia	12.36	46.66	3776.7	2.5	0.731
AMU	106.27	428.89	4035.85	2.14	0.687

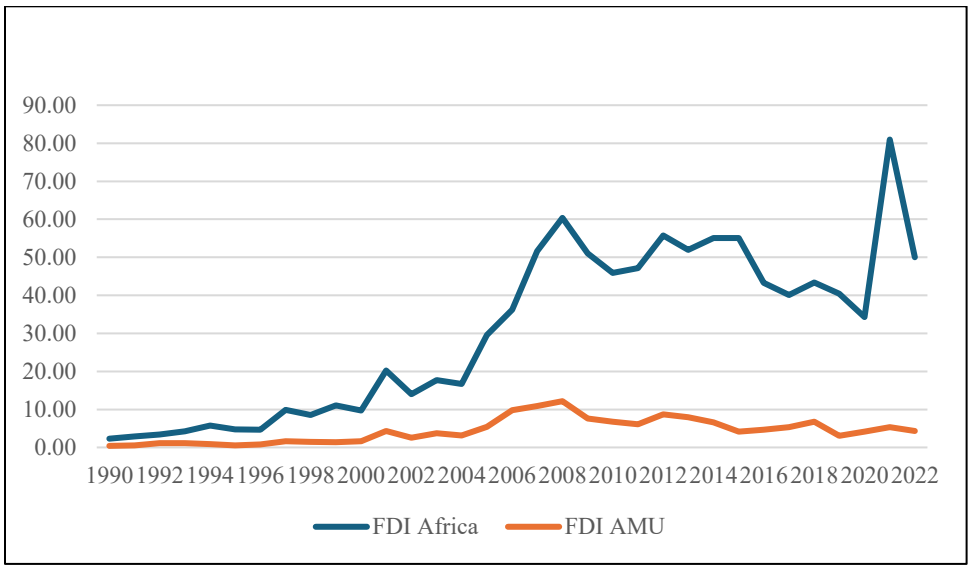
Source: World Bank database, 2024.

In 2021, the inflows of FDI to Africa reached a peak of USD80.97 billion. Conversely, as can be observed, there was a notable decrease in FDI inflow for Africa and AMU in 2022, which may be due to the post-pandemic temporary economic rebound following the COVID-19 pandemic. In 2022, FDI inflow to Africa amounted to US$34.24 billion, representing a 43.25% contraction relative to the historic peak observed in 2008. Statistically, AMU countries attracted only 3.5% of the aggregate world FDI inflow in 2021, which is very low compared to other regions (World Bank, 2024). Although the AMU has not attracted the

desirable FDI, a substantial amount of optimism remains (Khalfaoui & Derbali, 2021). Notably, an exciting feature of AMU is that these countries are experiencing important socio-political and economic transformations (El-Asmi, 2018; Volodina, 2019).

Figure 2

FDI Inflow of AMU vs Africa (1990-2022)



Source: World Bank Database, 2024

Table 2 below shows the quality of the six institutional factors defined by the Worldwide Governance Indicator (WGI) in the five AMU countries in 2022. The institutional factors include voice and accountability (VAA), political stability (PST), government effectiveness (GOV), regulatory quality (REG), rule of law (ROL), and control of corruption (COC). According to Table 2, all AMU countries have a low ranking in global institutional quality.

Table 2

Institutional level of AMU countries in 2022.

Country	VAA	PST	GOV	REQ	ROL	COC	Average
Algeria	-1.00	-0.74	-0.51	-1.06	-0.83	-0.64	-0.80
Libya	-1.39	-2.20	-1.75	-2.09	-1.80	-1.53	-1.79
Mauritania	-0.73	-0.51	-0.70	-1.06	-0.66	-0.80	-0.74
Morocco	-0.56	-0.32	-0.13	-0.09	-0.20	-0.36	-0.28
Tunisia	-0.18	-0.60	-0.30	-0.41	-0.08	-0.25	-0.31
AMU	-0.77	-0.87	-0.68	-0.94	-0.72	-0.71	-0.78

Source: Worldwide Governance Indicators, 2024.

Note: The estimate of the WGI institutional factors ranges between -2.5 and 2.5, where higher value indicates better institutional quality.

Notably, a study conducted by Nurjannah et al. (2023) confirmed that developing nations show less efficacy in controlling corruption, worsening inflation and poverty problems, ultimately imposing adverse effects on economic growth. Indeed, most AMU members, such as Libya, Tunisia, and Mauritania, witnessed the Arab Spring wave in early 2011, and its security, political, and economic repercussions can still be seen (Kirikkaleli et al., 2021). Even though these anti-authoritarian revolts failed to bring about the hoped-for democratic political transition, they nevertheless left the region much altered from before (Hill & Cavatorta, 2019). According to the Worldwide Governance Indicators (2024), all AMU countries have a low ranking in global institutional quality. Likewise, several studies reported that the institutional environment in AMU is featured by insecure private property, a biased system of law, corruption, and high costs of doing business, which has adversely affected their economic performance (Abdelbary, 2023; Gründler & Potrafke, 2019; Haouas et al., 2021; Volodina, 2019).

