

DOKUZ EYLÜL UNIVERSITY
GRADUATE SCHOOL OF SOCIAL SCIENCES
DEPARTMENT OF ECONOMICS (ENGLISH)
ECONOMICS PROGRAM
DOCTORAL THESIS
Doctor of Philosophy (PhD)

THE CHANGING ROLES OF GOVERNMENT ON
INCOME DISTRIBUTION

Muhammet Fatih ELÇİN

Supervisor
Prof. Dr. Yeşim ÜÇDOĞRUK GÜREL

2024

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DECLARATION

I hereby declare that this doctoral thesis titled as “The Changing Roles of Government on Income Distribution” has been written by myself in accordance with the academic rules and ethical conduct. I also declare that all materials benefited in this thesis consist of the mentioned resources in the reference list. I verify all these with my honour.

Date

23/10/2024

Muhammet Fatih ELÇİN

ABSTRACT
Doctoral Thesis
Doctor of Philosophy (PhD)
The Changing Roles of Government on Income Distribution
Muhammet Fatih ELÇİN

Dokuz Eylül University
Graduate School of Social Sciences
Department of Economics (English)
Economics Program

Economic inequality is a multifaceted issue encompassing income disparities and social and political dimensions. It creates a vicious cycle, leading to and worsening many societal problems. Given the severity of its consequences, the urgency of addressing economic inequality becomes clear. This thesis aims to explore the causes of economic inequality and propose potential solutions to mitigate its harmful effects. It makes a unique contribution to the literature by modeling the state's dependency on pluralistic societal demands and capital, where these forces exert opposing influences on the state. To understand the dynamics of economic inequality, it is crucial to evaluate how societal demands affect the state and how capital shapes the state's role.

The thesis is composed of three chapters. The first chapter begins by questioning why economic inequality is a problem. It examines the trajectory and current state of economic inequality over the past 40 years, followed by a review of solutions proposed in the existing literature. This chapter also addresses economic inequality from institutionalism and market opposition perspective, questioning whether the drive to have more or the concept of justice that matters most. The second chapter builds on the market and institutional dichotomy discussed in the first chapter by presenting a theoretical model that includes financial intermediaries and the state, highlighting the potential impact of the financial system on economic inequality. According to the model, the financial system can positively affect income distribution only if it does not reduce the size

of the state. The third chapter empirically investigates the relationship between financial development, income inequality, and government policies by building on the theoretical model presented in the second chapter. Initially, an analysis of 63 countries where country-specific effects are controlled reveals a positive relationship between financial development and income inequality from 1980-2019. Following this, a more comprehensive analysis for 168 countries is conducted using static and dynamic panel data methods such as fixed effects and the difference Generalized Method of Moments. Subsequently, the 168-country sample is divided into developed and developing economies, and separate analyses are applied to capture the distinct dynamics of each group. In the samples covering all countries and developed countries, financial development negatively impacts income inequality when the size of the government is controlled. However, no significant relationship exists between financial development, government, and income inequality in developing countries. When developing countries are excluded, the empirical results align with the theoretical model, suggesting that the interaction between the financial system and the state is critical in shaping income distribution.

Keywords: Economic Inequality, Government Size, Financial Development, General Equilibrium Models, Empirical Analysis.

ÖZET

Doktora Tezi

Devletin Gelir Dağılımında Değişen Roller

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Ekonomik eşitsizlik, sadece gelir eşitsizliklerini değil, sosyal ve politik boyutları kapsayan çok yönlü bir sorundur. Bu olgu, birçok toplumsal soruna yol açan ve onları kötüleştiren bir kısır döngü yaratır. Sonuçlarının ciddiyeti göz önüne alındığında, ekonomik eşitsizliği ele almanın aciliyeti açıkça ortaya çıkar. Bu tez, ekonomik eşitsizliğin nedenlerini araştırmayı ve zararlı etkilerini azaltmak için çözümler önermeyi amaçlamaktadır. Bu çalışma, devletin çoğulcu toplumsal talepler ve sermayeye olan bağımlılığını modelleyerek literatüre özgün bir katkı sağlamaktadır; bu güçler, devlet üzerinde zıt yönde etkiler göstermektedir. Ekonomik eşitsizliğin dinamiklerini anlamak için, toplumsal taleplerin devleti nasıl etkilediğini ve sermayenin devletin rolünü nasıl şekillendirdiğini değerlendirmek gerekmektedir.

Tez üç bölümden oluşmaktadır. İlk bölüm, ekonomik eşitsizliğin neden bir sorun olarak tanımlanması gerektiğini sorgulayarak başlar. Ekonomik eşitsizliğin son 40 yıldaki seyrini ve mevcut durumunu ele alır, ardından mevcut literatürde önerilen çözümleri inceler. Bu bölüm ayrıca, ekonomik eşitsizlik sorununu, kurumsalcılık ve piyasa arasındaki karşıtlık perspektifinden ele alarak, daha fazlasına sahip olma dürtüsünün mü yoksa adalet kavramının mı daha önemli olduğunu sorgular. İkinci bölüm, birinci bölümde tartışılan piyasa ve kurumsal ikiliği temel alarak finansal araçları ve devleti içeren teorik bir model sunar ve finansal sistemin ekonomik eşitsizlik üzerindeki potansiyel etkisini vurgular. Modele göre, finansal sistem, devletin boyutunu küçültmediği takdirde gelir dağılımını olumlu yönde etkileyebilir. Üçüncü bölüm, ikinci

bölümde sunulan teorik modeli temel alarak, finansal gelişme, gelir eşitsizliği ve devlet politikaları arasındaki ilişkiyi ampirik olarak incelemektedir. İlk olarak, ülkeye özgü etkilerin kontrol edildiği 63 ülkeyi kapsayan bir analiz, 1980-2019 yılları arasında finansal gelişme ile gelir eşitsizliği arasında pozitif bir ilişki olduğunu ortaya koymaktadır. Bu analizlerin ardından, 168 ülkeyi kapsayan daha kapsamlı bir analiz, sabit etkiler ve fark Genelleştirilmiş Momentler Yöntemi gibi statik ve dinamik panel veri yöntemleri kullanılarak gerçekleştirilmiştir. Sonrasında, 168 ülkelik örneklem gelişmiş ve gelişmekte olan ülkeler olarak ikiye ayrılmış ve her iki grubun kendine özgü dinamiklerini anlayabilmek için analizler ayrı ayrı da uygulanmıştır. Tüm ülkeleri ve gelişmiş ülkeleri kapsayan örneklemelerde, devletin boyutu kontrol edildiğinde, finansal gelişmenin gelir eşitsizliğini olumsuz etkilediği görülmektedir. Ancak, gelişmekte olan ülkeler için finansal gelişme, devlet ve gelir eşitsizliği üçgeninde anlamlı bir ilişki bulunamamıştır. Gelişmekte olan ülkeler dışarıda bırakıldığında, ampirik sonuçlar teorik model ile örtüşmekte ve benzer bir dinamiği işaret ederek, finansal sistem ile devlet arasındaki etkileşimin gelir dağılımını şekillendirmede kritik bir rol oynadığını göstermektedir.

Anahtar Kelimeler: Ekonomik Eşitsizlik, Devletin Boyutu, Finansal Gelişme, Genel Denge Modelleri, Ampirik Analiz.

THE CHANGING ROLES OF GOVERNMENT ON INCOME DISTRIBUTION

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ABBREVIATIONS

BGP	Balanced Growth Path
Congo, Dem. Rep.	Congo Democratic Republic
Congo, Rep.	Congo Republic
COVID-19	Coronavirus Disease 2019
EITC	Earned Income Tax Credit
et. al.	et alia (Latin for “and others”)
FRD	Financial Reforms Database
FDI	Financial Development Index
GDP	Gross Domestic Product
GFDD	Global Financial Development Database
GMM	Generalized Method of Moments
OLS	Ordinary Least Squares
PWT	Penn World Table
SWIID	Standardized World Income Inequality Database
UK	United Kingdom
USA	United States of America
WDI	World Development Indicators
WID	World Inequality Database

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INTRODUCTION

Economic inequality is a fundamental factor underlying social unrest and revolutions. These upheavals and revolutions are in constant motion and interact, making economic inequality a shaping force for societies from the past to the present. It is argued that three fundamental problems are at the core of economics: What to produce? How to produce? Who gets what? While all three questions are essential, the question of “*Who gets what?*” is distinct because it directly raises issues of equity and fairness, making it particularly challenging to address, especially in the context of economic inequality. This question is often explained in contemporary economics education through the concept of marginal productivity. The idea that people earn based on their contributions, as captured in the phrase “*You reap what you sow,*” doesn’t fully explain today’s complex inequalities. However, economic inequality can be explained by factors beyond an individual’s control, such as inheritance, talent, education, social networks, geographic location, and access to opportunities. People are aware of these factors beyond their control when claiming their share of what is produced, and this awareness leads them to believe that there is more to their claim than the marginal productivity argument. This distribution issue is a significant problem because there is no precise measure of who deserves what and to what extent.

Shifting the distribution problem beyond the marginal productivity argument brings a significant issue: the notion of *merit* or *fair share*, which can be measured through marginal productivity, becomes much more challenging to quantify. This measurement problem is one of the fundamental reasons underlying the issue of inequality. To address this, participation has come to the forefront. The state is the executor of participatory solutions. Suppose the state is a strong actor or economic entity in an economy. In that case, the measurement of economic activities can be established, and while this measurement may not be perfect, it creates a sense of justice. In other words, even though the state’s intervention may not ensure complete or absolute justice, it at least provides a sense of social fairness.

Like hunger, poverty might seem like a relatively simple social issue to address. Just as feeding the hungry can solve the immediate hunger problem, alleviating poverty often involves straightforward interventions, such as providing

basic resources. However, economic inequality is a far more complex issue. Inequality cannot be approached with the same simplicity as poverty. For example, if two equally needy individuals are treated unequally—one is fed while the other is not—this can spark a sense of injustice, leading to broader social unrest. Unlike poverty, economic inequality cannot be resolved merely by redistribution or direct interventions; it requires understanding the social and political forces that drive it. Additionally, the concept of who “deserves” what is highly subjective as it varies greatly from person to person, further complicating efforts to address inequality in a fair and universally accepted way. Failing to address these underlying dynamics can unlock a range of other societal issues.

In this context, the theoretical model presented in this thesis provides a framework for understanding economic inequality in a more nuanced way. With this theoretical model, this thesis fills a gap in the literature by modeling the state’s dependency on both societal demands for equality and the forces of capital, and examining how these competing forces shape economic inequality. Piketty and Zucman (2014) have highlighted the rise of *unfettered capital* since the 1980s and its role in deepening economic inequality. Building on this, the thesis introduces a new argument: that unfettered capital, by its very nature, exerts pressure on the state to shrink, limiting its ability to intervene in the market and redistribute wealth. This forms a crucial part of understanding how economic inequality is sustained. This thesis’s unique contribution is its theoretical model, which demonstrates how the state is simultaneously influenced by two powerful but opposing forces: the demands of capital, which favor a smaller state with minimal market interference, and societal demands for equality, modeled through the median voter theorem based on Meltzer and Richard (1981). These societal demands push for a more interventionist state. Both forces believe their claims are just, and they push the state in opposite directions. The model illustrates how economic inequality evolves in an economy where the state is passive and constrained by these competing pressures.

This thesis’s theoretical model provides a deeper explanation of how financial development can exacerbate inequality, particularly when it leads to a smaller state that is less capable of redistributing wealth. Empirical results support these theoretical insights: financial development increases inequality when it weakens the state’s size

and influence, a pattern observed in developed countries. The results for developing countries are less clear, as a significant relationship between financial development and inequality was not found. Nonetheless, when focusing on the global sample, the evidence also aligns with the theoretical model, reinforcing the idea that the interaction between the financial system and the state plays a crucial role in shaping income distribution.

This thesis is divided into three main chapters. The first chapter opens with an inquiry into the reasons behind the persistent nature of economic inequality. It then traces the development of economic inequality over the past four decades, evaluates its current status, and assesses the various solutions presented in the literature to tackle it. The chapter then delves into economic inequality, examining it through the conflicting perspectives of institutional frameworks and market forces. At this point, the research questions that guide this thesis emerge clearly: Is the drive for material accumulation more influential than the pursuit of justice? Are financial markets accessible only to a privileged elite? If so, is there an institutional power capable of addressing this inequality, or does financial development exacerbate the problem? These research questions form the foundation of the inquiry: How and under what conditions does financial development increase or decrease income inequality through the influence of capital on the state?

The theoretical model and empirical findings have been briefly introduced to highlight the thesis's unique contribution. However, presenting the second and third chapters in more detail is essential, where these key arguments are thoroughly developed. In this context, the critical research questions raised in the first chapter are addressed theoretically in the second chapter. The second chapter builds on the dichotomy between markets and institutions discussed in the first chapter by presenting a theoretical model that includes financial intermediaries and the state, highlighting the potential impact of the financial system on economic inequality. According to the model, the financial system can only positively affect income distribution if it does not reduce the state's size. Specifically, in an economy where economic inequality exists, the state cannot remain indifferent to the pluralistic demands of the public to reduce this inequality. However, the endogenous tax rate, part of the internal mechanism, is not independent of the financial intermediary

representing the financial system that develops and grows with capital. Furthermore, the endogenous tax rate is negatively related to the productivity of the financial intermediary representing the financial system. In this context, the state, responding to the pluralistic demands of the public, depends on capital. Therefore, financial development is associated with increasing economic inequality.

The third chapter provides a detailed empirical analysis of the relationship between financial development, income inequality, and government policies. Building on the theoretical discussions from the previous chapter, this section presents empirical evidence exploring how financial development interacts with the government's size to shape income distribution. The analysis begins with a study of 63 countries (20 persistently developed and 43 persistently developing) from 1980 to 2019. These countries were chosen because they consistently remained in the same income category (developed or developing) over the entire period, making them ideal for examining long-term trends in the relationship between financial development and inequality. Using a fixed effects model to control for country-specific effects, the analysis of these two economic extremes reveals a positive relationship between financial development and income inequality, suggesting that as financial development progresses, inequality tends to increase. This finding aligns with the theoretical model, which proposes that financial development exacerbates inequality when the state's capacity to regulate and intervene is constrained. Following this, a more comprehensive analysis is conducted using static and dynamic panel data estimation methods, including fixed effects and the difference GMM, for a broader sample of 168 countries. This sample includes all countries with accessible data from 1980 to 2019, offering a more complete picture of the global financial development-inequality nexus. The sample is further divided into two subsamples consist of 101 developed and 67 developing economies to capture the distinct dynamics within each group, providing a more nuanced understanding of how financial development impacts income inequality across different economic contexts. For the global sample, the results consistently indicate that financial development increases income inequality, particularly when government size is controlled. This trend is especially pronounced in developed countries, where financial development benefits the wealthy more than lower-income groups, reinforcing existing income disparities. In contrast, the results

for developing countries are less conclusive. Financial development in these economies does not show a significant direct correlation with income inequality. This lack of clear patterns may stem from weaker institutional frameworks or data limitations, making it difficult to draw firm conclusions about how financial development interacts with inequality in these regions. Overall, the findings emphasize the complex dynamics of financial development and inequality, particularly highlighting the crucial role of strong institutions and governance in mitigating the adverse effects of financial development.

This thesis is far from an ambitious stance on solving economic inequality. However, it embodies a serious effort to understand the issue of economic inequality. The three distinct chapters in this thesis collectively serve a unified purpose: Economic inequality is a severe and persistent problem. Pluralistic solutions are essential for addressing this issue. Still, it is crucial to acknowledge that states implementing these solutions may be passive in the face of markets, which are arguably not entirely independent of intervention. Building on this premise, this thesis aims to comprehensively analyze economic inequality by examining theoretical and empirical perspectives on how financial systems and the size of government affect income distribution. It provides a theoretical explanation for the conditions under which financial development can either mitigate or worsen economic inequality and demonstrates empirically that this theoretical explanation holds. By doing so, the thesis aims to significantly contribute to the broader discourse on economic disparities, offering insights that can inform academic research and practical policymaking.

CHAPTER ONE

UNDERSTANDING INEQUALITY: HISTORICAL, SOCIAL, AND POLITICAL PERSPECTIVES

1.1. INTRODUCTION

Inequality can take many forms, from economic to social and political, and the consequences of inequality can be profound and far-reaching. A wide range of damaging outcomes of inequality can be mentioned, such as low social mobility, high crime rates, limited access to education and healthcare, political instability, social unrest, and lower economic growth (Atkinson, 2015; Blanchard and Rodrik, 2021; Piketty et al., 2022; Stiglitz, 2012). The intricate web of social and economic factors contributing to these disparities highlights that the reasons perpetuating social and economic inequality are deeply rooted in societal structures and economic systems. Instances like characterizing societies with rigid social hierarchies and unequal land distribution, resources, and means of production can exemplify these reasons (Acemoglu and Robinson, 2013; Piketty, 2020). All the issues stemming from inequality, whether explicitly addressed or not in this context, significantly impact individuals' quality of life and the destiny of societies. The fact that individuals are born, live, or try to survive within certain social classes or castes that determine their privileges, rights, and opportunities in these societies has caused inequality to persist¹. As an autonomous issue since its inception, inequality has fostered the emergence of institutions like slavery and patriarchy while also restricting access to education and information to specific groups. In essence, inequality has undermined concepts of fairness and justice in meeting basic needs.

As one of the most persistent challenges human societies face, inequality has manifested in various forms. This implies that, rather than undergoing significant transformations, the fundamental nature of inequality persists, adapting to the prevailing societal structures and instruments of each era. In recent decades, wars, globalization, technological change, and shifting political and economic systems have

¹ Milanovic (2016: 126-166) draws attention to this situation, which he defines as "Citizenship Rent". He states that where a person was born and lived is important because two-thirds of people's lifetime income is determined by where they live.

led to a widening gap between the rich and poor in many countries worldwide². These phenomena, shown as the source of inequality today, are not independent of individuals and societies. Understanding the root causes of inequality can contribute to developing more effective strategies for reducing it.

Historically, the extent to which factors causing inequality are independent of human intervention remains controversial (Atkinson, 2015; Piketty, 2020; Fukuyama, 2011; Schidel, 2017). The prevailing notion is that market dynamics, seemingly influenced by technological developments, resource scarcity, global climate change, and natural disasters, contribute to social inequality through supply and demand dynamics. However, it is equally contentious to what extent these dynamics are independent of human influence, as market dynamics are subject to intentional human interventions. As technology is not “given,” factors affecting market dynamics, such as global climate change and resource scarcity, are not independent of human intervention. This underscores the recognition that the state, as another means of human intervention, plays a pivotal role in shaping and addressing inequality. Governments directly or indirectly influence market dynamics through policies and actions and contribute to a more equitable distribution of resources and opportunities (Stiglitz, 2012). Thus, the state serves as a crucial instrument through which society can shape its economic landscape, emphasizing the interconnectedness of human agency and institutional structures in addressing societal disparities. In modern economies, the government sets and enforces the rules of the game, sometimes overtly and sometimes more covertly, allocating resources and shaping income distribution through tax policies and social spending. Apart from deciding tax obligations and penalties for non-compliance, the state’s role extends to regulating various legal relations between the government and its citizens. Even when debts and creditors are involved, the state sets the limits and controls financial transactions within its jurisdiction. Besides establishing the criteria for individuals’ access to social necessities such as education, health, and security, the government influences the extent to which a person’s inheritance is affected by their parents, thereby playing a crucial role in shaping societal structures and dynamics. The state’s pervasive

² According to Atkinson (2015) and Piketty and Zucman (2014), incidents like world wars, economic crises, the gradual repealing or introduction of anti-capital policies, etc., determine the course of inequality in the 20th and 21st centuries.

influence spans multiple dimensions, from overseeing legal relations and financial transactions to shaping access to social necessities and influencing intergenerational aspects³.

