TRADE AND INTRA-REGIONAL TRADE, FOREIGN DIRECT INVESTMENT - ECONOMIC GROWTH NEXUSES IN THE ARAB MAGHREB UNION: THE MODERATING ROLE OF INSTITUTIONAL QUALITY

BY

YOUNES BOUBECHTOULA

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Kulliyyah of Economics and Management Sciences

International Islamic University Malaysia

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ABSTRACT

The continued failure of Arab Maghreb Union (AMU) countries (Algeria, Libya, Mauritania, Morocco, and Tunisia) to become high-income countries has led to a renewed focus on the fundamental determinants of economic growth and the economic impact of institutional quality in these countries. The study adopted a random effect model (REM) to measure the influence of trade openness, foreign direct investment (FDI) inflows, intra-regional trade, and institutional quality on economic growth in AMU countries from 1996 to 2022 and the moderating effect of institutional quality in the system (absorptive capacity). In addition, the Toda-Yamamoto approach is used to measure causal effects between variables. The study utilized economic growth, trade openness, FDI inflows, intra-regional trade, and the human capital index which measures how education outcomes influence economic growth as macroeconomic variables. The institutional quality is proxied by the overall score of the Worldwide Governance Indicators (WGI) factors. The findings suggest that trade openness has a significant impact on economic growth, whereas FDI and human capital do not have a substantial impact. Surprisingly, intra-regional trade exhibits a significant negative effect on growth. Moreover, the analysis reveals that institutional quality directly enhances economic growth and amplifies the growth benefits of trade openness. However, institutional quality exacerbates the adverse effects of intra-regional trade, and its moderating effect on the relationship between FDI inflows and economic growth is not significant. This is due to the institutions' inability to provide investors and enterprises with a conducive business environment. For the third objective, causality analysis indicates no significant causal relationships between trade openness, FDI inflows, and institutional quality, except for a unidirectional negative causality from institutional quality to trade openness in the AMU region between 1996 and 2022. These findings underscore the complex, context-dependent role of institutions in shaping growth trajectories in AMU countries in the long run. Policymakers should prioritize institutional reforms, revitalize intra-regional trade through harmonized policies, and align FDI strategies with local capacities. Future research could explore these relationships in other developing regions, incorporating additional variables such as technological innovation and environmental sustainability.

ملخص البحث

إن فشل دول اتحاد المغرب العربي في تحقيق مكانة اقتصادية دفع إلى إعادة التركيز على محددات النمو الاقتصادي ودور جودة المؤسسات. اعتمدت الدراسة نموذج الآثار العشوائية (REM) لقياس تأثير انفتاح التجارة، وتدفقات الاستثمار الأجنبي المباشر، والتجارة البينية الإقليمية، وجودة المؤسسات على النمو في دول اتحاد المغرب العربي للفترة من 1996 إلى 2022، وفحص الدور الوسيط لجودة المؤسسات في العلاقة بين تلك المتغيرات والنمو من خلال نماذج تفاعلية. بالإضافة إلى ذلك، استُخدم منهاج تودا-ياماموتو (PTY) لقياس العلاقات السببية بين المتغيرات. واستخدمت الدراسة النمو الاقتصادي، وانفتاح التجارة، وتدفقات الاستثمار الأجنبي المباشر، والتجارة البينية الإقليمية، ومؤشر رأس المال البشري كمتغيرات اقتصادية كلية. وتم قياس جودة المؤسسات بالدرجة الإجمالية لعوامل مؤشرات الحوكمة العالمية (WGI). أظهرت النتائج أن الانفتاح التجاري يؤثر إيجابياً على النمو، في حين لم يظهر الاستثمار الأجنبي المباشر ورأس المال البشري تأثيرا ذا دلالة إحصائية. بالمقابل، أثرت التجارة البينية سلبياً على النمو، وهو ما قد يعكس تشوهات هيكلية أو انحرافاً تجارياً. كما كشفت الدراسة أن جودة المؤسسات تعزز النمو مباشرةً وتُعظّم فوائد الانفتاح التجاري، لكنها تفاقم الآثار السلبية للتجارة البينية، دون أن يكون لها دور وسيط بين الاستثمار الأجنبي والنمو، ويعزى ذلك إلى عجز المؤسسات عن توفير بيئة أعمال جاذبة للمستثمرين. لم تُسجّل الاختبارات السببية علاقات ذات دلالة بين المتغيرات إلا في اتجاه سلبي وحيد الاتجاه من جودة المؤسسات إلى الانفتاح التجاري. تُؤكد هذه النتائج على الدور المعقد للمؤسسات في تشكيل مسارات النمو في دول الاتحاد. ينبغي لصانعي السياسات إعطاء أولوية للإصلاحات المؤسسية، وإحياء التجارة البينية عبر سياسات منسقة، ومحاذاة استراتيجيات الاستثمار الأجنبي مع القدرات المحلية. يمكن للأبحاث المستقبلية استكشاف هذه العلاقات في مناطق نامية أخرى، مع إدراج متغيرات إضافية مثل الابتكار التكنولوجي والاستدامة البيئية.

APPROVAL PAGE

The thesis of Younes Boubechtoula has been approved by the following:

Muhammad Irwan Ariffin
Supervisor

Jarita Duasa
Co-supervisor

Zakaria Lacheheb
Internal Examiner

Muhammad Shabri
External Examiner

Sanisah Binti Saidi
Chairman

DECLARATION

I hereby declare that this thesis is the result of my own investigations, except where otherwise stated. I also declare that it has not been previously or concurrently submitted as a whole for any other degrees at IIUM or other institutions.

Younes Boubechtoula

Signature Date 20/07/2025

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This thesis is dedicated to my father, whose love and wisdom guide me still. O Allah, forgive him, have mercy on him. To my mother, my strength and inspiration, whose sacrifices shaped who I am. To my wife, my unwavering partner, whose support carried me through. And to my children, Mohamed, Ouais, and Iyad, my greatest motivation. May this remind you to always pursue your dreams. This thesis is a tribute to my family's love, sacrifices, and unwavering support. It belongs to all of us.

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LIST OF ABBREVIATIONS

ADF	Augmented Dickey-Fuller
AFCFTA	African Continental Free Trade Area
AIC	Akaike Information Criterion
AMG	Augmented Mean Group
AMU	Arab Maghreb Union
APEC	Asia-Pacific Economic Cooperation
ARDL	Autoregressive Distributed Lag Model
ASEAN	Association of Southeast Asian Nations
AU	African Union
BIC	Bayesian Information Criterion
BRICS	Brazil, Russia, India, China, and South Africa
CEE	Central and Eastern Europe
COC	Control of Corruption
COMESA	Common Market for Eastern and Southern Africa
CSD	Cross-Sectional Dependence
CVF	Civil Freedoms
DCCE	Dynamic Common Correlated Effects
DSUR	Dynamic Seemingly Unrelated Regression
D-8	Developing Eight Organization for Economic Cooperation
EAC	East African Community
ECOWAS	Economic Community of West African States
EU	European Union
FDI	Foreign Direct Investment
FEM	Fixed Effect Model
FFC	Freedom From Corruption
GCC	Gulf Cooperation Council countries

GDP	Gross Domestic Product
GLS	Generalized Least Squares
GMM	Generalized Method of Moments
GOV	Government Effectiveness
HCI	Human Capital Index
HTM	Hausman-Taylor Model
IMF	International Monetary Fund
ICRG	International Country Risk Guide
JIN	Judiciary Independence
LAC	Latin America and the Caribbean
LSDV	Least Squares Dummy Variable
MENA	Middle East and North Africa
MNCs	Multinational Corporations
MWALD	Modified Wald Test
NAFTA	North American Free Trade Agreement
OECD	Organization for Economic Co-operation and Development
OIC	Organization of Islamic Cooperation
OLS	Ordinary Least Squares
PFR	Political Freedoms
PMG	Pooled Mean Group
POLS	Pooled Ordinary Least Squares
PP	Phillips–Perron
PRP	Property Rights Protection
PST	Political Stability
PTR	Panel Threshold Regression
PWT	Penn World Tables
QIC	Quasi-likelihood Information Criterion
QLA	Quality Legal Arrangements
QQ	Quantile-on-Quantile
R&D	Research and development
REM	Random Effect Model

REQ	Regulatory Quality
ROL	Rule of Law
SACU	Southern African Customs
SADR	Sahrawi Arab Democratic Republic
SADC	Southern African Development Community
SBC	Schwarz Bayesian Criterion
SDG	Sustainable Development Goals
SEM	Structural Equation Modeling
SSA	Sub-Saharan Africa
TO	Trade Openness
2SLS	Two-Stage Least Squares
TY	Toda and Yamamoto
UN	United Nations
US	United States
VAA	Voice and Accountability
VAR	Vector Autoregressive
VECM	Vector Error Correction Model
WBs	Western Balkans
WGI	Worldwide Governance Indicators
WTO	World Trade Organization

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND OF STUDY

Economic growth is a major challenge for sustainable economic development, a vital objective for all countries (Dahmani et al., 2022). Particularly in developing countries, the factors which boost or hinder economic growth have been an unresolved debate to date (Bostan et al., 2023). Thus, economic growth determinants have attracted substantial attention among scholars in both theoretical and empirical literature (Mtar & Belazreg, 2023). Theoretically, different models have been formulated to explain economic growth, such as the classical growth model of Smith (1776), the neoclassical growth model of Solow (1956), and the modern growth model of Romer (1986). In the neoclassical growth model of Solow (1956), physical capital accumulation has been a significant focus.

However, in modern growth theories, the fundamental sources of growth have been extended to include innovations, technology, human capital, and institutions (Acemoglu et al., 2005). Traditionally, scholars have looked at trade openness and FDI to determine why some countries can grow faster than others (Paschal et al., 2024; Sriyana & Afandi, 2020; Tham et al., 2018), Some researchers reported that trade openness and FDI positively impact economic growth (Akadiri et al., 2020; Tahir & Hayat, 2020). However, others argued that trade openness and FDI negatively impact economic growth which lead developing economies to face the challenge of balancing the benefits and risks of trade openness (Silajdzic & Mehic, 2018; Tran, 2019).

The mixed results indicate that the growth effects of trade openness and FDI inflows depend on the host country's absorptive capacity, such as the quality of institutions (Aslam, 2020; Miao et al., 2020). To clarify, absorptive capacity refers to the degree to which economies can absorb and effectuate recently introduced technologies (Hanafy & Marktanner, 2019). According to Chengying et al. (2023), absorptive capacity is a country's capability to identify the importance of new, external knowledge, assimilate it, and apply it commercially. It is a broad combination of skills necessary to deal with the implicit transfer of knowledge components and amend imported knowledge. The empirical studies confirmed that institutional quality indirectly impact economic growth via trade openness and FDI inflows (Masron et al., 2018; Thanh et al., 2019).

Therefore, to fully realize the advantageous outcomes of trade liberalization and FDI inflows, governmental support is needed. This involves creating a favorable business climate and building effective institutions (Hadili et al., 2020; Ifeakachukwu & Fagite, 2024). In contrast, a weak institutional environment may blur the open economy's positive effects and be a significant reason emerging countries cannot catch up to high-income countries (Acemoglu & Robinson, 2012; Kar et al., 2019; North, 1994). Further explanation, trade openness and FDI inflows positively impact growth if accompanied by a solid institutional context, speeding up their benefits like technology transfer and knowledge spillover (Duodu & Baidoo, 2020; Slesman et al., 2020).

Therefore, this research agrees with the concept of absorptive capacity in terms of the function of institutions' quality in describing FDI-growth association and trade openness-growth nexus. In addition, the enormous benefits of economies of scale and the failure of global trade agreements to take place have made regional trading blocs to be a plausible alternative (Mariotti, 2022). The European Union (EU), the North American Free Trade Agreement (NAFTA), the Asia-Pacific Economic Cooperation (APEC), the Association of Southeast Asian Nations (ASEAN), the group of Brazil, Russia, India, China, and South Africa (BRICS), and other trade alliances are all examples of trading

blocs (Ahmed & Hussain, 2019; Jiang et al., 2021; Nurjannah et al., 2023; Wood et al., 2021).

Besides the African Union (AU), Africa comprises several regional and trade unions, such as Southern African Customs (SACU), East African Community, the Arab Maghreb Union (AMU), and recently the African Continental Free Trade Area (AFCFTA) (Agupusi, 2021; Ayenagbo & Boukari, 2022; Henok & Kaulihowa, 2022; Obeng-Odoom, 2020). Focusing on the AMU is an economic and political framework situated northwest of the African continent, as shown in Figure 1.1. Also, it has a favorable geographic location as it is close to the EU, the world's leading commercial power (Djeflat, 2021). Although the AMU is located in Africa, it is an integral part of the Middle East and North Africa (MENA) region (Khalfaoui & Derbali, 2021).

According to Rafa and Amour (2023), the term "Maghreb" means the "Sunset Peninsula" or "West,", and it has long included the five Muslim Arab countries of northwest Africa: Algeria, Libya, Mauritania, Morocco, and Tunisia. These five states, which have been grouped since 1989 in the Arab Maghreb Union (AMU), also include the disputed territory of Western Sahara, located between Mauritania and Morocco.

Figure 1.1 Map of AMU members within the African continent.

Source: United Nations Economic Commission for Africa.

The AMU members are resource-rich countries with large young populations and a big market that remains poorly exploited (Eregha & Mesagan, 2020; Haouas et al., 2021; Khalfaoui & Derbali, 2021). Specifically, Table 1.1 presents a profile of AMU countries in 2022, detailing key economic indicators. The total population of AMU is 106.27 million, spread over a vast territory of 6 million square kilometers (World Bank, 2024), with a combined Gross Domestic Product (GDP) of USD 428.89 billion. The average GDP per capita for AMU countries is USD 4,035.85. Algeria, with the largest population in the region (44.90 million), has the highest GDP (USD 191.91 billion) and a GDP per capita of USD 4,273.9.

Despite having a smaller population (6.81 million), Libya has a relatively high GDP per capita of 6,716.2 USD, but its economy contracted with a GDP growth rate of -1.2 percent. Mauritania, with the smallest GDP of USD 10.38 billion, shows a robust growth rate of 5.2 percent, though its GDP per capita is lower at USD 2,190.7. Morocco and

Tunisia have GDPs of USD 134.18 billion and 46.66 billion USD, respectively, with GDP per capita figures of USD 3,527.9 and USD 3,776.7. The Human Capital Index (HCI) for these countries varies, with Libya having the lowest HCI at 0.718, while Algeria, Tunisia, and Mauritania show higher values, reflecting the level of human development. Overall, the data reflects a diverse economic landscape within the AMU region.

Table 1.1 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.

Note: the GDP used is nominal GDP in current USD

Figure 1.2 provides the GDP at current prices (in trillion USD) for AMU and Africa from 1996 to 2021. Over this period, AMU's GDP shows gradual growth, starting at USD 0.14 trillion in 1996, peaking at USD 0.46 trillion between 2012 and 2013, and fluctuating between USD 0.37 and USD 0.45 trillion in the later years. In contrast, Africa's GDP exhibits a significant upward trajectory, rising from USD 0.59 trillion in 1996 to USD 2.94 trillion in 2022. While AMU's GDP remains relatively stable with minor fluctuations, Africa's economy shows consistent growth, reflecting the region's increasing economic output over the last three decades. Despite that, the contribution of AMU members to the global economy is very scanty, even though they have important natural resources and a big market (Khalfaoui & Derbali, 2021).

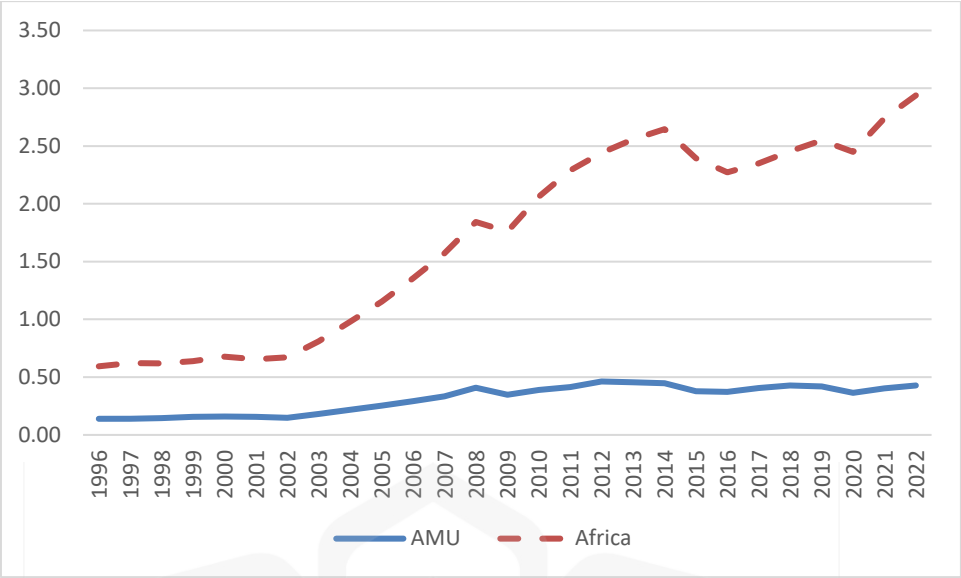

Figure 1.2 GDP of AMU vs Africa (in trillion USD, 1996-2022)

Source: World Bank database, 2024.

The AMU has aimed at several objectives, including trade facilitation and strengthening regional economic linkages (Abdullah et al., 2015; Eggoh & Belhadj, 2015). Figure 1.3 compares the total trade in Africa and AMU countries from 1996 to 2022, measured in billion USD. In 1996, Africa's total trade was USD 269.04 billion, while AMU's total trade was significantly smaller at USD 78.48 billion. Over the years, both regions saw substantial growth in total trade, with Africa's trade steadily increasing, reaching a peak of USD 1,486.85 billion in 2022. In parallel, AMU's total trade grew, reaching USD 373.97 billion by 2022.

The trade decline in 2020, likely due to the global pandemic, was followed by a rebound in 2021 for Africa and AMU. Generally, while AMU's trade retains a smaller share of Africa's total trade, both regions have seen significant upward trends. According to the World Bank (2024), the total trade of Africa and AMU represents 2.66 percent and 0.92 percent of the total trade of the globe, which is very minimal. The primary trading partners

for AMU countries consist of industrialized economies, primarily inside the EU (Khalfaoui & Derbali, 2021). The same study confirmed that trading with these nations (industrialized countries) has hurt the trade balance of AMU economies. Therefore, AMU countries attempted to reform their trade policies to promote economic growth and increase welfare (Hadili et al., 2020).

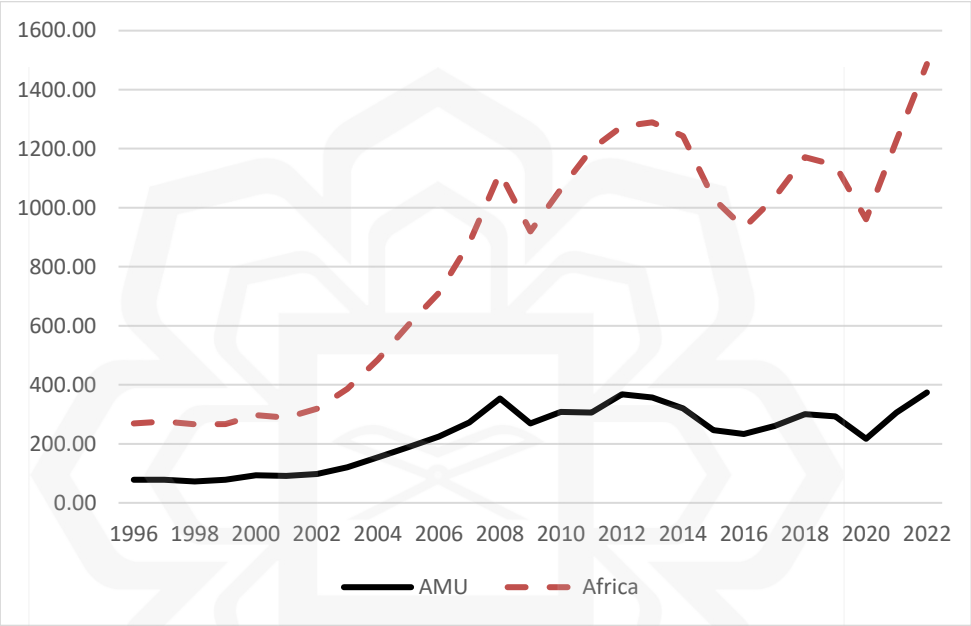

Figure 1.3 Total trade of AMU vs Africa (in billion USD, 1996-2022)

Source: World Bank Database, 2025.

Figure 1.4 illustrates the trade integration within the AMU region from 1996 to 2022, measured in million USD. In other words, Figure 1.4 depicts the trajectory of intra-regional trade (IRT) as a percentage of total trade within the AMU over the 27-year period from 1996 to 2022. The data reveals a distinct pattern characterized by an initial prolonged decline, followed by a period of volatility and a notable peak, concluding with a recent stabilization. IRT commenced at 3.29% in 1996 and experienced a consistent downward trend, reaching its nadir of 1.89% in 2005. Subsequently, trade integration exhibited significant fluctuations: a modest recovery began after 2005, leading to unstable values generally fluctuating between 2.0% and 3.5% until 2014. A striking surge occurred in 2015,

where IRT peaked sharply at 4.73%, representing the highest level in the observed timeframe. This period of rapid growth reflects the broader economic expansion within the region.

However, this peak proved ephemeral, as integration levels fell markedly in 2016 (3.33%) and continued to decline due to the oil price drop (Shirazi & Šimurina, 2023). From 2016 onwards, IRT demonstrated relative stability, hovering within a narrower band between 2.76% and 3.12%, culminating at 3.09% in 2022. Overall, despite the significant peak in 2015, the long-term trend suggests persistent challenges in deepening trade integration within the AMU, with 2022 levels remaining marginally below the starting point of 1996 resulting from the repercussions of the 2020 worldwide recession induced by the COVID-19 pandemic (Obayelu et al., 2021; Volkov & Konstantinova, 2023).

The regional trade in AMU is weak compared to its economic size and the enormous surface that AMU members cover. Although the AMU has made efforts to promote trade openness, its intra-trade still lags behind those of other trading blocs in developing countries across Africa, the Middle East, Asia, and Latin America (Abdullah et al., 2015; Bouët et al., 2017). Similarly, Kamel and Kalai (2021) reported that since the establishment of AMU, the amount of trade between its members is negligible compared to their total trade, making it the least integrated region globally. However, there was a gradual recovery after 2020, and by 2022, trade within the AMU region reached a high, indicating a positive trend in regional economic integration. Overall, the data suggests that while intra-AMU trade has been volatile, the long-term trend reflects strengthening economic ties within the region.

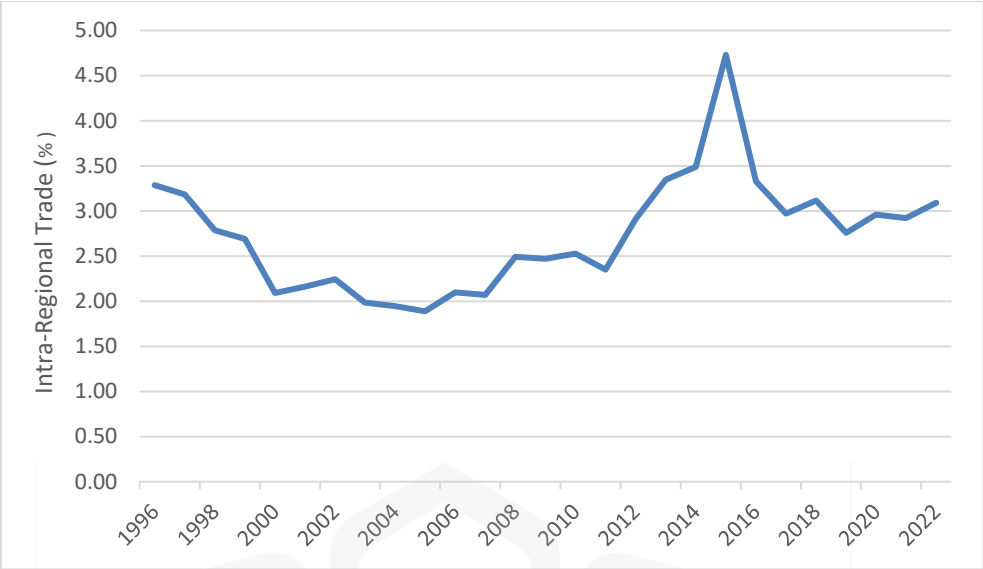

Figure 1.4 Trade integration within AMU (1996-2022)

Source: International Monetary Fund database, 2024.

For real investment, in January 2013, the AMU countries launched an investment bank focused on infrastructure development (Worrall, 2017). Figure 1.5 compares the FDI inflows into Africa and AMU countries from 1990 to 2022 in billion USD. Following several ups and downs, FDI inflows in Africa grew from USD 4.33 billion in 1996 to USD 20.20 billion in 2001 to reach USD 60.34 billion in 2008. During the 2000s, the graph shows that FDI inflows into Africa generally increased, with a notable increase in 2008, reaching a peak of USD 80.97 billion in 2021. Conversely, as can be noticed, there was a remarkable decrease in FDI inflows for Africa in 2022. In detail, FDI inflows in Africa stood at USD 34.24 billion in 2022, a 38.21 percent decline from the historic high recorded in 2021.

In parallel, FDI inflows in AMU grew from USD 1.61 billion in 1996 to the peak of USD 12.16 billion in 2008. In addition, from 1996 to 2022, it is difficult to observe a clear rise in FDI inflows in AMU. Statistically, AMU countries attracted only 3.5 percent of the aggregate world FDI inflows in 2021, which is very low compared to other regions

(World Bank, 2024). Even though the AMU has yet to attract the desirable FDI, there is still a substantial amount of optimism (Khalfaoui & Derbali, 2021). Truthfully, an exciting feature of AMU is that these countries are experiencing necessary socio-political and economic transformations (El-Asmi, 2018; Volodina, 2019).

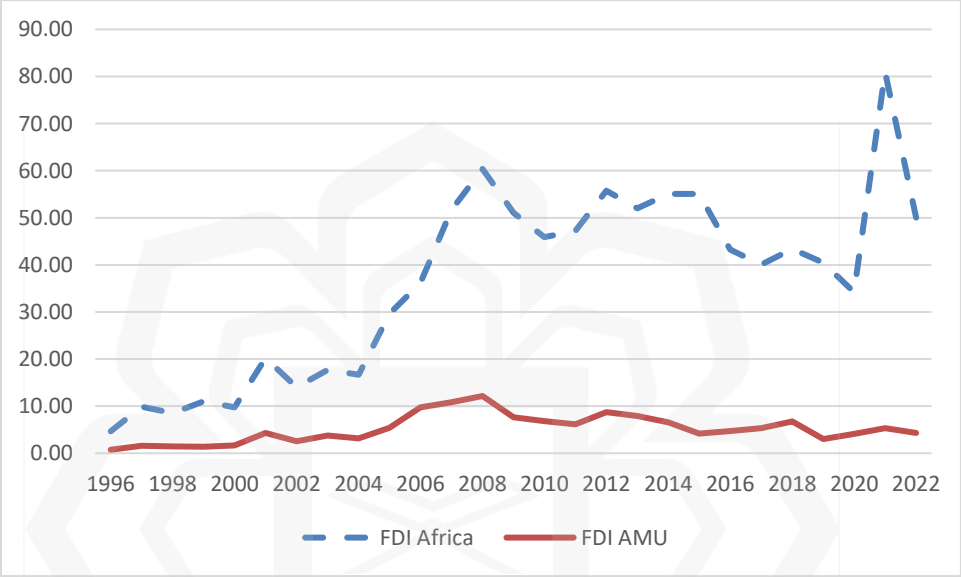

Figure 1.5 FDI Inflows of AMU vs Africa (1996-2022)

Source: World Bank Database, 2024.

Table 1.2 below shows the scores of institutional qualities of the six factors defined by the Worldwide Governance Indicator in the five AMU countries in 2022. The institutional factors include voice and accountability (VAA), political stability (PST), government effectiveness (GOV), regulatory quality (REQ), rule of law (ROL), and control of corruption (COC). The index measure is derived from a spectrum from -2.5 (showing weak) to 2.5 (meaning strong) points. A lower numerical value signifies a lower quality of institutional factors, while a higher numerical value signifies a better quality. Overall, the AMU region exhibits a generally low institutional quality, with all countries scoring below zero on the governance indicators.

The Table 1.2 shows Libya has the lowest average score (-1.79), reflecting its significant institutional challenges across all indicators, particularly in political stability, government effectiveness, and regulatory quality. Algeria also exhibits weak governance, with an average score of -0.80, struggling notably with VAA and REQ. In contrast, Morocco and Tunisia report relatively better performance, with average scores of -0.28 and -0.31, respectively. Morocco performs best across most indicators, especially in government effectiveness and the rule of law. With an average score of -0.74, Mauritania falls between Algeria and Morocco, demonstrating moderate institutional challenges. The low AMU's institutional quality reflects the region's ongoing political and governance challenges.

Table 1.2 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.

Chapter One consists of a total of eight sections. The purpose of this chapter is to introduce the whole thesis. Section 1.2 offers an overview review, emphasizing the significant growth contributions of trade openness, foreign direct investment (FDI) inflows, institutional factors, and the state of economic growth of Arab Maghreb Union (AMU) countries. Section 1.3 provides the problem statement as the basis of the study. The research questions are presented in Section 1.4 and translated to the study's objectives in Section 1.5. Sections 1.6 and 1.7 explain the significance of the study and the scope of the study respectively. Finally, Section 1.8 provides the organization of the study.

