The relationship between financial sector development and individual economic well-being in Mena region: Panel feasible generalized least squares between 2005 and 2022

Amine El Kadri[1*]
Khalil Ksissou[2]
Mohammed El-Khodary[3]

[1,2,3]*Department of Economics and Management of Organizations, Sidi Mohamed Ben Abdellah University, Fez, Morocco.*
[1]*Email:* amine.elkadri@usmba.ac.ma
[2]*Email:* khalilksissou@gmail.com
[3]*Email:* mohammed.elkhodary@usmba.ac.ma

Abstract

This research explores the nexus between financial sector development and individual economic well-being in 29 countries in the MENA region using panel data models over the period 2005-2022, based on the R programming language. The key financial variables considered are bank branches per 100,000 adults (AI), liquid liabilities (OI), deposit assets (DI), stock market capitalization (DM), and market capitalization of listed national companies (CM). Furthermore, the study employs 9 panel data models to examine the interaction; these models include Pooled OLS, Fixed Effects models (with individual, time, and two-way effects) using different approaches (within and between), and Random Effects models. Specification tests suggest the importance of accounting for fixed effects and addressing heteroskedasticity in the analysis. To enhance the analysis, 3-Panel Feasible Generalized Least Squares models were adopted to address challenges encountered by the model. The PFGLS First-Difference individual effect model demonstrated higher explanatory power and statistical significance of coefficients explaining 97% of the data's variability compared to the PFGLS Individual and Time Fixed Effects models, providing a more reliable framework for understanding the connection between financial indicators and individual economic well-being. The findings conclude the significant influence of financial fluctuations on the dynamics of individual economic well-being. It proposes that policymakers have to focus on promoting financial sector development to achieve sustainable economic growth and improve individual economic well-being.

1. Introduction

The financial sector is an influential part of any economy, playing an essential function in facilitating capital flows and managing risk. According to the World Bank, a well-functioning financial sector is essential for economic growth and development. The financial system is responsible for providing a range of services, including banking, insurance, investment, and asset management, which are essential to the functioning of modern economies (World Bank, 2020). The evolution of financial systems, from primitive barter systems to complex, globally interconnected markets, has brought forth unprecedented opportunities and challenges (Veena, 2022). The progression of the financial sector, including aspects such as the depth and length of markets, access to financial services, and efficiency of financial intermediaries, is the driving force behind the economic transformation of countries (Mavlutova & Volkova, 2019). Moreover, Sebunya (2021) concludes that

it is indispensable to review and improve the transmission mechanisms through which financial development influences economic growth and establish an enabling environment to ensure a profound effect on economic growth. Recently, a study by Ijaz, Sarwar Awan, and Shah (2023) emphasizes the magnitude of developing the financial sector and upgrading savings mobilization to promote economic growth. The relationship between developing the financial sector and the well-being of individuals is a subject of paramount importance in the world of economics and finance. This dynamic interplay has far-reaching consequences, not only for households and businesses but also for the country's macroeconomic landscape. The financial sector, often regarded as the lifeblood of any economy, plays a pivotal role in facilitating economic growth, stability, and prosperity at macro and micro levels (Vousinas, 2013). It serves as a conduit through which individuals access capital, manage risk, and channel their savings into productive investments (Salazar-Rebaza, Aguilar-Sotelo, Zegarra-Alva, & Cordova-Buiza, 2022). In turn, these financial activities have the potential to reshape the economic fortunes of individuals, households, and communities. The financial sector is an important part of any economy and goes far beyond the conventional banking services sector, encompassing a wide range of financial activities including capital mobilization, risk management, and resource allocation for effective investment (Orlov, 2020). In the MENA region, the financial sector has undergone significant growth in recent years, with many reforms and initiatives aimed at enriching the efficiency and stability of financial markets. However, despite these efforts, accessing finance remains a difficulty for many businesses in the region. According to the World Economic Forum, only 8% of total bank loans are accessible to Small and Medium-sized Enterprises (SME) in the MENA region (World Economic Forum, 2021). This lack of access to finance severely impacts SME growth and employment. To address this issue, the International Monetary Fund focuses on strengthening the role of SMEs in the Arab world. Stepanyan, Abajyan, Ndoye, and Alnasaa (2019), where public-private collaboration is needed to establish a uniform regulatory framework that helps create more job opportunities and build a resilient economy. As the MENA region undergoes profound socio-economic transformations and grapples with a complex array of challenges and opportunities, the symbiotic relationship between financial sector development and individual prosperity takes centre stage.

This article embarks on a comprehensive exploration of the complex and dynamic interaction between financial sector development and individual economic well-being. It seeks to illuminate the multifaceted dimensions of this relationship, drawing on a wealth of theoretical frameworks and empirical evidence based on a real-world case study in the MENA region between 2005 and 2022. By delving into the various mechanisms through which financial sector progression can impact individual economic well-being, we can support the financial health of nations and the livelihoods of their citizens. Based on financial sector development by encompassing a wide array of factors, ranging from the financials' deepness and breadth of markets to the efficiency and stability of financial institutions by using key elements such as the accessibility of banking services, the development of capital markets, deposit assets, and financial liquidity available for economic activities, to achieve this goal, we'll address the following primary question: Does the development of the financial system impact individuals economic well-being?

This research addresses a critical gap in the literature, as there is a noticeable absence of studies that specifically analyze the link between the financial sector and individual well-being. While there is existing research on connection between the financial sector and economic growth, there is also research on Economic growth and individual well-Being. It is surprising that there is a dearth of scholarly work focusing on the intersection of the financial sector and individual well-being. In doing so, we aim to offer a blueprint for designing effective policies and strategies that harness the potential of financial sector development to improve the lives of citizens.

The significance of this research extends beyond academic curiosity; it holds practical implications for policymakers, financial institutions, and stakeholders operating in the MENA region. In the subsequent sections, we delve deeper into data analysis, employing advanced panel econometric techniques to unravel patterns, correlations, and causal modelling. By doing so, we aim to provide a substantive foundation for informed decision-making. The findings aim to provide nuanced insights into how specific mechanisms, practices, and policies within the financial sector can directly impact the daily lives of individuals. By understanding the interplay between financial indicators and individual economic well-being, this study seeks to contribute tailored evidence-based recommendations. These recommendations can serve as a compass for policymakers, guiding the formulation of strategies that align with the aspirations and needs of the residents in the MENA region.

2. Literature Review
2.1. Financial Sector and Economic Growth

The amalgamation of research studies presented in the Table 1 illuminates the overarching theme: the instrumental purpose of financial sector development in advancing economic growth. These studies, conducted across diverse methodologies and settings, converge on a pivotal conclusion: the presence of a robust and well-developed financial sector contributes significantly to economic growth.

Table 1. Financial sector and economic growth review.