One of the areas where human intervention can be the most complex is the field of financial economics. Financial systems play a vital role in a free-market economy, representing the principles of competition, freedom, and minimal state intervention advocated by free-market supporters. Financial markets are particularly influential in countries where the free-market economy thrives, as these countries typically impose less regulation, allowing financial markets to operate with greater freedom (Friedman, 1962). However, excessive freedom in financial markets can result in financial crises, market manipulation, and income inequality (Greenwood and Jovanovic, 1990; Galor and Zeira, 1993). Therefore, it is essential to position the financial system with the government and strike a balance. While financial markets are crucial to a free-market economy, government oversight and regulation are also necessary to prevent excesses and problems. This approach preserves the advantages of a free-market economy while keeping its negative aspects in check.

In the intricate web of societal dynamics, it is crucial to recognize that the forces shaping the state and the market are not independent of inequality; instead, a mutual causality exists. In simpler terms, where there is inequality, the influences on the state and the market tend to perpetuate and, in some cases, exacerbate disparities. So, how do we combat these entrenched disparities? The key lies in acknowledging the power of the majority. Democracy, as a fundamental institution, proves that the voice and collective will of the majority cannot be ignored. By strengthening democratic principles, promoting inclusive governance, and ensuring equal representation, we pave the way to address and rectify societal inequalities. Essentially, the answer to fighting disparities is empowering the majority through democratic processes. Social and economic conditions play a significant role in determining individuals' positions within income distribution. However, it is essential to note that inclusive institutions, driven by a sense of justice, can yield positive outcomes beyond merely addressing adverse effects. An exemplary instance of this phenomenon is

³ Stiglitz (2012:82) expresses this situation more technically: People's physical and human capital endowments, which affect inequality, are passive against the government.

governments' responsiveness to address inequality-related issues. Democracy encourages governments to recognize and react to inequality and implement various social and economic policies to reduce disparities. States that cannot remain indifferent to the demand for democracy implement policies that will solve the problem of inequality, such as progressive tax reforms that require the rich to contribute proportionately more, increased investments in education and health services to provide equal opportunities, and labor market regulations that protect the rights of employees (Alesina and Rodrik, 1994; Persson and Tabellini, 1994). Furthermore, democracy fosters an environment where individuals from all backgrounds can participate in decision-making processes and advocate for their needs. These efforts collectively contribute to more equitable societies and counteract the perpetuation of inequality, allowing for broader social well-being and sustainable development (Lipset, 1959; Lenski, 1966; Meltzer and Richard, 1981, 1983; Saint-Paul and Verdier, 1993; Simpson, 1990; Gradstein and Milanovic, 2021). As a result, it would be misleading to claim that inequality is subject to a constantly self-reinforcing process. In recent decades, notable progress has been made in addressing global inequality, signifying a positive trajectory compared to historical benchmarks. It is argued in the literature that indicators of well-being, access to education, and overall quality of life have significantly improved, contributing to a more egalitarian global landscape (Pinker, 2021)⁴. While challenges persist, acknowledging these advancements provides a nuanced perspective on the ongoing efforts to reduce inequality and enhance societal well-being. In this context, governments will remain responsive to the imperative of addressing inequality, challenging the notion that inequality is a self-reinforcing process.

This thesis asserts that inequality is intricately shaped by political power dynamics and economic factors, aiming to illuminate the nuanced interplay between these elements. Critics have pointed out the limitations of assessing economic inequality solely through income metrics and poverty measures (Sen, 1999). This critique is grounded in the belief that an exclusive focus on income disparities

⁴ It is necessary to be cautious when accepting progress about income inequality. While inter-country inequality tends to follow an Ω -shaped curve, indicating initial improvement followed by worsening, intra-country inequalities often follow a U-shaped curve, where inequality initially decreases but then rises again (Pinker, 2021; Atkinson, 2015).

overlooks a broader spectrum of factors influencing inequality, including health disparities, limited access to education services, and social exclusion. This thesis endeavors to unravel the intricate nature of economic inequality, surpassing conventional income measurements to encompass broader well-being and societal involvement issues. The study aims to delve into the root causes of economic inequality and proposes more comprehensive and effective measures to alleviate it.

Given its profound social implications, this study first concerns understanding the reasons behind economic inequality. The significance of this inquiry becomes apparent when it is considered that many factors contributing to inequality are either artificial or within human control. Thus, defining inequality as merely “participating in the flow” is inadequate. The potential for intervention in inequality lies within the purview of government policies (Scervini, 2012; Borck, 2007). Borck (2007) highlights that there will be a positive relationship between economic inequality and redistribution under certain conditions. The author emphasizes that if income increases in parallel with political power, there will be redistribution from poor to rich, not rich to poor. This underscores the importance of designing policies that counteract these dynamics by ensuring that redistributive efforts aim to reduce inequality rather than exacerbate it. Importantly, these interventions are not independent of the people’s demand for participation. This thesis introduces a comprehensive economic model designed to analyze the dynamics of economic inequality within a two-period general equilibrium framework, incorporating financial intermediaries. In this model, the state is a central actor, wielding its tax instrument to influence economic dynamics. What distinguishes this model is its incorporation of democratic principles by applying the median voter theorem. The median voter theorem, a cornerstone of democratic theory, posits that the median voter’s preferences in a distribution significantly impact policy outcomes (Meltzer and Richard, 1981). In the theoretical model, the state leverages this democratic principle in tax determination. Specifically, the government assesses the needs and preferences of individuals and allocates tax revenues accordingly, giving considerable weight to the demands of the median voter. This intricate interplay between democratic decision-making and economic policies forms the crux of our theoretical model. The state’s tax decisions, driven by the median voter’s preferences, shape the economic landscape over two periods. Incorporating financial intermediaries

adds another layer to the model, as these entities are vital in allocating economic resources and capital. By examining the interactions between the state, the median voter, and financial intermediaries, this thesis seeks to unravel how economic inequality evolves in such a dynamic and democratic economic environment. Through rigorous analysis and simulations, the study aims to provide insights into the nuanced mechanisms through which democratic decision-making, mediated by the median voter theorem, interacts with tax policies and financial intermediation to influence the trajectory of economic inequality in a two-period general equilibrium setting. As a first step towards examining the intricate relations impacting inequality, this thesis section presents statistical evidence of the effects of financial markets and the government on wealth and income inequality. This evidence highlights the importance of government intervention in reducing inequality, recognizing it as a social problem. The rest of the chapter is divided into three parts: Economic Dynamics: Income Inequality, Financial Development, and Government Size - presenting valuable and unique tools for revealing income inequality within countries; Literature Review - discussing empirical and theoretical studies related to the subject; and Conclusion.

1.2. ECONOMIC DYNAMICS: INCOME INEQUALITY, FINANCIAL DEVELOPMENT AND GOVERNMENT SIZE

“The available economic statistics are our main window on economic behavior. In spite of the scratches and persistent fogging, we cannot stop peering through it and trying to understand what is happening (Griliches, 1986: 1509).” This compelling quote summarizes the essence of the motivation that gave rise to this section. Despite its flaws and limitations, economic data remains a crucial tool for understanding economic behavior.

Exploring the intricacies of economic dynamics, attention shifts to the interplay between financial development, state interventions, and the trade-offs between growth and economic equality. The post-1980 era signals a discernible shift in the state’s approach to market inequalities, with decreased state capital controls (Piketty and Zucman, 2014; Alvaredo et al., 2018). This period aligns with the notion that a more interventionist government negatively impacts free markets and economic growth

(Kaldor, 1957; Kuznets, 1955; Benhabib, 2003), indicating a preference for equality over economic growth. The state's role in shaping market dynamics is crucial in this narrative. Post-1980, certain instances witnessed a relaxation of state controls over capital, ushering in an era of financial development characterized by market innovations. This section queries whether the state's withdrawal from strict controls or the move toward freer markets translates into better economic performance. Exploring the impact of financial development, the inquiry questions whether they fostered a more inclusive economic environment or exacerbated existing disparities. The investigation also delves into how the state's stance influenced the delicate trade-offs between economic growth and equality. More precisely, the investigation delves into the consequences of giving up the bigger size government in the name of economic growth for the world countries (see Table 2). This examination aims to unravel the state's role in shaping the trajectory of market inequalities post-1980, contributing to a nuanced understanding of its impact on both the market and societal equality.

To unravel the dynamics of income inequality, this section delves into the evolution of income disparities within nations over the past four decades. This investigation hinges (is based) on a critical debate: Do market-driven policies, premised on the belief that inequalities will self-correct within free markets, hold the key to addressing the issue of economic inequality? Alternatively, does the state wield a more substantial influence in ameliorating inequality? This section endeavors to answer these questions by analyzing empirical data and trends in income distribution. By doing so, the aim is to shed light on the efficacy of market-based approaches versus state-driven interventions in the context of income inequality. The historical trends and recent shifts in income distribution patterns are examined to begin this journey, and the causes and consequences of these shifts are explored.

This section utilizes data from various reliable databases for empirical analysis. The exploration of financial development drew upon the comprehensive Global Financial Development Database (GFDD) of the World Bank⁵. The World Inequality

⁵ The Global Financial Development Database, compiled by the World Bank, offers comprehensive annual data of 108 indicators on financial system characteristics for 214 economies dating back to 1960. The latest update was in September 2022, covering data up to 2021 (World Bank, 2022; Cihak et al., 2012).

Database (WID) and SWIID version 9.4, known for their rich troves of data in this domain, are employed to dissect the intricacies (complexities) of within-country income inequality. In addition, Penn World Tables (PWT) version 10.01 is utilized to measure the share of government in national economies and to classify countries according to their income levels (Chancel et al., 2022; Fredrick, 2020; Feenstra et al., 2015).

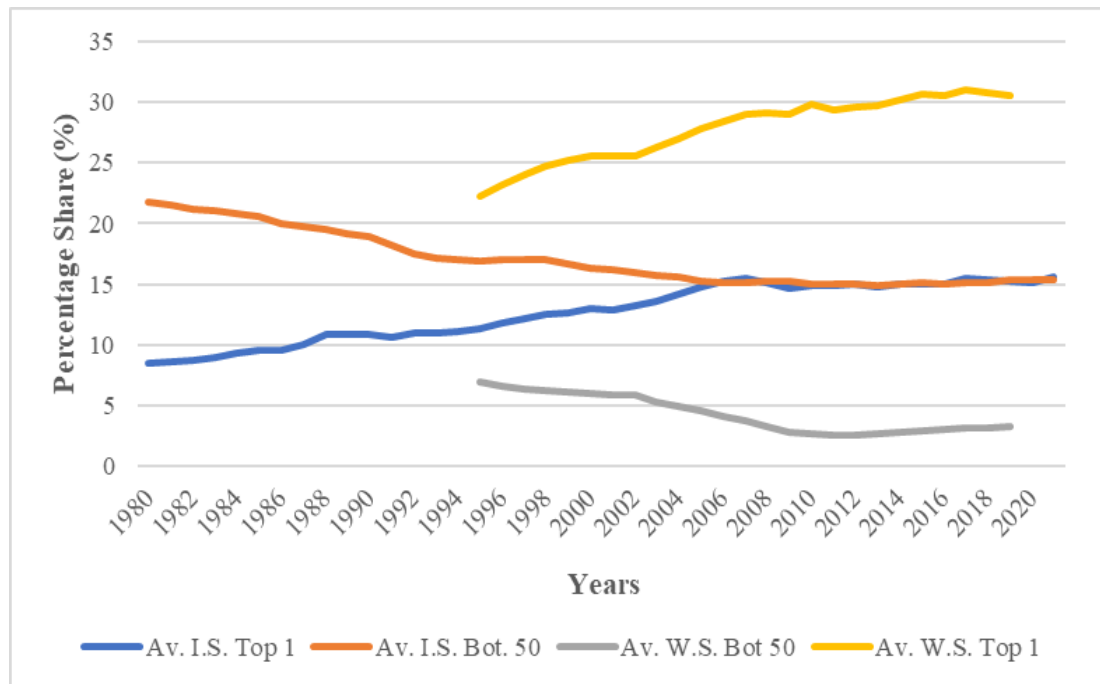
Before delving into the market-state dichotomy in detail, an overview of the global inequality landscape will be presented to give an idea of the magnitude of the problem. The general situation of inequality in the world is considered in terms of wealth and income; the picture shows very little evidence for a just world today. Drawing on Alvaredo et al. (2018) methodology and placing trust in the representation of the world by China, the USA, and Europe, Figure 1 illustrates that the period from 1980 to 2021 is favorable for the top one percent in terms of income share. However, the same period is equally dismal for the bottom fifty percent. According to the current data of the World Inequality Database, the share of the top one percent of people in the world increased from 8.5% to 15.6% between 1980 and 2021, while the share of the bottom fifty percent decreased from 21.8% to 15.4% in the same period. A similar picture exists for wealth inequality. In a case where the world is represented again by China, the USA, and Europe, the share of the top one percent of wealth in 1995 was 22.3%. This rate stands out as 30.6% in 2019. The share of the bottom fifty percent of wealth was 7% in 1995 and 3.3% in 2019⁶. Even if it is assumed that income is distributed equally among the bottom fifty percent, today, there is a difference of almost 51 times in income and nearly 464 times in wealth between the wealthiest and the poorest one percent of the world.

The period from 1980 to the present is worth examining in terms of focusing on the problem of inequality because Piketty and Zucman (2014) argue that capital markets operated without restrictions before World War I. Subsequently, anti-capital policies were implemented, suppressing asset prices until the 1970s, such as high

⁶ The World Inequality Database also presents data for the top one percent and the bottom fifty percent of the world (not just China, the USA, and Europe). If these data are taken as a basis, the income share of the top 1 percent between 1980 and 2021 varies between 17.5% and 19.5%. The income share of the bottom fifty percent increased from 6.2% to 8.1%. The ratio between the two indicators hovers around 250%. The top one percent's share of wealth remained stable at around 37% between 1995-2021. The share of the bottom fifty percent of wealth was 1.5% in 1995 and 1.9% in 2021.

income and inheritance taxes, rent control and nationalization, capital control, and foreign exchange restrictions (Piketty and Zucman, 2014; Frieden, 2006). The gradual removal of these policies from the 1980s onwards played a role in the resurgence of asset prices, resulting in higher inequalities in terms of income and wealth.

Figure 1: A Comparison of Wealth and Income Inequalities Between the Bottom 50% and Top 1% from 1980 to 2021



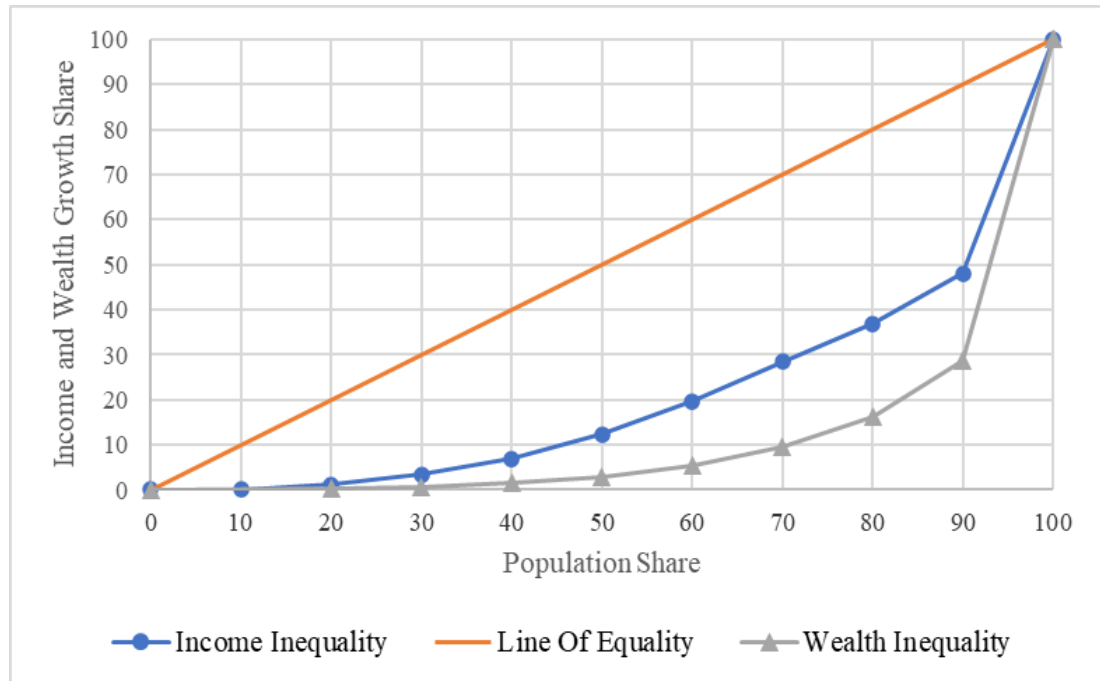
Source: Author's calculations based on the WID.

Atkinson's (2015:16-19) findings on income inequality in the United States, as detailed in his analysis using the Gini Coefficient and income shares of the top 1%, align with the trends presented in Figure 1. The author observed a significant rise in the Gini Coefficient since the 1980s and a remarkable increase in the income share of the top 1%.

Having explored the deterioration of income and wealth inequality, it is now crucial to shift the focus to a different aspect of economic inequality: inequality in the distribution of income growth. While income and wealth distributions shed light on time-specific inequalities in societies, examining the distribution of income growth

provides valuable information about how these inequalities will evolve. Figure 2 highlights the unequal distribution of income and wealth growth across population percentiles, enabling inferences to understand broader wealth and income inequality trends. This figure facilitates a sequential examination of growth distribution across different population percentiles over the four-decade period from 1980 to 2020. The horizontal axis represents the population percentiles, ranging from the lowest 10% to the highest 10%, while the vertical axis signifies the shares of income growth received by each percentile. Upon close examination, the figure reveals a stark inequality pattern in the income growth distribution. Notably, the bottom 10% of the population received a relatively modest share, approximately 0.12%, of the total income growth over this period. Moreover, the share of income the bottom 50% receives is 12.3%. In contrast, the top 10% get a substantial percentage, constituting nearly 52% of the overall income growth. This striking disparity in income growth allocation underscores the significant divide in how different segments of society participated in the economic advances of the past four decades. The figure is a visual representation of the unequal distribution of income growth, a critical facet of modern economic inequality. This empirical evidence sets the stage for subsequent discussions on the drivers and implications of this inequality in income growth. Turning to wealth inequality, the distribution exhibits a similar concentration pattern among the population percentiles. During 1995-2020, the top 10% of the global population received 71% of the total wealth increase, while the bottom 50% could not even get 3%. These findings emphasize inequality's stark and persistent nature, particularly within the upper income and wealth distribution echelons.

Figure 2: Lorenz Curve: Income Growth Distribution 1980-2020 and Wealth Growth Distribution 1995-2020



Source: Author's calculations based on the WID.

