THE IMPACT OF INCOME INEQUALITY ON ECONOMIC GROWTH IN THE MENA REGION (1996-2020): AN EXAMINATION OF DIRECT AND INDIRECT EFFECTS

Master's Degree

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Eskişehir 2023

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MASTER'S THESIS

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Anadolu University

Graduate School of Social Science

June 2023

JÜRİ VE ENSTİTÜ ONAYI

Mostafa Mohamed BAHBAH'ın ''The Impact of Income Inequality on Economic Growth in The MENA Region (1996-2020): An Examination of Direct and Indirect Effects '' başlıklı tezi **23 Haziran 2023** tarihinde, aşağıdaki jüri tarafından Lisansüstü Eğitim-Öğretim ve Sınav Yönetmeliğinin ilgili maddeleri uyarınca toplanan **İktisat Anabilim Dalı nda, yüksek lisans tezi** olarak değerlendirilerek kabul edilmiştir.

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ÖZET

MENA BÖLGESİNDE GELİR EŞİTSİZLİĞİNİN EKONOMİK BÜYÜME ÜZERİNDEKİ ETKİSİ (1996-2020): DOĞRUDAN VE DOLAYLI ETKİLERİN İNCELENMESİ

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Bu çalışma, gelir eşitsizliğinin ekonomik büyümeye doğrudan ve dolaylı etkilerini ampirik olarak incelemekte ve özellikle bu ilişkiyi belirleyen çeşitli iletim kanallarına Orta Doğu ve Kuzey Afrika (MENA) bölgesinde odaklanmaktadır. Gelir dağılımı açısından dünyanın en eşitsiz bölgesi olan MENA bölgesi, bu çalışma için çarpıcı bir arka plan sağlar. Ayrıca, bu konuya bu bölgeye özgü olan kısıtlı literatür göz önünde bulundurulduğunda, bu çalışma 1996'dan 2020'ye, 25 yıl boyunca 14 MENA ülkesindeki etkileri incelemektedir. Sonuçların geçerliliğini ve sağlamlığını garanti etmek için, çalışma Sabit Etkiler (FE), Sabit Etkiler İki Aşamalı En Küçük Kareler (FE-2SLS) ve İki Aşamalı En Küçük Kareler (2SLS) dahil olmak üzere çeşitli ekonometrik teknikler kullanmaktadır. Çalışmanın bulguları, özellikle birincil iletim kanalları dikkate alınmadığında, gelir eşitsizliğinin ekonomik büyümeye güçlü negatif bir doğrudan etkisi olduğunu vurgulamaktadır. Dolaylı etkilerle ilgili olarak, analiz, eşitsizlik-büyüme bağlamında insan sermayesinin fiziksel sermayeden öncelikli olduğunu öne sürmektedir. Bu, öncelikli olarak kredinin erişilebilirliğinin rolünün eğitimi ve dolayısıyla büyümeyi teşvik etme şeklinde güçlendirilmesinden kaynaklanmaktadır. Bu durum, Kredi Piyasası Kusurları kanalını desteklemektedir. Ayrıca, bulgular, artan politik istikrarın eşitsizliğin büyüme üzerindeki negatif etkilerini önemli ölçüde dengelediği kanalını doğrulamaktadır.

Anahtar Kelimeler: Gelir eşitsizliği, Ekonomik büyüme, MENA bölgesi, Aktarım kanalları

ABSTRACT

THE IMPACT OF INCOME INEQUALITY ON ECONOMIC GROWTH IN THE MENA REGION (1996-2020): AN EXAMINATION OF DIRECT AND INDIRECT EFFECTS

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This study empirically explores the direct and indirect impacts of income inequality on economic growth, with a particular focus on various transmission channels that dictate this relationship in the Middle East and North Africa (MENA) region. The MENA region, being the world's most unequal region in terms of income distribution, provides a compelling backdrop for the study. Furthermore, given the limited literature on this topic specific to this region, this study scrutinizes the effects in 14 MENA countries over a span of 25 years, from 1996 to 2020. To ensure the validity and robustness of the results, the study employs a variety of econometric techniques, including Fixed Effects (FE), Fixed Effects Two-Stage Least Squares (FE-2SLS), and Two-Stage Least Squares (2SLS). The study's findings highlight a robust negative direct effect of income inequality on economic growth, especially when primary transmission channels are not considered. Regarding the indirect effects, the analysis suggests that human capital takes precedence over physical capital within the inequality-growth nexus. This is primarily due to its reinforcement of the role of credit accessibility in promoting education and, consequently, growth. This supports the Credit Market Imperfection channel. Additionally, the findings substantiate the Sociopolitical Unrest channel, as increased political stability significantly counteracts the negative effects of inequality on growth.

Keywords: Income inequality, Economic growth, MENA region, Transmission channels

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STATEMENT OF COMPLIANCE WITH ETHICAL PRINCIPLES AND RULES

I hereby truthfully declare that this thesis is an original work prepared by me; that I have behaved in accordance with the scientific ethical principles and rules throughout the stages of preparation, data collection, analysis and presentation of my work; that I have cited the sources of all the data and information that could be obtained within the scope of this study, and included these sources in the references section; and that this study has been scanned for plagiarism with “scientific plagiarism detection program” used by Anadolu University, and that “it does not have any plagiarism” whatsoever. I also declare that, if a case contrary to my declaration is detected in my work at any time, I hereby express my consent to all the ethical and legal consequences that are involved.

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(Mostafa Mohamed Mostafa Bahbah)

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2SLS	: Two-Stage Least Squares
CEO	: Chief Executive Officer
FE	: Fixed Effects
FE-2SLS	: Fixed Effects Two-Stage Least Squares
GDP	: Gross Domestic Product
GMM	: Generalized Method of Moments
GNP	: Gross National Product
IV	: Instrumental Variables Estimation
NI	: Net Income
OLS	: Ordinary Least Squares
MENA	: Middle East and North Africa
MPS	: Marginal Propensity to Save
NDP	: Net Domestic Product
S-GMM	: System Generalized Method of Moments
SSA	: Sub-Saharan Africa
SWIID	: Standardized World Income Inequality Database
USA	: United States of America
WDI	: World Development Indicators
WID	: World Inequality Database
WIID	: World Income Inequality Database

INTRODUCTION

What effects does inequality have on economic growth? Is there a necessary compromise between economic development and fair society? How does the level of inequality evolve in a capitalist economy? For instance, will equality increase as the economy grows and technology advances, or will it deteriorate? These questions have formed the centre of a long-standing debate among economists for decades without consensus on the answers.

The complexity of the inequality-growth relationship is due to the bidirectional causality between the two. On the one hand, the causality could run from growth, affecting the distribution of income and wealth. On the other hand, the distribution of economic resources could influence human capital development, innovation, and economic progress. The latter causal linkage has long been a focal point of enduring debate among economists.

Starting from Kuznets' (1955) work argued that the association between income inequality and economic growth takes the shape of an inverted U-curve. In the early phases of economic development, inequality gradually peaks and then slowly diminishes in the latter stages. Kuznets (1955) identified two factors that explain this connection. First, only the wealthiest members of society may acquire capital during the early stages of growth. At the same time, people with low incomes cannot save at this point, leading to significant income inequality. Second, in the early stages of economic development, the agricultural sector is larger than the industrial sector, with urban areas having higher average per-capita incomes than rural ones. As economic development proceeds and urbanisation rises at the expense of declining agricultural activity, income inequality increases. However, with the expansion of the urban population, technological advancement, industrialisation, and redistribution measures, income inequality will eventually decline.

While Kuznets' work was revolutionary in discussing the inequality-growth relationship, it also opened the door for many economists to verify the validity of his conclusions. As reported in his study, it was difficult to accept and generalise the direct relationship between income inequality and economic development in academic circles. That is because he examined a limited data set of the USA, Germany, and the UK. Moreover, he admitted to the limitation of his study as he said, “The paper is perhaps 5

per cent empirical information and 95 per cent speculation, some of it possibly tainted by wishful thinking (Kuznets, 1955, p. 26)". That encouraged many economists to engage in this discussion, developing our understanding of the relationship between inequality and economic growth empirically and theoretically.

However, until the mid-20th century, economic thoughts on this topic did not differ significantly from Kuznets' conclusions as the tradeoff between inequality and economic growth continued to dominate economists' thinking. Baselgia and Reto (2022) attribute this to a focus on growth over distribution in theories and practices. For instance, as explained previously, the Kuznets hypothesis claimed that unequal distribution would eventually resolve in later stages of economic development (Baselgia and Reto, 2022, p.1). Keynesian economics, which advocated government involvement in stabilising and growing the economy, overshadowed earlier discussions on distribution. The post-World War II economic boom, globalisation, and technological advances further reinforced the belief that economic expansion could reduce inequality.

In addition, the neoclassical approach's emphasis on market efficiency and individual decision-making neglected inequality, contributing to economic thought's ignorance of distributional issues (Baselgia and Reto, 2022, p.1). The development of macroeconomic representative-agent models, which concentrated on aggregate economic performance rather than income and wealth distribution, supported this perspective. As economists tried to test and corroborate their theories with data and facts, distributional issues were marginalised.

The burgeoning academic discourse delving into the implications of income distribution on economic growth was significantly stimulated after remarkable economic progress in many Asian countries during recent decades, which exhibited relatively low inequality levels (Forbes, 2000, p. 869). This phenomenon compelled economic scholars to reevaluate the association between inequality and economic growth rates. Bourguignon (2015) delineates a marked uptick in interest during the 1990s concerning the interaction between income distribution and economic growth, thereby cultivating a novel theoretical framework that diverges from traditional classical, neoclassical, and Keynesian perspectives (Bourguignon, 2015, p. 634). This emergent research corpus suggests the existence of several pivotal determinants of economic growth that could act as conduits, channelling the detrimental ramifications of inequality towards economic growth. These

potential conduits encompass aspects such as social and political stability, the calibre and productivity of human capital, and endogenous fiscal policy.

The surge in research in recent years on inequality as a topic of investigation can also be attributed to changes in wealth and income distribution worldwide. Despite the numerous theoretical models and critical empirical findings, there is still disagreement on how inequality affects growth. The available evidence shows a mixture of both beneficial and detrimental effects (e.g. Alesina and Rodrik, 1994; Anand and Kanbur, 1993; Barro, 2000; Benabou, 1996; Forbes, 2000; Persson and Tabellini, 1994; Suwoto and Zhai, 2016). The relationship between inequality and growth is complex, encompassing various theoretical channels and interactions, making it challenging to find a single parameter that captures this relationship across all countries and stages of development.

Although a wealth of research outlines the relationship between economic growth and income inequality, there remains a knowledge gap in this relationship's specific context within the Middle East and North Africa (MENA). This region is often considered one of the world's most unequal (Chancel et al., 2022, p. 11). Moreover, a less-explored research path is the analysis of the transmission mechanisms that could potentially affect growth patterns through inequality. This study aims to fill these research gaps by examining the interplay between economic growth and income inequality in 14 MENA countries from 1996 to 2020. It seeks to answer two primary research questions: Firstly, what is the direct effect of inequality on economic growth? Secondly, how do various mechanism channels influence the relationship between growth and inequality?

Various econometric methodologies will be employed to meet the study's objective and answer its research questions. This includes using Fixed Effects (FE) and fixed effects two-stage least squares (FE-2SLS) estimators to investigate the direct effect of inequality on economic growth. In studying the role of transmission channels, the two-stage least squares (2SLS) estimation method is incorporated into a three-step investigative analysis. The first step uses both FE and 2SLS to test the effects of inequality on transmission channels. The second and third steps employ FE and FE-2SLS to examine the effect of transmission channels on economic growth and, subsequently, the conditions under which the relationship between income inequality and growth shifts in strength or direction via a modified moderator analysis. This multifaceted approach ensures robust findings by accounting for the structural differences between the countries under study, controlling for potential endogeneity issues arising from unobserved time-invariant factors correlated

with independent variables, and addressing possible endogeneity problems resulting from reverse causality.

This study significantly contributes to the literature on the inequality-growth relationship, particularly concerning the MENA region, for two reasons. Most of the empirical research about this region in this area relied on data gathered before the Arab Spring (e.g. Jr et al., 2003; Lahouij, 2017; Ncube et al., 2014; Sbaouelgi and Boulila., 2013). This event significantly affected the dynamics of this relationship. However, this study investigates these dynamics over a broader period spanning two decades (1996-2020). This allows us to consider current dynamics and generate relevant policy recommendations. Furthermore, the current work represents the first comprehensive attempt to scrutinise the conditional effects of inequality on growth through various transmission channels for the MENA region.

Building upon the groundwork established in this introduction, which introduces the research topic, delineates the problem statement, and presents the research questions that this study strives to answer, the remainder of this thesis is organised into three chapters.

Chapter 1 offers a brief overview of the concept and measurements of income inequality, paired with a historical review that traces the evolution of theoretical thoughts on economic growth. This chapter sets the stage by clarifying key concepts and delving into the historical context shaping our understanding of economic growth.

Subsequently, Chapter 2 provides an exhaustive review of the theoretical and empirical literature surrounding economic growth, income inequality, and the factors influencing this intricate relationship. This chapter delves deeper into the nuances of our topic, drawing from a wide range of academic sources to provide a comprehensive backdrop to the study's research questions.

Finally, Chapter 3 meticulously details the research design and methodology for the study's investigation. This chapter unpacks the underlying logic of the chosen data and econometric models, justifying the selection of particular methodologies. Following this, it navigates through the presentation and discussion of empirical results, juxtaposing the findings of this study with the broader literature. In doing so, it brings to the fore both the consistencies observed with previous studies and the discrepancies that provoke further inquiry.

This chapter concludes by summarising the key findings, providing a reflective endpoint to exploring the relationship between economic growth and income inequality in the Middle East and North Africa region. Through this structured approach, this thesis aims to offer a nuanced and comprehensive understanding of a complex yet critical socioeconomic issue.

CHAPTER ONE

1. ECONOMIC GROWTH AND INCOME INEQUALITY: CONCEPTUAL FRAMEWORK

1.1. Economic Growth

1.1.1. Concept

Economic growth embodies the increase in a nation's per capita income, which is primarily quantifiable. It incorporates an upsurge in the aggregate wealth of a nation as depicted by the gross domestic product (GDP), gross national product (GNP), and net income (NI). By measuring alterations in the production capacity and the wider economy, this growth can be expressed positively, neutrally, or negatively. The nature of this manifestation is influenced by whether the growth rate of macroeconomic factors either exceeds, coincides with, or lags behind the population growth rate. This correlation furnishes a dynamic perspective on the progression of a nation's economy (Haller, 2012, p. 66).

Undoubtedly, economic growth plays a pivotal role in sculpting the global economy. The significance of economic growth becomes particularly evident when examining its historical impact over the past two centuries. Within the context of developed nations, technological advancements have made possible a standard of living that was once accessible only to an exclusive minority. This progress has further sparked remarkable strides in the healthcare and pharmaceutical sectors, resulting in improvements to both life expectancy and overall quality of life. However, the inconsistencies in economic growth rates have accentuated the profound disparities that exist between affluent and impoverished nations on a global scale.

1.1.2. Economic growth theories

Economic growth, while vitally significant, is often challenging to evaluate due to the range of its inherent and external complexities. It may not entirely capture a nation's economic activity, with sections such as the “black market” and societal aspects like work hours typically disregarded. Moreover, the environmental repercussions linked to economic activities are frequently sidelined. The relationship between economic growth and population increases adds another layer of complexity to the issue. The rapid population growth of recent centuries has precipitated the need for considerable product

growth to satisfy individual and societal needs. It is within this intricate milieu that theories of economic growth emerge.

Despite their limitations, these theories offer an essential framework for comprehending and appraising a country's socioeconomic conditions. A meticulous examination of these theories will shed light on the dynamic relationship between economic growth and inequality – the central subject of this study. Hence, this section endeavours to provide a chronological brief overview of these economic growth theories, setting the stage for a comprehensive and nuanced exploration of their implications and interrelations.

1.1.2.1. *Mercantilism*

Mercantilism, as an economic growth theory, places paramount emphasis on the role of the nation-state in directing and shaping economic activity, advocating for a positive balance of trade as a central pillar of economic prosperity(Chijioke et al., 2021, p.2). This theory is premised on an economy with underutilised resources, positing that increased demand leads to the employment of idle capital, land, or labour, subsequently boosting the GDP without an immediate effect on the price level. The enhancement of the money supply, typically in the form of precious metals during the Mercantilist era, is seen as a catalyst for growth without inflationary consequences. Unlike modern economic theories that champion consumption as a conduit for the general welfare, mercantilism views the elevation of employment and output levels as strategic tools for national independence from imported goods and for strengthening sovereign power (Backhaus, 2012, p. 95).

Rather than individual wealth, national wealth takes centre stage in the Mercantilist perspective. The focus is not on the global wealth of nations but on enriching the home country, manifesting a distinct nationalistic undertone. The wealth of a nation is understood in terms of the total goods produced and the profitable trade surplus achieved instead of merely accumulating precious metals. As a result, Mercantilists ardently encouraged exports while discouraging imports, aiming for a trade surplus and robust economic growth. Moreover, Mercantilists propounded active state intervention in population and labour management to ensure low wages and high production for international competitiveness. Policy tools included import quotas, monopolies, subsidies, and high tariffs, underlining an interventionist stance towards economic

management. In essence, mercantilism presents a protectionist and nationalist economic growth theory, valuing national wealth accumulation, state intervention, trade surplus, and low wages as driving forces of economic expansion (Backhaus, 2012, pp. 96-97)

1.1.2.2. *Physiocracy*

Physiocracy, a pioneering economic theory, arose in France during the 18th century, serving as an ideological shift away from mercantilism. Central to the physiocratic doctrine was the notion that a nation's prosperity emanates fundamentally from its agricultural sector, deeming this the sole productive industry. This view was underpinned by the belief in the natural order of economic life, recognising it as an inherent process governed by its internal laws rather than external intervention (Backhaus, 2012, p. 157). Consequently, Physiocrats primarily objected to the state's meddling in economic affairs, considering such interventions to disrupt this natural order.

The theoretical edifice of Physiocracy comprised the assertion of agriculture as the entire productive sector, the concept of 'produit net', and the circulation of wealth via the Tableau Economique. Equipped with a holistic approach to societal interpretation, Physiocracy extended beyond the boundaries of economics into the broader domain of social sciences. Advocating for a simplified taxation system, they promoted a single tax and endorsed free trade principles. Further extending their economic discourse, they developed a value theory and contributed significant ideas like wealth and mutual economic interconnectedness (Backhaus, 2012, p.158).

1.1.2.3. *Classical theory*

Classical Growth Theory, an economic concept founded during the 18th and 19th centuries by notable economists including Adam Smith, Thomas Malthus, David Ricardo, and John Stuart Mill, remains a cornerstone of economic understanding today. Anchored by Adam Smith's revolutionary proposition in “The Wealth of Nations,” the theory highlights the significance of free trade rather than gold accumulation in building a nation's wealth. Smith argued that wealth grows when parties willingly trade based on perceived profit, leading to a net increase in total wealth. He emphasised the concept of self-regulation of markets or the “invisible hand” that balances demand and supply when buyers freely choose among various suppliers (Backhaus, 2012, pp. 163-164). This

paradigm, coupled with his caution against monopolies and his emphasis on the importance of competition, forms a bedrock of economic theory.

Central to Classical Growth Theory is the principle of production optimisation. Smith contended that a nation's wealth grew with land, labour, and capital-output enhancement—prerequisites for improved labour productivity and capital expansion. He saw the division of labour and technological advancements as primary drivers of increased productivity, viewing competition as a tool for restoring equilibrium in the system. However, classical economists also cautioned against unfettered growth. Malthus, for instance, advanced a pessimistic view of economic expansion, warning of catastrophic outcomes if population growth surpassed the growth of resources for subsistence, a phenomenon he termed “diminishing returns” (Aghion and Howitt, 2008, pp. 217-218).

Complementing the views of Smith and Malthus, David Ricardo made a seminal contribution to Classical Growth Theory with his concept of comparative advantage, which further elucidated the dynamics of trade and growth. He argued that nations should focus their resources on industries with the most global competitiveness and trade with others for products no longer produced domestically. This theory, alongside John Stuart Mill's insights on the cumulative nature of capital, helps to elucidate the process of economic growth. Mill's insights explain how the accumulation of capital escalates labour demand and, given a constant population, triggers an elevation in real wages, thereby catalysing sustained population expansion. In instances where capital accretion surpasses workforce growth, these processes may be indefinitely sustainable. However, this worker augmentation equates to elevated consumer goods and food demand, challenging agricultural sectors characterised by diminishing returns to scale. Consequently, it engenders issues concerning the descending marginal productivity of capital and the abatement of investment incentives (Shapirov, 2015, p. 763). Classical Growth Theory, therefore, provides a comprehensive framework that underpins our understanding of economic growth, stressing the interconnectedness of trade, competition, investment, technological advancements, and population dynamics in shaping a nation's wealth.

1.1.2.4. *Schumpeterian growth theory*

Joseph Alois Schumpeter's growth theory forms a crucial cornerstone of economic development theory, emphasising the indispensable role of entrepreneurship and

innovation. Schumpeter posits that entrepreneurial actors, characterised by their initiative, foresight, and risk-taking abilities, introduce transformative changes that disrupt the economic equilibrium and ignite growth. This growth is made manifest through the introduction of new goods, the evolution of innovative production methods, the unearthing of untapped markets, the sourcing of fresh raw materials, and the creation of forward-thinking organisational structures. Intriguingly, Schumpeter's viewpoint extols the virtues of monopolies, viewing them as a testament to revolutionary change and disruption within the economic landscape (Shapirov, 2015, pp. 763-764).

Building upon the foundation laid by Schumpeter, Aghion and Howitt expanded this growth theory into a comprehensive framework. Their work underscores the crucial role that large corporations play in driving endogenous scientific and technological progress. This more intricate theoretical framework revolves around three principal ideas. The first concept maintains that diverse types of innovation, encompassing process, product, and organisational, fuel long-term economic growth. The second forwards the belief that these groundbreaking innovations frequently spring from within firms, propelled by investments in research and development and skill enhancements. These are stimulated by the anticipation of monopolistic gains that successful innovation often yields (Aghion and Festré, 2017, pp. 28-29).

Lastly, Aghion and Howitt introduced the gripping concept of 'creative destruction.' This theory describes the dynamic in which existing innovations become obsolete due to the emergence of disruptive newcomers, thus fostering a fluid interplay between the old and the new. This constant state of flux necessitates a carefully calibrated political economy that seeks to safeguard innovation-led gains without hampering the spirit of future innovation and market entry. A key conclusion drawn from Aghion and Howitt's expanded framework is the positive correlation between the rate of innovations and economic growth rate, thus further validating the pivotal role of innovation in driving economic development (Aghion and Festré, 2017, pp. 28-29).

1.1.2.5. *Keynesian and neo-keynesian growth theories*

During the 1930s Great Depression, British economist John Maynard Keynes, in his 1936 work 'The General Theory of Employment, Interest, and Money,' argued that capitalist economies could struggle to recover from investment slowdowns and could persist indefinitely with high unemployment and no growth. Challenging laissez-faire

capitalism's self-sufficiency, he advocated for periodic government intervention through measures such as tax cuts and increased spending to stimulate the economy, moderate business cycle fluctuations, and facilitate recovery post-Great Depression. Keynes further underscored the critical role of aggregate demand in maintaining economic stability. He suggested that during economic downturns and periods of high unemployment, diminished income leads to reduced consumption, savings, and investments, necessitating governmental fiscal policy actions to revitalise business activity and aggregate demand (Jahan and Mahmud, 2015, p. 3). Over the years, these theories have developed further, with Post-Keynesian thinkers like Evsey Domar and Roy Harrod contributing more nuanced insights.

These growth theories emphasise aggregate demand as the primary driver of economic growth. This perspective contrasts starkly with classical and neoclassical theories, which predominantly focus on aggregate supply and productivity. Keynesian theories acknowledge the implications of fluctuations in aggregate demand and the influence of macroeconomic policy on output and employment. They further recognise the role of psychological factors and uncertainty in shaping economic decisions, with concepts like “animal spirits” identified as catalysts for heightened growth. With their comprehensive analytical perspective, Keynesian theories present a well-rounded framework for understanding the dynamics of economic growth, distinct from other models under their central focus on aggregate demand (Dutt, 2010, pp.41-42).

The Post-Keynesian or Neo-Keynesian theory of economic growth is mainly attributable to the intellectual contributions of Evsey Domar and Roy Harrod, often collectively identified as the Harrod-Domar hypothesis due to their closely aligned insights. Domar advanced Keynes' theory by highlighting investment as an indispensable factor in enhancing income and augmenting productive capacity. His hypothesis delineates the rate of investment growth required for revenue growth, which is dependent on the ratio of savings to national income and the average efficiency of investment. Domar's theory underscores the importance of continued capital accumulation, asserting that investment growth enables aggregate demand and supply to reach a dynamic equilibrium (Shapirov, 2015, p. 765).

On the other hand, Harrod's theory focuses on the economic growth trajectory in the system, drawing from the accelerator concept. His approach elucidates the mechanism for balanced growth by focusing on the interplay of income, savings, investments, and

entrepreneur expectations. Harrod contends that labour and capital productivity growth rates dictate the actual growth rate. If the actual growth rate aligns with the natural rate—ensuring full utilisation of capital resources—the economy will continue to grow. However, this requires active state involvement to achieve a stable dynamic equilibrium. Despite their distinct perspectives, Harrod and Domar's ideas are often jointly considered due to their shared emphasis on the marginal propensity of savings and the inherent instability of dynamic market equilibrium. While their theories effectively captured the processes of economic growth in the 1930s and the post-World War II era, subsequent decades' qualitative and technological changes necessitated more comprehensive theories embodied in neoclassical growth models (Shapirov, 2015, p. 766).

1.1.2.6. *Neoclassical growth theory*

The Neoclassical Growth Theory emerged during the mid-twentieth century. Predominantly focusing on equilibrium states, it elucidates the growth trajectory by examining the interplay among capital accumulation, technological advancements, and population growth. The theory underscores the distinction between short-run or momentary equilibrium, where capital goods, population, and technology are presumed fixed, and long-run equilibrium, which contemplates changes in these parameters over time. Such a construct offers a unique lens to comprehend the complexities of economic growth. However, it is not an exhaustive growth theory or a chronological narrative of economic history(Hahn, 2010, pp. 172-173).

At the heart of Neoclassical Growth Theory lies Robert Solow's seminal work. Solow constructed a model that establishes a balance between aggregate demand and supply, thereby providing a robust framework for understanding long-term economic expansion. This model, analysed through the Cobb-Douglas production function, identifies three main drivers of economic growth: labour, capital, and technological progress. In Solow's vision, the economy is a closed system, devoid of international transactions. Labour expands at an externally fixed rate, capital accrues from savings drawn from the overall economic output - albeit subject to depreciation, and technological progress or 'total factor productivity' is assumed to grow at an externally determined rate. The model suggests constant returns to scale with diminishing returns to individual factors, also illustrating the concept of a 'steady state' where per capita economic growth decelerates and eventually halts in the absence of technological innovation (Popa, 2014, pp. 27-28).

To circumvent this limitation, Solow incorporated technological progress as a third catalyst for economic growth, complementing labour and capital. This exogenous factor bolsters the productive efficacy of labour and capital, counteracting diminishing returns and contributing to sustained per capita output growth. Technological progress, represented by a consistently exponentially growing productivity parameter in the aggregate production function, is equated with an increase in labour supply growing at a rate corresponding to population growth plus the productivity rate. As the economy nears the steady state, the growth rate of the capital stock depends on the net effect of savings and depreciation. Simultaneously, technological progress tempers the declining output-to-capital ratio associated with capital accumulation. The apex of the steady state is determined by the savings rate, depreciation rate, population growth rate, and the exogenous rate of technological progress. Solow's model posits that with the impetus of exogenous technological progress, the steady state itself evolves, enabling long-term growth that is both qualitative and quantitative, thus giving economic growth an intensive dimension (Popa, 2014, pp.27-28).

However, while providing an invaluable foundation to comprehend certain growth aspects, the Neoclassical Growth Theory is not without its detractors. Critics point to the theory's inadequacy in explaining investment and savings behaviour, traditionally depicted as proportional to income or emanating solely from profits. Investment behaviour is discussed within the scope of warranted paths, where the marginal return to any investor always aligns with the marginal investment cost. This somewhat reductionist perspective has invited critiques, underscoring the need for an expanded, nuanced view of economic behaviour. In sum, while the Neoclassical Growth Theory is a vital starting point for exploring economic growth, its limitations are crucial for its application and refinement in a dynamically evolving economic landscape (Shapirov, 2015, p. 768).

1.1.2.7. *Endogenous growth theory*

The Endogenous Growth Theory, often called the “new growth theory”, emerged in the latter part of the twentieth century as a seminal development in economic growth theory. Proposed by economists Paul Romer and Robert Lucas, this theory marked a considerable paradigm shift from traditional neoclassical growth models. The most striking departure resides in the perception of technological progress, which, unlike in neoclassical models where it was treated as an exogenous force, is recognised in

endogenous growth theory as an integral factor arising from within the economy itself(Shapirov, 2015, pp. 768-769).