Title	Author	Research objective	Methodology	Result
"Impact of financial sector development & savings on economic development of Pakistan"	Ijaz et al. (2023)	Examine the connection between financial sector dev, savings, and economic growth.	Two-stage least squares (2SLS) regression	Developing the financial sector and raising savings mobilization is key to promoting economic growth in Pakistan.
"Investigation for finance-growth nexus: A dynamic common correlated estimator approach"	Mehmood and Bilal (2021)	Investigate the impact of financial dev on eco growth in 10 selected developing countries	Dynamic common correlated estimator	Financial development has a significant positive impact on economic growth. The impact is higher in countries with a higher financial development level.
"Economic growth, corruption, and financial development: Evidence from Ukraine"	Ziernhold and Jung-Ivannikova (2021)	Identify the long-term and short-term impact of economic growth on Ukraine's financial development.	Auto regressive distributed lag (ARDL) and cointegration	Economic growth positively affects the financial development in Ukraine
"Financial development and economic growth in Asian countries: A panel empirical investigation"	Chen, Pour, and de los Reyes (2020)	Evaluate the association between financial dev and economic growth.	Dynamic panel least squares (10 emerging Asian countries)	Long-run equilibria exists between financial dev and eco growth. The research concludes that policymakers have to focus on developing their financial sectors to promote economic growth.
"The impact of financial development and globalisation on economic growth …"	Fuinhas, Marques, and Lopes (2019)	Investigate the impact of financial market development and globalization on economic growth in 10 countries.	ARDL and cointegration	The expansion of the financial sector affects economic growth in the short and long-term.
"Financial development and economic growth: A re-examination using panel data"	Hurlin and Venet (2008)	Re-examine the relationship between financial dev and eco growth, considering the role of financial intermediaries and markets.	Panel data analysis	Financial dev has a positive effect on eco growth, the effect being larger for countries with more advanced financial systems.
"Regulation of financial systems and economic growth in OECD countries an empirical analysis"	Alain, Shuji, and Torsten (2006)	Examines the association between financial dev and economic growth in" OECD", taking into account the position of intermediaries and financial markets.	Panel data analysis (25 OECD countries)	Financial dev has a positive and significant impact on economic growth in OECD countries, with a larger impact in countries with more developed financial systems.

Title	Author	Research objective	Methodology	Result
"Finance and growth: Theory and evidence"	Levine (2004)	Provide a comprehensive survey of the theoretical and empirical literature on the connection between financial dev and economic growth.	Literature review and meta-analysis	Financial dev is associated with eco growth, with strength of positive relationship varying across countries and time periods.
"Financial development and economic growth: Panel data of low-income countries"	Qayyum, Siddiqui, and Hanif (2004)	Investigate the relationship between financial dev and eco growth countries with low-income.	Panel data analysis (33 low-income countries)	Financial development has a positive impact on eco growth in low-income countries, effect varying depending on different levels of financial development.
"Finance and the sources of growth"	Beck, Levine, and Loayza (2000)	Provide new evidence on the relationship between financial dev and eco growth, focusing on the role of financial institutions and markets.	Cross-country regression analysis (80 countries)	Financial dev is positively influencing the eco growth, which being larger for countries with more developed financial systems.
"Finance and growth: the role of stock markets and banks"	Levine and Zervos (1999)	Investigate the relative importance of stock markets and banks in raising economic growth, considering the role of financial institutions and markets.	Cross-country regression analysis (49 countries)	Both stock markets and banks are positively impact on eco growth, with the effect being larger for countries with more developed financial systems.
"Financial development and economic growth: An overview"	Senhadji and Abdelhak (2000)	Conduct a meta-analysis of existing studies to analyse the nexus between financial dev and eco growth.	Meta-analysis	Financial dev has a positive effect on economic growth, which is being larger for developing countries.
"Finance and growth: Schumpeter might be right"	King and Levine (1993)	Examine links between financial development and economic growth, focusing on the role of financial institutions and markets.	Cross-country regression analysis (49 countries)	Financial dev is impacting positively and significantly the eco growth, supporting the Schumpeterian view.

The findings uniformly assert a positive link between financial development and economic growth. This research journey commences with King and Levine (1993), advocating the significance of financial institutions and markets in fuelling economic expansion, thus aligning with Schumpeter's perspective. All the way to Ijaz et al. (2023), where they cast their focus on re-examining the relationship between financial development and economic growth, reaffirming that financial development holds a positive and significant sway over economic growth, even amidst the complexities of economically diverse settings.

2.2. Economic Growth and Individual Well-Being

In a series of studies exploring the intricate nexus between economic growth and individual economic well-being, various researchers have undertaken the task of reassessing, examining, and synthesizing this multifaceted relationship.

Stevenson and Wolfers (2008) re-examined the Easterlin paradox using data from 22 countries, further contributing to the disposition of the association between economic growth and subjective well-being. The estimated liaison indicates the nexus between subject well-being and income. Furthermore, by examining the liaison between variations in subjective well-being and income during a period, the study finds economic growth connected with rising happiness. These results suggest a clear function for absolute income and a minor position for relative income in arbitrating happiness. Easterlin Paradox is a 1974 discovery in the economics of happiness made by Richard Easterlin, which states that at any given time, happiness varies directly with income, but over time, happiness does not tend to increase when income continues to grow.

Sacks, Stevenson, and Wolfers (2010) investigate "the association between subjective well-being and income across individuals and countries." The authors analyzed datasets covering 140 countries, which represent nearly all of the world's population. The research shows that a country's wealthiest individuals and wealthier countries have higher average life satisfaction, suggesting that subjective well-being improves with material living standards.

Li and Shi (2019) aim to analyze the formative mechanism of the Easterlin paradox and the impact of economic growth on subjective well-being. The research methodology involved analyzing various research studies in psychology, economics, sociology, and political science. The results of the study suggest that subjective well-being stagnates instead of increasing with economic growth due to the upgrading of material needs to enjoyment needs and the intensity of social inequality triggering relative deprivation.

Mentus and Vladisavljevic (2021) aim to revisit the Easterlin paradox and examine the relationship between income and income satisfaction. The authors analyze data from the Gallup World Poll, which covers 156 countries and over 1.7 million individuals, to investigate this relationship. The authors find that there is a positive relationship between income and income satisfaction, which challenges the Easterlin paradox. They argue that the paradox may be linked to the utilization of cross-referenced data and the failure to take into account adaptation and social comparisons. When considering longitudinal data and controlling for these factors, they find that increases in income do bring higher levels of income satisfaction.

Moro-Egido, Navarro, and Sánchez (2022) investigated the link between subjective well-being, social capital, and economic growth over time. The study found that there is a statistically significant and positive link between economic growth and subjective well-being. However, the relationship between social capital and subjective well-being was not as strong as that between economic growth and subjective well-being.

According to another study based in Korea (Thompson & Kim, 2022), where the authors try to examine the relationship between economic growth and mental health problems in South Korea. The results indicate a significant positive link between economic growth and mental health problems in South Korea.

In conclusion, the nexus between economic growth and individual well-being has been the subject of numerous studies. The Easterlin paradox of 1974, which suggests that happiness does not increase with income over time, has been challenged by several researchers. Researchers found a positive link between economic growth and subjective well-being. On the other hand, it was found that subjective well-being stagnates with economic growth due to the upgrading of material needs to enjoyment needs and the intensity of social inequality triggering relative deprivation. Establishing a significant positive association between economic growth, well-being, happiness, and mental health.

2.3. Financial Sector and Individual Economic Well-Being in MENA Region

While the recent research has illuminated the connection between a robust financial sector and economic growth, analyzing the link between economic growth and individual well-being, an essential piece of the puzzle remains the exploration of whether the financial sector directly influences the well-being of individuals.

This study addresses a critical gap in understanding how the financial sector's specific mechanisms, practices, and policies impact the everyday lives of individuals in MENA countries. It seeks to uncover the intricate dynamics specific to the region, examining the role of financial institutions, markets, and policies in shaping the prosperity and quality of life of MENA residents.

The added value of this research lies in its potential to offer tailored insights and evidence-based recommendations for policymakers, financial institutions, and stakeholders operating in the MENA region. By bridging the gap between financial sector development and individual well-being, this study can inform policy decisions that are better aligned with the aspirations and needs of MENA residents. It can help identify areas

where targeted interventions and reforms within the financial sector can lead to tangible improvements in the quality of life, income distribution, access to credit, and overall well-being of individuals in the MENA region. Furthermore, the findings of this research contribute to the broader academic discourse on economics and finance, extending our understanding of how variations in financial systems impact individuals' lives across different global contexts and countries.