The likelihood that income and wealth growth shares will become equal across all percentiles in the foreseeable future remains somewhat limited. This assertion draws support from an extensive body of literature emphasizing income inequality's enduring and persistent nature (Piketty, 2014; Atkinson, 2015; Stiglitz, 2012; Milanovic, 2016; Saez and Zucman, 2014; Corak, 2013). While a more egalitarian world remains an aspiration, it is essential to acknowledge the formidable challenges and complexities inherent in addressing deep-rooted disparities. Pursuing greater income equality necessitates sustained effort and informed policies, recognizing that realizing this vision may prove elusive in practice. When examining simulations presented by Alvaredo et al. (2018) on the subject, it becomes evident that the inequality route followed by Europe is a more reasonable option to reduce global inequality. Otherwise, inequality is likely to increase if countries worldwide follow current inequality trends or the path taken by the United States. According to the authors, the differences between these simulations are more understandable when the

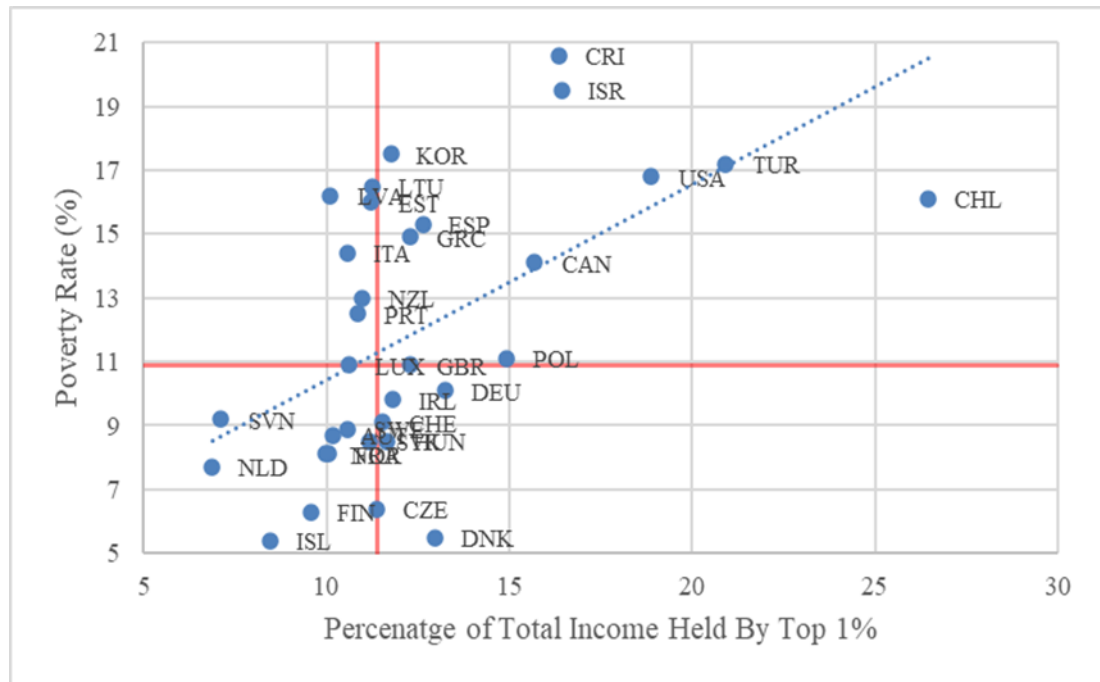
institutional differences between Europe and the USA are addressed. Europe's success can be attributed to progressive tax policies, equitable access to education, and robust labor market institutions (Alvaredo et al., 2018: 248-286). In Figure 2, income and wealth inequality between deciles is evident. However, the evidence reveals that inequality exists within these 10% segments. The concept is aptly illustrated by Atkinson (2015: 16-19), who likens inequality to a set of Matryoshka dolls, with each layer representing a different level of economic well-being⁷. In this context, when the upper echelons of income distribution are explored, particularly within the top 10 percent of the global population, it becomes evident that disparities are remarkably pronounced. Calculations indicate that even among this elite group, inequality remains substantial. Specifically, from 1980 to 2020, a significant 23% share of the total global income growth was captured by the top 1%. However, within this top 1%, an astonishing 47 percent of the income growth realized (acquired) by this group was claimed by the top 1 per thousand individuals. In other words, the top 1 in a thousand gets almost 11 percent of the total global income growth. These findings underscore the hierarchical and highly skewed nature of income growth, shedding light on the remarkable concentration of income among the most affluent individuals within the global elite. Wealth inequality is even more apparent; the top 1% captured 37% of global wealth growth from 1995 to 2020. Besides, the top 1 per thousand individuals claimed 62% of that wealth growth of 37%, almost 23% of the total. The purpose of depicting the income and wealth growth distributions across various income groups in Figure 1 and Figure 2 is to underscore the notion that once-established, inequalities tend to solidify over time. These visual representations were created to emphasize that these inequalities persist in their current progression without concerted political or institutional measures. The graphical illustration serves as a reminder that the existing disparities will continue along the same path unless proactive steps are taken.

⁷ Based on Atkinson's (2015) analysis, even within the top 1 percent, there are considerable inequalities. The top 1 percent of the top 1 percent (or the uppermost 0.01 percent) controls roughly one-fifth of the total income within this elite group. This means that 1 out of every 10,000 people receives 1 out of 25 units of total income. Atkinson (2015) compares this structure to Russian matryoshka dolls, where the distribution of income in the top echelons mirrors the same patterns of inequality across all layers, no matter how the income distribution is divided. The data from Figure 2, derived from the World Inequality Database, supports this matryoshka analogy.

Figures 1 and 2 shed light on the trajectory of inequality, revealing the status of income and wealth disparities over the past four decades and identifying the beneficiaries of income and wealth growth during this period. Notably, policies implemented since 1980 often prioritized economic growth (considering there is an inequality and economic growth trade-off) over addressing inequality (Alvaredo et al., 2018; Krugman, 1990; Forbes, 2000; Noah, 2012). In this context, it is worth considering that, despite rising inequality, a poverty reduction—the more profound concern—may lead to a greater willingness to tolerate policies to alleviate wealth disparities (Addison and Cornia, 2001). Following Atkinson (2015: 26), Figure 3 examines the hypothesis that high inequality and low poverty coexist. The trickle-down economy hypothesis posits that economic growth and prosperity will permeate society by incentivizing the wealthy to accumulate greater wealth (Stiglitz, 2012). Proponents argue that increasing the wealth of the rich can have positive implications for the broader economy and society (Deninger and Squire, 1996; Krugman, 1990). Figure 3 illustrates the relationship between income inequality and poverty⁸ across 33 OECD member countries in 2015. The figure reveals a discernible positive relationship between income inequality and the poverty rate. In countries where the top 1 percent holds a smaller share of income, poverty rates tend to be lower, while in countries where the top 1 percent controls a larger share, poverty rates are generally higher.

⁸ The poverty rate that is used to measure poverty, is defined as the proportion of individuals in a given age group whose income falls below half of the median household income of the total population.

Figure 3: Poverty vs Income Inequality for 33 OECD Countries

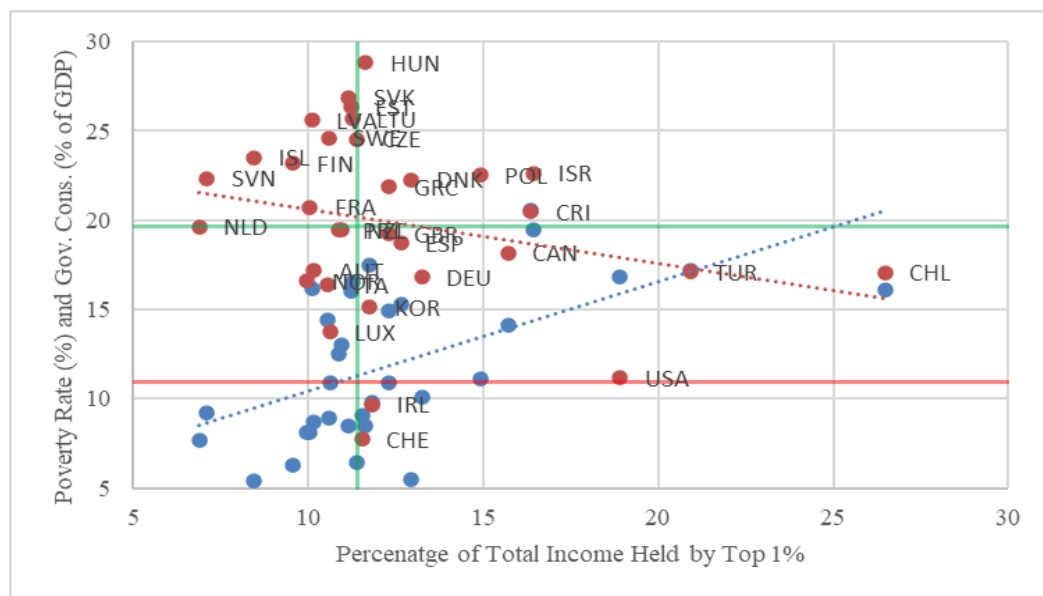


Source: Author's calculations based on the WID and OECD Database

Figure 3 depicts four distinct regions based on the median values along the axes of the poverty rate (10.9% in the United Kingdom and Luxemburg) and the income share of the top 1 percent (11.4% in the Czech Republic). Starting from the upper left, Region 1 represents a combination of high poverty rates and low inequality, while Region 2 indicates high levels of inequality and poverty. Region 3 represents low levels of both inequality and poverty, whereas Region 4 showcases low poverty rates alongside high inequality. Notably, the figure demonstrates that the density of countries is concentrated within the second and third regions comprising 19 countries. Ten countries, including the United States and Türkiye, exhibit high-income inequality and poverty rates (region 2). However, nine countries have low-income inequality and poverty (region 3). For five countries, the income shares of the wealthiest 1 percent exceed the median value, and the corresponding poverty rates fall below the median (region 4). Conversely, in six countries, the income shares of the wealthiest 1 percent fall below the median value, and the corresponding poverty rates exceed the median (region 1).

Building upon the acknowledgment that the state plays a crucial role in addressing economic and social challenges, particularly in fostering a more equal society, Figure 3 prompted a closer examination of the state's role in tackling inequality and poverty. Consequently, this exploration led to the emergence of Figure 4 as a means to delve into the intricacies of the state's intervention in the depicted challenges.

Figure 4: Poverty and Government Size vs Income Inequality for 33 OECD Countries



Source: Author's calculations based on the WID and OECD Database

Figure 4 provides a detailed analysis of Figure 3, incorporating government sizes. Red data points depict the percentages of GDP attributed to government consumption, corresponding to the income shares of the top one percent across the sampled countries. The figure is divided into four regions based on median values for government consumption share in GDP (19.6% in the Netherlands) and the income share of the top 1 percent (11.4% in the Czech Republic), represented by green horizontal and vertical lines. Beginning in the top left, Region 1 indicates a combination of high government consumption rates and low inequality. Region 2 signifies high inequality coupled with high government consumption rates. Region 3 showcases low levels of inequality and government consumption, while Region 4

displays lower government consumption rates and higher inequality rates. The figure reveals that country density is concentrated in the first (9 countries) and fourth (10 countries) regions, totaling 19 countries. Notably, ten countries, including the United States and Türkiye, exhibit higher income inequality and lower government consumption (region 4). Conversely, nine countries with lower income inequality and higher government consumption rates are located in Region 1. In Region 2, six countries have the top 1 percent's income share exceeding the median value and government consumption rates above the median. On the other hand, in Region 3, six countries depict income shares below the median for the top 1 percent and corresponding government consumption rates below the median.

Six countries are located in both figures' critical regions with unfavorable conditions (Region 2, characterized by higher inequality and poverty rates in Figure 3, and Region 4, marked by higher inequality and lower government consumption rates in Figure 4): Chile, Türkiye, USA, Canada, Spain, and Korea. The prospects are not promising for the residents of the countries positioned between the green and red horizontal lines in Figure 4, given that previous pieces of evidence in Figures 1 and 2 indicate that time is not a remedy for inequality.

Based on the prevailing trends of global inequality since 1980, as depicted in Figure 1 and Figure 2, it is evident that allowing inequality to persist does not lead to positive outcomes, as demonstrated in Figure 3. Nonetheless, as shown in Figure 4, the government can play a significant role in reducing income inequality and poverty indirectly. Several suggestions have been put forth to address these complex issues⁹. These encompass a spectrum of policy domains, ranging from social safety nets and educational initiatives to labor market dynamics, financial market development, and progressive taxation strategies (Jaumard et al., 2013; Doerrenberg and Teichl, 2013; Saez and Zucman, 2019). However, this thesis focuses on financial development and the state's role in income inequality. While various forms of inequality, such as wealth and consumption disparities, deserve attention, this thesis primarily focuses on income inequality¹⁰. This specialization is motivated by the theoretical model employed in this study, which provides unique insights into the dynamics of income inequality. Before

⁹ Detailed examinations of the extensive research about alleviating inequality will be thoroughly explored in the subsequent literature review section.

¹⁰ Differences regarding general types of inequalities will be discussed in the literature review section.

delving into the intricate relationships between these variables, comprehensively explaining the data sources and methodologies employed is imperative. It is important to note that in the ensuing graphs and analyses, data from countries across the globe are meticulously adjusted to ensure robust and accurate results.

One critical adjustment in this study involves categorizing countries based on their average GDP per capita from 1980 to 2019. This classification was essential to create more uniform and comparable samples for analysis. The data source employed for this purpose was the expenditure-side real GDP at chained PPPs (in mil. 2017 US\$) from PWT 10.01. The classification uses threshold income levels, predefined income thresholds set as multiples of the world average GDP per capita. This meticulous calibration process played a crucial role in ensuring that the subsequent analyses accurately capture the dynamics relating to financial development, the role of the state, and income inequality within these income groups.

Table 1 categorizes countries into various income groups according to their economic prosperity. This classification is based on each country's real GDP per capita (X) compared to the world average real GDP per capita ($\bar{y}_t$) for a given year (t). The thresholds for each income group are defined as multiples of the world average GDP per capita, providing a clear framework for this classification (Tumer, 2019; Kane, 2016).

Table 1: Economic Prosperity Categories by GDP per Capita

Income Group	Threshold Income Level
The Top Class	$2 * \bar{y}_t \leq X_{it}$
The Upper-Middle Class	$1.5 * \bar{y}_t \leq X_{it} < 2 * \bar{y}_t$
The Middle-Class	$\bar{y}_t \leq X_{it} < 1.5 * \bar{y}_t$
The Lower-Middle Class	$0.5 * \bar{y}_t \leq X_{it} < \bar{y}_t$
The Lowest Class	$X_{it} < 0.5 * \bar{y}_t$

Source: Created by the author.

The number of countries subject to the classification (presented in Table 1) and having complete data between 1980 and 2019 is 124¹¹. Of these, 28 countries fell into the top-class category, with a GDP per capita exceeding the world average in 1980. Remarkably, 26 of these 28 countries, constituting 93% of this group, retained their top-class status in 2019. The lowest class, characterized by a GDP per capita less than half the world average, displayed a similar trend of salient stability as if firmly anchored to an unyielding force. In 1980, this group comprised 54 countries; 44 countries, or 81%, were still in this category in 2019. These persistent countries, which have steadfastly maintained their positions over the last four decades, collectively represent 56% of the world's nations.

Recognizing the need for homogeneity in the sample for rigorous analysis, this study focused on these consistently classified countries within the top and bottom income groups, ensuring that the subsequent analyses are founded on datasets of high consistency and reliability.

Building upon the research conducted by Aghion et al. (2019), Figure 4 and Figure 5 provide visual representations of the intricate relationship between financial development and income distribution dynamics¹². The investigation separates these dynamics into Top-Class (Figure 5) and Lowest-Class (Figure 6) countries. Aghion et al. (2019) suggest that an increase in the number of patents per capita leads to a corresponding rise in the share of income held by the top 1 percent. This observation implies that innovation might be a driving force behind escalating income inequality. However, it is important to highlight that this relationship is more nuanced. When the top 1 percent's income share is omitted from the Gini coefficient calculation, Aghion et al. (2019) reveal no significant correlation between the number of patents per capita and the Gini coefficient calculated for the remaining 99 percent of the population¹³.

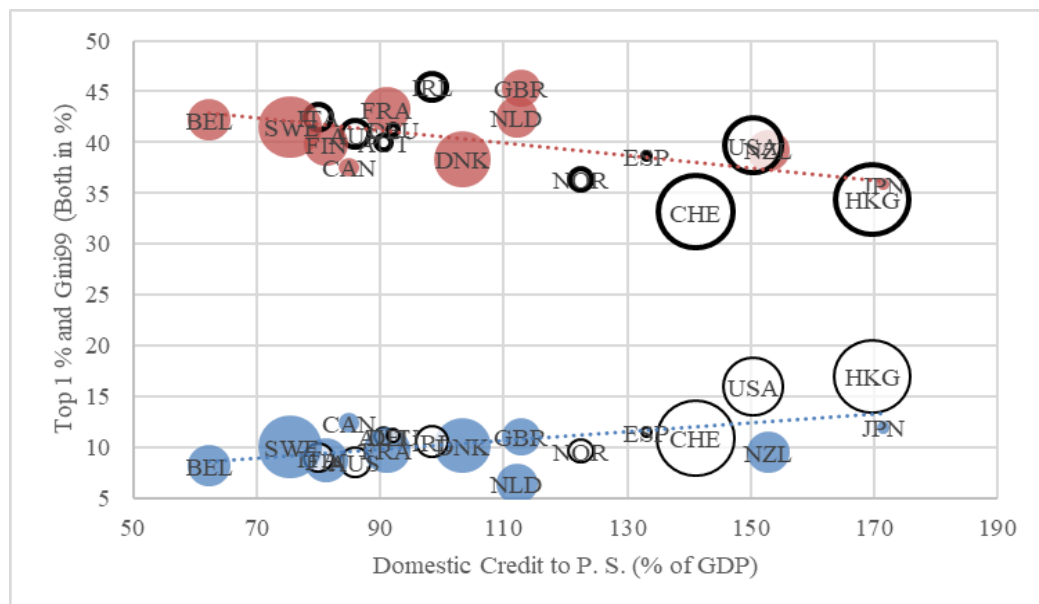
¹¹ In accordance with Mankiw et al. (1992: 413), countries with populations below 1 million in 2019 were omitted from the sample to ensure the analysis focuses on economies of significant size, which are more comparable in terms of economic dynamics. The omitted countries are namely, Bermuda, Brunei Darussalam, Cayman Islands, Luxembourg, Bahamas, Barbados, Iceland, Montserrat, Suriname, Antigua and Barbuda, British Virgin Islands, China, Macao SAR, Saint Lucia, Djibouti, Cyprus, Aruba, Saint Kitts and Nevis, Malta, Seychelles, Anguilla, St. Vincent and the Grenadines, Guyana, Fiji, Belize, Turks and Caicos Islands, Dominica, Comoros, Grenada, Bhutan, Cabo Verde, Sao Tome and Principe, Maldives.

¹² See Appendix 1 for the list of countries.

¹³ The plot of the Gini index as a function of the average income share of the top 1% and the corresponding innovation percentiles for the bottom 99% is visualized by Aghion et al. (2019). The bottom 99% Gini index is the Gini coefficient of the income distribution minus the top 1% ($G_{99} =$

This detail underscores the complexity of the relationship between innovation and income inequality. With this in mind, Figures 5 and 6 focus on assessing the relationship between financial development, measured by domestic credit to the private sector as a share of GDP from GFDD of the World Bank, and two key metrics: the share of income held by the top 1 percent and the Gini coefficient for the remaining 99 percent of the population (Solt, 2020; Chancel et al., 2022). These figures provide insights into how financial development affects income distribution in both Top-Class and Lowest-Class countries.

Figure 5: Financial Development and Income Inequality for Top-Class Countries 1980-2019¹⁴



Source: Author's calculations based on the WID and GFDD.

$(G - top1)/(1 - top1)$). Innovation quantiles are calculated using US state year pairs from 1976-2009. Authors suggest that innovation does not seem to be linked to Gini because innovation increases social mobility while feeding into inequality between those at the top and the rest of society.