1.2 PROBLEM STATEMENT

Despite their abundant natural resources, the AMU countries have failed to realize their central vision of achieving sustainable economic growth and improved welfare (Dursun, 2021; Hongxing et al., 2021). Rafa and Amour (2023) argue that the Maghreb countries have faced persistent challenges in formulating effective solutions to their entrenched economic issues. El-Asmi (2018) further notes that the AMU has remained in a state of institutional lethargy since its establishment in 1989. A critical challenge lies in identifying the key drivers of economic growth necessary to meet the UN's 2030 Sustainable Development Goals (SDGs) (Adeosun et al., 2020; Ayenagbo & Boukari, 2022). Although AMU member states have implemented various economic strategies to foster growth and welfare, the efficacy of these measures remains uncertain due to structural internal constraints and external pressures (Hadili et al., 2020). These unresolved issues collectively underscore three interconnected lacunae in the existing framework.

Firstly, anti-globalization sentiments and protectionist movements have increased in recent years, causing significant shifts in the liberal international order (Acemoglu, 2023; Callaghan, 2021; Rewizorski, 2021). Evidence of this can be seen in the rise of isolationism

and nationalism, exemplified by the Brexit, the US-China trade war, and the U.S. decision to withdraw from the Trans-Pacific Partnership (Basri & Hill, 2020; Oramah & Dzene, 2019). These developments have reignited debates on the efficacy of economic integration and trade liberalization as pathways to economic growth (Amadi, 2020; Makun, 2017). In other words, while trade openness, FDI, and intra-regional trade are widely recognized as key drivers of economic growth globally, their growth impacts in the AMU context remain ambiguous and insufficiently examined.

Secondly, in regions like the AMU, political and institutional challenges further complicate economic integration efforts. In other words, political disputes, historical conflicts, and regional instability, such as the longstanding Algeria-Morocco conflict over Western Sahara, have hindered deeper cooperation and economic integration (De Larramendi, 2019; Sour, 2022). Algeria regards the Sahrawi Arab Democratic Republic (SADR) as a case of decolonization, whereas Morocco asserts sovereignty over the territory as an integral part of its kingdom (Abdi, 2021; Volodina, 2019). The ongoing Ukraine-Russia crisis further threatens AMU integration, particularly by worsening tensions in the Algeria-Morocco conflict over the SADR.

Morocco's alignment with Western powers, exemplified by the U.S. recognition of its sovereignty over the SADR in 2020, contrasts sharply with Algeria's geopolitical positioning. As Europe seeks to reduce dependence on Russian energy, Algeria, the largest African natural gas exporter to the EU and a strategic ally of Russia, has leveraged its energy influence to reinforce its SADR claims (Bhattacharya, 2022; Gatto et al., 2024). Consequently, the Ukraine-Russia crisis has intensified regional fragmentation, as Algeria and Morocco's divergent geopolitical alignments strain the AMU's fragile cohesion.

Moreover, most AMU member states, including Libya, Tunisia, and Mauritania, experienced the Arab Spring wave in early 2011, and their enduring security, political, and

economic repercussions can still be seen (Kirikkaleli et al., 2021). Although these anti-authoritarian movements failed to achieve the anticipated democratic transitions, they profoundly transformed the region's sociopolitical landscape (Hill & Cavatorta, 2019). For instance, Libya following the collapse of Gaddafi's regime has grappled with chronic insecurity, escalating instability, and the absence of legitimate state institutions (Rafa & Amour, 2023; Sawani, 2020). The Arab Spring's aftermath has thus compounded obstacles to regional economic progress. Compounding these challenges is the AMU's persistently weak institutional quality, a critical factor undermining its economic performance. As evidenced by the Worldwide Governance Indicators (WGI, 2023), all AMU nations rank poorly in global institutional quality metrics, reflecting systemic governance deficiencies.

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 have adversely affected their economic growth (Abdelbary, 2023; Gründler & Potrafke, 2019; Haouas et al., 2021; Volodina, 2019). Importantly, Hadili et al. (2020) conducted a study that revealed that free trade policy alone is insufficient to stimulate economic growth in AMU nations. Accordingly, promoting AMU's economic growth utilizing an open economic strategy, i.e., via trade openness, FDI inflows, and intra-regional trade, is not always smooth. These institutional deficiencies have significant economic consequences, as they deter FDI inflows, hinder the transfer of technology, and limit the growth benefits of trade openness, FDI inflow, and intra-regional trade (Hadili et al., 2020; Li et al., 2023).

In this vein, while studies have shown that institutional quality plays a pivotal role in mediating the growth effects of trade openness and FDI inflows, the empirical evidence remains inconclusive, particularly for developing regions like the AMU (Duodu & Baidoo, 2020; Fu, 2021; Thanh et al., 2019). For instance, some studies suggest that strong institutions enhance the absorptive capacity of host economies, enabling them to leverage FDI inflows and trade openness for growth (Jude & Levieuge, 2017; Ketteni & Kottaridi,

2019). However, others argue that the relationship between institutional quality and economic growth is context-dependent, with varying effects across income levels and regions. Moreover, countries with institutional environments that support more flexibility in labor and credit markets can better transmit the positive growth effects of FDI inflows and trade openness.

For example, Hayat (2019) provided evidence that high institutional quality enhances FDI-induced economic growth in low-income and middle-income countries. However, in high-income countries, FDI is found to have negatively impacted FDI-growth nexus. Conversely, Ullah et al. (2022a) stated that good institutional quality encourages high investment and effective factor allocation, reduces uncertainty, and makes it easier for economic agents to work together, leading to economic growth. Notably, a study conducted by Nurjannah et al. (2023) confirmed that developing nations show less efficacy in controlling corruption, hence worsening problems of inflation and poverty, ultimately imposing adverse effects on economic growth.

Thirdly, the causal linkages among trade openness, FDI, and institutional quality remain unresolved. Conflicting evidence persists regarding whether institutional reforms precede economic openness and FDI inflows, or vice versa. Similarly, the directionality between trade openness and FDI and whether trade openness attracts FDI or FDI drives trade openness remains ambiguous. These causal dynamics have never been systematically investigated within AMU's geopolitically volatile context. Given these complexities, this study seeks to address three key research objectives. It aims to investigate the direct impact of trade openness, FDI inflows, intra-regional trade, and human capital on economic growth in AMU countries. This objective is critical because, despite the adoption of open economic strategies, the AMU's growth outcomes have been inconsistent, necessitating a deeper understanding of the factors driving or hindering economic growth.

Moreover, the study examines the moderating role of institutional quality in shaping the relationships between trade openness, FDI inflows, intra-regional trade, and economic growth. This objective is motivated by the need to understand how institutional weaknesses in the AMU may be attenuating the potential growth benefits of economic integration and openness. In addition, the study seeks to determine the direction and magnitude of causality among trade openness, FDI inflows, and institutional quality. This objective is particularly important because understanding the causal relationships between these variables can provide insights into whether improvements in institutional quality can drive greater trade openness and FDI inflows, or vice versa. A causality test is essential here, as it goes beyond the correlational analysis in the first objective to uncover the underlying dynamics that policymakers can target to foster sustainable economic growth.

In summary, this study addresses a critical gap in the literature by examining the interplay between institutional quality, trade openness, FDI inflows, intra-regional trade, and economic growth in AMU. The central contention is that the AMU's low institutional quality may impede the economic growth potential of trade openness, FDI inflows, and intra-regional trade a concern underscored by the region's persistent governance challenges. By integrating updated empirical evidence and recent geopolitical developments, this research provides actionable insights for policymakers to design integration strategies tailored to the AMU's unique institutional and geopolitical constraints. Notably, the role of institutional quality in moderating growth outcomes has been underexplored in developing economies, particularly within the AMU context. Consequently, existing studies require greater depth to address limitations in understanding how institutions shape the growth effects of trade openness and FDI in the region. To bridge this gap, researchers must prioritize updating analyses of AMU countries to reflect contemporary dynamics, enabling policymakers to formulate optimal integration strategies.

1.3 RESEARCH QUESTIONS

Given the above problem statement, the following questions are raised from the arguments deliberating the issues and research gaps.

i. How does trade openness, FDI inflows, intra-regional trade, and human capital influence economic growth in AMU countries?
ii. How does institutional quality moderate the relationships between trade openness, FDI inflows, intra-regional trade, and economic growth in the AMU countries?
iii. How are trade openness, FDI inflows, and institutional quality causally linked in AMU countries?

1.4 RESEARCH OBJECTIVES

Given the above questions, the study intends to achieve the following objectives.

i. To investigate the impact of trade openness, FDI inflows, intra-regional trade, and human capital on economic growth in AMU countries.
ii. To examine the institutions' moderating role between trade openness, FDI inflows, intra-regional trade, and economic growth relationships.
iii. To determine the direction and magnitude of causality among trade openness, FDI inflows, and institutional quality in AMU.

1.5 SIGNIFICANCE OF THE STUDY

Achieving high economic growth has remained the most pressing economic issue in developing countries. Notably, after the recurring external threats and recent domestic security, political, and economic crises in AMU, the research on the real drivers of growth

has been reawakened (Hadjadj, 2022; Němečková, 2021). Moreover, there is renewed vigor to search for the impact of institutions on economic growth (Nedić et al., 2020; Nirola & Sahu, 2019). Although AMU countries show the characteristics of low quality institutional factors, their impact on the growth effects of trade openness, intra-regional trade, and FDI inflows have not yet been fully explored.

In this context, the study contributes to theoretical literature by exploring the effect of the endogenous growth channel of institutional factors on growth effects of trade openness, FDI inflows, and intra-regional trade. In detail, it examines how institutional quality determines the growth effects of trade openness, FDI inflows, and intra-regional trade through their common endogenous growth channel which is facilitating the transfer of technology. Furthermore, the study contributes to empirical literature in several ways. Firstly, this study focuses on the most critical determinants of economic growth by investigating the impact of trade openness, FDI inflows, human capital, and institutional quality on economic growth in AMU countries.

Secondly, due to the lack of empirical research examining the economic growth effect of intra-regional trade in AMU, the study aims to fill the gap in this specific research area. Thirdly, for in-depth analysis, the study focuses on how absorptive capacity in terms of institutional quality affects economic growth through the channels of trade openness, intra-regional trade, and FDI inflows. Fourthly, as a result of the first three contribution points, the study can determine whether trade openness, FDI inflows, and intra-regional trade might influence economic growth directly or indirectly via institutional quality. Fifthly, the study separately shows the causal relationships between trade openness, FDI inflow, and institutional quality in the AMU countries using the Panel Toda and Yamamoto (PTY) technique. The PTY test holds significant methodological value in panel data analysis by addressing critical limitations of traditional Granger causality approaches, such as pre-test biases from unit root and cointegration analyses, while accommodating mixed integration orders and cointegration uncertainties. Its robustness stems from employing an

augmented VAR model with d_{max} lags and a modified Wald test, ensuring valid causal inferences in non-stationary panels without restrictive assumptions, making it indispensable for empirical studies with heterogeneous or conflicting integration properties.

Notably, the present study uses either the random effect model (REM) or fixed effect model (FEM) to achieve the study's first two research objectives. Also, it may use the Hausman-Taylor model (HTM) as a possible third alternative model to FEM and REM. Besides, the study uses the overall score of the six comprehensive institutional factors defined by the WGI project (Kaufmann et al., 2004). In this way, the research findings are expected to make an essential contribution and to have high significance to the following stakeholders: Firstly, for researchers and academicians, this study offering updated findings to the literature and addressing the gaps identified in the literature. To clarify, this study aims to provide a comprehensive analysis of the existing literature and develop conceptual insights to fill the identified gaps in the literature in AMU. Subsequently, for the policymakers, although several studies have mixed results on the real determinants of economic growth, there needs to be more recent literature in AMU countries. In other words, there needs to be more studies on the economic growth effects of trade openness, FDI inflow, intra-regional trade, and institutional quality in AMU countries.

Also, there is a lack of research concerning the function of institutional quality in describing trade-growth and FDI-growth nexuses in AMU. Thus, this study is important to assist policymakers in having the necessary insight needed to adopt reliable and appropriate policies to stimulate local and regional economic growth and propel AMU members among high-income countries. Finally, the potential investors; the study has other benefits, such as providing valuable and practical feedback on the impact of trade openness, intra-trade, and institutional and investment environment on economic growth in AMU countries. Practitioners such as foreign investors and entrepreneurs could easily refer to the results monitored to manage their asset portfolio and risk tolerance level.

In other words, foreign investors need to understand the macroeconomic environment and institutional quality to conduct hedging country risk through global diversification. Thus, the results of this study are necessary by focusing on AMU countries to arrive at more robust recommendations for foreign investors.

1.6 SCOPE OF THE STUDY

This study examined the role of trade openness, FDI inflow, inter-regional trade, and human capital on economic growth in AMU countries (Algeria, Libya, Mauritania, Morocco, and Tunisia). Also, it investigates the economic growth impact of institutions' quality and its influence on the growth effects of trade openness and FDI inflow. For the first two objectives, the study uses either the random effect model (REM) or the fixed effect model (FEM), as well as the Hausman-Taylor model (HTM) as a possible third alternative model. For the third objective, the study will conduct the Toda and Yamamoto (1995) panel causality approach. Moreover, the study covers the period from 1996-2022, choosing 1996 as the starting year because most of the AMU countries gained membership in the World Trade Organization (WTO) in 1995 (Hadili et al., 2020).

Similarly, the decision to select the countries of the AMU is built on the motivation to look at the effectiveness of regional trade bloc to encourage trade integration among its members, similarities in terms of socio-economic background and geographical region of the members, and availability of annual data within the stated period. Also, the study uses secondary data on economic growth (changes in nominal GDP in USD), trade openness (percent of GDP), FDI net inflows(percent of GDP), and intra-regional trade (the ratio of total trade within AMU over trade of AMU with non-AMU members or rest of the world).

For the institutional quality, the study employs comprehensive and relevant institutional factors based on the WGI project (Kaufmann et al., 2004). The institutional factors are voice and accountability, political stability, government effectiveness, regulatory quality, the rule of law, and control of corruption.

1.7 ORGANIZATION OF THE STUDY

This study consists of five chapters. The first chapter serves as an introduction to the topic. This section offers a comprehensive summary of the thesis, focusing on the impact of trade openness, FDI inflow, intra-regional trade, institutions' quality, and the economic conditions of the countries within the AMU. This chapter encompasses various components, namely the problem statement, research questions and objectives, significance of the study, scope of the study, and the organization of the study. Chapter Two addresses conceptual issues and comprehensively reviews both theoretical and empirical literature.

Chapter Three of this study encompasses the methodological aspects. For instance, research hypotheses, theoretical framework, model specification, justification of variables and data sources, and analysis method. Chapter Four presents the empirical results of the panel estimators and discusses them in detail to conclude whether the trade openness and institutional quality affect economic growth in AMU countries. Chapter Five is the conclusion of the study which presents a summary of the research findings, its implication to the relevant policy recommendations, contributions from the study and also suggestions for further use.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter focuses on a review of theoretical and empirical literature on the determinants of economic growth. The review is grouped into five broad sections. Section 2.2 discusses the theoretical review of economic growth, specifically, the modern growth theory. Following, Section 2.3 offers a comprehensive empirical literature review, organized into six subsections. The first three subsections explore the direct economic growth effects of trade openness, FDI, intra-regional trade, and institutions. These subsections examine the various mechanisms through which these factors influence economic growth, drawing on empirical studies to provide a nuanced understanding of their relationships. In Subsections 2.3.5 and 2.3.6, the review focuses on the moderating role of institutional quality, analyzing how institutional quality affects the growth effects of trade openness and FDI. The research gap in the existing literature is identified in Section 2.4, pointing to areas that require further investigation. Finally, Section 2.5 offers a conclusion, summarizing the key findings.

2.2 THEORETICAL REVIEW

Sustainable economic growth does not come suddenly and is not an automatic birthright for any economy (Bostan et al., 2023). Therefore, many economists provided several theoretical frameworks that have motivated developing countries to reform their foreign investment policies and promote trade openness (Louardy & Moussamir, 2022). Typically, economic growth theories refer to an increase in observed or projected output, in other

words, production at full employment (Peruzzi & Terzi, 2021). Thus, for an economy to grow, it has to create the right conditions for economic growth. In this regard, early theories of economic growth have emphasized the role of factors of production (capital, labor) in increasing national wealth and extending markets to improve efficiency and productivity (Ali & Mna, 2019).

However, in recent years, theoretical discussion of economic growth has gone beyond economic variables such as human and physical capital to examine deeper determinants of economic performance. In this context, many theorists talk about the idea that a country's institutions, such as its political stability, appropriate regulatory structures, property rights are among the primary determinants of sustaining economic growth (Rodrik, 2004). Here, the major point is that institutions put limits on the behavior of economic actors, direction, and motivation. Thus, improvements can lead to a better sense of well-being. For this study, the endogenous model, which will be looked at in the next part as the principal theory, could be a better way to explain economic growth.

2.2.1 Modern Growth Theory

Exploring factors influencing variations in economic growth across different countries has been a central topic in economics. Over time, many competing ideas were offered to challenge the existing one, resulting in its re-emergence in new forms. The neo-classical growth model proposed by Solow in 1956 has been the prevailing framework for understanding variations in per capita income. This model attributes these variances to disparities in the rate of capital accumulation, which are, in turn, influenced by variations in saving rates and technological advancements. This model has been influential in the field for several decades. Over time, economics became increasingly concerned about the incongruity between empirical facts and the neo-classical forecast that poorer countries

would experience quicker economic growth and eventually converge with wealthier countries (Sayan, 2006).

The endogenous theory is an economic concept proposed to explain the variables influencing long-run economic growth (Firth & Mellor, 2000). It was developed by several modern economists such as Romer (1986), Lucas (1988), and Barro (1990) whom criticized Solow's (1956) model and his explanations (Sarkar, 1999). The new growth model rejected the idea of the natural disparity of growth, which necessarily leads to the stationary state. Basically, the endogenous growth theories assume that growth of output is explained by the increase input of certain variables like labor, physical and human capital accumulation, and technical progress (Ramzan et al., 2019). Accordingly, growth can continue indefinitely because of the presence of increasing returns to capital and positive externalities (Gutiérrez, 2015).

Romer's model emphasizes the internal factors that enhance economic growth, including a mathematical explanation of technological advancement (Hartwig, 2014). As pioneer study, Romer (1990) introduced a new concept of human capital, which he defined as the skills and knowledge that enable workers to be productive. In other words, the model emphasized how workers with superior knowledge, education, and training can help to accelerate technological advancement (Ortigueira & Santos, 1997). Also, the endogenous growth theory contradicts the neoclassical perspective by proposing that market activities drive technological progress and, as a result, economic growth over the long term (Bovenberg & Smulders, 1996).

The proponents of the new growth theories support the long-term relationship between trade openness and economic growth (Dollar 1992; Grossman & Helpman, 1991; Lucas, 1988; Rebelo, 1991; Romer, 1986, 1990). In contrast the neo-classical growth theory recognizes no long run association between trade openness and economic growth (Hye &

Lau, 2015). The endogenous theory argued that trade openness increases long-term growth by facilitating technology access, knowledge spillover, optimizing resource allocation (Barro & Sala-i-Martin, 1997; Coe & Helpman, 1995; Howitt & Aghion, 1998; Rivera-Batiz & Romer, 1991; Roubini & Sala-i-Martin, 1995). Furthermore, both endogenous and neoclassical growth models shed light on the role of FDI in driving economic growth (Barro, 1991; Barro & Lee, 1993; Grier & Tullock, 1989; Lucas, 1988; Romer, 1986).

However, the models have mixed views on the effects of FDI on economic growth. Solow (1956) assumed that FDI does not affect long-term growth and only has a short-term impact through the diminishing effect of capital. While the new growth model emphasizes the significance of endogenous transfer of superior knowledge and technology by FDI into the host country's production process. To clarify, FDI inflows can stimulate long run economic growth by their ability to improve physical and human capital, boost R&D, transfer expertise (Lucas, 1988; Romer, 1986). Moreover, endogenous growth models highlight the significance of inward FDI as a key driver of economic growth.

This emphasize is attributed to its role in facilitating the transfer of technology from advanced economies, reducing poverty, boosting productivity, and enhancing the knowledge and expertise of workers in the recipient country through internationalization (Chenaf-Nicet & Rougier, 2016). The endogenous growth theory provides a theoretical basis for policies that suggest the occurrence of FDI spillover effects and their positive impact on the growth and development of domestic firms (Barro & Sala-i-Martin, 1997). Examining the effects of FDI in recipient countries has received considerable attention and resources owing to the notable increase in international capital inflows.

In addition, the new growth theory proclaims that governments should provide a suitable environment for investments, such as constructing a well-designed property rights system (Greiner & Hanusch, 1998). Accordingly, the endogenous theory has focused on the effects of institutions on a macro level (Haydaroğlu, 2015). Thus, the differences that

occur in the structure of institutions have led to differences in the level of long-term economic growth (Torstensson, 1994). In contrast, there are no institutions in the neoclassical theory that assumes that individuals' preferences are stable and that choices are made within income and technological restrictions (Leblang, 1996; North, 2008). In his study Furukawa (2007) examines the effects of intellectual property rights protection on growth within an endogenous growth framework.

Additionally, entrepreneurs lack any incentive to invent or innovate unless they have the right to adequate control over the returns from the property. Also, a good institutional environment is a critical factor that pushes people from the informal market to register on the market (Dincer, 2007; Leblang, 1996). In short, endogenous growth theories suggest that various countries' long-term development rates should vary because of the differences in policies and institutions in each country (Acemoglu et al., 2005).

2.2.2 Institutional Quality

Following Romer (1986), endogenous growth models began to challenge the neo-classical framework more strongly, eventually bringing the neo-classical model's dominance in the growth literature to the end (Sayan, 2009). While human capital and R&D activities that endogenous growth theories suggested as critical factors to promote growth are widely recognized, the theory stopped short of providing answers to what determines growth on a deeper level. Subsequently, a rapidly growing literature that underscores the role of institutions in explaining relatively low rates of per capita incomes in developing countries. According to convincing arguments by Acemoglu et al. (2005), institutions affect growth endogenously; institutions like the structure of property rights and well-functioning markets matter most for economic outcomes.

The institutional environment has no definition that is universally acceptable unequivocally. In other words, there is no unanimity in defining an institution as a concept. In his work, North (1992) defines institutions as "the rules of the game in a society or, more formally, are the humanly devised constraints that shape human interaction. Consequently, they structure incentives in human exchange, whether political, social, or economic" p.4. Furthermore, North (1991) suggested that the institutional factors can be informal constraints and formal rules. The informal restrictions include sanctions, taboos, customs, and traditions. Instead, the formal rules include regulations, political rules, judicial rules, economic rules, and contracts. For North and Weingast (1989), institutional factors such as the rule of law, political stability, democracy, and property rights are crucial elements underlying modern economic growth.

Broadly speaking, economic systems that guarantee property rights and equal opportunity for all are challenging to maintain if political power is concentrated in a single individual or small group. This approach offers a natural concept of a hierarchy of institutions, with political institutions impacting equilibrium economic institutions, which decide economic growth (Acemoglu et al., 2005). In this context, the relationships between economic growth and institutions are established by effective allocation of resources and reduction of transaction costs. According to Sayan (2009), variations in economic growth among countries can be attributed to the impact of institutional quality on resource allocation. To clarify, in low-quality institutions, resources can be allocated to non-productive areas, whereas good institutions prevent the waste of resources.

For example, human capital will be directed towards productive activities which will improve the existing technology (Tornell, 1997). Besides, the process of reallocation of resources can be interrupted in some cases. Sometimes, less productive firms stay in the market by getting government help in the form of trade protection, favored contracts, and subsidies (Sokhanvar, 2022). Moreover, good institutional quality facilitates the bringing of financial resources, accelerates technological knowledge flows, and encouraging

entrepreneurs (Milgrom et al., 1990). Furthermore, well defined institutions reduce transaction costs and encourage entrepreneurs to invest (Libecap, 1989). According to North (1991), in cases where there is weak rights protection, corruption, and bureaucracy, the transaction costs will be higher, and investors will not decide to invest.

Therefore, the high cost due to poor institutional quality reduces physical and human capital investment. Additionally, the existence of guaranteed effective property rights reduces uncertainty in economic life and transaction costs which will motivate individuals to accumulate physical and human capital or develop better technologies (Haydaroğlu, 2015). Despite the inherent challenge of establishing a definitive measure for institutional quality, an increasing body of research is dedicated to exploring the correlation between institutional quality and economic success, employing various measures. One prominent measure frequently employed for this objective is the aggregate governance index established by Kaufmann et al. (1999a). The index combines various indicators of civil liberties and the efficacy of channels through which citizens can exercise their political rights. It also considers factors such as political stability, rule of law, and the extent of corruption.

The importance of achieving political stability, economic prosperity, and social welfare in the AMU countries is widely acknowledged. However, more comprehensive research is needed on the effects of the institutional environment on AMU countries' economic growth. There have been limited empirical studies on institutional quality in the AMU region over the last decade. In a comprehensive sense, institutions include the collective framework of legal, cultural, and legislative contexts within which economic activities are conducted, and where economic policies are formulated at the national or regional level. The advancement within the institutional domain is anticipated to play a significant role in influencing the economic growth of the relevant economies.

2.3 EMPIRICAL REVIEW

The primary goals of any economy are to achieve high levels of welfare and stable economic growth (Wang et al., 2022b). However, North Africa has recently experienced considerable political and economic developments (Němečková, 2021). In this particular, the effects of the Arab Spring (anti-dictatorship revolutions) have negatively impacted the business climate worldwide (Hill & Cavatorta, 2019). Also, recent implications of political-economic developments in Europe and America reflect the growth of anti-globalization sentiment (Callaghan, 2021). These recent trends caused doubt in the international system as liberalism became less trusted, which paved the way for various empirical investigations that yielded inconclusive results (Amadi, 2020). Economically, globalization or economic freedom contrasts with a nation's isolation, in which trade openness and FDI constitute the main components of globalization (Radmehr et al., 2022).

Bostan et al. (2023) argued that economic growth is influenced by several factors, including trade openness, FDI, and institutional quality, which can foster or hinder growth. For developing countries, particularly AMU countries, understanding the proper drivers of economic growth is critical, as these nations face challenges in aligning their growth strategies with the UN's 2030 SDGs. Moreover, among recent political and economic shifts, such as the rise of anti-globalization sentiments and protectionist movements, AMU countries must reevaluate their open economic policies. This section, therefore, reviews the empirical literature on the relationship between trade openness, FDI inflows, intra-regional trade, and economic growth.

Also, it examines how institutional quality may influence the growth effect of trade openness and FDI inflows. By delving into these studies, the section aims to provide a clearer understanding of the complex interactions between these factors, which is crucial for shaping the future growth trajectories of AMU countries in the recent global and

regional economic environments. Moreover, while extensive, the evidence reveals persistent contradictions and context-dependent outcomes, especially for developing economies like the AMU, highlighting settled theories, unresolved puzzles, and critical gaps this study addresses.

2.3.1 Trade Openness and Economic Growth

The idea of trading with the rest of the world is ancient and multifaceted, it was introduced early by the world's economic pioneers Adam Smith and David Ricardo (Dahmani et al., 2022; Dragusha et al., 2023). Currently, there is no self-sufficient country in the world which produces all the goods it requires. Thus, trade openness is built based on the concept of comparative advantages, so each nation tries to produce the goods in which it has a competitive advantage (Hussein et al., 2023). Accordingly, the growing necessity to integrate world economies and disperse wealth based on countries' requirements in recent times have encouraged countries to open their trade.

For example, in developing nations, laws restricting trade were common, but as time passed, most nations came to see the value of trade openness (Chibalamula et al., 2023). In this vein, the relationship between trade openness and economic growth has been extensively discussed in modern economic literature by several researchers (Hasan & Du, 2023; Rahman et al., 2023). On the empirical front, several studies were in line with the endogenous theory, according to which greater trade openness stimulates economic growth in the long run (Intisar et al., 2020; Radmehr et al., 2022). In other words, trade openness is widely regarded as a key catalyst for rapid economic growth for developed and developing economies (Hao, 2023).

Thus, including trade openness in exploring the economic growth effect is rational. However, literature lacks consensus, making this topic a long-standing controversial issue that has received global attention. For instance, Tahir and Hayat (2020) used the nonlinear ARDL framework to study the influence of trade openness on economic growth in Brunei Darussalam from 1989 to 2018. According to the findings, trade openness has boosted economic growth only in the long run. Further empirical studies, such as Adeel-Farooq et al. (2017), Idan (2023), Nguyen (2022), Okoro et al. (2020), Romyen et al. (2018), and Wang and Hu (2018) were optimistic about the long run effect of trade openness on economic growth.

Additionally, Çevik et al. (2019) noted that trade openness in Turkey can positively affect the economic growth by exports which serve as a vital revenue stream when domestic savings are insufficient to cover the cost of capital goods imports. Besides, Kong et al. (2021) found that trade openness positively influences the Chinese growth from 1994 to 2018 which confirm that China's rapid economic growth and poverty alleviation are heavily related to its trade with the rest of the world. In another case, during the period 1995-2019, trade openness and growth in various European states were examined by Bostan et al. (2023). The study confirmed that trade openness positively influenced economic growth, which supports the assumption that countries with a greater degree of trade openness may enjoy faster growth.