3. Methodology
3.1. Study Description

In this study, we delve into the broader landscape of economic development within the MENA Region. Our analysis seeks to uncover the intricate relationship between financial sector development and individual economic well-being. To illuminate this complex interaction, we examine key financial variables that have a substantial impact on the economic dynamics presented in Figure 1. These factors include the number of bank branches per 100,000 adults (AI), the amount of liquid assets (OI), and deposits (DI), the size of the stock market (DM) and the number of domestic companies (CM).
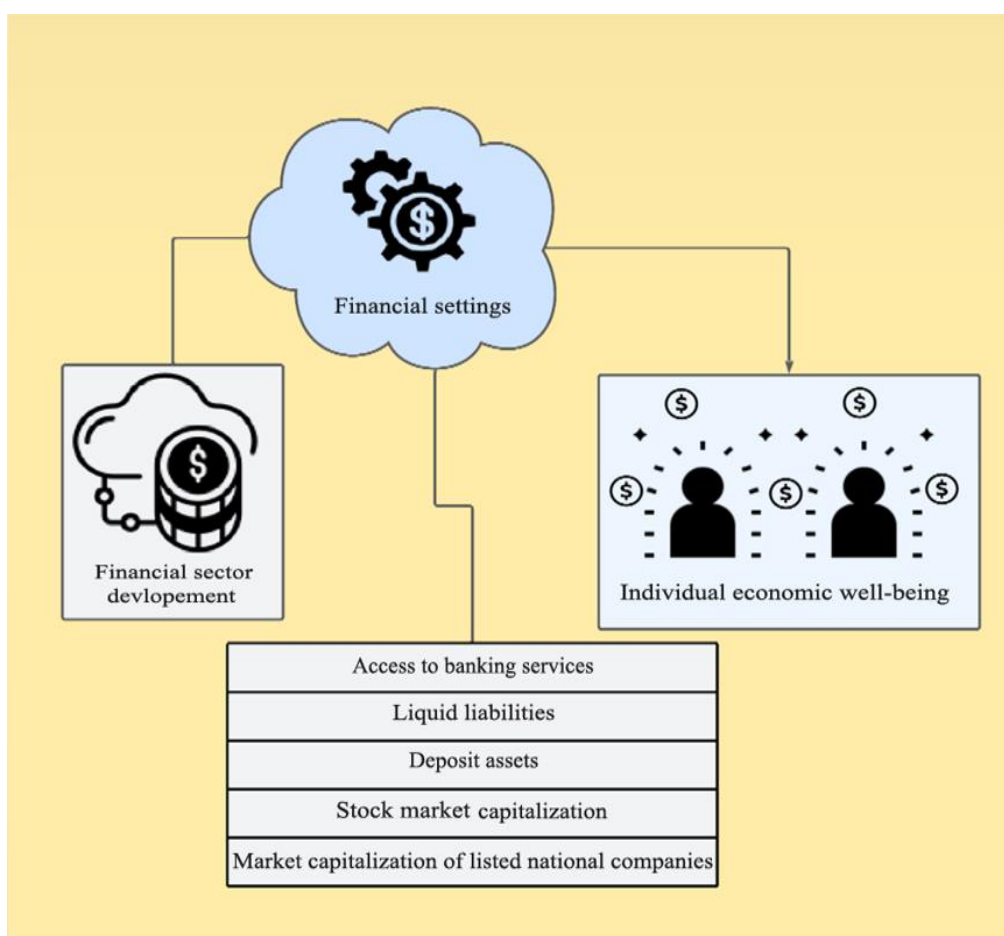

Figure 1. Conceptual framework for the research.

Our study spans a substantial timeframe, covering the years from 2005 to 2022, and encompasses a wide geographical scope, encompassing 39 diverse countries across the MENA region. The data used in our analysis represents a rich and comprehensive dataset, offering a panoramic view of economic development dynamics. This secondary data was meticulously sourced from reputable and authoritative governmental organs worldwide, ensuring the reliability and relevance of our findings. Specifically, we imported the data by leveraging the World Bank Development Indicators (WDI) package within the R programming language directly by using the function: "WDI (indicator = indicators, start = 2013, end = 2023, country = MENA)," solidifying the robustness of our empirical foundation.

For an in-depth understanding, Table 2 encapsulates essential information concerning the description of each variable used in this study.

Table 2. Variable's description.

Variable	World bank code	Title	Description
GDP	NY.GDP.PCAP.CD	"GDP per capita"	The gross domestic product (GDP) per capita in the MENA region, representing the average economic output per person.
AI	GFDD.AI.02	"Bank branches per 100,000 adults"	The count of bank branches per 100,000 adults in the MENA region, indicating accessibility to banking services.
OI	GFDD.OI.07	"Liquid liabilities"	The aggregate value of liquid liabilities within the financial sector, reflecting the extent of financial liquidity available for economic activities.
DI	GFDD.DI.05	"Deposit assets"	The total amount of deposit assets held within the financial institutions, illustrating the level of savings and financial intermediation.
DM	GFDD.DM.01	"Stock market capitalization"	The total market capitalization of stocks traded in the stock markets of the MENA region, reflecting the size and activity of the stock market.
CM	CM.MKT.LCAP.GD.ZS	"Market capitalization of listed national companies"	The total market capitalization of national companies listed on stock exchanges, depicting the significance of local corporate entities in the market.

Note: All codes are designated by the World Bank for accessing indicators. (e.g., https://data.worldbank.org/indicator/NY.GDP.MKTP.CD)

Table 3 provides a concise overview of the Middle Eastern and North African (MENA) countries used in this research, along with their respective International Organization for Standardization (ISO 2-character) country codes. These codes are standardized international identifiers that facilitate data management and cross-referencing in international contexts.

Table 3. ISO 2-Codes for countries in the MENA region.

Country	Algeria	Armenia	Azerbaijan	Bahrain	Cyprus	Djibouti	Egypt	Emirates	Eritrea	Georgia
Iso2c	DZ	AM	AZ	BH	CY	DJ	EG	AE	ER	GE
Country	Iran	Iraq	Israel	Jordan	Kuwait	Lebanon	Libya	Malta	Mauritania	Morocco
Iso2c	IR	IQ	IL	JO	KW	LB	LY	MT	MR	MA
Country	Oman	Palestine	Qatar	Saudi	Somalia	Sudan	Syria	Tunisia	Turkey	Yemen
Iso2c	OM	PS	QA	SA	SO	SD	SY	TN	TR	YE

3.2. Model Specification

Analyzing the relationship between financial sector development and individual economic well-being in the MENA region is a complex task. It involves assessing how various financial indicators, such as the accessibility of banking services, liquidity in the financial sector, deposit assets, stock market activity, and the market capitalization of national companies, impact individual prosperity in different countries. To gain meaningful insights, we have to turn to advanced econometric techniques. These methods are particularly well-suited for handling data with two dimensions: a temporal dimension, spanning the years from 2005 to 2022, and an individual dimension, involving the countries within the MENA region. These econometric models have the capability to track individual-level changes over time while accounting for both time-specific and country-specific effects.