LITERATURE REVIEW

Foreign Direct Investment and Economic Growth

The impact of FDI on economic growth is non-negligible, becoming a heavily debated issue in international business and economics (Chen & Jiang, 2022). Although there is a prevalent belief that FDI tends to stimulate economic growth, the present empirical literature does not support a broad conclusion on the relationship. To demonstrate, Paul and Jadhav (2020) pointed out that FDI inflow is an important source for enhancing the growth of emerging nations by bringing in non-debt-creating capital. Hence, capital deficiencies in developing nations may be mitigated through the strategic attraction of FDI, thereby bridging the disparity between existing reserve capacities and targeted investment thresholds (Bird & Choi, 2020; Sabir et al., 2019). Moreover, Ennin and Wiafe (2023) state that Multinational Corporations (MNCs) are characterized by the utilization of sophisticated advanced technology, trade strategies, patents, branding, managerial methodologies, and appealing marketing strategies. Likewise, Liu et al. (2020) posit FDI as a catalytic mechanism for host economies, underscoring its strategic importance in advancing the economic growth of China, India, and Singapore during the 1980-2020 period.

In the same way, Radmehr et al. (2022) confirmed that FDI had a favorable impact on 62 low and high-income economies from 1995 to 2016 in the long and short term. Further, using the Fixed and Random Effects models, Adegboye et al. (2020) proved that in sub-Saharan African (SSA) economies from 2000 to 2018, the FDI has positively assisted economic growth. Using similar estimating techniques, Gherghina et al. (2019) showed that between 2003 and 2016, FDI exerted a positive influence on economic growth trajectories across a sample of eleven European nations. Hao (2023) confirmed that from 1990 to 2021, China's FDI affects positively the industrial economic growth. Therefore, several developing countries have adopted new policy measures to liberalize, facilitate, and regulate FDI operations, aiming to attract FDI, hoping that new technologies, job opportunities, and economic growth will be brought in (Okwu et al., 2020; Owusu-Nantwi & Erickson, 2019; Wang et al., 2023).

On the contrary, Bieleń et al. (2024) stated that FDI could push out local businesses, make countries more dependent on foreign investment, lower standards for workers and the environment, or even capital flight. In his empirical study, Yimer (2023a) cited a number of studies that found FDI inflows have adversely affected economic growth in certain nations by crowding out domestic firms. Furthermore, Abdullah and Chowdhury (2020) and Ngundu and Ngepah (2020) confirmed that FDI in poor nations affects economic growth negatively because most of the benefits are transferred back to the home country. Thus, to benefit

from FDI's knowledge transfer, it is required that host countries must have a certain level of absorptive capacity (Huynh et al., 2021; Shi, 2019). As a result, states that are unable to absorb the expertise from MNCs lose competitiveness, resulting in negative productivity spillovers from FDI (Moralles & Moreno, 2020).

In the same vein, Ennin and Wiafe (2023) examine the long-term effects of mining-related foreign direct investment (FDI) on Ghana's economic growth between 1996 and 2015. Utilizing the Autoregressive Distributed Lag (ARDL) methodology, their findings demonstrate that mining FDI exerts a detrimental long-term effect on the nation's economic development. Similarly, Ibhagui's (2020) analysis of sub-Saharan African (SSA) economies empirically establishes that the direct growth implications of FDI remain characterized by ambiguity and inconsistency across the region. Correspondingly, Anetor (2020) claimed that the lack of a high-quality labor force in SSA countries made it hard to absorb FDI's spillover advantages and led FDI to deteriorate the country's balance of payments and reduce competitiveness in local markets. Likitwongkajon and Vithessonthi (2020) found that FDIs were negatively associated with Japanese firms' performance from 1990-2016. For Kosovo, Govori and Fejzullahu (2020) showed that FDIs in primary sector and the tertiary sector have negatively impacted the GDP. Likewise, Intisar et al. (2020) argued that FDI had a negative impact on GDP per capita in Western Asia from 1985 to 2017. Similarly, Despotović et al. (2024) found that FDI in the primary and secondary sectors had a negative effect on economic growth in Central and Eastern Europe (CEE) and the Western Balkans (WBs).

According to Clark et al. (2016), developing economies in Africa exhibit a pronounced reliance on commodity-driven economic structures and primary sector activities, resulting in crowding-out phenomena and an underdeveloped manufacturing base that constrains the productivity spillover potential of FDI. Thus, despite many empirical studies supporting the significant relationship between FDI and economic growth, it would be unrealistic to assert that FDI influences economic growth. For example, AL-Mutairi et al. (2024) pointed out that FDI insignificantly affects Palestinian economic growth for the period 1996-2020. By using different time frames and empirical methods, Haini et al. (2024) and Osabohien et al. (2022) demonstrated that direct FDI inflows do not have a substantial effect on economic growth across 15 Economic Community of West African States (ECOWAS) nations. Adams (2009) found that FDI's effect on growth is insignificant when using the fixed-effects estimation. Similarly, Akinlo's (2004) results did not confirm FDI's positive impact but instead reported no meaningful correlation between FDI and economic growth in Nigeria.