The theory places substantial emphasis on human capital as a vital determinant of economic growth. As postulated by Romer and Lucas, economies that exhibit a greater accumulation of human capital, facilitated through significant investments in education and health, are predisposed to experience accelerated growth rates. Romer, in particular, underscored that the economic growth rate is directly proportional to the value of human capital invested in acquiring new knowledge. Contrarily, Lucas highlighted the critical tradeoff between current production and the accumulation of human capital, suggesting that allocating time between these alternatives dictates the economic growth rate (Shapirov, 2015, pp. 769-770).

Another distinguishing element of the endogenous growth theory lies in its attitude towards capital. The theory rejects diminishing marginal returns to capital, a cornerstone of neoclassical economics, and instead subscribes to the idea of constant or even increasing returns to scale. This perspective is often associated with positive externalities, such as knowledge spillovers from research and development (R&D) activities, which are essential catalysts for sustained economic growth(Howitt, 2010, pp. 68-71).

International trade also commands significant attention in endogenous growth theory. The model posits that by expanding the economic system's boundaries, free international trade leads to an aggregate increase in human capital, promoting higher economic growth rates. Furthermore, economists like J. Grossman and E. Helpman argue that endogenous high-tech innovations resulting from R&D activities are the primary engine of economic growth. This assertion is further reinforced in P. Aghion's and P. Howitt's theory of endogenous technological progress, which contends that inter-firm competition can spur long-term economic growth by creating and implementing innovative products and technologies (Howitt, 2010, pp. 68-71).

In summary, endogenous growth theory presents a comprehensive and nuanced perspective on the multifaceted mechanisms that underpin economic growth. By recognising the inherent value of human capital, the role of R&D, the impact of state policies, intellectual property rights, and international trade, it offers rich insights into understanding and influencing economic growth trajectories.

1.2. Income Inequality

1.2.1. Concept

Inequality is commonly associated with comparisons of distinct quantitative entities, which can be evaluated using appropriate metrics and indicators. However, it transcends mere numerical comparison and assumes novel dimensions within a societal context (Gallo, 2002, p. 5). Here, inequality emerges as a multidimensional construct, encompassing disparities in access to human and legal rights, political representation, or opportunities. This study primarily focuses on the economic facet of inequality, which may involve income, wealth, consumption, or wage disparities. These aspects are closely interwoven and measured using distinct methodologies and data sources. Among these, income and wealth inequality takes centre stage in the economic literature concerning economic disparity. However, income inequality is the most prevalent metric, comprising wage flows and monetary flows generated from wealth in the form of capital income.

Piketty (2014) work offers a comprehensive definition of capital. He illustrates:

> "The sum total of nonhuman assets that can be owned and exchanged on some market. Capital includes all forms of real property (including residential real estate) as well as financial and professional capital (plants, infrastructure, machinery, patents, and so on) used by firms and government agencies (Piketty, 2014, p. 46)".

In this perspective, unlike income, wealth has the potential to persistently grow, comprising both financial and non-financial assets, such as patents and intellectual property. Nevertheless, it is generally accepted that financial assets are the most vital component of wealth. Supporting this, Sierminska and Medgyesi (2013) research asserts that real estate constitutes approximately 75% of capital assets in developed countries.

Recent literature emphasises the significant role of inherited wealth and high capital returns in increasing the income share of society's elite. Piketty (2014) examination of income distribution in France highlighted that "within the cohorts born around 1970-1980, 12-14% of individuals received inheritances equivalent to the lifetime labour income of the bottom half of less well-compensated workers (Piketty, 2014, p.421)". Concurrently, the lines separating work income from capital income have become nebulous, particularly illustrated by the corporate CEOs who, due to their vast income levels, frequently gain significant capital returns, affording them opportunities for capital accumulation beyond the reach of ordinary workers. Further, wealth often acts as a gateway to lucrative jobs, an advantage usually expedited by unrestricted access to elite

networks and familial ties, proliferating through capital accumulation and reinforcing income avenues that solidify an individual's economic position.

On the contrary, income is typically earned personally. Given our existence within a societal framework, individuals do not live in isolation but within households. As such, an individual's consumption depends on personal and household income (Galbraith, 2016, p.46). Despite the significance of personal income inequality and its insights into labour market dynamics, wage structures, and employment patterns, it falls short as an indicator of economic inequality.

As illustrated in Figure 1.1, household income is calculated based on Atkinson's (2015) guide. It comprises the total income of all members from work and capital income in the form of rent, along with private and governmental transfers. After-tax deductions, what remains is the household's disposable income. By incorporating the value of public services provided by the state, such as education, health, and social services, one can further expand upon the concept of household disposable income (Atkinson, 2015, p.30).

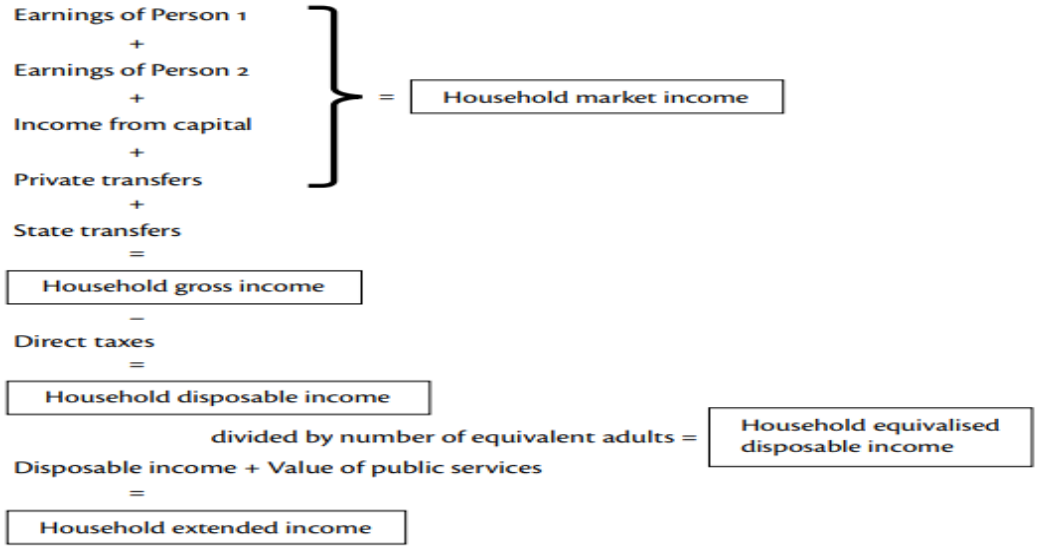

Figure 1.1. *Household income calculation*

Source: Atkinson, 2015, p.30

The comparison between market income and disposable income is a useful indicator for assessing the effectiveness of a state's social and economic policies in either alleviating or exacerbating income inequality. This comparison can be made by contrasting pre-tax income with post-tax income. Interestingly, in an analysis of the two largest Middle Eastern and North African (MENA) countries by population - Türkiye and Egypt - it was discovered that there was no significant difference in the gap between

market income and disposable income, as reflected by the Gini coefficient. This information, illustrated in Figure 1.2, implies that the welfare state system in these countries may not substantially impact the redistribution of wealth from the affluent to the impoverished. However, in recent years, the Gini coefficient for disposable income revealed that it is lower in Türkiye than Egypt. This suggests that Türkiye's social welfare system may be more robust than Egypt's.

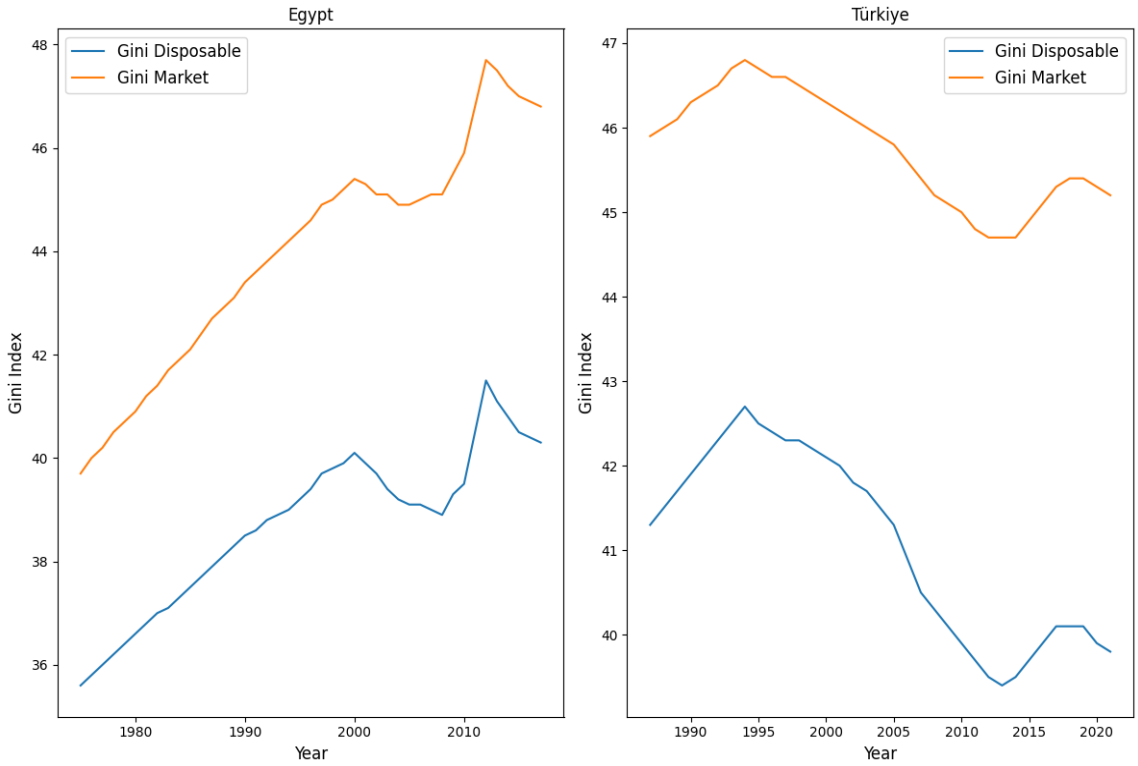

Figure 1.2. *Market and disposable Gini coefficient in Türkiye and Egypt*

Source: Author's elaboration *using SWIID data* (Solt, 2020)

1.2.2. Measures

Determining the extent of income inequality across various countries or assessing its fluctuation over time within a single country necessitates a systematic and effective measurement method. Over the years, economists have devised several methodologies to quantify these income disparities. However, selecting an appropriate measure of inequality involves carefully considering both methodological and practical aspects, given the phenomenon's complexity. A successful measure is a reliable indicator of

economic welfare, hence the importance of ensuring its effectiveness. Ebert (2010, p. 96) identifies four crucial criteria for proficient inequality measurement:

i. **Anonymity**: According to this criterion, the identity of the income recipient is irrelevant. This implies that changes in income distribution among individuals do not influence the inequality assessment. Evaluations of inequality should be carried out irrespective of the individuals' specific identities. This enables the arrangement of incomes in ascending order, from the least wealthy to the most affluent, without affecting the overall evaluation.

ii. **Population**: This criterion asserts that duplicating the population alongside their respective incomes should not alter the inequality measurement. The influence of population size on inequality is deemed negligible, as the income distribution across different layers of the population primarily drives inequality.

iii. **Relative income**: Here, the importance of income lies in its relative standing rather than its absolute size. Any constant percentage adjustment to everyone's income should not affect the degree of inequality. Thus, the inequality assessment should extend beyond mere income levels to include income distribution.

iv. **Transfer principle of Dalton**: Named after economist Hugh Dalton, this principle suggests that if one income distribution is achieved from another through a series of regressive transfers (transfers from those with lower income to those with higher income), the original distribution should be considered more unequal.

Apprehending the intricacies of income distribution—an indicator of how a country's total GDP is dispersed amongst its populace—is crucial for accurately measuring income inequality. The three primary classifications of income distribution include sectoral, functional, and personal. Sectoral distribution elucidates the economic structure and diversification across various sectors. Functional distribution, meanwhile, examines income allotment based on distinctive roles in the production process, offering transparency on economic returns. Personal distribution, often illustrated via the Lorenz Curve, highlights income inequality within a societal context. Building upon these insights, this study navigates various prominent measures of inequality, including the Gini coefficient, Kuznets ratio, Atkinson index, and Palma ratio. Each measure furnishes

distinct viewpoints on income inequality, thereby forging an exhaustive framework for investigating economic disparities.

1.2.2.1. *Lorenz curve*

The Lorenz curve, a vital tool in understanding income distribution, was formulated by American economist (Lorenz, 1905). It elucidates the relationship between cumulative shares of national income and the corresponding cumulative shares of earners. While its conceptual framework is akin to the percentile shares method, it differs in associating cumulative income shares with cumulative shares of individuals, broadening its scope beyond simply income shares (Bellù and Liberati, 2005, p. 2).

The horizontal and vertical axes of the Lorenz curve represent the cumulative percentage share of the population and income, respectively. The curve emerges when cumulative national income shares are plotted against their proportionally accumulated population shares (Bellù and Liberati, 2005, p. 2). This graphical representation forms the foundation of the Gini coefficient, a predominant method of measuring income inequality.

Referring to Figure 1.3, the Lorenz curve details the proportion of national income received by different population sectors, indicating income distribution. The 'line of perfect equality' is a theoretical scenario where all individuals receive equal income shares; in such a case, the Lorenz curve would overlap with the equidistributional line, forming a 45° line. However, any deviation of the Lorenz curve from this line towards a more concave shape signifies income inequality. This is a common phenomenon as income distribution rarely approaches absolute equality in real-world scenarios.

1.2.2.2. *Gini coefficient*

The Gini coefficient, developed by Gini Corrado in 1912, is the most frequently used measure in the literature on income inequality. Derived from the Lorenz curve, this metric provides a potent tool for assessing income and wealth distribution (Kakwani and Podder, 2008). It serves as a summary statistic for the Lorenz Curve's depiction of income distribution (Dorfman, 1979, p.147).

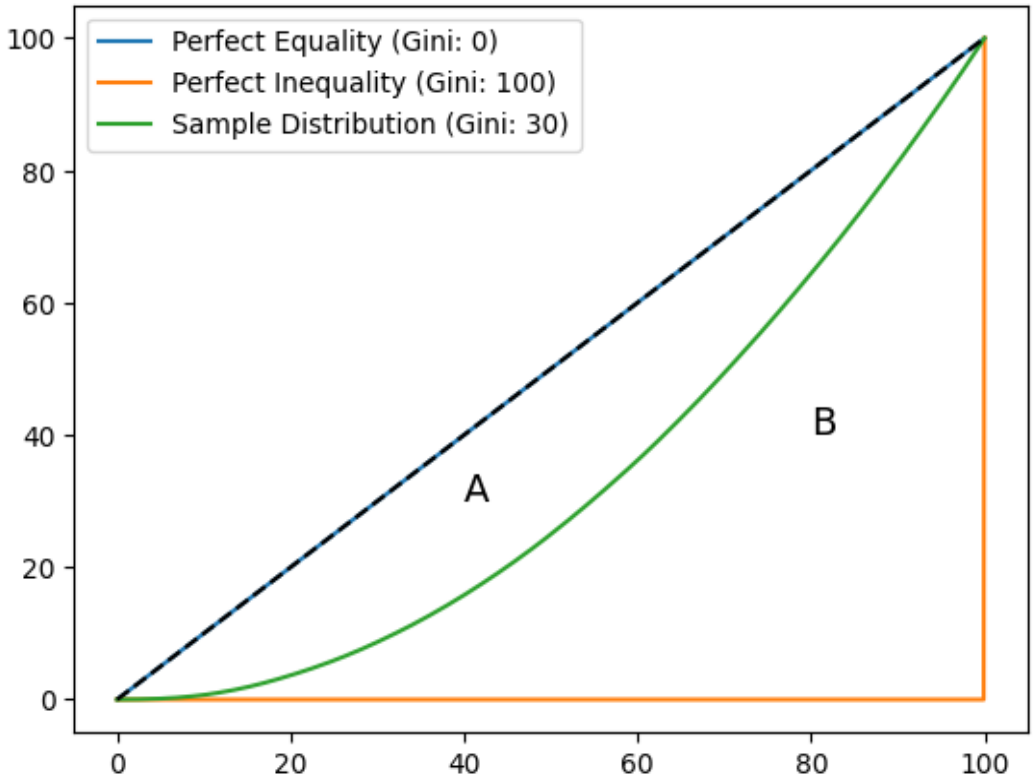

Figure 1.3. *Lorenz curve and Gini coefficient*

Source: Author's elaboration.

Expressed as a single figure, the Gini coefficient enables comparison across diverse income groups. The coefficient is computed using the Lorenz curve, as depicted in Figure 1.3. It is expressed as the ratio of area A (the region between the Lorenz Curve and the line of perfect equality) to the sum of areas A and B (the space extending from perfect equality to perfect inequality) (De Nardi et al., 2000, P.7).

When assessed concerning the population, the Gini coefficient offers insights into disparities in income distribution. In a society where income distribution mirrors population distribution—for instance, the bottom 10 per cent of the population receiving 10 per cent of the income—the Gini coefficient is “0”, indicating a lack of inequality. Conversely, in a highly unequal society, where one individual holds all the income, the Gini coefficient reaches “100”, reflecting peak inequality.

Countries with minor inequalities, such as Sweden, Norway, and Germany, typically have Gini coefficient ratios of 30 or below. In contrast, societies with high inequality, such as those in the Middle East, North Africa, and several African and Latin American countries, tend to have Gini coefficient ratios of 50 or higher.

The Gini coefficient offers several advantages as a measure of inequality. Firstly, it provides a comprehensive representation of inequality within the population. It allows for comparing inequality levels within a country across different cities or residential areas. Moreover, it tracks changes in inequality over time, indicating whether income distribution trends favour the wealthy or are moving towards a more equitable scenario(Allison, 1978, p.877). Lastly, it is a useful tool for comparing inequality trends across nations. For instance, if a country's GDP rises without a corresponding decrease in the Gini coefficient, it implies that wealth and income increases are confined to the rich, with no significant improvement in the status of the poor.

However, the application of the Gini coefficient as a metric for inequality does not come without drawbacks, as identified by Chitiga et al. (2014, pp.9-10):

- Comparisons involving countries with varying characteristics, such as the vast and economically diverse Russia and the United States, may yield inaccuracies. Specifically, an aggregate Gini coefficient for a large, economically diverse nation might be higher than the coefficients computed separately for its provinces. Consequently, comparing such a nation with smaller countries may result in potentially misleading interpretations.
- Disparities in national subsidy systems pose additional complications when the Gini coefficient is calculated on the basis of disposable income. To illustrate, some nations adopt cash transfers, while others resort to food stamps or commodity transfers. This leads to the partial exclusion of income in the Lorenz curve, thus influencing the calculation of the Gini coefficient.
- The efficiency of income utilization also bears a significant impact on the outcomes of the Gini coefficient. Suppose families with higher incomes utilize their resources more efficiently than their lower-income counterparts. In that case, the actual levels of inequality may exceed those projected by the Gini coefficient.
- The Gini coefficient, notwithstanding its utility, has the potential to obscure distinct income distribution scenarios. For example, a pair of countries both boasting a Gini coefficient of 50 may possess radically dissimilar income distribution characteristics. In one, it is conceivable that no income is received by half the population, the remaining income being shared equally among the other half. In contrast, another country might exhibit a balanced distribution of income except for a single-family amassing half of the national wealth. The root of this

inconsistency lies in the fact that Lorenz curves, despite their differing shapes, can generate identical Gini coefficients. Despite these challenges, it is critical to appreciate that the quest for total justice in the distribution of income and wealth, though it represents an ideal, may be problematic in its practical application. Furthermore, the achievement of an acceptable degree of income distribution equality does not inherently imply a high living standard. In essence, equality is but one component of a multitude of factors that collectively influence the standard of living.

1.1.2.3. *Kuznets coefficient and ratio*

The Kuznets coefficient and ratio serve as fundamental measures for income distribution, providing nuanced insights into sectoral imbalances and economic disparity patterns. These metrics, originating from Simon Kuznets's works, depict different aspects of the income distribution while highlighting deviations from equality.

The Kuznets coefficient is a particularly effective tool for scrutinising sectoral imbalances. It computes the inequality between sectoral average wages based on the distribution of total production and labour force across different sectors (Öztürk, 2009, p. 59). The calculation takes the absolute value of the difference between sectoral production and labour force percentages, subsequently weighted by the proportion of each sector's contribution to the labour force. This method resembles the Lorenz Curve's approach, akin to the Gini Coefficient, albeit stratified by sectors.

In a two-sector economy, the Kuznets coefficient ranges between 0 and 1. A value of 0 implies a perfect wage balance, indicating that the sectoral average wage aligns with the national average. Conversely, a coefficient of 1 suggests extreme wage disparity, where a single sector, with an inconsequentially small employment share, produces the entirety of the output. Therefore, the Kuznets coefficient offers an insightful measure of the functional income distribution, especially pertinent to countries with inadequate individual or household income data (Kaplan, 2019, p.20).

On the other hand, the Kuznets ratio adapts a percentile shares analysis approach, essentially assessing the income disparity across various demographic cohorts. It partitions the population into income groups and calculates the share of national income received by each. The ratio is then derived by dividing the income share of the wealthiest

20% by that of the poorest 40% (Bakırtaş, 2014). Consequently, economies with an equal income distribution exhibit lower Kuznets ratios.

Together, the Kuznets coefficient and ratio offer invaluable insight into the income distribution landscape of an economy. Their respective methodologies allow for comprehensive analysis, encompassing sector-specific wage imbalances and overall income disparity, contributing significantly to studying and interpreting economic inequality.

1.2.2.4. *Percentile shares*

Percentile shares represent a straightforward, commonly used methodology for evaluating distributional inequalities. This method involves ranking the income of all individuals or households in ascending order and then segregating them into groups, often divided into the 20th, 10th, 5th, or 1st percentiles. Each section thus created represents an income group, and calculating each group's portion from the national income allows for determining and comparing income disparity between any of these brackets.

A practical illustration of this approach can be observed when each population group's share of national income is divided into 20 distinct clusters, each embodying 5% of the populace. This technique makes it feasible to ascertain how much the top 10% earn compared to the poorest 10% income bracket.

A primary advantage of the percentile shares analysis is its flexibility compared to alternatives such as the Lorenz curve or the Gini coefficient. While these metrics assess inequality across the entire population, percentile shares offer an opportunity to measure income disparities within any subpopulation.

However, this approach also faces some critique, primarily revolving around the breadth of its focus. Specifically, it is more interested in the total income of individuals or households, regardless of income source, which could range from employment, interest, and rent to gifts or inheritances. Moreover, it overlooks income's origin, whether urban or rural, or from a specific sector such as agriculture, manufacturing, trade, or services. The focus is primarily on the magnitude of the income. Consequently, two individuals may fall into the same income bracket even though one may be required to work twice as many hours as the other, demonstrating that equal earnings do not necessarily correlate with equal effort or circumstance (Todaro and Smith, 2012, pp. 218-219).

1.2.2.5. *Atkinson index*

The Atkinson Index, developed by British economist Anthony Barnes Atkinson, is a highly recognised measure of economic inequality. This comprehensive metric addresses the limitations of previous indices, such as the Gini Index, by incorporating a sensitivity parameter to account for society's aversion to inequality. The parameter varies from zero, indicating societal indifference towards inequality, to infinity, representing an intense aversion to inequality. Remarkably, the chosen value of this parameter can impact the measurement of inequality, placing more emphasis on income disparities at the lower end of the distribution as its value increases (Atkinson, 2015, p. 47).

The Atkinson Index is unique in its ability to incorporate ethical judgments about an acceptable level of inequality, making it a normative measure of inequality. This approach enables the index to satisfy several desirable properties for an inequality measure, like the Pigou-Dalton transfer principle. Despite its inherent complexity and less intuitive nature compared to other measures, such as the Gini coefficient, the Atkinson Index is a robust tool in economic analysis, especially in investigating the dynamics of income and wealth disparities in society.

1.2.2.6. *Palma ratio*

The Palma Ratio, named after its developer Jose Gabriel Palma, is an inequality measurement belonging to the family of inter-decile ratios. This unique ratio represents the national income shares of the top 10 per cent of households compared to the bottom 40 per cent. Palma's empirical observations revealed that the distribution of wealth across nations generally exhibits stability within the middle-income bracket, emphasising the relevance of examining the 'tails' of distribution - the richest and the poorest - to understand inequality patterns (Cobham et al., 2016, p.28).

This perspective on income inequality led to the 'Palma Proposition', which postulates that changes in income or consumption inequality primarily originate from fluctuations in the richest (D10) and poorest (D1–4) income brackets, leaving the middle (D5–9) relatively stable. Critics argue about this measure's rigidity and future applicability, given its empirical regularity. Regardless, the Palma Ratio offers a distinct viewpoint on income inequality by focusing on the extremes of wealth distribution, thus providing a valuable tool for inequality analysis in various research and policy contexts (Cobham et al., 2016, p.28).

1.2.2.7. *Theil index*

The Theil index, a measure of income inequality, considers individual income distribution and categorisation. As a part of the generic entropy measures, the index draws its fundamentals from income-to-mean ratios. Two significant indices under this category include Theil's L, also known as the mean log deviation, and Theil's T, commonly referred to as the Theil index. When there is complete income equality, these indices attain a zero value. However, the values escalate as the income distribution becomes more unequal (Trapeznikova, 2019).

Contrary to the Gini coefficient, these indices are not limited to a maximum value of 1. Nevertheless, the Theil index is not a relative measure of inequality, which hampers its numerical comparisons across different population sizes or group compositions. Theil's L and T are exceptionally responsive to changes at different income spectrums. L is sensitive to the lower end and T to the upper end. To comprehend variations in inequality, scrutinising the development patterns of these measures can be illuminating(Trapeznikova, 2019).

Notwithstanding its lack of an intuitive interpretation, the Theil index's decomposability makes it a favourite choice for empirical research. It aids in quantifying how differences within and between various population subgroups such as age, education, and geography contribute to income inequality, an invaluable feature for policymakers aiming to discern inequality causes. The Theil T index, for instance, can partition global inequality into within-country and between-country components, with studies indicating that more than 70% of global inequality arises from intra-country differences. In sum, while country rankings tend to exhibit some stability across multiple inequality criteria, the choice of the metric plays a significant role in policy impact analysis, mainly when policies affect income distribution ends differently. Additionally, the chosen metric may shape a nation's observed temporal inequality trends(Trapeznikova, 2019).

CHAPTER TWO

2. THEORETICAL AND EMPIRICAL LITERATURE REVIEW

2.1. Theoretical Literature Review

In this section of the chapter, the study offers a succinct review of the existing theoretical literature concerning the impact of income inequality on economic growth. The primary focus is the historical evolution of understanding this relationship over the years, commencing from the Classical approach, moving to the Neoclassical approach, and finally to the Modern approach. The objective is to illuminate the channels and mechanisms each approach contemplates and operates through.

The forthcoming subsections and their respective content are visualised in Figure 2.1. This figure delineates the crucial theoretical approaches to the effect of income inequality on economic growth. The Classical approach posits that greater inequality positively influences economic growth, while the Neoclassical approach suggests that inequality has no bearing on growth. Conversely, the Modern approach proposes that greater inequality negatively impacts economic growth. Each approach is elaborated upon in its corresponding subsection, with additional details on the various channels each approach considers, such as the differential saving propensity channel under the Classical approach and the human capital channels under the Modern approach.

By providing a synopsis of the topics to be discussed, Figure 2.1 acts as a navigational aid through the intricate relationship between income inequality and economic growth from a variety of theoretical perspectives.