By employing these panel data models, we aim to uncover insights into how the financial sector's development impacts economic well-being across the MENA region. Panel data, otherwise longitudinal and cross sectional time series data, involve multiple observations on multiple individuals (countries, in this case) over multiple time periods (Bell & Jones, 2015; Cheng. Hsiao, 2005; Park, 2011). These models are designed precisely for such datasets, allowing us to explore how financial variables interact with individual economic well-being across countries and years. The equation is a representation of the panel data model we use:

$$GDP_{it} = \alpha_i + \beta_1 AI_{it} + \beta_2 OI_{it} + \beta_3 DI_{it} + \beta_4 DM_{it} + \beta_5 CM_{it} + \mu_{it}$$

This equation captures the dynamics of GDP per capita (GDP_{it}) in relation to various financial indicators while considering country-specific (α_i) and time-specific (t) effects. The coefficients ($\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$) allow us to quantify how each financial variable influences economic prosperity. Figure 2 explains the panel model estimation procedure and test used in the research.
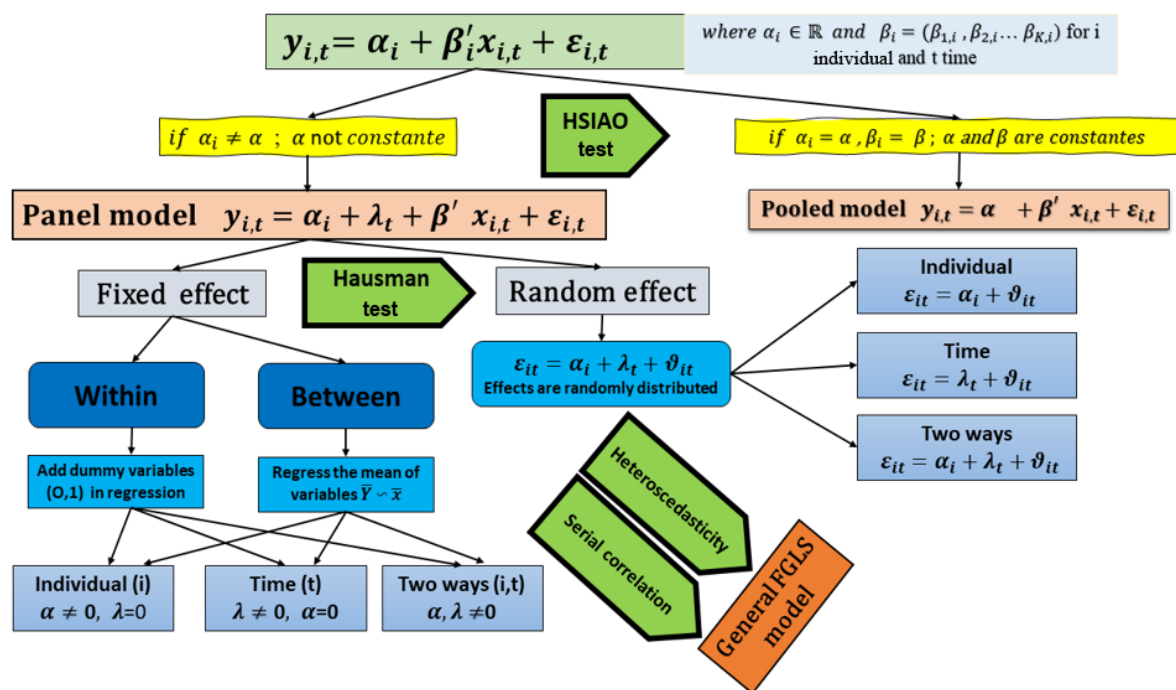
430

Figure 2. Panel models estimation procedure and tests.

4. Results

4.1. Descriptive Analysis

The plot in Figure 3 shows the trend of GDP per capita (current US dollars) over time in the MENA region, from 2005 to 2023. The countries with the highest GDP per capita in 2022 are Qatar, Kuwait, and the United Arab Emirates, while the countries with the lowest GDP per capita are Yemen, Syria, and Somalia.

Overall, GDP per capita has grown in most MENA countries over the past 18 years. However, there has been significant variation in growth rates across countries. For example, Qatar's GDP per capita has more than doubled over this period, while Yemen's GDP per capita has declined by over 50%.

The plot also shows that the COVID-19 pandemic had a negative impact on GDP per capita in many MENA countries. In 2020, GDP per capita declined in all MENA countries except for Qatar. However, GDP per capita rebounded in most countries in 2021 and 2022.
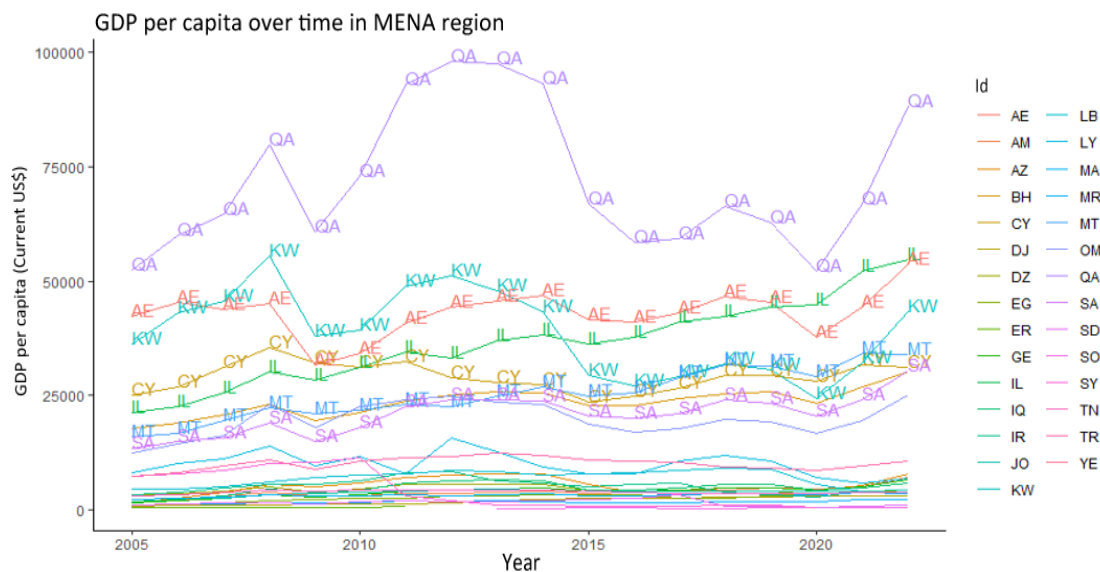

Figure 3. GDP per capita evolution in the MENA region's countries.
Note: Country names are represented by their respective ISO 2-Codes as shown in Table 3.

Figure 4 shows that the liquid liability to GDP ratio has increased in most MENA countries over the past 18 years. However, there has been significant variation in the rate of increase across countries. For

431

example, the liquid liabilities to GDP ratio has more than doubled in Lebanon and Egypt over this period, while it has increased by less than 10% in Qatar and the United Arab Emirates.

We can see how the COVID-19 pandemic had a significant impact on the liquid liabilities to GDP ratio in many MENA countries.

In 2020, the liquid liabilities to GDP ratio increased in all MENA countries except for Qatar and the United Arab Emirates. This increase is likely due to the fact that governments and businesses in many MENA countries borrowed heavily to respond to the pandemic. Moreover, the oil-rich countries of the Gulf Cooperation Council (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the UA Emirates) have consistently had the lowest liquid liabilities to GDP ratios in the MENA region.
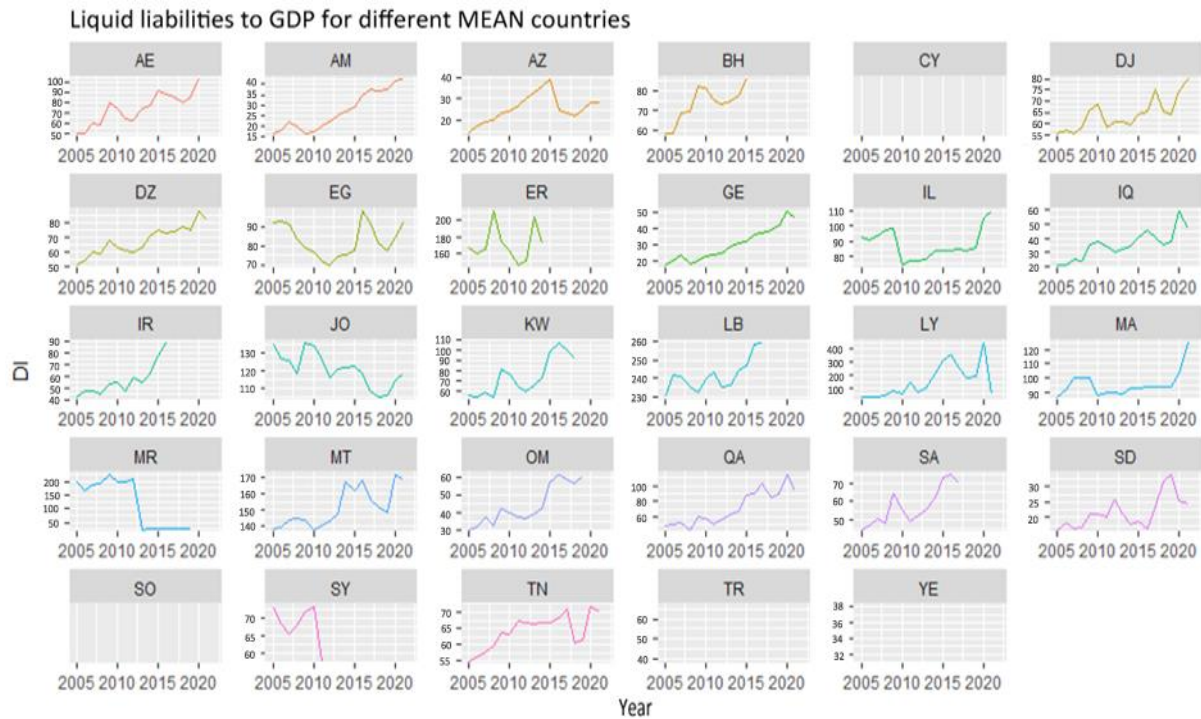