In South Africa, Hlongwane and Daw (2021) discovered an insignificant long-run relationship between FDI and economic growth from 1970 to 2019. Moreover, Meivitawanli's (2021) empirical analysis employing the GMM model yielded findings that challenge conventional assumptions about the role and outcomes of FDI. In other words, the research claimed that FDI has an insignificant role in explaining economic growth in Indonesia from 2008 to 2017. In the same way, Osuji (2015) used the ARDL model and proved that from 1981 to 2013, FDI in Nigeria has an insignificant effect on growth in the long and short run. In a recent study, Karahan and Çolak (2024) investigated the causal link between FDI and economic growth across Regional Comprehensive Economic Partnership (RCEP) member states from 1980 to 2020. Their symmetric causality analysis revealed no statistically significant relationship between the two variables in any of the countries studied.

The limited extant literature examining the impact of FDI on economic growth within AMU member states has yielded divergent empirical outcomes, underscoring a persistent lack of scholarly consensus. For instance, Kalai and Helali (2021) examined the non-linear effect of FDI on the economic growth of the AMU countries during the period 1980-2019. The findings demonstrated that a causal relationship between FDI and economic growth emerges exclusively under long-term temporal parameters, with such linkages empirically validated solely within the nation-specific contexts of Algeria and Tunisia. Moreover, Abdouli and Hammami (2017) indicated that from 1990 to 2012, there was a bidirectional causal relationship between FDI inflows and economic growth in Morocco, Tunisia, Algeria, and Libya. Similarly, Chibalamula et al. (2023) found that FDI has positively supported Moroccan economic growth from 1994-2019. Ali and Mna (2019) examined how FDI affects economic growth in Tunisia, Algeria, and Morocco during the period from 1980 to 2014. The results of the generalized method of moments (GMM) technique indicated positive and significant results only in the case of Morocco. However, the findings prove that for Tunisia and Algeria, the effect of FDI on economic growth is neutral.

Similarly, from 1970 to 2015, Mebarki and Mokhtari (2020) used ARDL cointegration and found that FDI has an insignificantly positive effect on economic growth in Algeria. The study claims that Algeria's open economy strategy failed to ensure the diversification of non-hydrocarbon national production. The persistent heterogeneity in findings pertaining to the FDI-growth nexus may stem from methodological limitations in capturing the bidirectional interdependencies between these variables, coupled with inherent structural and institutional divergences across host economies. The empirical literature shows that FDI growth effect is conditional on the absorptive capacity in terms of institutional quality that would enable FDI to promote economic growth.

FDI, Institutional quality, and economic growth

Empirical literature broadly indicates that FDI inflows stimulate economic growth via spillover effects like technology transfer (Asiamah et al., 2019; Barro & Sala-i-Martin, 1997; Grossman & Helpman, 1991). Additionally, FDI can enhance growth by upgrading physical and human capital in host countries (Elkomy et al., 2016; Qazi et al., 2017). Nevertheless, studies acknowledge that contextual factors significantly mediate FDI's growth impact (Akinlo, 2004; Durham, 2004; Iwasaki & Tokunaga, 2014). In light of persistent divergence in empirical findings concerning the FDI-growth nexus, contemporary scholarly inquiry has increasingly prioritized the mediating role of host economies' absorptive capacities as a critical contingent factor in reconciling these inconsistencies. For instance, they have stressed that its growth effect depends on the quality of institutional factors. Put differently, the impact of FDI inflows on economic growth hinges on the presence of certain conditions, such as the institutional quality of host countries.
In the same way, Ullah et al. (2022) emphasize that FDI's growth impact is contingent on host nations' institutional quality a core absorptive capacity. High-quality institutions are prerequisite for FDI to accelerate economic growth (Ullah, Ali, et al., 2022). Consequently, countries with comparable FDI inflows may experience divergent growth outcomes based on institutional strength (Slesman et al., 2021; Ullah, Ali, et al., 2022). Supporting this, Nguyen et al. (2018) note that robust institutions attract FDI to high-productivity sectors and amplify their growth effects. Consequently, recent scholarships increasingly prioritize institutional quality as a critical mediator in the FDI-growth nexus (Saidi & Ochi, 2023). Supporting this focus, Haini and Tan (2022) analyzed institutional quality's impact across OECD economies (2000–2019). Their generalized method of moments (GMM) estimations revealed consistently positive complementary effects on growth in both sectoral and industrial FDI contexts. Earlier, Buchanan et al. (2012) theorized that weak institutions elevate transaction costs, deter long-term investments, and weaken

foreign-domestic firm linkages, constraining FDI's growth spillovers. Substantiating this, Tomizawa et al. (2020) identified property rights protection and rule of law as institutional prerequisites for growth via entrepreneurship and innovation.