In contrast, in the modern economic environment, trade openness can create significant potential and unexpected risks for emerging countries (Onifade et al., 2022; Seyfullayev, 2022). Several theoretical studies confirmed that trade openness is detrimental to economic growth in the long term if an economy focuses on sectors with dynamic comparative disadvantages (Lucas, 1988; Redding, 1999; Sarkar, 2008; Young, 1991). Based on empirical literature, several practical investigations have found that trade openness impedes economic growth. For instance, Suryandaru (2023) found a significant

impact of trade openness on the long term economic growth, suggesting that reducing trade openness promotes economic growth.

This negative effect of trade openness on economic growth also supported by the study of Elfaki et al. (2021) and Hossain and Maitra (2020). Besides, Tahir et al. (2019) argued that trade openness negatively affected the service sector in developing countries. According to a study conducted by Gonçalves et al. (2021), trade openness has a positive effect on growth in rich countries but harms the economic growth of poor and emerging countries. In addition, a study applied the ARDL model conducted by Rakshit (2022) found that over the period 1979-2017, trade openness had a negative long-term impact on economic growth in India. Furthermore, from 1974 to 2011, almost the same results against trade openness were found by Rahman et al. (2020), insisting that trade openness impacts growth negatively in South Asia.

Likewise, Mtar and Belazreg (2023) asserted that trade openness negatively impacts economic growth for 11 European countries from 2001-2016. The findings admitted that protectionism in certain circumstances could stimulate domestic production. In 82 countries, Ramzan et al., (2019) used the generalized method of moments (GMM) model for the period 1980-2014, stating that trade openness negatively affects GDP when countries have a low level of total factor productivity. The findings Instead, some research has concluded that the growth effect of the implementation of trade openness is not significant. In this case, Kumari et al. (2021) failed to prove any relationship between trade openness and economic growth India from 1985 to 2018. In Azerbaijan, the same results found by Seyfullayev (2022).

For African countries, Ahmad et al. (2018) and Hongxing et al. (2021) showed a significant weight of trade openness on economic growth. In other words, Sunde et al. (2023) confirmed that internationally active countries are more productive and thus tend to

develop faster than their counterparts that only produce to satisfy their domestic markets. By using the same technique, the nonlinear ARDL framework, Udeagha and Ngepah (2021) re-examine the link between trade openness and economic growth in South Africa from 1960-2016. The results show that trade openness has positive effects in the short run. In the long run, it is considerably hindering the economy.

On the contrary, Polat et al. (2015) concluded that trade openness hinders economic growth in South Africa over the period 1970-2011. Similarly, Hussein et al. (2023) assessed the effect of trade openness on economic growth in Somalia for the period 1985-2017. The findings detected the presence of a negative long run effect of trade openness on economic growth in Somalia. Alike, Kinfack and Bonga-Bonga (2023) claimed that trade openness has a negative relationship with economic growth in low-income countries. While for upper income countries, trade indicators are positive and significant which indicate that African countries are not economically homogeneous. Miao et al. (2020) found that there is no evidence of economic growth effect due to Africa-China trade since it is dominated by China's economic interests. In Nigeria and Lesotho, the same results found by Afolabi (2022) and Malefane and Odhiambo (2021), respectively.

In the context of AMU, most countries are big oil traders; several studies posit both the positive and negative impacts of trade openness on economic growth. Hongxing et al. (2021) found that trade openness in AMU panel grouping indicated a significant weight on economic growth from 1990 to 2018. Ali et al. (2021) analyzed the asymmetric association between trade openness and economic growth in the Organization of Islamic Cooperation (OIC) countries from 1991-2018. Hence, the majority of these countries, which Mauritania, Tunisia, Morocco, and Libya are among them, support the trade-led growth hypothesis. Sghaier (2021) found almost the same result for Tunisia, Morocco, and Algeria. Moutinho and Madaleno (2020) show that trade openness did not lead to high rates of GDP in Algeria and Libya from 1973 to 2017. Chibalamula et al. (2023) showed that trade openness harms

the Moroccan economic growth. Similarly, Onifade et al. (2022) found a negative relationship between trade openness and growth in Algeria, Morocco, and Tunisia.

2.3.2 Foreign Direct Investment and Economic Growth

Since the mid-1980s, market liberalization, innovations, and the transfer of modern technologies have significantly impacted the business climate around the world (Shittu et al., 2020). With the boom in international activities today, FDI is seen as a strong driving force behind a nation's sustainable growth (Kumari et al., 2021; Shikur, 2024; Sokhanvar & Jenkins, 2022). In other words, the impact of FDI on economic growth is non-negligible, becoming a heavily debated issue in international business and economics (Chen & Jiang, 2022; Darwin et al., 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.

Paul and Jadhav (2019) and Comes et al. (2018) argued that FDI inflows are an important source to enhance growth of emerging nations by bringing in non-debt-creating capital. Hence, the lack of capital in developing countries could be solved by attracting FDI to bridge the gap among reserves and required investment levels (Abduvaliev & Bustillo, 2024; Bird & Choi, 2020). Ennin and Wiafe (2023) posits that MNCs are characterized by the utilization of sophisticated advanced technology, trade strategies, patents, branding, managerial methodologies, and appealing marketing strategies. Therefore, most governments aim to attract FDI hoping that new technologies, job opportunities, and economic growth will be brought in (Le & Le, 2020; Okwu et al., 2020; Wang et al., 2023a; Wehncke et al., 2023).

For these reasons, several developing countries adopted new policy measures to liberalize, facilitate, and regulate FDI operations (Owusu-Nantwi & Erickson, 2019). Likewise, Liu et al. (2020) found that FDI is considered a blessing for the host economy, which played an essential role in the economic growth of China, India, and Singapore from 1980 to 2020. Moreover, in their study on 34 Asian countries, Muhammad and Khan (2019) concluded that FDI played an important role in economic growth from 2001 to 2012. 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 effect model (FEM) and random effect model (REM), 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, the impact of FDI on economic growth in 11 European Countries was positive and significant. Further, by using the ARDL approach, Sarker and Khan (2020) proved that in Bangladesh from 1972 to 2017, the FDI has positively assisted the economic growth. Hao (2023) confirmed that from 1990 to 2021, China's FDI affects positively the industrial economic growth.

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 the FDI in poor nations affects 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) investigates the impact of mining FDI on economic growth in Ghana from 1996-2015. The results of the ARDL approach established that mining FDI hurts economic growth in Ghana in the long run. In SSA countries, Anetor (2020) claimed that the lack a high-quality labor force made it hard to absorb FDI's spillover advantages.

Also, the study revealed that FDI deteriorates the country's balance of payments and reduces competitiveness in local markets. Ibhagui (2020) found that the direct impact of FDI on growth is largely ambiguous and inconsistent. 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. The same results were found in research on 63 developing and developed countries by Kannen (2020) regarding the impact of FDI in the primary and secondary sectors. Likitwongkajon and Vithessonthi (2020) found that FDIs were negatively associated with Japanese firms' performance from 1990-2016.

In Pakistan, Shabbir et al. (2020) indicated that FDI has a negative impact on economic growth from 1980 to 2017. For Kosovo, Govori and Fejzullahu (2020) showed that FDIs in the activities belonging to the 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. Similar result, Despotović et al. (2024) showed that FDI in the primary and secondary sectors in the countries of Central and Eastern Europe (CEE) and the Western Balkans (WBs) negatively impacted growth.

According to Clark et al. (2016), developing economies in Africa are dependent on commodities and the primary sector, leading to crowding out effects and a weak

manufacturing sector that limits FDI's productivity spillovers. Some research has found that FDI can boost growth, whereas other research has found the opposite (Akalpler & Adil, 2017; Alvarado et al., 2017; Shittu et al., 2022; Sokhanvar, 2019). 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 (Golitsis et al., 2018; Karahan & Çolak, 2024; Odhiambo, 2022). For example, Al-Mutairi et al. (2024) pointed FDI insignificantly affects Palestinian economic growth for the period 1996-2020.

By using different time frame and empirical methods, Haini et al. (2024) and Osabohien et al. (2022) show that the effects of direct FDI are insignificant to economic growth of Economic Community of West African States (ECOWAS). According to Nupehewa et al. (2022), there is no causality between FDI and economic growth for most developed and emerging economies in European, Oceanian, Mediterranean, and African regions. Adams (2009) found that FDI's effect on growth is insignificant when using the fixed effects estimation. Similar findings were reported by Mahembe and Odhiambo (2016) and Hossain and Hossain (2023), asserting that no causality relationship exists from FDI to economic growth.

In South Africa, Hlongwane and Daw (2021) discover insignificant long run relationship between FDI and economic growth from 1970-2019. Moreover, the findings of the GMM model explored by Meivitawanli (2021) was against commonly held belief regarding FDI. The research found 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 that FDI in Nigeria has an insignificant effect on growth in the long and short run.

The existing few studies on the effect of FDI on growth in AMU countries have also reported mixed findings. 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 results obtained showed that link between FDI and growth has only been observed over a long period for Algeria and Tunisia. Moreover, Abdouli and Hammami (2017) indicated that from 1990-2012, there is 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 supports 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 GMM technique indicated positive and significant only in the case of Morocco. This positive link between FDI and the Moroccan economic growth also supported by the study of Bakour et al. (2022). However, the findings prove that for Tunisia and Algeria, the effect of FDI on economic growth is neutrality. Similarly, from 1970 to 2015, Mebarki and Mokhtari (2020) used ARDL cointegration and found that FDI has an insignificantly 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.

2.3.3 Intra-Regional Trade and Economic Growth

Integration has garnered significant attention in light of the favorable economic outcomes it has produced for individual member nations (Bong & Premaratne, 2018; Shah, 2021). One notable benefit is that member nations can engage in commerce with other member nations without encountering any barriers, regardless of whether the economies involved are at the same level or differ in economic development. Nevertheless, this good effect does not always happen all the time. According to Obasaju et al. (2021), the integration does not help states because each state has its own characteristics.

Several seminal articles have brought attention to the significant connections between economic integration and economic growth (Grossman & Helpman, 2015). This is attributed to the growing exchanges of goods, technologies, and ideas, which serve as motivators for the acquisition and dissemination of knowledge. Additionally, economic integration provides expanded market opportunities and influences international prices (Bolea et al., 2019). The occurrence of exports and imports is not solely driven by foreign demand but also by the presence of cooperative agreements. Okoro et al. (2020) recommend fostering a favorable environment even among different nations with varying levels of productivity to encourage the production of high-quality goods.

While there is a scarcity of research examining the correlation between intra-regional trade and economic growth, Nurjannah et al. (2023) analyze the determinants that impact the economic growth within a sample of six lower-middle-income ASEAN nations from 1996 to 2019. The findings indicated a significant correlation between inter-regional trade and economic growth. According to the findings of Tahernejad et al. (2017), evidence suggests that some countries within the Developing Eight Organization for Economic Cooperation (D-8), including Iran, Indonesia, and Malaysia, saw a favorable influence of inter-regional trade on their respective economic growth. Okoro et al. (2020) demonstrated, using the GMM Method, that regional trade in West Africa substantially positively impacts economic growth.

In a study conducted by Zahonogo (2017), the pooled mean group (PMG) technique was used to examine the relationship between inter-regional trade and economic growth in a sample of 42 sub-Saharan African nations from 1998 to 2012. The study's findings indicated that active trade liberalization was a necessary condition for inter-regional trade to substantially impact economic growth. Additionally, Miron et al. (2010) did find a statistically significant association between intra-regional trade and GDP growth in Romania when employing the vector auto-regression. Applying the GMM technique,

Haiyun et al. (2023) confirmed that regional integration has no robust effect on economic growth in the short and long runs for the member states of the Common Market for Eastern and Southern Africa (COMESA) from 2004 to 2016.

For AMU countries, the International Monetary Fund (IMF) indicated their main trade partners are European countries in the southern Mediterranean region, namely Spain, France, and Italy. According to Rafa and Amour (2023), the low percentage of intra-Maghreb trade persists despite initiatives to improve intra-regional trade and economic cooperation. In fact, very limited research examines the function of intra-regional trade in describing economic growth. For example, Abdullah et al. (2015) found an asymmetric relationship between intra-regional trade and GDP among AMU countries from 1989-2009.

2.3.4 Institutional Factors and Economic Growth

After the seminal work of North (1991), there is a growing discussion about the impact of institutional quality on economic growth (Aiyemo, 2024; Guenichi & Omri, 2024; Schembri et al., 2024). Several pioneering academic contributions have attempted to establish an empirical link between institutional quality and economic growth. As Flachaire et al. (2014) and Acemoglu et al. (2005) pointed out, institutional quality impact the allocation of physical and human capital investments in addition to the development of technology and the organization of the production process. In another study, Acemoglu and Robinson (2019) and Bekhet and Latif (2018) emphasized that well enforced private property rights lead to an efficient allocation of resources.

In fact, the disparities in factors such as technology, bureaucratic quality, and control of corruption are crucial in shaping a country's capacity to achieve economic

growth (Jahanger et al., 2022). In the same vein, Hall and Jones (1999), Keefer and Knack (1997), and Rodrik (1999) found that the inequality in institutional quality is a major reason why developing countries are unable to catch up to high-income countries. Generally, economic incentives in society are influenced by economic institutions. This structure will guide people regarding resource allocation and who gets the profits, revenues, and residual control rights (Acemoglu et al., 2005).

Also, Tahat et al. (2018) stated that institutional environment refers to systems of social beliefs and socially organized actions. Thus, institutions are used to create a normative market order and reduce transactional uncertainty, transaction costs, and the best allocation of resources (Li et al., 2018). Similarly, Ashraf (2023) and Dzhumashev and Hailemariam (2021) stated that good institutions are the foundation of a prosperous society's economic success. Corrado and Rossetti (2018), Danish and Ulucak (2020), and Sehrawat and Giri (2019) confirmed that institutional factors, such as the rule of law, political stability, and low levels of corruption, significantly impact economic growth and uncertainty reduction.

To clarify, Corrado and Rossetti (2018) argued that good institutions are critical in ensuring that growth policies are administered successfully to stimulate economic growth. Thus, economists widely agree that institutions play a crucial role in supporting economic growth. Rodrik (2004) stated that in developed countries, investors have confidence in their property rights, the rule of law is in place, and individuals have access to civil liberties and political participation. However, in developing countries, these arrangements are either non-existent or poorly developed (Ofori et al., 2024). In a recent study, Mujalli et al. (2024) found that institutional quality negatively affected the GDP in six GCC countries: Bahrain, the United Arab Emirates, Saudi Arabia, Qatar, Oman, and Kuwait, in both the long run and short run.

Specifically, Li et al. (2018) revealed that institutions could affect growth through three fundamental mechanisms. Firstly, institutions influenced technological innovation via property rights processes. Secondly, institutions could influence the accumulation of technological human capital which leads to growth. Thirdly, the more mature the market is, the better the institutions are. Using this channel helps to boost productivity and technological progress. Besides, Pinho and Martins (2020) confirmed that institutions significantly impact the likelihood of starting a new business. On the other hand, restricting civil and political rights and failing to establish institutions that encourage economic inclusion and technology adaptation can decline economic activities and growth (Das & Drine, 2020).

Empirically, Nguyen et al. (2018) found that in 33 emerging countries, good institutions encourage consumption, investment, and resource distribution efficiency by protecting property rights and promoting freedom of choice. In addition, employing a fixed effects model on a dataset of 138 nations, Mollick and Vianna (2024) showed that between 1996 and 2019, superior institutional quality positively influenced economic growth. Alike, Arvin et al. (2021) found that institutional quality is essential to long-term economic growth. It ensures that macroeconomic policies are well implemented in poor and lower-middle-income countries. Similarly, Masuch et al. (2017) confirmed that institutional quality measures based on the WGI project of Kaufmann et al. (2004) are critical factors in long-term growth in European countries.

In south Asian economies, Ahmed et al. (2021) and revealed that institutional quality is a driving factor in promoting green economic growth over 2000-2018. Likewise, Dinç et al. (2019) found that institutions are essential for economic growth because it includes things like the rule of law, political freedom, a transparent legal structure, good governance, and political stability. Campos et al. (2016) showed that unstable institutions had harmed Argentina's economic growth. Parallelly, Ali et al. (2022) indicated that institutions are positively correlated with economic growth of OIC countries for long-run

estimates. For Western Balkan economies, Nedić et al. (2020) found that government efficiency and regulatory quality had the most statistically significant and favorable effects. However, control of corruption and rule of law have a slightly smaller impact.

On the same note, Slesman et al. (2015) confirmed that political instability limits the country's ability to build up physical and human capital. Specifically, political instability inhibits innovation and technology adoption and encourages expropriation and jurisdictional manipulation. Thus, weak political institution is a key restraint of economic growth (Kar et al., 2019). For intellectual property rights, a major argument in favor of stronger property rights is that it stimulates economic growth by protecting innovators from imitation, thereby encouraging innovation (Goldsmith, 1995; Haydaroğlu, 2015; Rodrik, 1996; Tran et al., 2021). In fact, many countries have strengthened their protection of property rights by reforming their patent systems. However, several works indicated the relationship between property right protection and economic growth is actually not so clear (Acemoglu et al., 2001; Hall & Jones, 1999).

For instance, Horii and Iwaisako (2007) were unable to provide evidence of a positive relationship between property rights protection and economic growth. Moreover, the research of Furukawa (2007) was in line with the works that argued that property right protection may not enhance economic growth in an endogenous growth model and emphasizes a role for relaxing property right protection as a growth-enhancing policy. Similarly Aghion et al. (2005) found strong evidence of an inverted U relationship between competition and innovation by using panel data. For Africa, Ogbuabor et al. (2020) reported that institutional factors like government inefficiency, corruption, the rule of law, and regulatory quality have a negative effect on economic growth of West African countries.

Ganau (2017) examined how economic growth can be affected by democracy, legislature effectiveness, and regime instability in 50 African nations. The findings imply

that from 1981 to 2001, democracy and regime instability have a detrimental impact on growth, but legislature effectiveness had a beneficial effect. For the SSA countries, Doan (2019) confirmed that institutional quality is a critical factor for economic growth after using balanced panel data during 1980-2013. Parallelly, Nzié and Pepeah (2022) demonstrated that the worst-performing countries are resource-rich countries with poor institutional quality which seems to agree with Epo and Faha (2020), who attested that resources are a problem only where institutional quality is poor.

However, Yusuf et al. (2020) demonstrated that democracy in West Africa from 1996 to 2016 had no significant impact on economic growth, either in the short or long term, while political instability had a negative effect on economic growth. Eren and Başar (2023) concluded that the growth impact of some WGI institutional indicators is statistically insignificant in lower-middle-income countries. Similarly, Edo and Oigiangbe (2024) found that institutional quality has a positive but insignificant direct impact on economic growth in sub-Saharan Africa from 1980 to 2021. Paschal et al. (2024) found an insignificant causal effect of institutional quality on economic growth in Tanzania from 1990 to 2018.

For AMU countries, Volodina (2019) highlighted that corruption has become a noticeable issue in almost all the countries in AMU countries which are considered as a threat to institutional environmental quality and economic growth. Additionally, Haouas et al. (2021) examined the key drivers of the slow and weak economic performance in Algeria from 1979 to 2019. The results stress the importance of the political and institutional variables for growth in Algeria. Moreover, Matallah (2020) investigated the impact of the six institutional factors of WGI database in economic growth in MENA countries from 1996-2017. For Algeria and Libya, the research showed that good institutional quality is an essential component of these countries' economic growth.

Similarly, Zghidi et al. (2018) investigated the role of institutions in mediating the impact of remittances on growth in the North Africa from 1980 to 2012. Using the GMM technique, the study found that good institutional environment appears to pronounce the economic growth effect of remittances. For Morocco, Aboudi and Khanchaoui (2021) confirmed that better institutional and governance quality is essential to mitigate the negative effect of inflation and debt on economic growth. In contrast, Ayenagbo and Boukari (2022) examined the relationships between institutions and economic growth in several blocks in Africa from 1996-2018. For the AMU, the data provides no proof of a causal relationship between the factors.

In short, institutional quality not only directly promotes growth but also plays a key role in enhancing the interactions between trade openness and FDI with economic growth. Most previous studies have focused mainly on the direct impact of institutional quality on growth. In contrast, this study examines the direct growth effect and the intermediary role that institutions play in influencing the growth effects of trade openness, FDI inflows, and intra-regional trade on economic growth in AMU. The choice of institutional factors in this study is driven by its objectives and research focus. Specifically, the study considers six institutional indicators defined by the WGI project: voice and accountability, political stability, government effectiveness, regulatory quality, rule of law, and control of corruption (Handoyo, 2023). These factors will be discussed in the following paragraphs.

2.3.4.1 Voice and Accountability (VAA)

Generally, a higher voice and accountability index indicates greater freedom (Fawaz et al., 2021). Voice encompasses a range of formal and informal channels through which individuals articulate their preferences, opinions, and perspectives. Accountability refers to the inherent connection between citizens and government officials (Goetz & Jenkins,

2001). The level of voice and accountability refers to the degree to which the citizens of a country can engage in the governance of their country (Wang et al., 2022a). Kaufmann et al. (1999b) argued that voice and accountability, one of six institutional factors, focuses on civil liberties and political rights such as freedom of expression, electoral participation, and media independence. A robust level of voice and accountability is distinguished by enabling citizens to engage more actively in the governance of their country.

Sirowy and Inkeles (1990) explored the relationship between economic growth and democracy, finding that achieving a certain level of democracy may require more effort to boost economic growth. The study concluded that countries should focus on building a strong economic framework while pursuing democratic governance. A study conducted by Chiu (2016) revealed a detrimental correlation between the presence of a voice and accountability mechanism and the rate of economic growth in emerging economies. Fawaz et al. (2021) asserted in their literature that despite the higher economic growth of East Asian economies, their level of democracy remains deficient.

On the other hand, the study conducted by Sabir et al. (2019) examined the influence of institutional quality on FDI inflows. The researchers utilized panel data from 1996 to 2016, encompassing countries with low, lower-middle, upper-middle, and high-income levels. The GMM model was employed for analysis. The findings validate that the voice and accountability index positively influence FDI across all categories of countries. Raza et al. (2021) analyzed the correlation between FDI and economic growth, considering the quality of institutions, in the Organization for Economic Cooperation and Development (OECD) countries from 1996-2013. The findings from the fixed effect model and GMM estimator reveal a one-way causal relationship between the interaction terms of FDI with the index of voice and accountability and economic growth.

Saeed (2022) examined the key elements of institutional quality that significantly influenced per capita growth in 58 resource-rich developing countries from 1996 to 2014. The findings indicate that VAA has the most relevant and significant effect on economic growth compared to other components of institutional quality. The study by Alexiou et al. (2020) reevaluated the correlation between institutional quality and economic growth in 27 post-socialist economies from 1996 to 2016. The study employed the WGI indicators to evaluate institutional quality. The results indicate that in the immediate term, VAA exhibits a perplexing adverse impact on economic growth, which warrants additional examination.

2.3.4.2 Political Stability (PST)

Political instability refers to the disruption of a country's governments, regimes, and communities. It is often caused by the violent overthrow of authorities or the high likelihood of their forced removal (Asteriou & Siriopoulos, 2000; Kurecic & Kokotovic, 2017). On the other hand, Singha and Singh (2022) revealed that political stability is a qualitative condition of public development, expressed as public order, achieved by controlling and balancing stakeholders in a society to achieve specific goals, ideals, and targets. It is also a reflection of good governance, which is defined as the act of overseeing the performance of the state apparatus. Similarly, Ake (1975) defined political stability as members of society limiting their behavior patterns to those constrained by political role expectations. Any act that deviates from these boundaries is an example of political instability.

In the same way, Zangina et al. (2019) stated that political stability relates to the prospect of the stability of the government as well as the lack of politically motivated violence and terrorism. It is a situation where members of society largely restrict themselves to behavioral conduct, regarded as being within the confined usual political role. Thus, the

absence of such a normal political atmosphere, which threatens the stability of the government, is regarded as political instability. Also, conflicts between political actors could resort to violence and instability in the political system. For example, terrorism as a dimension of political instability is an act of violence perpetrated to create fear in society and obstruct normal activities of life in order to achieve political as well as economic benefits (Enders et al., 2006). As a result, terrorists' activities have, in recent times, become prevalent with their resultant effects on investment and economic activities.

Political unrest can subside the effectiveness of government, violate the law and order situation, and deteriorate the peace of society (Yıldırım & Gökalp, 2016). The coexistence of all these factors is necessary to create a favorable investment environment and to improve the stock market performance. This assertion is also supported by La Porta et al. (2002), who suggested that political stability and good governance are essential for the betterment of the economy and attracting investors. Therefore, it is necessary to understand how political instability in the economy affects economic growth. During political unrest, investors may feel anxious regarding the safety of their investment in a politically unstable economy. Similarly, news related to political unrest normally demotivates investors and forces them to withdraw their funds. As a result, during political unrest, the trading volume declined (Dalyop, 2019).

Similarly, Hoque et al. (2018) pointed out that political instability and violence affect a company's business operation, resulting in lower production levels and delays in foreign export schedules. This scenario causes a downward pressure on firms' profits and cash flow. Altogether, these negative influences of political instability can eventually result in reduced economic output. Hence, it can be inferred that political instability negatively affects economic growth and stock market development. Therefore, the sluggish economic growth in the last decades has raised the importance of political stability, a central issue in light of the recent evolution of the world economy (Alexandre et al., 2022).

Acemoglu et al. (2005) claim that the mechanism affecting institutional quality is the political system held by elites with ultimate power. Elites are the most crucial factor behind the poor-quality institutions in underdeveloped and emerging countries. In other words, they argue that elites affect formal institutions negatively through their impact on the political system. Therefore, among the political stability measurements, the degree of democracy has received special attention and has fueled controversy, in contrast with the consensus in the literature regarding the positive effects of economic freedom on economic growth (Acemoglu et al., 2019; Barro, 1996). Nondemocratic regimes are often associated with extensive government intervention in and controlling the economy (Jakob & Sturm, 2003; Rode & Gwartney, 2012).

The historical performance of such high levels of intervention is poor, especially given the collapse of the Soviet Union, which indeed appeared to mark the end of history for planned economies (Gowa, 2011). However, the strong growth of China and other East Asian countries gave new support to the possibility that non-democratic regimes, or less than fully democratic regimes, may be more efficient in reallocating resources (Bolesta, 2022). Evidence that democracy may be detrimental to growth is provided by Barro (1996) and Tavares and Wacziarg (2001). In contrast, Acemoglu et al. (2019) argued that democracy does cause growth in a significant and sizeable way by stimulating investment, schooling, economic reforms, and public goods provision and reducing social unrest.

Raza et al. (2021) examined the interaction of FDI with institutional quality and its impact on economic growth using fixed effect and GMM models. The results show that in OECD countries, the interaction terms of political stability with FDI significantly and positively affects economic growth from 1996 to 2013. The results are supported by the work of Buchanan et al. (2012) and Jude and Levieuge (2017). Thus, strong political stability strengthens the association between FDI and economic growth. In addition, Karimi and Daiari (2018) tested the role of the quality of WGI institutional factors in economic growth using GMM panel data for 10 ASEAN countries from 1996-2014. The results

confirm a positive relationship between political stability and economic growth in the selected ASEAN countries.

Hoque et al. (2018) investigated the role of political instability on the FDI-growth relationship in Bangladesh from 1993 to 2016. The ARDL model and hierarchical regression approach results revealed that political instability negatively moderates the FDI-growth nexus. According to Alexandre et al. (2022), political instability negatively affects economic growth, FDI, and trade openness. Therefore, political stability is required to attract FDI and stimulate economic growth. Maune (2017) found that political stability and the absence of violence and terrorism positively and significantly related to economic growth in Zimbabwe. For Southeast Asia, Bong and Premaratne (2018) found that regional integration significantly affected economic growth. More specifically, the empirical results suggest that to enhance regional integration and economic growth in the region, public institutions should stabilize political stability while promoting international trade among member countries.

2.3.4.3 Government Effectiveness (GOV)

International organizations such as the World Bank, the United Nations, the OECD, and the IMF have emphasized the importance of good governance (Huang & Ho, 2017). Governance plays an important role in promoting a country's competitiveness and improving the quality of life for its people. Moreover, good governance is widely recognized as essential for development, but its full impact on improving development outcomes, particularly in developing countries, is not yet fully understood (Acemoglu & Robinson, 2012). Thus, one of the most commonly discussed questions about governance is whether good governance benefits economic growth.

Interestingly, the rising interest in governance results from safeguarding property rights and contracts to enhance growth and investment (Burnside & Dollar, 2000). Accordingly, the relationship between governance and economic growth is one of international development's most important research areas (Mahmood, 2021). Several empirical studies based on the WGI have examined the impact of governance on economic growth, most of which suggest that governance significantly impacts economic growth. For example, Raza et al. (2021) analyzed the relationship between FDI and economic growth in the presence of institutional quality for OECD countries from 1996-2013. The fixed effect and GMM model estimators unveiled a positive unidirectional causal relationship between government effectiveness and economic growth.

According to Bayar (2016), bad governance has a detrimental impact on development and economic growth. Therefore, governance is crucial in illuminating why most developing nations must catch up. Similarly, Olaoye et al. (2021) proved that ensuring the effectiveness of government and innovation through increasing R&D expenditure can sufficiently drive sustainable economic growth in Africa. Moreover, Al-Naser and Hamdan (2021) examined how public governance affects economic growth in the six GCC countries from 1996 to 2019. It is found that the government's effectiveness has a significant positive impact on economic growth. Consequently, poor governance produces poor growth, whereas good governance enhances sustained economic growth.