Figure 4. Trends in the liquid liabilities to GDP ratio in the MENA region, 2005-2023.

Note: Country names are represented by their respective ISO 2-Codes as shown in Table 3.

The presented summary statistics Table 4 offers valuable insights into the dataset used to investigate the primary objective of this study. The dataset comprises information from 29 countries within the MENA region between 2005 and 2022.

Table 4. Statistics and normality results.

Variable	Min.	Range	1st Qu	Median	Mean	3rd Qu	Max.	Std.	Count	NA	Normtest.p
GDP	356.1	97685.24	3060.4	4788.3	13623.4	22382.5	98041.4	17146.52	514	60	0.000
AI	0.173	1784.027	5.239	14.579	80.423	22.252	1784.2	317.1038	417	156	0.000
OI	612.3	443595.3	10705.8	39297	84996.8	114515.6	444207.6	103176.8	436	137	0.000
DI	13.8	436.1526	41.13	64.06	78.18	91.67	449.95	57.387	424	149	0.000
DM	0.0534	526.1416	21.865	39.133	49.7055	64.2354	526.195	51.1734	246	326	0.000
CM	0.0534	508.171	21.746	39.134	49.158	63.333	508.224	49.857	246	326	0.000

For the variable GDP (Gross Domestic Product per capita), which measures the economic output, we observe a wide range of values, spanning from 356.1 to 98041.4 in constant 2010 US dollars. The distribution exhibits variation, with a substantial mean GDP of 13623.4. The presence of 60 missing or undefined values is noted, and a normality test suggests a non-normal distribution (p-value < 0.05).

Also, other variables like AI (Bank Branches per 100,000 Adults), OI (Liquid Liabilities in Million USD), DI (Deposit Assets as a Percentage of GDP), DM (Stock Market Capitalization as a Percentage of GDP), and CM (Market Capitalization of Listed National Companies as a Percentage of GDP) have a lot of different values, which shows that MENA countries are very different from one another. These variables also show varying degrees of missing data and exhibit non-normal distributions according to the normality tests.

In summary, the statistics and normality results reveal a rich landscape of economic and financial diversity across the MENA region, presented by wide ranges, substantial means, and non-normal distributions.

4.2. Correlation Analysis

The correlation coefficient is a measure of the strength and direction of the linear relationship between two variables (Rainey et al., 2023). The correlation plot presented in Figure 5 suggests that there is a positive link between financial sector development and economic growth (GDP) in the MENA region. This relationship is statistically significant; for example, GDP has a strong positive correlation with AI, DM, OI, and CM. This means that countries with higher levels of AI, DM, OI, and CM tend to have higher levels of GDP. Secondly, GDP has a weak positive correlation with DI. This means that countries with higher levels of DI tend to have high levels of GDP. However, the correlation is not very strong, indicating that other factors also play a significant role in determining GDP levels.

The scatter plots show the nature of the relationship between each of the two variables in our research; in contrast, histograms show the distribution of each variable, which can be used to assess the previous normality test results, mentioning that variables are not normally distributed.
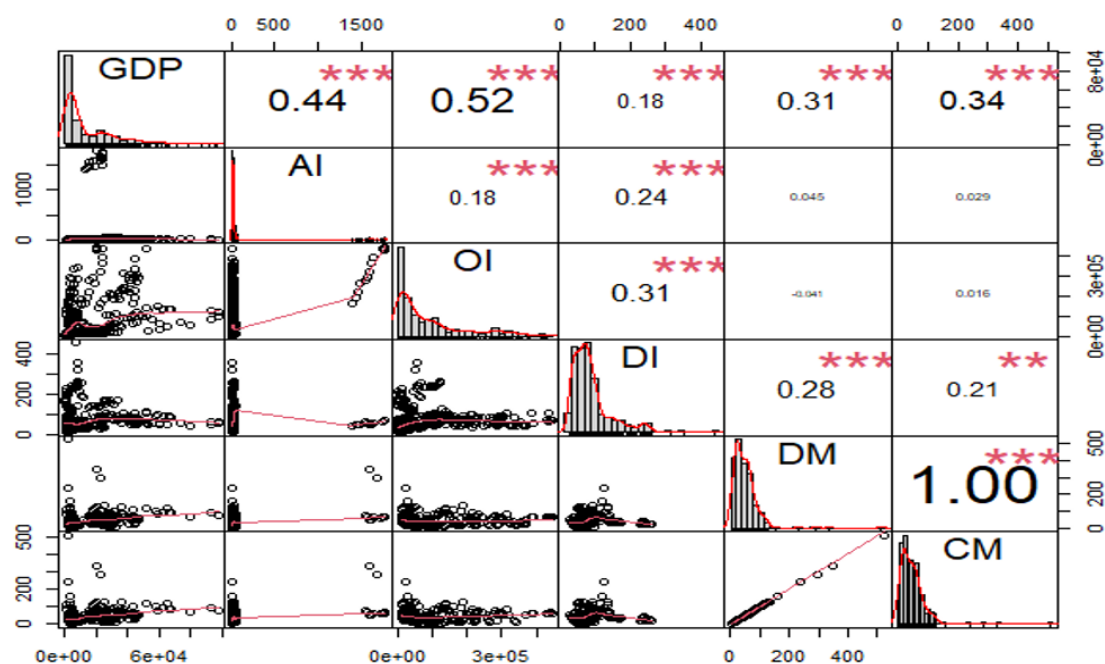

Figure 5. Correlation results.

Note: ** and *** represent significance level at 10% and 1% respectively.

4.3. Panel Models

In this study, we have employed various panel data models to examine the relationships between key economic variables and GDP within a panel analysis consisting of multiple countries in the MENA region over the period 2005-2022. Panel data models offer a powerful framework for capturing both cross-sectional and time-series variations in the data, allowing us to better understand the dynamics of economic wellbeing. The 9 models considered include Pooled OLS, Fixed Effects models (with individual, time, and two-way effects) using different approaches (within and between), and Random Effects models (with individual, time, and two-way effects).

Each of these models serves a unique purpose in econometric analysis. Pooled OLS provides a baseline estimation, while Fixed Effects models control for unobserved individual or time-specific effects, and Random Effects models account for unobserved factors following a random distribution. Additionally, Fixed Effects and Random models, incorporating individual, time, and two-way effects, prove instrumental in controlling for unobserved factors that may be specific to either specific countries as individuals or certain time periods. This approach aids in isolating and understanding the impact of variables of interest, minimizing the potential for omitted variable bias.