Deficient institutions correlate strongly with reduced investment, slower productivity growth, lower per capita income, and diminished output expansion (Jude & Levieuge, 2017). Complementing this, Das and Mahalik (2020) demonstrate that multinational subsidiaries achieve superior performance in host countries with robust institutional frameworks. Concurrently, Gupta et al. (2022) employed ARDL methodology (1995-2019) to establish absorptive capacities including institutional quality and technological innovation as critical mediators in the FDI-growth nexus. Mirroring these findings, Aziz's (2022) GMM analysis confirms institutions' pivotal role in Arab economies, where they amplify growth by internalizing FDI spillovers. Miao et al. (2020) demonstrated through GMM analysis (2003–2017) that Chinese FDI's positive growth effects in African nations hinge on institutional quality improvements via policy interventions.

Additionally, Yimer (2023) proved that for the period 2000-2017, the better the institutional quality, the higher the FDI-induced growth in Africa. Accordingly, Mamman and Valei (2023) posit that resource-abundant nations characterized by underdeveloped institutional frameworks must prioritize the rectification of institutional deficiencies to foster sustainable economic development. Saidi and Ochi (2023) empirically investigated the tripartite interdependencies among FDI, economic growth, and institutional quality across a panel of selected North African and developing economies including Algeria, Morocco, Mauritania, and Tunisia utilizing a longitudinal panel dataset spanning 2000-2018. By applying the Panel Threshold Regression (PTR) methodology, their findings revealed that the interplay between these variables is non-linear and threshold dependent. Specifically, no statistically significant association between FDI and economic growth was observed when institutional quality as measured by the WGI index remained below a critical threshold of 1.20. However, FDI inflows exhibited a positive and statistically significant impact on growth trajectories once institutional quality surpassed this threshold, underscoring the critical mediating role of governance frameworks in enabling FDI-driven developmental outcomes. In the same vein, Ullah et al. (2022) showed that in 80 developing countries, the magnitude of FDI's influence on economic growth increased when the interaction with institutional quality (IQ) was introduced into the model.

On the contrary, Saidi et al. (2022) found no significant relationship between institutional quality and FDI-driven growth in developing economies based on ARDL analysis (1996-2014). Diverging evidence emerges from Ullah, Luo, et al. (2022), whose panel data study (1996-2019) examined sector-specific FDI's growth effects under regulatory frameworks. Their empirical results revealed that regulatory frameworks interacted negatively with FDI inflows, producing significant adverse impacts on host countries' economic growth during the study period. In addition, Chih et al. (2022) indicated that the growth-enhancing potential of FDI is substantially attenuated by the countervailing mediating influence of institutional frameworks within sub-Saharan African (SSA) economies. Further, Smolo (2021) showed that institutional quality does not affect Western Balkans' economic growth from 2000 to 2019. This may be because the sample countries' institutions are too underdeveloped to affect growth or the FDI-growth connection.

Ait Soussane et al. (2022) found that FDI's contribution to economic growth in Morocco varies depending on the source country. Analyzing data from 1995 to 2020, their research revealed that investments from Spain and France positively influenced growth, while those from Germany, the Netherlands, China, and

Turkey exhibited negative effects. Conversely, FDI originating from the United States, Italy, the United Kingdom, Switzerland, and Gulf nations showed no statistically significant impact. Given the above discussion, the existing empirical literature on the impact of the institutional quality of the host country on the FDI-growth relationship is vastly conflicting. In fact, for AMU countries, a significant concern that may be relevant to most studies examined in this context is their tendency to attribute the relationship between FDI and economic growth solely to macroeconomic factors, neglecting the crucial aspect of institutional quality in the economies hosting FDI.

METHODOLOGY

Theoretical framework and model specification

In examining the economic growth effect of FDI inflow and institutional quality, the study follows the AH endogenous growth model proposed by Acemoglu (2007).

$$Y(t) = A(t)\, H(t) \tag{1}$$

Y, *A*, and *H* denote *GDP*, technological advancement, and human capital, respectively. Moreover, applying the natural logarithm to the expression of Equation (1) results in the logarithmic form of Equation (1).

$$ln\ Y(t) = ln\ A(t) + ln\ H(t) \tag{2}$$

Taking the derivative of equation (2) with respect to time yields the fundamental growth equation:

$$\frac{\partial \ln Y(t)}{\partial t} = \frac{\partial \ln A(t)}{\partial t} + \frac{\partial ln H(t)}{\partial t} \tag{3}$$

$$\dot{Y} = \dot{A} + \dot{H} \tag{4}$$

Equation (4) is the fundamental economic growth equation, in which $\dot{Y}$ represents variations in GDP, which is economic growth. It is imperative to underscore that $\dot{A}$ and $\dot{H}$ are presumed to be distinct. Moreover, the study investigates the moderating role of institutional quality through the interactions with FDI inflow, in AMU, as the theoretical model which is expressed in Equation (1). Following the study assumes that technological advancements in AMU countries are influenced by economic factors including FDI inflow, institutional quality (IQ), inflation (*INF*) and the natural logarithm of the labor force (*lnL*) (Acemoglu, 2007; Duodu & Baidoo, 2020). This relationship is summarized in equation (5) below:

$$\dot{A} = f\,(FDI, IQ, lnL, INF) \tag{5}$$

Therefore, equation (5) can be employed to expand the technological advancements in equation (4), resulting in the following fundamental economic growth equation:

$$\dot{Y} = FDI + IQ + lnL + INF + H \tag{6}$$

The study then extends Equation (6) to capture the interaction of institutional quality with FDI in Equation (7), following the assertion of Stensnes (2006).