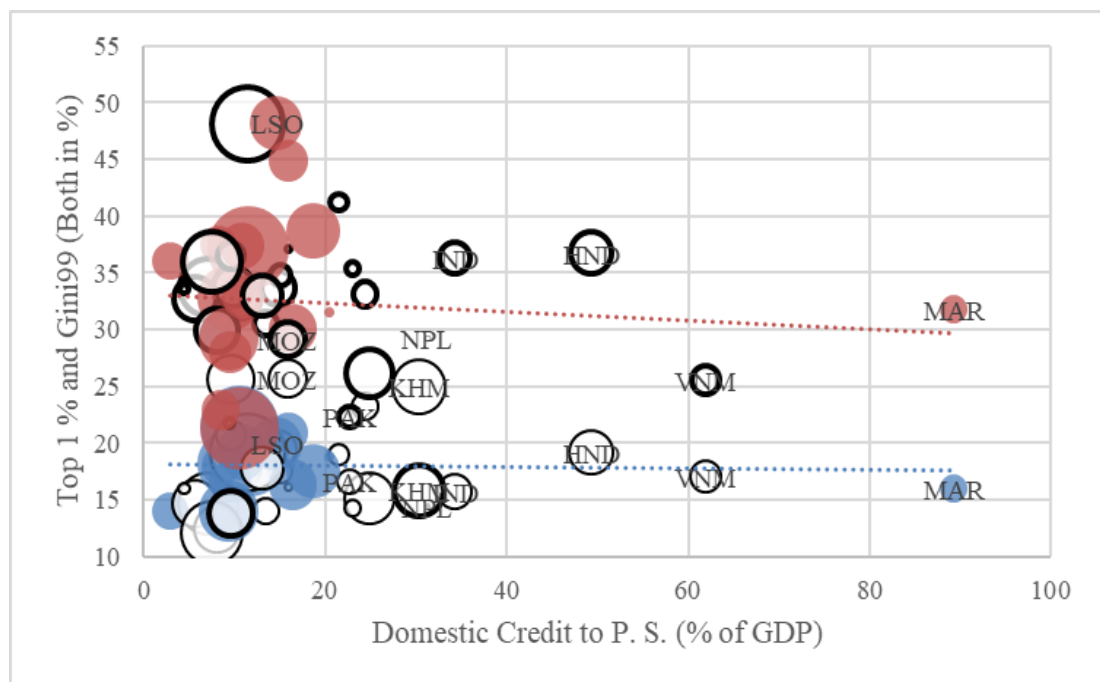
¹⁴ Following Mankiw et al. (1992: 413), five oil-producing countries—Bahrain, Kuwait, Qatar, Saudi Arabia, United Arab Emirates—and Israel, considered an outlier, are excluded from the dataset. These countries are often excluded due to their unique economic structures heavily influenced by oil revenues, which can distort comparative analyses of economic indicators across countries (Auty, 2001; Gelb, 1988).

Figure 5 comprises two scatter plots for the top-class countries, each shedding light on distinct aspects. The first scatter plot on the bottom portrays the relationship between two crucial indicators: the average domestic credit to the private sector as a percentage of GDP spanning the years 1980 to 2019, which serves as a gauge of financial development, and the average share of total income held by the top 1% for the same period. The second scatter plot on the top reveals the connection between the average of the same financial development indicator for 1980-2019 and the average Gini Coefficient (specifically Gini99) for the period 1980-2019, calculated by excluding the top one percent of income earners. These scatter plots are invaluable for visualizing the intricate relationships between financial development and income distribution dynamics in top-class countries. An attempt was made to bubble these figures to deduce whether finance is developed or inequality is low in countries where the government has a significant size. However, this was abandoned because the government sizes are very close (for example, the graph cannot reflect the difference between 0.17 and 0.20). Instead, bubbles were made according to the difference between each country's government consumption and the average government consumption. The average government consumption of the 20 countries in the top group for the 1980-2019 period is 16 percent. The average annual government consumption of Hong Kong, Switzerland, and the USA for the same period is 7.8, 7.3, and 10.9, respectively. Accordingly, subtracting the general average from these three countries' annual average government consumption, we find the numbers -8.2, -8.7, and -5.1, respectively. Notably, these three countries have the lowest government consumption in the group, thereby pulling down the overall average for the top group. The three countries that increased the government consumption average for the top group the most are Sweden, Denmark, and France, respectively. After subtracting the average government consumption of these three countries from the general average, we get 5.9, 4.7, and 3.1.

The insights derived from Figure 5 closely mirror the findings of Aghion et al. (2019). In line with this, a higher share of domestic credit to the private sector in GDP indicates a more significant income share for the top 1 percent and a lower Gini99 within top-class countries. Hence, a positive correlation exists between financial development and the income share of the top 1 percent, while a negative correlation is

observed between financial development and Gini99. Much like innovation, financial development has a dual impact: it widens income inequality between the elite and the remainder of society while enhancing social mobility. Aghion et al. (2019) underscores the essential balance required within capitalism. It emphasizes protecting property rights and fostering innovation to stimulate economic growth and social mobility. Furthermore, it is crucial to enact regulations to counterbalance the potential for established market players to inhibit productivity and social mobility. As expressed by Rajan and Zingales (2014), capitalism requires safeguards to protect itself from capitalists. This concept equally applies to financial development, where a harmonious coexistence of free-market principles and prudent regulation is imperative.

Figure 6: Financial Development and Income Inequality for Lowest-Class Countries 1980-2019



Source: Author's calculations based on the WID and GFDD.

Figure 6 depicts the relationship between financial development and income distribution dynamics within the lowest-class countries. This analysis employs indicators related to financial development and income inequality, similar to those in

Figure 5. Specifically, the figure draws upon data from 43¹⁵ countries that were part of the lowest-income group in 1980 and remained within this group in 2019. Contrary to the diverged patterns observed in top-class countries, the analysis does not reveal a clear or consistent relationship between financial development, measured by domestic credit to the private sector as a percentage of GDP, and various measures of income inequality. Nevertheless, although the figure suggests that financial development potentially alleviates income inequality when the top 1 percent is excluded from the analysis, it is important to underline that this effect is not very strong. Based on this analysis made for this country group, it is not possible to read the impact of the share of government consumption on income inequality and financial development.

Figures 5 and 6 provide valuable insights into the relationship between financial development and income inequality; however, they come with notable limitations. First, the samples of Figures 5 and 6 are limited to only 20 developed and 43 developing countries, respectively, which restricts the generalizability of the findings. Additionally, the mathematical relationship between the top 1% income share and Gini99 is somewhat expected, as higher top 1% shares naturally result in lower Gini99 values. While these figures suggest that financial development might not be entirely detrimental, further research is needed to explore these dynamics in greater detail.

It is essential to underscore the notable variations in economic indicators between the two distinct groups of countries, which are pivotal in understanding the divergent relationships uncovered in Figures 5 and 6. For instance, a stark contrast emerges when examining the average values of domestic credit to the private sector as a percentage of GDP. The top-class countries exhibit a significantly higher average, with a striking value of 110.56%, whereas the lowest-class countries report an average of 17.95%. This discrepancy emphasizes the substantial divergence in financial development levels between the two groups. Moreover, the income distribution within these country groups also displays considerable differences. On average, the share of income received by the top 1 percent in the top-class countries is 11%. In contrast, the lowest-class countries report an average of 18%, indicating that income distribution

¹⁵ 44 out of 54 countries remained in the same group, but the State of Palestine was excluded from the sample due to the lack of data on financial development.

among the top earners differs remarkably. Despite these variations, the average Gini99 values present an intriguing twist. A comparison of average Gini99 values shows that since the share of income received by the top 1 percent is high in the lowest-class countries, it is plausible that the Gini99 value is low. While the average Gini99 value in the top-class countries is 0.40, this value is lower in the lowest-class countries, that is, 0.32. This explains why, although the top 1 percent has a larger share of income in the lowest-class countries, the formula used in the Gini99 calculation automatically makes inequality between lower income groups appear lower. Thus, higher income inequality for the bottom 99 percent in top-tier countries is associated with a lower income share for the top 1 percent. These disparities in financial development, income distribution, and income inequality levels shed light on the intricate dynamics within these country groups and emphasize the complexity of the relationship between financial development and income inequality. To understand the mechanisms underlying this finding, it would be helpful to refer to various studies in the literature. For example, studies examining the relationship between financial development and income distribution show that access to financial services and the opportunities to benefit from these services have significant effects on income distribution (Galor and Zeira, 1993). Additionally, the depth and sophistication of financial systems in lowest-class countries may increase the likelihood that individuals in these countries will generate income through financial assets, leading to relatively higher inequality among the top 1 percent and the rest of the population (Asongou and Batuo, 2012; Gyimah, 2002). In exploring the nature of financial development and income inequality, African countries offer critical insights, particularly through the lens of liberalization policies and corruption. Asongu and Batuo (2012) provide a comprehensive analysis of financial liberalization's mixed outcomes on income distribution, suggesting that while such policies aim to stimulate growth, they may inadvertently widen economic disparities. Similarly, Gyimah-Brempong (2002) underscores the detrimental role of corruption, which hampers economic growth and exacerbates income inequality, disproportionately affecting the most vulnerable populations. These studies highlight the complex interplay between financial systems, governance, and economic equity, underscoring the need for inclusive and transparent policies to ensure that the fruits of financial development are equitably shared. In this context, it is critical to understand

that income inequality is closely related to the top income group and the structure and accessibility of countries' financial systems. The results presented in these two figures also indicate that similar economic development methods will not be plausible for every country (Chang, 2003).

These two groups of countries differ significantly in terms of financial development. This is the primary motivation for choosing two samples to examine financial development dynamics and income distribution. Significant differences exist between these two groups of countries, ranging from their institutions to their geography. For instance, among the top-class countries, only Hong Kong is in Asia, while the others are in Europe and North America (USA and Canada). In contrast, most of the 43 countries in the bottom group, except for Haiti and Honduras, are concentrated in Asia, particularly Africa. When the Human Development Indices (HDI) of two country groups are compared, the importance of grouping countries in this way will be more clearly understood. Based on the data of 2021, the HDI average of the top class is 0.935, while the average of the lowest class is 0.540. The HDI disparities between these two groups are so substantial that they require a separate study.

The relationship between financial development and income distribution is a complex issue that needs more attention. It is crucial to understand that the classification of countries based on income groups results from a meticulous perspective. Therefore, when examining homogeneous groups of countries, it would not be appropriate to talk directly about the adverse effects of financial development on income inequality. Notably, in countries where the state's share in the economy is significant, the risk of those benefiting from the existing financial system becoming future residents is lower¹⁶ (Saez and Zucman, 2016; Niimi and Horioka, 2018; De Nardi, 2004; Feiveson and Sabelhaus, 2018) (Feds. Notes). Therefore, the relationship between financial development and income distribution is crucial, as it can result in severe social and economic consequences, influencing wealth distribution and contributing to the persistent nature of wealth inequality.

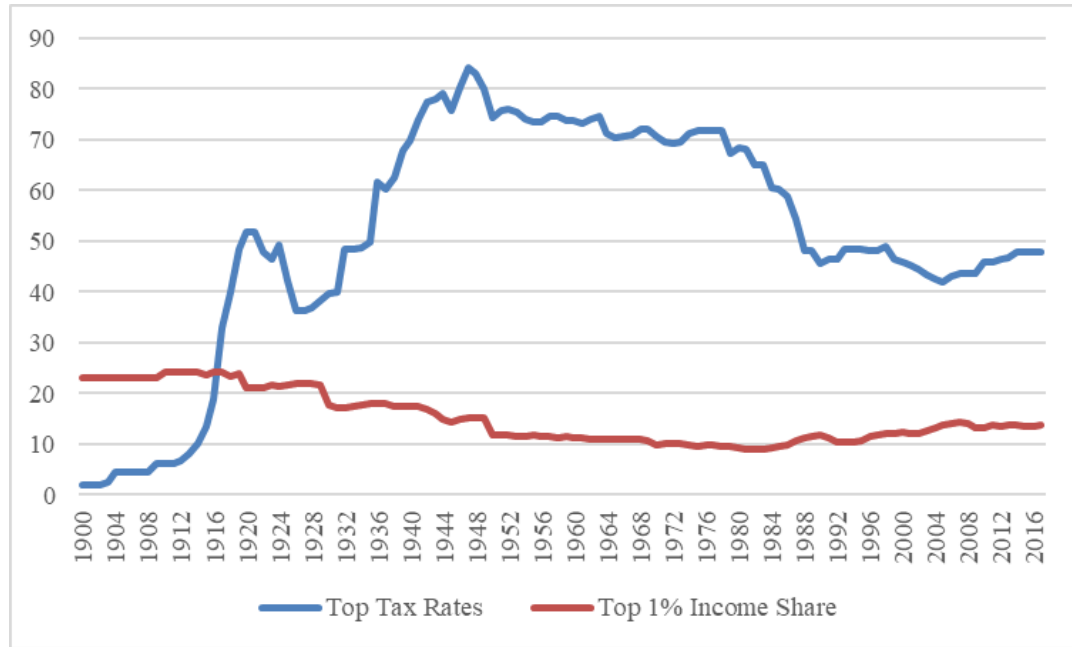
¹⁶ Aghion et al. (2019: 1-6) mentioned that innovation can have similar consequences as it increases the share of the top 1 percent.

Based on Piketty's (2018: 312) research, Figure 7 examines the impact of state interventions on inequality. The figure depicts the trend of average top marginal income tax rates in the United States, the UK, Germany, France, and Japan since 1900. At the beginning of the twentieth century, personal income taxation was non-existent or had minimal presence in these countries. However, income tax was introduced to finance the First World War, leading to the imposition of high top marginal tax rates during the 1950s–1970s. Subsequently, the top rates were significantly reduced from the 1970s onwards, with an average decrease from 70% to 42% in the mid-2000s.

The historical trend indicates a correlation between the decrease in state-enforced top marginal tax rates and the rise of income inequality, as detailed by Piketty (2018). During the mid-20th century, high tax rates were employed to redistribute wealth, reflecting societal efforts to mitigate income disparities. The latter part of the century saw a paradigm shift with the adoption of neoliberal policies, leading to reduced tax rates and coinciding with increased income concentration at the top. Recent policy adjustments in several countries suggest a potential reconsideration of this approach in light of growing public concern over economic equity.

The red line shows the change in the average income share of the top 1 percent over the years for five countries. Accordingly, while it was 24 percent in 1910, it decreased to 9 percent in 1982. It has risen since 1982 and reached 14 percent in 2017. The leading country in the increase here is the USA with 19 percent, while France is with 10 percent.

Figure 7: Trends in Maximum Income Tax Rates and Top 1% Income Shares across Affluent Nations (1900-2017)



Source: Author's calculations based on the WID.

This study comprehensively analyzes how state size and financial development impact income distribution dynamics. The study examines the effect of financial development on income inequality, mainly focusing on how much financial development can reduce income inequality when the state ensures justice in income distribution. As can be deduced from Figures 5 and 6, the scope of financial development is quite controversial. Financial development can be seen as beneficial when it creates opportunities for those at the bottom of the economic welfare scale. Still, it also tends to increase the income share of the richest. The primary motivation of the thesis is to address this duality in an economic environment that includes the state. To delve deeper into this critical aspect, we will examine the share of government consumption in GDP - a key economic indicator of the state's economic involvement. Table 2 encapsulates the average share of government consumption in GDP values, providing valuable insights into the state's economic participation and impact on income distribution.

Table 2: Average Government Consumption Share of GDP by Income Group

Income Group	1980	1985	1990	1995	2000	2005	2010	2015	2019
Top (28→26)	0.17	0.18	0.17	0.15	0.15	0.15	0.16	0.18	0.18
Upper-Middle (10→1)	0.16	0.17	0.17	0.21	0.19	0.21	0.23	0.19	0.18
Middle (10→4)	0.18	0.21	0.21	0.19	0.17	0.18	0.19	0.21	0.20
Lower-Middle (22→10)	0.20	0.24	0.19	0.19	0.18	0.17	0.17	0.19	0.19
Lowest (54→44)	0.24	0.23	0.19	0.15	0.15	0.15	0.14	0.15	0.16

Source: Author's calculations based on the PWT 10.01.

The data in Table 2, which presents the average share of government consumption in GDP by income group from 1980 to 2019, reveals varying trends for different income groups. The first column of the table displays the number of countries that belonged to the same group in 1980 and 2019, respectively. For clarity, the numbers are enclosed in parentheses. According to the table, it is evident that the bottom and top income groups exhibit a relatively stable structure over time, showing less mobility between these groups. However, a more dynamic pattern emerges for the middle-income groups, with countries in these categories displaying greater mobility. The data indicates that movement within the middle-income groups is more pronounced, signifying higher economic mobility in these groups. This disparity in mobility among different income groups is conspicuous. The top income group experienced a relatively stable share of government consumption in GDP values, with minor fluctuations but an overall consistency in the 0.17 to 0.18 range. In contrast, the upper-middle income group exhibited more variability in their share of government consumption in GDP. This group shows some variation, starting at 0.16 in 1980, peaking at 0.23 in 2010, and then decreasing to 0.18 in 2019. The middle-income group exhibits a relatively stable pattern, with the share fluctuating between 0.17 and 0.21 over the years, reaching 0.20 in 2019. The lower-middle income group shows some fluctuation, starting at 0.20 in 1980, increasing to 0.24 in 1985, and then stabilizing around 0.19 in the later years, implying a slight decrease after the initial rise. Lastly, the lowest income group experienced a decline in government consumption share from

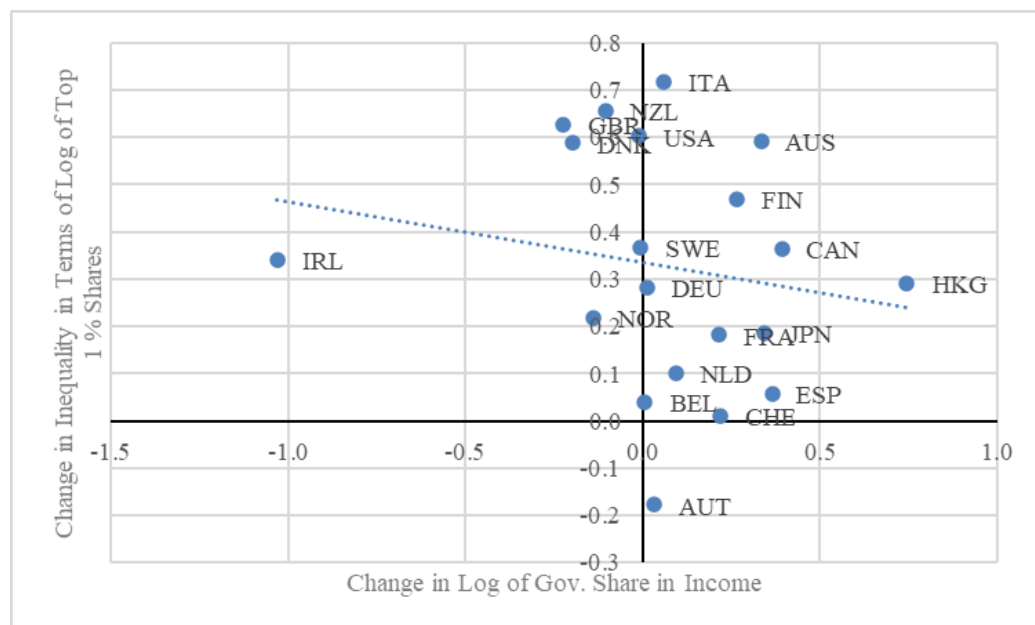
0.24 in 1980 to 0.14 in 2010, followed by a slight increase to 0.16 in 2019. This indicates a substantial reduction in government consumption share over the period. This analysis underscores the changing patterns of the share of government consumption in GDP among different income groups, with the top and lowest groups demonstrating relative stability and a clear downward trend, respectively. The other groups, with higher mobility, showcase variations in their government consumption shares over time. It is observed that reducing government consumption has not significantly benefited the lowest-income group.

A comprehensive view of how the size of the state has evolved within each income group over the years is provided in Table 2. We will focus on countries that consistently belong to the same income group. The methodological approach examines the relationship between financial development and income inequality by prioritizing the continuity of countries within their income groups. The relationship between government size and income inequality is also examined using the same approach. We will now demonstrate the distribution graphs that illustrate the relationship between the logarithmic changes in the size of the state and the income share of the top 1 percent during the 1980-2019 period. Inspired by Alvaredo et al. (2018: 259), Figures 8 and 9 represent the top-class and lowest-class income countries, respectively.