2.1.1. Classical approach

The classical approach posits that inequality stimulates economic growth through two main channels: incentives and differential saving channels. This viewpoint is based on the idea that the marginal propensity to save rises with individual income level, as developed by economists (Pigou, 1936; Kaldor, 1957). It suggests that higher aggregate savings and growth can be achieved if these savings are invested (Galor, 2009; Gründler and Scheuermeyer, 2015; Joshi, 2017). The incentives channel contends that inequality creates greater incentives to work and invest, as individuals are motivated by the potential

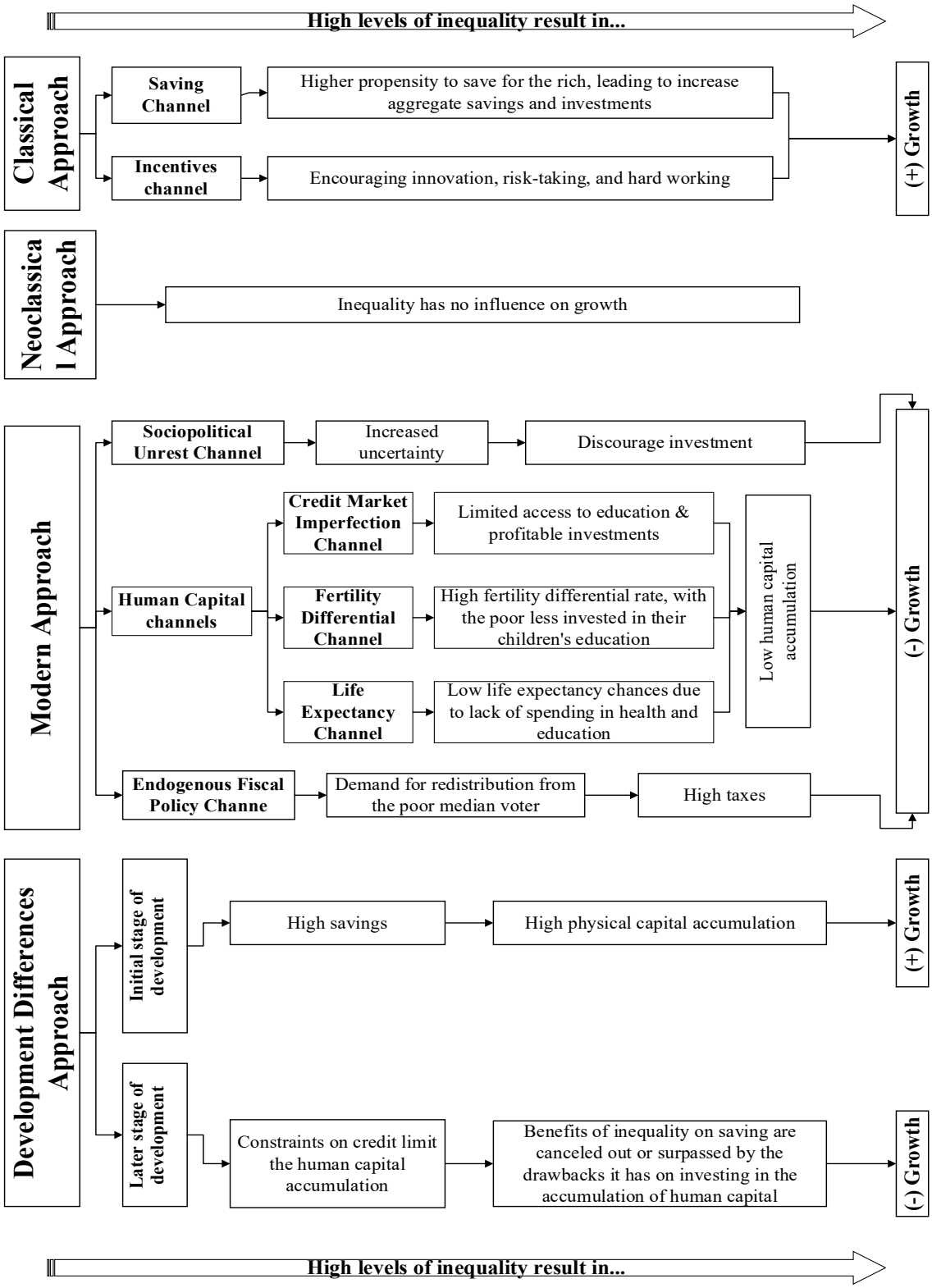

Figure 2.1. *Theoretical frameworks explaining how inequality impacts economic growth*

Source: Author's elaboration based on (Kaldor, 1957; Galor, 2009; De La Croix and Doepke, 2003; Castelló-Climent, 2010; Galor, 2006; Meltzer and Richard, 1981; Alesina and Perotti, 1996; Hibbs, 1973; Venieris and Gupta, 1986).

rewards associated with higher income levels. This channel emphasizes the role of incentives in driving economic growth through increased productivity and investment. The differential saving channel argues that the rich save more than the poor. When these savings are invested, it leads to accelerated economic growth. In the following subsection, the study discusses Kaldor's (1957) saving propensity differential channel model in greater detail.

2.1.1.1. *Kaldor and saving propensity differential channel*

Kaldor (1957) posited a model of economic behaviour based on two groups: capitalists and workers. He suggested that the marginal propensity to save (MPS) increases with wealth, implying that wealthier capitalists save more than workers. As a result, capitalists display a higher MPS than workers, indicating an accumulation of savings at a quicker pace among the more affluent group. According to Kaldor, this could affect economic growth, given the direct relationship between savings and investment. Additionally, he considered the investment to national income ratio as an external factor, stable and unaffected by variations in the MPS. Within the context of full employment, Kaldor proposed a naturally occurring balance between saving and investment, leading to an equitable distribution of total income between wages and profits. As per his theory, increased economic inequality could stimulate growth if savings from the wealthier segment of society are converted directly into investment (Gallo, 2002, p. 15).

The total income profit share can be represented in (equation (2.1)) as:

$$\frac{p}{Y} = \left({}^{1}/_{S_p} - S_w\right)\left({}^{I}/_{Y} - S_w\right) \qquad (2.1)$$

Where (P) is the profit rate, (I) refers to the investment, (Y) is the total Income, (S_p) and (S_w) shows the tendency to save for capitalists and workers, respectively. Since ($s_p > s_w$) and $({}^{1}/_{s_p - s_w})$ a coefficient expresses the change in income distribution in the case of a one-unit change in the investment rate. The larger the similarity between the savings rate of capitalists (S_p) and workers (S_w), the stronger the impact of alterations in the investment rate on income distribution. If we assume that (S_w) is minimal or even equal to zero, the (equation (2.2)) will be as follow:

$$p = \left({}^{1}/_{S_p}\right) I \qquad (2.2)$$

This proposal effectively expresses Kaldor's thoughts on capitalist consumption. He claims that a specific distribution mechanism between capitalist profits and worker wages equalizes savings and economic investments. Profits must rise parallel with price increases to maintain a sustainable balance between investment and savings. Consequently, raising investments will result in raising savings. This suggests that a positive correlation exists between growth and inequality in the income distribution of the factors of production (Gallo, 2002, p. 15).

The limitation of Kaldor's model to only two economic classes has drawn significant criticism for multiple reasons. Cline (1975) made this observation and contends that it restricts the model's ability to generalize its findings, especially when there are three or more economic classes. In addition, the significance of foreign direct investments is not considered in Kaldor's model.

While Kaldor developed his model based on profit share, Kalecki (1951) proposed a model based on Marxian beliefs on wage share and employed monopoly analysis. The model is based on the relationship between the product price and marginal cost, represented by the (equation (2.3)).

$$\mu = (p - m)/\, p \tag{2.3}$$

Where (p) is the product price, and (m) is the marginal cost. If marginal cost equals marginal revenue, (μ) equals the inverse of the product's elasticity of demand. Variable costs in Kalecki's model consist of labour and raw material costs. When considering a closed economy, Kalecki finds that the labour share fluctuates negatively with the economy's "average" amount of monopolistic power. As a result, the percentage of wages in value added is negatively connected with the elasticity of product demand under the relationship between the degree of monopoly and the elasticity of product demand mentioned above. Therefore, this model predicts that economic growth based on a rise in monopolistic power will result in a widening gap between the share of wages and profits in total Income (Gallo, 2002, p. 15).

On the other hand, Kalecki's model faces the challenges of constructing a macroeconomic theory of distribution based on microeconomic elements without paying attention to the aggregate problems of the analysis. For example, he argues that, at the microeconomic level, it is reasonable to assume the supply of a particular factor at a

specific price. In contrast, at the macroeconomic level, some limitations may arise from factor availability (Gallo, 2002, p. 15).

The work of Kuznets (1955) carries some critics of the classical approach, arguing that the concentration of wealth within a narrow demographic, leading to a rise in the capital-output ratio, does not necessarily spur economic growth. Kuznets pointed to the practice of the affluent shifting their wealth to offshore locations offering lax regulations and superior interest rates. Furthermore, he noted that the wealthy might display a higher propensity to consume rather than save. This classical perspective has also been implicitly challenged by the neoclassical approach, which positions the consumer and the producer as the sole significant economic agents. Neoclassical economics refutes the idea of income-based behavioural differentiation, positing that consumers and producers possess distinct characteristics irrespective of income levels (Joshi, 2017, p. 5).

2.1.2. Neoclassical approach

A focus on efficiency has long dominated neoclassical macroeconomic analysis without considering distributional considerations. In contrast to the classical approach, which posits that greater inequality drives economic growth, the neoclassical perspective contends that inequality has little to no effect on growth. Based on the Solow (1956) work of representative-agent models[1], this viewpoint rejects heterogeneity in macroeconomic analysis, including examining income distribution. However, this approach overlooks the connection between inequality and economic growth, agreeing that the influence starts with economic growth and the impact of development stages on income distribution, which aligns with the Kuznets hypothesis.

In recent years, the study of macroeconomics has revived the focus on heterogeneity, exploring both the positive and negative relationships between inequality and economic growth (Baselgia and Reto, 2022, p. 4). The neoclassical perspective sees income inequality as inevitable and even desirable in a free market if it stimulates growth. In contrast, the heterodox theory posits that inequality arises from institutional arrangements and power disparities that benefit the wealthy, suggesting that addressing

[1] Solow growth analysis uses a single representative agent to represent the average behaviour of all households and firms in an economy. This agent makes decisions on consumption, saving, and investment. The model focuses on long-run economic growth driven by technology, capital accumulation, and population growth. However, the representative agent is a simplification that does not capture the full complexity of individual preferences and behaviours.

these disparities would lead to a more equitable income distribution. This perspective highlights the complexity of the relationship between inequality and growth, offering an alternative viewpoint to the neoclassical approach.

Neoclassical economists also believe that savings result from avoiding consumption and that accumulating financial capital stimulates investment and economic growth. The institutionalist argument, which claims that savings are caused by the wealthy's insufficient consumption rather than their choices, challenges this position. Institutionalists argue that accumulating financial capital leads to social and economic instability, reduced effective demand, and increased income inequality (Josifidis and Supić, 2018).

To sum up, the neoclassical perspective disputes the classical belief that posits a beneficial impact of inequality on economic growth. It does not argue that income inequality negatively affects growth.

2.1.3. Modern approach

The modern approach to the connection between economic growth and income inequality has cast doubt on classical and neoclassical viewpoints, as it reveals the substantial impact of heterogeneity and income inequality on macroeconomic indices. Numerous studies (e.g., Galor and Zeira, 1988, 1993; Alesina and Rodrik, 1994; Alesina and Perotti, 1996; Persson and Tabelleni, 1994; Hibbs, 1973; Venieris and Gupta, 1986) have presented different justifications for this view, explaining how income inequality can stunt economic progress (Joshi, 2017, p. 6).

While the classical approach views growth and inequality as incompatible objectives that must be chosen between, the modern approach emphasizes that income distribution can significantly influence economic growth. According to Galor (2009), this new perspective on economic growth and income inequality provides a fundamentally different story compared to classical and neoclassical approaches. Unlike the neoclassical approach, it underlines the role of income distribution as a crucial component of economic development.

In contrast to earlier approaches that prioritized physical capital, the current approach underscores the importance of human capital in economic progress. According to Galor (2009), human capital development is a critical pathway through which income inequality affects economic growth. The sub-channels of the modern approach all agree

that inequality harms economic growth. However, they have different mechanisms for how this occurs. These sub-channels include credit market imperfections, life expectancy, fertility differentials, socio-political unrest, and endogenous fiscal policy (Galor, 2009).

2.1.3.1. *Human capital channels*

This section delves into the channels associated with human capital, concentrating on elucidating the potential adverse effects of inequality on economic growth. The primary mechanism it highlights is the detrimental impacts of inequality on the level of education, fertility rates, and public health of the population. Through this exploration, the section aims to illuminate these various channels that intertwine human capital and economic growth within the context of inequality.

2.1.3.1.1. *Credit market imperfection channel*

The credit market imperfection presents a strong argument against the classical viewpoint, demonstrating that income and wealth inequality can generate inefficiency and harm economic growth in the long run. This is primarily because poor individuals cannot invest in potentially profitable ventures or their education due to the lack of collateral to borrow funds. In contrast, wealthy individuals have the opportunity to receive a better education. They can implement projects even if they are less privately or socially profitable simply because they possess sufficient collateral or do not need to take loans.

As a result, less profitable projects may be implemented, ultimately making society worse off. Therefore, taking steps towards redistributing wealth from top to bottom can help ambitious individuals in the lower class obtain the collateral they need. This redistribution is expected to accelerate economic growth by promoting investment and increasing productivity (Bourguignon, 2015, p.639). This argument finds its justifications through the work of several authors (Aghion and Bolton, 1997; Banerjee and Newman, 1993; Benabou, 1996; Galor and Zeira, 1993; Piketty, 1997). Among these, the Galor and Zeira (1993) model is the most widely used in the empirical literature, as it places particular emphasis on the role of education in an individual's life cycle.

- **Galor-Zeira Model**

Galor and Zeira (1993) propose a dynamic model that explains how wealth inequality impacts long-term economic growth. The model assumes that people divide their life cycle into two periods: the first period, where individuals may choose to work

in less-skilled jobs or invest time in education, and a second period where those who invested in education can work in high-paying jobs, while others work low-paid jobs in both periods. The decision to invest in education depends on an individual's inheritance. Those with more inheritance have better access to education, while others may need to borrow to cover the costs. However, credit market imperfections mean that some individuals may not have sufficient collateral to access loans or face high-interest rates, making it challenging to complete their education.

In the model[2], each family has a single child providing the intergenerational link. This assumption also means that there is no population growth. In this case, the utility function of the representative individual is represented in (equation (2.4)).

$$V = \alpha \log c + (1 - \alpha) \log b \qquad \alpha \in (0,1) \tag{2.4}$$

According to argument (b), in the utility function, individuals benefit from sharing their wealth with their descendants. Then this bequest is passed down to the next generation as an inheritance. Where (c) represents the amount consumed by the individual in the second period, (b) is the bequest amount the individual leaves to his kid, (a) is the consumption elasticity of the utility function, and (1-a) denotes bequest elasticity.

Assume (x) represents the amount of inheritance that an individual owns, which differs between individuals. Suppose (h) is the fixed amount of investment in human capital that individuals need to be skilled workers. Individuals have the free will to invest or not invest in education, regardless of what they have of (x) and (h). If they prefer work over education, they will work as unskilled workers for two periods and get paid at (w_u) wage level. Moreover, they can lend to others at the (r) interest rate. As a result, their second-period budget restriction will be represented in (equation (2.5)).

$$c = (x + w_u)(1 + r) + w_u - b \tag{2.5}$$

On the other hand, if they prefer education over working, they will work in highly skilled jobs during the second period and get paid at (w_s) wage level. However, the financing of education expenses relies on x and h's respective sizes: a) if (x < h), individuals will borrow at (i) rate to finance their education. b) if (x > h), then the individuals' inheritance will be sufficient to finance their education. Therefore, their second-period budget restrictions will be represented in (equation (2.6) and (2.7)).

$$c = (x - h)(1 + i) + w_s - b \tag{2.6}$$

[2] This study draws from the work of Azam Abdul Razak (2006, pp.11-14) in its explanation of the Galor and Zeira (1993) model.

$$c = (x - h)(1 + r) + w_s - b \tag{2.7}$$

Suppose the representative individual's utility function (equation (2.4)) is maximized according to inheritance. In that case, the optimal bequest for various individuals will be obtained. Galor and Zeira (1993) determine the appropriate quantity of inheritance in the form of a first-order nonlinear difference equation by doing some algebraic calculations as in (x_{t+1}, x_t) space of equation (2.8).

$$x_{t+1} = (1 - \alpha)\begin{Bmatrix} [(x_t + w_u)(1 + r) + w_u], & if & x_t < f \\ [(x_t - h)(1 + i) + w_s] if & f \le x_t < h & \\ [(x_t - h)(1 + r) + w_s], & if & x_t > h \end{Bmatrix} \tag{2.8}$$

Galor and Zeira (1993) determine the appropriate quantity of inheritance in the form of a first-order nonlinear difference equation by doing some algebraic calculations as in (x_{t+1}, x_t) space: supposing the representative individual maximizes the utility function (equation (2.4)) according to inheritance, we will obtain the optimal bequest for various individuals.

Equation (2.8) could be illustrated graphically as in Figure 2.2 where x_{t+1} is the quantity of bequest at time $t + 1$ and x_t Is the quantity of bequest at time t.

According to Figure 2.2, society is classified into three groups:

First group: Individuals with an amount of inheritance less than (f) cannot afford education expenses. Thus, they will work in unskilled jobs in both periods of their life.

Second group: Individuals with an amount of inheritance between (f) and h this group could have access to education in the first period of their life by taking credit. Then they can work in highly skilled jobs in the second period.

Third group: Individuals with an inheritance of more than (h) will gain education during the first period. They will work in highly skilled jobs in the second period.

Regardless of the population split into three groups, we realize that we ended up only into two main groups separated by an unstable equilibrium point (g). Those with an inheritance of more than (g) will become in the rich group, and those with less than (g) will become in the poor group in the long run. The logical explanation for this dynamic

long-run equilibrium is that subsequent generations must have a minimum amount of inheritance to provide a sufficient inheritance for their offspring after them.

It is clear from Figure 2.2 that the income levels in the country are determined in the long run by the number of individuals who inherit more than g. So, if we assume that there are three countries: The first country has its population divided equally around h and f. In the second country, two-thirds of the population is concentrated at point (h), and the remaining third is at point (f). As for the third country, the population is concentrated opposite of the second country. In all of the above cases, the part of the population that lives around f will move to $x_{poor,}$ and the part of the population that lives around h will move to x_{rich}.

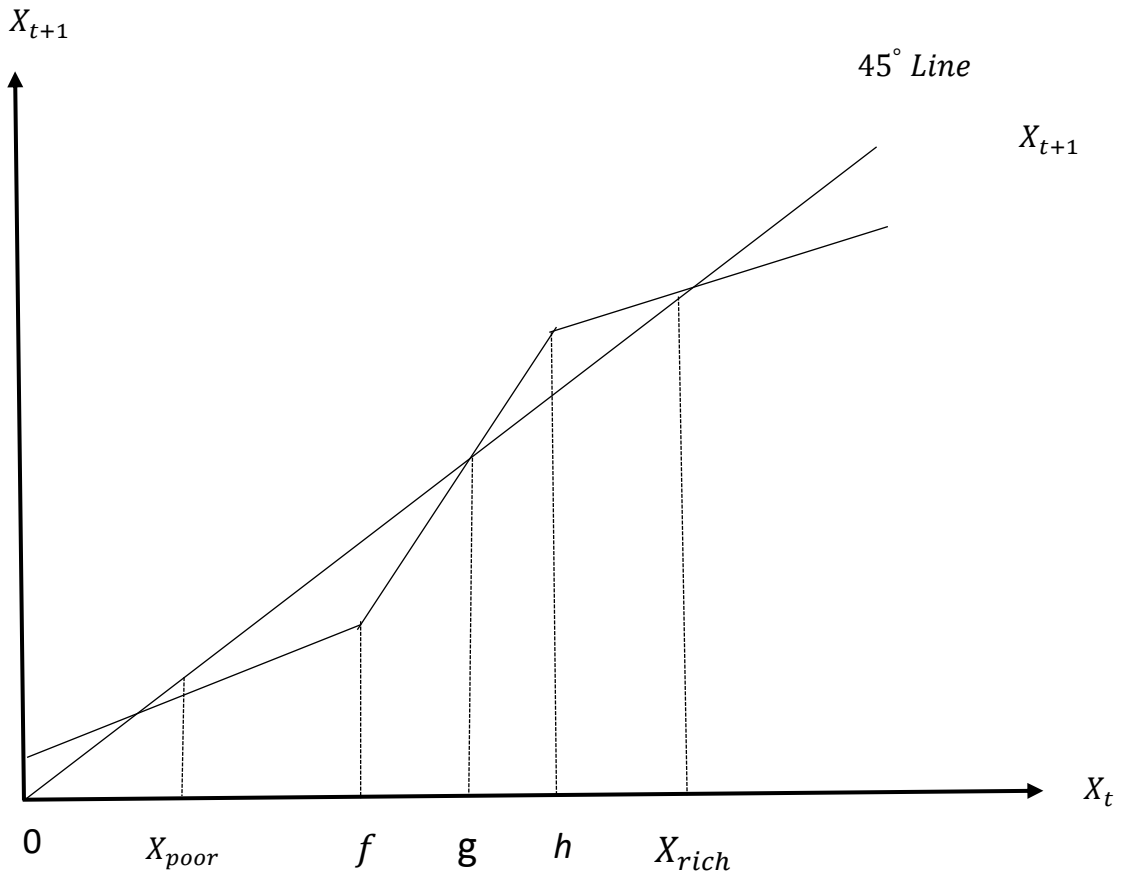

Figure 2.2. *Dynamics of Galor and Zeira model*

Source**:** Azam Abdul Razak, 2006, p.14

To clarify the last example, we can imagine the income values at $X_{poor;}$ *f; g; h;* and X_{rich} are (1, 3, 5, 7, and 9, respectively). Accordingly, we can observe the following: for the first country, the income level will not change, in the second country, the Income will

decrease, but for the third country, the Income will tend to rise. If (g) is considered a reference point separating the poor from the rich economies. The larger the population whose inheritance is greater than g, the higher the state's Income in the long run. We will reach the following conclusions: 1) Countries with poor economies will end up in poverty, 2) Countries with rich economies in which wealth is equitably distributed will end up rich, 3) Countries with rich economies in which wealth is distributed unfairly will end up in poverty in the long run.

2.1.3.1.2. *Fertility differential channel*

The impact of income inequality on fertility rates and human capital investments has been the subject of extensive research. Becker and Barro (1988) pioneered this area, establishing the link between initial inequality and high fertility rates, particularly in low-income societies. They argue that families often grapple with a trade-off between the number of children and their education. Families with limited resources may prefer having more children to increase family income or secure old-age support. However, such decisions often come at the cost of education, creating a dichotomy between quantity and quality, between more children and better education (Becker and Barro, 1988, p. 3).

The inverse relationship between fertility and wages further reinforces this dichotomy. Kremer and Chen's (2002) shows that higher wages lead to reduced fertility, implying a trade-off between wages and fertility rates. They propose that an increase in the proportion of unskilled workers will decrease wages and increase their expected number of children due to the reduced opportunity cost of having children. This effect multiplies across generations, with the children of unskilled workers likely to continue this cycle, thus creating a persistent socio-economic pattern (Kremer and Chen, 2002, p. 155).

The dynamics of fertility rates and income inequality present critical implications for economic growth. Building upon the differential fertility channel, De La Croix and Doepke (2003) posit that larger income disparities result in increased fertility differentials, which in turn lead to more children with lower education levels. This process, over time, depresses average human capital accumulation, leading to reduced economic growth rates. These researchers emphasize the long-term economic repercussions of income inequality and its influence on fertility rates(De La Croix and Doepke, 2003, p. 1091).

Fertility decisions, as Galor and Weil (1993) propose, are also influenced by the relative income of couples. When a woman's income is high, the relative cost of having children increases, possibly leading to fewer children. This decision-making process impacts population growth and the capital per worker, setting a cyclical pattern that influences wages and, subsequently, the relative share of women's wages. This model shows how fertility decisions, inextricably tied to income levels, reverberate through the economic structure of a society, affecting aspects far beyond the immediate family unit(Galor and Weil, 1993, pp. 3-5).

In conclusion, the triadic nexus of income inequality, fertility rates, and human capital investments affect economic growth and socio-economic development. Inequality influences family decisions regarding fertility and human capital investments, which ultimately shape the economic growth trajectory of nations. Therefore, understanding this intricate relationship is vital in shaping effective policies to reduce inequality and promote sustainable economic growth.

2.1.3.1.3. *Life expectancy channel*

The Life Expectancy Channel aims to explore the complex relationship between inequality, life expectancy, and economic growth. Studies by (Chakraborty and Das, 2005; Galor and Mayer, 2001) have begun investigating the impact of health investments on generational inequality, suggesting that credit market issues can perpetuate poverty (Castelló -Climent, 2010, p.402).

In ideal capital markets, where all participants have equal access to information and the same opportunities, Castelló-Climent and Doménech (2008) use differences in life expectancy to establish a link between inequality and growth. Empirical evidence from studies such as (Currie & Moretti, 2003) supports the idea that family human capital, including education and health, significantly impacts life expectancy. When investing in education, people consider their chances of survival. The model predicts that individuals living in poverty and with little education will have lower life expectancies and invest less in human capital, as the opportunity cost of education is higher for them. On the other hand, individuals with more wealth and a longer time horizon to reap the benefits of schooling are more likely to invest in human capital (Castelló -Climent, 2010, p.403).

The initial distribution of schooling influences average human capital in the long term and during the transition to the steady state due to a mean-preserving dispersion in

survival probability. This channel suggests that higher initial education inequality reduces a country's life expectancy, which in turn lowers the average human capital investment. In other words, if a country has a higher level of inequality in education, it will lead to lower life expectancy and less investment in human capital (Castelló -Climent, 2010, p.403).

2.1.3.2. *Reconciling between classical and human capital approaches*

Galor and Moav (2004) work introduced a robust theoretical model that reconciles differences between savings channel and human capital approaches. This model, aptly referred to as the "Differences in Economic Development Approach," expertly delineates the transition of developed economies from a reliance on physical capital — tangible assets, equipment, and infrastructure — to a focus on human and knowledge-based capital. Such capital is vested in the competencies, education, and skills of the workforce. The model illuminates that during the early phase of the Industrial Revolution, economic growth was primarily driven by the accumulation of physical capital, which led to resource concentration among individuals with high savings, propelling economic expansion. However, as economies evolved, Galor and Moav's model underscored a significant shift, highlighting human capital as the primary engine of growth. This shift also shed light on the dynamic interplay between inequality, access to credit, and economic advancement, presenting a profound understanding of the economic evolution that encapsulates modern economies (Galor, 2006, p.1).

The model effectively differentiates between two distinct economic regimes[3], Regime I and Regime II. In Regime I, the return on physical capital outweighs that of human capital, resulting in wealth concentration among the affluent. Conversely, the less privileged often spend their earnings instead of saving or investing. This wealth inequality creates a state of equilibrium in which the continued accumulation of physical capital drives economic growth. In contrast, Regime II highlights the economy's unique trait of increasing returns on human capital. This regime can be divided into three phases, each distinguished by the availability and use of credit for human capital investment. This progression eventually leads to optimal human capital investment, achieved once credit constraints are fully lifted (Galor, 2006, pp.12-14).

[3] Galor and Moav (2004) use the term “regime” to denote a system, situation, or stage of development in which human and physical capital possess certain characteristics. Within this regime, these characteristics in turn influence the relationship between growth and inequality.

In conclusion, Galor and Moav (2004) argue that the influence of inequality on economic growth depends on the relative advantages of physical and human capital. When the returns on physical capital dominate, increased inequality may stimulate economic growth; however, in an economic setting where returns on human capital are substantial, a rise in inequality could potentially obstruct economic development. Therefore, the model accentuates the significance of equitable investment in human capital, particularly in economies where the returns from such investments are significant.

2.1.3.3. *Sociopolitical unrest channel*

Income inequality has consistently been recognized as a key socio-political issue, inciting debate among academics, policymakers, and social thinkers. A robust body of literature, with seminal works by (Alesina and Perotti, 1996; Hibbs, 1973; Venieris and Gupta, 1986), posits a compelling connection between income inequality and socio-political instability. The crux of this discourse is the proposition that individuals, particularly the poor who are deprived of adequate economic opportunities in traditional markets, are often driven to seek these opportunities through non-market activities[4].

The socio-political consequences of income inequality extend into various facets of society, with notable impacts on social crime rates and unrest. High levels of inequality can foster an environment conducive to criminal activities, as individuals deprived of resources might resort to unproductive means to meet their needs. Participation in such activities signifies a direct waste of societal resources, as time and energy that could have been utilized productively are channelled into non-productive pursuits. Further, the threat posed by these activities hampers the interests of others and negatively impacts the investment climate (Barro, 2000, p. 7).

The socio-political ripple effects of income inequality do not end at increased crime rates and social unrest; political stability is also at stake. High inequality has been linked to political instability, potentially culminating in governmental. This climate of instability fosters economic uncertainty, affecting savings and investment, leading to capital outflows, and causing a decrease in foreign direct investment. Thus, political instability fueled by income inequality can induce a detrimental cycle that undermines the overall economic well-being of a nation (Alesina and Perotti, 1996, pp. 1204-1206).

[4] Non-market activities refer to illegal and unproductive actions that operate outside the boundaries of legitimate economic systems.

As triggered by income inequality, this socio-political instability carries significant economic growth implications. According to (Perotti, 1996; Alesina et al., 1996) socio-political instability can deter investment and capital accumulation, thereby impeding long-term economic growth. They propose a succinct pathway wherein growth increases as investments increase, and investments increase as socio-political instability decreases. When socio-political instability decreases as inequality decreases, growth increases, signifying a positive relationship between reduced inequality and economic growth (Joshi, 2017, p. 7).