In contrast, Alimi and Dhiab (2023) argued that governance has an asymmetric effect on economic growth in 48 developing countries over the period 2002-2020. The results indicate that enhancing governance in developing countries can obstruct economic growth. The positive effects of sound governance on economic growth require numerous factors that currently need to be improved in these countries. On the other hand, Maune (2017) found that government effectiveness is insignificant in influencing economic growth in Zimbabwe. Almost the same results, Hartley and Aldag (2022) revealed that in Vietnam, the efforts to improve governance effectiveness in less industrialized provinces to promote

economic growth are insignificant. Thus, governance remains one of the impeding factors to sustained economic growth in developing countries, particularly in developing countries.

2.3.4.4 Regulatory Quality (REQ)

Regulatory quality is a prerequisite for the furtherance of environmental quality. Thus, to enhance regulatory control, the government must intensify its efforts to make institutions more proactive and capable of enforcing environmental laws and regulations so that economic growth does not undermine environmental quality (Maduka et al., 2022). According to Obasaju et al. (2021), the index of regulatory quality captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. Al-Naser and Hamdan (2021) studied the impact of public governance on economic growth in the six GCC countries between 1996 and 2019. They found that regulatory quality positively and significantly affects economic growth.

Nedić et al. (2020) presented an empirical analysis of the impact of institutional quality on the economic growth of five Western Balkan countries from 2006 to 2016. By empirically testing the impact of individual quality indicators of institutions on economic growth, the regulatory quality factor has a statistically significant and positive impact. Further, Raza et al. (2021) showed a bidirectional causal relationship between the FDI and regulatory quality on economic growth for OECD countries from 1996-2013. Nevertheless, Maune (2017) found that regulatory quality is insignificant in influencing economic growth in Zimbabwe. Likewise, Radulović (2020) found no short-run relationship between regulatory quality and economic growth in EU countries, while in the non-EU countries of Southeast Europe, regulatory quality is significant.

In addition, Ullah et al. (2022b) found that the interaction of FDI with regulatory quality showed insignificant influences on FDI-growth nexus in the case of SSA countries. On the contrary, Ogbuabor et al. (2020) studied how institutional quality affects economic growth in West Africa. Their findings mainly showed a strong negative link between poor regulatory quality and growth, which slowed down economic growth in the region.

2.3.4.5 Rule of Law (ROL)

The integrity of institutions relies on a strong rule of law, which is considered key for good governance and institutions (Ramanujam & Farrington, 2023). Notably, the intricacies revolving around the rule of law are the prime issue of this century (Lin et al., 2022). Thus, the rule of law has become a central strategy in state-building, conflict resolution, and economic development (Stadnyk et al., 2022). According to Agostino et al. (2020), the rule of law refers to contract fulfillment, the activity of magistracy and police, and low crime levels. Through its capacity to protect persons, property, and contract rights, restrain the arbitrary use of government power, and reduce corruption, the rule of law has been identified as a precondition for a well-functioning market economy (Asongu et al., 2023).

The rule of law provides the structural government constancies required to guide human behavior; legal rules must be of general application, publicized, prospective, intelligible, noncontradictory, possible to comply with, stable, and congruent (Fuller, 1964). These so-called precepts of legality are the minimum conditions required to create a stable framework of rules that can factor in the practical reasoning of legal subjects. In turn, a stable legal system provides a base level of expectations upon which strangers may form exchange-based relationships. As exchange-based economies grow, expanding in space and time, mechanisms for enforcing contracts become increasingly important (Greif,

1993). In other words, the rule of law provides credible commitment from the state when delivering market-supporting institutions.

Several researchers agreed on the positive impact of the rule of law on economic growth. For example, Raza et al. (2021) concluded that the rule of law promotes economic growth. Similarly, Radulović (2020) found that in EU countries, there is a long-run relationship between the rule of law and economic growth. Meanwhile, in non-EU countries, the rule of law is statistically insignificant. Alexiou et al. (2020) examined the relationship between institutional quality and economic growth in 27 post-socialist economies from 1996 to 2016, using the WGI to assess institutional quality. The study found that, in the long run, economic growth is positively linked to the rule of law.

Likewise, Mehmood et al. (2023) investigated the relationship between institutional quality and economic growth in South-Asian countries from 2002 to 2018. The study found that the rule of law positively and significantly affects economic growth in the long-term equilibrium. Similarly, Setayesh and Daryaei (2017) showed a significant positive correlation between the rule of law and economic growth in eight developing Islamic countries from 2005 to 2014. Gupta and Bhatia (2022) revealed that the governments of BRICS countries must work toward their political conditions, mainly the rule of law, to enhance their sustainable economic growth.

Gherghina et al. (2019) examine the link between FDI inflows and economic growth considering institutional quality in 11 CEE countries from 2003 to 2016. The results showed that the rule of law index positively influences growth. In 18 selected transition economies, Luong et al. (2020) suggested that the size of the shadow economy could be controlled by improving the effectiveness of the rule of law and the economy's growth, particularly in transition countries. In Ukraine, Sereda (2021) argued that establishing the principle of the rule of law is an urgent need to create a positive impetus for economic

progress. In contrast, Al-Naser and Hamdan (2021) found that the rule of law index insignificantly affects economic growth.

2.3.4.6 Control of Corruption (COC)

Corruption is a widespread phenomenon; every nation has a different level of corruption in different sectors, and its roots are in the ancient history of human civilization (Beyaert et al., 2023). Thus, it is one of the most severe threats to the economy, and combating it was one of the initial goals of politics and government (Agbu, 2003). According to Fawaz et al. (2021), corruption is a major obstacle to economic growth, so controlling corruption is crucial for a country. Honesty in the government reduces administrative costs and rent-seeking behavior and promotes economic growth (Chiu, 2016). For the definition of corruption, Uroos et al. (2022) defined it as the misuse of public assets and powers for personal interest.

Also, it is an illegal activity to accumulate money and wealth; it is the abuse of public power to increase wealth illegally through misuse of public law (Uddin & Rahman, 2023). In addition, the definition of corruption depends on what is to be modeled and measured (Bardhan, 1997). Thus, the first type is grand corruption, which is corruption by political elites in economic policymaking. The second type is bureaucratic corruption, referring to corruption by bureaucrats in their dealings with superiors, that is, political elites or the public. The third type is legislative corruption, which refers to the extent to which legislators' voting behavior can be influenced by interest groups (Jain, 2001).

Notably, every structure of the economies, such as feudalism, socialism, and capitalism, has experienced a situation of corruption (Das et al., 2020). According to Haruna and Abu Bakar (2020), corruption is perceived as a barrier to economic growth as

it reduces competition, weakens the rewards for entrepreneurship, and diminishes antitrust enforcement; this directly impacts the development of innovative concepts and work efficiency. Consequently, corruption affects the quality of institutions and economic growth (Afonso & Rodrigues, 2022; Simo-Kengne & Bitterhout, 2023). Furthermore, the effects of corruption on economic growth have been a topical academic issue, and the mainstream findings tend to suggest that corruption negatively affects growth (Ha & Frömmel, 2023; Mohammed et al., 2022; Padhan et al., 2023; Uddin & Rahman, 2023).

Corruption results in higher investment costs, thereby deterring both domestic and international investors, consequently impeding economic growth (Asafo-Adjei et al., 2023). In addition, Anderson and Marcouiller (2002) discovered that corruption is the primary obstacle to the expansion of worldwide economic transactions. Nurjannah et al. (2023) stated that developing countries are ineffective in controlling corruption, which aggravates the issues of inflation and poverty before negatively impacting economic growth. Moreover, Azariadis and Ioannides (2022) mentioned that corruption effects suggest a plausible answer to why all countries are not developed.

Besides, Karimi and Daiari (2018) concluded that control of corruption has a positive impact on economic growth in the ten selected ASEAN countries from 1996-2014. In a study done on 83 developing countries to analyze the effects of corruption on economic growth, Spyromitros and Panagiotidis (2022) showed that corruption hinders the economic growth of those developing countries in 2012-2018. Son et al. (2020) use World Bank aggregate data from 2004 to 2017 to investigate the impact of corruption on economic growth in 120 countries. The results of the 3SLS regression show that corruption hinders economic expansion.

On the other hand, several researchers find that corruption might be desirable for stimulating economic growth, suggesting that corruption helps firms to circumvent bad

policies (Aderounmu et al., 2022; Dreher & Gassebner, 2013). Mardiyani et al. (2023) employed the corruption rate as an indicator of institutional quality and determined that it negatively affect Indonesia's inclusive economy. Bhasin and Garg (2018) suggest that foreign investors favor environments where laws can be easily bypassed through corrupt bureaucracies and where regulations are weak or less strict.

In contrast, Radulović (2020) found that in non-EU countries, there is a statistically insignificant long-run relationship between control of corruption and economic growth. Similarly, Urbina and Rodríguez (2022) revealed no significant impact of corruption on economic growth in Brazil and Peru.

2.3.5 Impact of Institutions on Trade Openness-Growth Nexus

Differences in economic structure, level of technologies, and institutions lead to differences in the opportunities and abilities to benefit from trade openness (Seyfullayev, 2022). These differences are pushing emerging countries to choose between trade openness and protectionism or to achieve a balance between these directions. One can find both negative and positive economic results of protectionism and openness in economic history. In principle, trade openness can enhance economic growth by encouraging better resource allocation and promote the diffusion of knowledge (Mania & Rieber, 2019; Serrano & Myro, 2019; Serrano & Myro, 2019). Thus, to help their economies to flourish, most emerging countries have liberalized their trade in recent decades (Fu, 2021).

However, several empirical studies reported different effects of trade openness on economic growth (Nguyen, 2020; Silajdzic & Mehic, 2018; Tahir & Hayat, 2020). There are many opinions about the relationship between trade openness and economic growth in

economics. The studies conducted offer substantial evidence of both the benefits and drawbacks of openness for growth. They also present several ideas regarding the conditions necessary for the effectiveness of an openness policy, suggesting that trade openness might not be the best growth option in an imperfect institutional environment. According to Rodrik (1999), external trade shocks can have long-term negative consequences for economic growth in societies that have weak institutions.

Thus, trade openness is an essential driver of economic growth, but little is known about how the institutional factors influence the economic growth effect of trade openness. An important study conducted by Chang et al. (2009) suggested that an interaction between trade openness and institutional factors is important to influence the economic growth results. Instead, the economic growth effects of trade openness could be accelerated by better facilitating efficiency and boosting the advantages of economies of scale in an appropriate institution (Dollar & Kraay, 2003; Fu, 2021; Hadhek & Mrad, 2015). In this context, Saad (2021) and Hyun (2018) reported that institutional variables such as legal and political systems are essential for growth, and they can be a source of comparative advantage in shaping trade patterns.

In addition, Doan (2019) asserted that institutions ensure quality of contract enforcement and other rights protection, which have received a great deal of attention in recent years due to their influence on trade volume. In a recent study, Duodu et al. (2024) utilized data from 30 SSA countries from 2002 to 2020 and applied the augmented mean group (AMG) and the two-stage least squares (2SLS) estimations for their analysis. The findings indicate that Chinese trade positively affects economic growth in countries with strong institutions, whereas its impact is diminished in nations with weaker institutions. In contrast, US trade promotes economic growth regardless of the strength of institutional quality.

According to Álvarez et al. (2018), trade openness is a better growth-promoting policy tool in a solid institutional environment than in a poorly developed institutional environment. Coulibaly (2023) analyzed the growth effect of trade openness on SSA countries, considering the growth effect of institutional factors during 1980-2017. The outcomes of the PMG technique confirmed that improving institutions' quality can positively empower FDI-induced economic growth. In the same way, Canh et al. (2019) discussed the role of institutional quality in 84 countries by showing that the improvement of the institutional environment enhances the growth effects of trade openness. For Vietnam, Thanh et al. (2019) has also argued that economic institutions quality influences the impact of trade openness in promoting Vietnamese economic growth.

On the other hand, Nguyen, Su, et al. (2018) used GMM estimators to determine the impacts of institutions on the growth effect of trade openness in 29 countries. The results confirmed that from 2002 to 2015, institutions negatively impacted the growth effect of trade openness. Baliamoune-lutz (2011) found that international trade had only a minor impact on economic growth, and they inferred that weak domestic institutions are to blame for this. As anti-globalization attitudes rise, countries are more likely to engage in longer-term economic relationships with significant government institutions while increasing their exports. Thus, trade between nations with varying regulatory standards is hampered by this issue, which hurts developing countries with weak institutions (Yan & Yang, 2020).

Karam and Zaki (2019) explored the relation between institutions and trade openness in the MENA region from 1995-2014. The findings show that the institutional gap between trading partners has a significant negative effect on trade. Thus, for the same region, Onifade et al. (2022) recommended strengthening institutions among the countries in the region to harness the benefits of trade openness in our increasingly globalized world. Importantly, Duodu and Baidoo (2020) examined the effect of institutions on the growth effects of trade openness on the economic growth of Ghana. The results of the ARDL model

revealed that the interaction between trade openness and institutions had a negligible impact on economic growth in the Ghanaian context.

Similarly, Akbari et al. (2019) examined the impact of institutional factors on the development of 151 companies that are established in free trade zones. The results show that institutional factors do not moderate the relationship among resources, competitive advantage, and performance. Moreover, the impact of China-Africa trade on African countries' economic growth is examined by Miao et al. (2020). The study indicated that the effects of China-Africa trade on economic growth in African countries depend on the institutional quality of each country. Although the impact of trade openness and institutional performance on economic growth have been discussed in several studies for different economies, for AMU countries, no observed studies are available.

2.3.6 Impact of Institutions on FDI-Growth Nexus

FDI inflows are vital in achieving sustained economic growth in emerging nations (Asiamah et al., 2019). Specifically, FDI inflows can enhance economic growth through technology (Barro & Sala-i-Martin, 1997; Grossman & Helpman, 1991). Also, FDI inflows can boost economic growth by improving the physical and human capital of the host nation (Elkomy et al., 2016; Qazi et al., 2017). Nevertheless, numerous studies have shown that some elements influence the recipient country's FDI-growth connection. For example, Guenichi and Omri (2024) argued that better institutions facilitate technology transfer and knowledge diffusion from FDI to the host economy, while poor institutions increase home country uncertainty (i.e., business costs) and undermine FDI-induced growth.

For this reason, Nguyen, Su, et al. (2018) and Ullah et al. (2022a) stated that the impact of FDI on economic growth is conditional on the absorptive capacity of the host country, particularly institutional quality. In other words, depending on the quality of their institutions, countries with similar quantity of FDI inflows may experience very different levels of economic growth (Slesman et al., 2021). According to Nguyen, Su, et al. (2018), a favorable institutional environment fosters FDI in pioneering industries and amplifies the growth impact of FDI inflows. Indeed, various institutional factors such as political stability, the rule of law, corruption control, and property right could impact the growth effect of FDI inflows (Canh et al., 2019).

Consequently, the importance of institutional quality in the growth effect of FDI has become a major focus of growth-related research in recent years (Saidi & Ochi, 2023). Importantly, Tomizawa et al. (2020) reported that property rights and the rule of law, and their widespread support in society are thought to be critical to economic growth via business creation and product innovation. Because of this, poor institutional quality is generally linked to more inadequate investment, slower productivity development, lower per capita income, and an overall slower increase in output (Jude & Levieuge, 2017).

On the empirical side, Haini and Tan (2022) examines whether institutional quality affects the relationship between FDI inflows and growth in sample of several OECD countries. The results of the GMM method show that from 2000 to 2019, institutional quality has a positive complementary effect across both FDI sectors (sectoral and industrial). Further, Das and Mahalik (2020) studied how the quality of the host country's institutions, corruption perception index, investment regime affected multinationals' overseas subsidiaries' performance. The study proved that countries with higher institutional quality have more successful foreign subsidiaries. Similarly, Gupta et al. (2022) reported that from 1995 to 2019, the outcomes of the ARDL model indicated that the link between FDI and economic growth is influenced indirectly by absorptive capacities, such as institutions and technological capability.

Almost the same results, Aziz (2022) proved by using GMM model that institutions play a key role in enhancing growth via indirect impact by absorbing spillovers of FDI inflows in Arab countries. For African countries, Miao et al. (2020) examined how the Chinese FDI affect the economic growth of African countries and how the institutions quality plays a role in that for the period of 2003-2017. The GMM model proofed that the benign impacts of the Chinese FDI on economic growth of African countries remain contingent upon appropriate policy action to improve the institutional quality of African countries. Yimer (2023b) revisits the FDI-growth nexus in Africa, categorizing countries as resource-rich or resource-scarce for the period 2000-2017 by using GMM technique. The results proved that the better the institutions, the higher the FDI-induced growth.

Therefore, resource-rich countries with weak institutional qualities, should address the gap in institutional quality to improve economic growth (Mamman & Valei, 2023). In another study, Saidi and Ochi (2023) examines the triangular relationship between FDI, economic growth, and institutions quality for Algeria, Morocco, Mauritania, Tunisia, and other developing countries over the period 2000-2018. Using the Panel Threshold Regression (PTR) model, the findings indicated no significant correlation exists between FDI inflows and economic growth when institutional quality falls below the threshold of -1.20 threshold. However, the positive and significant impact of FDI inflows on economic growth becomes evident only when institutional quality is above the threshold of -1.20.

On the contrary, by using ARDL model for several developing countries from 1996 to 2014, Saidi et al. (2022) indicated that the quality of institutions in developing countries does not affect FDI and economic growth. Furthermore, Ullah et al. (2022b) empirically estimated the influence of sectoral FDI on economic growth and the role of business regulations in influencing the FDI-growth connection of developing countries. The outcomes indicate that from 1996 to 2019, the sectoral FDI inflows significantly contribute

to economic growth. In contrast, the interaction of regulations with FDI negatively impacted host countries' economic growth.

Chih et al. (2022) indicated that the positive FDI effect on growth is significantly damaged by the negative intermediary role of institutions in SSA economies. Also, the analysis indicated that both low democratic (high autocratic) and high democratic (low autocratic) regimes do accelerate the positive impact of FDI on growth. However, results indicate a slow-down effect of FDI on growth under moderate democratic autocratic regimes. This particular finding suggests that the intermediary role of democracy in determining the effect of FDI on economic growth is nonlinear. Although the role of quality of institutions influencing the FDI-growth connection have been discussed in prior studies for limited economies, for AMU countries, only studies about the direct impact of institutions on FDI are available (Khalfaoui & Derbali, 2021).

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 for 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. In addition, Rodrik et al. (2004) highlighted the importance of not just having institutions but also their effective implementation. In other words, institutional quality may seem robust; nonetheless, enforcing effective governance, regulatory frameworks, and corruption mitigation is inadequate. This can diminish the influence of institutional quality on economic growth, as policies may exist but are not adequately implemented.

In many developing countries, institutions might appear strong based on formal indicators, but their influence is diminished by poor enforcement or corruption. Further, the AMU 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. For FDI and institutional quality to positively affect growth, complementary reforms in areas like education, infrastructure, and the financial system are often necessary. If these complementary reforms

are lacking in AMU countries, it could explain why both FDI and institutional quality do not significantly contribute to growth.

Campos and Kinoshita (2002) emphasized that the positive impact of FDI on growth is more likely to be realized when there are complementary reforms in place, particularly in infrastructure and financial systems. A large informal economy in AMU countries can undermine the effectiveness of formal institutions and dilute the impact of FDI on growth. When significant economic activity takes place outside formal regulatory frameworks, institutional quality metrics may not fully capture the business environment's realities, leading to weak economic growth despite seemingly good governance indicators. La Porta and Shleifer (2014) suggested that large informal economies in developing countries can limit the effectiveness of formal institutions and reduce the benefits of FDI. This may explain why institutional quality and FDI fail to boost growth in AMU economies.

2.3.7 The Causality Relationship between Trade Openness, FDI, and Institutional Quality

The causal relationships between trade openness, FDI, and institutional quality have been extensively studied, yet the findings remain heterogeneous, reflecting region-specific dynamics and methodological limitations. These relationships are complex and often interdependent, with significant variations observed across different contexts and regions. Firstly, the causal interplay between trade openness and FDI has been widely examined, with studies revealing diverse outcomes depending on regional and methodological factors. For instance, Singh (2024) identifies unidirectional causality from trade openness to FDI in India in the period (1991 to 2019) using VECM, while Udemba (2019) reports reverse

causality from FDI to trade openness in Nigeria from 1970 to 2018, using Granger causality tests.

Broader regional analyses, such as Akadiri et al. (2020) across 25 African nations (1980-2018), reveal bidirectional causality, whereas Benabdennour et al. (2024), employing panel ARDL models for 124 countries (1996–2021), confirm that trade openness has stronger long-run effects on FDI in developing economies. Country-specific studies further complicate this narrative. For example, Tran (2023) demonstrates unidirectional causality from trade openness to FDI in Vietnam in the period (1996 to 2021), while Rathnayaka Mudiyanselage et al. (2021) observe a positive causality from FDI to trade openness alongside negative causality from trade openness to FDI in Romania from 1997 to 2019, suggesting that structural inefficiencies may invert expected relationships. Methodologically, advanced approaches like the Toda-Yamamoto-Dolado-Lutkephol (TYDL) test, applied by Saleem et al. (2018) to China over the period 1980 to 2015, reveal bidirectional causality.

Secondly, the causal relationship between institutional quality and trade openness has garnered significant scholarly attention, yet critical gaps persist, particularly in the context of the AMU. Qamruzzaman (2021) employs ARDL models to identify a positive long-run causality from institutional quality to trade openness, suggesting that robust governance frameworks enhance global market integration. Similarly, Akkoc and Ciftci (2024), using panel bootstrap Granger causality tests, demonstrate that corruption, a proxy for weak institutional quality, positively influence international trade in Ukraine, highlighting the paradoxical role of governance in trade dynamics within institutionally fragile settings. Despite these insights, no analogous studies have been conducted in AMU countries, which exhibit unique institutional landscapes characterized by divergent anti-corruption measures and uneven regulatory harmonization.

Thirdly, the causal relationship between FDI and institutional quality has been extensively debated, yet findings remain inconclusive and context dependent. Studies such as Paschal et al. (2024) in Tanzania (1990-2018) and Fon et al. (2021) across 56 African nations from 2003 to 2015 report insignificant or null effects of institutional quality on FDI using VAR and panel analyses. In contrast, Saleem et al. (2021) in Pakistan over the period (1980 to 2016) and Karim et al. (2023) in Bangladesh in the period 1995 to 2021, confirm long-run causality from institutional quality to FDI using ARDL and bounds tests.

Similarly, Antonietti and Mondolo (2023) identify bidirectional causality between institutional quality and FDI in 102 countries using panel VAR, while Huynh et al. (2020) in Asian economies and Nxumalo and Makoni (2021) in emerging markets demonstrate causality from FDI to institutional quality via GMM and ARDL frameworks. This heterogeneity underscores the role of regional institutional ecosystems. For instance, Minh (2019) attributes provincial FDI disparities in Vietnam to institutional quality variations, while Hakimi and Hamdi (2017) link corruption to FDI deterrence in the MENA region.

In conclusion, the causality relationships between trade openness, FDI, and institutional quality are complex and context-dependent, with significant regional and methodological gaps, particularly in understudied regions like the AMU. Addressing these gaps through advanced methodologies such as the Panel Toda Yamamoto test could provide critical insights into how these variables interact in diverse institutional and economic settings, ultimately informing policies that foster sustainable development and economic integration.

2.4 RESEARCH GAP

The above discussion indicates that the effects of trade openness and FDI showed mixed results, especially after recent economic and political trends in the liberal international order (Amadi, 2020; Bostan et al., 2023). In fact, the expansion of new nationalism following the UK Brexit and the rise of protectionism following the new US-China trade war are clear examples of the changes (Callaghan, 2021; Rewizorski, 2021). Also, there are inconsistent results regarding the relationship between FDI and economic growth, may be due to the failure to model the effects of the interaction between FDI and growth and the disparity between host countries. 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.

The mixed outcomes and limited recent studies require further empirical studies for a clearer perspective, especially for developing nations such as AMU countries; only a few studies are available. Therefore, this research aims to fill the gaps in AMU countries by examining the impact of trade openness and FDI inflows on economic growth, which will eventually produce robust, unbiased results. Secondly, the recent change in the world business climate has coincided with the growing anti-globalization sentiment (Onafowora & Owoye, 2019). Thus, there is a significant gap in the existing literature regarding the growth impact of regional trade which leads to an urgent need to reexamine the regional trade's growth effects.

In fact, there is limited and outdated research on the relationship between intra-regional trade and economic growth. Thus, this study gives new insights into this issue by filling the gap by examining the economic growth effect of intra-regional trade for AMU from 1996-2022. The results will be of great importance to each AMU country to stimulate economic growth by benefiting more from regional trade integration. Thirdly, previous studies focusing on institutions primarily tested their direct links to economic growth, FDI

attraction, and trade openness facilitating (Li, 2021; Nedić et al., 2020; Qamruzzaman, 2021; Tran et al., 2021).

In contrast, much is to be known about how absorptive capacity in terms of institutions' quality matters for economic growth. Specifically, there is an ambiguity on the spillover effects of institutions' intermediary role in determining trade openness-growth and FDI-induced growth nexuses (Asamoah et al., 2019; Duodu & Baidoo, 2020; Nguyen, Su, et al., 2018). Therefore, this study attempts to clarify the uncertainty on the influence of institutions' quality on FDI-growth association that previous studies have addressed. Also, this study provides insights into the impact of institutional quality on trade openness-growth and intra-regional trade-growth nexuses in AMU countries. In detail, this study shows the impact of the overall score of the six WGI institutional factors on the FDI-growth nexus and the trade openness-growth in AMU countries.

In terms of data, previous studies related to institutions and trade openness-growth nexus and FDI-growth have used different sample countries rather than AMU countries. Moreover, they utilized different variables to proxy institutions' quality rather than the overall score of WGI factors. For instance, Coulibaly (2023) used the Centre for Systemic Peace governance index to proxy institutions' quality. Miao et al. (2020) utilized the six WGI institutional indicators separately for 2003-2017. Ullah et al. (2022a) used Panel data from 1996-2019 for SSA countries, Latin America and the Caribbean (LAC), and Asian countries. To measure institutions' quality, they used an average of only five WGI indicators, which exclude voice and accountability. Regarding FDI, Haini and Tan (2022) examine whether institutional quality affects the FDI-growth relationship by using only the sectoral and industrial level FDI inflows as a proxy to measure FDI and not the aggregate FDI inflow.

In terms of empirical and technical methods, this study applied an empirical strategy, allowing us to interpret our findings straight-forwardly. In particular, this study used interaction terms and considered panel regressions FEM, REM, and HTM models for 1996-2022, which differs from the previous related research. For example, Saidi and Ochi (2023) used the PTR model over 2000-2018 to examine the effect of institutions' quality only on FDI-growth nexus. Ullah et al. (2022a) utilized a comparative analysis and GMM method to explore whether absorptive capacities in terms of institutional capacity can moderate the relationship between FDI and economic growth.

Theoretically, this study examines the endogenous growth effect of absorptive capacity, which is proxied by institutions' quality on trade openness-growth, FDI-growth, intra-regional trade-growth nexuses. To demonstrate, institutional factors like property rights, rule of law, control of corruption, and political stability affect growth endogenously (Acemoglu et al., 2005; Furukawa, 2007). In this context, well-defined institutions affect economic growth by efficiently allocating human and physical capital and accelerating technological knowledge flows (Milgrom et al., 1990; Sayan, 2009; Tornell, 1997). According to North (1991) and Libecap (1989), weak rights protection, corruption, and bureaucracy increase transaction costs, preventing investors from investing. Therefore, the high cost due to poor institutional quality reduces physical and human capital investment.

Similarly, the endogenous growth theory provides a theoretical basis for how trade openness and FDI inflows affect economic growth. Firstly, trade openness affects economic growth by facilitating technology access, knowledge spillover, and optimizing resource allocation (Rivera-Batiz & Romer, 1991; Roubini & Sala-i-Martin, 1995). Secondly, FDI inflows stimulate economic growth by transferring knowledge and technology into the host country, their ability to improve physical and human capital, boosting R&D, and transferring expertise (Chenaf-Nicet & Rougier, 2016; Lucas, 1988; Romer, 1986). Given these points, this study contributes theoretically by examining the effect of the common endogenous growth channel of institutions' quality with trade openness, FDI inflow, and

intra-regional trade on their growth effects. In other words, this study examines how institutions affect trade openness-growth, FDI-growth, and intra-regional trade nexuses through their ability to influence the technology transfer.

Finally, despite the increasing interest in recent studies on the determinants of economic growth, their focus has been confined to ascertain the influence of the macroeconomic variables and institutions' quality in stimulating growth without considering the causal relationship between these variables. To clarify, while the causal relationships between trade openness, FDI, and institutional quality have been widely explored, findings remain mixed due to region-specific dynamics, methodological constraints, and the interdependent nature of these variables. Existing methodologies, such as ARDL and Granger causality, fail to address cross-country heterogeneity, endogeneity, and nonlinear relationships inherent in the AMU's diverse economies. Meanwhile, advanced approaches like the Panel Toda-Yamamoto test, which have been proven to resolve spurious correlations in similar contexts, remain unapplied here. Bridging this gap could offer actionable insights to align regional economic growth strategies with the 2030 Agenda.

Therefore, there is a need to bring a new dimension in investigating the macroeconomic and institutional factors relationship by applying the Panel Toda-Yamamoto (PTY) causality model to determine the causal relationship between the macroeconomic and institutional variables, particularly for AMU countries. The approach is based on Augmented VAR modelling, which applies to the modified Wald test as more robust than the traditional causality test. In short, this study is the first to provide empirical evidence on the direction and magnitude of causality relationship between institutional environment, trade openness, and FDI inflows in the context of AMU countries.