The estimations shed light on how different financial variables, such as bank branches, liquid liabilities, deposit assets, stock market capitalization, and market capitalization of listed national companies, are associated with changes in GDP per capita in the MENA region. Through the models presented in Table 5, we aim to uncover the complex dynamics of economic growth and identify the financial factors that significantly impact GDP within the panel data context.

Table 5. Panel data model estimations and results.

N°	Model		Panel settings					Estimate					Perf	
			Individual	Time	Between	Within	Random	AI	OI	DI	DM	CM	R²	P-value
1	Pooled OLS		F	F	F	F		-11.08 (**)	0.07 (***)	-12.48	-3002.91 (**)	3267.61 (**)	0.26	0
2	Fixed effects	Within individual	T	F	F	T		-12.22 (***)	0.06 (***)	-194.11 (***)	-945	917.49	0.28	0
3		Between individual	T	F	T	F		-11.37	0.06	-45.48	-4159.27	4559.23	0.48	0.01
4		Within time	F	T	F	T		-12.22	0.06 (***)	-194.11 (***)	-945	917.49	0.29	0
5		Between time	F	T	T	F		31.59 (*)	0.03	133.43 (.)	-1629.8	1588	0.54	0.01
6		Two-way	T	T	F	T		-12.22	0.06 (***)	-194.11 (***)	-945	917.49	0.28	0
7	Random	Individual	T	F			T	0.84	0.06 (***)	-93.57 (**)	-1139.2	1120.52	0.21	0
8		Time	F	T			T	Singularity						
9		Two- way	T	T			T	-2.62 (***)	0.06 (***)	-150.64 (***)	-1086.01 (***)	1061.28 (***)	0.05	0

Note: *, ** and *** represent significance level at 10%, 5% and 1% respectively. Additionally, Logical Operations (T and F) are employed to indicate true and false.

4.4. Specification Tests

The tests included in Table 6 examine key aspects of panel data modelling, including the significance of unobserved individual effects, the comparison of fixed effects versus pooled and random effects models, and the presence of heteroskedasticity related to individual and time-specific effects.

Table 6. Specification tests results.

Test		P-value	Result
Wooldridge (2002)	Pooled unobserved individual effects	0.0247	Unobserved individual effects are significant.
Hausman (1978)	Pooled vs fixed	2.2e-16	Fixed-effects model is more applicable as compared to pooled model.
	Pooled vs random	2.2e-16	Random effects model is applicable than the pooled.
Hsiao (2003)	Fixed vs random	2.6e-11	Fixed effects model is applicable than the random effects.
Breusch and Pagan (1980)	Individual in fixed	2.2e-16	Individual-specific effects in the fixed effects model are statistically significant: Individual's Heteroskedasticity
	Individual in random	2.2e-16	Individual-specific effects in the random effects model are statistically significant: Individual's Heteroskedasticity.
	Time in fixed	2.2e-16	Time-specific effects in the fixed effects model are statistically significant: Time's Heteroskedasticity.

The presence of statistically significant unobserved individual effects in the Wooldridge test suggests that there are underlying factors specific to each individual that are influencing the dependent variable. This indicates that a model that accounts for these individual effects is necessary. Both the Hausman test and the Hsiao test suggest that the fixed effects model is more applicable than pooled and random effects. The fact that individual and time-specific effects are found to be statistically significant in both the fixed effects and random effects models emphasizes the importance of accounting for individual and time-level variability in the analysis. However, it's crucial to address the issue of heteroskedasticity, which is present in both individual and time-specific effects in the fixed effects model. In our case, two-way fixed effects are the most relevant model.

4.5. Panel Feasible Generalized Least Squares Model's Results

According to the estimation's results in Table 2 and analyzing specification tests in Table 3, it became evident that the Fixed Effects two-way model faced challenges in adequately capturing the underlying patterns. The model exhibited a notably low R^2 (28%), implying that it explained only a limited portion of the variation in the MENA region. Additionally, the presence of heteroskedasticity, as indicated by a low p-value in the Breusch-Pagan test, raised concerns about the violation of the assumption of constant error variance. In response to these challenges, the decision to estimate a Panel Feasible Generalized Least Squares (PFGLS) model was made. PFGLS offers distinct advantages in handling Heteroskedasticity (Mumuni & Mwimba, 2023; Zhang et al., 2023) through weighted estimation while potentially capturing additional variation that the Fixed Effects Two-way model might overlook. Furthermore, by adopting the PFGLS approach presented in Table 7, it was possible to maintain the statistical significance of the estimated coefficients, ensuring the reliability of the analysis and enhancing the overall robustness of the model.

Table 7. Panel FGLS results.

Panel feasible generalized least squares	Estimate					R-squared
	AI	OI	DI	DM	CM	
Individual fixed effects within	-7.14	0.02 (**)	-76.74 (***)	-1299.2 (***)	1286.6 (***)	0.95
Time fixed effects within	-7.12 (***)	0.05 (***)	-43.02 (***)	-2664.6 (***)	2869.1 (***)	0.3
individual effect first-difference	-22.8 (***)	0.02 (***)	-139.04 (***)	171.04 (.)	-225.06 (*)	0.97

Note: *, ** and *** represent significance level at 10%, 5% and 1% respectively.

Based on the performance metrics and statistical significance of coefficients, we have evaluated three panel data models estimated using PFGLS: "Individual Fixed Effects Within Model, the Time Fixed Effects Within Model, and the Individual Effect First-Difference Model."

The Individual Effect First-Difference Model emerges as the most compelling option among the three. It exhibits the highest R-squared value of 0.97, indicating that it effectively explains a significant

435

proportion (97%) of the variance in the GDP as a dependent variable. Additionally, the low p-value (0.01) indicates that all coefficients in this model are statistically significant. While the Individual Fixed Effects within Model also boasts a high R-squared value of 0.95 and significant coefficients, the Individual Effect First-Difference Model surpasses it in terms of explanatory power. On the other hand, the Time Fixed Effects within Model, with an R-squared value of 0.30, appears to provide a less satisfactory fit compared to the other two models. For these reasons, the first difference model will be considered the appropriate model:

$$\Delta GDP = -22.8\ \Delta AI + 0.02\ \Delta OI - 139.04\ \Delta DI + 171.04\ \Delta DM - 225.06\ \Delta CM \ ,$$
$$\text{Where the First Difference}, \Delta X = X_t - X_{t-1}$$

The results reveal that variations in these variables exhibit distinct effects on GDP per capita dynamics. Notably, a variation in bank branches per 100,000 adults (ΔAI) is associated with a significant opposite variation in GDP per capita. This inverse relationship in 22.8 degrees suggests that when there is a variation in the accessibility of banking services, characterized by an increase or decrease, it tends to correspond with 22.8 variable units in the same way as individual economic well-being, as measured by GDP per capita. In practical terms, this indicates that as the availability of bank branches becomes more variable-either increasing or decreasing significantly-it may have a dampening effect on the fluctuations in individual economic performance. This could imply that extreme fluctuations in banking accessibility might lead to economic instability or uncertainty, affecting the overall economic health of individuals within the MENA region.

Conversely, the positive coefficient of 0.02 suggests a minimal direct relationship between ΔOI and ΔGDP. When there is an increase in liquid liabilities in millions of USD, it provides acceleration in GDP per capita, and vice versa. This relationship suggests that an increase in liquid liabilities, such as bank deposits and other liquid assets held by financial institutions, can positively influence the economic performance of individuals. It implies that when financial institutions have more liquid assets available, they are better positioned to provide loans and support economic activities, which can lead to an increase in GDP per capita, highlighting the minimal role of liquidity in supporting individual economic well-being.

The negative coefficient of -139.04 suggests an inverse relationship between ΔDI and ΔGDP. In simpler terms, when there is an increase in Deposit Assets as a percentage of GDP, this leads to a significant decrease in GDP per capita variations. This relationship suggests that even small fluctuations in the proportion of deposit assets can have substantial effects on individuals' economic performance. An increase in this ratio may indicate a higher level of funds being held in bank deposits, potentially diverting resources away from other investments or economic activities. This could lead to a decline in GDP per capita.