$$\dot{Y} = f\,(FDI,\ IQ,\ lnL,\ INF,\ H,\ FDI*IQ) \qquad (7)$$

*FDI*IQ* denotes the interaction between institutional quality and FDI inflow. The interaction terms reflect the moderating influence of institutional quality on the economic growth effects of FDI inflows in AMU nations. Equation (7) is subsequently converted into its estimable form as follows:

$$\dot{Y}_{it} = \alpha_{i0} + \beta_1 FDI_{it} + \beta_2 IQ_{it} + \beta_3 INF_{it} + \beta_4 lnL_{it} + \beta_5 H_{it} + \beta_6 (FDI_{it} * IQ_{it}) + \varepsilon_{it} \qquad (8)$$

In equation (8), the variables have been previously defined; α_0 represents the constant term, while ε_{it} signifies the stochastic error component for nation i (i= 1...5), which is characterized by a mean of zero and constant variance [ε_{it} $\tilde{N}$ $(0, \sigma^2)$]. Additionally, t denotes the temporal trend t = (1996…2022) for country i, accordingly. The β_s (1…6) represent the coefficients of the variables to be estimated. Consequently, in this framework, β_6 is employed to evaluate the influence of institutional quality on the moderating effect of FDI inflow on economic growth.

Estimation strategy

The study uses panel estimation models and utilizes the Hausman (1978) test to determine whether the individual-specific effects are fixed yet heterogeneous across units or random. Consequently, the growth impacts of the independent variables in the two scenarios require the application of either the random or fixed effect model to fulfil the study's purpose.

Data and variable description

This section discusses the descriptions of the variables and their corresponding prior expectations. The selection of AMU countries is based on the desire to evaluate the efficacy of the regional investment in promoting FDI among its members, the similarities in socio-economic backgrounds and geographical regions of the members, and the availability of annual data within the specified timeframe. This analysis employs secondary data and 27 annual observations from 1996 to 2022. 1996 is designated the first year after most AMU nations attained WTO membership in 1995 (Hadili et al., 2020). The empirical analyses utilize secondary data reflecting changes in GDP as an indication of economic growth. The primary explanatory variables include FDI inflow in percentage of GDP, human capital, institutional quality indexed by control of corruption indicator, labor force, and the interaction between institutional quality and FDI inflow. Similar to Akeel and Khoj (2023) and Zaman et al. (2021), the study will utilize inflation as a control variable. The data sources for macroeconomic variables include the World Bank database and the International Monetary Fund (IMF). The control of corruption index is derived from the World Governance Indicators (WGI). Table 3 illustrates the measurements and sources of the variables utilized in this study.

ANALYSIS AND DISCUSSION OF EMPIRICAL RESULTS

Descriptive statistics

Table 4 provides a statistical summary of the variables used in the study. The highest level of economic growth was experienced by Libya in 2012 with 92.12 percent, while the minimum value of economic growth was also observed in Libya in 2002, with -39.95 percent. Moreover, the average economic growth

score of the five AMU countries for 1996-2022 is 5.55 percent, which has the highest volatility. In contrast, the lowest volatility is in human capital. In detail, the standard deviation for FDI inflow is 4.22, economic growth is 15.77, institutional quality is 0.48, human capital index is 0.29, inflation is 4.40, and labor force is 1.00. Thus, economic growth varies highly among the AMU nations. Generally, most countries have gradually increased their FDI inflow.

Table 3

Sources of variables and their measurements.

Notation	Variable name	Measurement	Sources
Ẏ	Economic growth	Percentage change in GDP at current USD prices.	World Bank
FDI	Foreign Direct Investment	FDI, net inflows (% of GDP).	World Bank
H	Human capital index	A composite index based on years of schooling and returns to education.	Penn World Tables
IQ	Institutional Quality	Control of corruption index ranging from approximately (− 2.5 weak, + 2.5 strong).	Worldwide Governance Indicators
INF	Inflation	Percentage change in Consumer Price Index (CPI)	World Bank
lnL	Labor force	Natural log of the number of people ages 15 and older who supply labor for producing goods and services during a specified period (World Bank, 2024).	World Bank

Source: compiled by the authors

Over the period, Mauritania experienced twice the highest FDI inflow at 27.65 percent and 20.60 percent in 2005 and 2012, respectively. However, after seven years, Mauritania recorded its lowest point at -11.19. Overall, Mauritania experienced the highest level of FDI inflow among AMU countries from 1996 to 2022. When analyzing the institutional quality index, a noticeable finding is that all five AMU countries have a low ranking in global institutional quality. According to the Worldwide Governance Indicators (WGI), in 2020, Algeria's institutional quality was rated at -0.80, ranking 172nd globally, while Libya's score was -1.79, placing it at 208th. Mauritania had a score of -0.74, ranking 165th; Morocco stood at -0.28, ranking 127th; and Tunisia was at -0.31, ranking 130th. Thus, all five countries of the Arab Maghreb Union (AMU) exhibit relatively low rankings in institutional quality, highlighting challenges in governance and institutional effectiveness across the region.