2.5 CONCLUSION

This chapter reviewed existing literature on economic growth, focusing on the determinants of economic growth and the impact of the institutional environment on global and AMU-specific perspectives. This section is crucial for providing a more precise understanding and guiding the selection of relevant variables. In other words, this review critically synthesizes empirical evidence on trade openness, FDI, intra-regional trade, institutional quality, and their interplay with economic growth, explicitly highlighting consensus areas, unresolved debates, and research gaps. While extensive research confirms that trade openness stimulates long-term growth in economies with dynamic comparative advantages through technology diffusion and efficiency gains, its benefits remain contingent on robust institutional frameworks that enforce contracts and mitigate corruption.

Similarly, FDI drives growth only when host economies possess adequate absorptive capacity including skilled labor and strong institutions with sectoral distribution proving critical (positive spillovers in manufacturing versus crowding-out effects in extractive industries). Regional integration further accelerates growth through market expansion and reduced trade costs. However, significant controversies persist developing economies like AMU exhibit asymmetric outcomes to identical policies (e.g., openness benefiting resource-rich Algeria/Libya while hampering Morocco/Tunisia), while FDI-growth relationships remain inconsistent across AMU states. Critical gaps include insufficient analysis of intra-regional trade's growth potential despite AMU's low intra-Maghreb commerce and European dependency, alongside inadequate examination of how institutions moderate trade openness-growth and FDI-growth nexuses.

This study addresses these deficiencies through novel contributions. Firstly, initial comprehensive AMU analysis (1996-2022) of trade openness, FDI, intra-regional trade and institutions. Secondly, conceptualization of institutions as absorptive capacity using a composite WGI index to model moderation effects. Thirdly, Toda-Yamamoto causality test

captures nonlinear dynamics; 4) Policy-relevant insights for leveraging institutions amid anti-globalizations. By resolving puzzles surrounding divergent policy outcomes, regional trade's compensatory potential, and institutional thresholds for FDI efficacy, this research positions institutions as the linchpin of sustainable growth in volatile economic landscapes. The next chapter will present the research methodology to be used, which will be discussed in detail in Chapter Three.

CHAPTER THREE

METHODOLOGY

3.1 INTRODUCTION

To better understand AMU's economic growth determinants, this chapter provides an overview of the econometric modelling techniques used in this study. As discussed in chapter two, many studies have been done to explain the fundamental determinants of economic growth. This chapter deals with the discussion of methods adopted for conducting this study. The study's research hypotheses are discussed in Section 3.2, while the theoretical framework is explained in Section 3.3. Section 3.4 presents the models employed for data analysis. Section 3.5 discusses the justification of the variables examined in this study. The sources of data and measurements utilized in the study are explained in Section 3.6. The methods of analysis used in the study, and the conclusion of the chapter are drawn in Sections 3.7 and 3.8, respectively.

3.2 RESEARCH HYPOTHESES

The following hypotheses are developed to achieve the study's objectives stated in Chapter 1, Section 1.5:

H1: Trade openness, FDI inflow, and intra-regional trade positively affect AMU's economic growth.

H2: Institutional quality exerts a positive moderating effect on the nexuses of TO-growth, FDI-growth, and IRT-growth in AMU.

H3: A causality relationship exists among trade openness, FDI inflow, and institutions' quality in AMU.

3.3 THEORETICAL FRAMEWORK

The theoretical framework conceptualized the theories, establishing the relationship between the identified factors (Sekaran, 2003). Specifically, the theoretical framework of this study highlights the significance of selected macroeconomic variables and institutional factors with economic growth. There is no agreed-upon theoretical framework to guide empirical research on economic growth. However, according to the well-known notion of Eysenck and Barrett (1985), "Measurement without theory is meaningless" p.35. Thus, identifying key theories and relevant models is crucial for conducting meaningful research. This section discusses the theories that apply to the study and their significance. Specifically, the endogenous growth theory, as exemplified by the AK economic growth model, forms the foundation for shaping the research objectives of this study.

3.3.1 Endogenous Growth Model

Endogenous growth theory emerged as a response to the limitations of neoclassical growth theory. The theory emphasized the importance of internal factors such as human capital and technological innovation in driving long-term economic growth. Lucas (1988) made a significant contribution by highlighting the role of human capital, arguing that investments in education and skill development increase the productivity of individuals and lead to higher aggregate output. Lucas's model introduced the idea of increasing returns to human capital, which could sustain economic growth without relying on exogenous technological

progress. Meanwhile, Romer (1986, 1990) contributed to endogenous growth theory by focusing on technology, demonstrating that technological innovation results from intentional investment in research and development (R&D) within the economy rather than external factors.

Romer's work showed that technological progress is endogenous, with innovation spurred by economic incentives and investments, thus facilitating sustained growth. The Uzawa-Lucas model (Uzawa, 1965; Lucas, 1988) further integrated human capital into the production function, illustrating how physical and human capital can interact to generate growth. The Uzawa-Lucas model emphasized that human capital accumulation through education and training could increase returns to scale, allowing for perpetual growth without diminishing returns. This marked a departure from traditional growth models, where technological progress was assumed to be exogenous. Together, these contributions laid the foundation for developing the AK model, which combines capital accumulation and technological development, allowing for sustained growth through capital accumulation.

In examining the economic growth effect of trade openness, FDI inflow, intra-regional trade, and institutional quality, the study follows the AH endogenous growth model proposed by Acemoglu (2009). Moreover, following Duodu and Baidoo (2020), the study investigates the moderating role of institutional quality through the interactions with trade openness, FDI inflow, and intra-regional trade in AMU, as the theoretical model which is expressed in Equation (3.1).

$$Y(t) = A(t)\, H(t) \tag{3.1}$$

where Y, A, and H represent GDP (changes in GDP for this study), technological progress, and human capital respectively. Further taking the natural logarithm of Equation (3.1) leads to the log form of Equation (3.1).

$$ln\ Y(t) = ln\ A(t) + ln\ H(t) \tag{3.2}$$

Differentiating Equation (3.2) with respect to time gives the fundamental growth equation:

$$\frac{\partial lnY(t)}{\partial t} = \frac{\partial ln\ A(t)}{\partial t} + \frac{\partial ln\ H(t)}{\partial t} \tag{3.3}$$

$$\dot{Y} = \dot{A} + \dot{H} \tag{3.4}$$

This will be the fundamental economic growth equation, where $\dot{Y}$ is changes in GDP, which is economic growth. It must be noted that $\dot{A}$ captures growth in economic output contributed by factors other than human capital. Also, $\dot{A}$ and $\dot{H}$ are assumed to be separable and linear. Likewise, the study assumes that economic factors such as trade openness, FDI inflow, intra-regional trade, institutional quality influence technological progress in AMU countries. To avoid errors caused by omitting important variables this study follows Akeel and Khoj (2023) and Al-Naser and Hamdan (2021) and included control variables such as inflation and labor force in the equation of the model.

$$\dot{A} = f(TO, FDI, IRT, IQ, lnL, INF) \tag{3.5}$$

Thus, Equation (3.4) can be written as:

$$\dot{Y} = TO + \text{FDI} + IRT + IQ + lnL + INF + \dot{H} \tag{3.6}$$

Where $\dot{Y}$ is explained earlier and *TO, FDI, IRT, IQ, lnL, INF*, and $\dot{H}$ denote trade openness, FDI inflow, intra-regional trade, institutional quality, natural logarithm of labor force, inflation, and human capital, respectively. Following the assertions by Adu (2013), the study then extends Equation (3.6) to capture the interaction of trade openness, FDI inflow, and intra-regional trade with the institutional quality in Equation (3.7).

$$\dot{Y} = f(TO, FDI, IRT, IQ, lnL, INF, \dot{H}, TO*IQ, FDI*IQ, IRT*IQ) \quad (3.7)$$

where *TO*QI, FDI*IQ, IRT*IQ* represent the interaction of trade openness, FDI inflow, intra-regional trade with institutional quality. The interaction terms capture the moderating effect of institutional quality on the growth impact of trade openness, FDI inflow, and intra-regional trade of AMU countries. Equation (3.6) is then transformed to its estimable form as follows:

$$\dot{Y}_{it} = \alpha_0 + \beta_1 TO_{it} + \beta_2 FDI_{it} + \beta_3 IRT_{it} + \beta_4 IQ_{it} + \beta_5 lnL_{it} + \beta_6 INF_{it} + \beta_7 \dot{H}_{it} + \delta_1 (TO_{it} * IQ_{it}) + \delta_2 (FDI_{it} * IQ_{it}) + \delta_3 (IRT_{it} * IQ_{it}) + \varepsilon_{it} \quad (3.8)$$

where the variables in Equation (3.8) are as already explained, α_0 and ε_{it} denote the constant term and the stochastic error term for country i (i= 1...5) respectively, such that the stochastic error term has a mean of zero and constant variance [ε_{it} $\tilde{\text{N}}$ $(0, \sigma^2)$]. Also, *(t)* represents the time trend for country *(i)* respectively. The β_s (1, 2, 3, . . . , 7) are the respective coefficients of the selected macroeconomic variables to be estimated whereas δ_i is the coefficient of the interaction terms.

3.3.2 Research Framework

The research framework shown in Figure 3.1 is based on the literature review and research problem. The framework focuses on the relationship between macroeconomic variables and institutional factors with economic growth. More specifically, economic growth is the dependent variable and is proxied by changes in the gross domestic product (GDP). Simultaneously, trade openness (TO), FDI inflow, and intra-regional trade (IRT) are the independent macroeconomic variables. The six WGI institutional factors include regulatory quality, rule of law, control of corruption, voice and accountability, political stability, and government effectiveness. This study uses interaction terms of the overall score of the six institutional factors developed by Kaufmann et al. (2004) with trade openness, FDI inflow, and intra-regional trade.

Interacting factors are variables that affect the direction or strength association between explanatory (independent -*X*-) and explained (dependent -*Y*-) variables (Baron & Kenny, 1986). The control variables used in this study are inflation rate and labor force. The scenario of the endogenous growth models used in this study is presented in the research framework below. The solid lines indicate the direct growth effects of trade openness (*TO*), *FDI*, intra-regional trade (*IRT*), natural log of labor force (*lnL*), and inflation (*INF*). At the same time, the moderating effects of the institutional quality (*IQ*) and the causality relationships are represented by the dashed and dotted lines, respectively. Notably, H1, H2, and H3 correspond to the hypotheses developed in Section 3.2 earlier.

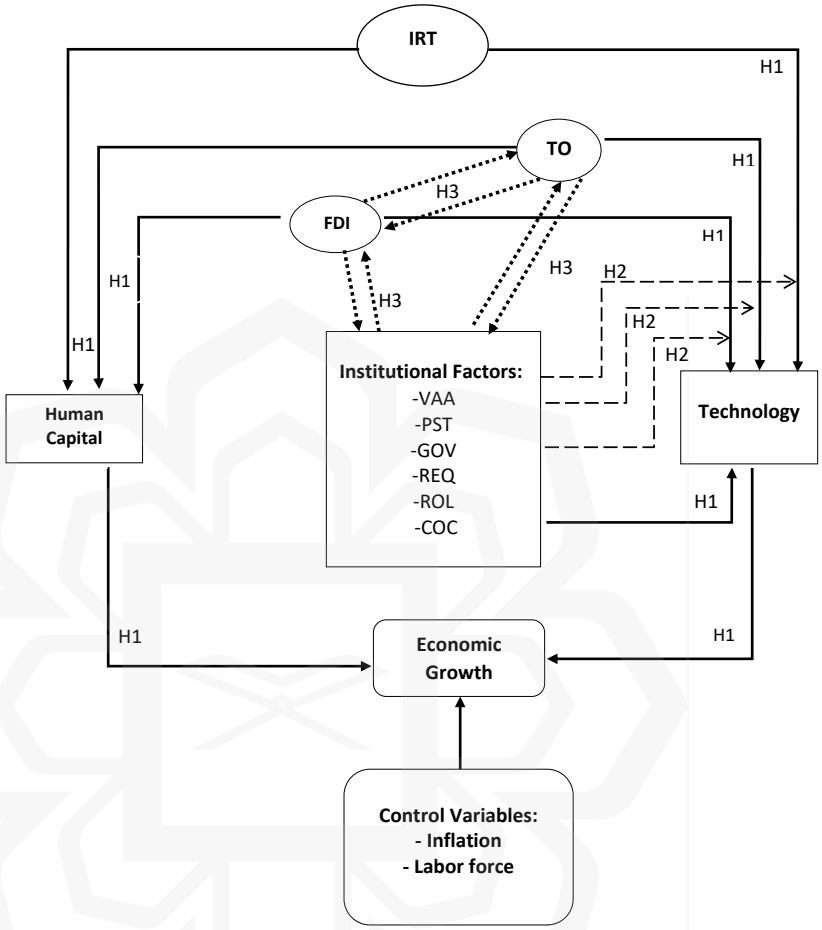

Figure 3.1: Research framework

3.4 MODEL SPECIFICATION

This section describes the model specification to be estimated based on the problem statement and the objectives of this study. An empirical model is developed to evaluate the distinct effects of trade openness, FDI inflow, intra-regional trade, and human capital on AMU countries' economic growth. The model specification also aims to examine the

moderating impact of institutional quality upon the growth effects of trade openness, FDI inflow, and intra-regional trade using interaction terms. Additionally, the model specification intends to determine the direction and magnitude of causality among TO, FDI inflow, and institutional quality in AMU. To achieve these three objectives, the study employs yearly macro panel data from several databases from 1996 to 2022. It must be emphasized that Equation (3.8) is estimated under two distinct specifications. In the first case, the Equation (3.10) is estimated using all the variables without institutional quality and the interaction terms whereas in the second case the Equation (3.11) is estimated with all the variables without TO, FDI, and IRT.

Among the databases referred are the World Bank database (GDP, TO, FDI, INF, L), Penn World Tables (human capital index), IMF (intra-regional trade), and WGI (institutional quality). The AMU countries for the study are Algeria, Libya, Mauritania, Morocco, and Tunisia. The secondary data for the empirical analyses involves the changes in GDP as the main proxy for economic growth, representing the response variable. Meanwhile, trade openness, FDI inflow, intra-regional trade, human capital, institutional quality, and the interaction of trade openness, FDI inflow, and intra-regional trade with institutional quality are used as the main explanatory variables. Finally, the study will fittingly employ inflation and labor force as control variables.

3.4.1 Growth Effects of Macroeconomic Variables

This study considers trade openness, FDI inflow, intra-regional trade, human capital, and labor force as an essential part of economic output. Also, the study incorporates control variables, such as inflation and labor force, to mitigate omitted variable bias, which occurs when key factors are excluded (Osuji, 2015), thereby preventing errors in the model's estimates. Thus, this study uses the following model to assess the influence of a set of macroeconomic variables on economic growth:

$$\dot{Y}_{it} = f(TO_{it}, FDI_{it}, IRT_{it}, \dot{H}_{it}, lnL_{it}, INF_{it}) \quad (3.9)$$

Where $\dot{Y}_{it}$ denotes the economic growth $[(GDP_{it} - GDP_{it-1})/ GDP_{it-1}]*100$ indicates the changes in gross domestic product (GDP) which represents economic growth (dependent variable) for the country i=(1…5) and time t = (1996…2022). The independent variables are trade openness (TO), foreign direct investment inflows (FDI), intra-regional trade (IRT), and human capital ($\dot{H}$). For lnL_{it} and INF_{it}, they are used as control variables, which are labor force and inflation rates. Hence, the econometric specification of the equation (3.9) is shown as follows:

$$\dot{Y}_{it} = \alpha + \beta_1 TO_{it} + \beta_2 FDI_{it} + \beta_3 IRT_{it} + \beta_4 \dot{H}_{it} + \beta_5 lnL + \beta_6 INF_{it} + \varepsilon_{it} \quad (3.10)$$

Where subscript t stands for the period (t=1996….2022), α and β signify the parameters, and ε denote the stochastic error, the rest defined in the previous equation.

3.4.2 Growth Effect of Institutional Quality

A number of factors have been recognized as major determinants of economic growth such as trade openness and FDI which are means to enlarge the human and physical capital of the host country (Kinfack & Bonga-Bonga, 2023; Qazi et al., 2017). Many other studies have explained that trade openness and FDI inflows positively affect the economic growth of the host country until the intervention of some certain factors, such as institutional quality as argued by Lacroix et al. (2021) and Coulibaly (2023). Thus, this study agrees with the previous studies on the role of institutional quality as a conditional factor in trade openness-growth and FDI-growth nexus.

To capture the direct and moderate growth effect of institutional factors, the study examines the direct effects of IQ and its interaction with TO, FDI inflow, and IRT. According to Brambor et al. (2006), if the model is interactive, attention should be paid to the interaction term rather than individual terms. Based on similar studies such as Hayat (2019), Nguyen, Su, et al. (2018), and Ullah et al. (2022a), this study uses the empirical model below expressed in equations (3.11) below.

$$\dot{Y}_{it}=\alpha_0 + \beta_1 IQ_{it} + \beta_2 (TO*IQ)_{it} + \beta_3 (FDI*IQ)_{it} + \beta_4 (IRT*IQ)_{it} + \beta_5 \dot{H}_{it} + \beta_6 INF_{it} + \beta_7 lnL + \varepsilon_{it} \quad (3.11)$$

*TO*IQ, FDI*IQ,* and *IRT*IQ* denote the interaction terms of institutions' quality with TO, FDI inflow, and IRT respectively. The reason for including an interaction term of TO and FDI inflows with IQ in a growth model is to assess how the effects of TO and FDI inflows on growth vary with a country's institutions (Coulibaly, 2023; Duodu & Baidoo, 2020; Miao et al., 2020; Ullah et al., 2022a). In particular, the interaction terms of trade openness, FDI inflow, and intra-regional trade with institutional quality offer a clearer understanding of how these factors together influence economic growth in AMU countries. Principally, this approach provides insight into whether institutional quality enhances or reduces the growth benefits of trade openness, FDI inflow, and intra-regional trade.

According to Brambor et al. (2006) and Greene (2003, p123), the coefficients for interaction terms cannot be interpreted in isolation; substantive effects require calculating conditional marginal effects. In other words, if a model includes an interaction term, the marginal effect of variable X on dependent variable Y might be substantial for meaningful values of the modifying variable Z, even if the coefficient on the interaction term XZ is not significant. As stated by Burks et al. (2019), the interaction term enables the marginal effect of one independent variable to vary based on the value of another independent variable.

Following Law et al. (2020), the marginal effect examines whether the impact of a shift in trade openness on economic development is influenced by the level of institutional quality.

Therefore, in this paradigm, β_2, β_3, and β_4, are used to test the role of institutional quality in moderating the growth effect of TO, FDI, and IRT. According to Brambor et al. (2006), the marginal effect of TO, FDI, and IRT on economic growth can be determined by calculating the partial derivative in the following manner:

$$\frac{\partial \dot{Y}_{it}}{\partial TO_{it}} = \beta_2 IQ_{it} \tag{3.12}$$

$$\frac{\partial \dot{Y}_{it}}{\partial FDI_{it}} = \beta_3 IQ_{it} \tag{3.13}$$

$$\frac{\partial \dot{Y}_{it}}{\partial IRT_{it}} = \beta_4 IQ_{it} \tag{3.14}$$

Similar to Haini et al. (2024) and Thanh et al. (2019), this study estimates the marginal effect of TO, FDI, and IRT on economic growth at marginal value of institutional quality in the sample by taking the derivative of the interaction term with respect to each variable.

3.5 DESCRIPTION OF VARIABLES

This section provides a description of the macroeconomic variables, institutional factors, and economic growth in the model specification. Specifically, the change in the GDP is

used as a proxy of economic growth, which is the dependent or the explained variable. In parallel, trade openness, FDI inflow, intra-regional trade, and institutional factors are variables of interest used as explanatory (independent) variables. Additionally, inflation and labor force are used as control variables. The following sections will discuss how to describe and measure each of these variables.

3.5.1 Gross Domestic Product (GDP)

The changes in the GDP are often used as a metric of economic growth. According to Dinç et al. (2019), GDP is the summation of the value of products and services generated by all domestic producers in an economy, including product taxes and minus any subsidies included in the value of the exports. In this study, the changes in GDP (current US$) are used to proxy economic growth. This measure has been widely used in many international business and economics studies such as Sarker and Khan (2020), Kumari et al. (2021), Hasan and Du (2023), and Miao et al. (2020).

3.5.2 Trade Openness (TO)

Trade openness (TO) is defined as the extent to which a country engages in international commerce by exchanging products and services (Manwa & Wijeweera, 2016). Usually, it is measured by the total trade of goods and services divided by the value of GDP. This variable is used to measure the extent to which foreign trade influences economic growth. Also, this ratio is popular and frequently used in the literature to measure the openness of an economy (Duodu & Baidoo, 2020; Intisar et al., 2020; Tatar et al., 2022).

3.5.3 Foreign Direct Investment Inflows (FDI inflows)

According to the World Bank (2018), FDI is a set of cross-border economic activities such as acquiring physical assets for production by a resident in one economy and carried out in another country. The investor's country is referred to as a home country, while the country where the investment is located is referred to as a host country. Therefore, a country's FDI net inflows are the total amount of FDI made by non-resident investors. Further, FDI inflows are often regarded as an essential driver for economic growth in host countries. Similar to Shittu et al. (2020) and Haque et al. (2022) this study expressed the inward FDI as an annual ratio of FDI inflows to GDP (in current USD) to measure the impact of FDI inflows on economic growth.

3.5.4 Intra-Regional Trade (IRT)

Intra-regional trade (IRT) refers to trade among countries within a particular region or geographic area (Ditsiou et al., 2023). Specifically, this type of trade includes the exchange of goods and services between countries within a specific region, such as the EU, ASEAN, and AMU. IRT is often promoted to encourage economic growth and integration within an area and help countries become more economically interdependent. Similar to Shah (2021) and Ssekibaala et al. (2022), this study expressed the IRT as the ratio of total trade within AMU over trade of AMU with non-AMU members or rest of the world. Put simply, the IRT (expressed as a percentage) denotes the proportion of trade that occurs within a specific region, relative to the total trade conducted by that region. AMU members heavily rely on regional trade when the trade share is high. Although previous outcomes have been inconsistent, there is a hypothesis proposing that commerce within an area could have a beneficial effect on economic growth.

3.5.5 Human Capital (H)

Nelson and Phelps (1966) asserted that a nation's long-term, sustainable economic growth relies on the presence of a well-educated workforce capable of understanding advanced technology and possessing the ability to effectively utilize creative methods. In addition, the new growth theory emphasizes the substantial influence of the accumulation of human capital in justifying the pace of production growth. This encompasses investments made in human capital and is considered a crucial element of long-term economic expansion. In endogenous growth theory, human capital is considered a crucial factor in determining economic growth which emphasizes the importance of human capital in fostering growth in both emerging and established countries (Barro, 2003; Mankiw et al., 1992).

For example, Schembri et al. (2024) confirmed the importance of human capital in driving economic growth. Moreover, by applying the GMM technique, Haiyun et al. (2023) proved that human capital has a statistical significance and adverse impact on economic growth in the short and long runs for the member states of COMESA over the period 2004-2016. Lucas (1988) concluded that variations in economic growth among countries mostly resulted from disparities in their human capital accumulation. This study aligns with the research conducted by Affandi et al. (2019) and Ali et al. (2022), which used school enrollment to measure human capital.

3.5.6 Institutional Factors (IQ)

In recent years, the role of institutional quality in shaping and influencing economic growth has received considerable scholarly attention (Nasreen et al., 2020). According to Meyera (2019), a country's long-term economic growth is determined by its institutions' strength and quality. In fact, the institutional environment plays a fundamental role in explaining

the variations in economic growth across different nations (Kar et al., 2019; Masron et al., 2018). In this vein, Boateng et al. (2021) stated that higher-quality institutional environments foster more efficient resource allocation, innovation, and capital accumulation and create broader opportunities for economic growth.

In parallel, Canh et al. (2021) argued that a better institutional environment quality can help mitigate economic issues such as information asymmetry, transaction costs, and risk by increasing market efficiency. As a result, countries can fully capitalize on openness strategies, creating more favorable economic growth conditions (Maruta, 2019). The notion of institutions refers to a wide range of factors that explain the differences in economic growth among countries that markedly influence economic outcomes (Nguyen, Schinckus, et al., 2018). Hence, choosing institutional factors for a particular study depends on the objective and research interest.

The institutional quality variable used in the present study is obtained by averaging the six dimensions of institutions published by WGI consisting of voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law, and control of corruption. The indicators are measured on a scale from -2.5 to 2.5, with higher values reflecting stronger institutional quality. These indicators collectively provide a comprehensive framework for evaluating the overall institutional environment across countries. To clarify, the IQ variable in this is measured using the average of six WGI indicators, and this method follows Alabed et al. (2021), Saidi and Ochi (2023), and Ullah et al. (2022).

Therefore, the overall institutional index is measured on a scale ranging from -2.5 to 2.5, where the higher value represents a better quality. The data comes from the WGI database, with anticipated positive results regarding the moderating impact of institutional quality on the economic growth-trade and growth-FDI nexuses. The WGI is a widely used

and recognized index for measuring institutional quality in literature (Aiyemo, 2024; Haini & Tan, 2022; Ifeakachukwu & Fagite, 2024; Obalade, 2024).

3.5.6.1 Voice and Accountability (VAA)

The voices and accountability indicator (VAA) measures how citizens exert the power to influence the government. This indicator encompasses the freedom to choose a government, freedom of expression, and an impartial media. The index relates to civil liberties and how citizens can exercise their freedom inside the democratic process (Sabir et al., 2019). The presence of a compelling voice can potentially restrict the propensity of self-interested politicians to exploit their political authority, therefore facilitating the inclusion of citizens in the decision-making processes of governance. Accountability pertains to the capacity of individuals, business entities, and civil society to examine the actions of the government and public institutions and enforce responsibility to promote openness in the management of public affairs (Mamman & Valei, 2023).

The index is scored on a scale from -2.5 to 2.5, with higher VAA values indicating greater political freedom and civil liberties, signifying a system supporting democratic engagement and accountability. Conversely, lower VAA scores suggest restrictions on political participation, media freedoms, and public expression, often indicative of autocratic or repressive regimes. The utilization of the voice and accountability index as one of institutional quality measures aligns with previous studies such as Barbier and Burgess (2021), Hao et al. (2021), and Ogbuabor et al. (2020). The relationship between VVA and its connections to FDI inflows and economic growth, as well as trade openness and economic growth, warrants further exploration. VAA may positively influence the relationship between trade openness, FDI inflow, and economic growth.

3.5.6.2 Political Stability (PST)

The political stability indicator (PST) measures the probability of a country maintaining a stable political system and the absence of politically motivated violence, terrorism, and other forms of insurgency (Adegboye et al., 2020). This indicator is critical in assessing the overall health of a country's political environment, as political stability is often a fundamental component of sustainable development and economic performance. It is essential to note that political instability can create a state of unease and an unfriendly economic environment, which can result in many hazards for MNCs. For example. political crises, property destruction, loss of human lives, increased insurance costs, and a negative impact on the profitability of their investments (Mamman & Valei, 2023).

This research employed the political stability and absence of violence and terrorism index generated by the WGI to assess the effect of political stability, which is aligned with several researchers, Wang et al. (2023b), Epo and Faha (2020), and Sabir et al. (2019). PST's scores range from -2.5 to 2.5, with higher scores indicating a stable political environment, minimal violence, and reduced risk of destabilizing events. A lower PST score suggests heightened risks of political turmoil, civil war, or terrorism, which can lead to uncertainty and disrupt economic and social development. There is a proposition that political stability may positively impact the nexuses between FDI inflows and economic growth, as well as between trade openness and economic growth.

3.5.6.3 Government Effectiveness (GOV)

The government effectiveness indicator (GOV) looks at the level of public services, how well they are delivered, and the degree to which the public service is protected from political influence (Adegboye et al., 2020). This indicator pertains to the efficacy of public

policy development and execution and the perceived trustworthiness of the government's dedication to these public policies (Mamman & Valei, 2023). A score between -2.5 and 2.5 is used, with higher GOV values signifying an efficient, competent, and well-functioning government capable of effectively delivering public goods and services. A lower GOV score suggests challenges such as inefficiency, poorly implemented policies, and bureaucratic or administrative weaknesses, which can hinder the government's ability to meet citizens' needs and foster development.

Utilizing the WGI index to measure government effectiveness aligns with several scholarly studies, including those conducted by Azimi et al. (2025), Belgacem et al. (2024), and Chen et al. (2024). An effective government fosters economic stability, attracts foreign investment, and facilitates trade, all essential for long-term growth. Thus, a high government's effectiveness tends to have a favorable effect on the nexuses of FDI inflows and economic growth, as well as trade openness and economic growth.

3.5.6.4 Regulatory Quality (REQ)

The regulatory quality indicator (REQ) assesses the government's capacity to create effective regulatory policies and enforce laws that support and enhance private sector growth (Sabir et al., 2019). This indicator encompasses regulations about restrictive capital restrictions, corporate governance, accounting standards, environmental regulations, intellectual property rights, and tax and tariff policies (Mamman & Valei, 2023). Regulatory policies possess the capacity to exert influence on investment costs, as well as expedite or impede FDI and international trade operations. Consequently, these policies can significantly impact the relation between FDI inflows and economic growth, as well as trade openness and economic growth.