Socio-political instability driven by inequality also presents significant obstacles to upholding property rights and the proper functioning of economic institutions. Research suggests that governments in societies with high-income disparity often underinvest in their legal frameworks, fostering an environment prone to property rights violations (Svensson, 1998, pp. 1318-1319). In addition, high-income inequality potentially paves the way for crony capitalism and nepotism. In these societies, an affluent upper class benefiting from an unequal income distribution may exert undue political influence and manipulate legal institutions to their advantage. This power asymmetry resulting from income inequality permits the wealthy to engage in rent-seeking activities freely. This practice can lead to a misallocation of resources and a decrease in productivity, subsequently impairing economic growth (Glaeser et al., 2003, pp.200-201).

In conclusion, income inequality engenders socio-political unrest, which directly impedes economic growth. High-income disparities fuel societal instability, threatening the rule of law and diverting crucial state resources away from productive pursuits and towards ensuring stability. To navigate these challenges, governments should consider implementing redistributive policies. These policies are intended to mitigate the disruptive effects of income inequality, thereby fostering a more stable and prosperous society. Governments can create an environment that bolsters equitable growth and societal well-being by actively addressing the socioeconomic issues spawned by income inequality.

2.1.3.4. *Endogenous fiscal policy channel*

The earlier explored transmission channels investigated the relation between growth and disposable income distribution, income after taxes have been deducted. However, a novel perspective that emerged in the 1990s began exploring the relationship

between market inequality (pre-taxes) and growth via government policies. This approach suggests redistributive taxes could engender an inverse relationship between income inequality and growth.

This political economy approach elucidates the association between economic development and societal inequality through the fiscal policy channel. It is premised on the idea that the state's fiscal policy is shaped by political participation, wherein citizens vote on tax rates, and the resulting fiscal policy reflects their choices. In nations with high inequality levels, lower-income social groups may advocate for a more equitable income distribution through fiscal policy by taxing the wealthy and transferring these funds to the less affluent. However, high tax rates could deter investment, resulting in sluggish economic growth. Historically, this belief in the inverse relationship between income inequality and economic progress has been showcased in the work of (Alesina and Rodrik, 1994; Bertola, 1993; Persson and Tabellini, 1994).

The political economy approach is grounded in Perotti's 1996 work, which highlights two main mechanisms for the fiscal policy channel: a political mechanism, where the democratic voting process dictates the income distribution in society and an economic mechanism that explains how tax policies influence economic growth rates. The political mechanism proposes an inverse relationship between income distribution inequality and the equilibrium level of taxes. This premise, rooted in the work of Meltzer and Richard (1981) and the concept of the "median voter," posits that in a democratic regime, each citizen's market income plays a significant role in shaping their electoral orientation. Therefore, lower market-income citizens are more likely to support higher taxes and government transfers, as this will augment their net income. However, it is crucial to note that not all voters wield the same relative political weight. The equilibrium tax rate, determined by the voting process, depends ultimately on the median voter. In a society with severe income and wealth inequality, the relative income position of the median voter will be low, making them relatively poor compared to other voters. This results in a vote for higher tax rates, as the median voter expects this to enhance their net income (Perotti, 1996, p.150).

The second economic mechanism asserts that if government subsidies provided by the welfare state are financed through taxes, this will curtail the return on investment and dissuade the accumulation of physical and human capital. Also, unemployment benefits might decrease the incentive to work, slowing and weakening economic growth. Thus,

the political economy approach views fiscal policy as a conduit through which social inequality affects economic growth, with both political and economic mechanisms in operation (Perotti, 1996, p.151).

Saint Paul and Verdier's (1996) work challenges the direct association between inequality and redistribution in the political mechanism. They assert that rising inequality does not necessarily lead to a worsening position for the median voter relative to the average societal income, thus negating the assumption of increased taxes. This is particularly true if the inequality is concentrated amongst the poorest strata, potentially improving the median voter's financial status compared to the average income. Furthermore, the relative influence and power of various political actors could significantly impact the outcome of redistribution policies. Their approach also presupposes a fixed tax system. However, the outcomes may vary with the implementation of progressive taxes, where tax rates increase with income levels. Such a system can potentially mitigate inequality by imposing a heavier tax burden on the wealthy. Finally, they caution that the model might result in a flawed tax system that fails to adequately reduce societal inequality, as the affluent might evade taxes. Therefore, a political mechanism might not always effectively impose high tax rates in the face of increasing income inequality (Saint Paul and Verdier, 1996, pp.720-721).

The relationship between economic growth, inequality, and redistribution is complex and multifaceted, necessitating a nuanced understanding that extends beyond traditional political economy models. These models have been critiqued for disregarding imperfect credit markets, presuming a fixed initial income distribution, and viewing political participation as an external factor. Such models typically suggest a unidirectional causal relationship where inequality influences tax levels, which are contingent upon the poverty level of the median voter, and subsequently negatively impact future growth. However, models like those posited by (Perotti, 1993; Saint-Paul and Thierry, 1993) suggest that redistribution does not necessarily lead to weak growth in democratic societies.

Saint-Paul and Thierry (1993) propose that education can mitigate the adverse effects of income inequality on economic growth in democratic societies. By increasing the efficiency of human capital, initial income distribution through public education could boost future growth rates. However, continuous application of this mechanism could lower inequality levels over generations, reducing the tax proceeds for public education

and making economic growth more reliant on private education investments(Saint-Paul and Thierry, 1993, p. 406).

Similarly, Perotti (1993) highlights the indivisibility of private investment in human capital, particularly in education, as pivotal for sustainable economic growth. Perotti argues that such investments can increase productivity and motivate others to invest similarly, thereby underlining the necessity of considering society's distinct poverty levels. In an impoverished society, only the affluent can invest in education, making inequality the primary driver of economic growth. Education is financed through taxes for middle and wealthy societies, leading to increased economic growth and reduced income distribution inequality aligning with the Kuznets hypothesis(Perotti, 1993, pp.755-757).

Benabou (1996) criticizes the traditional political economy models for overlooking credit market inefficiencies and suggests incorporating assumptions of imperfect credit markets for a more comprehensive understanding of how redistribution policies impact economic efficiency. He argues that while redistributive policies might decrease economic efficiency by reducing physical capital accumulation, they can simultaneously improve efficiency by promoting investment in human capital, specifically by making credit more accessible for education. Furthermore, technological advancements can potentially counterbalance the detrimental effects of redistributive policies by lowering the return on educational investment while increasing marginal capital returns, thereby promoting long-term economic growth(Benabou, 1996, pp. 32-39).

The relationship between inequality and economic growth can shift with the political context and the effectiveness of the traditional political economy approach. Benabou (1996) expands on this by critiquing the median voter hypothesis and ideal democratic regimes, arguing that societies could move towards a more equitable distribution when inequality levels influence the redistribution process through democratic political participation. Furthermore, the distribution of political forces among society members may not correspond to economic forces distribution, impacting the relationship between initial inequality and redistribution(Benabou, 1996, pp. 25-29).

Ades and Verdier (1996) suggest a model reflecting a more realistic connection between income and wealth distribution, political participation, and economic growth. They posit that disparities in income and wealth can lead to the formation of two societal classes the affluent, who can bear the cost of political participation and the poor, who

cannot, resulting in imposed taxes without deriving benefits from redistribution. The size of the politically elite group impacts long-term economic growth, income, and wealth distribution (Ades and Verdier, 1996, pp. 6-8).

Atkinson and Bourguignon (2000) integrate democratic political participation, inequality, and economic growth into their model, highlighting that educational investments drive economic growth and political participation. Their model shows the potential for the wealthy to support the education of the poor, thereby cultivating a middle class, increasing returns on investment in human capital, and maintaining power (Atkinson and Bourguignon, 2000, pp. 524-526).

According to Bourguignon and Thierry (2000), economic openness can also impact the incentives of the wealthy class to support education for the poor and initiate a democratization process. In a closed economy, the wealthy may see benefits in supporting the education of the poor to increase the return on their physical capital, but this may come at the expense of potentially losing political control to the newly educated working class. In contrast, in an open economy, the rates of return on local capital may not exceed international rates. Thus, the wealthy may not see any benefits in supporting the education of the poor. However, economic openness may contribute to reducing poverty and inequality by reducing the levels of genuine domestic interest to approach the international level, thereby creating surpluses in the Income of the working class (Bourguignon and Thierry, 2000, p.892).

In summary, the traditional political economy approach posits that high levels of income inequality can harm economic growth by reducing incentives for investment through the implementation of income and wealth redistribution taxes in a democratic society. However, when inequality reaches levels deemed unacceptable by a majority of the population, political instability may arise due to growing dissatisfaction and attempts to redistribute wealth through illegal means.

2.2. Empirical Literature Review

Two categories within the empirical literature study how inequality affects economic growth. The first category attempts to quantify the direct relationship between inequality and economic growth. The second category examines the efficacy of various transmission mechanisms proposed in the theoretical literature. This section of the study is divided into two subsections: The first explores the first category's studies, and the

latter tries to shed light on the empirical work implemented on various transmission channels.

2.2.1. Direct link studies

The research's main objective, which strives to evaluate the direct relationship, is to discern the nature and extent of the impact of increasing inequality on economic growth. Significant disparities exist across these studies in sample sizes, inequality indicators, estimation strategies, and confidence in income distribution data. The findings of these studies are presented in Table A1 in the appendix section, and their respective ways of addressing methodological issues are systematically examined in this section.

Early post-1990 studies investigating the connection between inequality and economic growth have primarily utilized the Barro regression model style. This methodology incorporates inequality alongside other conventional growth predictors, with the influence of inequality on growth estimated via the coefficient of the inequality variable. Most of these studies have focused on cross-country comparisons, underlining an inverse relationship between inequality and growth. For instance, Persson and Tabellini (1994) integrated panel data from historical records and cross-sectional studies conducted post-World War II to show that inequality obstructs economic development. Further reinforcing this inverse relation, Alesina and Rodrik (1994), along with Clarke (1995), using data sourced from (Jain, 1975; Lecaillon et al.,1984). These studies highlight the prevalent theme of a negative connection between economic inequality and growth.

While measures of inequality, sample sizes, and sources of income distribution data differ between studies, most investigations using reduced-form Ordinary Least Squares (OLS) estimation found that inequality had a significantly negative impact on future growth. This does not consistent with expectations grounded in the classical approach. According to (Persson and Tabellini,1994; Perotti,1996) including regional dummies as an explanatory factor considerably diminished the inequality-growth effect. Perotti (1996) also found the negative inequality-growth link to be statistically significant only in affluent countries. According to various studies, these conclusions withstand numerous sensitivity analyses, incorporating changes in inequality measures, samples, periods, moderator variables, and estimation methods.

In the second half of the 1990s, many publications cast doubt on the validity of the previous studies, which had shown a negative relationship between inequality and its

impact on growth. The objections revolved around the methodology and data quality, undermining the negative association. Three main criticisms were made: questionable quality of income distribution data, the used measures of inequality, and reliance on cross-sectional data. Deininger and Squire's (1996) high-quality dataset prompted a new wave of research on the topic, which further questioned the initial consensus. Below is a detailed discussion of these concerns.

2.2.1.1. *Data quality concerns*

There were serious concerns about the reliability of the data utilized in the early research phase on the inequality-growth nexus. Consequently, the Deininger and Squire (D&S) dataset, widely regarded as an advancement in data quality and breadth, was made available. Despite some initial reservations, the D&S dataset and its replacement, the World Income Inequality Database, have been used in the vast majority of subsequent studies. The WIID has vastly improved over the previous two decades, expanding coverage to include 200 nations and more than 3,700 individual observations. Despite advancements in data quality, experts still cannot agree on how inequality affects economic growth, suggesting that deeper problems need to be solved (Deininger and Squire, 1996; Voitchovsky, 2011).

To tackle these issues, Deininger and Squire (1996) constructed a high-quality dataset representative of the general population based on household surveys covering all income sources. They identified construction methods, income measurements, and population coverage as factors contributing to the poor quality of income distribution data. However, it is also worth noting that other studies using different databases, like the SWIID, have found varying degrees of adverse robustness effects. For instance, studies that used the SWIID database, like Berg et al. (2018), had these varying results. Nevertheless, the reliability of results from the SWIID database has been questioned, especially for developing countries (Jäntti et al., 2020). Most empirical studies on the inequality-growth relationship have relied on the D&S dataset, named after its creators, who used it to demonstrate that income inequality negatively affects subsequent growth. However, this effect disappeared when controlling for regional dummy variables. Other researchers analyzing the D&S dataset reported similar findings, suggesting that the improvement in data quality did not materially lead to consensus about the inequality-growth effect (Baselgia and Reto, 2022, p. 9).

However, the D&S dataset did not fully address data comparability issues. Atkinson and Brandolini (2001) identified differences in income definitions (gross income or expenditures) and recipient units (households or individuals) across countries and over time as critical issues with the D&S dataset. These variations can cause data comparability issues and bias the results (Knowles, 2005; Perraton, 2006). For instance, when using expenditure data, inequality had a significant negative impact on growth. However, when using gross income data, it had no effect.

Additionally, no empirical studies are exploring how changes in recipient units affect the estimation of the inequality-growth link. Considering that household income inequality may conceal other types of inequality, such as gender inequality, changes in the recipient unit could significantly impact the estimation of the inequality-growth relationship (Cavalcanti and Tavares, 2007; Galor and Weil, 1993; Schober and Winter-Ebmer, 2011; Seguino, 2000). For example, East Asian countries may exhibit low levels of household income inequality but high levels of wage inequality among women, which could stimulate growth(Neves and Silva, 2014, p. 10).

2.2.1.2. *Sensitivity of results to data structure and estimation methods*

Early cross-country studies and subsequent panel estimation studies, initiated after Deininger and Squire's (1998) dataset availability, present contradicting evidence. Some indicate a positive association between inequality and growth (Forbes, 2000; Li and Zou, 1998; Partridge, 1997), while others find no relationship (Barro, 2000; Panizza, 2002). Moreover, Banerjee and Duflo (2003) suggest that increased inequality results in weaker future growth using non-parametric approaches, while Herzer and Vollmer (2012) point out potential limitations of traditional panel estimators due to slope heterogeneity and endogenous regressors.

Concerning the use of cross-sectional data, Forbes (2000) raised the issue of omitted variable bias. To address this, various estimation methods, including fixed effects and first-difference generalized method of moments models, were utilized at the cross-state level in the USA (Voitchovsky, 2011). However, issues persist. Region-specific measurement errors can distort cross-country estimates, and panel data estimates may be influenced by persistent inequality over time, resulting in minimal time-series variation (Castells-Quintana et al., 2019, pp.8-9). Voitchovsky (2011) also noted the potential skewing of coefficients in cross-country studies due to time-invariant omitted factors.

Non-linearity in the inequality-growth relationship is another concern raised by Banerjee and Duflo (2003) . Voitchovsky (2011) suggests that panel and cross-country studies may record different time effects. Studies like (Easterly, 2007; O'Donnell et al., 2015), using health and democracy as instruments to address reverse causation, have also been criticized (Houle, 2015). Although many have tried to employ instrumental variables to study inequality, achieving success has been a challenging task. Roodman (2009) review of Forbes (2000) disputes the proposed beneficial influence of inequality on growth, highlighting the risk of instrument proliferation and potential false-positive results.

The general method of moments (GMM) estimator, introduced by Arellano and Bond (1991) , is widely used but criticized for its sensitivity to persistent variables, leading to weak instruments in the first difference GMM estimator. In response, Blundell and Bond (1998) proposed a more robust system GMM estimator (S-GMM) that has been extensively applied to inequality-growth studies. Despite its popularity, issues remain. Weak instruments can lead to unreliable results in S-GMM models, despite their advantages and suitability for investigating the inequality-growth relationship.

In conclusion, while the S-GMM remains a prevalent choice, it is crucial to be aware of potential weak instruments and take steps to mitigate these issues. Implementing diagnostic tests, as recommended by (Bazzi and Clemens, 2013; Kraay, 2015), can provide evidence of consistency and help assuage concerns about the validity of results (Baselgia and Reto, 2022, p. 10).

2.2.1.3. *Inequality: definitional and measurement issues*

The selection of inequality metrics and concepts significantly shapes the influence of inequality on growth in empirical studies. Although wealth is a more relevant indicator, income is often used due to its accessibility (Aghion et al., 1999). Wealth inequality, especially based on land, is more detrimental to growth than income inequality (Alesina and Rodrik, 1994; Birdsall and Londoño, 1997; Deininger and Squire, 1998). Castelló and Doménech, 2002 and Castelló-Climent, 2010) underscore the relevance of human capital inequality, which, alongside land, may not be reliable indicators of genuine wealth if market prices are considered.

Choosing the appropriate inequality measure in a developing economy presents another challenge. Historically, this was accomplished using the Gini coefficient.

However, Voitchovsky (2005) demonstrated that a single metric might obscure the subtleties of the inequality-growth relationship. Voitchovsky found growth to be positively associated with top-level inequality and negatively associated with bottom-level inequality. However, findings from Litschig and Lombardi (2019) contrast with Voitchovsky's, asserting that inequality at the top of the distribution does not impact growth, and inequality at the bottom has a positive effect. The disagreement underscores the complexity of the inequality-growth relationship and the need for multiple metrics to understand it fully.

Research needs to shift from solely examining the effects of inequality on average income growth rates, as proposed by Van der Weide and Milanovic (2018), to investigating its impacts across all income levels. They found that initial inequality hampers growth for those in lower income percentiles but enhances growth for the higher income percentiles in the USA. Replicating these results in various countries and thoroughly examining the effects of inequality on income growth at different distribution levels is required. Also, some scholars argue for absolute measurements over the Gini coefficient, which is criticised for overlooking class disparity and producing inconsistent outcomes. Such absolute measurements might better reflect individuals' perceptions of inequality.

Since the beginning of the 21st century, the discourse surrounding the effect of inequality on growth has been fraught with disagreement, and no definitive consensus has been reached so far. While some studies point to a linear association between inequality and growth, others dispute this premise. For instance, Bleaney and Nishyama (2004) found that the coefficient on inequality was similar for high- and middle-income countries but was markedly different among growth models. This lack of homogeneity across models highlighted the uncertainty of this relationship. Further complicating the matter,Chen (2003) argued for an inverted U-shaped association, while Banerjee and Duflo (2003) suggested that any shift in inequality, whether an increase or decrease, could lead to a reduction in short-term growth.

The issue of a country's level of development is another area where researchers have sought to elucidate the impact of inequality on growth. Bengoa and Robles (2005) discovered a U-shaped relationship between income inequality and growth in ten Latin American countries, while Castelló-Climent, (2010) found that the adverse effects of income and human capital inequality were more pronounced in less affluent economies

and faded in wealthier ones. Moreover, Khalifa and El Hag (2010) , along with Chambers and Krause (2010), provided empirical support to Galor and Moav's (2004) theory that the inequality-growth relationship evolves with a nation's development. They identified a significant threshold income per capita that determines whether this relationship is positive or negative.

2.2.2. Transmission channels studies

The theoretical framework examined earlier identifies several potential pathways elucidating the link between inequality and economic growth. However, despite their theoretical significance, empirical research on these channels is relatively sparse. This section consequently delineates the principal empirical findings of the various mechanisms discussed earlier. The reduced-form relationship provides insights into the interaction between inequality and growth. However, it fails to outline the underlying transmission channels comprehensively. Empirical studies have endeavoured to validate each proposed transmission channel; Table A2 in the appendix summarizes their essential characteristics and conclusions.

2.2.2.1. *The role of empirical evidence in validating Kaldor's channel*

Available data suggest a positive connection between lifetime income and propensity to save. This assertion is corroborated by Dynan et al. (2004) pioneering study and subsequent microdata research. Fagereng et al. (2020) also found that differences in returns among wealthier individuals are not solely attributable to variances in the allocation of safe and risky assets. This positive influence of inequality on growth could be magnified via the savings channel, as wealthier individuals display a higher propensity to save and tend to earn superior investment returns.

Contrarily, Barro (2000) contends that income disparity does not invariably lead to elevated overall saving rates. Research employing aggregate data from multiple countries has yielded inconsistent results regarding the relationship between inequality and individuals' saving capacity. Deininger and Squire (1998) uphold the channel mediated by market inefficiencies and borrowing constraints and further observe that investment in human capital carries more weight than physical capital. This concept is demonstrated by (Birdsall and Londoño, 1997; Deininger and Olinto, 1999), where asset inequality is shown to impact growth.

While savings and fixed asset investment positively contribute to growth, appraising the effect of income inequality on economic growth poses a challenge in emerging economies. There is no clear evidence that income inequality invariably boosts savings (Topuz, 2022). Odusanya and Akinlo (2020) incorporated an interaction term for saving and income inequality in their growth model, adhering to Kaldor's proposition. Their findings suggest that income distribution inequality stimulates growth via the savings channel in the SSA region. Affluent individuals, possessing a higher propensity to save, are more inclined to make substantial investments, thereby fostering economic growth.

2.2.2.2. *The interplay of inequality and credit access limitations in influencing human capital accumulation and economic growth*

An upswing in wealth disparity may precipitate a decline in educational investment among low-income individuals. Neves and Silva's (2014) study indicates that inequality could impede economic growth via lending constraints.

Cingano (2014) proposes examining how income inequality affects human capital accumulation across different economic and social strata within a country as a more effective way to evaluate its impact on education. Empirical evidence suggests income disparity negatively affects educational attainment among lower socioeconomic groups due to credit constraints, but this is not observed among middle and upper socioeconomic groups. Financial development may alleviate these constraints, fostering growth in bottom-quintile earnings at a faster rate than the average GDP per capita, as outlined by (Beck et al., 2007). This progression could be particularly beneficial for those in lower income brackets.

Building on (Galor and Moav, 2004; Galor et al., 2009) credit market imperfection approach, Erman and te Kaat (2019) proposed that inequality affects sectors depending on the physical capital intensity and human capital intensity. Utilizing sector-level empirical data across 86 countries from 1980-2012, they observed a 0.8 to 1.1 percentage point annual disparity between industries at the 75th and 25th percentiles of physical capital intensity in countries with higher Gini coefficients. Slower growth was also noted in human capital-dependent sectors in nations with unequal wealth distribution. They suggest a link between inequality and growth through the relative importance of human and physical capital intensity within a country's production structure.

In the long term, land inequality dampens human development, reducing income and life expectancy. Galor et al. (2009) and Wigton-Jones (2020) identified that greater land inequality slows human capital growth and curtails state-funded social support initiatives and educational investment per child.

Topuz (2022) utilized two-stage estimations to investigate the influence of income disparity and credit availability on student advancement. The results highlighted that while credits aid, inequality and credits collectively impair schooling. This corroborates the initial phase of the credit market imperfection channel, demonstrating that income disparity decreases human capital and financial development augments it. Inequality does not have a positive impact on human capital. In developing nations, escalating inequality discourages school enrollment.

Studies suggest disparities in educational investment exist among socially advantaged individuals and those with high returns but less social advantage, potentially hampering economic progress. Marrero and Rodriguez (2013) found that inequality of effort can promote growth, while inequality of opportunity can obstruct it. Income inequality embodies these concepts and elucidates the vagueness of empirical results in the inequality and growth literature. Conversely, Ferreira et al. (2018) found no substantial relationship between inequality of opportunity or effort and growth and no evidence that inequality of opportunity hinders economic progress. Aiyar and Ebeke (2020) propose that income inequality more adversely affects future growth in countries with high inequality of opportunity, as parents' economic status can curtail their children's prospects. Their data implies a more substantial negative impact of the wealth gap on growth when individuals cannot improve their economic status across generations. Further research is required to investigate this hypothesis, as ambiguity in the empirical inequality-growth literature might stem from overlooking inequality of opportunity and income inequality.

Barriers to human capital accumulation can obstruct a country's long-term progress by fostering an unequal distribution of talent. According to Hsieh et al. (2019), eliminating barriers that prevent acquiring and developing the skills, knowledge, and abilities required for economic growth and development was responsible for 36% of the US GDP per capita increase between 1960 and 2010. In contrast, reducing labour market discrimination contributed only 8% of the growth. It is currently unknown whether less-

developed countries face these challenges to human capital accumulation to a lesser extent.

2.2.2.3. *Influence of sociopolitical disturbances on the pace of economic advancement*

Empirical investigations by (Alesina and Perotti, 1996; Svensson 1998; Keefer and Knack, 2002) provide evidence for the sociopolitical unrest channel affecting economic growth. Alesina and Perotti (1996) analyze cross-sectional data from developed and emerging countries to explore income inequality's influence on socio-political instability and, subsequently, on investment and growth. They find substantial support for the hypothesis that political unrest negatively impacts growth by diminishing property rights protection, leading to economic insecurity, reduced investment, and decelerated growth. This proposition is further reinforced by research from (Aisen and Veiga, 2013; Jong-A-Pin, 2009; Alesina et al., 1996).

2.2.2.4. *Empirical evidence supporting the fiscal policy channel*

Fiscal policy channel, as suggested by political economics and redistribution literature, operate through two mechanisms to influence inequality and growth. Firstly, high taxes are imposed in democracies where resource distribution is unequal, a phenomenon aligned with the median voter theorem. Secondly, an equity-efficiency trade-off may slow economic growth due to heavy taxation. Despite this theoretical basis, empirical evidence supporting the claim that taxes stifle economic growth is scarce. Studies by (Perotti, 1996; Persson and Tabellini, 1994) indicate that the data does not uphold this conventional belief.

Contrary to traditional views, recent research from (De Mello and Tiongson; 2006;Pineda and Rodriguez, 2006) suggests that countries with higher inequality might distribute less. Further, they found a U-shaped relationship between income inequality and redistribution.

The view is that taxes retard growth could be offset by tax incentives that stimulate public and private investment, thus reducing the efficiency loss due to redistribution. If public investments such as infrastructure and education are regarded as advantageous for a functional economy, taxes could, paradoxically, correlate positively with growth. This is supported by recent studies (Berg et al., 2018; Gründler and Scheuermeyer, 2018) proposing that reducing inequality could stimulate growth, thus counterbalancing the

negative effect of taxation. However, the nonlinear effect of taxation on growth suggests that the negative influence on incentives and long-term growth may not be as significant as conventional models predict (Jaimovich and Rebelo, 2017).

While the political economics channel has some relevance, empirical evidence is scant for its primary theoretical links. Mulligan et al. (2004) identified minor variations in economic and social policies across political systems based on democratic traits. Conversely, Milanovic (2000, 2010) suggested that redistribution could augment inequality. Factors such as lower political engagement among low-income households and the middle class's limited benefit from redistribution (Milanovic, 2000; Scervini, 2012) further challenge the theoretical foundations. Piketty et al. (2014) noted that tax cuts often follow, not precede, increasing levels of inequality among the wealthiest. Kuziemko et al. (2015) observed that while their information treatment noticeably affected attitudes toward inequality, it had little impact on support for redistribution.

The effectiveness of redistribution is assessed using several measures, including government transfers as a percentage of GDP, shifts in income distribution for the lowest quintile from factor to disposable income, and top marginal tax rates (Bassett et al., 1999; Milanovic, 2000; Piketty et al., 2014). Research by (Alesina and Glaeser, 2004; Iversen and Soskice, 2006; Perotti, 1996) generally correlate redistribution with decreased inequality. However, the link between redistribution and poverty is less specific. In significant market inequality, the median voter could spur more substantial redistribution. Conversely, when wealthier individuals get richer while the poor get poorer, the rich might leverage their financial clout to advocate for tax cuts, potentially exacerbating economic disparities.

CHAPTER THREE

3. EMPIRICAL ANALYSIS

3.1. Methodology

3.1.1. Model construction and estimation techniques

This study aims to empirically investigate the impact of income inequality on economic growth through a two-phase process. The first phase estimates the direct effects of income inequality on economic growth. For this purpose, the study employs a panel data analysis using a modified version of the Barro (2003) model. Consider equation (3.1), which models the GDP per capita growth rate for a given nation i during period t:

$$\ln Y_{i,t}{}^{*} = \left(\ln Y_{i,t} - \ln Y_{i,t-1}\right) = F(\ln K_{i,t}, H_{i,t}, X_{i,t}) \quad (3.1)$$

The constituent elements of this equation are as follows: The term $\ln Y_{i,t}{}^{*}$ symbolises the per capita output growth rate. $\ln K_{i,t}$ represents the volume of capital stock at the commencement of period t. $H_{i,t}$ embodies the per capita measure of human capital. Lastly, $X_{i,t}$ is a matrix of other control variables which are anticipated to influence the rate of GDP per capita growth.

Since the study narrows its focus to the MENA region, it is essential to note that any inferences drawn from the study only apply to the behaviour of these specific countries. As a result, for the model to effectively explain the relationship stated by the previous growth function, it is necessary to consider any possible structural differences between these countries. Therefore, the fixed effects FE method is appropriate to ensure that the estimators remain unbiased (Baltagi, 2021, p. 16). This allows equation (3.1) to be reformulated as equation (3.2):

$$\ln Y_{i,t}{}^{*} = \alpha_0 \ln K_{i,t} + \alpha_1 G_{i,t} + \alpha_2 H_{i,t} + \alpha_3 X_{i,t} + \eta_i + \xi_t + \varepsilon_{i,t} \quad (3.2)$$

Where $G_{i,t}$ represents income inequality, η_i is the fixed country effects, ξ_t donates for the time effect in period t , and $\varepsilon_{i,t}$ is the error term.