Figure 8 illustrates the relationship between the logarithmic change (growth) of the share of government consumption in GDP and the logarithmic change of the share of income received by the top 1 percent for 20 countries that have maintained their top-class status for four decades, which serves as an indicator of changes in inequality within these countries over the forty years. An intriguing pattern emerges when we analyze the data about changes in government size and income inequality within these top-class countries. The scatter plot of these variables suggests a negative relationship, indicating that an increase in the share of government consumption in GDP is associated with a decrease in the income share of the top 1 percent. This observation aligns with economic theories (views) that suggest a powerful government's redistributive role may reduce income inequality (Meltzer and Richards, 1981; Elgin et al., 2013; Alesina et al., 2001). However, it is vital to note that the change in government size is relatively small and predominantly positive. This suggests that these countries have not grown substantially in government size. The

government size variable shows a marginal increase from 0.17 in 1980 to 0.18 in 2019, indicating limited growth in the state's role over the analyzed period. In stark contrast, income inequality has experienced more substantial increases during this timeframe. The graphical representation illustrates this disparity: the sum of changes in government consumption is 1.37, while the sum of values for the top 1% income shares is 6.53. This discrepancy highlights a scenario where inequality has risen significantly while government consumption has witnessed only minimal growth. Despite the observed negative relationship between the variables, the modest impact of the limited change in government size on income distribution suggests a need for further analysis. A comprehensive understanding of this relationship, including statistical significance testing and consideration of additional contextual factors, is essential.

Figure 8: Government Consumption and Income Inequality Trends in the Top-Class Countries (1980-2019)



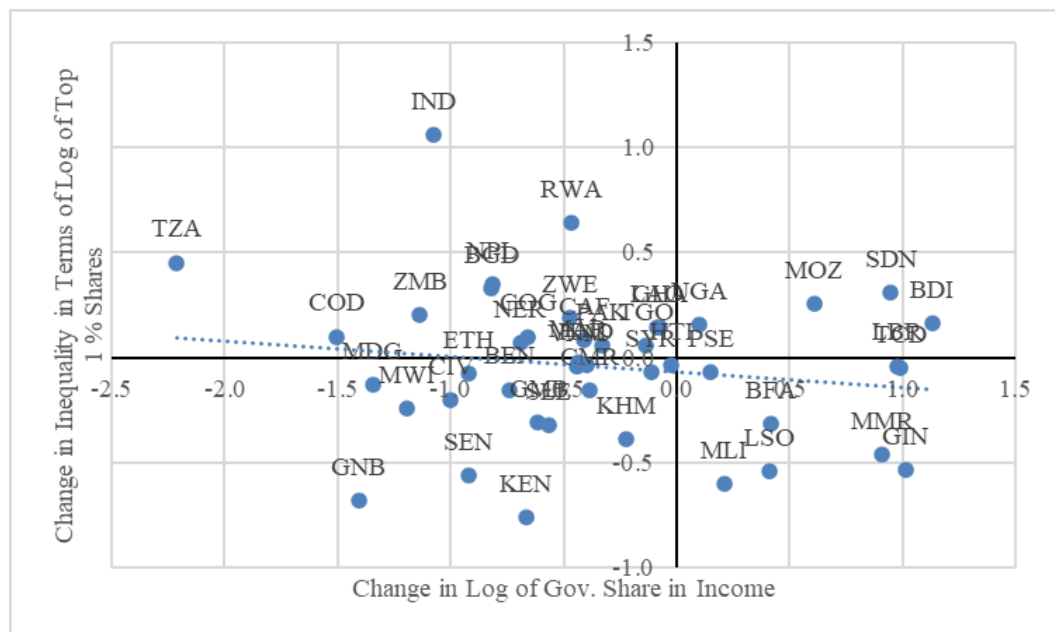
Source: Author's calculations based on the WID and PWT 10.01.

Figure 9 provides insights into the dynamics of countries classified within the lowest-class. As mentioned earlier, among the 54 nations classified within the lowest income group in 1980, 44 remained within the same group in 2019. These countries

experienced a decrease in their share of government consumption to GDP, which dropped from 0.24 in 1980 to 0.15 in 2019. Despite this decrease in government size, these 44 nations followed a consistent pattern from 1980 to 2019. Reducing government consumption did not help these countries to move up to higher-income groups.

The scatter plot depicted in Figure 9 reveals a declining trend, mirroring the relationship observed in Figure 8. Both figures show a negative relation between the share of government consumption in GDP and the income share of the top 1 percent. This uniformity in the findings underscores the inaccuracy of presuming that reducing the size of government positively impacts income inequality.

Figure 9: Government Consumption and Income Inequality Trends in the Lowest-Class Countries (1980-2019)



size and inequality, it becomes clear that shrinking the state is not a practical solution to combating income inequality, whether in upper-class or lower-class countries. It is also apparent that diminishing the government's consumption share in GDP is not a remedy for reducing inequality across countries. Figures 8 and 9, in conjunction with Table 2, provide compelling evidence supporting these conclusions.

According to Piketty (2020: 20-23), the world had a successful period in terms of equality after the First World War until 1980. After 1980, the whole world returned to inequality. The countries that have not experienced a decrease in inequality are South Africa, Brazil, and the Middle Eastern countries -The Middle East is defined here as the region extending from Egypt to Iran and Türkiye to the Arabian Peninsula, with a population of roughly 420 million- that have never experienced social democratic political regimes. Between 1950 and 1980, it was possible to talk about a more egalitarian world due to the strength of communism and the understanding of the social state. Still, after the 1980s, the substantial rise of capital revived inequality. The analyses in this section are consistent with the view that the social state is the remedy for economic inequality.

This comprehensive exploration of the intricacies surrounding income distribution, financial development, and government consumption has uncovered a complex web of relationships that affect countries on various economic fronts. Figures and tables have unveiled the dynamics that shape income inequality, poverty alleviation, and the government's role in these processes. This section provides an overview of income distribution from 1980 to the present, laying a critical foundation for subsequent analyses. It has been emphasized that allowing income inequality will not reduce poverty. Addressing both issues simultaneously is necessary. A deeper dive into the income shares of the poorest 50 percent and the top 1 percent has been taken, dissecting these brackets' growth and inequality trends. Table 1 has showcased the classification of countries based on average income, which has proved instrumental in understanding the dynamics at play. The rigid structures of the bottom and top groups have emphasized mobility challenges, particularly when financial development has favored those already at the top. This section highlights the various impacts of financial development. Surprisingly, it reduces income inequality among the poorest 99 percent while enriching the affluent. As deeper ventures have been taken, the ramifications

have been encountered, as illustrated in Figure 4 for the wealthiest nations and Figure 5 for the least affluent countries. These figures have provided insights into the interplay between financial development and income distribution, elucidating the varying impacts on income inequality within the top and bottom income groups. Finally, the impact of government consumption as a percentage of GDP on income inequality has been explored. While a direct link between a smaller state and reduced inequality has been initially hypothesized, the evidence has not fully supported this expectation. In conclusion, the stylized facts section has demonstrated the complexity of the relationships between income inequality, financial development, and government consumption. The importance of additional research in fully understanding the intricate interactions within the rich tapestry of variables influencing income distribution has been highlighted. Recognizing the limitations of simplistic solutions necessitates thorough consideration, rigorous analysis, and a deeper comprehension of the underlying mechanisms. The groundwork laid in this section aims to contribute to the ongoing exploration of economic policies addressing the effects of income inequality and promoting more equitable societies within the scope of this thesis.

The role of the government in a market economy has been a subject of ongoing debate, with some advocating for minimal government intervention and a *laissez-faire* approach (Hayek, 1945; Friedman, 1962). In contrast, others argue that the state should be more active in shaping the market (Stiglitz, 2012; Piketty, 2020). This thesis centers around the latter perspective, emphasizing the crucial role of the government as a regulatory and balancing entity within the market framework.

It is vital to acknowledge the potential of their synergistic relationship rather than regarding the state and the market as opposed entities. The government, endowed with its regulatory powers, can create a level playing field, ensuring that market participants operate within ethical, legal, and socially responsible boundaries, thereby fostering an environment that encourages competition, innovation, and sustainable economic growth. One of the principal functions of the government is to promote social welfare and equitable wealth distribution. In an entirely unregulated market, there is a risk of income inequality and the concentration of wealth among a few. The government can mitigate these disparities by implementing progressive taxation, social safety nets, and wealth redistribution policies, contributing to a more just and

equitable society (Stiglitz, 2012; Blanchard and Rodrik, 2021). In this section, it is essential to remember that the challenge is to create state policies that effectively, efficiently, and wisely address inequality. Put differently, considering government policies' impact on inequality from various angles is essential. The effectiveness of state policies in ensuring equality should be emphasized, regardless of the debate on the importance of the state's size. In other words, the focus should be on the versatility of the policies. The effectiveness of government policies in ensuring equality is pivotal. Atkinson (2015) illustrates this with a tax/transfer system model, showing that simple tax increases might not adequately address inequality without considering the tax system's responsiveness to changes in the Gini coefficient. Claiming tax increases will correct inequality without examining the factors affecting this elasticity is only regarded as correct with cautious optimism.

In the context of effective, efficient, and wise government policies, it is useful to remember that all state actions are related to distribution. In addition to the direct effects of progressive taxes on inequality, the indirect effects of the state on inequality can be discussed in a range of ways, from environmental protection to innovation. Market-driven profit motives can occasionally lead to practices that jeopardize consumer rights and environmental sustainability. The government, acting as a counterbalance, enforces regulations to protect consumers from exploitation and prevent ecological degradation. This approach fosters long-term market stability and safeguards the interests of future generations (Roberts, 2001; Markannen and Anger-Kraavi, 2019). Government intervention can also play a pivotal role in fostering innovation and competition. By offering incentives, funding research and development, and enforcing antitrust regulations, the government stimulates healthy competition, prevents market monopolization, and fuels innovation, ultimately benefiting consumers and the overall market (Lucas, 1988; Barro, 1996, 2001; Aghion and Howitt 1992; Risso and Carrera, 2019).

In conclusion, it is imperative to recognize that the government's role in a market economy should extend beyond that of an impartial judge. Instead, it should be seen as a driving force behind a balanced and equitable economic system. In a world where market forces are potent, the government's guiding hand is indispensable in ensuring fairness, protecting vulnerable sections of society, and fostering a sustainable,

innovative, and competitive marketplace. The key lies in striking a balance that harnesses the dynamism of the market while tempering its excesses. In this paradigm, the government is not an adversary to the market but a partner in its success.

At the beginning of this section, the importance of statistics as a determinant of economic behavior was highlighted despite their flaws. Atkinson (2015) illustrates with various examples that existing inequalities encountered in measuring economic disparities may be underrepresented in the data. He discusses the measurement challenges of inequality through household surveys (Atkinson, 2015: 48-49). It is crucial to emphasize both the significance of inequality and the difficulties in measuring it consistently¹⁷. By addressing these limitations, Atkinson (2015) underscores the complexity of accurately measuring economic inequality and the importance of refining data collection methods to reflect reality better. As demonstrated in the examples provided, these statistics shape economic policies, often benefiting the advantaged. This section highlights the issue of economic inequality, which is significantly concerning even within the limitations of current statistical representations. Focusing on the disparities and potential biases in data collection methods, such as those highlighted by Atkinson (2015), makes it evident that the problem of economic inequality may be more severe than statistics alone can reveal. Addressing these measurement challenges is crucial for developing more equitable economic policies that accurately reflect the realities of all societal groups.

1.3. LITERATURE REVIEW

As the previous section shows, inequality remains a persistent and pressing issue despite significant human progress and evolution. This literature review seeks to delve into the multifaceted nature of inequality, examining why it is considered a

¹⁷ According to the author, household surveys are a widely utilized data source for studying inequality, but they have several limitations. They primarily focus on traditional households, excluding individuals in non-traditional settings such as students, boarders, military personnel, and those in hospitals, hostels, shelters, or reception centers. This also includes older individuals in care homes, children in care, and the homeless, who are likely concentrated in the lower income brackets. Additionally, sample selection bias may occur if the listing from which the sample is drawn does not accurately represent the entire household population. Furthermore, people who do not respond to household surveys are likely to have large incomes and high wealth, as they have logical reasons for not disclosing their well-being.

detrimental phenomenon and why it continues to be a severe problem in modern societies. Furthermore, the review explores various theoretical frameworks and policy suggestions to address inequality, particularly within the market economy versus institutionalism. Lastly, it highlights reasons for optimism in the fight against inequality and outlines the study's aims.

1.3.1. Why is inequality considered a lousy phenomenon?

In economic policy and social justice, a fundamental debate revolves around the delicate balance between addressing economic inequality and tackling poverty directly. This debate revolves around bridging the gap between the affluent and the poor or uplifting impoverished conditions (Feldstein, 1999; Bourguignon, 2004). Economic inequality is vital when making policy decisions and engaging in societal discussions. It impacts income distribution, wealth disparities, and overall prosperity within countries. It is essential to recognize that addressing poverty can perpetuate or exacerbate economic inequality. In these cases, the dialogue surrounding poverty reduction may be viewed as rationalizing or legitimizing inequality. To delve deeper into this multifaceted debate, the trade-off between mitigating economic inequality and directly improving the lives of those in need must be examined (Atkinson, 2015; Sen, 1999).

Novels and travel stories from the late 18th century often provide insight into the living conditions of impoverished people¹⁸. Over the past two centuries, the trajectory of global poverty has witnessed a significant positive shift. Angus Maddison's (1995) historical GDP estimates and Francois Bourguignon and Christian Morrisson's (2002) insights reveal that around 84% of the world's population lived in extreme poverty in 1820. However, the ratio had decreased to 24% by 1992. While approaching the success of modern societies with cautious optimism since the success is intricately linked to the raising of minimum standards of living for all, it is undeniable that the achievements of these societies in the last quarter of the twentieth

¹⁸ Poverty was widespread in the 18th century, as captured by Arthur Young's observations of the French countryside. Young's observations stress the challenges faced by the poor in the past. He recognized that poverty threatened national prosperity, as the poor played a critical role in driving national wealth through their substantial consumption (Young, 1792: 27-28).

century and the beginning of the twenty-first century are closely tied to the improvement of minimum living standards for all community members. The following historical context exemplifies this intricate relationship: In the eighteenth century, Europe boasted a higher average standard of living than Asia and Africa. Nevertheless, the disparity in living standards between these regions is less pronounced today (Ravallion, 2016: 12-18). Namely, the progress exists, but some details should be considered. Therefore, inequality is not the most critical problem, but it comes to the fore due to its complex structure. Individuals have compelling and straightforward reasons to strive for poverty alleviation and personal prosperity. On the other hand, there are various motivations for individuals to be concerned about the prosperity differences among different people, ranging from sentimental factors to institutional considerations. Scanlon (2021) underscores that the call for equality extends beyond the simple objective of raising the income of the poor. Concerns about inequality stem from the detrimental effects it induces and the unsustainable institutions it nurtures. In cases where institutional injustices result in a substantial wealth accumulation among a small population segment, it becomes reasonable to consider taxing the wealthiest 1%, irrespective of potential implications for economic growth (Scanlon, 2021). Nevertheless, such tax policies need to be supported by justifications and clear objectives. One possible rationale for these taxes is their ability to generate revenue to fund social welfare programs. There is a need to balance efforts to reduce poverty and those addressing inequality. Understanding and addressing inequality encompasses creating policies and systems that promote inclusive economic growth, fair distribution of resources, access to quality education and healthcare, and social mobility for individuals across all income levels. By narrowing the wealth gap, the aim is to create a more just and sustainable society that benefits everyone, not just the impoverished.

Amartya Sen (1999: 87-90) asserts that poverty in a wealthy country leads to *social exclusion*. It is unlikely that the poorest individuals in a rich country compare their income status with their counterparts in a less affluent country. Still, instead, they are more likely to make comparisons based on the environment in which they have acquired their life experiences. This tendency highlights the significance of economic inequality.

Reducing inequality is a crucial issue that stems from recognizing its damaging consequences. It is undeniable that people have an inherent sense of justice and equality. It is worth noting that no reasonable person would endorse inequality despite attempts by some individuals to justify it. Defending something inherently wrong would not be a wise decision. Instead, supporters of inequality, at least those who do not explicitly oppose efforts to reduce it, may argue that economic growth requires disparities. Moreover, it is claimed that economic growth ensures that the shares of income groups in the economy also grow, which means that poverty is indirectly reduced (Kornai, 1992; Li and Zou, 1998; Feldstein, 1999; Peterson, 2017). Instead of attempting to legitimize inequality by citing the growth-inequality trade-off argument, it is crucial to recognize inequality as fundamentally detrimental and focus on distinguishing between acceptable and unacceptable inequalities according to this conviction. This approach shifts the emphasis from a perceived necessity of inequality for economic growth to a moral and ethical evaluation of societal disparities. It encourages policymakers and scholars to prioritize equity and justice, aiming to reduce harmful inequalities while acknowledging that some level of inequality may be inevitable but must be justified by fair and equitable principles. By delving into these questions, a broader perspective emerges that emphasizes the need to address the multifaceted dimensions of inequality beyond income redistribution alone.

To highlight the acceptable and unacceptable limits of inequality, Mankiw (2013) discussed the potential role of entrepreneurs in a utopian world where full economic equality is possible. According to Mankiw (2013), we should imagine how the initiatives of extraordinary individuals such as Steve Jobs, J.K. Rowling, and Steven Spielberg would influence public policies in such a scenario. The author invites us to consider the impact of these entrepreneurs could have on driving innovation and economic growth, even in a context of complete economic equality.

Mankiw's (2013) example is essential for considering the complex aspects of economic inequality, much like all economic phenomena. While one might argue that "some people" deserve their economic situation due to their contributions and innovations, there are significant counterarguments. Critics argue that many factors contributing to economic outcomes are beyond individual control, such as inherited wealth, access to education, and social networks (Stiglitz, 2012; Piketty, 2014).

Furthermore, structural inequalities and systemic biases can perpetuate disparities, undermining the notion of a purely meritocratic economic system (Sen, 1999). Piketty (2020: 28) discusses different justifications for wealth inequality, particularly in Western societies, highlighting the complexities and contradictions in how wealth is perceived and justified. Wealthy individuals are categorized into two groups. The first group is classified as the “Global Wealthy Elite” or “Economic and Political Powerhouses,” including Russian oligarchs, Middle Eastern oil sheiks, and billionaires from various countries. These individuals are often criticized for their wealth, raising questions about whether they truly “deserve” their riches. Piketty (2020) emphasizes that the economic contributions of people in this group are insignificant, arguing that their wealth stems from close connections to political forces, unfair access to natural resources, or licensing regulations. The second group comprises entrepreneurs from Europe or America, with Silicon Valley innovators as examples. These individuals are praised for their contributions to global prosperity. Supporters of this group argue they should be even wealthier given their significant impact on society. Some even believe that society owes them a moral debt, which could be repaid through tax breaks or political influence. Many justifications for inequality in Western society ignore specific facts that must be questioned. For example, can entrepreneurs establish businesses without years of public investment in basic research? Additionally, can quasi-monopolies that arise from patenting common knowledge generate such enormous profits without the support of legal and tax codes? These are essential issues that are often overlooked in discussions about inequality. These critiques emerge as a questioning of the fundamental arguments behind justifying inequality, as Piketty (2020) suggested.

At this point, explaining the various justifications and perceptions surrounding economic inequality seems necessary. It is important to compare how some wealthy people are criticized while others are praised for their morals and success, particularly in the Western world. This helps us to question how public investment and legal structures play a role in wealth accumulation and whether wealth creation is solely based on merit because critics point out that wealth inequality, as a type of economic inequality, has negative social and economic impacts, such as limited social mobility, higher crime rates, and lower economic productivity (Neckerman and Torche, 2007;

Wilkinson and Pickett, 2009; Ezcurra and Palacios, 2016; Tay, 2015). Societies must comprehend the essence of inequality, identify its underlying causes, and explore potential solutions to pave the way for a more equitable world.

To understand whether economic inequality is good or bad, it is useful to remember what Christopher Jencks said: “The social consequences of economic inequality are sometimes negative, sometimes neutral, but seldom - as far as I can discover – positive” (Jencks 2002: 64).