Moreover, the positive coefficient of 171.04 suggests a direct exponential relationship between ΔDM and ΔGDP. Every increase in stock market capitalization as a percentage of GDP leads to very high rise in GDP per capita. Conversely, a decrease in ΔDM results in a large decrease in ΔGDP. This relationship underscores the role of stock market capitalization in stimulating economic growth. An increase in this ratio indicates that the stock market represents a larger portion of the economy, which can draw investments and stimulate economic activity. Therefore, when stock market capitalization increases, it tends to positively influence GDP per capita.

Finally, the negative coefficient of -225.06 implies a negative variation in the Market Capitalization of Listed National Companies with variations in Gross Domestic Product per capita, implying ΔDM is inversely related to ΔGDP. When there is an increase in ΔDM, it leads to a significant decrease in ΔGDP, and conversely, a decrease in ΔDM results in an increase in terms of ΔGDP. This relationship indicates that when market capitalization is concentrated among listed national companies, it may not necessarily translate into higher economic well-being for individuals. A higher concentration of market capitalization could indicate a limited diversification of economic activities and investments, potentially leading to a decrease in GDP per capita.

5. Discussion

The results of this study shed light on the complex relationship between the financial sector and individual well-being in the MENA region. Globally, Individuals' economic well-being increases with the development of the finance sector. Firstly, it is noteworthy that the study found a significant inverse relationship between variations in accessibility of banking services and GDP per capita's variations. This result suggests that extreme fluctuations in banking accessibility can potentially lead to economic instability or uncertainty, negatively affecting individual economic well-being. This finding aligns with previous research by Shahbaz, Kumar Tiwari, and Nasir (2013), which highlighted the significant influence of financial development on economic growth but also emphasized the importance of stability and consistency in financial services. According to Turyan (2023), a necessary balance is needed between the financial sector and the real sector of the economy.

All the same, the study identified a positive relationship between variation in Liquid Liabilities and GDP per capita. This result implies that an increase in liquidity positively influences economic well-being. This observation resonates with the literature, particularly the work of Honohan and Beck (2007), who emphasized the role of well-functioning financial systems in mobilizing savings and efficiently allocating capital. However,

the study also revealed a negative relationship between variations in Deposit Assets as a Percentage of GDP (DI) and GDP per capita's variations. Even small fluctuations in the proportion of deposit assets were found to have substantial effects on individual economic performance. This outcome highlights the importance of considering the composition of financial assets within an economy. This finding aligns with the critical view presented by Levine (2004) regarding the complex nature of the relationship.

Furthermore, the study uncovered a direct exponential relationship between Stock Market Capitalization as a Percentage of GDP (DM) and GDP per capita, emphasizing the role of stock market capitalization in stimulating economic growth. This result is coherent with research by Beck et al. (2000), which underscored the positive influence of financial development, including advanced stock markets, on economic growth. Nevertheless, the study also found a negative relationship between Market Capitalization of Listed National Companies (DM) and GDP per capita, suggesting that a higher concentration of market capitalization among listed national companies may not necessarily translate into higher individual economic well-being. This finding reinforces the notion that diversification of economic activities and investments is essential, as emphasized in the literature by various scholars (Almeida & Gonçalves, 2022; Loubassou & Mbongo, 2021).

6. Conclusion

This article has delved into the intricate link between financial sector development and individual well-being in the MENA region. The study's findings offer valuable insights into how various aspects of the financial sector impact GDP per capita. Notably, the accessibility of banking services has been shown to have a significant influence on economic stability. Extreme fluctuations in banking accessibility can disrupt economic well-being, emphasizing the need for consistent and reliable financial services. Conversely, the presence of liquidity in the financial system positively affects individual economic performance. This observation aligns with the role of well-functioning financial systems in mobilizing savings and efficiently allocating capital. The study also highlights the importance of considering the composition of financial assets, as fluctuations in the proportion of deposit assets can substantially affect individual economic outcomes. Stock market capitalization emerges as a powerful driver of economic growth and well-being, underscoring the significance of well-developed stock markets. However, the concentration of market capitalization among listed national companies may not necessarily translate into higher individual economic well-being, emphasizing the need for economic diversification. These findings have significant policy implications, pointing to the importance of stable banking services, diversified financial sectors, and efficient capital allocation in promoting individual well-being in the MENA region. As the region undergoes transformative changes, these insights can guide policymakers and stakeholders in designing strategies to harness the full potential of financial sector development for the benefit of their citizens.

7. Limitations

This study, while shedding light on the intricate relationship between financial sector development and individual economic well-being in the MENA region, encounters several limitations that are essential considerations for a more comprehensive understanding of the subject. Firstly, the findings may not be readily generalizable beyond the MENA region due to its unique cultural and economic diversity. Secondly, the specific time frame examined, spanning from 2005 to 2022, may not capture longer-term trends or account for the potential impact of short-term economic fluctuations. Additionally, the reliance on GDP per capita to determine economic well-being may overlook other critical aspects of quality of life and income distribution. Lastly, the omission of external factors, such as political stability and global economic conditions, presents another limitation, as these factors can significantly influence financial sector dynamics and individual well-being.

References

Alain, D. S., Shuji, K., & Torsten, S. (2006). *Regulation of financial systems and economic growth in oecd countries: An empirical analysis OECD*. Retrieved from https://www.oecd.org/economy/growth/40505986.pdf

Almeida, J., & Gonçalves, T. C. (2022). Portfolio diversification, hedge and safe-haven properties in cryptocurrency investments and financial economics: A systematic literature review. *Journal of Risk and Financial Management, 16*(1), 1-25. https://doi.org/10.3390/jrfm16010003

Beck, T., Levine, R., & Loayza, N. (2000). *Finance and the sources of growth*. Retrieved from https://deliverypdf.ssrn.com/delivery.php?ID=40507210300309508908109108409312709801800906601203709 21231201130890290830731130991081101010570261231240541130311061190151040080060090460401060010 00016099065072059015040093006105114121095093030021089115117007025113018086092064011019009117 092026003&EXT=pdf

Bell, A., & Jones, K. (2015). Explaining fixed effects: Random effects modeling of time-series cross-sectional and panel data. *Political Science Research and Methods, 3*(1), 133–153. https://doi.org/10.1017/psrm.2014.7

Breusch, T. S., & Pagan, A. R. (1980). The lagrange multiplier test and its applications to model specification in econometrics. *The Review of Economic Studies, 47*(1), 239–253. https://doi.org/10.2307/2297111

Chen, C., Pour, G., & de los Reyes, E. (2020). Financial development and economic growth in Asian countries: A panel empirical investigation. *International Journal of Applied Economics, Finance and Accounting*, 6(2), 76-84. https://doi.org/10.33094/8.2017.2020.62.76.84

Fuinhas, J. A., Marques, A. C., & Lopes, C. (2019). The impact of financial development and globalisation on economic growth: Evidence from a macro panel of ten countries. *Asian Economic and Financial Review*, 9(3), 366–388. https://doi.org/10.18488/journal.aefr.2019.93.366.388

Hausman, J. A. (1978). Specification tests in econometrics. *Econometrica: Journal of the Econometric Society*, 1251-1271. https://doi.org/10.2307/1913827

Honohan, P., & Beck, T. (2007). Making finance work for Africa. *The World Bank*. https://doi.org/10.1596/978-0-8213-6909-8

Hsiao, C. (2003). *Analysis of panel data* (2nd ed.). United Kingdom: Cambridge University Press.