To further understand the influence of income inequality on growth, the study compares the results of the comprehensive growth model with those of simplified models

that exclude transmission channel variables. Consequently, this comparison enables a more thorough understanding of the effects of inequality on economic growth and the role of various control variables in this relationship(Gründler and Scheuermeyer, 2015, p. 8). The estimation strategy employed in this study involves averaging all variables over five-year periods from 1996 to 2020. This approach is widely used in economic growth literature as it accounts for the long-term perspective of growth theory, mitigates short-term variations, eliminates annual serial correlation arising from economic cycles fluctuations, and addresses the possibility of data gaps in unbalanced panel data (Forbes, 2000; Gründler and Scheuermeyer, 2018; Voitchovsky, 2005).

Many studies have indicated the importance of avoiding endogeneity (e.g. Forbes, 2000, p. 283; Voitchovsky, 2005, pp. 874-876). Therefore, the use of fixed effects estimators is an effective means of controlling for endogeneity problems that may arise from unobserved time-invariant factors correlated with independent variables, especially when employing within-group estimates (Imai and Kim, 2019, p. 1). However, this method falls short when addressing endogeneity issues stemming from reverse causality, which occurs when the dependent variable affects the independent variable, as in the case when economic growth influences income inequality.

In an attempt to surmount this identified limitation, the adoption of the Instrumental Variables Estimation (IV) method, typified by the Two-Stage Least Squares (2SLS) approach or the Arellano-Bond Generalized Method of Moments (GMM) estimator, can provide an alternative solution. The 2SLS technique, widely recognized in academic literature, offers consistent parameter estimates that address the endogeneity problems which originate from reverse causality. However, exclusive reliance on the 2SLS estimator for panel data could potentially lead to a loss of losing crucial structural differences between the countries under study, which are obtained from the fixed effect within-group estimator. Moreover, the GMM dynamic panel data models typically find application in scenarios where the cross-section units (N) are large and the time series (T) is relatively small. This is primarily due to the fact that these models use lags of the dependent variable as instruments, which unfortunately become less robust when the time series is not sufficiently small.

To address this concern, the study attempts to estimate a simultaneous equation model using the fixed effects two-stage least squares FE-2SLS estimator. Semykina and Wooldridge (2008) highlighted the superiority of this method, as it remains reliable

regardless of the correlation level between the unobserved factor and instrumental variables. Furthermore, the FE-2SLS estimator allows for the possibility that the selection process may be correlated with the unobserved effect[5].

Notably, the estimator does not require the specification of reduced-form equations for endogenous variables and makes no assumptions about the distribution of the idiosyncratic error term. Additionally, there are no restrictions on the serial correlation in the error term. By employing the FE-2SLS estimator, the study can effectively address endogeneity problems while preserving the structural differences characteristics between the countries under investigation(Semykina and Wooldridge, 2008, p. 20).

When applying the FE-2SLS estimator to account for endogenous factors, it is important to use valid external instruments that strongly correlate with income inequality and do not correlate with the residuals of the regression. For this purpose, the study will use selection instrument variables that follow the approach of many economic growth studies, such as (Barro, 2003; Biyase and Maleka, 2019; Gründler and Scheuermeyer, 2018), which use lagged independent variables as internal instruments.

After estimating the direct effects of income inequality on economic growth, the study proceeds to the second phase, focusing on examining the validity of each transmission channel within the MENA region. This investigation is grounded in the theoretical foundations outlined in Chapter 2. A review of the existing literature reveals that various methods have been employed to quantify the impact of these channels on the relationship between income inequality and economic growth. It has been observed that some studies adopt a two-stage approach strategy[6] similar to mediator[7] analysis, treating channel variables as intermediaries (e.g. Berg et al., 2018; Topuz, 2022; Shen and Zhao, 2023), while others resemble a moderator[8] analysis approach, incorporating an interaction term between the income inequality proxy and the channel variable (e.g. Gründler and Scheuermeyer, 2018; Čiegis and Dilius, 2019; Odusanya and Akinlo, 2020).

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[5] The unobserved effect in the panel data model's equation of interest. It is a variable that is not directly observed or measured but is assumed to have an impact on the outcome being studied.

[6] In the first stage, scrutinize the effects of inequality on each potential channel variable. In the second stage, evaluate the impact of inequality on economic growth, with a focus on how it operates through these specific variables.

[7] A mediator effect occurs when the relationship between two variables (an independent variable X and a dependent variable Y) can be explained by a third variable, called a mediator (Z) as it clarifies the mechanism through which X influences Y.

[8] A moderator effect occurs when the relationship between two variables (an independent variable X and a dependent variable Y) changes in strength or direction depending on the level of a third variable, called a moderator (Z).

In the current study, the evaluation of the transmission channels' roles will employ a combined approach, drawing inspiration from the two strategies found in the literature while not strictly adhering to the conventional mediator and moderator examination[9]. This approach aims to provide a more comprehensive understanding of the interrelationships among variables. Firstly, a modified mediator analysis allows for the identification of the underlying mechanisms through which a channel influences the inequality-growth nexus. Secondly, a modified moderator analysis investigates the conditions under which the relationship between inequality and growth changes. By adopting both methodologies, the study can achieve a deeper insight into the complex interplay among these variables and identify the circumstances in which a particular channel could make this relationship strongest or weakest. Furthermore, this combined strategy enhances the findings' external validity, as it encompasses a broader range of factors and relations that may influence the connection between income inequality and economic growth.

This combined approach is applied through a series of methodological steps. The methodological steps include the following:

- **Modified Mediator Analysis**

  To investigate the underlying mechanisms by which transmission channels influence the inequality-growth nexus. The steps for this analysis include the following:

  1- Assess the impact of income inequality on each channel variable. This will be accomplished by estimating (equation (3.3) using 2SLS[10] and FE methods:

$$\text{Channel}_{it} = \alpha_0 + \alpha_1 G_{i,t} + \alpha_2 \ln Y_{i,t}{}^{*} + \eta_i + \xi_t + \varepsilon_{i,t} \qquad (3.3)$$

  2- Evaluate the influence of each channel variable on growth, while controlling for income inequality. This will be conducted by estimating the reduced form of the baseline model as in (equation (3.4) using FE and FE-2SLS methods, as shown below:

[9] Detailed information about mediator and moderator analysis can be found in the book by Hayes (2017).
[10] The instrumental variables utilized in estimating the Two-Stage Least Squares (2SLS) models are the lagged values of trade openness and the Gini coefficient. These instrumental variables have been assessed through a weak instruments test and have demonstrated robustness.

$$\ln Y_{i,t}{}^{*} = \alpha_0 + \alpha_1 G_{i,t} + \alpha_2 \text{Channel}_{it} + \eta_i + \xi_t + \varepsilon_{i,t} \quad (3.4)$$

- **Modified Moderator Analysis**

  To examine the conditions under which the relationship between income inequality and growth changes in strength or direction, this study utilizes the FE and FE-2SLS methods. The steps for this analysis include:

  3- Introduce interaction terms between income inequality and each channel variable into the reduced form of baseline regression model specified in (equation (3.2)) as shown below in (equation (3.5)):

$$\ln Y_{i,t}{}^{*} = \alpha_1 G_{i,t} + \alpha_2 \text{Channel}_{it} + \alpha_3 (G_{i,t} \times \text{Channel}_{it}) + \eta_i + \xi_t + \varepsilon_{i,t} \quad (3.5)$$

  Taking the partial derivative of the previous equation concerning $G_{i,t}$ while holding the channel variable constant enables measuring the changes in $\ln Y_{i,t}$ associated with a one-unit increase in $G_{i,t}$ While keeping the Channel_{it} value fixed at a certain level.

$$\frac{d \ln Y_{i,t}{}^{*}}{d G_{i,t}} = \alpha_1 + \alpha_3 (\text{Channel}_{it}) \quad (3.6)$$

  From this, the study deduces that the impact of income inequality, $G_{i,t}$, on economic growth, $\ln Y_{i,t}{}^{*}$, is influenced by the value of the Channel_{it} variable, along with the direction of the interaction term coefficient. An intriguing inference is that if α_3 is positive, it implies that as the channel variable escalates, the influence of income inequality on growth intensifies. This suggests that in regions or periods with elevated channel variable values, income inequality wields a stronger influence on growth. Conversely, a negative α_3 suggests that a rise in the channel variable reduces the impact of income inequality on growth, thereby indicating that in situations where the channel variable is high, the influence of income inequality on growth is lessened.

3.2. Data and Variables Selection

The selection of data and variables for this study is driven by both the availability of data and the inherent attributes of the countries under scrutiny. Focusing on 14 countries within the Middle East and North Africa (MENA) region, spanning from 1996 to 2020, the study investigates the complex connections between economic growth and income inequality. The countries selected include Algeria, Cyprus, Egypt, Iran, Israel, Jordan, Mauritania, Morocco, Oman, Saudi Arabia, Sudan, Syria, Tunisia, and Türkiye. The diversity of these nations, in terms of their varied economic, political, and social landscapes, presents a representative snapshot of the wider MENA region, enabling a more profound examination of the interplay between economic growth and income disparity in this regional context.

Figure 3.1 offers a visual representation of the scale of income inequality within the MENA region. This region ranks as one of the most unequal globally in terms of income distribution, as demonstrated by comparing the income share of the top 10% with that of the bottom 50%. This comparison includes broader global regions as well as specific countries within the MENA region. The stark disparities emphasised in this figure underscore the pressing socioeconomic challenges faced by the MENA region, stressing the need to tackle income inequality as an integral part of economic development and social equity strategies.

To achieve the aim of the study, the study assesses a selection of variables over 25 years, using an average five-year interval. This methodology aims to capture different economic cycles and the impacts of significant regional events, such as the Arab Spring and the global financial crisis. The variables for this study are divided into two main groups: those estimating the direct relationship between economic growth and income inequality using the baseline model, and transmission channel variables, which function as predictors of growth. The framework of these variables is visually represented in Figure 3.2. This comprehensive approach to data selection and organisation provides a robust framework for analysing the complex relationships between economic growth and income inequality within the MENA region.

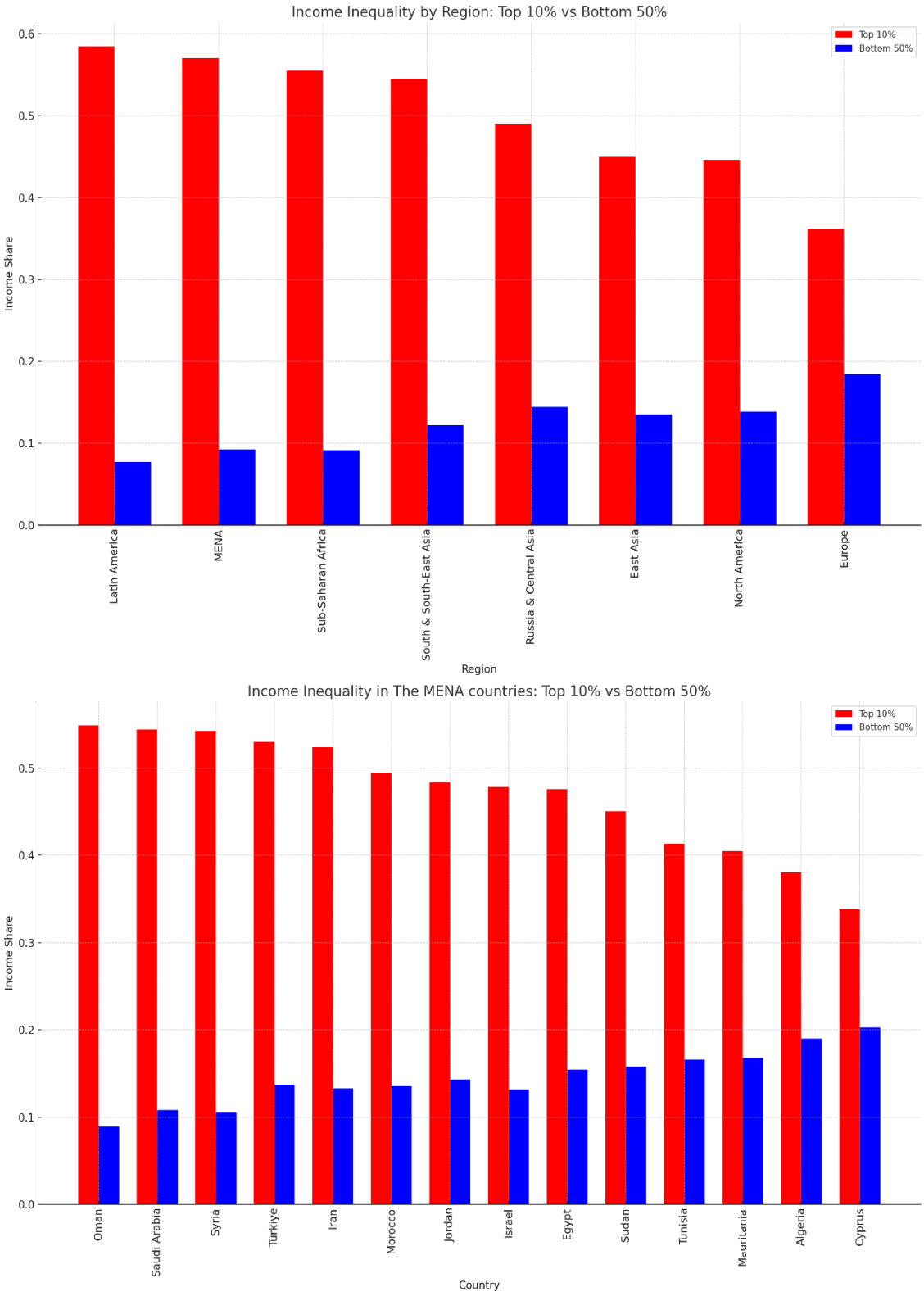

Figure 3.1. *Income Distribution Disparity: A Comparative Analysis of Global Regions and MENA Countries*
Source: Author's elaboration using WID data for the year 2020

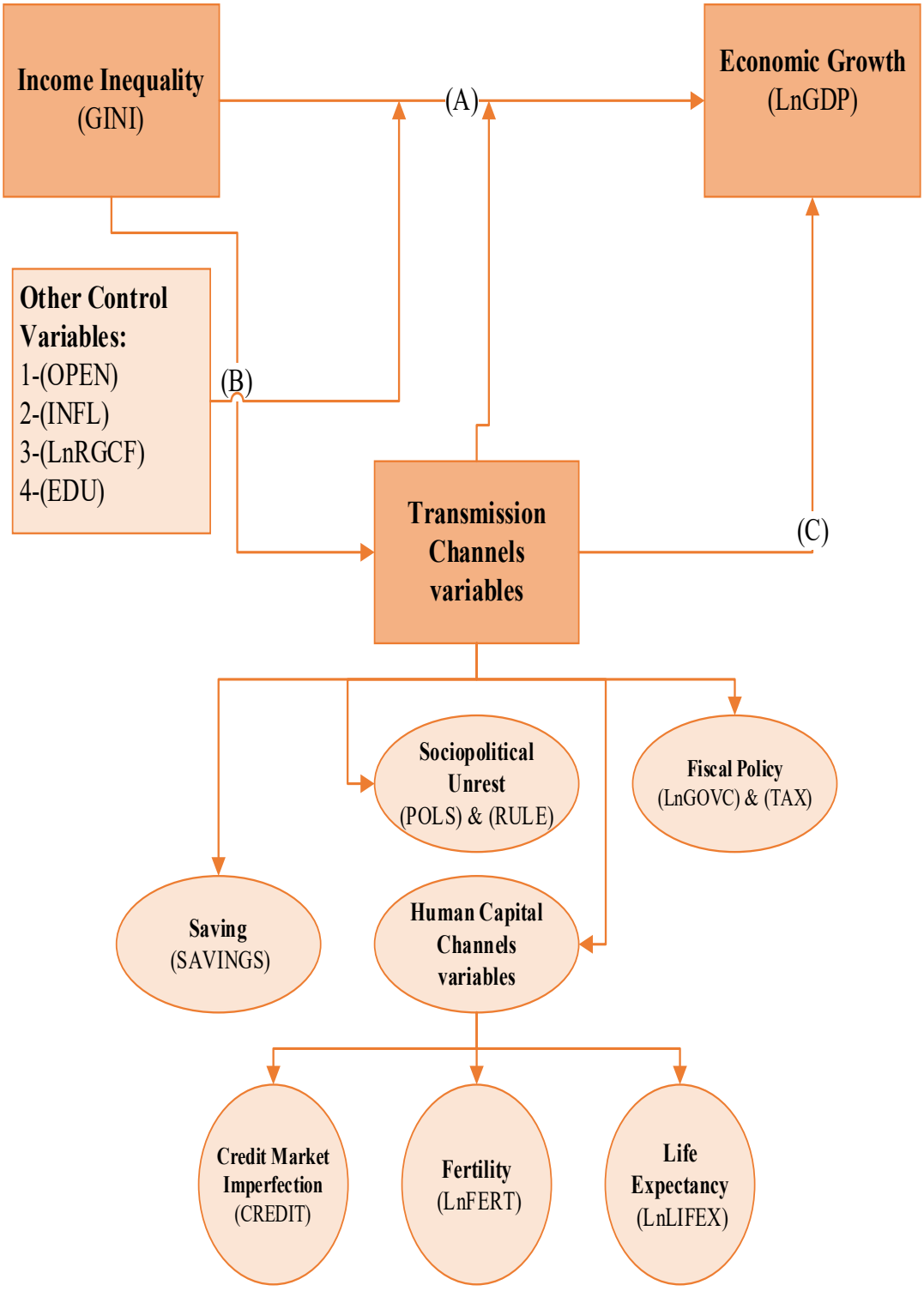

Figure 3.2. *Framework of variables*

Source: Author's elaboration

- **Baseline Model Variables**

The study uses the natural logarithm of real GDP per capita (LnGDP) in 2015-dollar terms as the dependent variable, with income inequality assessed using the Gini coefficient of income (GINI). The model includes two primary explanatory variables: physical capital and human capital.

Physical capital, represented by Gross fixed capital formation in 2015-dollar terms (LnRGCF), encompasses machinery, equipment, and infrastructure investments. Human capital is measured through two key components: the education index (EDU) and the logarithm of life expectancy at birth (LnLIFEX). The model also incorporates exports plus imports divided by GDP to control for the degree of global openness (OPEN) and inflation (INFL) as a stand-in for economic instability.

- **Transmission Channels Variables**

The second group of variables consists of transmission channel variables, which are crucial in examining the interplay between income inequality and economic growth. These variables aim to identify the mechanisms through which inequality affects growth and the conditions under which this relationship may vary. The transmission channel variables investigated in this study include:

- Savings Channel: Gross national savings as a percentage of GDP (SAVINGS).
- Credit Market Imperfection Channel: Domestic credit to the private sector by banks as a percentage of GDP (CREDIT).
- Fertility Differential Channel: The natural logarithm of total fertility rate (LnFERT).
- Life Expectancy Channel: Life expectancy at birth, measured in the natural logarithm of total years (LnLIFEX).
- Sociopolitical Unrest Channel: The Political Stability and Absence of Violence (POLS) and the Rule of Law (RULE) indicators.
- Endogenous Fiscal Policy Channel: Total tax revenue as a percentage of NDP (TAX) and the natural logarithm of general government final consumption expenditure in constant 2015 US dollars (LnGOVC).

Detailed information on the definitions and sources of all variables in the study can be found in Table 3.1. Table 3.2 provides descriptive statistics for the data that have been

analysed. The table displays each variable's average, standard deviation, minimum, and maximum values.

Table 3.1. *Variables, definitions, and sources*

Variables	Definition	Source
LnGDP	GDP per capita (constant 2015 US$)	World Development Indicators (WDI)
GINI	A summary indicator of inequality calculated based on pre-tax national income goes from 0 (when everyone has the same resources) to 100 (a scenario where one person owns everything in an economy)	World Inequality Database (WID)
TOP10	Pre-tax national income Top 10% share	World Inequality Database (WID)
BOTTOM40	Pre-tax national income Bottom 40% share	World Inequality Database (WID)
SAVINGS	Gross national savings (% of GDP)	World Development Indicators (WDI)
OPEN	Trade openness refers to the combined value of both exports and imports of goods and services, expressed (% of GDP)	World Development Indicators (WDI)
INFL	The consumer price index is a measure of inflation that indicates the yearly percentage shift in the expenses incurred by an average consumer in obtaining a set of goods and services, which may remain constant or vary at predetermined intervals, such as annually	World Development Indicators (WDI)
LnLIFEX	Life expectancy at birth, total (years)	World Development Indicators (WDI)
EDU	Education Component of SHDI. The educational dimension is measured with two indicators. The first one, the mean years of schooling of adults aged 25+, reflects the current situation with regard to education in society. The second one, expected years of schooling, indicates the future level of education of the population.	Global Data Lab

Table 3.1. *(continued)*

Variables	Definition	Source
CREDIT	Domestic credit to the private sector by banks (% of GDP)	World Development Indicators (WDI)
LnFERT	Fertility rate, total (births per woman)	World Development Indicators (WDI)
LnRGCF	Gross fixed capital formation (constant 2015 US$)	World Development Indicators (WDI)
RULE	The Rule of Law indicator gauges societal rule adherence and confidence, encompassing various governance aspects. It examines institutional effectiveness in shaping behaviour and safeguarding rights. Scores range from -2.5 to 2.5, with higher scores signifying better governance.	Worldwide Governance Indicators (WGI)
POLS	The Political Stability indicator measures the likelihood of political instability and violence, including terrorism. It evaluates the overall stability of a country's political environment. Scores range from -2.5 to 2.5, with higher scores indicating greater political stability.	Worldwide Governance Indicators (WGI)
LnGOVC	General government final consumption expenditure (constant 2015 US$)	World Development Indicators (WDI)
TAX	Total tax revenue as % of NDP	Global Taxation of Capital and Labour (Bachas et al., 2022)

Source: Author's elaboration

3.3. Results and Discussion

In this section, the study employs the fixed effects (FE) and fixed effects two-stage least squares (FE-2SLS) methods to examine the direct influence of income inequality on economic growth. Following this, the study proceeds to investigate the mechanisms through which inequality impacts economic growth. This is done by employing the fixed effects (FE), two-stage least squares (2SLS), and fixed effects two-stage least squares

(FE-2SLS) methods. This approach enables a more comprehensive examination of the typical characteristics of inequality.

Table 3.2. *Descriptive statistics for a 5-year average time span*

Variables	Observation	Mean	SD	Min	Max
LnGDP	70	8.572	1.063	6.666	10.553
GINI	70	58.918	5.537	45.458	67.108
TOP10	70	47.996	5.989	33.216	55.658
BOTTOM40	70	8.541	1.901	5	12.456
SAVINGS	68	24.738	10.906	-2.194	53.111
OPEN	70	71.456	29.384	1.238	150.335
INFL	68	8.676	13.328	-0.310	74.101
LnLIFEX	70	4.276	0.083	3.984	4.415
EDU	70	0.576	0.162	0.221	0.888
CREDIT	67	48.477	42.736	2.163	248.209
LnFERT	70	1.073	0.349	0.287	1.721
LnRGCF	70	23.760	1.629	20.574	27.152
LnGOVC	70	23.299	1.515	20.127	25.891
RULE	70	-0.184	0.730	-2.054	1.164
POLS	70	-0.645	0.861	-2.744	1.013
TAX	67	19.210	11.501	1.400	40

Source: Author's calculation

3.3.1. The effect of income inequality on economic growth

Before delving into the econometric analysis of the impact of income inequality on economic growth, this study visualizes the relationship between the two variables during the 1996-2020 period, as illustrated in Figure 3.3. This preliminary scatterplot visualization aims to identify any overarching patterns in the data. Figure 3.3 shows a weak correlation[11] between the Gini Coefficient and Log GDP per capita. However, there is a distinct empirical pattern: countries situated above the regression line mostly consist of wealthy oil countries (e.g. Saudi Arabia and Oman) with high levels of income inequality, as well as some other MENA countries with better economic development relative to others in the region (e.g. Israel, Türkiye, and Cyprus). In contrast, countries located below the regression line typically exhibit lower levels of development. The important finding from this observation is that it is

[11] Pearson correlation between income inequality, represented by the Gini Coefficient, and economic growth, measured by the log of real GDP per capita (LnGDP) was found to be 0.0767.

important to include the fixed effects of individual countries when examining how income inequality affects economic growth.

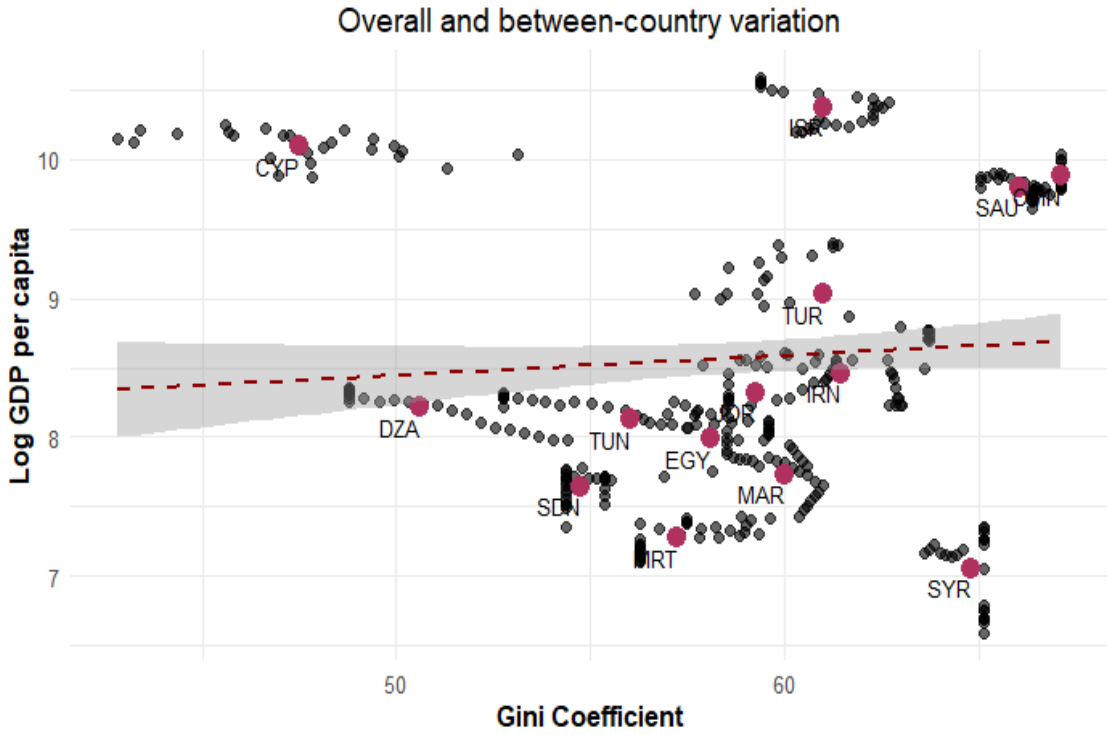

Figure 3.3. *Relationship between income inequality and log real GDP per capita*

Note: grey points represent overall data, while maroon points indicate country means.
Source: Author's elaboration

3.3.1.1. *Baseline fixed effect estimates*

Theoretical frameworks suggest that the impact of inequality on economic growth is transmitted through multiple channels, including the accumulation of physical and human capital, fertility rates, fiscal policy, and sociopolitical unrest. Galor (2009), however, argues that in order to accurately determine the complete growth impact of income inequality, it is necessary to eliminate certain conventional controls. In light of this, Table 3.3 presents the results of baseline fixed-effect growth regressions. These models are organized in increasing complexity, ranging from simplified models that exclude some controls to more comprehensive ones, all of which include time dummies and country-fixed effects.

Table 3.3. *Baseline fixed effect (FE) estimates results*

	Dependent Variable: Log Real GDP per Capita (LnGDP)					
	(1)	(2)	(3)	(4)	(5)	(6)
GINI	-0.026***	-0.022***	-0.009***	-0.012***	-0.009**	-0.006
	(0.007)	(0.005)	(0.004)	(0.003)	(0.004)	(0.006)
LnRGCF	0.033***	0.040***	0.043***	0.042***	0.048***	0.017
	(0.013)	(0.014)	(0.011)	(0.010)	(0.014)	(0.015)
EDU		1.317***	1.528***	0.836***	0.788***	0.735**
		(0.412)	(0.272)	(0.245)	(0.295)	(0.351)
LnLIFEX		2.166***	1.621***	1.521***	1.761***	0.494
		(0.496)	(0.384)	(0.531)	(0.612)	(0.584)
LnFERT			0.595***	0.386***	0.428***	0.477***
			(0.129)	(0.080)	(0.105)	(0.115)
LnGOVC				-0.001	-0.017	0.056
				(0.084)	(0.091)	(0.082)
OPEN				0.001	0.002***	0.0005
				(0.001)	(0.0005)	(0.001)
INFL				-0.001	-0.001	-0.002***
				(0.001)	(0.001)	(0.001)
POLS				-0.011	-0.033	-0.064*
				(0.025)	(0.039)	(0.038)
CREDIT					-0.0005***	-0.0003
					(0.0002)	(0.0003)
SAVINGS						0.004
						(0.005)
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	70	70	70	68	66	65
R^2	0.119	0.499	0.613	0.514	0.544	0.444

Note: The table displays fixed effect estimates, accompanied by robust standard errors that account for both serial correlation and heteroskedasticity presented in parentheses below the corresponding coefficient estimates. *p<0.1; **p<0.05; ***p<0.01 represent significance levels.
Source: Author's calculation

Model (1) demonstrates the total impact of income inequality on growth, with the Gini coefficient representing income inequality and log real GDP per capita (LnGDP) signifying growth. The model controls for the influence of physical capital, indicated by LnRGCF. The results reveal a statistically significant negative relationship between income inequality and growth at a 1% significance level, suggesting that a one-unit increase in the Gini coefficient leads to a 2.6 percentage point reduction in growth.