1.3.2. Why does inequality remain a serious problem despite human evolution and progress compared to the past?

In all societies, people care deeply about inequality. Changes in inequality have tangible consequences for people’s living conditions, which, as noted earlier, clash with the most fundamental and valuable notions of justice and equality. In this context, it is intuitively predicted that the prevailing economic systems in the world will be successful to the extent that they treat different classes of society in a balanced and fair manner. However, despite our understanding of justice and fairness, equality has remained a phenomenon in which its acceptable limits have been constantly discussed in the history of humanity. The permissible limits of inequality are often open to interpretation, leading to ongoing discussions and controversies. People have different values, beliefs, and expectations about what is fair, leading to varying perceptions of inequality. For example, some may believe everyone should have equal opportunities, while others may argue that individuals should be rewarded for their hard work and merit (Piketty, 2020: 28). These different perceptions can create debates about the appropriate level of inequality in society.

There are many claims about the stubborn nature of inequality. One of them is the limited income movement between different income groups, which plays a significant role in perpetuating the issue of inequality (Atkinson, 2015: 40-41). Jenkins (2011) has extensively examined income mobility in the United Kingdom and found that there is indeed a notable degree of income mobility from one year to the next. However, he makes an important observation that most of this mobility occurs over short rather than long distances. Jenkins (2011) vividly depicts the underlying

mechanism. According to the study, each individual's income fluctuates around a relatively stable long-term average, a reference point on the income scale. People are tethered to this point, much like a rubber band, and while they may temporarily deviate from this point from one year to the following, such deviations tend to be limited due to the restraining force of this metaphorical band.

Being subject to the abovementioned metaphorical band contradicts humanity's institutional level today. As time progresses, institutions evolve according to the dynamics of their society. If this indicates that more democratic societies will emerge compared to the past, people will demand a more equal society. Yet, why people cannot defeat the stubborn nature of inequality?

The answer to the question of persistent inequality is not straightforward and varies depending on different perspectives. The progress made between the eighteenth century and the last four decades is undeniable, but there have also been regression phases. These periods saw an increase in inequality and a decline in civilization. This perspective recognizes the intricate nature of historical trends in inequality and progress, highlighting that advancements do not always follow a linear path. For example, during the Euro-American Enlightenment and the Industrial Revolution, developments in equity and economic equality were anticipated. However, these periods were also marked by oppressive forms of ownership, such as colonialism and slavery, which reached significant levels over the last three centuries. (Piketty, 2020: 19). Human progress, as observed over the past three centuries of world history, is not a linear or continuous upward trajectory. This means society does not always progress steadily from one positive outcome to another. Considering that every change or development will not result in positive outcomes is crucial. In other words, a change does not guarantee a benefit. The idea that unrestricted competition between nations and economic entities naturally results in universal social harmony is challenging. Competition can drive innovation and progress but may not automatically lead to social harmony (Klein, 2007; Chang, 2011). It is important to note that competition should not be overestimated for its harmonizing effects¹⁹. Progress is not handed effortlessly; it requires a constant struggle. This implies that individuals and societies

¹⁹ Kuznets (1955), who claimed that the problem of inequality would disappear in the long run with economic growth, was harshly criticized by today's economists (Piketty, 2014: 1-15; Atkinson, 2015: 45-46; Milanovic, 2016: 50-54).

must actively work towards positive change rather than assuming it will occur independently. The process of understanding progress involves a careful examination of historical transformations. Studying and analyzing past events and changes requires looking at their positive and negative consequences. Finally, genuine improvement can be identified through rational analysis and a comprehensive understanding of these historical changes. This implies that policymakers should critically assess the impact of changes and developments to determine whether they represent genuine progress. In essence, this thesis underscores the complexity of human progress. It challenges assumptions about the inevitability of positive outcomes and emphasizes the need for active effort, critical examination of history, and rational analysis to gauge genuine improvement. It encourages a nuanced and cautious approach to understanding and pursuing societal progress (Piketty 2020: 16-20).

Piketty (2020) argues that the progress spearheaded by the Euro-American Enlightenment and the Industrial Revolution is often obscured by various factors that hinder people from recognizing the issue of inequality. One of the most noteworthy examples is the shifting demographics over time. The sheer size of the population can act as a barrier, making it difficult to perceive and address the world's problems. The world has a much larger population than in the 18th century. The global population and the average national income experienced remarkable growth between 1700 and 2020. The global population experienced a remarkable surge, skyrocketing from 600 million in 1700 to surpass 7 billion in 2020. In terms of income, adjusted for 2020 euros and purchasing power parity, it rose from a mere 80 euros per person per month in 1700 to approximately 1,000 euros per person per month in 2020. Three centuries ago, around three-quarters of the global population lived near subsistence levels, struggling to meet their basic needs (Piketty, 2020). However, today, only around one in five people face such conditions. This indicates an overall improvement in living standards worldwide. Despite the overall progress, when only averages are considered, the world's inhabitants are in a better situation than in the past. Nevertheless, it proceeds to unveil the concealed realities surrounding inequality. As an example of healthcare inequality, let us consider the stark contrast in infant mortality rates. In the wealthiest countries in Europe, North America, and Asia, the infant mortality rate is less than 0.1 percent, while in the most impoverished nations in Africa, it is almost 10

percent. The disparities in per capita income should also be discussed, with the wealthiest countries having much higher incomes (over 3,000-4,000 euros per month) compared to the poorest countries (100-200 euros per month). Some small tax havens and petro-monarchies are noted for their exceptionally high income disparities. Despite acknowledging real progress, there is always room for improvement. It would be unreasonable to become complacent, and further efforts are needed to address these inequalities. Economic success indicators often focus on aggregates and ignore differences between individuals (or countries). The growth of the population directly gives rise to increasing the differences between individuals and indirectly leads to growing inequalities. (Piketty, 2020:16-20).

The course of action depends on understanding the reasons behind the recent increase in inequality and the factors contributing to high inequality in societies. The question of why inequality has been resurgent since 1980 requires an economic analysis that places distributional concerns at the forefront. While this may not be a popular stance among economists, it is believed to be crucial not only for understanding inequality but also for comprehending the functioning of the economy and addressing the pressing policy challenges we face today. When grappling with international imbalances, climate change, an aging population, or fiscal sustainability, assuming a homogenous world with identical individuals sharing the same resources and interests is unrealistic. It becomes necessary to include the distributional dimension in economic indicators such as GDP to build a bridge between economic policies and the lived experiences of individuals (Atkinson, 2015:302). With humanity's development, the types of inequality have increased, and the methods of combating inequality have also evolved. Strategies should be designed to measure inequality with an understanding that the historical trajectory of economic inequality while showing overall progress, is not linear. Types of inequality are increasing, and differences between countries remain severe. By acknowledging these complexities, more effective and inclusive policies can be developed to address the multifaceted nature of inequality in modern societies.

Atkinson (2015: 42) highlights the potential significant inequality between different generations. He suggests that later individuals may have higher lifetime incomes, significantly if real incomes have been rising. Governments make long-term

investment decisions using a social discount rate of two components. The first component is related to the time value of money (pure discount factor). The second component reflects the expectation that future generations will be better off financially. However, the conventional assumption in using the social discount rate, which asserts that future generations will invariably be better off, is controversial. Suppose the expected growth rate of average incomes is slowing down or stagnating due to a focus on sustainability; in that case, it may not be appropriate to discount future generations' incomes as they will be wealthier. The concept of intergenerational justice appears at this point. Society is morally responsible for considering future generations' welfare while making policy decisions. It cannot be assumed that future generations will be better off. Hence, future generations' economic prosperity and well-being should not be neglected while making decisions concerning public investments. The potential stagnation or decline in future incomes due to sustainability concerns should be essential when deciding on measures to reduce current income inequality. In other words, policymakers should be cautious about assuming that future generations will automatically be better off and should be potentially more concerned about addressing present inequalities as their assumption has contributed to the perpetuation of economic inequality for generations.

1.3.3. What are the suggestions for tackling inequality within the opposition framework between the market economy and institutionalism?

Besides the debate about whether inequality is good or bad, another conflict creates a clash of ideas among economists. Due to the scope of the field of economics, this dilemma is likely to be more critical. This dilemma is whether inequality is worth fighting for. This debate can be addressed by comparing the views of two Nobel Prize-winning economists on the fight against inequality.

Nobel Prize winner Robert Lucas argues that economists should not make income distribution a central focus (Lucas, 2003: 20). He suggests that getting preoccupied with distribution questions harms sound economics. Lucas believes the benefits of improving poor people's lives by redistributing current production (through

policies like taxation and wealth redistribution) are limited compared to the benefits of increasing overall production. In essence, he prioritizes economic growth over income distribution concerns. In contrast, Robert Solow (2003) argues the importance of considering income distribution in economics. He emphasizes that understanding income distribution is crucial for understanding how economies function. He points out a high degree of heterogeneity in a modern economy, meaning that individuals and groups have different economic goals, information, capacities, expectations, and beliefs. Therefore, it is essential to recognize these differences when modeling the economy because they can lead to different and sometimes conflicting economic behaviors. In this view, income distribution is seen as integral to understanding the dynamics of an economy.

Stiglitz (2012: 145-180) suggests that economic inequality's adverse effects would be less pronounced if it were certain that those who are poor today would be better off tomorrow or if true equality of opportunity existed. However, inequality is a self-perpetuating issue that could have worse consequences than anticipated if left unchecked. For instance, transferring money from lower-income groups to the wealthy reduces consumption because the wealthy tend to spend a lower proportion of their income than low-income individuals (Dynan et al., 2004; Fischer, 2020). Therefore, unless there is a different impact, such as an increase in investment or exports, the demand potential in the economy will fall below its capacity. As a result, unemployment will increase, wages will decrease, income will shift towards profit, and consumption and income growth will be negatively affected (Kaldor, 1957; Pasinetti, 1962). According to Stiglitz (2012), the different impacts that prevented the decrease in demand were the technology bubble in the 1990s and the real estate bubble in the first decade of the 21st century. Today, the government is the only institution equipped with the tools to create a different impact. Let us assume that the marginal propensity to consume (MPC) of the top 1% is 50%, while the bottom 50% has an MPC of 100%, meaning they consume all of their income. If we go back to Figure 1 and consider a world consisting of China, the USA, and the European Union, the share of income of the top 1% and the bottom 50% in 2019 was about 15%. Therefore, the richest 1% saves 7.5% of the total income. Suppose the government wants to increase the share of income received by the bottom 50% to 20%. In that case, the share of

income received by the richest 1% will decrease by 5%, and their savings will be reduced to 5% of their income. In this scenario, total demand will increase directly by 2.5% (7.5%-5%). As long as the MPC of the top 1 percent decreases - which is very likely since their income in absolute terms is very high - these transfers from the rich to the poor will make positive contributions to aggregate demand and indirectly to unemployment.

Based on demand-led growth theories, the effects of ensuring equality on economic growth through an external influence - in this case, this influence is none other than the government - are apparent. However, even in a world where we assume that the Robin Hood tale has materialized, the effectiveness of this policy is questioned. Atkinson (2015: 5-6) illustrates the challenges of reducing inequality through taxation and transfers with a notable example. Suppose a simplified tax/transfer system where a constant tax rate and uniform benefits are applied to all individuals. In this scenario, gross income 'Y' becomes net income 'N', with 't' representing the tax rate and 'A' denoting the uniform benefit provided to everyone.

The net income (N) for an individual can be calculated as:

$$N = (1 - t)Y + A$$

The tax rate and uniform benefit affect the Gini coefficient for disposable income. It is calculated as:

$$G_{net} = (1 - t)G_{gross} \left[\frac{1}{\text{Ratio of average disposable income to average market income}} \right]$$

Assuming government spending on goods and services absorbs 20% of tax revenue, 80% of tax revenue goes towards the uniform benefit, or the ratio of average disposable income to average market income is 80%. Suppose the Gini coefficient for market income (G_{gross}) is 0.5. We want to calculate the effect of an increase in the tax rate (Δt) on the Gini coefficient for disposable income (G_{net}).

The reduction in the Gini coefficient due to an increase in the tax rate is:

$$\Delta G_{net} = \frac{(0.5 * \Delta t)}{0.8}$$

To find the required increase in the tax rate to achieve a desired reduction in the Gini coefficient, we rearrange the formula:

$$\Delta t = \frac{\Delta G_{net} * 0.8}{0.5}$$

Therefore, the necessary increase in the tax rate (Δt) is 1.6 times the desired reduction in the Gini coefficient (ΔG_{net}).

This formulation demonstrates that substantial increases in the tax rate are required to achieve significant reductions in the Gini coefficient for disposable income, highlighting the limitations of relying solely on tax instruments or fiscal measures to address inequality. Thus, exploring additional variables to increase the tax system's sensitivity to changes in the Gini coefficient is essential for more effectively combating inequality.

After examining the challenges of using tax instruments and fiscal measures to reduce the Gini coefficient and address economic inequality, it becomes evident that conventional methods may not fully capture the complexity of income distribution and its impact on societal well-being. This realization prompts a broader consideration of income that includes monetary transactions and the value of non-monetary benefits provided by public services. Such an expanded view helps us to address some of the limitations inherent in traditional economic indicators and offers a more comprehensive understanding of inequality.

Understanding and addressing economic inequality requires precise measurement and comprehensive data reflecting households' economic situation. One significant change in distribution statistics that can create a roadmap for combating inequality is the inclusion of income in kind, particularly the value of public health, education, and social care services. These services contribute to what is known as "extended income" (Atkinson, 2015: 29-33). While it is challenging to determine the exact value of public services, their impact on household resources is undeniable. For instance, government spending on public education significantly increases household disposable income, as parents would otherwise have to pay for private schooling. The provision of public services varies by country, and their omission can affect the comparison of inequality across nations. Countries with less public spending tend to have higher private spending, but the distribution may differ. When public services are valued at their cost to the government, the measured inequality in extended income in European countries is significantly less than in disposable income (Aaberge et al., 2013). This highlights the importance of including non-cash benefits in income measurements to provide a more accurate picture of economic inequality. To delve

deeper into this issue, it is essential to consider the broader implications of government spending on inequality. Increased government intervention in the form of public services can reduce inequality, as these services provide crucial support that can level the playing field. However, the effectiveness of such interventions depends on the efficiency and equity of public spending.

The discussion around the state's role in addressing inequality often centers on the balance between market forces and institutional interventions. Proponents of a market economy argue that minimal government intervention allows for natural economic corrections and innovations (Smith, 1776; Friedman, 1962; Hayek, 1944). However, institutionalists emphasize the need for robust state intervention to ensure equitable resource distribution (Stiglitz, 2012; Piketty, 2014; Acemoglu and Robinson, 2013). Government policies that reduce inequality include progressive taxation, social welfare programs, and investments in public services such as healthcare and education. These measures can mitigate the adverse effects of inequality by redistributing wealth and providing equal opportunities for all citizens. Precision in measuring economic inequality is crucial for developing effective policies to combat disparities. A more accurate representation of inequality can be achieved by including the value of public services in income measurements. This approach underscores the importance of government intervention in reducing inequality and highlights the need for comprehensive and inclusive economic policies. Understanding the impact of these policies within the market economy and institutionalism frameworks can guide future efforts to create a more equitable society.

It is widely acknowledged that complete equality is unattainable and that some degree of inequality is inevitable. Nonetheless, it is crucial to monitor and scrutinize inequality for the betterment of society and the economy. In this regard, determining the ideal level of inequality is a complex issue that involves various factors, including social, economic, and political considerations. While some argue that a certain degree of inequality is necessary to promote innovation and growth (Partridge, 1997; Forbes, 2000; Charles-Coll, 2010), others believe that excessive inequality leads to social unrest and undermines economic stability (Alesina and Rodrik, 1994; Clarke, 1995; Alesina and Perotti, 1996; Persson and Tabellini, 1994). In recent years, there have been calls for fairer income distribution and a more equitable economic system from

various quarters, including civil society, academic circles, and political leaders (Blanchard and Rodrik, 2021). Many governments have responded to these demands by introducing policies to reduce inequality (Stiglitz et al., 2008).

Researchers have begun to examine in detail the consequences of policies that may directly affect inequality and, at first glance, seem to strain the government's financial power (Steil et al., 2014). The Haas Institute for a Fair and Inclusive Society at UC Berkeley examined policies to reduce economic inequality, from rising minimum wages to ending residential segregation. The study indicates that providing higher wages to employees who earn the least can lift nearly 4.6 million individuals out of poverty and contribute about \$2 billion to the country's income. Moreover, raising the minimum pay rate does not negatively affect job opportunities or hinder economic progress. This research has shown that the Expand the Earned Income Tax (EITC) has had a positive impact on families. This tax credit has managed to lift around 4.7 million children above the poverty line every year. By increasing the EITC, more children escape poverty while giving extra economic support to the working poor, especially single parents taking their first steps into the workforce. Furthermore, the study shows that residential segregation based on race and income is found to have a strong correlation with reduced levels of upward mobility in a metropolitan area. This means that people in such regions struggle to move up the social and economic ladder. Eliminating discrimination by race and income can increase economic mobility and thus prevent inequality from persisting for generations. For example, some countries have raised the minimum wage, introduced progressive taxation systems, and expanded social welfare programs. However, the effectiveness of these measures varies widely across different countries and regions.

Despite these policies, it is still possible to argue that the world is not becoming a more equitable place. The gap between the rich and poor widens in many countries, and social mobility remains limited. Almeida (2020) highlights that the 2008 financial crisis resulted in income losses across all income levels, but the low- and middle-income groups were hit the hardest. While wealthier households experienced minor and short-lived setbacks, poorer households faced severe and prolonged hardships. Moreover, the concentration of wealth and power in the hands of a few individuals and corporations has raised concerns about the fairness of the economic system. Overall,

the ability of states to establish justice and promote equity is evolving. However, the success of this ability in practice is questionable because government policies' effectiveness in reducing inequality depends on various factors, including political will, institutional capacity, and global economic conditions. Naturally, states' success in establishing equality also depends on the factors that affect the will to choose the side of political power. Or a single factor, which is material well-being.

The relationship between politics and inequality may not encourage the fight against inequality because wealth and income concentration will likely provide political power and influence. Considering the truth expressed by the 19th century US senator Mark Hanna with the words, "*Two things are important in politics. The first is money, I don't remember the second.*", it is not unreasonable to think that the primary source of political power and influence is wealth and income (Atkinson, 2015: 305). Moreover, in this case, the purpose of political power and influence will not be to fight inequality. The increase in inequality since 1980, which can be considered as the beginning of the golden years of liberalism, has further strengthened opposition to redistribution, bolstered support for economic policies that encourage market liberalization, and thus further increased inequality. This cumulative process has contributed to the current situation (Milanovic, 2024).

Piketty (2020: 19-20) summarizes the critical events and changes that have occurred from the beginning of the 20th century to the present, showing that different (positive and negative) outcomes have emerged regarding inequality. The first half of the 20th century (1914-1945) was marked by genocidal self-destruction among European powers. In the 1950s and 1960s, colonial powers were forced to move away from colonialism by granting independence to many former colonies. Simultaneously, the United States made significant strides in eliminating racial inequality and extending civil rights to the descendants of enslaved people. The collapse of the Soviet Union in 1989-1991 marked the beginning of a period favoring capitalism over socialism. Additionally, the abolition of the apartheid regime in South Africa in the early 1990s was a significant step toward ending racial discrimination. However, new challenges emerged in the early 2000s, including the warming climate and the rise of xenophobic identity politics in many countries.

According to Piketty (2020: 20), socioeconomic inequality has been a notable trend since the 1980s. The author attributes this trend to a radical form of neo-property ideology that emphasizes the rights of property owners. In the mid-20th century, a pivotal period marked by significant global economic transformations, the state's role emerged as a paramount factor in mitigating income inequality. In contrast to the mainstream economic perspective, the dissenting view highlights that the state, which assertively embraced institutionalism and progressive taxation policies, was essential in promoting equitable wealth distribution from 1950 to 1980 (Ram, 1997; Council of Economic Advisers, 1994). In this context, the pattern of inequality from the post-World War II era to the present challenges the Kuznets (1955) hypothesis. The catching up of nations such as Germany, France, Sweden, and Japan with the economic powerhouses of the United States and the United Kingdom was not solely a result of market forces but was profoundly influenced by state-driven initiatives. These efforts spanned various institutional dimensions, such as introducing progressive social and educational policies to promote equality. These initiatives were particularly significant in the aftermath of World War II, as societies sought to rebuild on a more equitable foundation (Piketty, 2020: 29-34; Atkinson, 2015: 45-82). In this view, the state's commitment to reducing income inequality and promoting socioeconomic equity was not a hindrance to economic growth but rather a catalyst; in other words, it was meant to minimize the damages arising from economic inequality. Progressive taxation facilitated a thriving and dynamic workforce by channeling resources towards education, infrastructure, and social welfare (Weller, 2007; Ihrig and Moe, 2004). At the same time, a commitment to equitable institutional frameworks ensured that wealth should be more evenly distributed. The pivotal lesson drawn from this period is that state-driven policies, rooted in progressive taxation and institution-building, can be instrumental in fostering economic prosperity while simultaneously reducing inequality, thereby challenging conventional financial wisdom and advocating for a more balanced and inclusive approach to economic governance (Rodrik, 2011; Saez and Zucman, 2019; Ostry et al., 2014).