Higher scores on the scale (from -2.5 to 2.5) reflect a regulatory environment that is transparent, efficient, and conducive to business development, facilitating economic growth and investment. Lower scores indicate regulatory inefficiencies, excessive bureaucracy, unclear rules, or barriers to business activity, which can deter investment and hinder economic expansion. Multiple studies like Akinlo (2024), Barra and Falcone (2024), and Dam et al. (2024) have utilized the regulatory quality index generated by WGI to measure institutional quality.

3.5.6.5 Rule of Law (ROL)

The Rule of Law (ROL) is a measure used to assess the extent of how well individuals, and the government adhere to the legal framework established by the governing authority (Sabir et al., 2019). The legislation should foster individuals' capacity and inclination to adhere to its guidance. This scenario entails a state of affairs in which individuals, both public and private companies and institutions, including the government, are all held responsible for adhering to legal regulations (Mamman & Valei, 2023). The concept of the rule of law pertains to the impartiality and efficacy of the legal framework and the extent to which it is enforced. This pertains to the subjugation of society to prescribed and institutionalized legal frameworks and the restriction of discretionary authority. Thus, establishing an autonomous and proficient judiciary is vital to upholding the efficacy of the legal framework and protecting the welfare of the political system and society.

The law and order issue holds significant importance for international investors and is considered a crucial factor in trade openness. The ROL index assesses individuals' perceptions of the caliber of law and contract enforcement, the efficacy of law enforcement organizations, the potential for crime and violence, and the degree to which laws and regulations are adhered to within a given society (Kacho et al., 2017). The ROL index is

measured on a scale from -2.5 to 2.5, with higher values signifying strong rule of law, fair and impartial legal systems, and protection of individual and property rights. Lower ROL scores suggest a weak rule of law, characterized by corruption, biased legal processes, and inadequate legal protection, which undermines trust in public institutions and hampers economic and social development. Several prior studies have used rule of law index to measure institutional quality (Bah, 2024; Barra & Falcone, 2024; Diallo & Ouoba, 2024).

3.5.6.6 Control of Corruption (COC)

Control of Corruption (COC) refers to the capacity to effectively mitigate and reduce the occurrence and influence of corrupt practices (Sabir et al., 2019). According to Transparency International, corruption can be described as the exploitation of delegated authority for personal benefit. Public officials who are charged with the responsibility of formulating and implementing public policies and programs engage in the misappropriation of public resources. Corruption can manifest in various forms, including petty, grand, or political corruption, which are contingent upon the scale of the financial resources and sector implicated (Mamman & Valei, 2023). Corruption encompasses various illicit practices such as bribery, nepotism, favoritism, misappropriation, and embezzlement, which pertain to the unlawful acquisition or misuse of public resources (Gründler & Potrafke, 2019).

Corruption, namely in the form of bribery for the purpose of obtaining services and the creation of artificial bureaucratic obstacles intended to facilitate rent-seeking behavior, has the effect of raising operational expenses for businesses and distorting economic activity (Hakimi & Hamdi, 2017). Consequently, corruption, by its inherent characteristics, exhibits a propensity for secrecy and complexity, rendering its quantification and remediation challenging endeavors. Nevertheless, several organizations, such as the World

Bank, International Country Risk Guide (ICRG), and Transparency International, have developed indices to measure corruption levels across countries.

These indices are widely used in empirical research. The data used in this analysis, sourced from the WGI, covers a long period, making it suitable for panel data analysis and commonly used in studies of institutional environments. The COC indicator is scored on a scale from -2.5 to 2.5, with higher values indicating successful anti-corruption efforts, greater transparency, and low levels of corruption in public decision-making processes. A lower COC score reflects widespread corruption, weak enforcement of anti-corruption laws, and systemic abuse of power, which can erode public trust, hinder investment, and stifle economic growth. Several studies, such as those by Asamoah et al. (2019) and Kacho et al. (2017), have used the corruption control index to assess institutional quality. Hence, a hypothesis can be formulated that the presence of a high rating of control of corruption will have a beneficial influence on the nexuses of growth-FDI and growth-trade openness in nations belonging to the AMU.

3.5.7 Inflation (INF)

Inflation refers to an increase in the prices of goods and services, which can erode consumers' purchasing power (Rosnawintang et al., 2021). It can be assessed using various indicators, such as the GDP deflator and the consumer price index (CPI) (Turner et al., 2019). Consistent with previous studies by Albataineh (2024), Bhattarai et al. (2021), and Patra and Sethi (2024), this research utilizes the CPI as a proxy for the control variable, as it reflects the annual percentage change in the cost of a typical basket of goods and services for the average consumer. Furthermore, integrating the inflation rate into the model is crucial to understanding the full impact of monetary policy on economic growth and stability.

Inflation is directly linked to higher production costs, and maintaining stable inflation rates is essential to fostering economic growth, as macroeconomic stability significantly affects growth outcomes. An unstable investment environment can hinder sustained growth. In summary, inflation can have positive and negative economic growth implications (Asfuroglu & Elgin, 2016; Caglayan et al., 2016; Nasir et al., 2020; Zhou, 2019).

3.5.8 Labor Force (L)

Labor force is seen as a critical determinant of economic growth, as it directly influences the production capacity of an economy (Amornkitvikai et al., 2023). Similar to Fernandez et al. (2022), in this study labor force refers to the total number of people aged 15 and older who are either employed or actively seeking employment. A larger, more skilled labor force typically leads to higher productivity, driving increases in economic growth. Also, the size and composition of the labor force can affect the overall efficiency and innovation within an economy (Canchari et al., 2018). For instance, a growing and educated workforce can accelerate technological advancements, improve industries' competitiveness, and foster economic growth (Maximilian et al., 2018). Conversely, a shrinking or undereducated labor force can limit an economy's growth potential (Balbaa, 2024). Thus, changes in the labor force are critical to understand the dynamics of economic growth (Çelik & Doğan, 2024). In the context of endogenous growth theory, the labor force is an important explanatory variable of economic growth because it directly influences the economy's capacity to generate long-term growth through its impact on human capital, innovation, and technological progress (Chen et al., 2016; Oyedepo, 2024).

3.6 DATA SOURCES AND MEASUREMENTS

This study utilizes data from various secondary sources, incorporating 27 annual observations from 1996 to 2022. 1996 was selected as the starting point because most AMU countries became members of the WTO in 1995 (Hadili et al., 2020). The countries examined in this research are the member states of the Arab Maghreb Union (AMU), namely Algeria, Libya, Mauritania, Morocco, and Tunisia. The macroeconomic data sources include the World Bank database and the International Monetary Fund (IMF). Additionally, the study employs data on institutional quality, sourced from the Worldwide Governance Indicators (WGI), using the average of six key indicators: voice and accountability, political stability, government effectiveness, regulatory quality, rule of law, and control of corruption. The selection of these data sources, along with the extended period and data availability, was influenced by the quality and comprehensiveness of the data. The measurement and sources of the variables used in this study are presented in Table 3.1.

Table 3.1 Sources of variables and their measurements.

Variable/Notation	Measurement	Sources
Economic Growth (Y)	The change in GDP, gross domestic product at current USD prices.	World Bank
Trade Openness (TO)	Import plus export divide GDP (percent of GDP)	World Bank
Foreign Direct Investment Inflows (FDI)	FDI, net inflows (percent of GDP)	World Bank

Intra-regional trade (*IRT*)	The ratio between trade AMU members with other AMU members is divided by trade of AMU members with the rest of the world.	IMF
Human Capital Index (*H*)	Human capital index, based on years of schooling and returns to education	Penn World Tables (PWT)
Institutional Factors (*IQ*)	voice and accountability, political stability, government effectiveness, regulatory quality, rule of law, control of corruption	Worldwide Governance Indicators
Labor Force (*L*)	labor force participation number of people aged 15 and older who supply labor for producing goods and services during a given period	World Bank
Inflation (INF)	The annual percentage changes in the average consumer's cost of acquiring a basket of goods and services. It is measured by the Consumer Price Index (CPI).	World Bank

3.7 METHOD OF ANALYSIS

This study examined the AMU economies based on annual panel data covering 1996-2022. According to Baltagi (2013), this study's panel data is macro since it is cross-sectional units over a long period (N<T). Appropriately, to achieve the study's first two objectives, several macro panel data transformation and econometric modelling techniques are employed in

this study to achieve its objectives. The normal problems in cross-sectional data are heteroskedastic errors and potential error correlation, the so-called cross-sectional dependence (CSD). Apart from these issues, the endogeneity problem may also be a concern. Proper modelling of panel data requires taking into consideration these statistical issues.

Addressing these issues depends largely on the panel data structure and whether the behavior of a variable under study is static or dynamic. Finally, to meet the last objective of the study, the Toda and Yamamoto (1995) will be used to assess the causal linkages between trade openness, FDI inflow, and institutional quality.

3.7.1 Methods

Given the characteristics of the present study, static panel estimations were deemed more appropriate than dynamic panel estimations (ARDL and GMM). Firstly, the Arellano and Bond (1991) test revealed insignificant endogeneity, suggesting that dynamic models designed to address endogeneity are unnecessary. Secondly, the absence of a significant lagged dependent variable, confirmed by the Arellano-Bond test, further supports the use of static models. Thirdly, our study faces the N<T issue, rendering dynamic panel estimations unreliable. Lastly, the presence of time-invariant variables and the need to include dummy variables are more readily accommodated within the static panel framework. A typical or generic panel model is written as:

$$y_{it}=\beta x_{it}+u_i+\varepsilon_{it} \tag{3.15}$$

The dependent variable, denoted as y_{it}, is influenced by a vector of explanatory variables, represented by x_{it}. Additionally, the individual-specific effects are denoted as u_i, and the standard error term is represented by ε_{it}. The purpose of incorporating individual-specific effects is to account for the presence of unobserved heterogeneity or other factors that may influence the dependent variable. Time-specific effects can be used to consider the influence of time-varying factors that consistently affect all units within a cross-sectional analysis. As previously stated, to accomplish the first two objectives of the study, Model (3.15) is estimated, considering the two treatments of the individual-specific effects.

These effects are considered constant but variable among units or random. The growth effects of the independent variables in these two scenarios necessitate using two distinct estimators: the fixed effects model (FEM) and the random effects model (REM). The estimator selection is contingent upon the presence or absence of a correlation between the explanatory factors and the error terms. As previously mentioned, the fixed effects estimator demonstrates consistency irrespective of the presence or absence of correlation between u_i and x_{it}. When the correlation between variables is absent, the fixed effects estimator exhibits inefficiency, but the random effects estimate demonstrates consistency and efficiency. This gives rise to the subsequent hypotheses:

H_0: u_i is not correlated with x_{it}

H_1: u_i is correlated with x_{it}

The Hausman (1978) is commonly utilized to differentiate between these two hypotheses. The absence of rejection of the null hypothesis indicates a preference for the random effects estimator. The rejection, conversely, indicates the use of the fixed effects estimator.

3.7.1.1 Fixed Effects Model (FEM)

The fixed effects model assumes that the individual-specific effects u_i are constant within a cross-sectional unit but can vary between different units. In other words:

$$yit=\beta xit+ ui +\varepsilon it \tag{3.16}$$

In practical terms, the within-transformation of equation 3.16 can be employed to eliminate the individual-specific effects.

$$(y_{it} - \bar{y}_i) = \beta(x_{it}-\bar{x}_i) + \epsilon_{it} \tag{3.17}$$

where $\bar{y}_i$ and $\bar{x}_i$ are the group means, i.e. $\bar{y}_i = \frac{1}{T}\Sigma_t y_{it}$ and $\bar{x}_i = \frac{1}{T}\Sigma_t x_{it}$, and $\epsilon_{it}=(\varepsilon_{it}-\bar{\varepsilon}_i)$. Define $W_{xy}=\Sigma_{i,t}(x_{it}-\bar{x}_i)(y_{it}-\bar{y}_i)$ and $W_{xx}=\Sigma_{i,t}(x_{it}-\bar{x}_i)^2$.

The fixed effects estimator, also referred to as the inside estimator or LSDV estimator, is commonly used for the least squares estimation of (3.17). According to equation (3.17), the calculated value for the slope coefficient is:

$$\hat{\beta}_{Within}= \hat{\beta}_{LSDV}= W_{xx}^{-1} W_{xy} \tag{3.18}$$

where W_{xx}^{-1} represents the transformed variance-covariance matrix of the independent variables, W_{xy} represents the transformed covariance between the independent and dependent variables. $W_{xx}^{-1} W_{xy}$ provides the estimated coefficients $\hat{\beta}$ for the independent variables after accounting for within-entity variation. In other words, $\hat{\beta}_{Within}$ and $\hat{\beta}_{LSDV}$

represents the estimated coefficients $\hat{\beta}$ within transformation and the Least Squares Dummy Variable (LSDV). The fixed effects estimator provides consistent estimates irrespective of the presence or absence of correlation between the explanatory variable and the error term. Nevertheless, in the absence of correlation, this method is inefficient as it relies on fluctuations within the given data. An additional drawback of the estimator is its limited capacity to integrate time-invariant variables into the model, as they will be eliminated during the within-transformation process.

3.7.1.2 Random Effect Model (REM)

Individual-specific effects can be defined as random, which forms the basis of the random effects model. This can be expressed as:

$$y_{it}=\beta x_{it}+u_i+\varepsilon_{it};\ u_i \sim IID(0,\sigma_u^2)\ \varepsilon_{it} \sim IID(0,\ \sigma_\varepsilon^2) \tag{3.19}$$

where u_i and ε_{it} are not correlated. It should be noted that, in the random effects model, the errors for an individual across different time periods are correlated rather than independent. More precisely,

$$E(\epsilon_{it}\epsilon_{is})=\begin{cases}\sigma_u^2 + \sigma_\varepsilon^2 & \text{for } t = s\\ \sigma_u^2 & \text{for } t \neq s\end{cases} \tag{3.20}$$

where $\epsilon_{it} = u_i+\varepsilon_{it}$. The estimation of equation (3.19) is conducted using the generalized least squares (GLS) estimation method, considering a variance covariance matrix with non-zero off-diagonal elements:

$$\hat{\beta}_{GLS}=\frac{W_{XY}+\theta B_{XY}}{W_{XY}+\theta B_{XY}} \tag{3.21}$$

where $B_{XY}=T_{XY}-W_{XY}$ and $B_{XX}=T_{XX}-W_{XX}$ (they are between variations). θ is the ratio of σ_{ε}^2 to $T\sigma_{u}^2+\sigma_{\varepsilon}^2$:

$$\theta=\frac{\sigma_{\varepsilon}^2}{T\sigma_{u}^2+\sigma_{\varepsilon}^2} \tag{3.22}$$

Thus, it is clear that $\hat{\beta}_{GLS}$ will be closer to $\hat{\beta}_{POLS}$ (the estimated coefficient from POLS regression) if σ_{u}^2 approaches zero, i.e. there is not much variation in the individual specific effects. It will be closer to $\hat{\beta}_{Within}$ when *T* gets larger. In addition, unlike the fixed effects model, the random effects model permits the inclusion of time-invariant variables. Nevertheless, the random effects estimator produces estimates that are biased when there is correlation between the error term and the variables on the right-hand side (i.e., $\epsilon_{it}=u_i+\varepsilon_{it}$).

3.7.1.3 Hausman-Taylor Model (HTM)

Mundlak (1978) posited that the random effects model presupposes the exogeneity of all the regressors with the random individual effects. Conversely, the fixed effects model accommodates the endogeneity of all the regressors together with these individual effects. Thus, the choice regarding the exogeneity of the regressors and individual effects is binary, with only two options: either all or nothing. Baltagi (2013) suggested a Hausman-Taylor model (HTM), based on the work of Hausman and Taylor (1981), that allows for some of the regressors to be correlated with the individual effects. This test is offered as an

alternative to the all-or-nothing choice. The testability of these overidentification constraints can be assessed using a Hausman-type test. In particular, Hausman and Taylor (1981) consider the following model:

$$y_{it}=\beta_1 x_{1it}+\beta_2 x_{2it}+\theta z_i+u_i+\varepsilon_{it};\ \varepsilon_{it}\sim IID(0,\ \sigma_\varepsilon^2) \tag{3.23}$$

where x_1 is endogenous and correlated with u_i, but uncorrelated with the error term ε_{it}, requiring instrumental variable techniques (e.g., the Hausman-Taylor estimator) to address this endogeneity. However, x_2 is strictly exogenous and does not require such corrections, as it is independent of both u_i and ε_{it}. In this model, z_i is a vector containing time-invariant variables. Notably, some of these time-invariant variables may be endogenous. The inside estimator cannot estimate the coefficients of the time-invariant variables as they are eliminated through the within transformation. Therefore, the random effects estimators are the most suitable choice when there are variables that do not change over time. The assumption is $u_i\sim IID(0,\ \sigma_\varepsilon^2)$, and it is not correlated with ε_{it}. The primary concern is that the aforementioned model includes several endogenous explanatory variables, specifically x_{1it}. The 2SLS estimators presuppose that these endogenous explanatory variables exhibit correlation with the idiosyncratic error ε_{it}.

The Hausman and Taylor (1981) estimator utilizes the technique of instrumental variables. Nevertheless, it presupposes that the internal explanatory factors are associated with the individual-specific random effects, u_i, and none of the explanatory variables are associated with ε_{it}. The HTM is specifically developed to estimate a panel model that includes explanatory variables that do not change over time, while also accounting for the non-zero correlation between certain explanatory variables and the individual-specific effects. The steps for estimating HTM are as follows: Firstly, the within estimator is applied to estimate β_1 and β_2, generating within residuals while filtering out time-invariant variables, leaving their coefficients not estimated at this stage.

In this model, β_1 and β_2 represent the coefficients of the time-varying explanatory variables x_{1it} and x_{2it}, respectively, with key differences in their interpretation and associated properties. β_1 captures the effect of the endogenous variable x_{1it} on the dependent variable y_{it}. Since x_{1it} is correlated with the individual-specific effect u_i, estimating β_1 requires addressing endogeneity through techniques such as the Hausman-Taylor estimator to avoid bias and inconsistency. In contrast, β_2 reflects the impact of the exogenous variable x_{2it} on y_{it}. Because x_{2it} is uncorrelated with both u_i and ε_{it}, it does not present endogeneity issues and can be estimated using standard methods (OLS or REM).

Next, these within residuals are regressed on the time-invariant explanatory variables, with endogenous time-invariant variables instrumented using exogenous time-varying x_{2it} and time-invariant variables, ensuring that the number of exogenous time-varying variables meets the order condition for identification. The variance components are then derived from the within and overall residuals, which are used to apply GLS transformations to all variables. Finally, the HTM estimator is run using GLS-transformed variables, with the within-transformed time-varying variables, their within-panel means, and the exogenous time-invariant variables serving as instruments.

3.7.1.4 Panel Toda-Yamamoto (PTY) Causality Test

The concept of causality, which various philosophers have articulated, is utilized across numerous theoretical frameworks (Granger, 1980). In this context, causality pertains to the extent to which one variable influence changes in another. Moreover, analysis often involves evaluating how the historical values of one variable affect another. To fulfil the third objective of this study, the Toda and Yamamoto (1995) causality method will be used. While its primary application is in time-series data, its adaptation to panel data has gained

traction recently (Islam, 2022; Pata et al., 2023; Yilanci & Gorus, 2020; Yixing et al., 2021). Notably, Namini and Hudson (2019) argued that the Toda and Yamamoto causality test outperforms the Granger causality test under specific conditions.

Traditionally, panel Granger causality involves conducting bivariate regressions using stationary variables and applying Wald tests to impose restrictions on relevant coefficients (Hurlin & Dumitrescu, 2012; Yilanci & Gorus, 2020). When variables are non-stationary, the typical approach estimates a VAR model in first-order differences (Hoarau & Lucic, 2023). In cases of cointegration, a VECM is specified. However, the standard Wald test statistics for testing Granger causality in VAR or VECM models exhibit non-standard asymptotic distributions and are highly sensitive to nuisance parameters in finite samples (Toda & Phillips, 1991). Moreover, this approach depends on preliminary steps such as estimating unit roots, cointegration ranks, and vectors, which may introduce significant pre-test biases (Toda, 1995).

Furthermore, the hypothesis of non-causality in VECM involves nonlinear constraints on parameter matrices, making Wald tests prone to size distortions due to rank deficiencies under the null hypothesis (Dolado & Lütkepohl, 1996). To address these limitations, Toda and Yamamoto (1995) proposed a modified Granger causality procedure independent of whether the VAR is stationary, integrated in an arbitrary order, or cointegrated. This approach allows for testing linear or nonlinear restrictions on coefficients by estimating a VAR in levels and applying the Wald criterion without requiring assumptions about the integration or cointegration properties of the time series data (Emirmahmutoglu & Kose, 2011).

For panel data, Andriansyah and Messinis (2019) extended Hurlin and Dumitrescu's (2012) panel Granger causality test and proposed a new panel causality model that is based on Toda and Yamamoto's (1995) approach and is therefore robust to

both the integration and cointegration properties of the variables. This method accommodates non-stationary variables with differing integration orders and eliminates the need for cointegration tests. The Panel Toda-Yamamoto (PTY) causality test applies a modified Wald (MWALD) test from the augmented panel VAR model ($K+d_{max}$) with d_{max} additional lags as the maximum order of integration of variables and K is the optimal lag length taken from the information criteria (Hoarau & Lucic, 2023). Trofimov (2023) highlighted that this method accommodates mixed integration orders, heterogeneous balanced panels, and cases with limited evidence of cointegration.

In other words, the PTY test is particularly effective for variables with mixed integration orders, such as I(0) and I(1), or when cointegration tests provide conflicting results (Sotiropoulou et al., 2023). Therefore, the PTY test is robust to different integration orders and remains valid irrespective of the presence or absence of cointegration (Andriansyah & Messinis, 2019). The implementation of the PTY test involves determining the maximum order of integration d_{max} by performing unit root tests on all variables and identifying the highest order of integration. In this study, the Augmented Dickey-Fuller (ADF) and Phillips–Perron (PP) tests will be employed to assess the stationarity properties of the data. Following this, cointegration can be examined using tests such as those proposed by Pedroni (1999, 2004) and Kao (1999).

The absence of cointegration among variables integrated of order I(1) suggests that the PTY test may be more suitable than a VAR model in first differences. Secondly, to estimate the augmented panel VAR ($K+d_{max}$), the study determines the optimal lag length (K) using information criteria such as the Akaike Information Criterion (AIC), Bayesian Information Criterion (BIC), and Quasi-likelihood Information Criterion (QIC) (Akaike, 1974; Schwarz, 1978; Xiao & Sun, 2019). The modified Wald (MWALD) test is then used to test for causality. Thus, to demonstrate how to test the null hypothesis of non-causality in a panel framework, a panel version of the Toda and Yamamoto (1995) test is suggested. To this end, an augmented panel VAR($k+d_{max}$) model can be constructed as follows:

$$Y_{it} = a_{it} + \sum_{j=1}^{m} \beta_{ij}\, Y_{it-j} + \sum_{j=m+1}^{k+d_{max}} \beta_{ij}\, Y_{it-j} + \sum_{j=1}^{m} \gamma_{ij}\, X_{1it-j} + \sum_{j=m+1}^{k+d_{max}} \gamma_{ij}\, X_{2it-j} + \epsilon_{it} \quad (3.24)$$

Here, Y_{it}, X_{1t}, and X_{2t} are potentially non-stationary variables with a maximum integration order of d_{max}. Parameters a, β, and γ represent the model's coefficients, while ϵ_{it} denotes the residuals. The null hypothesis assumes that X_{1i} Granger does not cause Y_{it} while the variable X_{2i} is held constant. Rejection of the hull hypothesis supports the presence of causality from X_{1i} to Y_{it}. In other words, causality relationship from X_{1i} to Y_{it} exists if $\gamma_{ij} \neq 0$.

3.7.1.5 Diagnostic Tests

Diagnostic tests are essential in static panel data analysis to address issues such as heteroskedasticity, cross-sectional dependence (CSD), serial correlation, time effects, and endogeneity. Some of the various tests available are widely adopted due to their effectiveness and simplicity. Firstly, the modified Wald statistic is employed to test for groupwise heteroskedasticity in a fixed effects model, explicitly examining whether the residuals exhibit constant variance or variable variances across different cross-sectional units. In other words, H_0: $\sigma_i^2 = \sigma^2$, i=1…,N where N represents the total number of cross-sectional units. According to the assumption of null homoscedasticity, the statistic follows a Chi-squared (χ^2) distribution with N degrees of freedom.

Secondly, the existence of CSD is crucial in empirical panel data research, especially when the countries under study share similar economic characteristics, such as emerging economies, developing nations, and transitional economies (Yixing et al., 2021). An economy with similar characteristics is sensitive to the effects of shocks in other

countries due to factors such as international trade, financial integration, and globalization. According to Pata et al. (2023), the presence of CSD implies that a political, economic, or social shock in one country may spill over to another. Traditional panel data methods that do not account for CSD may lead to biased results.

Thus, this can be examined by utilizing the LM test proposed by the Breusch-Pagan (1980) LM test or the Pesaran (2004) CD test for CSD. The null hypothesis posits that the residuals of the cross-sectional units are uncorrelated. These tests are conducted following the estimation of a fixed-effects panel model. Zhou et al. (2022) note that Pesaran (2004) criticized the Breusch-Pagan LM test for its ineffectiveness when the sample size (N) is large. According to Baltagi (2013), CSD on error terms is typically a more significant concern in macro panels. However, in panel data with a small time dimension but a large number of cross-sectional units, such as micro panels, CSD is less likely to pose a significant problem.

Thirdly, the existence of serial correlation diminishes the efficiency of the outcomes. Therefore, it is recommended to do a serial correlation test. Drukker (2003) provides evidence that the Woolridge's (2002) test has favorable size and power qualities when used to datasets of modest size, among the numerous tests available for assessing serial correlation. According to Drukker (2003), the Wooldridge test involves regressing the residuals derived from the panel model in first differences against their lagged values. The examination involves evaluating the coefficient of the lagged residuals, which is hypothesized to be -0.5. The statistical test used for this evaluation follows an *F*-distribution.

Fourthly, a test can also be conducted to determine whether time-specific effects should be included in the estimation of a model with fixed effects. This can be readily accomplished by applying the restricted *F*-test to the regression's time-dummy coefficients.

Lastly, the Hausman test is used to test for endogeneity, especially when you have an instrumental variable (IV) for the potentially endogenous regressor. The test compares the estimators from a random-effects model (or another consistent estimator like OLS) with the estimates obtained from an instrumental variable approach, namely the two-stage least squares estimator (2SLS). It is used to address the endogeneity issue. Let's reconfigure the conventional panel model subsequently:

$$y_{it}=\beta_1 x_{1it}+\beta_2 x_{2it}+u_i+\varepsilon_{it};\ \varepsilon_{it}\sim IID(0,\ \sigma_\varepsilon^2) \tag{3.25}$$

x_{1it} is a $k_{1\times1}$ vector of explanatory variables that are considered to be endogenous. x_{2it} is a $k_{2\times1}$ vector of explanatory variables that are assumed to be strictly exogenous. x_{it} is a vector that combines both $x_{it}=[x_{1it}\ x_{2it}]$. This implies that ε_{it} does not exhibit any correlation with the variables in x_{2it}, whereas it is permissible for it to exhibit correlation with x_{1it}. The impacts distinguish between each individual, denoted as u_i, can be either fixed or random. A potentially intriguing scenario could occur if certain variables in x_{1it} and/or x_{2it} remain constant throughout time. Estimating the coefficients of these time-invariant variables using the inside estimator is not feasible in this scenario. Conversely, the random effects model lacks consistency when certain explanatory factors are correlated with the individual-specific effects.

The 2SLS estimators address the problem of endogeneity in equation (3.25) by using instrumental factors to complement the endogenous explanatory variables. In order to meet the order condition, the number of instruments must be equal to or greater than the number of endogenous explanatory variables. Various 2SLS estimators exist, which differ based on the assumption made on the individual-specific effects. If u_i is considered to be constant and has a correlation with x_{2it}, then the fixed effects or within estimator is optimal in terms of efficiency. Assuming that u_i is random and not connected to x_{2it}, the random effects estimators will be both more efficient and consistent. Essentially, the 2SLS fixed

and random effects estimators are extensions of the conventional fixed and random effects estimators designed to address the issue of endogeneity.

3.8 CONCLUSION

The third chapter discusses the methodological procedure employed in this study. The first part of the chapter consists of the introduction and research hypotheses. The theoretical framework includes the endogenous growth model and research framework. Then, the model specifications with all necessary adjustments were adequately discussed. Next, the chapter discussed the justification of variables, data sources, and measurement. After that, the analysis method includes the estimation techniques of the fixed effect model (FEM), random effect model (REM), Hausman-Taylor model (HTM), relevant diagnostic tests, and Panel Toda-Yamamoto (PTY) causality test.

CHAPTER FOUR

DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 INTRODUCTION

This chapter thoroughly discusses and interpretates the findings to answer all the highlighted objectives in chapter one with the use of appropriate econometrical tools. Therefore, in order to adequately answer the objectives of this study, this chapter is arranged in the following order. Section 4.1 is the introduction; Section 4.2 displays the results of direct growth effects of the macroeconomic variables. Then the chapter slants towards Sections 4.3 to present the estimation results of the growth effects of institutional quality. For the last objective, which is to determine the direction and magnitude of causality among trade openness, FDI inflow, and institutional quality in AMU, is presented in section 4.4. Section 4.5 concludes the chapter.