Incorporating both human and physical capital, Model (2) includes education and life expectancy variables, which are commonly used in empirical growth models and could form a fundamental part of the transmission mechanism linking inequality to growth. Holding this set of transmission variables constant, the model shows a relatively diminished effect of inequality on growth. The parameter estimate for the Gini coefficient declines to -0.022, representing an approximate 15% reduction in the impact of income inequality on growth compared to the previous model. Consistent with established theory and prior empirical research, the newly implemented controls make a significant contribution to economic growth.

Model (3) reveals the enduring diminishing effect of income inequality on growth, even when the variable of fertility is introduced; the impact of income inequality on growth notably declines to -0.009. This finding emphasises the crucial role of the fertility channel in the relationship between inequality and growth. Surprisingly, fertility demonstrates a significantly positive effect on growth, contrasting with many empirical growth studies (e.g. Barro, 1991, 2003; Akintunde and Oladeji, 2013; Gründler and Scheuermeyer, 2015; Shen and Zhao, 2023). A plausible interpretation is that the increased fertility in developing countries in the MENA region might boost population growth[12] through several interlinked socio-economic mechanisms unique to developing economies. Economies in the MENA region, typically characterised by large informal sectors and labour markets focused on labour-intensive jobs such as agriculture and rural activities, leverage these sectors as significant engines of growth and absorbers of labour, often outperforming industrial sectors.

The observed increase in fertility could stimulate population growth, indirectly promoting key components of economic growth such as labour force expansion and

[12] The countries under study in the MENA region, average fertility rate of 3.103 exceeds the replacement level of 2, where couples have enough children to replace themselves resulting in continued population growth due to a higher number of births.

rising consumer demand. These trends suggest that population growth, spurred by higher fertility rates, might stimulate economic growth in such emerging contexts.

Moreover, this empirical evidence can be seen through the perspective of the demographic transition theory. This theory posits a societal transition from high to low birth and death rates as an economy develops from pre-industrial to industrialised. The significant rise in fertility in the MENA region may provoke an upswing in the working-age population, potentially providing a temporary demographic dividend. This dividend, by fostering a larger labour force, stimulating demand for goods and services, and enhancing overall productivity, has the potential to accelerate economic growth.

Model (4) further incorporates government expenditure, trade openness, and inflation control variables, in addition to one of the sociopolitical unrest channel variables represented by the POLS indicator. These variables are expected to affect economic growth. The coefficient for Gini coefficient drops slightly to -0.012 but remains statistically significant. The sociopolitical unrest variable is not statistically significant in this model.

In Model (5), the study adds credit market imperfection channel variables. The coefficient for Gini coefficient remains negative but drops to -0.009 and is significant at the 5% level. The credit market variable is negative and statistically significant in this model, suggesting that a one-per-cent increase in bank credit to the private sector leads to a 0.05 percentage point reduction in economic growth.

Finally, Model (6) includes the savings channel variable, which further decreases the coefficient of the Gini coefficient to -0.006, losing its statistical significance. This finding indicates that when accounting for the savings channel, the direct effect of income inequality on economic growth is no longer significant. This result implies that this transmission channel plays a crucial role in the link between income inequality and growth. In terms of other control variables in Models 4, 5, and 6, inflation does not have a significant impact on growth except in Model 6, while the trade openness variable is positive and only significant in Model 5. Government expenditure has a significant impact on growth in all three models.

3.3.1.2. *Baseline FE-2SLS estimates*

To ensure the robustness of the baseline findings, this study takes a further step by employing the fixed effects two-stage least squares (FE-2SLS) method to address

potential biases that could arise due to endogeneity issues. Table 3.4 reports the estimations of FE-2SLS, which instruments the income inequality with its first-period lag in addition to the lag of trade openness[13] in all six models. Moreover, the first-period lag of each transmission channel variable is introduced when incorporating the respective channel into the model as an internal instrumental variable.

In Table 3.4, despite slight variations in the estimated outcomes, the results consistently demonstrate the inhibitory impact of income inequality on economic growth. The inclusion of control variables leads to a gradual attenuation of the growth effect of income inequality. Interestingly, with the incorporation of the fertility channel variable in Model (3), the effect of income inequality on growth is reduced and no longer statistically significant, as found in (Barro, 2000; De La Croix and Doepke, 2003; Gründler and Scheuermeyer, 2018; Shen and Zhao, 2023). This outcome could possibly be attributed to the introduction of fertility, which eliminates other transmission channels from inequality to growth.

Table 3.4. *Baseline FE-2SLS estimates results*

	Dependent Variable: Log Real GDP per Capita (LnGDP)					
	(1)	(2)	(3)	(4)	(5)	(6)
GINI	-0.076***	-0.024**	-0.013	-0.022*	0.001	0.024
	(0.020)	(0.011)	(0.027)	(0.013)	(0.013)	(0.026)
LnRGCF	0.008	0.040***	0.044***	0.044***	0.053***	0.024
	(0.021)	(0.016)	(0.014)	(0.011)	(0.016)	(0.029)
EDU		1.303***	1.508***	0.788**	0.791*	0.751
		(0.403)	(0.324)	(0.312)	(0.409)	(0.472)
LnLIFEX		2.190***	1.654***	1.517***	1.727**	0.697
		(0.519)	(0.384)	(0.476)	(0.711)	(0.673)
LnFERT			0.623***	0.354***	0.475***	0.695** *
			(0.134)	(0.059)	(0.069)	(0.180)
LnGOVC				-0.005	-0.041	0.002
				(0.093)	(0.124)	(0.101)

[13] Since trade openness has an impact on how income is distributed through globalization and skill-biased technology advancement, it is used as external instrument for income inequality.

Table 3.4. *(continued)*

	Dependent Variable: Log Real GDP per Capita (LnGDP)					
	(1)	(2)	(3)	(4)	(5)	(6)
OPEN				0.002***	0.001	-0.001
				(0.001)	(0.001)	(0.002)
INFL				-0.0003	-0.001	-0.003**
				(0.001)	(0.002)	(0.002)
POLS				0.001	-0.020	-0.080
				(0.028)	(0.046)	(0.058)
CREDIT					-0.0004	-0.001
					(0.0003)	(0.001)
SAVINGS						0.008
						(0.006)
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	69	69	69	67	62	61
R^2	0.104	0.499	0.624	0.517	0.536	0.378

Note: The table displays fixed effects two-stage least squares (FE-2SLS) estimates, accompanied by robust standard errors that account for both serial correlation and heteroskedasticity presented in parentheses below the corresponding coefficient estimates. *p<0.1; **p<0.05; ***p<0.01 represent significance levels.
Source: Author's calculation

3.3.2. The influence of transmission channels on the inequality-growth nexus

3.3.2.1. *Savings channel*

Taking an essential step towards evaluating the savings channel's validity requires scrutinizing the fundamental hypothesis that governs its impact on the relationship between economic growth and income inequality. This hypothesis suggests that wealthier individuals save more than those in lower income brackets. To investigate this channel, the study begins by testing the relationship between income inequality, measured by the Gini coefficient, Top 10% income share, and Bottom 40% income share, and national savings.

The initial examination reveals a positive correlation between both the Gini coefficient and the top 10% income share with national savings. In contrast, a negative

correlation emerges between the bottom 40% of income share and national savings, as illustrated in Figure 3.4. These correlation relationships could indicate the savings channel's positive impact on growth. However, further investigation is necessary to confirm this relationship.

Figure 3.4 also uncovers intriguing patterns among the countries in the MENA region. Only Algeria, Iran, and Saudi Arabia appear above the line in all three parts of the figure. It becomes clear that oil-rich countries, such as Saudi Arabia, Oman, and Iran, exhibit the highest levels of income inequality. Meanwhile, countries like Cyprus and Algeria display the lowest levels of income inequality, according to the three measures of income inequality utilized in the study.

Building upon the initial examination, the study's empirical analysis provides further insight into the role of the savings channel in the inequality-growth nexus. In Table 3.5, the findings of Panel A reveal a positive relationship between income inequality, as measured by the Gini coefficient, and national savings. This might indicate that the savings channel influences growth in a favourable way. However, although the Gini coefficient has a positive sign, it is only statistically significant at the 10% level. This indicates that there is some evidence of a relationship, but it is not particularly strong across all three models analyzed.

Panels B and C in Table 3.5 continue to investigate the impact of inequality in the top and bottom ends of the income distribution while also incorporating inflation into the analysis. The results from Panel B, which focus on the impact of the Top 10% income share on national savings, do not show any significant deviations from the Gini coefficient in relation to both the direction of influence and the statistical significance.

On the other hand, Panel C investigates the impact of the bottom 40% income share and indicates an inverse relationship between the income shares of the poorest individuals and savings levels. This finding corroborates the theoretical explanation that people with low incomes tend to allocate a significant proportion of their earnings towards consumption. However, this relationship is not statistically significant across all models, which suggests that there is no clear evidence supporting this result[14].

[14] The study uses lagged values of income inequality and trade openness as instrumental variables for income inequality in the 2SLS models presented in Table 3.5, considering the potential endogeneity of income inequality to national savings. These variables are demonstrated to be effective instruments, as the weak instrument diagnostic test results reject the null hypothesis, indicating that the specified instruments are not weak.

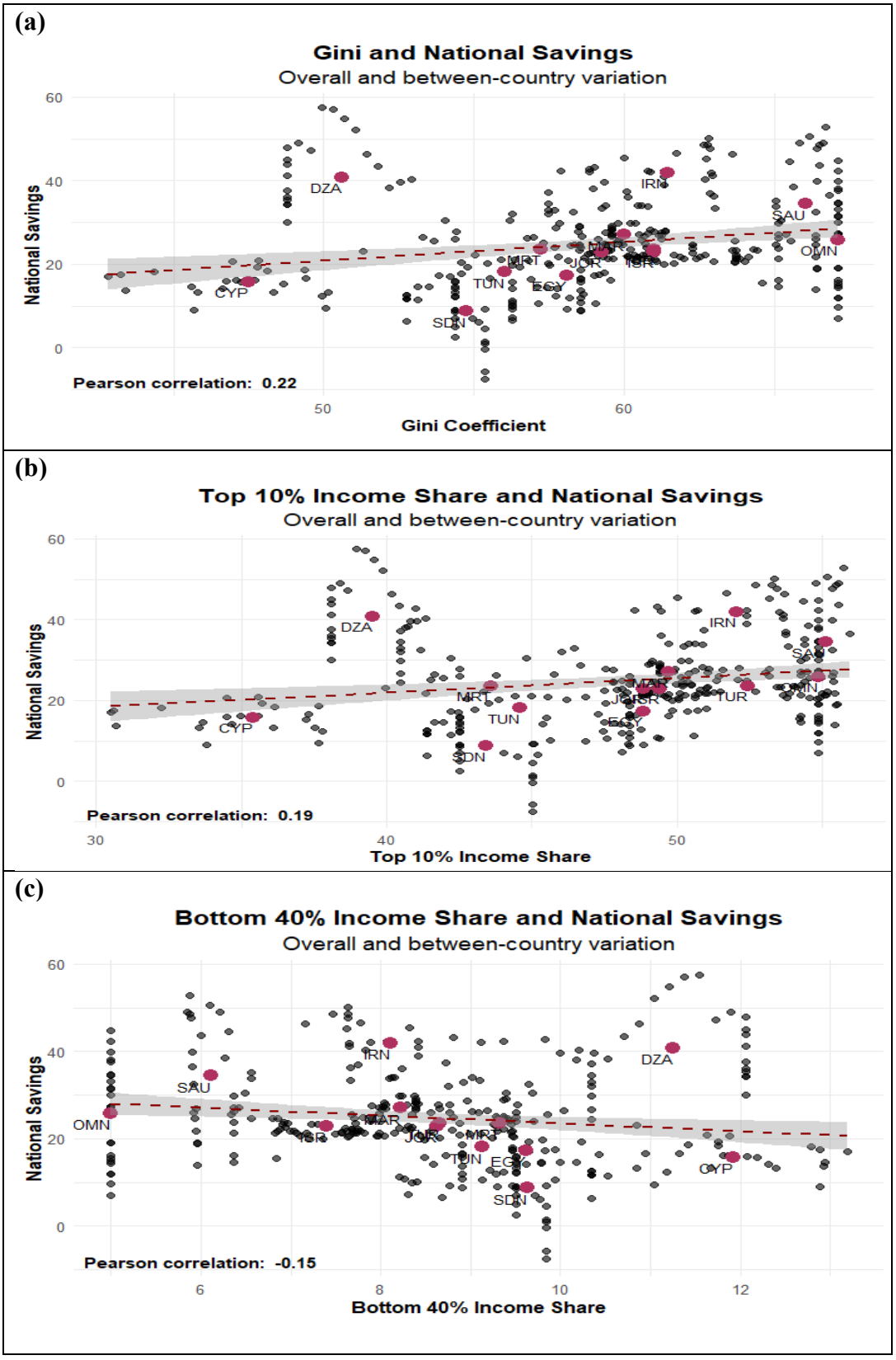

Figure 3.4. *Relationship between income inequality and national savings*

Note: grey points represent overall data, while maroon points indicate country means.
Source: Author's elaboration

Table 3.5. *The impact of income inequality on saving channel variable*

	Dependent Variable: National Savings (SAVINGS)		
	FE	2SLS (A)	2SLS (B)
Panel A: Impact of Gini on National Savings			
LnGDP	0.624	0.944	0.946
	(1.291)	(0.952)	(0.952)
GINI	0.425*	0.540*	0.537*
	(0.241)	(0.307)	(0.307)
Constant		−14.624	−14.434
		(21.601)	(21.617)
Observations	68	63	63
R^2	0.057	0.085	0.085
Diagnostics: Weak instruments		445.338*** P-V (<2e-16)	237.623*** P-V(<2e-16)
Panel B: Impact of Top 10% income share on National Savings			
LnGDP	0.465	0.484	0.486
	(1.335)	(0.976)	(0.977)
INFL	0.146	−0.193*	−0.192*
	(0.103)	(0.107)	(0.107)
TOP10	0.396*	0.497*	0.495*
	(0.226)	(0.264)	(0.264)
Constant		−1.048	−0.950
		(16.703)	(16.704)
Observations	67	63	63
R^2	0.082	0.117	0.117
Diagnostics: Weak instruments		275.266*** P-V (<2e-16)	300.559*** P-V (<2e-16)

Table 3.5. *(continued)*

	Dependent Variable: National Savings (SAVINGS)		
	FE	2SLS (A)	2SLS (B)
Panel C: Impact of Bottom 40% income share on National Savings			
LnGDP	0.417	0.344	0.339
	(1.382)	(1.012)	(1.012)
INFL	−0.125	−0.168	−0.168
	(0.104)	(0.118)	(0.118)
BOTTOM40	−0.833	−1.251	−1.265
	(0.754)	(0.870)	(0.870)
Constant		34.573***	34.739***
		(11.897)	(11.896)
Observations	67	63	63
R^2	0.054	0.096	0.096
Diagnostics: Weak instruments		458.549*** P-V (<2e-16)	394.780*** P-V (<2e-16)

Note: The table displays within-group fixed effects estimates with time dummies in the (FE) column. The next two columns present 2SLS estimates, as column (A) shows estimates without time dummies, and column (B) shows estimates with time dummies, 2SLS estimates accompanied by robust standard errors that account for both serial correlation and heteroskedasticity presented in parentheses below the corresponding coefficient estimates. $^{*}p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$ represent significance levels.
Source: Author's calculation

The previous investigation on the influence of income inequality on savings presents inadequate substantiation to support the notion that heightened inequality augments individuals' propensity to save. These findings could potentially be attributed to the relatively low levels of economic development across the majority of MENA region countries. The present findings are consistent with those of Topuz (2022), who observed that in developed countries, the affluent exhibit a greater marginal propensity to save, resulting in a rise in overall savings as inequality increases. Nevertheless, this assertion is not applicable to underdeveloped countries.

Table 3.6 examines the conditional relationship between inequality and the savings channel variable with respect to the impact of inequality on growth. Consequently, the reduced form of the baseline models includes the interaction term of income inequality

and national savings[15]. Although the Gini coefficient shows a negative and significant relationship with economic growth, both savings and its interaction term with the Gini coefficient are statistically insignificant, individually and together.

Table 3.6. *Effects of income inequality on economic growth (savings channel)*

	Dependent Variable: Real GDP per capita (LnGDP)			
	FE	FE-2SLS	FE (A)	FE-2SLS (A)
GINI	-0.019***	-0.039***	-0.020**	-0.037***
	(0.004)	(0.003)	(0.009)	(0.014)
LnRGCF	0.033***	0.019***	0.034***	0.027***
	(0.009)	(0.007)	(0.009)	(0.008)
GINI × SAVINGS			0.0001	0.0003
			(0.0003)	(0.0004)
SAVINGS	0.002	0.004	-0.001	-0.013
	(0.004)	(0.004)	(0.013)	(0.020)
Time dummies	Yes	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes	Yes
Observations	68	67	68	67
R^2	0.167	0.155	0.168	0.155

Note: The table displays both fixed effect estimates (FE) and fixed effects two-stage least squares (FE-2SLS) estimates, accompanied by robust standard errors that account for both serial correlation and heteroskedasticity presented in parentheses below the corresponding coefficient estimates. *p<0.1; **p<0.05; ***p<0.01 represent significance levels.
Source: Author's calculation

In summary, the estimation results of the impact of inequality on growth through the savings channel in the MENA region deviate from the classical theoretical expectations. The invalidity of this channel is confirmed across all three steps of the

[15] Since income inequality may be endogenous to growth, the study estimates FE-2SLS models in Table 3.6 using lagged values of income inequality and trade openness as instruments variables.

analysis as summarized in Table 3.7. In the first step, the findings suggest that there is weak evidence supporting the notion that inequality boosts savings, which could be attributed to the insufficient number of affluent individuals in the MENA region.

In the second step, the study tested the impact of savings on economic growth, which was found to be insignificant. This suggests that the savings channel does not play a strong role in promoting growth in the region, further deviating from the classical viewpoint.

Lastly, the final step of the analysis examined the interaction between inequality and savings in relation to economic growth. The results did not provide any clear evidence of a significant relationship, further corroborating the invalidity of the savings channel in the inequality-growth nexus in the MENA region.

Table 3.7. *Saving Channel's Summary Findings*

The research questions pertaining to savings channel	
Does income inequality lead to an increase in savings?	No
Does savings boost growth?	No
Is the savings channel effective? In other words, Does inequality have a positive effect on growth through the savings channel?	No

3.3.2.2. *Human capital channels*

3.3.2.2.1. *Credit market imperfection channel*

According to Galor and Zeira (1993), the Credit Market Imperfection Channel negatively impacts economic growth, as income inequality limits individuals' ability to invest in their education due to a lack of access to credit. To empirically investigate this channel, this study first examines the impact of income inequality on credit accessibility.

The findings, presented in Table 3.8, indicate a significant and inverse relationship between inequality and credit accessibility in all three models, suggesting that heightened income inequality is linked to reduced access to credit. The scatterplot in Figure 3.5, specifically panel (a), illustrates a negative correlation between income inequality and credit accessibility, providing additional evidence for these empirical findings.

To further investigate the Credit Market Imperfections Channel, the study examines the impact of credit availability on individuals' education, as represented by the Education Index (EDU), through the perspective of income inequality. An interaction term is

introduced into the model by combining the Gini coefficient with a capital markets imperfections variable as a moderator, as presented in Table 3.9.

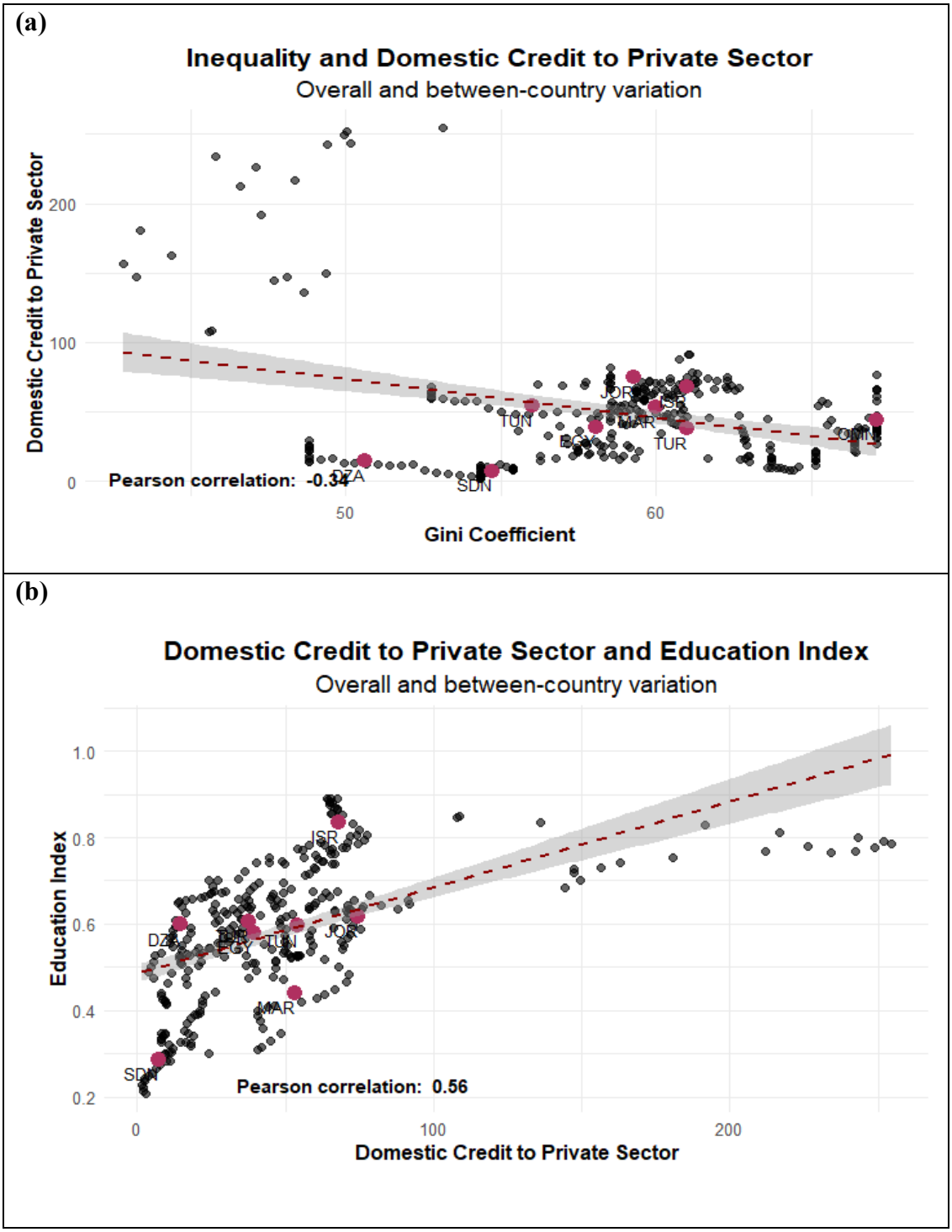

Figure 3.5. *Relationship between income inequality and credit market imperfection*

Note: grey points represent overall data, while maroon points indicate country means.
Source: Author's elaboration

Table 3.8. *The impact of income inequality on credit market imperfection channel variable*

	Dependent Variable: Domestic Credit to Private Sector (CREDIT)		
	FE	2SLS (A)	2SLS (B)
LnGDP	24.068***	25.022***	25.014***
	(3.972)	(4.915)	(4.895)
GINI	−3.332***	−3.767***	−3.754***
	(0.760)	(1.241)	(1.220)
Constant		55.672	54.992
		(55.948)	(55.620)
Observations	67	63	63
R^2	0.057	0.060	0.060
Diagnostics:			
Weak instruments		408.916*** P-V (<2e-16)	274.56 *** P-V (<2e-16)

Note: The table displays within-group fixed effects estimates with time dummies in the (FE) column. The next two columns present 2SLS estimates, as column (A) shows estimates without time dummies, and column (B) shows estimates with time dummies, 2SLS estimates accompanied by robust standard errors that account for both serial correlation and heteroskedasticity presented in parentheses below the corresponding coefficient estimates. *p<0.1; **p<0.05; ***p<0.01 represent significance levels.
Source: Author's calculation

The analysis in Table 3.9 investigates the impact of credit availability on individuals' education, measured by the Education Index (EDU), in the context of income inequality. A significant and negative relationship between income inequality and the Education Index (EDU) is found according to 2SLS estimations, suggesting that increasing income inequality can hinder investment in human capital. The interaction term (GINI × CREDIT) is positive and significant across all models, indicating that the negative effect of income inequality on education is mitigated as credit availability increases. This supports the idea that rectifying credit market imperfections could

potentially mitigate the negative impacts of income inequality on educational attainment. Consequently, this could foster economic growth and align with the findings of (Gründler and Scheuermeyer, 2018).

Table 3.9. *The impact of credit market imperfection on human capital (education index)*

	Dependent Variable: Education Index (EDU)		
	FE	2SLS (A)	2SLS (B)
LnGDP	0.092***	0.104***	0.104***
	(0.014)	(0.014)	(0.014)
GINI	−0.005	−0.010**	−0.010**
	(0.004)	(0.005)	(0.005)
CREDIT	−0.006**	−0.009***	−0.009***
	(0.003)	(0.003)	(0.003)
GINI × CREDIT	0.0001**	0.0002***	0.0002***
	(0.000)	(0.000)	(0.000)
Constant		0.166	0.169
		(0.229)	(0.229)
Observations	67	63	63
R^2	0.675	0.705	0.705
Diagnostics:			
Weak instruments (GINI)		257.570 *** P-V (<2e-16)	152.329*** P-V (< 2e-16)
Weak instruments (GINI×CREDIT)		66.680*** P-V (<2e-16)	24.361*** P-V (8.15e-14)

Note: The table displays within-group fixed effects estimates with time dummies in the (FE) column. The next two columns present 2SLS estimates, as column (A) shows estimates without time dummies, and column (B) shows estimates with time dummies, 2SLS estimates accompanied by robust standard errors that account for both serial correlation and heteroskedasticity presented in parentheses below the corresponding coefficient estimates. *p<0.1; **p<0.05; ***p<0.01 represent significance levels.
Source: Author's calculation

These results from Tables 3.8 and 3.9 [16] support the two stages of Galor and Zeira's (1993) theory, which asserts that income inequality can restrict individuals' access to credit. Consequently, limited credit availability for disadvantaged individuals negatively impacts their ability to invest in education.

Table 3.10 estimates the conditional relationship between income inequality, credit availability, and their impact on economic growth using fixed effects (FE) and fixed effects two-stage least squares (FE-2SLS) models[17]. The results reveal a positive and significant relationship between education and economic growth (LnGDP) in the FE, FE-2SLS, and FE(A) models indicating that higher levels of education contribute to increased economic growth.

The introduction of the interaction term (GINI×CREDIT) in the FE(A) and FE-2SLS(A) models aims to capture the conditional effect of income inequality on growth as it relates to credit availability. The interaction term (GINI×CREDIT) in the FE-2SLS(A) model is positive and significant at the 10% level, which suggests that the negative effect of income inequality on economic growth could be mitigated as credit availability increases.

To summarise, the consolidated findings relevant to the credit market imperfection channel are presented in Table 3.11. The analysis presented in this study provides robust evidence supporting the Credit Market Imperfection Channel, as proposed by Galor and Zeira (1993). The findings derived from Tables 3.8 and 3.9 indicate that the presence of income inequality has a detrimental effect on the accessibility of credit, thereby hampering the ability of individuals to invest in their education. The findings in Table 3.9 demonstrate a significant and favourable interaction between the variables of GINI and CREDIT, suggesting that enhancing access to credit can serve to mitigate the damaging impact of income inequality on educational achievement. This finding is further supported by the results in Table 3.10, which depict a positive and significant relationship between education and economic growth (LnGDP), and the positive interaction term (GINI×CREDIT) in the FE-2SLS(A) model.

[16] Tables 3.8 and 3.9 showcase the 2SLS estimates, where weak instruments diagnostic tests featured in these tables reveal statistical significance, confirming the effectiveness of the selected instrumental variables for the analysis.