Table 5 summarizes the descriptive statistics for the composite index derived from the six WGI institutional factors across the five AMU member states analyzed in this study. The cross-national disparities in institutional quality are evident, with Libya exhibiting the lowest mean score (-1.20), reflecting systemic deficiencies in corruption mitigation mechanisms. Conversely, Tunisia recorded the highest mean value (-0.14), suggesting comparatively stronger institutional efficacy in corruption control relative to its regional counterparts.

Table 4

Descriptive statistics

Variable	Observations	Mean	Standard. Dev.	Min	Max
Ẏ	135	5.55	15.77	-39.96	92.12
FDI	135	2.77	4.22	-11.19	27.65
H	135	1.88	0.29	1.07	2.69
IQ	135	-0.59	0.42	-1.58	0.28
INF	135	4.05	4.40	-9.79	25.85
lnL	135	15.11	1.00	13.34	16.38

Source: compiled by the authors

Table 5

Descriptive statistics of the control of corruption for the countries analyzed (1996-2022).

Country	Observations	Mean	Standard. Dev.	Min	Max
Algeria	27	-0.67	0.14	-0.99	-0.47
Libya	27	-1.20	0.29	-1.58	-0.85
Mauritania	27	-0.63	0.23	-0.94	-0.07
Morocco	27	-0.29	0.14	-0.49	0.10
Tunisia	27	-0.14	0.18	-0.53	0.28
AMU	135	-0.58	0.19	-1.58	0.28

Source: Worldwide Governance Indicators, 2024.

Note: The estimate of the WGI institutional factors ranges between -2.5 and 2.5, where higher value indicates better institutional quality.

Table 6 shows pairwise correlations among the variables. Since the reported correlation statistics are relatively low, it can be assumed that there are no serious multicollinearity problems among the variables.

Table 6

Correlation statistics

	$\dot{Y}$	FDI	$\dot{H}$	IQ	INF	lnL
$\dot{Y}$	1					
FDI	0.12	1				
$\dot{H}$	-0.12	-0.30	1			
IQ	0.02	0.06	0.001	1		
INF	0.17	0.12	0.14	-0.21	1	
lnL	-0.02	-0.33	0.34	0.34	-0.14	1

Source: Compiled by the authors

Regression results

This research used the Breusch-Pagan Lagrangian Multiplier (LM) test to assess heteroskedasticity (Breusch & Pagan, 1980). The Breusch-Pagan LM test results reject the null hypothesis (p-value = 0.00), indicating substantial evidence of heteroskedasticity and deeming the application of pooled OLS unsuitable. Furthermore, the Pesaran CD (cross-sectional dependence) test is employed to assess the correlation of residuals across entities, as cross-sectional dependence may introduce bias in test outcomes. The outcome of the Pesaran CD test (p = 0.00) indicates that the null hypothesis is rejected; thus, the error terms exhibit correlation across sections. This study used the Wooldridge test to assess serial correlation. The result of the Wooldridge test (p-value = 0.17) demonstrates the absence of serial correlation. The Hausman test results in Table 7 indicate that the Random Effects Model (REM) is more appropriate than the Fixed Effects Model (FEM) for this investigation (p = 0.58). Furthermore, robust standard errors are employed to grant reliable estimations of REM.

Table 7

Results of Hausman Test

Variables	Standard Error
Degrees of freedom	6
chi-square	4.58
Prob > chi2	0.59

Source: compiled by the authors

Table 8 presents the regression results from the random effect estimation, illustrating the impact of FDI inflow on economic growth. The first model does not include the human capital index, the second model disregards inflation, and the third model excludes institutional quality. However, column (4) represents the comprehensive model estimated according to the specifications outlined in equation (8) and summarized in Figure 3. Robust standard errors are indicated in brackets. The remaining columns (1-3) present the regression outcomes utilizing various sets of explanatory variables to verify the robustness of the primary model in column (4). The estimated results from models (1-3) closely align with those of the primary model (4), indicating that model (4) is robust. Consistent with Siddikee and Rahman (2021) and Osabohien et al. (2022), this study's findings revealed a p-value greater than 0.10 ($p > 0.10$), indicating that the coefficient associated with FDI inflow is not statistically significant.