4.2 GROWTH EFFECTS OF MACROECONOMIC VARIABLES

4.2.1 Preliminary Analysis

4.2.1.1 Descriptive Analysis

Table 4.1 provides a statistical summary of the variables used in the equation (3.10) relevant to the analysis of the first objective. The average score of economic growth (Y) of five AMU countries for 1996-2022 is 5.55 percent with a high standard deviation of 15.77, suggesting considerable variation across the AMU countries, ranging from a substantial decline of -39.96 to a significant increase of 92.12. The highest level of economic growth was in Libya in 2012, with 92.12 percent due to the post-conflict temporary economic rebound following the 2011 civil war (Abushoufa et al., 2024). In contrast, the minimum value of economic growth was also observed in Libya in 2002, with -39.96 percent, driven by declining global oil prices and compounded by the lingering impact of United Nations economic sanctions imposed against Libya (Asma, 2023).

Trade openness demonstrates a mean of 75.20 percent, indicating a generally open trade environment, though with substantial variation across AMU countries, as evidenced by a standard deviation of 20.02. Over the period, Libya scored the highest trade openness at 129.17 percent in 2022. Algeria and Morocco are at the other extreme. Meanwhile, FDI inflows show a mean of 2.77 percent and a standard deviation of 4.23. Mauritania scored the highest FDI inflows at 27.65 percent in 2005 among AMU countries from 1996 to 2022. However, after seven years, Mauritania scored at the peak bottom with -11.19 percent in 2019.

Table 4.1 highlights a significant range in intra-regional trade values among AMU countries from 1996 to 2022. Accordingly, intra-regional trade exhibits a moderate mean of 2.74 percent and a standard deviation of 1.80, suggesting low varying levels of intra-regional trade among the AMU countries. The smallest value recorded is 0.56 percent, belonging to Mauritania in 2005. This indicates a low level of economic interaction during these years.

Table 4.1 Summary Statistics

Variable	Observations	Mean	Standard. Dev.	Min	Max
$\dot{Y}$	135	5.55	15.77	-39.96	92.12
TO	135	75.20	20.02	34.80	129.17
FDI	135	2.77	4.23	-11.19	27.65
IRT	135	2.74	1.80	0.56	11.04
$\dot{H}$	135	1.88	0.29	1.07	2.69
lnL	135	15.11	1.003	13.34	16.38
INF	135	4.05	4.41	-9.80	25.85

Source: Author's calculation using STATA.

Conversely, a small increase in intra-regional trade is observed in later years, with Mauritania reaching the highest value of 11.04 percent in 2015. These figures reflect a growing trend in trade activity within the AMU, suggesting enhanced economic cooperation and integration among member countries. They particularly highlight Mauritania's significant leap in trade value. This upward trajectory points to the potential for further economic collaboration in the region.

The human capital has a mean of 1.88, with values spanning from 1.07 to 2.69. It presents a relatively low standard deviation of 0.29 compared to other variables, indicating less variation in human capital development across the AMU countries. The natural log of the labor force demonstrates a mean of 15.11 with a standard deviation of 1.003, implying a considerable range in labor force sizes among the countries analyzed. Finally, inflation exhibits a mean of 4.05 percent with a standard deviation of 4.41, indicating a moderate variation in inflation levels, including possible deflation (minimum value of -9.80 percent). In sum, Table 4.1 provides a valuable overview of the key variables and their statistical characteristics, which will be instrumental in understanding the relationships and patterns observed in the analysis of the first objective.

4.2.1.2 Correlation Matrix Analysis

Table 4.2 shows pairwise correlations among the variables used in equation (3.10). Since the reported correlation statistics are relatively low, it can be assumed that there are no serious multicollinearity problems among the variables.

Table 4.2 Correlation Matrix of First Objective

	$\dot{Y}$	TO	FDI	IRT	$\dot{H}$	*lnL*	INF
Ẏ	1						
TO	0.11	1					
FDI	0.12	0.32	1				
IRT	-0.17	0.27	0.01	1			
Ḣ	-0.12	0.26	-0.30	0.36	1		
lnL	-0.02	-0.27	-0.33	-0.15	0.34	1	
INF	0.17	-0.03	0.12	0.04	0.14	-0.14	1

Note: $|r| \leq 0.50$ weak correlation, $0.50 < |r| \leq 0.70$ moderate correlation, strong correlation $|r| > 0.70$

Source: Author's calculation using STATA.

4.2.2 Hausman Test

The Hausman test results presented in Table 4.3 indicate that the REM is the more appropriate estimation technique for the Model (3.10) compared to the FEM. As outlined in the methodology chapter, in the absence of a correlation between individual-specific effects and explanatory variables, the fixed effects estimator suffers from inefficiency, while the random effects estimator maintains both consistency and efficiency. Statistical

evidence supports this choice, as the p-value of the Hausman test exceeds 0.05, leading to the non-rejection of the null hypothesis of no correlation between individual effects and explanatory variables. Furthermore, robust standard errors have been employed to ensure robust, consistent estimates within the REM framework.

Table 4.3 Results of Hausman Test

Item	Value
Degrees of freedom	6
chi-square	4.62
Prob > chi2	0.59

Source: Author's calculation using STATA.

4.2.3 Random Effect Model (REM)

Table 4.4 below shows the regressions results of the REM of trade openness (TO), FDI inflows (FDI), intra-regional trade (IRT), human capital ($\dot{H}$) and the selected control variables on economic growth (labor force and inflation). The robust standard errors are reported in parentheses. Column (5) is the complete model based on the specifications stated in Equation (3.10). The other Columns (1-4) are the regression results with different sets of explanatory variables for robustness checking of the main model in Column (5). The first hypothesis (H1), positing positive effects of trade openness (TO), FDI inflows, and intra-regional trade (IRT) on growth, receives partial support.

To clarify, across all models, trade openness consistently shows a positive and statistically significant effect on economic growth at the one percent level, with coefficients ranging from 0.14 to 0.20, indicating a robust and positive relationship between trade

openness and economic growth. However, FDI inflows have no significant effect on economic growth in any of the models. Since the estimated results from Models (1-4) are not much different than the main Model (5), it can be said that the estimated Model (5) is robust. This study obtains results similar to those found by Tahir et al. (2019), which indicated that trade openness had a favorable and significant impact on economic growth. Specifically, a one percent increase in trade openness will increase economic growth in AMU countries by 0.20 percent per annum, aligning with the first hypothesis.

The favorable effect of trade openness on economic growth suggests that the sampled AMU countries could benefit substantially from liberalizing international trade. Hence, they could achieve the desirable long-run economic growth. In other words, increased trade openness would put these economies on the track of long-run economic growth through efficient allocation of resources and productivity. Consistent with Siddikee and Rahman (2021) and Osabohien et al. (2022), this study's findings indicated that the coefficient of FDI inflows is insignificant. Accordingly, the results indicate that the influence of FDI inflows on economic growth in AMU countries is negligible, diverging from the posited expectations of the first Hypothesis (H1). 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.

On the other hand, the results demonstrated that the intra-regional trade has negatively impacted on the economic growth of AMU countries. Statistically, a one unit increase in IRT correlates with a 1.34 unit decline in growth, deviate from the first hypothesis expectations (H1). Some of the reasons for this negative effect include high barriers to trade, logistical bottlenecks, lack of production base diversification, and political considerations (Abdullah et al., 2015). Furthermore, the negative result may be attributed to the "spaghetti bowl" effect, characterized by the overlapping membership of AMU countries in multiple regional trade agreements (e.g., Agadir, EU Association Agreements,

COMESA). As noted by Tanaguzova et al. (2023), the multiplicity of agreements, with their divergent regulations and standards, can increase trade costs.

Consequently, it is crucial to examine whether external trade commitments are synergistic or detrimental to the objectives of the AMU. In line with Aslam (2020), the study found an insignificant growth effect of human capital index in AMU countries, which could be explained by the absence of essential skills, low educational quality, and brain drain (Marchetta, 2012). Also, the results confirmed that the insignificant impact of labor force can be due to a mismatch between the skills trained in schools and the skills needed in the economy with inefficient allocation (Zhan et al., 2023). Moreover, among the traditional determinants of growth, inflation is a positive and statistically significant determinant of economic growth in AMU countries. According to the results, inflation's coefficient (0.86) significantly explains AMU's economic growth, indicating that the price stability from mild inflation contributes positively to AMU's economic growth. Lastly, in all four models, the constant terms are generally not statistically significant. Overall, the findings highlight the strong positive role of trade openness and inflation in promoting economic growth, while the effect of intra-regional trade is negative.

Table 4.4 Results of Random Effects Estimation.

Variables	(1) Y	(2) Y	(3) Y	(4) Y	(5) Y
TO	0.14*** (0.04)	0.17*** (0.05)	0.20*** (0.07)	0.20*** (0.05)	0.20*** (0.05)
FDI	0.14 (0.10)	-0.06 (0.16)	-0.08 (0.21)	-	-0.05 (0.18)

IRT	-	-1.63*** (0.55)	-	-1.35*** (0.47)	-1.34*** (0.48)
$\dot{H}$	-10.38** (4.56)	-7.82 (7.78)	-15.57** (6.86)	-11.22 (6.58)	-11.55 (7.72)
lnL	1.66 (1.40)	-	2.74** (1.22)	2.00 (1.09)	2.00 (1.08)
INF	-	0.75*** (0.14)	0.90*** (0.12)	0.85*** (0.11)	0.86*** (0.13)
Cons	-11.20 (19.27)	9.05 (10.90)	-25.09 (18.22)	-18.50 (15.58)	-18.03 (15.61)
Observations	135	135	135	135	135
r2_w	0.07	0.12	0.11	0.13	0.12
r2_b	0.04	0.41	0.001	0.29	0.29
r2_o	0.05	0.10	0.10	0.12	0.12

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

Source: Author's calculation using STATA.

4.2.4 Diagnostic Tests

Table 4.5 summarizes diagnostic tests to assess key econometric assumptions in the regression model. The assumption of homogeneity or absence of unobserved individual heterogeneity is hardly tenable; however, it is advisable to run a statistical test whether σ_u^2=0. This study uses the Lagrangian Multiplier (LM) test of Breusch and Pagan (1980) to check the heteroskedasticity. The null hypothesis H_0: $\sigma_i^2=\sigma 2$, i=1…,N, where N

represents the total number of cross-sectional units. The results show that the H_0 of homoskedasticity is rejected since the p-value is less than the standard significance level of 0.05. This suggests that the error variance is not constant, implying the presence of heteroskedasticity in the model. Therefore, the use of pooled OLS is not appropriate.

Moreover, for cross-sectional, the study uses the Pesaran (2004) CD test to examine the null hypothesis (H_0) of no correlation of residuals across entities, as CSD may introduce bias in test outcomes. The test result shows that the p-value (0.00) is lower than 0.05, which confirms that the null hypothesis cannot be accepted; accordingly, the error terms are correlated across sections. Also, this study uses the Wooldridge test to evaluate the null hypothesis (H_0) of no serial correlation in the residuals. The Wooldridge test yields a p-value of 0.10, indicating that H_0 is accepted, and no serial correlation exists. In addition, the *F*-test for time-specific effects tests the null hypothesis (H_0) that there are no time-specific effects in the model. A p-value of 0.00 rejects H_0, implying significant time effects.

However, the REM is determined to be a more appropriate estimation technique for Model (3.10) than the FEM, and the time dummy variables are found to be insignificant. Thus, incorporating the time effects may not be necessary. In this case, the preferred approach is to exclude the time dummies from the model, as their inclusion would not contribute meaningful variation. This simplifies the model specification while maintaining efficiency and avoiding unnecessary complexity. Lastly, the Hausman test is the most widely used for the endogeneity issue to check if one or more explanatory variables correlate with the error term. In other words, the Hausman test for endogeneity tests the null hypothesis (H_0) that there is no endogeneity in the model. With a p-value of 0.59, H_0 is not rejected, indicating that the model does not suffer from endogeneity issues.

Table 4.5 Diagnostic Test

Test statistics	Null hypothesis H_0	p-value
Heteroskedasticity: Breusch-Pagan LM test	If p-value <0.05, reject H_0 of homoskedasticity.	0.00
Cross-Sectional Dependence Pesaran (2004) CD test	If p-value <0.05, reject H_0 of no CSD.	0.00
Serial Correlation: Woolridge's (2002)	If p-value<0.05, reject H_0 of no serial correlation.	0.10
Time Effects: *F*-test	If p-value<0.05, reject H_0 of no time-specific effects.	0.00
Endogeneity: Hausman test	If p-value<0.05, reject H_0 of no endogeneity.	0.59

Source: Author's illustrations

4.3 GROWTH EFFECT OF INSTITUTIONAL QUALITY

4.3.1 Preliminary Analysis

4.3.1.1 Descriptive Analysis

Table 4.6 provides a statistical summary of the institutional quality and interaction variables, with data spanning from 1996 to 2022. The mean institutional quality (IQ) of AMU is -0.66, indicating a relatively low average IQ when compared to both the global average (0.02) and the African average (-0.64). While the global average IQ is slightly positive, AMU and Africa exhibit negative mean IQ values, suggesting generally pourer institutional quality in these regions. Regarding variability, AMU's standard deviation (0.48) exceeds that of Africa (0.18) and the world (0.05), implying more pronounced disparities in institutional quality among AMU countries. The bottom IQ values for AMU and Africa are notably low, with -1.91 and -2.41, respectively, signifying that certain countries in these regions experience inferior institutional quality.

In AMU, the lowest IQ value (-1.91) was recorded for Libya in 2019, and the highest IQ (0.06) was for Mauritania in 1998. In Africa, the minimum IQ (-2.41) was observed in Somalia in 2008, while the highest IQ (0.87) was for Mauritius in 2014. Globally, Somalia in 2008 also has the minimum IQ value (-2.41), and the highest IQ (1.95) is attributed to Finland in 2004. Consequently, the maximum IQ values for AMU (0.06) and Africa (0.87) are lower than the global maximum (1.95), further emphasizing the relatively poorer institutional quality in both AMU and African countries. In addition, while institutional quality varies widely across these regions, AMU and Africa generally face greater institutional strength challenges than the global average.

Specifically, all five AMU countries rank poorly regarding global institutional quality. According to the WGI (2022), Algeria's institutional quality was rated at -0.79, ranking 174th globally, while Libya's score was -1.79, placing it at 210th. Mauritania scored -0.75, ranking 167th; Morocco at -0.28, ranking 129th; and Tunisia at -0.32, ranking 132nd. Thus, all five countries of the Arab Maghreb Union (AMU) exhibit relatively low rankings in institutional quality, highlighting challenges institutional effectiveness across the region. The interaction terms, including TO*IQ (trade openness and institutional quality), FDI*IQ (FDI inflows and institutional quality), and IRT*IQ (intra-regional trade and institutional

quality), exhibit negative averages. Moreover, TO*IQ exhibits the broadest range of values, spanning from -231.62 to 2.63, indicating significant variability.

Table 4.6 Summary Statistics of Institutional Quality and Interaction Variables

Variable	Observations	Mean	Standard. Dev.	Min	Max
Ẏ	135	5.55	15.77	-39.96	92.12
IQ	135	-0.66	0.48	-1.91	0.06
IQ_{World}	-	0.02	0.05	-2.41	1.95
IQ_{Africa}	-	-0.64	0.18	-2.41	0.87
TO*IQ	135	-48.13	39.72	-231.62	2.63
FDI*IQ	135	-1.60	3.11	-18.35	7.97
IRT*IQ	135	-1.55	1.53	-9.82	0.08

Source: World Bank Database and Worldwide Governance Indicators, 2025

4.3.1.2 Correlation Matrix Analysis

Table 4.7 shows pairwise correlations among the variables. Since the reported correlation statistics are relatively low (except TO*IQ), it can be assumed that there is no serious multicollinearity problem among the variables.

Table 4.7 Matrix of Correlation for Second Objective

	Ẏ	IQ	TO*IQ	FDI*IQ	IRT*IQ	H	lnL	INF
Ẏ	1							
IQ	0.02	1						
TO*IQ	-0.04	**0.86**	1					
FDI*IQ	-0.11	0.13	0.29	1				
IRT*IQ	0.16	0.67	0.51	0.11	1			
Ḣ	-0.12	-0.12	-0.11	0.30	-0.14	1		
lnL	-0.02	0.21	0.30	0.38	0.28	0.34	1	
INF	0.17	-0.24	-0.12	-0.14	-0.19	0.14	-0.15	1

Note: $|r| \leq 0.50$ weak correlation, $0.50 < |r| \leq 0.70$ moderate correlation, strong correlation $|r| > 0.70$

Source: Author's calculation using STATA.

4.3.2 Hausman Test

The Hausman test result ($p = 0.53$) presented in Table 4.8 suggests that the REM is more suitable than the FEM for model (3.11). Additionally, robust standard errors are utilized to ensure reliable estimation of the REM.

Table 4.8 Results of Hausman Test

Item	Value
Degrees of freedom	6
chi-square	6.07
Prob > chi2	0.53

Source: STATA.com

4.3.3 Random Effect Model (REM)

Table 4.9 presents the regression results of four regression Models (1-5) from the REM based on equation (3.11), analyzing various factors' impact on AMU growth from 1996 to 2022. It illustrates the direct growth effects of institutional quality and its influences on trade openness, FDI inflows, and intra-regional trade by incorporating the interaction term technique. The dependent variable is economic growth (Y), while the independent variables include IQ, H, and the interactions of institutional quality with TO, FDI inflows, and IRT, represented by TO*IQ, FDI*IQ, and IRT*IQ, respectively (e.g., TO*IQ captures how the effect of TO on Y varies with IQ). Also, the selected control variables are labor force and inflation (lnL & INF). The robust standard errors are reported in parentheses, reflecting the precision of the coefficient estimates.

The Column (5) represents the comprehensive model estimated according to the specifications outlined in Equation (3.11) and summarized in Figure 3.1. On the other hand, the other columns (1, 2, 3, 4) are the regression results with different sets of explanatory variables for robustness checking of the main model in Column (5). To explain, the first

model omits the Ḣ, the second disregards lnL, the third excludes INF, and the fourth model ignores FDI*IQ. Therefore, Model (5) is selected as the most robust and relevant model because it shows significant results for the key variables. To simplify, model (5) examines the IQ's direct growth effects and its moderating impact on the nexuses between trade openness, FDI inflows, intra-regional trade, and economic growth.

Besides, Column (5) introduces the direct economic growth effects of the control variables (lnL and INF). Consistent with Arvin et al. (2021) and Mollick and Vianna (2024), this study's findings indicated that only in the model (5), IQ alone has a positive statistically significant direct effect on economic growth. Notably, the interaction terms reveal critical moderating roles of IQ. To analyze the impact of institutional quality in conjunction with TO and IRT on economic growth via interaction terms the study follows the marginal effect approach suggested by Greene (2003). In other words, the substantively meaningful marginal effect of trade openness on economic growth must be calculated by the average of institutional quality. For this study, the analysis used the average institutional quality (-0.66).

Notably, the interaction terms reveal that IQ only moderates TO and IRT's effects, implying that institutions matter indirectly the economic growth in AMU economies. Specifically, the interaction between IQ and TO (TO*IQ) is positive and significant (β_2=0.08, p<0.01), suggesting that higher institutional quality increases the growth benefits of trade openness (i.e., 0.20 growth per 1 unit increase in TO). In other words, a stronger institutional quality could amplify the positive growth effects of trade openness in AMU countries from 1996-2022, likely by improving regulatory frameworks and reducing transaction costs. To put it another way, institutional quality positively moderates the trade openness-growth nexus in AMU countries during the period 1996-2022, validating the hypothesis that stronger institutions enhance TO's positive growth impact.

Conversely, the interaction of institutional quality with intra-regional trade (IRT*IQ) is negative and significant (β_4=-1.48, p<0.01), indicating that stronger institutions exacerbate the adverse growth effects of intra-regional trade (i.e. -1.34 growth per one unit increase in IRT). In other words, strong institutions negatively moderate the IRT-growth nexus in AMU countries during the period 1996-2022. This counterintuitive result may stem from rigid institutions that limit flexibility in regional trade. Accordingly, the results show that the second hypothesis (H2), which posits that IQ positively moderates the relationship between trade openness, FDI inflows, intra-regional trade, and economic growth, is partially validated. Moreover, in line with the findings of Ofori et al. (2024), who found that human capital has no impact on growth due to weak IQ, this study confirmed that the $\dot{H}$ is insignificant. In other words, the current research finds that $\dot{H}$ has no positive impact on growth in AMU from 1996 to 2022. Also, the results confirmed that the insignificant impact of labor force.

Other potential factors contributing to the insignificant impact of $\dot{H}$ and labor force on economic growth in AMU countries were explained in the previous subsection. Furthermore, within the conventional determinants of growth, INF continues to show a positive coefficient at the 1 percent level, with a significant coefficient of 0.89. The constant term is positive (2.81), but it is not statistically significant. To sum up, the study identified a significant positive direct effect of institutional quality on economic growth in AMU countries. Also, the study revealed significant findings concerning the moderating effect of institutional quality in AMU countries from 1996 to 2022, suggesting that institutions in these countries need to be developed.

Table 4.9 Results of random effects estimation.

Variables		(1) Y	(2) Y	(3) Y	(4) Y	(5) Y
IQ		2.85 (3.62)	4.27 (2.88)	-0.92 (2.33)	5.47*** (2.19)	5.38** (2.61)
TO*IQ	raw	-0.08*** (0.03)	-0.10*** (0.02)	-0.05* (0.03)	-0.12*** (0.03)	-0.12*** (0.02)
	marginal effect	0.05** (0.02)	0.07*** (0.01)	0.04* (0.02)	0.08*** (0.02)	0.08*** (0.02)
FDI*IQ	raw	-0.35 (0.12)	-0.05 (0.14)	-0.40 (0.10)	-	-0.09 (0.14)
	marginal effect	0.23 (0.08)	0.04 (0.09)	0.27 (0.07)	-	0.06 (0.09)
IRT*IQ	raw	2.69*** (0.58)	2.48*** (0.30)	2.55*** (0.13)	2.22*** (0.26)	2.24*** (0.24)
	marginal effect	-1.77*** (0.38)	-1.63*** (0.20)	-1.68*** (0.08)	-1.46*** (0.17)	-1.48*** (0.16)
Ḣ		-	-7.06 (5.80)	-4.66 (2.60)	-8.75** (4.07)	-8.44 (4.61)
lnL		0.06 (1.08)	-	0.21 (0.98)	1.03 (1.12)	1.07 (1.11)
INF		0.76*** (0.13)	0.85*** (0.16)	-	0.91*** (0.10)	0.89*** (0.11)
Cons		3.19 (17.92)	16.95 (12.11)	11.11 (16.50)	3.98 (21.90)	2.81 (22.81)
N		135	135	135	135	135
r2_w		0.10	0.12	0.07	0.12	0.13
r2_b		0.03	0.15	0.24	0.17	0.18
r2_o		0.10	0.11	0.06	0.11	0.12

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

Source: Author's calculation using STATA.

Although conventional wisdom suggests that intra-regional trade and FDI inflows should foster economic growth, the institutional contexts in AMU countries could explain the lack of their positive growth effects. To clarify, intra-regional trade and FDI inflows positively impact economic growth when achieving a sufficient degree of absorptive capacity, including human capital, infrastructure, and technology. In many developing countries, including those in the AMU, the capacity to effectively absorb growth effects of intra-regional trade and FDI inflows might be limited due to inadequate skills, poor infrastructure, or underdeveloped technology.

4.3.4 Diagnostic Tests

Table 4.5 summarizes diagnostic evaluations of key econometric assumptions of the regression of the growth effects of institutional quality model. The same diagnostic tests will be performed as explained in detail in section 4.2.4 previously. The Breusch-Pagan LM test (Breusch & Pagan, 1980) rejects the null hypothesis of homoscedasticity ($p < 0.05$), indicating heteroskedasticity. Similarly, Pesaran's (2004) CD test reveals significant cross-sectional dependence ($p = 0.00$), rejecting the null hypothesis of error independence. These findings collectively demonstrate violations of critical regression assumptions, rendering pooled OLS estimation unsuitable. The Wooldridge test yielded a p-value of 0.14, failing to reject the null hypothesis and indicating no serial correlation. While the F-test for time-specific effects showed significance ($p < 0.01$), the REM was deemed more appropriate than the FEM for model 3.11. Insignificant time dummy variables suggested that incorporating time effects was unnecessary, justifying their exclusion. Lastly, the Hausman test ($p = 0.53$) revealed no endogeneity concerns, supporting the model's validity.

Table 4.10 Diagnostic Test

Test statistics	Null hypothesis H_0	p-value
Heteroskedasticity: Breusch-Pagan LM test	If p-value <0.05, reject H_0 of homoskedasticity.	0.00
CSD Pesaran CD test	If p-value <0.05, reject H_0 of no CSD.	0.00
Serial Correlation: Woolridge's (2002)	If p-value<0.05, reject H_0 of no serial correlation.	0.14
Time Effects: *F*-test	If p-value<0.05, reject H_0 of no time-specific effects.	0.01
Endogeneity: Hausman test	If p-value<0.05, reject H_0 of no endogeneity.	0.53

Source: Author's illustrations

4.4 ESTIMATION OF CAUSALITY MODEL

In this section, the causal relationship between trade openness, FDI inflows, and institutional quality are investigated using the dynamic Panel Toda-Yamamoto (PTY) causality approach for the panel of five AMU countries. Though the Toda-Yamamoto technique employed for analysis of the causal relationship is not concerned with the stationary properties of the series and cointegration, the unit root analysis is conducted to ascertain the maximal order of integration of the variables, primarily for lag augmentation in respect of the Augmented panel VAR model as advanced by Toda and Yamamoto (1995).

4.4.1 Panel Unit Root Test Results

In spite of the applicability of a causality approach regardless of the variables' integration properties, the Augmented Dickey-Fuller (ADF) panel unit root test is employed in this study to ascertain the maximum order of integration of the variables in the model (d_{max}). The result of the test ADF unit root test is shown in Table 4.11 at level and first difference. From Table 4.11, the null hypothesis of non-stationarity was rejected only for FDI inflows (FDI) which attained stationarity at level I(0). Thus, trade openness (TO) and institutional quality (IQ) are integrated of order one I(1). Therefore, the results obtained from the ADF test suggest that the maximum order of integration in this study is one, i.e. d_{max}=1. This means that the lag augmentation (d_{max}) is determined as one in estimating Augmented VAR model for the causality analysis.

Table 4.11 Unit Root Tests

Augmented Dickey-Fuller (ADF)				
Variables	At Level, I(0)		1st Difference, I(1)	
	Statistic	p-value	Statistic	p-value
TO	-0.12	0.45	-6.48	0.00
FDI	-2.43	0.00	-	-
IQ	0.23	0.59	-4.30	0.00
Phillips–Perron (PP)				
Variables	At Level, I(0)		1st Difference I(1)	
	Statistic	p-value	Statistic	p-value

TO	8.01	0.63	84.46	0.00
FDI	70.06	0.00	-	-
IQ	5.17	0.87	105.01	0.00

Source: Author's calculation using STATA.

4.4.2 Selection of Lag Length Results

Based on the stationarity analyses, the appropriate causality test is the Panel Toda-Yamamoto (PTY) model. As a custom in the application of the Toda Yamamoto causality approach, the lag lengths should be evaluated to select the optimal lag length employed in estimating the augmented VAR for the causal analysis between TO, FDI inflows, and IQ for the AMU countries. In this study, the Akaike Information Criterion (AIC), Bayesian Information Criterion (BIC), and Quasi-likelihood Information Criterion (QIC) are used to determine the optimal lag length (Akaike, 1974; Schwarz, 1978; Xiao & Sun, 2019). According to the selection criteria (smallest value of AIC, BIC, and QIC), the result of the optimal lag test is presented in Table 4.12 which shows that the optimal lag length is k=1.

Table 4.12 Lag Length Selection Criteria

Lag	AIC	BIC	QIC
1	-60.50*	-230.35	-129.32
2	-43.89	-171.28	-95.51
3	-41.84	-126.77	-76.26

4	-25.55	-68.02	-42.76

Note: * denotes lag order selected by the criterion.

Source: Author's calculation using STATA.

4.4.3 Estimation Results of Panel Toda-Yamamoto Panel Causality

Table 4.13 shows causality analysis amongst trade openness (TO), FDI inflows, and institutional quality (IQ) for AMU countries using dynamic Toda-Yamamoto panel causality approach. Following the confirmation of I(1) order as the maximum order of integration of the variables in the model and the selection of lag one as the optimal lag length, the study can proceed to employ the series in the dynamic Toda-Yamamoto panel causality framework. The results from the modified Wald test in respect of the causality are presented below.

Table 4.13 Results of Panel Toda Yamamoto Causality

Null Hypothesis	Coefficient	Conclusion
TO does not Granger-cause FDI FDI does not Granger-cause TO	-0.02 -0.51	No causality
TO does not Granger-cause IQ IQ does not Granger-cause TO	0.0002 -27.26**	Unidirectional causality at 5%

FDI does not Granger-cause IQ IQ does not Granger-cause FDI	0.0004 -1.14	No causality

Note: * p < 0.10, ** p < 0.05, *** p < 0.01

Source: Author's calculation using STATA.

The findings from the Panel Toda Yamamoto causality tests (Table 4.13) offer partial support for the third hypothesis (H3) positing causal linkages among trade openness, FDI inflows, and institutional quality in AMU countries from 1996 to 2022. First, the absence of significant coefficients for causal relationship between trade openness and FDI inflows, contradicting the expected interdependence implied by the third hypothesis. However, unidirectional causality emerges from institutional quality toward trade openness, suggesting that improvements in institutional frameworks Granger-cause increases in trade openness. Notably, no causal links are observed between FDI inflows and institutional quality, as the coefficient for FDI inflows do not Granger cause institutional quality, and vice versa. To clarify, FDI in AMU is resource-driven, not institutionally sensitive. Investors tolerate weak governance for resource access.