The previous section highlighted the significant impact of the state's assertive measures against economic inequality, mainly through taxation of the wealthiest segments last century, as illustrated in Figure 7. According to this figure, it is notable

that the reduction in inequality coincided with increased tax rates on the wealthiest individuals during the post-war era, while the reverse trend—rising inequality—emerged post-1980. This observation raises several questions about the origins and limitations of the social state concept of the post-war. Was it only about raising taxes, or were broader pro-equality policies involved? Exploring other policies that affect distribution beyond taxation is crucial because it was previously mentioned that all laws are related to distribution. For instance, Piketty (2020: 29) discusses various pro-equality measures that were demanded and implemented, providing a broader context to these policies. Atkinson's insights on learning from history, alongside Piketty's analysis of the resurgence of inequality, provide valuable guidance on the shifts in inequality policies post-1980 and their impacts on intra- and inter-country disparities.

The book *Combating Inequality* points out that the 2008 crisis was a critical lesson and marked a turning point regarding inequality. Several policies were introduced or adjusted after this crisis to address inequality more effectively. It is essential to analyze these subsequent policies to understand how the fight against inequality has evolved, with historical trends showing variable commitments to equality measures. During periods when inequality was declining, economic growth typically improved, and societal well-being also seemed to enhance. These positive outcomes are crucial to highlight. However, after the 1980s, a shift from equality-focused policies led to a period marked by increased inequality, particularly exacerbated by the global financial crisis of 2008. This crisis triggered a broader realization of the need for a renewed focus on reducing disparities.

In discussing these topics, it is beneficial to draw on examples from Piketty's extensive research, which examines tax policies and other redistributive measures that have historically contributed to or hindered the fight against inequality. This approach will provide a comprehensive view of how various strategies have been employed over time to tackle economic disparities and what can be learned from these experiences. The political and ideological shifts that have influenced other political and social institutions, contributing to reducing and regulating inequality, merit further examination.

Piketty (2020) highlights a notable shift towards increased economic collaboration, where employees are given a role in shaping business strategies and

participating in key decision-making processes. Countries like Germany and Sweden were early adopters of these practices in the 1950s. However, despite their initial success, these practices have not been widely adopted or developed subsequently, partly due to the unique historical trajectories of these countries. For instance, up until the 1980s, political entities such as the British Labour Party and the French Socialists were proponents of nationalization programs. Yet, following the fall of the Berlin Wall and the collapse of communism, there was a swift and complete retreat from redistributive policies. Moreover, globally, there has been inadequate effort toward radically rethinking or altering the existing model of private property ownership, which continues to be a fundamental challenge in addressing inequality (Piketty, 2020: 29-36). According to Piketty (2020), the stark increase in inequality in the United States is partially attributed to systemic failures in education access, which is heavily influenced by parental income. He notes, “The probability of access to higher education was just slightly above 20 percent for the 10 percent of young adults whose parents had the lowest income, increasing linearly to more than 90 percent for those whose parents had the highest income” (Piketty, 2020: 35). This disparity suggests that strategic investments in education could significantly reduce inequality beyond fiscal policy by leveling the playing field for lower-income families. Piketty points out that the lack of public regulation in educational admissions and the concentration of resources in elite institutions exacerbate these disparities, implying that governmental education intervention could be a powerful tool to combat inequality. The effectiveness of government policies also depends on various factors such as political will, institutional capacity, and global economic conditions.

Atkinson (2015) suggests that income inequality should concern society and policymakers, even in seemingly minor details, such as adjustments for inflation in income measures. By paying attention to these aspects, policies can be better tailored to overcome income inequality. For instance, individuals with bank accounts with zero interest experience reduced purchasing power over time. Conversely, in the case of liabilities, the obligation to repay is reduced in terms of its purchasing power, effectively decreasing the actual value of debt. Atkinson (2015) finds it surprising that so little attention has been paid to these inflation adjustments, which are very apparent to small savers. Even at low rates of price increases, small savers see their wealth

eroded, and this issue deserves more attention. Such small details in economic measures can significantly impact income inequality and should concern society and policymakers. Addressing these issues with sensitivity makes it possible to create more effective policies to tackle income inequality. In conclusion, understanding and addressing the minor details of income measures, like inflation adjustments, can be crucial in combating income inequality. As Atkinson (2015) points out, recognizing these issues can help us to design better policies that protect the purchasing power of savers and ensure a fairer economic system. Attention to detail is essential for overcoming income inequality and should be integral to policymaking.

The primary motivation for interventions to reduce inequality is based on the sociological frameworks that support these efforts, focusing on the insights provided by utilitarian philosophy and its implications for economic justice. Notable in this discourse are the contributions of John Rawls and Amartya Sen, whose theories offer a nuanced understanding of social justice and inform practical policy approaches. Economists have argued that high inequality reduces overall social utility, considering individual welfare-benefit (utility) levels (Atkinson and Brandolini, 2015). This perspective suggests that redistribution from one wealthy person to someone having less wealth will reduce inequality and increase social benefits (utility), as expressed by Hugh Dalton, a prominent British economist and former Finance Minister. Dalton (1920), drawing on the utilitarian ideas of A.C. Pigou from his work *Wealth and Welfare* (1912), recognized the societal benefits of redistributing income. This concept, now known as the Pigou-Dalton principle, suggests that transferring income from wealthier to poorer individuals, assuming all else equal, will invariably enhance overall social satisfaction. This principle is based on the assumption that utility, a measure of happiness or satisfaction, increases with income but at a decreasing rate for everyone. Pigou articulated that such transfers would increase the total happiness across society because those less wealthy gain more satisfaction from each additional dollar received than the wealthier lose from the same dollar given away. This concept underscores the idea that more equitable income distribution can improve society's welfare. Furthermore, integrating income distribution data into broader economic performance indicators remains challenging. The approach developed from Dalton's theories involves calculating distributionally adjusted national income, which can be

linked with traditional economic metrics like the Gini coefficient or Sen’s real national income formula. This formula,

$$\text{Real National Income} = \text{National Income} \times (1 - G)$$

Where G is the Gini coefficient, underscores the necessity to align income distribution measures with general economic assessments. This integration is crucial for accurately evaluating the effectiveness of social welfare policies and requires timely and detailed data on income distribution. Integrating the Gini coefficient into the national income aligns with Sen’s (1999) criticism. The author criticizes the utilitarian view from the point of measuring and judging inequality. Economists who aggregate and summarize individual welfare in terms of the level of utility attributed to each individual have argued that high inequality reduces total utility (Atkinson and Brandolini, 2015: 3-16). Accordingly, total utility will increase in the “Robin Hood” economy. However, this approach has been seen as irrelevant to measuring and evaluating inequality (Sen, 1999).

In a Robin Hood-style economy, wealth is transferred from the affluent to the impoverished, and distributional weights are used to gauge inequality. These weights place more significance on individuals with lower economic standing, aligning with societal values prioritizing redistribution and forming an essential foundation for tackling inequality. To illustrate this, Okun’s (1975) *leaky bucket* analogy is often used in thought experiments. Suppose \$1 is taken from a person earning twice the average income and transferred to someone earning half the average income, but only 50 cents is received due to a loss in the transfer process. Whether this “leaky” transfer enhances social welfare depends on how we value marginal changes in income. An elasticity of 1 indicates that the 50 cents received by the person with half the average income is valued four times as much as the \$1 cost to the person with double the average income, thereby increasing social welfare. With an elasticity of 0.5, the weight is only double, equaling the cost and benefit. More generally, a loss l is socially acceptable up to the point where:

$$z^\varepsilon (1 - l) = 1$$

In this equation:

z represents the proportion of the donor’s income compared to the recipient’s income.
 ε represents the elasticity of the social marginal value of income.

l is the loss incurred during the transfer.

The equation essentially states that the social acceptability of the loss depends on the relative income ratio and the elasticity value. If the weighted benefit to the recipient, adjusted for the loss, equals the cost to the donor, the transfer is deemed socially acceptable (Atkinson and Brandolini, 2010). The Rawlsian stance of prioritizing the least advantaged may seem extreme. Nevertheless, it's essential to recall Plato's argument that in a society, the wealthiest individuals should have at most four times the wealth of the poorest (Rawls, 1971: 92). Considering the extent of economic inequality in the world, which we have previously demonstrated, this view of Plato is quite profound.

A Theory of Justice by John Rawls is a seminal work in political philosophy and ethics. As one of the most influential and widely recognized philosophers in social justice, Rawls (1971) presents his ideas on social justice and the principles of a just society. His work has profoundly impacted discussions of contemporary justice, ethics, and political philosophy. Rawls's ideas have provided a foundational framework for addressing social justice issues.

Rawls (1971) sparked significant debate among moral philosophers. His influential ideas generated various responses and discussions within the field of ethics and political philosophy. Rawls framed his principles of justice around the concept of *primary goods*. These primary goods encompass various elements considered essential for a good life in society. They include rights, opportunities, powers, income, and wealth. Rawls (1971) argued that rational individuals desire access to these primary goods regardless of their other personal preferences.

Utilitarianism is a moral theory centered on achieving the greatest overall happiness or utility, often at the expense of individual rights and well-being (Mill, 1863; Bentham, 1789). Rawls's (1971) approach introduced a different perspective that considered principles of justice and fairness. At this point, a critique by Amartya Sen is foregrounded. According to Sen (2009), Rawls's approach has limitations because it may not fully consider the diverse ways individuals can convert access to primary goods into a good quality of life. In other words, while Rawls's theory acknowledges the importance of direct goods, it may not account for the variations and complexities in how people use them to achieve well-being and a high quality of life.

Sen (1999) proposed an alternative approach to assessing social justice. Instead of focusing on primary goods (such as income, wealth, and rights), Sen's (1999) practice centers on *capabilities*. Sen's (1999) capability approach emphasizes the opportunities available to individuals based on their functioning in specific circumstances. The capability approach concerns the opportunities people have to achieve the kind of lives they value. Unlike approaches focusing solely on resources or income, it looks at how different factors impact an individual's ability to convert those resources into valuable life outcomes. For example, individuals with disabilities may face higher travel-to-work costs compared to those without disabilities. This additional cost can affect their ability to participate in work and society despite having similar income levels. Considering these additional factors, the approach provides a more comprehensive assessment of social justice.

The capability approach shifts the focus from achieved outcomes (such as income) to the range of opportunities available to individuals. Sen (1999) sees this focus on opportunities as a crucial aspect of personal freedom. According to Sen (1999), it is not just about what people have but what they can do and be. This approach broadens the dimensions examined when assessing social and economic performance. It considers broader factors beyond income, including health, education, resource access, and overall well-being.

Sen's capability approach has significantly impacted indices used to measure development and well-being. The Human Development Index (HDI) is one good example. HDI evaluates a country's well-being based on education, life expectancy, and income, aligning with Sen's focus on capabilities. While the capability approach broadens the guide, the disparities in economic resources, such as income, wealth, access to education, and healthcare services, remain a significant source of injustice (Thorbecke and Charumilind, 2002; Wen et al., 2003). Economic inequality is considered within this framework for instrumental reasons, as it can profoundly impact people's capabilities and opportunities. Despite the broader perspective of the capability approach, the primary focus in this context is on the economic dimension of inequality. This implies that while capabilities are crucial, economic resources and disparities remain a central concern (Atkinson, 2015: 12-13).

Crucially, both Rawls and Sen underscore the pivotal role of institutions in shaping individuals' access to primary goods or capabilities. This aligns with the thesis's central argument: institutionalism is a cornerstone in addressing and rectifying societal inequalities. Robust and equitable institutions can effectively redistribute resources, safeguard individual rights, and provide equal opportunities. Moreover, institutional frameworks can promote social mobility, ensuring that disparities in income and wealth do not translate into inequalities in access to essential services, education, or healthcare.

By anchoring the discussion of inequality within institutionalism, it is recognized that addressing this multifaceted issue necessitates comprehensive policy interventions. These interventions may include progressive taxation systems, legal protections against discrimination, and investments in social infrastructure. Such policies should aim to redistribute economic resources and enhance individuals' capabilities, enabling them to fully participate in and contribute to society. By adopting a holistic perspective that draws from the insights of Rawls and Sen, we can forge a path toward a more just and equitable society where institutions act as bulwarks against the forces of inequality, fostering an environment where all individuals can thrive, regardless of their backgrounds or circumstances.

As the above discussions demonstrate, one of the most fundamental questions in the literature when addressing the issue of inequality is: "*What can individuals own, and to what extent?*" This question delves into the very nature of ownership in a society. It encompasses many assets and resources, including land, buildings, companies, natural resources, knowledge, financial assets, and even public debt. Economists emphasize the importance of establishing clear guidelines and laws governing the relationships between property owners and non-owners. These legal and regulatory frameworks determine who can own what and under which conditions. They are crucial in defining property rights, responsibilities, and limitations (Piketty, 2020). Inheritance laws, estate taxes, and mechanisms for transferring wealth and assets can significantly affect society's wealth and property distribution, and intergenerational property transfer is an example of such legal regulations. The historical issue of human property (in other words, slavery) is a powerful example of how property rights can be expanded or restricted (Allain and Hickey, 2012; Park, 2022). Although it has disappeared in many

societies, it can be presented as one of the striking examples of how legal regulations can positively or negatively affect inequality. As a result, the property regime and education and fiscal policies play an essential role in shaping social disparities. In other words, how property is owned, controlled, and distributed directly impacts society's inequality level. The fundamental questions about the nature of ownership, the rights of individuals to own various forms of property, and the legal and regulatory frameworks that govern property relations should be inquired. Addressing these questions is essential for understanding and addressing the structural drivers of social inequality within societies.

1.3.4. What are the reasons for optimism about inequality?

“From this historical analysis, one important conclusion emerges: what made economic development and human progress possible was the struggle for equality and education and not the sanctification of property, stability, or inequality.” (Piketty, 2020: 3)

Ensuring social and economic equality fosters significant advancements in economic development and human progress. The concept of sanctifying poverty, where societal structures and ideologies persuade the poor to accept their socioeconomic status, often serves to perpetuate inequality. For example, *gratitude* in monotheistic religions can sometimes be misused to convince the poor that their place in society is divinely ordained, discouraging efforts to seek better living conditions²⁰. Similarly, *the caste system* in South Asia historically entrenched social and economic disparities by defining individuals' roles and rights based on their birth. In the previous sections, we included the views that the rich should be rewarded more for their hard work and merit in their current situation (Piketty, 2020: 28). Based on this view, politicians can also sanctify poverty; for instance, specific authoritarian regimes may perpetuate narratives that justify economic inequality as a necessary sacrifice for

²⁰ Leaving aside the debate about whether blessing the poor's economic and social condition and protecting the rich is an abuse of religion or “inherent” in religious teachings, Piketty (2020) discusses the zakat tax specific to Islam. He makes the following noteworthy observation: In the case of oil monarchies, gifts proportional to the wealth of oil sheiks and billionaires can provide significant resources to the community. Additionally, these gifts offer invaluable information about the distribution and evolution of wealth within these societies (Piketty, 2020: 408).

national stability or growth. However, recognizing these mechanisms allows for critically reassessing societal values and implementing policies that promote equality. Societies can dismantle these entrenched inequalities by focusing on equitable access to education, fair distribution of resources, and inclusive governance. This approach improves individual well-being and catalyzes broader economic and social progress, offering substantial reasons for optimism in the fight against inequality.

Dalton (1920) claims that most distribution theories deal with income distribution among production factors. In addition, according to Dalton, interpersonal economic distribution, which needs to be addressed directly, has not been enough to occupy the agenda of economics literature. However, today, the economic distribution problem is more common among economists (Blanchard and Rodrik, 2021:12).

The Prospect of Upward Mobility (POUM) hypothesis suggests that perceptions of social mobility and opportunity shape citizens' policy attitudes toward redistribution. Manza and Brooks (2020) tested this hypothesis to determine how significant the prospect of upward mobility or social mobility expectations is for American citizens in influencing policymakers' decisions. They explored several key issues. Firstly, they examined how recent trends have influenced mass political attitudes, especially in a scenario where economic growth does not automatically lead to better living standards for most individuals and families, a point previously made by Mischel et al. (2012) and Noah (2012). Secondly, they investigated whether rising inequality and decreasing upward mobility have affected ordinary Americans' political and policy preferences. Previous studies have found cross-national evidence supporting Americans' optimism about social mobility expectations (Piketty, 1995; Bénabou and Ok, 2001). This optimism may explain the less egalitarian policy preferences in the U.S. compared to the more egalitarian attitudes in other wealthy democracies (Alesina et al., 2018). Manza and Brooks's (2020) findings demonstrate that POUM beliefs significantly influence policy attitudes. Higher optimism regarding mobility prospects is linked to decreased support for taxation and equality policies. Put differently, a persistent and strong belief in the Prospect of Upward Mobility (POUM) has contributed to the slow public reaction to growing inequality. The findings of this study are crucial, as they highlight the impact of mobility perceptions on policy attitudes. Additionally, the research question itself is significant because it

encapsulates the ongoing efforts of today's academics to understand and address equality issues²¹.

Positive developments regarding inequality can be observed in some periods, interestingly during wars and natural disasters (Atkinson, 2015; Bănică et al., 2020). Could a more just society be possible in the future with the experiences gained from these processes in which inequality was reduced? So, what is the main reason for this decrease? What do states do right in the name of inequality in these processes, and inequality decreases? Atkinson (2015: 55-59) states that World War II departed from the rising income inequality trend observed in many countries before the war. Instead, there was a more widespread reduction in inequality during this period. The war led to significant economic and social changes. In this context, it is possible to mention the transformative effects of war and its disruptive effects. The decrease in inequality after the war can be cited as an example of one of these transformative effects. The postwar settlement, which included agreements and policies established after the war, shaped the economic landscape. Atkinson (2015) implies that these policies contributed to reduced inequality. Even in countries where the existing government remained in power, social attitudes evolved, fostering a stronger sense of social solidarity. This shift influenced policies to reduce inequality, as a collective commitment to fairness and justice became more prominent in public discourse. Consequently, governments were prompted to implement measures that addressed disparities and promoted a more equitable distribution of resources. Some examples demonstrate that the social state's concept strengthened after the war.

Atkinson (2015) discusses two significant examples from the United Kingdom: the 1944 Education Act and the election of the Labour government in 1945. These events led to the introduction of substantial policies, such as the National Health Service and a unified National Insurance system. In the United States, a similar shift occurred during the *Great Compression* period, characterized by a decrease in wage disparity. This reduction in inequality was attributed to labor market interventions, including actions by the National War Labor Board, President Roosevelt's New Deal

²¹ Manza and Brooks (2021)'s findings are an essential example of the sanctification of poverty arguments for downplaying inequality mentioned above. The fact that expectations of upward mobility in the USA are associated with less egalitarian policies aligns with the concept of the "land of opportunities."

policies, and the strengthening of trade unions (Atkinson, 2015: 58; Piketty, 2020: 29-34). During and after World War II, income inequality decreased significantly. However, the permanence of these changes in social policies and their current effects on inequality remains controversial. The period from 1945 to 1980 contains positive examples of increased equality. It is essential to learn lessons from this and similar periods in the fight against inequality. These historical examples highlight how decisive policy actions and a solid social state can effectively reduce disparities. They also underscore the importance of maintaining and adapting these policies to address contemporary challenges and ensure long-term equity.