Hsiao, C. (2005). *Why panel data? (September 6, 2005). IEPR Working Paper No. 05.33*. Retrieved from https://ssrn.com/abstract=820204

Hurlin, C., & Venet, B. (2008). *Financial development and growth: A re-examination using a panel granger causality test*. Retrieved from https://shs.hal.science/halshs-00319995

Ijaz, F., Sarwar Awan, M., & Shah, F. N. (2023). Impact of financial sector development & savings on economic development of Pakistan. *International Journal of Social Science & Entrepreneurship*, 3(2), 91–111. https://doi.org/10.58661/ijsse.v3i2.132

King, R. G., & Levine, R. (1993). Finance and growth: Schumpeter might be right. *The Quarterly Journal of Economics*, 108(3), 717–737. https://doi.org/10.2307/2118406

Levine, R. (2004). Finance and growth: Theory and evidence (w10766; p. w10766). *National Bureau of Economic Research*, 1-118. https://doi.org/10.3386/w10766

Levine, R., & Zervos, S. (1999). Stock markets, banks, and economic growth. *The World Bank*. https://doi.org/10.1596/1813-9450-1690

Li, L., & Shi, L. (2019). Economic growth and subjective well-being: Analyzing the formative mechanism of Easterlin Paradox. *The Journal of Chinese Sociology*, 6, 1-19. https://doi.org/10.1186/s40711-018-0090-9

Loubassou, M., & Mbongo, G. (2021). Effects of investments on the economic diversification of the states of the central African economic and monetary community. *Modern Economy*, 12(2), 385–400. https://doi.org/10.4236/me.2021.122020

Mavlutova, I., & Volkova, T. (2019). *Digital transformation of financial sector and challengies for competencies development*. Paper presented at the Proceedings of the 2019 7th International Conference on Modeling, Development and Strategic Management of Economic System (MDSMES 2019). Proceedings of the 2019 7th International Conference on Modeling, Development and Strategic Management of Economic System (MDSMES 2019), Ivano-Frankivsk, Ukraine.

Mehmood, S., & Bilal, A. R. (2021). Investigation for finance–growth nexus: A dynamic common correlated estimator approach. *Global Business Review*. https://doi.org/10.1177/09721509211016250

Mentus, V., & Vladisavljevic, M. (2021). Easterlin paradox revisited: Do increases in income bring higher levels of income satisfaction? *Sociologija*, 63(2), 220–235. https://doi.org/10.2298/SOC2102220M

Moro-Egido, A. L., Navarro, M., & Sánchez, A. (2022). Changes in subjective well-being over time: Economic and social resources do matter. *Journal of Happiness Studies*, 23(5), 2009–2038. https://doi.org/10.1007/s10902-021-00473-3

Mumuni, S., & Mwimba, T. (2023). Modeling the impact of green energy consumption and natural resources rents on economic growth in Africa: An analysis of dynamic panel ARDL and the feasible generalized least squares estimators. *Cogent Economics & Finance*, 11(1), 2161774. https://doi.org/10.1080/23322039.2022.2161774

Orlov, S. (2020). *Modern organizational and technological trends in the financial sector of the economy*. Paper presented at the Proceedings of the Ecological-Socio-Economic Systems: Models of Competition and Cooperation (ESES 2019). Kurgan, Russia.

Park, H. M. (2011). Practical guides to panel data modeling: A step-by-step analysis using stata. *Public Management and Policy Analysis Program, Graduate School of International Relations, International University of Japan*, 12, 1-52.

Qayyum, A., Siddiqui, R., & Hanif, M. N. (2004). *Financial development and economic growth: Evidence from heterogeneous panel data of low income countries*. Retrieved from https://ideas.repec.org/p/pra/mprapa/23431.html

Rainey, C., Villikudathil, A. T., McConnell, J., Hughes, C., Bond, R., & McFadden, S. (2023). An experimental machine learning study investigating the decision-making process of students and qualified radiographers when interpreting radiographic images. *PLOS Digital Health*, 2(10), e0000229. https://doi.org/10.1371/journal.pdig.0000229

Sacks, D. W., Stevenson, B., & Wolfers, J. (2010). *Subjective well-being, income, economic development and growth brookings*. Retrieved from https://www.brookings.edu/articles/subjective-well-being-income-economic-development-and-growth/

Salazar-Rebaza, C., Aguilar-Sotelo, F., Zegarra-Alva, M., & Cordova-Buiza, F. (2022). Financing in the alternative securities market: Economic and financial impact on SMEs. *Investment Management and Financial Innovations*, 19(2), 1–13. https://doi.org/10.21511/imfi.19(2).2022.01

Sebunya, M. (2021). Economic growth and financial sector development: Long-run structural break cointegration and short-run equilibrium relationships in the East African community. *International Journal of Applied Economics Finance and Accounting*, 9(2), 48–62. https://doi.org/10.33094/8.2017.2021.92.48.62

Senhadji, M. S. K., & Abdelhak, S. (2000). *Financial development and economic growth: An overview IMF*. Retrieved from https://www.imf.org/en/Publications/WP/Issues/2016/12/30/Financial-Development-and-Economic-Growth-An-Overview-3926

Shahbaz, M., Kumar Tiwari, A., & Nasir, M. (2013). The effects of financial development, economic growth, coal consumption and trade openness on CO_2 emissions in South Africa. *Energy Policy*, *61*, 1452–1459. https://doi.org/10.1016/j.enpol.2013.07.006

Stepanyan, V., Abajyan, G., Ndoye, A., & Alnasaa, M. (2019). Enhancing the role of SMEs in the Arab world—some key considerations. *International Monetary Fund, 19*(40). https://doi.org/10.5089/9781513522760.007

Stevenson, B., & Wolfers, J. (2008). *Economic growth and subjective well-being: Reassessing the easterlin paradox (September 2008). CESifo Working Paper Series No. 2394*. Retrieved from https://ssrn.com/abstract=1273524

Thompson, E. K., & Kim, S.-Y. (2022). Assessing the relationship between economic development and mental wellbeing in South Korea. *Iranian Journal of Public Health*, *10*(10), 2379–2381. https://doi.org/10.18502/ijph.v51i10.11004

Turyan, K. V. (2023). Influence of financial intermediation institutes on the welfare of the population in the post-Soviet countries: A comparative analysis. *Cogent Social Sciences*, *9*(2), 2252260. https://doi.org/10.1080/23311886.2023.2252260

Veena, M. (2022). Conceptual evolution of financial inclusion. *EPRA International Journal of Economic and Business Review*, 1–7. https://doi.org/10.36713/epra10762

Vousinas, G. L. (2013). The transmission channels between financial sector and real economy in light of the current financial crisis a critical survey of the literature. *Modern Economy*, *4*(4), 248–256. https://doi.org/10.4236/me.2013.44028

Wooldridge, J. M. (2002). *Econometric analysis of cross section and panel data, second edition the mit press*. Retrieved from https://ipcig.org/evaluation/apoio/Wooldridge%20-%20Cross-section%20and%20Panel%20Data.pdf

World Bank. (2020). *Bank regulation and supervision a decade after the global financial crisis global financial development report*. Retrieved from https://documents1.worldbank.org/curated/en/513831574784180010/pdf/Global-Financial-Development-Report-2019-2020-Bank-Regulation-and-Supervision-a-Decade-after-the-Global-Financial-Crisis.pdf

World Economic Forum. (2021). *Improving access to finance for businesses in MENA region*. Retrieved from https://www.weforum.org/agenda/2021/11/improving-access-to-finance-for-businesses-mena-region/

Zhang, J., Ahmad, M., Muhammad, T., Syed, F., Hong, X., & Khan, M. (2023). The impact of the financial industry and globalization on environmental quality. *Sustainability*, *15*(2), 1-18. https://doi.org/10.3390/su15021705

Ziernhold, K., & Jung-Ivannikova, L. (2021). Economic growth, corruption, and financial development: Evidence from Ukraine. *International Journal of Applied Economics, Finance and Accounting*, *10*(1), 8–18. https://doi.org/10.33094/8.2017.2021.101.8.18