[17] Income inequality and its interaction with credit availability are instrumented using the lagged values of inequality itself, trade openness, and the credit market imperfections variable.

Table 3.10. *Effects of income inequality on economic growth (credit market imperfection)*

	Dependent Variable: Real GDP per capita (LnGDP)			
	FE	FE-2SLS	FE(A)	FE-2SLS(A)
GINI	-0.018***	-0.075	-0.004	-0.117**
	(0.003)	(0.047)	(0.009)	(0.052)
LnRGCF	0.021**	-0.014	0.023**	-0.027
	(0.010)	(0.027)	(0.010)	(0.021)
GINI×CREDIT			-0.0002	0.001*
			(0.0002)	(0.0003)
EDU	1.173***	1.222*	1.469***	0.677
	(0.360)	(0.699)	(0.481)	(1.048)
CREDIT	-0.001**	-0.0001	0.012	-0.029*
	(0.0003)	(0.001)	(0.011)	(0.017)
Observations	67	63	67	63
R^2	0.244	0.148	0.282	0.071

Note: The table displays both fixed effect estimates (FE) and fixed effects two-stage least squares (FE-2SLS) estimates, accompanied by robust standard errors that account for both serial correlation and heteroskedasticity presented in parentheses below the corresponding coefficient estimates. *p<0.1; **p<0.05; ***p<0.01 represent significance levels.
Source: Author's calculation

The implications of these findings extend beyond the theoretical validation of Galor and Zeira's (1993) theory. Policymakers in the MENA region have the potential to mitigate the adverse effects of income inequality on educational attainment and economic growth by tackling credit market imperfections and enhancing financial inclusion. By doing so, policymakers can facilitate a more comprehensive and enduring path of development for their respective nations. The aforementioned highlights the significance of formulating specific measures and interventions that not only augment the availability of credit but also tackle wider systemic concerns, thereby promoting a fairer allocation of resources and eliminating obstacles to education.

Table 3.11. *Credit market imperfection channel's summary findings*

The research questions pertaining to credit market imperfection channel	
Does increasing inequality limit an individual's ability to access credit?	Yes
Does increasing inequality negatively affect education levels?	Yes
Does inequality negatively influence education via the credit market imperfection channel?	Yes
Does credit accessibility affect growth?	Unclear
Does the level of credit accessibility change the relationship between income inequality and growth?	Unclear

3.3.2.2.2. *Fertility channel*

The Fertility Channel elucidates the nexus between income inequality and economic growth, stemming from the interplay between education investment and family size decisions. Lower-income parents may opt for more children to bolster family income and ensure support during old age, culminating in higher fertility rates and diminished education levels. Affluent families may have fewer children and invest more in education, increasing lifetime income. Income inequality is linked to greater fertility disparities between educated and uneducated women, which affects economic growth.

The empirical examination of the Fertility Channel starts by investigating the influence of income inequality on the fertility rate, as depicted in Table 3.12. The findings reveal a significant positive association between income inequality (GINI) and fertility rate (LnFERT), as demonstrated by the coefficients in both fixed effects (FE) and two-stage least squares (2SLS) models. This implies that heightened income inequality leads to increased fertility rates, corroborating the Fertility Channel's theoretical foundations. Additionally, the negative coefficients for LnGDP in all models suggest that a rise in GDP per capita corresponds to a decline in fertility rates. These outcomes lend credence to the idea that income inequality propels differences in fertility rates, which subsequently impact human capital investments and economic growth. The 2SLS estimates, which account for potential endogeneity, bolster the robustness of the results, with diagnostic tests unveiling strong instruments and no evidence of weak identification.

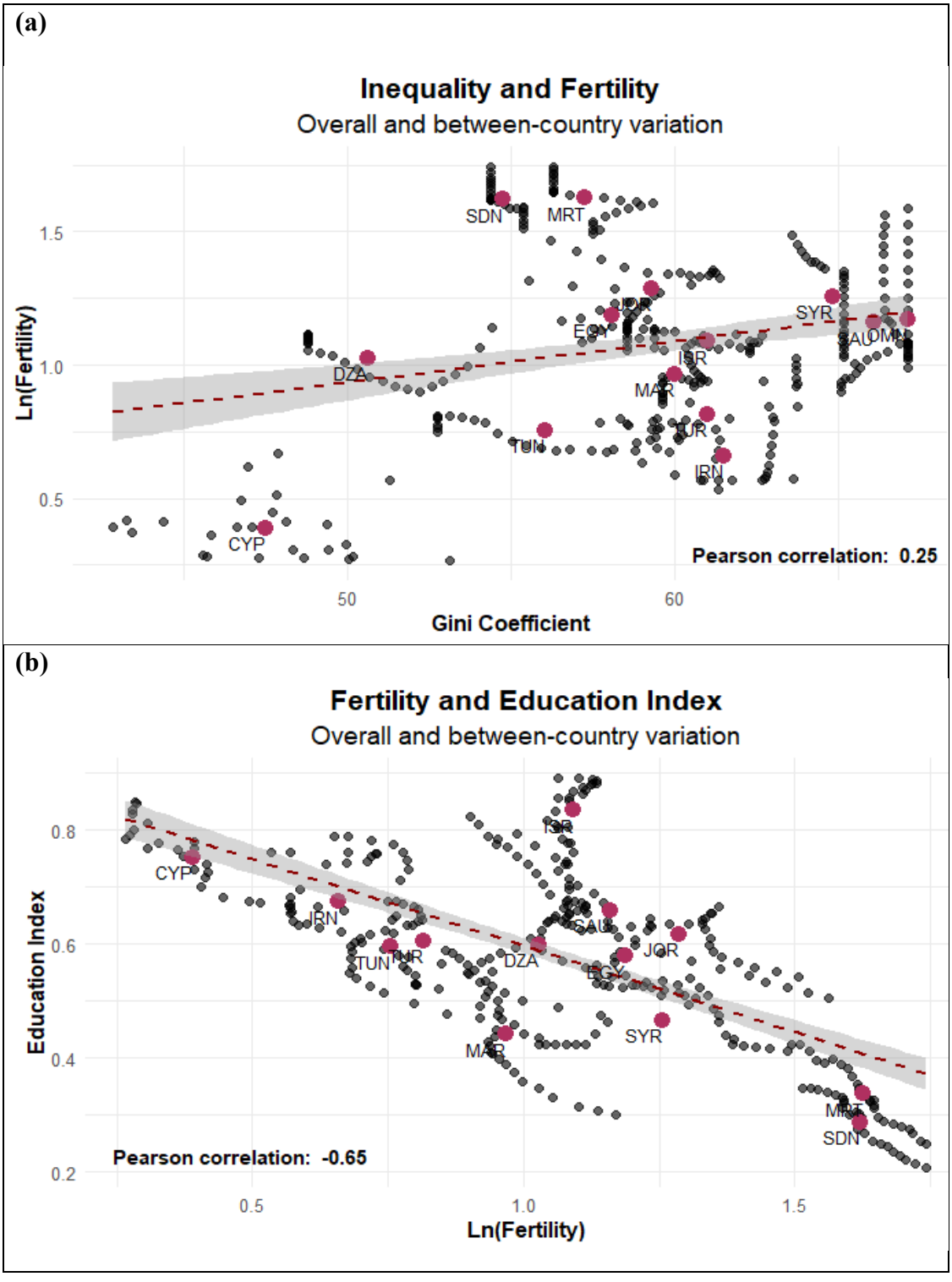

Figure 3.6. *Relationship between income inequality and fertility*

Note: grey points represent overall data, while maroon points indicate country means.

Source: Author's elaboration

Table 3.12. *The impact of income inequality on fertility channel variable*

	Dependent Variable: Fertility Rate (LnFERT)		
	FE	2SLS (A)	2SLS (B)
LnGDP	−0.148***	−0.170***	−0.170***
	(0.035)	(0.036)	(0.036)
GINI	0.017**	0.019***	0.019***
	(0.007)	(0.006)	(0.006)
Constant		1.415***	1.416***
		(0.461)	(0.463)
Observations	70	63	63
R^2	0.268	0.291	0.291
Diagnostics: Weak instruments		417.795 *** P-V (<2e-16)	284.262 *** P-V (<2e-16)

Note: The table displays within-group fixed effects estimates with time dummies in the (FE) column. The next two columns present 2SLS estimates, as column (A) shows estimates without time dummies, and column (B) shows estimates with time dummies, 2SLS estimates accompanied by robust standard errors that account for both serial correlation and heteroskedasticity presented in parentheses below the corresponding coefficient estimates.*p<0.1; **p<0.05; ***p<0.01 represent significance levels.
Source: Author's calculation

Upon examining the impact of income inequality on fertility rates, Table 3.13 presents an analysis of the relationship between fertility rates (LnFERT) and human capital, as gauged by the Education Index (EDU). Across all models (FE, 2SLS A, and 2SLS B), the coefficients for LnFERT are negative and highly significant, denoting that higher fertility rates correspond to lower levels of human capital. This outcome aligns with the Fertility Channel's theoretical expectations, as more children in high-fertility households may result in reduced investment in education per child.

Furthermore, the positive and significant coefficients for LnGDP in all models imply that an increase in GDP per capita is linked to higher levels of human capital. This discovery underscores the importance of economic development in fostering educational attainment. The robustness of these results is supported by the 2SLS estimates, which address potential endogeneity concerns, and the diagnostic tests for weak instruments, which indicate strong instruments and no evidence of weak identification.

Table 3.13: *The Impact of Fertility Rate on Human Capital (Education Index)*

	Dependent Variable: Education Index (EDU)		
	FE	2SLS (A)	2SLS (B)
LnGDP	0.091***	0.088***	0.088***
	(0.010)	(0.012)	(0.012)
LnFERT	−0.157***	−0.164***	−0.188***
	(0.031)	(0.035)	(0.034)
Constant		−0.005	0.025
		(0.123)	(0.121)
Observations	70	69	69
R^2	0.749	0.711	0.713
Diagnostics:			
Weak instruments (LnGDP)		492.11***	683.052 ***
		P-V (< 2e-16)	P-V (< 2e-16)
Weak instruments (LnFERT)		76.41***	542.013***
		P-V (< 2e-16)	P-V (< 2e-16)

Note: The table displays within-group fixed effects estimates with time dummies in the (FE) column. The next two columns present 2SLS estimates, as column (A) shows estimates without time dummies, and column (B) shows estimates with time dummies, 2SLS estimates accompanied by robust standard errors that account for both serial correlation and heteroskedasticity presented in parentheses below the corresponding coefficient estimates.*p<0.1; **p<0.05; ***p<0.01 represent significance levels.
Source: Author's calculation

Table 3.14 offers an analysis of the effects of income inequality on economic growth through the Fertility Channel, with real GDP per capita (LnGDP) as the dependent variable. In all models (FE, FE-2SLS, FE(A), and FE-2SLS(A)), the coefficients for GINI are negative and significant, suggesting that higher income inequality hampers economic

growth. This is in line with the Fertility Channel's theoretical underpinnings, which posit that initial inequality can be detrimental to growth owing to its positive connection with fertility rates and subsequent implications for human capital accumulation. Moreover, the positive and significant coefficients for LnRGCF across all models indicate that an increase in real gross capital formation is associated with higher economic growth. This result emphasizes the importance of investment in promoting economic growth.

Table 3.14. *Effects of income inequality on economic growth (fertility channel)*

	Dependent Variable: Real GDP per capita (LnGDP)			
	FE	FE-2SLS	FE(A)	FE-2SLS(A)
	(1)	(2)	(3)	(4)
GINI	-0.013**	-0.045*	-0.050***	-0.049***
	(0.006)	(0.026)	(0.010)	(0.008)
LnRGCF	0.050***	0.033*	0.069***	0.069***
	(0.008)	(0.017)	(0.010)	(0.010)
GINI × LnFERT			0.038***	0.036***
			(0.011)	(0.008)
LnFERT	0.641***	0.511***	-1.799***	-1.622***
	(0.111)	(0.176)	(0.601)	(0.549)
Observations	70	69	70	69
R^2	0.259	0.218	0.306	0.309

Note: The table displays both fixed effect estimates (FE) and fixed effects two-stage least squares (FE-2SLS) estimates, accompanied by robust standard errors that account for both serial correlation and heteroskedasticity presented in parentheses below the corresponding coefficient estimates. *p<0.1; **p<0.05; ***p<0.01 represent significance levels.
Source: Author's calculation

Crucially, the GINI × LnFERT interaction term in models FE(A) and FE-2SLS(A) is positive and highly significant, indicating that the negative effect of income inequality on economic growth is mitigated in countries with higher fertility rates. This finding may appear to contradict the Fertility Channel's role in the relationship between income inequality and economic growth.

A plausible rationale for this finding may be that the relation between fertility and economic growth exhibits a more intricate nature than what the theory posits at the outset. Increased fertility rates may result in a rise in the labour force, which has the potential to counterbalance the adverse impacts of reduced investments in human capital[18]. Moreover, it is plausible that the distinct circumstances prevailing in the MENA countries encompassed in the examination could exert an impact on the outcomes, and there could exist additional latent variables affecting this relation.

Interestingly, the results show that when the interaction term GINI × LnFERT is excluded (columns 1 and 2), there exists a positive and significant relationship between fertility and economic growth. This implies that fertility positively influences growth. However, upon introducing the interaction term GINI × LnFERT (columns 3 and 4), the coefficient for LnFERT turns negative and significant. This demonstrates that the relationship between fertility and growth is not linear and depends on the level of income inequality. The positive association between fertility and growth only holds when income inequality (GINI) is equal to zero.

In summary, the findings revealed in this study offer a compelling empirical substantiation of the theoretical construct of the Fertility Channel. Table 3.14, in particular, evidences that income inequality exerts a negative impact on economic growth, a detrimental effect that is somewhat cushioned in nations where fertility rates are relatively higher. This correlation remains robust upon implementing fixed effects and two-stage least squares estimation methodologies, which cater for potential endogeneity problems and time-invariant heterogeneity.

Tables 3.12 and 3.13 provide further empirical support, elucidating the Fertility Channel's role in the relationship between income inequality and the investment in human capital. They vividly illustrate the effect of income disparity on fertility rates and, consequently, the influence these rates exert on the development of human capital.

Table 3.15 succinctly summarises the main findings relating to the Fertility Channel. It becomes clear that an increase in income inequality incites higher fertility rates, which in turn have a detrimental effect on education levels. Furthermore, the data categorically demonstrate that fertility rates positively contribute towards economic growth. Additionally, fertility rates play a considerable role in mediating the relationship

[18] The baseline estimations in the study also align with these findings of a positive effect of fertility on economic growth.

between income disparity and economic growth, mitigating the harmful effects of inequality. Taken together, these results highlight the critical need to address income inequality in order to enhance the quality, not simply the quantity, of human capital, thereby promoting sustainable economic growth.

Table 3.15. *Fertility channel's summary findings*

The research questions pertaining to the Fertility channel	
Does increasing inequality lead to increasing fertility rates?	Yes
Does increasing fertility rates negatively affect education levels?	Yes
Do fertility rates affect growth?	Yes (Positively)
Do the rates of fertility change the relationship between income inequality and growth?	Yes (mitigate inequality's negative effect on growth)

3.3.2.2.3. *Life expectancy channel*

The life expectancy channel posits that inequality negatively affects life expectancy and investment in human capital. This is due to individuals with lower socioeconomic status being at a higher risk of premature mortality and facing financial constraints that limit their ability to allocate resources toward their children's education. Consequently, this can lead to weaker economic growth.

Contrary to the aforementioned theory, the results presented in Table 3.16 do not provide evidence for a negative relationship between income inequality and life expectancy. None of the three models demonstrate a statistically significant relationship between these variables. While Figure 3.7 does not offer a clear direction for this relationship, it does highlight certain patterns. Notably, countries in the MENA region with weaker development levels, such as Sudan and Mauritania, exhibit significantly lower life expectancy compared to their regional counterparts.

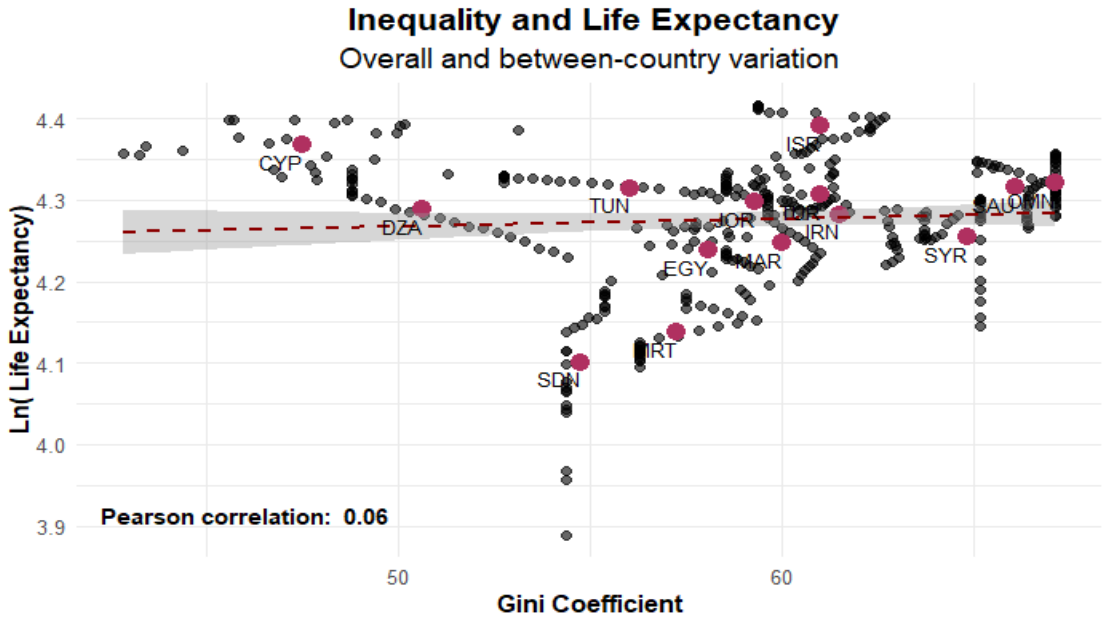

Figure 3.7. *Relationship between income inequality and life expectancy*

Note: grey points represent overall data, while maroon points indicate country means.

Source: Author's elaboration

Table 3.16. *The impact of income inequality on life expectancy channel variable*

	Dependent Variable: Life expectancy (LnLIFEX)		
	FE	2SLS (A)	2SLS (B)
LnGDP	0.056***	0.061***	0.061***
	(0.006)	(0.007)	(0.007)
GINI	0.0004	-0.00027	-0.00025
	(0.001)	(0.001)	(0.001)
Constant		3.773***	3.771***
		(0.106)	(0.106)
Observations	70	63	63
R^2	0.575	0.551	0.551
Diagnostics:			
Weak instruments		238.316 *** P-V (< 2e-16)	277.182 *** P-V (< 2e-16)

Note: The table displays within-group fixed effects estimates with time dummies in the (FE) column. The next two columns present 2SLS estimates, as column (A) shows estimates without time dummies, and column (B) shows estimates with time dummies, 2SLS estimates accompanied by robust standard errors that account for both serial correlation and heteroskedasticity presented in parentheses below the corresponding coefficient estimates.*p<0.1; **p<0.05; ***p<0.01 represent significance levels.
Source: Author's calculation

Table 3.17 examines the effects of income inequality on economic growth through the life expectancy channel. Life expectancy has a positive and significant effect on economic growth in the FE and FE-2SLS models. In these models, GINI coefficients are negative and significant, suggesting that higher income inequality corresponds to lower economic growth. However, with the interaction term GINI x LnLIFEX in the FE(A) and FE-2SLS(A) models, the relationship between income inequality and economic growth becomes loss its significance.

In the FE-2SLS(A) model, the interaction term GINI x LnLIFEX is positive and significant at a 10% level, implying that the negative effect of income inequality on economic growth could be mitigated as life expectancy increases. This result aligns with the human capital channels' assertion that improved health conditions increase productivity, potentially moderating inequality's negative impact on economic growth.

Table 3.17. *Effects of income inequality on economic growth (life expectancy channel)*

	Dependent Variable: Real GDP per capita (LnGDP)			
	FE	FE-2SLS	FE(A)	FE-2SLS(A)
	(1)	(2)	(3)	(4)
GINI	-0.024***	-0.054***	0.010	-1.179*
	(0.006)	(0.018)	(0.158)	(0.655)
LnRGCF	0.085***	0.070***	0.087***	0.031
	(0.020)	(0.024)	(0.021)	(0.022)
GINI × LnLIFEX			-0.008	0.268*
			(0.037)	(0.151)
LnLIFEX	3.207***	3.173***	3.681	-12.816
	(1.034)	(1.099)	(2.419)	(8.275)
Observations	70	69	70	69
R^2	0.395	0.352	0.395	0.288

Note: table displays both fixed effect estimates (FE) and fixed effects two-stage least squares (FE-2SLS) estimates, accompanied by robust standard errors that account for serial correlation and heteroskedasticity presented in parentheses below the corresponding coefficient estimates. *p<0.1; **p<0.05; ***p<0.01 represent significance levels.
Source: Author's elaboration

In conclusion, the analysis in Tables 3.16 and 3.17 does not consistently back up the hypothesis that income inequality negatively impacts life expectancy and, subsequently, economic growth through the life expectancy channel. However, as summarised in Table 3.18, the study does observe some unique findings: life expectancy seems to exert a positive effect on growth, but increasing inequality doesn't appear to have a direct effect on life expectancy. Moreover, it's noted that life expectancy does not change the relationship between income inequality and growth. Therefore, whilst the negative effect of income inequality on economic growth is evident, the relationship between income inequality, life expectancy, and economic growth in the MENA region appears to be more complex than initially posited.

Table 3.18. *Life expectancy channel's summary findings*

Research questions pertaining to Life expectancy channel	
Does increasing inequality affect life expectancy?	No
Does life expectancy affect growth?	Yes (Positively)
Does life expectancy change the relationship between income inequality and growth?	No

3.3.2.3. *Sociopolitical unrest channel*

The presence of inequality can potentially hinder economic growth by exacerbating political and social instability. This instability heightens risk, which negatively impacts investment. Furthermore, inequality and limited social mobility may contribute to criminal activity as an alternative to education or employment. Such criminal actions, particularly those violating property rights, can further deter investment.

Table 3.19 presents the findings of income inequality's impact on the sociopolitical unrest channel, precisely political stability and the role of low indicators. Contrary to predictions, the results reveal that sociopolitical unrest indicators are not statistically significantly affected by inequality across all estimates.

In Table 3.20, the study investigates the impact of various sociopolitical unrest indicators on economic growth, revealing a robust and statistically significant relationship between political stability, the rule of law indicators, and economic growth in both fixed

effects (FE) and fixed effects-two stage least squares (FE-2SLS) models presented in panels A and B, respectively. These findings not only align with but also reinforce conclusions from earlier empirical studies by (Aisen and Veiga, 2013; Alesina and Perotti, 1996; Barro, 1991), which collectively highlight a strong relationship between political stability and positive economic growth. Furthermore, the results of this study support the theoretical framework suggesting that increased sociopolitical instability leads to resource wastage due to the diversion of resources from productive investments to address the consequences of unrest. This hampers economic growth and development, emphasizing the crucial role of sound governance and political stability in fostering sustainable development.

Building on the previous findings, the analysis progresses to evaluate whether the association between income inequality and the channel variables of sociopolitical unrest is similarly relevant to the impact of inequality on growth through the incorporation of interaction terms. This methodology facilitates a more comprehensive understanding of how the influence of inequality on economic advancement is moderated by the degree of sociopolitical turbulence.

Table 3.19. *The impact of income inequality on sociopolitical unrest channel variables*

	FE	2SLS (A)	2SLS (B)
(Panel A) Dependent Variable: Political Stability and Absence of Violence Indicator (POLS)			
LnGDP	0.313***	0.167	0.167
	(0.091)	(0.112)	(0.112)
GINI	0.006	0.020	0.020
	(0.017)	(0.022)	(0.022)
Constant		−3.228**	−3.229**
		(1.384)	(1.382)
Observations	70	63	63
R^2	0.164	0.075	0.075
Diagnostics: Weak instruments		488.179*** P-V (<2e-16)	344.814*** P-V (<2e-16)

Table 3.19. *(continued)*

	FE	2SLS (A)	2SLS (B)
(Panel B) Dependent Variable: Rule of Law Index (RULE)			
LnGDP	0.547***	0.503***	0.503***
	(0.053)	(0.049)	(0.050)
GINI	−0.007	−0.001	−0.001
	(0.010)	(0.010)	(0.010)
Constant		−4.413***	−4.401***
		(0.730)	(0.731)
Observations	70	63	63
R2	0.630	0.565	0.565
Diagnostics:		383.298***	286.71***
Weak instruments		P-V (<2e-16)	P-V (<2e-16)

Note: The table displays within-group fixed effects estimates with time dummies in the (FE) column. The next two columns present 2SLS estimates, as column (A) shows estimates without time dummies, and column (B) shows estimates with time dummies, 2SLS estimates accompanied by robust standard errors that account for both serial correlation and heteroskedasticity presented in parentheses below the corresponding coefficient estimates.
*p<0.1; **p<0.05; ***p<0.01
Source: Author's calculation

The findings obtained through the estimations of FE(A), and FE-2SLS(A) demonstrate that MENA countries with superior political stability and improved rule of law may alleviate the adverse impacts of income inequality on economic growth. The results indicate that the interaction terms (GINI x POLS and GINI x RULE) exhibit a positive and statistically significant relationship. This suggests that nations with greater political stability and improved rule of law experience a less pronounced impact of income inequality on growth.

This study provides important insights into the dynamic interplay between income inequality, economic growth, and sociopolitical factors. Contrary to some prevailing notions, it is clear from the findings as summarised in Table 3.21 that increasing inequality does not directly instigate sociopolitical instability. However, the stability of the sociopolitical environment does have a positive influence on growth, acting as a vital determinant of economic prosperity. More significantly, the findings indicate that augmenting sociopolitical stability can mitigate the negative impact of income inequality

on economic growth. Thus, policies focusing on enhancing political stability and strengthening legal frameworks may prove crucial in counteracting the adverse effects of income disparity. In a globally diverse context, these conclusions underscore the importance of the sociopolitical milieu in influencing the relationship between income inequality and economic growth.

Table 3.20. *Effects of income inequality on economic growth (sociopolitical unrest channel)*

	Dependent Variable: Real GDP per capita (LnGDP)			
	FE	FE-2SLS	FE(A)	FE-2SLS(A)
Panel A: Results with Political Stability and Absence of Violence Indicator				
GINI	-0.018**	-0.049***	-0.003	-0.026**
	(0.007)	(0.015)	(0.007)	(0.012)
LnRGCF	0.055***	0.040***	0.031**	0.026***
	(0.015)	(0.010)	(0.016)	(0.010)
GINI × POLS			0.029***	0.023***
			(0.006)	(0.006)
POLS	0.138***	0.133***	-1.660***	-1.297***
	(0.030)	(0.026)	(0.374)	(0.332)
Observations	70	69	70	69
R^2	0.307	0.277	0.504	0.465
Panel B: Results with Rule of Law indicator				
GINI	-0.013	-0.027	-0.015***	-0.021
	(0.009)	(0.017)	(0.006)	(0.019)
LnRGCF	0.066***	0.059***	0.041*	0.041
	(0.016)	(0.022)	(0.023)	(0.032)
GINI × RULE			0.025***	0.025**
			(0.009)	(0.010)
RULE	0.233**	0.224**	-1.321**	-1.307**
	(0.091)	(0.092)	(0.581)	(0.643)
Observations	70	69	70	69
R^2	0.262	0.260	0.333	0.340

Note: The table displays both fixed effect estimates (FE) and fixed effects two-stage least squares (FE-2SLS) estimates, accompanied by robust standard errors that account for serial correlation and heteroskedasticity presented in parentheses below the corresponding coefficient estimates. *p<0.1; **p<0.05; ***p<0.01 represent significance levels.
Source: Author's calculation

Table 3.21. *Sociopolitical unrest channel's summary findings*

Research questions pertaining to *Sociopolitical unrest channel*	
Does increasing inequality cause Sociopolitical instability?	No
Does Sociopolitical stability affect growth?	Yes (Positively)
Does increasing Sociopolitical stability levels change the relationship between income inequality and growth?	Yes (Mitigates inequality's negative effect on growth)

3.3.2.4. *Endogenous fiscal policy channel*

The underpinning theories of the endogenous fiscal policy channel propose that two distinct mechanisms can drive a negative impact on economic growth from income inequality. The first of these, the political mechanism, was first suggested by Meltzer and Richard (1981). This mechanism proposes that inequality can spark a heightened demand for redistributive taxes and transfers. Such demands are an outcome of the political voting process, where individuals negatively affected by inequality seek to level the economic playing field through government intervention through redistributive policies.

The second mechanism, the economic one, emphasizes the potential detrimental effects that redistributive policies can have on the accumulation of physical and human capital and labour effort. When redistribution aims to achieve economic equality, it could unintentionally stifle investment in capital and labour, potentially undermining economic growth.