Practically, the results suggest that FDI inflow does not exert a significant impact on economic growth in AMU countries. In other words, FDI inflow is not a significant factor in explaining the level of economic growth in AMU countries, suggesting that these nations do not capitalize on FDI inflow. Conversely, the findings indicated that the human capital index has adversely affected the economic growth of AMU countries. The potential factors contributing to the adverse correlation between the human capital index and economic growth in AMU countries may include a deficiency in critical skills, poor educational quality, and brain drain (Marchetta, 2012). Furthermore, the adverse growth implications of the human capital index

in AMU nations could result from a discrepancy between the capabilities provided in educational institutions and those required by the industry (Zhan et al., 2023).

Furthermore, within the conventional determinants of growth, inflation emerges as a positive and statistically significant factor influencing economic growth in AMU countries. The coefficient of inflation (0.65) substantially explains AMU's economic growth. Consequently, price stability resulting from moderate inflation positively influences AMU's economic growth. The study revealed significant findings concerning the link between institutional quality and economic growth. The study identifies no statistically significant relationship (p-value > 0.1) between institutional quality and economic growth in AMU countries, suggesting that corruption control mechanisms in these nations may be underdeveloped. Similar results to Van Bon (2019), bad institutional quality has an insignificant impact on economic growth.

Further, the findings indicate that the labor force had a significant beneficial impact on economic growth in AMU countries. Also, the estimated coefficient for the interaction terms is significant in AMU countries in ($p<0.10$), which corresponds to a 90% confidence interval. To be precise, the authors find that the interaction of institutional quality with FDI inflow is negatively associated with economic growth in AMU countries. To put it another way, institutional quality negatively moderates the FDI inflow-growth nexus in AMU countries during the period from 1996 to 2022.

Table 8

Results of random effects estimation.

Variables	(1) Y	(2) Y	(3) Y	(4) Y
FDI	-0.25 (0.25)	-0.47 (0.36)	-0.50 (0.54)	-0.35 (0.32)
IQ	-2.31 (1.88)	-0.89 (1.32)	-	-1.42 (2.12)
H	-	-4.50** (2.27)	-7.25** (2.97)	-6.95** (2.75)
INF	0.55*** (0.10)	-	0.64*** (0.07)	0.65*** (0.08)
lnL	1.63** (0.74)	1.54* (0.86)	1.82*** (0.69)	2.02** (0.94)
FDI*IQ	-1.26*** (0.53)	-1.56** (0.70)	-1.40 (0.91)	-1.20* (0.63)
Cons	-24.02* (13.15)	-10.97 (12.34)	-11.86 (10.12)	-16.34 (14.17)
N	135	135	135	135
r2_w	0.06	0.05	0.08	0.08
r2_b	0.97	0.58	0.65	0.76
r2_o	0.06	0.04	0.07	0.08

Source: compiled by the authors.

Note: Robust standard errors in parentheses. (r2_w) R-squared within model. (r2_b) R squared between models. (r2_o) R-squared overall model. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Although conventional wisdom suggests that FDI and strong institutions should foster economic growth, the specific economic and institutional contexts in AMU countries could explain the lack of a positive effect. To clarify, FDI tends to have a positive impact on economic growth when the host country has a certain level of absorptive capacity, including human capital, infrastructure, and technology. In many developing countries, including those in the AMU, the capacity to effectively absorb and utilize foreign investments might be limited due to inadequate skills, poor infrastructure, or underdeveloped technology, reducing the potential for FDI to contribute to growth. Borensztein et al. (1998) argued that the impact of FDI on economic growth is contingent on the absorptive capacity of the host country, especially the level of human capital. Without sufficient absorptive capacity, the benefits of FDI may not materialize.

Moreover, the sectoral distribution of FDI matters. If FDI in AMU countries is concentrated in low-productivity or extractive industries (e.g., oil, gas, mining), it may not contribute significantly to broader economic growth. Extractive sectors often generate limited spillovers to the rest of the economy, and FDI in these sectors may not result in job creation or technology transfer, thereby limiting its growth-enhancing effects. Alfaro (2003) found that FDI in the primary sector (natural resources) often has a negative or negligible impact on growth, while FDI in manufacturing or services has a positive effect. If FDI in AMU countries is concentrated in extractive industries, this could explain its lack of impact on growth. In addition, even if institutional quality appears to be relatively strong according to indicators like the WGI, the practical enforcement of good governance, regulatory frameworks, and corruption control might still be weak. This could limit the impact of institutional quality on growth, as policies may exist on paper but not be effectively implemented.

Rodrik et al. (2004) highlighted the importance of not just having institutions but also their effective implementation. In many developing countries, institutions might appear strong based on formal indicators, but their influence is diminished by poor enforcement or corruption. Further, the Arab Maghreb Union countries have historically faced political instability, governance challenges, and social unrest. Such instability can erode investor confidence and neutralize the positive effects of both FDI and institutional quality. Even if formal institutional frameworks are in place, political instability can disrupt economic activities and limit growth. Aisen and Veiga (2013) show that political instability significantly reduces economic growth by creating uncertainty and discouraging investment. If AMU countries experience periods of instability, this could weaken the potential positive impact of institutional quality and FDI on growth.