These results collectively imply that institutional quality plays a critical role in shaping trade policies within AMU nations, but FDI inflows operate independently of both trade openness and institutional frameworks in this context. Similarly, the result of this study on the causal link between the FDI inflows and institutional quality replicates the results of Chan and Tang (2017). Overall, the findings suggest minimal evidence of causality, with one exception: unidirectional causality running from institutional quality to trade openness. Thus, the mixed evidence underscores the need to contextualize the hypothesis within region-specific institutional and economic structures.

4.5 CONCLUSION

In this chapter, the descriptive and inferential analyses concerning the three objectives of the study were presented and discussed. The preliminary analysis involves the description of panel data employed in the research and the correlation matrix for all the models in the study. The study used the REM to achieve the first and second objectives: the impact of selected macroeconomic variables on economic growth and the moderating role of institutional quality in the five AMU countries from 1996 to 2022. The findings provide a comprehensive analysis of the factors driving AMU's economic growth and the institutions' moderating role between trade openness, FDI inflows, intra-regional trade, and economic growth, addressing the research objectives and hypotheses outlined in the first Chapter.

The results from the analysis of the first objective reveal several important insights. First, trade openness is found to have a robust positive impact on economic growth, aligning with the first hypothesis. Therefore, the study suggests that more open trade policies foster economic growth, which points out the importance of global market integration for economic expansion. However, contrary to the first hypothesis expectations, the analysis reveals that FDI inflows do not significantly affect economic growth in AMU countries, which may indicate the need for complementary factors or conditions to leverage the benefits of FDI inflows fully. Surprisingly, intra-regional trade demonstrated a significant negative impact on economic growth, highlighting potential inefficiencies or barriers within the region that may hinder the potential gains from increased trade within the AMU block.

These results underscore the importance of addressing structural inefficiencies and enhancing the quality of intra-regional trade within AMU economies to unlock its potential benefits. Furthermore, human capital and the labor force exhibited no statistically

significant direct effects on economic growth in AMU countries from 1996-2022. This finding may indicate structural issues in the labor market or a mismatch between skills or abilities. Besides, the outputs suggest that human capital may not be primary drivers of economic growth in the AMU countries during the period 1996-2022. Additionally, inflation was found to significantly impact economic growth in AMU countries, emphasizing the need for macroeconomic stability.

The study's second objective is to analyze institutional quality's impact on economic growth and explore its moderating function between trade openness, FDI inflows, intra-regional trade, and economic growth. The second hypothesis posits a pivotal moderating role of institutional quality. While institutional quality directly enhances growth, its interaction effects vary. In other words, the findings indicate that institutional quality does exert a significant direct positive impact on economic growth. Moreover, it positively moderates the association between trade openness and economic growth, indicating that institutions may enhance the beneficial growth impacts of trade. This suggests that as institutions improve, the marginal growth benefits of trade openness may increase, likely by improving regulatory frameworks and reducing transaction costs.

On the other hand, institutional quality negatively moderates the relation between intra-regional trade and economic growth, implying that higher institutional quality exacerbates the adverse growth effects of intra-regional trade. This paradox may stem from institutional rigidities or mismanagement of regional trade policies. The nonsignificant interaction with FDI inflows suggests institutional quality alone does not amplify FDI inflows' economic growth impact without complementary policies.

The third hypothesis proposes a significant causal linkage among trade openness, FDI inflows, and institutional quality, the results show a limited support. To clarify, the Panel Toda and Yamamoto (PTY) causation test reveals no significant causality between

trade openness and FDI inflows, suggesting that these factors operate independently in the AMU context. Nonetheless, a negative unidirectional causal relationship exists from institutional quality to trade openness. In fact, this conclusion indicates that AMU's low institutional quality negatively causes trade openness but does not necessarily the reverse. In contrast, no evidence was discovered to establish causality between FDI inflows and IQ, further reinforcing the complexity of the interplay between FDI inflows and low IQ of AMU countries. The absence of a causal relationship between FDI inflows and institutional quality implies that FDI inflows in the AMU are not significantly influenced by the quality of institutions, which may reflect other determinants of FDI inflows in the region.

Overall, the results of this chapter contribute to a nuanced understanding of the economic dynamics in the AMU countries, highlighting the varying roles of trade openness, FDI inflows, intra-regional trade, institutional quality, and other factors in shaping economic growth. The findings suggest that while trade openness can positively influence growth, the role of FDI inflows and the effects of intra-regional trade require further investigation to understand the underlying structural challenges. Furthermore, institutional quality emerges as an important yet complex factor in mediating these relationships, pointing to the need for reforms that improve institutional quality to fully harness the potential benefits of trade and FDI inflows in AMU countries.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1 INTRODUCTION

This chapter presents the conclusions of the research work. The chapter commences with a synthesis of the core findings in Section 5.2. This is followed by the study's contributions in Section 5.3. Policy recommendations are proposed in Section 5.4, while limitations and suggestions for future research are discussed in Sections 5.5 and 5.6, respectively. Finally, Section 5.7 concludes the chapter.

5.2 SUMMARY OF THE FINDINGS

This study examines the determinants of economic growth in the AMU nations from 1996 to 2022 by using REM. Particularly emphasizing trade openness, FDI inflows, intra-regional trade, and human capital. Moreover, the study examines the moderating effect of institutional quality and the causal relationship between economic growth and other macroeconomic factors. Specifically, this study examines the effects of trade openness, FDI inflows, intra-regional trade, human capital, inflation, and labor force on economic growth in AMU countries. Consistent with the initial hypothesis (H1), the analysis indicates that trade openness significantly and positively impacts economic growth, implying that further integration into global markets fosters economic growth.

On the other hand, FDI inflows into AMU countries do not have a significant impact on economic growth, contradicting the first hypothesis (H1). This indicates that other factors may limit the direct contribution of FDI to economic growth in the region. Additionally, contrary to the expectations outlined in the first hypothesis (H1), intra-regional trade appears to impede economic growth, pointing to possible inefficiencies or obstacles within AMU's regional trade systems. Moreover, human capital and labor force have an insignificant impact on economic growth in AMU countries, potentially attributable to a lack of essential skills, inadequate educational quality, and brain drain. Moreover, inflation significantly explains AMU's economic growth over the study period (1996-2022), indicating that mild inflation and inflationary pressures positively contribute to and drive growth in AMU countries.

The second objective of the study is to explore the moderating role of institutional quality between trade openness, FDI inflows, intra-regional trade, and economic growth in AMU countries during the period 1996 to 2022. The findings reveal that the second hypothesis (H2) is partially supported. Specifically, the empirical findings underscore the dualistic role of institutional quality in shaping economic outcomes within the AMU context. First, institutional quality exhibits a statistically significant direct positive effect on economic growth, while also enhancing the growth benefits associated with trade openness, as evidenced by the significant interaction term. These results corroborate the second hypothesis (H2), affirming that robust institutional frameworks serve as critical enablers for harnessing the advantages of trade openness.

In contrast, the findings reveal that the interaction between FDI inflows and institutional quality is insignificant, implying that institutional quality does not moderate the FDI-growth relationship. This indicates that improvements in institutional frameworks alone may not be sufficient to enhance the economic growth impact of FDI inflows in AMU countries. Also, this result suggests that institutional reforms might need to be accompanied by complementary policies, such as infrastructure development and human capital

enhancement, to effectively amplify the growth effects of FDI inflows. Paradoxically, however, the moderating role of institutional quality amplifies the adverse growth effects of intra-regional trade, with the interaction term coefficient revealing a negative significant relationship.

In other words, higher institutional quality exacerbates the adverse growth effects of intra-regional trade in AMU countries over the period 1996-2022. This indicates that stronger institutions may inadvertently intensify the negative outcomes of intra-regional trade, potentially reflecting rigid regulatory environments or misaligned policy priorities. These findings collectively underscore the dual role of institutions in the AMU enhancing growth directly and reshaping trade dynamics while revealing critical gaps in leveraging FDI inflows and intra-regional trade.

The third objective of this study examines the direction and magnitude of causality between trade openness, FDI inflows, and institutional quality in AMU countries from 1996 to 2022. The findings indicate that the third hypothesis (H3), which posits causal linkages among trade openness, FDI inflows, and institutional quality, receives limited empirical support. Specifically, the results of the Panel Toda and Yamamoto (PTY) causality test reveal no causal association between trade openness and FDI inflows, nor between FDI inflows and institutional quality. However, institutional quality has an impact on trade openness, exhibiting a negative causality from institutional quality to trade openness, which implies that the quality of institutions may determine the degree to which trade openness influences economic growth, but not the other way around.

5.3 CONTRIBUTION OF THE STUDY

This study makes significant contributions to existing literature in several ways. As stated in the problem statement, the AMU countries failed to achieve their central vision of attaining sustainable economic growth and the welfare of their people. This study offers a comprehensive analysis of economic growth determinants within the AMU, a region that has been largely neglected in empirical research. Specifically, the study provides empirical insights into the roles of trade openness, FDI inflows, intra-regional trade, and institutional quality using REM. It addresses the gap in the literature concerning the factors influencing sustainable economic growth in AMU countries, which have struggled to capitalize on their natural resources and achieve their development goals.

One of the key contributions is the empirical evidence on the impact of trade openness, FDI inflows, intra-regional trade, and human capital on economic growth in the region. The study finds that while trade openness positively influences economic growth, intra-regional trade openness has a negative effect. The findings challenge the conventional belief that regional trade is a key driver of growth, suggesting that other factors may be at play or that institutional frameworks need strengthening to fully harness its potential. Instead, FDI inflows do not have any significant impact, contrary to the expectations of endogenous growth theory, which posits that FDI is a significant driver of growth.

Also, the research emphasizes the pivotal role of institutions in determining the effectiveness of trade openness and intra-regional trade, offering new perspectives on the importance of strong institutions for economic growth in the region. In particular, institutional quality positively moderates the relationship between trade openness and growth, suggesting that higher institutional quality may increase the positive growth effects of trade openness. Conversely, the study sheds light on the interaction between institutional quality and intra-regional trade, revealing that strong institutions worsen the negative effects of intra-regional trade. The paradoxical negative effect of intra-regional trade,

amplified by strong institutions, provides novel evidence of trade diversion and institutional overreach in regional blocs, a phenomenon underexplored in developing economies.

The study also makes an important methodological contribution to literature by examining the causality relationships between trade openness, FDI inflows, and institutional quality using the PTY causality test that is based on Toda and Yamamoto (1995). The findings indicate that institutional quality exhibits a unidirectional negative causal relationship with trade openness. From a policy standpoint, this thesis provides valuable insights for policymakers in the AMU, highlighting the importance of improving institutional quality and reconsidering the role of intra-regional trade in fostering economic growth. The research contributes to the broader field of development economics, offering a nuanced view of the factors driving economic growth in the AMU region.

5.4 POLICY RECOMMENDATIONS

This study's conclusions yield critical policy recommendations to enhance economic growth in the AMU. Given the robust positive association between trade openness and economic growth, policymakers should prioritize trade liberalization by reducing trade barriers, strengthening regional trade agreements, and addressing logistical bottlenecks to improve cross-border trade efficiency. Such measures would further integrate the region into the global economy and amplify growth prospects. While FDI inflows show no significant impact on growth, fostering a conducive institutional environment is essential to attract high-quality investments. Strengthening institutional frameworks through anti-corruption measures and enhanced transparency by establishing an AMU anti-corruption network. Also, legal reforms are critical to optimizing FDI's potential contributions to sustainable development.

The adverse effects of intra-regional trade underscore the need to revise regional integration strategies. Reducing non-tariff barriers, streamlining customs procedures, and upgrading infrastructure are imperative to unlock intra-regional trade's latent potential. Concurrently, institutional quality must be prioritized, as it directly enhances growth and moderates trade dynamics. Governance reforms, regulatory improvements, and financial system efficiency will create a stable environment for investment and economic activity. Regional collaboration, particularly through cross-border infrastructure projects and harmonized regulatory standards, can mitigate trade diversion risks and bolster economic cohesion.

The unidirectional causality from institutional quality to economic growth highlights the urgency of institutional reforms as a foundation for sustained development. Stability, transparency, and accountability in institutions are pivotal to fostering investor confidence. Despite the limited direct impact of human capital and labor force metrics, strategic alignment of education systems with labor market demands remains vital. Targeted investments in skill development programs and vocational training are necessary to address structural gaps, enhance workforce adaptability, and support long-term growth in a globalized economy.

Furthermore, the heterogeneity among AMU member states necessitates tailored interventions. Algeria must diversify its economy by incentivizing non-oil sectors, such as agriculture and renewables, alongside institutional reforms to reduce bureaucratic inefficiencies and corruption. Modernizing logistics infrastructure to lower trade costs with neighboring countries could enhance regional trade efficiency. Libya's fragile political context demands conflict resolution and stabilization to rebuild institutions, coupled with FDI incentives in reconstruction sectors, such as infrastructure and healthcare, backed by investor security guarantees. Mauritania should prioritize education and vocational training to bridge skill gaps, paired with transparent governance in its mining sector to attract

sustainable FDI. Simplified customs procedures would facilitate their integration into regional value chains.

Morocco, leveraging existing trade agreements, should expand manufacturing exports in automotive and textiles while intensifying anti-corruption efforts to bolster investor confidence. Strategic promotion of renewable energy projects in solar and wind aligns with global sustainability trends, positioning Morocco as a hub for green FDI. Tunisia must enhance financial accessibility to stimulate job creation and revitalize its tourism sector through eco-tourism initiatives. Collectively, these country-specific strategies emphasize the importance of addressing structural challenges while fostering regional synergies.

In conclusion, AMU policymakers should focus on institutional quality, regional integration, and regulatory enhancements to maximize the benefits of trade openness, FDI, and intra-regional trade. Such efforts will advance sustainable and inclusive economic growth across the Maghreb region.

5.5 LIMITATIONS OF THE STUDY

While this study provides valuable insights, it is not without limitations. First, the study covers the period from 1996 to 2022, and the dynamics of economic growth and institutional quality may have changed since the conclusion of the data period. Second, the study reliance on the overall score of the Worldwide Governance Indicators (WGI) factors, which may obscure the distinct effects of individual institutional factors (e.g., rule of law vs. governance efficiency). Third, the study primarily relies on quantitative data, which may overlook the nuanced effects of institutional factors, cultural differences, and political

contexts that could influence economic growth. Four, the focus on the AMU countries may limit the generalizability of the findings to other regions with different economic and institutional characteristics.

5.6 SUGGESTIONS FOR FUTURE STUDIES

Suggestions for future studies could explore several avenues to build upon this study's findings. First, exploring green economic growth as a dependent variable could align research with sustainable development goals. Also, research could investigate why FDI inflows do not significantly impact economic growth in the AMU region by examining the quality, type, and sector-specific influences of FDI. Additionally, future studies may consider disaggregating institutional quality to analyze the unique effects of its components, such as political stability, regulatory quality, legal frameworks, and corruption. This would provide a deeper understanding of the dynamic interactions between these dimensions and their nuanced impacts on economic growth.

Further research could also extend the analysis of intra-regional trade by exploring structural barriers to regional integration, including cultural, historical, and political factors that may hinder growth. Investigating the role of human capital and labor force development, particularly the skills needed for global economic integration, could offer valuable insights. Sectoral analyses of FDI and human capital, along with comparative studies across other African regions, would enhance contextual understanding. Incorporating post-2022 data, accounting for COVID-19 and geopolitical shifts, is also recommended. Finally, expanding the analysis to include regions with similar characteristics or examining longer time horizons could provide a broader perspective on the relationships between institutional quality, trade openness, FDI, and economic growth, enabling cross-country comparisons and more generalizable conclusions.

5.7 CONCLUSION

In conclusion, this study has explored the complex relationships between trade openness, FDI inflows, intra-regional trade, institutional quality, and economic growth in the AMU countries. The findings underscore the importance of strong institutions in promoting economic growth and the need for a more nuanced approach to regional integration and trade policies. Although FDI inflows have not shown a significant direct effect on growth in AMU countries, trade openness remains a key driver of economic expansion. By focusing on strengthening institutions, improving intra-regional trade efficiency, and promoting sound trade policies, AMU countries can better position themselves to achieve sustainable economic growth and contribute to the achievement of the UN's 2030 sustainable development goals. This chapter concludes by bridging empirical insights with actionable strategies, offering a foundation for revitalizing the AMU's economic potential in an era of global uncertainty.

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APPENDIX I: Institutional Quality World Ranking

Country	IQ	Rank
Denmark	1.77	1
Finland	1.71	2
Switzerland	1.70	3
New Zealand	1.68	4
Norway	1.65	5
Luxembourg	1.64	6
Singapore	1.60	7
Liechtenstein	1.60	8
Sweden	1.57	9
Netherlands	1.52	10
Australia	1.50	11
Iceland	1.47	12
Ireland	1.45	13
Canada	1.45	14
Andorra	1.39	15
Japan	1.37	16
Germany	1.37	17
Monaco	1.35	18
Estonia	1.30	19
Austria	1.30	20
Jersey, C.I	1.29	21
San Marino	1.29	22

UK	1.27	23
Greenland	1.25	24
Belgium	1.20	25
Taiwan, China	1.18	26
Aruba	1.10	27
Uruguay	1.05	28
France	1.05	29
Hong Kong SAR, China	1.04	30
Bermuda	1.04	31
Czechia	1.02	32
United States	1.00	33
Anguilla	1.00	34
French Guiana	1.00	35
Cayman Islands	0.99	36
Korea, Rep.	0.98	37
Lithuania	0.97	38
American Samoa	0.96	39
Portugal	0.94	40
Guam	0.94	41
Slovenia	0.86	42
Macao SAR, China	0.86	43
Brunei Darussalam	0.84	44
Latvia	0.82	45
Barbados	0.80	46

Martinique	0.78	47
Palau	0.77	48
Mauritius	0.77	49
Spain	0.76	50
Seychelles	0.75	51
Malta	0.75	52
Chile	0.72	53
Virgin Islands (U.S.)	0.71	54
Netherlands Antilles	0.70	55
Reunion	0.70	56
St. Vincent and the Grenadines	0.66	57
United Arab Emirates	0.66	58
Cyprus	0.63	59
Botswana	0.62	60
Qatar	0.61	61
Samoa	0.61	62
Dominica	0.60	63
Israel	0.60	64
St. Kitts and Nevis	0.60	65
Costa Rica	0.59	66
Bhutan	0.59	67
Cabo Verde	0.59	68
St. Lucia	0.58	69
Bahamas, The	0.57	70

Tuvalu	0.57	71
Slovak Republic	0.57	72
Micronesia, Fed. Sts.	0.55	73
Italy	0.55	74
Niue	0.55	75
Grenada	0.54	76
Marshall Islands	0.51	77
Poland	0.50	78
Kiribati	0.49	79
Croatia	0.48	80
Malaysia	0.44	81
Antigua and Barbuda	0.42	82
Hungary	0.39	83
Greece	0.39	84
Nauru	0.38	85
Georgia	0.34	86
Puerto Rico	0.33	87
Fiji	0.31	88
Namibia	0.30	89
Romania	0.30	90
Jamaica	0.28	91
Tonga	0.27	92
Cook Islands	0.22	93
Vanuatu	0.20	94

Bahrain	0.07	95
Montenegro	0.07	96
Oman	0.07	97
Bulgaria	0.06	98
Trinidad and Tobago	0.06	99
Kuwait	0.06	100
North Macedonia	0.05	101
Rwanda	0.04	102
Dominican Republic	0.01	103
Albania	-0.02	104
Panama	-0.03	105
Saudi Arabia	-0.03	106
Ghana	-0.04	107
Indonesia	-0.07	108
Jordan	-0.07	109
India	-0.08	110
Senegal	-0.09	111
South Africa	-0.09	112
Maldives	-0.10	113
Serbia	-0.11	114
Mongolia	-0.11	115
Belize	-0.11	116
Colombia	-0.18	117
Thailand	-0.18	118

Solomon Islands	-0.19	119
Armenia	-0.19	120
Guyana	-0.20	121
Sao Tome and Principe	-0.22	122
Moldova	-0.23	123
Argentina	-0.24	124
Kosovo	-0.24	125
Suriname	-0.25	126
Timor-Leste	-0.27	127
Philippines	-0.27	128
Morocco	**-0.28**	**129**
Brazil	-0.30	130
Benin	-0.31	131
Tunisia	**-0.32**	**132**
Peru	-0.33	133
China	-0.33	134
Viet Nam	-0.34	135
Kazakhstan	-0.34	136
Gambia, The	-0.35	137
Zambia	-0.35	138
Cote d'Ivoire	-0.38	139
Ecuador	-0.39	140
Paraguay	-0.40	141
Sri Lanka	-0.42	142

Malawi	-0.42	143
Lesotho	-0.43	144
Tanzania	-0.46	145
Nepal	-0.47	146
Kenya	-0.48	147
El Salvador	-0.48	148
Bosnia and Herzegovina	-0.50	149
Cuba	-0.52	150
Mexico	-0.52	151
Turkiye	-0.56	152
Papua New Guinea	-0.58	153
Sierra Leone	-0.64	154
Togo	-0.66	155
Uzbekistan	-0.67	156
Uganda	-0.67	157
Gabon	-0.68	158
Azerbaijan	-0.70	159
Lao PDR	-0.70	160
Niger	-0.71	161
Eswatini	-0.72	162
Guatemala	-0.72	163
Ukraine	-0.73	164
Bolivia	-0.73	165
Honduras	-0.74	166

Mauritania	**-0.75**	**167**
Madagascar	-0.75	168
Liberia	-0.75	169
Egypt, Arab Rep.	-0.76	170
Burkina Faso	-0.76	171
Cambodia	-0.76	172
Angola	-0.78	173
Algeria	**-0.79**	**174**
West Bank and Gaza	-0.82	175
Kyrgyz Republic	-0.85	176
Bangladesh	-0.86	177
Mozambique	-0.86	178
Djibouti	-0.90	179
Pakistan	-0.95	180
Ethiopia	-0.99	181
Guinea	-0.99	182
Congo, Rep.	-1.04	183
Guinea-Bissau	-1.04	184
Nicaragua	-1.04	185
Russian Federation	-1.05	186
Belarus	-1.07	187
Cameroon	-1.08	188
Comoros	-1.09	189
Nigeria	-1.10	190

Lebanon	-1.15	191
Tajikistan	-1.18	192
Mali	-1.18	193
Zimbabwe	-1.20	194
Burundi	-1.27	195
Iran, Islamic Rep.	-1.28	196
Equatorial Guinea	-1.29	197
Turkmenistan	-1.37	198
Chad	-1.40	199
Iraq	-1.47	200
Haiti	-1.50	201
Sudan	-1.59	202
Central African Republic	-1.59	203
Korea, Dem. People's Rep.	-1.60	204
Myanmar	-1.60	205
Congo, Dem. Rep.	-1.60	206
Eritrea	-1.67	207
Afghanistan	-1.72	208
Venezuela, RB	-1.73	209
Libya	**-1.79**	**210**
Yemen, Rep.	-1.96	211
Syrian Arab Republic	-2.02	212
Somalia	-2.02	213
South Sudan	-2.05	214

APPENDIX II: Review of Trade Openness-Growth Relationship in Academic Studies

Author & Year	Period	Countries	Method	Outcomes
Adeel-Farooq et al. (2017)	1985 2014	Pakistan India	ARDL	Positive
Idan (2023)	1990 2021	Iraq	ARDL	Positive
Sunde et al. (2023)	1990 2020	Namibia	ARDL	Positive
Dahmani et al. (2022)	1995 2018	Tunisia	ARDL	Positive
Ahmad et al. (2018)	1970 2016	Egypt, Kenya Morocco, Nigeria S-Africa	Granger Causality	Positive
Dragusha et al. (2023)	1994 2019	Albania	OLS	Positive effects
Wang and Hu (2018)	2014	China	OLS	Positive effects
Romyen et al. (2018)	1980 2015	Philippines Thailand	DSUR	Positive effects
Hongxing et al. (2021)	1990 2018	African countries	DSUR	Positive effects
Hye and Lau (2015)	1971 2009	India	ARDL	Negative effects
Polat et al. (2015)	1970 2011	South Africa	ARDL	Negative effects
Elfaki et al. (2021)	1984 2018	Indonesia	ARDL	Negative effects
Louardy and Moussamir (2022)	1980 2019	Morocco	ARDL	Negative effects

Sriyana and Afandi (2020)	1970 2017	ASEAN	ARDL	Asymmetric effects
Ali et al. (2021)	1991 2018	20 OIC countries	QQ	Asymmetric effect
Ali et al. (2022)	1991 2018	OIC countries	DCCE	Asymmetric effect
Moutinho and Madaleno (2020)	1973 2017	African Members of OPEC	ARDL	Asymmetric effect
Gonçalves et al. (2021)	1970 2014	58 countries	GMM	Asymmetric effect
Malefane and Odhiambo (2021)	1979 2013	Lesotho	ARDL	No effect
Mebarki and Mokhtari (2020)	1970 2015	Algeria	ARDL	No effect

Note: Autoregressive Distributed Lag Model (ARDL), Generalized Method of Moments (GMM), Dynamic Common Correlated Effects (DCCE), Quantile-on-Quantile (QQ), Ordinary Least Squares (OLS), Dynamic Seemingly Unrelated Regression (DSUR).

APPENDIX III: Review of FDI-Growth Relationship in Academic Studies.

Author & Year	Period	Countries	Method	Outcomes
Bird and Choi (2020)	1976 2015	76 emerging countries	GMM	Positive effect
Darwin et al. (2022)	2005 2019	21 emerging countries	GMM	Positive effect
Thanh et al. (2019)	2005 2015	Vietnam	GMM	Positive effect
Zghidi et al. (2016)	1980 2013	Algeria Egypt Morocco Tunisia	GMM	Positive effect
Le and Le (2020)	1970 2018	Singapore	ARDL	Positive effect
Wehncke et al. (2023)	2000 2018	20 African countries	ARDL	Positive effect
Sokhanvar and Jenkins (2022)	1995 2019	Estonia	ARDL	Positive effect
Comes et al. (2018)	2010 2016	Europe	OLS	Positive effect
Nguyen (2022)	1998 2017	South Asia	VAR	Positive effect
Owusu-Nantwi and Erickson (2019)	1980 2015	South America	VECM	Positive effect
Bakour et al. (2022)	1976 2016	Morocco	TY causality	Positive effect
Mahembe and Odhiambo (2016)	1980 2012	SADC countries	VECM	No effect

Hossain and Hossain (2023)	1981 2020	China	VAR	No effect
Golitsis et al. (2018)	1996 2014	Albania	VECM	No effect
Odhiambo (2022)	1980 2018	Kenya	ARDL	No effect
Sokhanvar (2019)	1995 2014	7 EU countries	VAR	Mix effect
Alvarado et al. (2017)	1980 2014	South America	GMM	Mix effect
Akalpler and Adil (2017)	1980 2014	Singapore	VECM	Negative effect
Shittu et al. (2022)	1990 2017	MENA	ARDL	Negative effect
Mebarki and Mokhtari (2020)	1970 2015	Algeria	ARDL	No effect

Note: Autoregressive Distributed Lag Model (ARDL), Generalized Method of Moments (GMM), Vector Error Correction Model (VECM), Vector Autoregressive (VAR), Toda and Yamamoto causality test (TY).

APPENDIX IV: Summary of Reviewed Papers on the Relationship between Institutions, Trade Openness, FDI and Economic Growth.

Author & Year	Period	Countries	Method	Outcomes
Yıldırım and Gökalp (2016)	2000 2011	38 Developing countries	FEM and REM	JIN, CVF, and PST have a negative impact on per capita GDP. QLA, PRP, PFR have an insignificant impact on per capita GDP
Hadhek and Mrad (2015)	1990 2010	OECD countries	GMM	- IQ has a positive effect on growth and TO-growth nexus
Asamoah et al. (2019)	1996 2016	34 SSA countries	SEM	-IQ has a Positive effect on GDP and TO-GDP nexus. - IQ has no effect on FDI-GDP nexus
Ogbuabor et al. (2020)	2009 2016	13 Western African countries	GMM	IQ has a negative effect on GDP
Thanh et al. (2019)	2005 2015	63 Vietnam provinces	GMM	IQ has positive effects on TO-growth and FDI-growth nexuses
Bhasin and Garg (2018)	2000 2012	16 Asian countries	FEM REM	PST, FFC, and REQ have negative effects on FDI.
Kurecic and Kokotovic (2017)	1996 2014	N. America EU, Asia-Pacific	ARDL	Long-term positive relation between PST and FDI for small economies. No relation between PST and FDI for larger and more developed economies
Sehrawat and Giri (2019)	1982 2016	India	ARDL	IQ has a positive long run effect on GDP
Bekhet and Latif (2018)	1985 2015	Malaysia	DOLS Granger	IQ has a negative effect on growth in long run

Note: Autoregressive Distributed Lag Model (ARDL), Generalized Method of Moments (GMM), Ordinary Least Squares (OLS), Structural Equation Modeling (SEM), Institutional Quality (IQ), Judiciary Independence (JIN), Civil Freedom (CVF), and Political Stability (PST), Quality Legal Arrangements (QLA), Property Rights Protection (PRP), Political Freedoms (PFR), Regulatory Quality (REQ), Freedom From Corruption (FFC).