As suggested by the theory, empirically investigating the endogenous fiscal policy channel in the context of the Middle East and North Africa (MENA) region countries is a complex task. The complexity arises since this channel's political mechanism presupposes an effective democratic process where the median voter can pressure policymakers to implement redistributive policies. Regrettably, this condition is unfulfilled as most MENA countries operate under authoritarian regimes.

Despite this complication, the study could assume that within an authoritarian regime, those in power might engage in indirect redistribution. This could be achieved by the provision of social transfers and expansion of public goods in order to maintain their authority and stave off demands for political change. With this assumption, the study can still evaluate the validity of this channel by testing the impact of inequality on government

expenditure and tax revenues. It will also examine the influence of these two aspects of fiscal policy on growth. Finally, it will scrutinize whether there is a conditional relationship between inequality and the two elements of fiscal policy and whether this extends to the effect of inequality on growth.

Table 3.22 illustrates the effect of income inequality on government expenditure and tax revenues. Panel A of the table reveals a positive association between income inequality and government expenditure, aligning with the hypothesis that rising inequality would trigger an increase in government spending. This surge in spending is often financed by taxation, with the funds directed towards social transfers in the MENA region.

Conversely, panel B presents an unexpected finding. While theoretical expectation suggests high inequality would trigger high taxation leading to increased tax revenue, the study discovers a statistically significant inverse relationship at the 1% level between income inequality and total tax revenue. Despite these results, they do not outright dismiss the Endogenous Fiscal Policy channel. Instead, they suggest that the dynamics of this channel may not function uniformly across countries. The factors contributing to these findings in developing countries, such as those in the MENA region, could include:

- **Tax Evasion and Avoidance:** The wealthy often have more resources to evade or avoid taxes, a scenario more likely in countries with higher income inequality. Less robust tax systems in some developing countries could fail to deter such practices, diminishing tax revenues.
- **Lower Tax Base:** In nations with high-income inequality, a significant segment of the population usually earns low incomes, resulting in a smaller tax base. Those earning less pay less in taxes or are entirely tax-exempt, reducing the government's tax revenue.
- **Informal Economy Expansion:** Income inequality can foster an unregulated, untaxed informal economy. Individuals in this sector often evade taxes, leading to reduced tax revenue. People in higher income brackets may also have more means to evade taxes, decreasing revenue.
- **Inefficient Tax Structure:** Many developing countries rely more on indirect taxes, such as sales taxes or value-added taxes, which disproportionately affect low-income earners. This regressive structure is less efficient at collecting

revenue from high-income earners, thus intensifying the effect of income inequality on tax revenues.

Table 3.23 investigates the efficacy of fiscal policy tools in spurring economic growth. Panels A and B demonstrate that government spending does not significantly impact economic growth. Total tax revenue exhibits a positive significance at a 10% level relationship with economic growth in FE estimation. However, FE-2SLS indicates no substantial association with economic growth. These results point to a confined impact of these policy instruments on growth in the MENA region, potentially due to the following factors:

- **Public Sector Inefficiency:** The public sector in some MENA countries is characteristically large and ineffective. This could curtail the potential of government spending as a fiscal policy tool, as the funds may not be channelled towards maximum growth.
- **Corruption and Transparency Deficit:** Corruption, a prevalent issue in several MENA countries, can undermine the efficacy of fiscal policies as funds could be misused or inefficiently deployed. Additionally, a lack of transparency makes it challenging for citizens and international observers to hold governments accountable.
- **Insufficient Fiscal Space:** A substantial number of MENA countries have constricted fiscal space, implying they have limited capacity to augment government spending or reduce taxes without adversely affecting their fiscal stability. This situation arises from factors such as elevated public debt and structural budget deficits.

Table 3.22. *The impact of income inequality on endogenous fiscal policy channel variables*

	FE	2SLS (A)	2SLS (B)
(Panel A) Dependent Variable: Government Expenditure (LnGOVC)			
LnGDP	0.652***	0.689***	0.689***
	(0.149)	(0.175)	(0.175)
GINI	0.067**	0.072*	0.072*
	(0.029)	(0.039)	(0.039)
Constant		13.261***	13.273***
		(2.224)	(2.228)
Observations	70	63	63
R^2	0.297	0.316	0.316
Diagnostics:		509.615***	274.630***
Weak instruments		P-V (<2e-16)	P-V (<2e-16)
(Panel B) Dependent Variable: Total tax revenue as % of NDP (TAX)			
LnGDP	3.497***	3.681***	3.678***
	(1.276)	(1.301)	(1.303)
GINI	−0.848***	−0.901***	−0.895***
	(0.242)	(0.257)	(0.256)
Constant		40.727*	40.405*
		(22.396)	(22.325)
Observations	67	63	63
R2	0.225	0.235	0.235
Diagnostics:		377.20***	230.02***
Weak instruments		P-V (<2e-16)	P-V (<2e-16)

Note: The table displays within-group fixed effects estimates with time dummies in the (FE) column. The following two columns present 2SLS estimates, as column (A) shows estimates without time dummies, and column (B) shows estimates with time dummies, 2SLS estimates accompanied by robust standard errors that account for both serial correlation and heteroskedasticity presented in parentheses below the corresponding coefficient estimates. $^{*}p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$
Source: Author's calculation

The last two columns of Table 3.23 investigate the conditional relationships between income inequality, government expenditure, and tax revenues. This is achieved by introducing interaction terms to the model: GINI × LnGOVC and GINI × TAX. A significant negative coefficient was noted for the interaction term GINI × LnGOVC in fixed effects estimations. This finding indicates that the positive relationship between income inequality and growth diminishes as government expenditure increases. It corroborates the hypothesis that redistributive policies, such as increased government spending, may inadvertently impede economic growth. However, the robustness check using FE-2SLS estimation does not reveal a significant relationship.

On the other hand, the interaction term GINI × TAX demonstrated a significant positive coefficient in the FE-2SLS estimation. This suggests that the negative impact of income inequality on growth becomes less impactful as tax revenues increase. It could infer that strategic utilization of tax revenues could counterbalance, at least partially, the adverse effects of income inequality on economic growth.

In summarising the findings on the endogenous fiscal policy channel as presented in Table 3.24, it can be discerned that income inequality does influence fiscal policy through both government expenditure and tax revenues. The study indicates a positive association between inequality and government expenditure, whilst inequality seems to exert a negative effect on tax revenues. However, it remains unclear from the analysis whether fiscal policy overall significantly affects economic growth.

Moreover, the findings elucidate a complex interaction between income inequality, fiscal policy, and economic growth. Increasing government expenditure does not appear to alter the relationship between income inequality and growth, suggesting that merely boosting spending might not be a sufficient strategy to offset the economic drawbacks of inequality. However, the research shows that enhancing tax revenues does indeed temper the negative effects of income inequality on economic growth.

These findings illuminate the nuanced operation of the endogenous fiscal policy channel, which appears to be conditioned by various factors such as public sector efficiency and tax structure. These factors may induce variations in how the channel operates across different nations. Furthermore, the findings for the MENA region imply that the explanation of the theoretical framework of fiscal policy channel found in literature, may not be wholly applicable to this region.

Table 3.23. *Effects of income inequality on economic growth (endogenous fiscal policy channel)*

	Dependent Variable: Real GDP per capita (LnGDP)			
	FE	FE-2SLS	FE(A)	FE-2SLS(A)
Panel A: Results with Government Expenditure				
GINI	-0.025***	-0.066***	0.313***	-0.128
	(0.007)	(0.013)	(0.113)	(0.246)
LnRGCF	0.034***	0.013	0.049***	0.029***
	(0.010)	(0.012)	(0.006)	(0.010)
GINI × LnGOVC			-0.015***	0.004
			(0.005)	(0.011)
LnGOVC	0.072	0.019	1.009**	-0.207
	(0.113)	(0.109)	(0.401)	(0.580)
Observations	70	69	70	69
R^2	0.126	0.107	0.191	0.085
Panel B: Results Total tax revenue as % of NDP				
GINI	-0.013**	-0.107*	-0.014	-0.092**
	(0.006)	(0.060)	(0.010)	(0.036)
LnRGCF	0.052***	0.006	0.052***	0.040**
	(0.015)	(0.041)	(0.016)	(0.016)
GINI × TAX			0.00002	0.002**
			(0.0002)	(0.001)
TAX	0.004***	0.0003	0.003	-0.125**
	(0.001)	(0.003)	(0.013)	(0.053)
Observations	67	64	67	64
R^2	0.192	0.079	0.192	0.120

Note: The table displays both fixed effect estimates (FE) and fixed effects two-stage least squares (FE-2SLS) estimates, accompanied by robust standard errors that account for serial correlation and heteroskedasticity presented in parentheses below the corresponding coefficient estimates. *p<0.1; **p<0.05; ***p<0.01 represent significance levels.
Source: Author's calculation

Table 3.24. *Endogenous fiscal policy* channel's summary findings

Research questions pertaining to *endogenous fiscal policy channel*	
Does inequality affect government expenditure?	Yes (Positively)
Does inequality influence tax revenues	Yes (Negatively)
Does fiscal policy affect growth?	Unclear
Does increasing government expenditure alter the relationship between income inequality and growth?	No
Does boosting tax revenues modify the relationship between income inequality and growth?	Yes (Mitigates inequality's negative effect on growth)

3.4.Conclusion

In the face of escalating inequality within the Middle East and North Africa (MENA) region, our understanding of income inequality's impact on economic growth remains markedly unexplored, especially concerning the transmission mechanisms of these inequality effects. This thesis aims to illuminate this multifaceted issue via a two-tiered empirical analysis. The first phase probes into the direct repercussions of income inequality on growth, whereas the second phase delves deeper into the indirect effects mediated through six distinct channels: savings, financial market imperfections, fertility rates, life expectancy, sociopolitical unrest, and fiscal policy. A detailed panel data set, capturing the period from 1996 to 2020, has been meticulously compiled for 14 countries within the MENA region to facilitate a holistic exploration.

The study found a robust negative direct effect of income inequality on economic growth, particularly when the key transmission channels were excluded from the consideration. However, this negative effect gradually diminished when variables representing the transmission channels were incorporated. These findings are consistent with numerous empirical studies suggesting that inequality tends to hamper economic growth in developing nations while concurrently promoting growth in developed ones. Such a finding indicates that within the context of the MENA region, these transmission mechanisms may indeed play a pivotal role in the intricate relationship between income inequality and economic growth.

Human capital accumulation is the most influential factor in the complex relationship between growth and inequality. Interestingly, human capital-related factors significantly impact this interplay more than physical capital. In the specific context of the MENA region, the idea that increasing inequality could lead to more physical capital accumulation and subsequently promote economic growth is empirically refuted. Instead, there is a clear connection between higher levels of inequality and lower levels of education, coupled with higher fertility rates, mainly when access to credit is limited. This scenario emphasizes the significance of imperfections in the credit market and the influence of the fertility channel in shaping the dynamics of growth and inequality within the MENA region.

Enhancing political stability and the rule of law aids in mitigating the harmful effects of income inequality on economic growth. Despite the high levels of political instability in the MENA region, the study did not find direct evidence that inequality contributes to this scenario. However, upon assessing the conditional effects of this channel on the inequality-growth relationship, results were found in line with the theoretical foundation of the sociopolitical unrest channel.

Generalizing the implications of the traditional conception of the fiscal policy channel's political and economic mechanisms, specifically for the MENA region, is challenging as the heightened inequality amplifies general government expenditure while reducing tax revenues. However, the implications of this channel on economic growth suggest that, while redistribution efforts appear to have negligible effects on the inequality-growth relationship, an increase in tax revenues assists in tempering the negative impacts of inequality on growth.

The revelations from this study demand immediate and unequivocal consideration from policymakers in MENA countries, instigating imperative measures to mitigate the detrimental effects of inequality on growth. The research uncovers the injurious consequences of economic disparity on growth, thereby requiring prompt and specific policy changes. This study shines a light on several crucial areas in need of policy intervention.

The study underscores the urgency to prioritise the calibre of human capital and make education more accessible. The data divulged presents a potent association between elevated fertility rates and diminishing opportunities for quality education. It further accentuates the pivotal role of equal access to credit, particularly for underprivileged

families. In light of these findings, the study robustly advises swift and enduring policy actions, which include the promotion of family planning and consciousness to regulate fertility rates, hence augmenting children's educational possibilities. The study also advocates the eradication of obstacles to education by establishing a robust public education system that offers free education and credit facilities to all, irrespective of their income stratum.

Additionally, the study emphasises the significance of ensuring curriculum relevance with the evolving demands of the labour market through the routine assessment and revision of school and university curricula. Other key areas of focus proposed by the study include the investment in quality teaching, providing incentives for professional development, and instituting a merit-based evaluation education system.

Moreover, the study points to the requirement for policies that bolster social and political stability. This involves intensifying the enforcement of the rule of law, fostering transparency, battling corruption, and nurturing best practices in governance to alleviate the negative impacts of income inequality on economic growth.

Finally, the study stresses the need for fiscal policy reform. It underscores the importance of enhancing tax-benefit systems, executing aggressive strategies against tax evasion, and facilitating the transition from informal to formal economic sectors. The study suggests tactics to increase financial inclusion rates in the MENA region as a method to boost these efforts. The policy implications presented in this study are of utmost importance and should be taken into account by policymakers in the MENA region to lay the foundation for a more equitable and prosperous future.

Despite revealing insightful findings, this study is not without limitations, predominantly stemming from issues of data availability and collection difficulties in developing countries. These challenges arise from a lack of transparency and openness in some nations that could potentially compromise the reliability and accessibility of the requisite economic data. Furthermore, an inherent distrust in government or other institutions could pose additional hindrances to these data collection endeavours. The issue is further exacerbated by the inadequate infrastructure prevalent in these regions, impeding the acquisition of comprehensive and precise data. Even in the face of these challenges, the study attempted to employ available indicators where feasible. However, these constraints resulted in a focus on a mere 14 countries, leaving many other nations in the MENA region unexplored. A broader incorporation of data from these excluded

MENA countries would unquestionably augment the robustness of the study, not only enhancing its credibility but also enabling a more comprehensive generalisation of the conclusions drawn. The aforementioned limitations underscore the pressing need for improvements in data collection infrastructure, as well as fostering a culture of transparency and openness within these nations, to enrich our understanding of the intricate relationship between income inequality and economic growth.

Looking ahead, numerous potential avenues for future research warrant exploration within this region. Firstly, the role of public debt in the relationship between inequality and growth remains largely unexplored. Secondly, quantifying the impacts of various monetary policy instruments, particularly in the present period, could offer comparative insights into the effects of conventional versus unconventional monetary policy on the growth-inequality nexus. Thirdly, while this study evaluated the influence of inequality on political stability and the rule of law, the reciprocal impact—namely, the influence of these indicators on inequality—remains largely unresolved. The investigation of these research paths has the potential to shed further light on the multifaceted relationship between inequality and economic growth in the MENA region.

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APPENDIX

Table A1. Selected Empirical studies on the direct relationship between inequality and economic growth

Author(s)	Sample and period	Data structure and Methodology	Data used	Inequality Indicator	Results	Comments
Alesina and Rodrik (1994)	46/70 countries 1960–1985	Cross-section / OLS 2SLS	Jain Fields	Gini coefficient of income and land	(−)	Inequality's impact on growth is insignificant for land inequality in undemocratic countries and when income and land inequality are considered together for the entire sample.
Persson and Tabellini (1994)	56 countries 1960–1985	Cross-section / OLS 2SLS	Paukert	Income shares of the fourth Quintile	(−)	Inequality has little impact on growth in undemocratic countries.
Clarke (1995)	74/81 countries 1970–1978	Cross-section / OLS WLS 2SLS	UN Social Indicators	Gini coefficient, Theil index, and Share of the fourth Quintile for income	(−)	
Perotti (1996)	67 countries 1960–1985	Cross-section / OLS WLS	Jain Lecaillon	Income shares of the fourth quintile	(−)	Inequality's impact on growth is insignificant in underdeveloped regions and countries.
Perotti (1996)	67 countries 1960–1985	Cross-section / OLS WLS	Jain Lecaillon	Income shares of the fourth quintile	(−)	Inequality's impact on growth is insignificant in underdeveloped regions and countries.

Table A1. *(continued)*

Author(s)	Sample and period	Data structure and Methodology	Data used	Inequality Indicator	Results	Comments
Birdsall and Londoño (1997)	43 countries 1960–1992	Cross-section / OLS	Deininger and Squire	Gini coefficient of income, land and human capital	(−)	Inequality's impact on growth is insignificant when considering income, land, and human capital together for the full sample.
Deininger and Squire (1998)	66/87 countries 1960–1992	Cross-section / OLS	Deininger and Squire	Gini coefficient of Income and Land	(−)	Inequality has little impact on growth in democratic and highly developed countries.
Li and Zou (1998)	46 countries 1960–1990	Panel / Fixed effects Random effects	Deininger and Squire	Gini coefficient of Income	(+)	If public consumption enters the utility function, income inequality has a positive and frequently significant impact on growth.
Deininger and Olinto (1999)	31/60 countries 1966–1990	Panel / System GMM	Deininger and Squire	Gini coefficient of Income and Land	(−)	Inequality in assets has a worse effect on growth than inequality in income.
Forbes (2000)	45 countries 1966–1995	Panel / First difference GMM	Deininger and Squire	Gini coefficient of Income	(+)	Economic growth is influenced positively by income inequality during the short- and medium-term.
Barro (2000)	84 countries 1965–1995	Panel / 3SLS	Deininger and Squire	Gini coefficient of Income	(±)	Inequality slows growth in poor countries but boosts it in prosperous ones.
Castelló and Doménech (2002)	67/83 countries 1960–1990	Cross-section / OLS	Barro and Lee	Gini coefficient of Income, and Human capital	(−)	Human capital inequality lowers investment and growth.
Chen (2003)	43 countries 1970–1992	Cross-section / OLS	Deininger and Squire	Gini coefficient of Income	(∩)	The relationship between income distribution and economic growth

Table A1. *(continued)*

Author(s)	Sample and period	Data structure and Methodology	Data used	Inequality Indicator	Results	Comments
						is an inverted U; little initial inequality boosts growth, while high inequality slows it.
Banerjee and Duflo (2003)	45 countries 1965–1995	Panel / Kernel regression Series estimator	Deininger and Squire	Gini coefficient of Income	(∼)	Reduced growth in the next period is linked to changes in inequality, regardless of whether inequality increases or decreases.
Bleaney and Nishiyama (2004)	42/69 countries 1965–1990	Cross-section / OLS	UNU-WIDER	Gini coefficient of Income	(∼)	The impact of inequality on growth is not clear-cut, but this study suggests a potentially positive relationship.
Knowle (2005)	40 countries 1960–1990	Cross-section / OLS	Deininger and Squire	Gini coefficient of Income	(−)	The impact of inequality on growth is negative in developing countries.
Voitchovsky (2005)	21 (developed) countries 1975–2000	Panel / System GMM	Luxembourg Income Study	Gini coefficient 90/75 perc. Ratio 50/10 perc. ratio	(±)	Inequality at the top boosts economic growth, whereas inequality at the bottom hurts it. Hence, one inequality measure may not be enough.
Bengoa and Sanchez-Robles (2005)	19/10 countries 1975–1995	Cross-section Panel / OLS Fixed effects Random effects GMM	Deininger and Squire	Gini coefficient of Income	(∼)	In high-income countries, inequality has a detrimental effect on growth, while in medium-income countries, the relationship between inequality and growth follows a

Table A1. *(continued)*

Author(s)	Sample and period	Data structure and Methodology	Data used	Inequality Indicator	Results	Comments
						hump-shaped pattern.
Castelló-Climent (2010)	102/56 countries 1960–2000	Panel / System GMM	UNU-WIDER Luxembourg Income Study	Gini coefficient of Income, and Human capital	(±)	Inequality has a detrimental effect on growth in low- and middle-income economies, whereas it has a positive effect in higher-income nations.
Chambers and Krause (2010)	54 countries 1960–2000	Panel	UNU-WIDER	Gini coefficient of Income	(−)	Greater income inequality slows economic growth.
Khalifa and el Hag (2010)	70 countries 1970–1999	Panel	Estimated Household Income Inequality	Gini coefficient of Income	(∩)	The influence of inequality on growth varies depending on the stage of development; beneficial in the early stages, negative below a certain level of income per capita.
Herzer and Vollmer (2012)	46 countries 1970–1995	Panel	Penn World Tables 6.3	Gini coefficient of Income	(−)	Inequality has a negative long-term impact on economic growth.
Cingano (2014)	31 countries 1970–2010	Panel; Sys-GMM	OECD income distribution dataset	Gini; bottom inequality; top inequality	(−)	Income inequality has a statistically significant detrimental impact on subsequent growth.
Halter et al. (2014)	106 countries 1965–2005	Panel; Diff-GMM, Sys-GMM	Deininger and Squire (1996); WIID	Gini coefficient	(±)	Inequality has a short-term positive impact on economic growth but a long-term detrimental one.
Gründler and Philipp (2015)	164 countries 1965–2014	Panel; two-step Sys-GMM	SWIID	Gini coefficient	(−)	Income inequality and limited credit availability hurt economic growth,

Table A1. *(continued)*

Author(s)	Sample and period	Data structure and Methodology	Data used	Inequality Indicator	Results	Comments
						but education spending mitigates it.
Berg et al. (2018)	31 countries 1970–2010	Panel; Sys-GMM	SWIID	Gini coefficient	(−)	Lower inequality leads to faster and more sustainable growth, but substantial redistribution hurts growth.

Note: taking inspiration from Neves and Silva (2014), this table summarizes the key findings of pertinent empirical research estimating a direct relationship between inequality and growth. The interpretation is always that higher levels of inequality have a positive (+), negative (−), nonlinear (∩), or ambiguous (~) effect on economic growth.
Source: Author's elaboration.

Table A2. Selected empirical studies on the transmission channels

Author(s)	Sample and period	Data structure and Method	Data used	Inequality Indicator	Channel	Results
Persson and Tabellini (1994)	13/43 countries 1960–1985	Cross-section / OLS 2SLS	Paukert	Income Share of the fourth quintile	Fiscal policy	Rejection
Alesina and Rodrik (1994)	46/70 countries 1960–1985	Cross-section / OLS 2SLS	Jain Fields	46/70 countries 1960–1985	Fiscal policy	Acceptance
Alesina and Perotti (1996)	71 countries 1960–1985	Cross-section / 2SLS	Jain Lecaillon	Income Share of the third and fourth quintiles	Sociopolitical unrest	Acceptance
Perotti (1993)	62 countries 1960–1985	Cross-section / OLS 2SLS	Jain Lecaillon	Income Share of the third and fourth quintiles	Credit market imperfection	Ambiguous
Perotti (1993)	49/27 countries 1960–1985	Cross-section / OLS 2SLS	Jain Lecaillon	Income Share of the third and fourth quintiles	Fiscal policy	Rejection
Perotti (1993)	64 countries 1960–1985	Cross-section / OLS 2SLS	Jain Lecaillon	Income Share of the third and fourth quintiles	Sociopolitical unrest	Acceptance
Deininger and Squire (1998)	73 countries 1960–1988	Panel /WLS and OLS	Deininger and Squire	Gini coefficient of Income and Land	Fertility	Acceptance
Deininger and Squire (1998)	52/81 countries 1960–1992	Cross-section / OLS	Deininger and Squire	Land Gini coefficient	Credit market imperfection	Acceptance
Svensson (1998)	101 countries 1960–1985	Cross-section/ OLS	Paukert	Income Ratio between the share of income by the poorest 40% to the richest 20%	Socio-political unrest	Acceptance

Table A2. *(continued)*

Author(s)	Sample and period	Data structure and Method	Data used	Inequality Indicator	Channel	Results
Deininger and Olinto (1999)	31/60 countries 1966–1990	Panel / System GMM	Deininger and Squire (1996)	Land Gini coefficient	Credit market Imperfection and	Acceptance
Sylwester (2000)	52 countries 1960–1992	Cross-section/ 3SLS	Deininger and Squire (1996)	Income Gini coefficient	Fiscal policy	Acceptance (Short-term) Rejection (long-term)
Barro (2000)	84 countries 1965–1995	Panel / OLS	Deininger and Squire (1996)	Income Gini coefficient	Savings	Rejection
Odedokun and Round (2001)	35 countries 1960-1990	Panel /OLS	WIDER/ UNDP	Gini coefficient and income shares	Savings and Fiscal policy	Rejection
Odedokun and Round (2001)	35 countries 1960-1990	Panel /OLS	WIDER/ UNDP	Gini coefficient and income shares	Credit market imperfection, Fertility, and Sociopolitical unrest	Acceptance
Keefer and Knack (2002)	56/89 countries 1970–1992	Cross-section/ OLS	Deininger and Squire	Income Land Gini coefficient	Sociopolitical unrest	Acceptance
Nel (2003)	25 countries 1986–1997	Panel /OLS	WIDER/ UNDP	Gini coefficient and income shares	Sociopolitical unrest	Rejection
De La Croix and Doepke (2003)	68 countries 1960–1992	Panel /GMM	Luxembourg	Gini coefficient	Fertility	Acceptance
Iradian (2005)	82 countries 1965–2003	Panel / Fixed Effect and GMM	World Development Indicators (WDI)	Gini coefficient	Credit market imperfection	Acceptance (in the long run) Rejection (in the short to medium run)
Pineda and Rodrguez (2006)	N/A 1960–1997	Panel/ Random effects	N/A	N/A	Fiscal policy	Acceptance

Table A2. *(continued)*

Author(s)	Sample and period	Data structure and Method	Data used	Inequality Indicator	Channel	Results
De Mello and Tiongson (2006)	54 countries 1981–1998	Cross-section/ OLS Tobit	UNU-WIDER	Income Gini coefficient	Fiscal policy	Acceptance
Mo (2009)	N/A 1970–1985	Panel/ 2SLS	Deininger and Squire	Income distribution polarization	Sociopolitical unrest	Acceptance
Castelló-Climent (2010)	108 countries 1960–2000	Panel /System GMM and OLS	(WIID)	Gini coefficient of Income, and Human capital	Fertility	Acceptance (in low- and middle-income countries) Rejection (in higher-income countries)
Babu et al. (2016)	29 countries 1980–2010/1999–2008	Panel/ GMM	SWIID	Gini coefficient	Fiscal policy	Acceptance
Chletsos and Fatouros (2016)	126 countries 1968–2007	Panel/ Fixed Effects, GMM, and 2SLS	PWT 8.1	Theil index	Fiscal policy and Human capital	Rejection
Castells-Quintana and Royuela (2017)	51 countries 1970/2007	Control Function Approach (CFA)	WIID	Gini coefficient	Fertility and Sociopolitical Unrest	Acceptance
Berg et al. (2018)	130 developed and developing countries 1960–2010	Panel /System GMM	SWIID	Gini coefficient	Fertility, Sociopolitical Unrest, and Human capital	Acceptance
Gründler and Scheuermeyer (2018)	192 countries 1960 / 2014	Panel /System GMM	SWIID	Gini coefficient	Fiscal policy, Credit market imperfection, and Fertility	Acceptance

Table A2. *(continued)*

Author(s)	Sample and period	Data structure and Method	Data used	Inequality Indicator	Channel	Results
Madsen et al. (2018)	21 OECD countries 1970/2011	Panel/ 2SLS		Gini coefficient and Top 10% income shares	Credit market imperfection	Acceptance(The negative impact is more severe in countries with less developed financial markets)
Le and Nguyen (2019)	Vietnam's Cities 1998 /2016	Panel/ 2SLS, Fixed effects, and OLS	General Statistic Office of Vietnam	Gini coefficient and Income ratio between the top and bottom quintiles.	Credit market imperfection and Fertility	Acceptance
Čiegis and Dilius (2019)	28 developed countries 1995/2014	Panel/ OLS	Eurostat	Gini coefficient	Credit market imperfection and Fiscal policy	Ambiguous
Odusanya and Akinlo (2020)	31 Sub-Saharan Africa (SSA) countries 1995/ 2015	Panel /Two-step System GMM	SWIID	Gini coefficient	Credit market imperfection, Fiscal policy, Fertility, Sociopolitical unrest, Human capital, and Savings	Acceptance for all except the human capital channel
Topuz (2022)	143 countries	Panel / Fixed and random effects, 2SLS, and GMM	SWIID	Gini coefficient	Credit market imperfection, Fertility, Sociopolitical unrest, and Savings	In developing countries, only the Fertility channel is accepted, while in developed countries, only the Sociopolitical Unrest and Savings channels are accepted; the Credit Market Imperfection channel is rejected in both.

Table A2. *(continued)*

Author(s)	Sample and period	Data structure and Method	Data used	Inequality Indicator	Channel	Results
(Shen and Zhao, 2023)	167 countries 1950 / 2020	Panel /System GMM	SWIID	Gini coefficient	Fertility, Human capital and Sociopolitical Unrest	Acceptance of human capital and Sociopolitical unrest channels at low-income levels.

Note: taking inspiration from Neves and Silva (2014), this table summarizes the key findings of pertinent empirical research testing the validity of different transmission channels that influence inequality - growth relationship.
Source: Author's elaboration.