In some cases, FDI can crowd out domestic investment, particularly if foreign firms dominate certain sectors of the economy. If domestic firms cannot compete with foreign firms, this might lead to a dependency on foreign investment without a corresponding increase in domestic capacity for growth. In such a case, FDI may not contribute significantly to economic expansion. Agosin and Machado (2005) found that FDI sometimes crowds out domestic investment in developing countries, limiting its overall contribution to economic growth. Besides, the quality of FDI matters. If FDI inflows do not result in significant technology transfer, skill development, or innovation, their contribution to economic growth will be limited. In many developing regions, including AMU countries, FDI might involve low-technology sectors or operations that do not generate meaningful knowledge spillovers to the domestic economy. Blomström and Kokko (1998) argued that the extent to which FDI contributes to growth depends on the

quality of the investment, particularly in terms of technology transfer and knowledge spillovers. If FDI in AMU countries is low-quality and lacks these elements, it may not have a positive impact on growth. Complementary reforms in education, infrastructure, and financial systems are prerequisites for FDI and institutional quality to catalyze growth in AMU economies. The absence of such reforms may explain their limited growth impact. Campos et al. (2002) emphasize that FDI's positive growth effects materialize only when supported by parallel reforms, particularly in infrastructure and finance. Concurrently, AMU's substantial informal economies undermine formal institutions and attenuate FDI's effectiveness. When significant economic activity operates outside regulatory frameworks, institutional quality metrics fail to reflect actual business conditions, creating growth-institutions disconnect despite favorable governance indicators. This aligns with La Porta and Shleifer's (2014) finding that large informal sectors in developing economies constrain formal institutions and diminish FDI returns, potentially explaining the growth stagnation of AMU.

CONCLUSION

To achieve the United Nations' sustainable development objectives for 2030, AMU nations face persistent challenges in identifying robust drivers of economic growth, as evidenced by this study's findings on the statistically insignificant impact of FDI inflows, underdeveloped institutional quality, and adverse effects of human capital development due to skill mismatches between educational outputs and industry demands. As an approach to achieving their growth and welfare promotion goals, AMU nations have adopted an open economic policy (Hadili et al., 2020). Nevertheless, actual studies on the topic have produced contradictory empirical results (Abdullah & Chowdhury, 2020; Radmehr et al., 2022; Shittu et al., 2022). Furthermore, the theoretical linkage between FDI inflows and economic growth has yet to be conclusively established and remains unproven (Bieleń et al., 2024; Paul & Jadhav, 2020). Consequently, this research looked at the AMU countries' (Algeria, Libya, Mauritania, Morocco, and Tunisia) economic growth from 1996 to 2022 via the perspective of FDI inflow, institutional quality, human capital index, labor force, and inflation. Furthermore, the study seeks to determine if the AMU countries' institutional quality influences the FDI inflow-growth nexus. Thus, this study used interaction terms to examine whether institutional quality moderated the FDI-growth nexus.

The empirical analysis reveals critical insights into the interplay of FDI, institutional quality, and economic growth in AMU countries. First, FDI inflows exhibit no statistically significant direct impact on economic growth, challenging assumptions that FDI inflow alone can drive development in the region. Therefore, to capitalize on the benefits of FDI, AMU nations need to enhance their absorption capacity by improving institutional quality. Second, institutional quality proxied by control of corruption similarly fails to independently influence growth, underscoring systemic governance deficits that hinder institutional effectiveness. Most notably, the interaction term between FDI inflow and institutional quality demonstrates a significant negative moderating effect, indicating that weaker institutions exacerbate the inefficacy of FDI inflow in stimulating economic growth. This adverse moderation suggests that in contexts marked by corruption and regulatory inefficiency, FDI inflows may distort resource allocation, discourage domestic innovation, or concentrate benefits in enclave sectors, thereby stifling broader economic progress. These findings align with the absorptive capacity framework, positing that institutional underdevelopment constrains AMU countries from harnessing FDI's potential spillovers, even as they prioritize FDI-led growth strategies.

This situation of institutions impedes the ability of economies within the AMU to adopt new technology. Consequently, inadequate institutional quality may account for its limited influence on the growth effects of FDI inflows. The findings suggest that AMU countries need to enhance their institutional quality to capitalize on FDI inflows. To conclude, investment policies in AMU countries must prioritize institutional reforms and human capital development to enhance economic growth, innovation, and resource efficiency. Targeted interventions should include strengthening anti-corruption frameworks, modernizing regulatory systems, and aligning educational curricula with industry demands through technical training programs. Sector-specific FDI policies are equally critical; diversifying investments beyond extractive industries toward high-productivity sectors, such as manufacturing and technology, could stimulate job creation and knowledge spillovers. Additionally, addressing the persistent skills gap between educational institutions and labor markets requires strategic collaboration between governments, academia, and private stakeholders.

Future research should explore the structural barriers preventing AMU nations from leveraging institutional quality to amplify the growth effects of FDI, particularly by examining governance frameworks, political stability, and absorptive capacities. Such insights would inform evidence-based reforms to transform FDI into a sustainable driver of inclusive development.

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