As shown in the previous section, income inequality has recently experienced an upward trend in numerous countries, although it has not always followed a consistent trajectory. This fact highlights the importance of examining historical data on inequality to gain insights into when and how it has declined. By studying these periods, we can gather valuable lessons and insights. To accomplish this, obtaining a comprehensive and extended dataset that captures income inequality over an extended period is crucial (Atkinson 2015: 45)²².

Evidence from household surveys conducted in various European countries indicates that the welfare state initially managed to maintain its position in the face of growing income inequality. However, it struggled to keep pace with the rising inequality over time. In the UK, official studies tracking the impact of taxes and benefits reveal a consistent increase in income inequality from market sources starting in 1961. By the late 1970s, the Gini coefficient for market income had risen by approximately five percentage points. In contrast, when considering final income, which includes cash transfers, benefits in kind, and adjustments for direct and indirect taxes, there was no discernible upward trend in inequality from 1961 to the mid-1980s. The difference, or the mathematical contribution of taxes and transfers, expanded to counterbalance the increase in market inequality, resulting in a decline in post-tax disparities during the 1970s. It is important to note that this calculation is purely

²²Atkinson (2015: 78) highlights Latin American countries that have experienced a decrease in income inequality, demonstrating that periods of reduced inequality can occur outside of catastrophic events. According to Atkinson, the ideal of a more equal society, which emerged from the lessons learned during these periods, has not been entirely abandoned. This provides reasons for optimism about the future. The author notes that the pursuit of a more equal society, inspired by past successes in reducing inequality, continues to influence current policies and social attitudes (Atkinson, 2015: 301-308).

mathematical and does not consider how market incomes would have fared without state transfers and taxes. The welfare state's ability to use taxes and, notably, cash transfers significantly maintained its position during this period (Atkinson, 2015: 65-66). The state's power in controlling income distribution can be measured by comparing market Gini data with disposable income Gini data. If the economic growth performances of countries with significant differences are examined, we can observe how state intervention in income distribution affects economic growth (OECD, 2011).

Two primary policies effectively eliminate income inequality: taxation (direct redistribution) and state aid (social programs). It is argued that welfare or social assistance programs play a more critical role than taxes in reducing income inequalities (OECD, 2011: 18). Over the last two decades, there has been a shift away from highly progressive income tax rates and the elimination of net wealth taxes in some countries (Cimadamore et al., 2016). Progressive tax rates mean higher-income individuals pay more of their income in taxes. The elimination of these tax policies has made the tax system less redistributive. Despite changes in tax policies, top earners receive a larger share of total income in many countries. This means they have a greater capacity to pay taxes than before. In response, governments are reconsidering the role of taxation in reducing income inequality. This reassessment goes beyond raising marginal tax rates (tax rates on additional income) and includes measures such as *Tackling Offshore Tax Evasion*: Governments are working to combat tax evasion through offshore accounts, which can be used to hide income from taxation (Cockfield, 2021). *Eliminating Tax Expenditures*: Some tax breaks or deductions disproportionately benefit higher-income groups (Joumard et al., 2013). Governments may reevaluate and eliminate these tax expenditures. *Reassessing Property and Wealth Taxes*: This involves looking at taxes related to property and wealth, including the transfer of assets (inheritance or estate taxes) (Piketty, 2011; Piketty and Zucman, 2014; Ohlsson, 2020). *Focus on Employment*: "Employment" as a tool in the fight against inequality can be expressed with the metaphor of the elephant in the room, meaning the most obvious solution to economic inequality. Creating better jobs, helping people escape poverty, and providing real career opportunities are critical challenges in addressing inequality (Kochan and Riordian, 2016; Van Der Hoeven, 2011).

In conclusion, the strategies designed to combat income inequality underscore the significance of intelligence in shaping effective policies besides determination. In essence, these approaches should be rooted in the principle of efficiency, which lies at the heart of economics' fundamental objectives. Addressing income inequality necessitates a careful allocation of resources, emphasizing the importance of avoiding waste in pursuit of equitable distribution. It is abundantly clear that the role of state intervention is indispensable in resolving pressing social issues. By aligning the efforts with efficiency and social responsibility principles, societies can work towards a more equitable and prosperous future for all.

1.4. CONCLUDING REMARKS

Until this section, we have presented numerical and visual shreds of evidence demonstrating the existence and persistence of economic inequality within countries over the last 40 years. We noted that, compared to the 18th century, there has been some progress in addressing inequality. However, this progress should be interpreted cautiously as underlying disparities continue. Furthermore, we highlighted that economic inequality has diversified alongside human development. Although the current situation is better than in the 18th century, economic inequality remains severe. We have also outlined the reasons for optimism about reducing inequality in the future. Our primary aim was to give information about the ongoing debates in the literature regarding economic disparities. The next objective is constructing a macroeconomic model that contrasts market dynamics with state interventions. This model will then be tested for its compatibility with real-world data to provide insights into practical strategies for mitigating economic inequality.

There has been a recurring critique regarding the ability of economic modeling to swiftly recognize and adapt to the dynamic shifts occurring in the global landscape (Krugman, 2009 How Did Economists Get it so Wrong?). This criticism contends that economic models often overlook our world's evolving realities, occasionally becoming overly absorbed in their academic pursuits. However, amidst these criticisms, it is essential to acknowledge the contributions of economists who have diligently delved into the pressing issue of escalating income inequality and its

multifaceted determinants. These factors encompass the far-reaching influences of globalization, the transformative impact of information and communications technology, the expansion of financial services, shifts in wage norms, the diminishing sway of trade unions, and the regulation of redistributive tax-and-transfer policies (Dabla-Norris et al., IMF, 2015; Eichengreen et al., IMF, 2021; OECD, 2011). These aspects collectively form the focal point of this study.

When discussing these mechanisms, there is a risk of giving the impression that inequality is solely determined by external forces beyond people's ability to influence. However, it is essential to recognize that these factors are not entirely beyond our control or separate from our economic and social systems. For example, globalization results from decisions made by international organizations, national governments, corporations, and individuals in their roles as workers and consumers. Similarly, the trajectory of technological advancement is influenced by decisions made by companies, researchers, and governments. Moreover, the growth and regulation of the financial sector are subject to political and economic choices, even though this expansion often responds to the financial needs of an aging population seeking retirement planning options. Because the free market is a relative concept, man can impose different restrictions on the market. Child labor was employed with the free market argument during the Industrial Revolution in England. However, legal limits have been set on this practice because it is against human rights (Chang 2011). In many countries, minimum wage laws are implemented to ensure that workers are paid a baseline wage deemed necessary for a decent standard of living. These laws restrict the absolute freedom of employers to set wages as low as they wish in a completely free market. Another example of human intervention in "nature" or the market is the measures taken by states to protect the environment. Governments often introduce regulations to protect the environment. These regulations limit businesses' freedom to pollute or exploit natural resources without consequences. In a genuinely free market, there would be no such restrictions, but environmental concerns lead to the imposition of regulations. It is possible to increase examples of the relativity of the free market. Although external factors impact, it is crucial to acknowledge that human decisions and policies within the economic and social system framework shape many elements.

Recognizing this fact allows us to understand better our ability to influence these forces and effectively tackle the issues associated with increasing inequality.

One of the primary benefits of reducing economic inequality is that it promotes equal opportunities, an essential component of modern democratic societies. In addition to external factors such as geography and natural disasters, internal factors such as the weakness of inclusive institutions or the strength of extractive institutions contribute to unequal societies (Acemoglu and Robinson, 2012; Acemoglu et al., 2005; North, 1990). Thus, there is a practical and compelling reason to strive for lower poverty and inequality, as very high inequality does not align with a well-functioning democracy. Economic inequality contradicts the notion of a good society; therefore, the solution is to reduce disparities, regardless of the reasons. However, the process of achieving this is challenging and intricate. This study conducts theoretical and empirical inquiries on how inequality will evolve in democratic societies.

CHAPTER TWO

UNRAVELING THE TRIANGLE: FINANCIAL INTERMEDIATION, INCOME DISTRIBUTION, AND GOVERNMENTAL ROLES: THEORETICAL FRAMEWORK

2.1. INTRODUCTION

“All models are wrong; some are useful.” (Box, 1987: 74)

Building on the previous chapter, it is clear that economic inequality is pervasive and, to some degree, inevitable. If increasing inequality is not carefully tracked and examined, it can result in numerous political, economic, and social crises.

Understanding that this study does not provide a definitive answer to inequality is crucial. The ideal level of inequality and the most socially desirable policies and institutions to achieve it are subjects of ongoing public deliberation and political processes. We aim to facilitate discussions on economic inequality by providing more precise and transparent information about income and wealth, empowering you to contribute to these critical debates.

The aim is to link macroeconomic phenomena – such as nationalization or expropriation and privatization policies, capital accumulation, and the evolution of public debt – with microeconomic trends that focus on inequality in individual earnings, social transfers of the state, personal wealth, and debt to equip citizens to make such decisions.

Simon Kuznets, a towering figure in economic theory, is widely recognized for his pioneering work on income distribution and inequality. Kuznets’s (1955) *“Economic Growth and Income Inequality”* is often cited as the first systematic attempt to analyze the relationship between economic growth and income inequality using empirical data. His findings continue to shape economic development, inequality, and policy-making discussions, underscoring the profound historical context of our research and the weight of the foundation on which it stands.

In this paper, Kuznets used historical data from a range of countries to show that income inequality tended to increase during the early stages of economic development but then began to decline as countries reached higher levels of

development. He argued that various factors could explain this pattern, including changes in labor force composition, technological progress, and economic structure shifts. Although Kuznets did not build a theoretical model, Kuznets's work on income distribution and inequality laid the foundation for a range of subsequent studies in this area. His findings continue to influence economic development, inequality, and policy-making discussions. However, it is worth noting that earlier theoretical works touched on issues of income distribution, which predate Kuznets' creation. Ricardo's theory of wages (Ricardo, 1817) and Karl Marx's analysis of capitalist exploitation (Marx, 1867) provide critical insights into early economic thought on these issues.

Despite its stated features, Kuznets' hypothesis is open to debate. One of the most consistent objections to the Kuznets hypothesis is that income inequality has recently increased in developed, wealthier countries (Piketty, 2014: 23; 2018: 19). Milanovic (2024) states that inequality across countries continued to rise during the last 20 years of the twentieth century. Although the growth of Asian economies has reduced inequality across countries, the demographic composition of the global richest has not changed significantly in the first quarter of the 21st century, and there is no evidence of a more equitable income distribution. In other words, the global richest no longer consists solely of individuals from Western economies but also includes those from Asian economies (Milanovic, 2024). According to Milanovic (2016), the descending part of the Kuznets curve, the claim that inequality will decrease as income rises in prosperous countries, was valid until the 1980s. Since then, contrary to expectations from the hypothesis, this relationship has disappeared, and the curve has turned upward instead of descending. The fact that income inequalities in the USA, UK, and even in countries such as Sweden and Germany, which are relatively more egalitarian, are increasing beyond discussion is irrelevant to the Kuznets hypothesis (Milanovic, 2016: 50-51). Piketty (2014: 23) visualized the income share of the wealthiest 10 percent in the USA between 1910 and 2010. According to this figure, the inverted U-shape hypothesis in economic inequality between 1913 and 1948, the subject of Kuznets's (1955) study, cannot be rejected. However, in the post-1948 period, the share of income the richest 10 percent received remained relatively stable, fluctuating between 30-35 percent until 1980. After 1980, this share increased gradually, reaching 45-50 percent by 2010. This trend highlights the complexities and

nuances of economic inequality over a century. It also underscores the ambiguity of the “long-term,” which challenges economic researchers. If the long term is defined as the 1910-2010 period, we are compelled to reject the inverted U hypothesis. This is because, while the hypothesis holds for the initial period studied by Kuznets, the latter part of the century shows a clear upward trend in income inequality, contradicting the initial hypothesis.

Several alternative theories have been proposed to explain the relationship between economic growth and income inequality, some of which challenge and supplement the Kuznets hypothesis (Gilder, 1981; Krugman, 2003; Atkinson, 2006;). A body of literature evaluates Kuznets’ hypothesis, which describes the trade-off between economic inequality and growth (Reiff, 2012). This literature proposes solutions to economic inequality through supply-side economic theories and formulates policies accordingly. These theories posit that “to help the poor and the middle classes, one must cut the taxes on the rich” (Gilder, 1981: 188). Gilder (1981) argued that if we genuinely want to assist the poor, we must abandon progressive taxation, as “regressive taxes actually benefit the poor!” He suggested that reducing taxes on the middle class merely makes the tax system more progressive and diminishes the productivity of the wealthy. This viewpoint explains the high inequality seen in the United States between 1910 and 1939, as previously cited concerning Piketty (2014). Reiff (2012) argued that the period, defended by advocates of supply-side economics on the premise that economic growth would increase the absolute shares of those at the bottom through the trickle-down effect, resulted in the Great Depression. Although the top earners’ income did not proportionally increase the shares of those at the bottom, the justification relied on the notion that absolute economic growth would benefit everyone (Reiff, 2012: 126).

Piketty (2014:15) argues that Solow (1956) is another economist whose approach to inequality diverges from Kuznets’, though their shared optimism is notable. According to Solow (1956), savings, meaning indirect capital accumulation, drives economic growth, ensuring that all stakeholders benefit equally as output, profits, and wages grow simultaneously. However, at this point, it is crucial to consider the consistent objections to economic inequality from a demand-side perspective. Stiglitz (2018) emphasizes real-world adjustment processes’ decentralized and

complex nature, contrasting with models that assume instantaneous equilibrium. For instance, reducing wages due to unemployment can decrease aggregate demand, potentially worsening unemployment levels. This effect may be more pronounced when there are differences in the marginal propensity to consume (MPC) among different groups. If wages fall, income shifts towards profits, and capitalists have a lower MPC than workers, aggregate demand can decline (Kaldor, 1957; Pasinetti, 1962). Consequently, the income growth rate will be negatively affected, in contrast to Solow's (1956) findings. As Stiglitz (2018, p. 90) aptly notes, "Assumptions matter. All models make simplifications. The question is, as we have said, what simplifications are appropriate for asking what questions? The danger is that the simplifications bias the answers, sometimes in ways we are unaware of."

According to microeconomics, an individual's wage is determined by his/her marginal productivity. This fundamental approach explains economic inequality among people: those who work less earn less, while those who work more earn more (Jehle, 2010: 125-161; Varian, 2014: 350-364). In this context, studies in the literature often explain income inequality through wage differences (Bernard and Jensen, 2000; Ashenfelter and Layard, 1983). Economic analysis employs supply and demand frameworks to elucidate wages and wage differentials. For instance, economic theory posits that workers' wages, whether skilled or unskilled, are set to balance supply and demand. When the increase in labor demand surpasses the increase in labor supply, wages fall (Borjas, 2013). Understanding changes in income inequality necessitates identifying the variables that shift supply and demand curves. These variables include technological advancements, globalization, and education levels (Goldin and Katz, 2008). Additionally, it is crucial to consider the factors affecting the rate of high qualifications or wealth accumulation of individuals in the economy. Factors such as access to quality education, inheritance laws, and social mobility significantly influence these dynamics (Piketty, 2014).

One of the factors affecting the labor market is the increase in the number of residents in a country, which leads to a higher labor supply. A notable example of this is legal and illegal immigration (Card, 1990). Additionally, advancing educational opportunities for individuals significantly influences the supply of skilled and unskilled labor (Goldin and Katz, 2008). Regarding demand, technology-induced

changes represent another critical labor market component (Autor et al., 2003; Acemoglu and Autor, 2011). The development of new technologies can significantly impact the labor market by either increasing the demand for labor with specific skills or reducing the need for such labor in certain sectors. For instance, skill-biased technological change (SBTC) can drive the demand for highly skilled workers who can operate and develop advanced technologies. Conversely, the need for low-skilled labor may diminish due to automation. If technologies that favor skilled workers generate greater profits, businesses will be motivated to develop and adopt these techniques. Acemoglu (2000) argues that the profitability of skill-biased techniques drives firms to develop and adopt such technologies. Consequently, machines that complement skilled workers become more profitable to produce and utilize when there is a larger pool of skilled workers, leading to an increased demand for skilled labor (resulting in a simultaneous increase in the supply and demand for skilled labor). Throughout the 20th century, technological advancements have increasingly favored skilled workers due to the steady rise in the supply of skilled labor. From this perspective, the development of skill-biased technologies exacerbates income inequality through wage differentials and entrenches it over time (Acemoglu, 2000; Autor et al., 2006).

As mentioned above, technological advancements are causing significant changes in the labor market regarding the quality and quantity of available jobs. These changes have shaped individuals' perceptions of the potential impacts of technological developments on economic inequality, as reflected in Geiger's (2019) survey results. According to the survey, people are increasingly concerned about how these changes might affect their employment opportunities, wages, and overall lifestyle. Over the past half-century, technological advancements have been focused on labor-saving measures and improving the quality of work. The introduction of digital technologies has decreased demand for mid-level employees performing routine tasks and increased demand for high-skilled workers with problem-solving abilities and technical knowledge (Autor, 2019). The evidence suggests that such advancements have

disrupted the labor force's dynamics and contributed to inequality (Acemoglu and Restrepo, 2019)²³.

Despite legitimate concerns about automation replacing mid-level employees, guaranteeing widespread job shortages due to technological advances contradicts the opposing literature. Historical analysis of technological revolutions shows that productivity increases resulting from technological advances do not necessarily lead to reduced employment opportunities. On the contrary, such productivity growth can increase labor demand (Autor, 2015; Bessen, 2019). For example, Autor (2015) argues that automation and technological advances can replace specific jobs, create new job opportunities, and increase productivity and economic growth, leading to higher employment levels. Bessen (2019) further supports this view by showing that technology often complements human labor, making workers more productive and increasing their value in the labor market. Therefore, although concerns about the potential negative impact of technological developments on employment and inequality are supported, as Acemoglu (2000) and Acemoglu and Restrepo (2019) emphasized in their work on skill-based technological change, it should be considered that the labor market has many dynamics. It is also necessary to consider the literature suggesting that technological development can lead to positive results in the labor market, thus reducing some of the adverse effects of economic inequality. The primary purpose of evaluating these perspectives is to highlight technology's complex and multifaceted impact on income inequality and the labor market. Because, as in almost every economic phenomenon, there are many details in the labor market that researchers and policymakers who want to work in this field need to pay attention to. In concluding this discussion, it is clear that the effects of technological advances on income inequality are not uniformly adverse and have a significantly broader economic context.

²³ Acemoglu and Restrepo (2019) emphasize two distinct effects of technological developments on the labor market. The first effect is a reduction in labor demand due to machinery substituting for labor. The second effect is an increase in labor demand by creating new tasks where labor has a comparative advantage. This dual impact on the labor market is not unique to their study. Autor (2015) also explores these two effects, discussing their implications on employment and wages. Thus, the studies by these authors provide evidence supporting two different perspectives on how technology affects labor markets.

Discussions about the trade-off between economic growth and inequality are grounded in classical welfare economics, precisely the trade-off between equity and efficiency. At this stage, it's essential to highlight the distinction between equality and equity. Equality involves providing the same resources or opportunities to every individual or group. On the other hand, equity acknowledges that people have varying circumstances and distributes the necessary resources and opportunities to ensure a fair result. The reason for emphasizing this difference is evident in Atkinson's (2015) book "Inequality: What Can Be Done?" Atkinson (2015) frequently combines the concepts of "efficiency" and "equity" (not efficiency and inequality) because these terms capture the essential trade-offs and complementarities in policymaking to reduce inequality. The term "equity" is significant in discussions about fairness and justice, highlighting the importance of adjusting interventions to consider different needs and starting points. This approach ensures that the policies implemented effectively level the playing field. Conversely, Atkinson (2015) uses "inequality" instead of "inequity" when discussing economic growth and inequality relations. The term "inequality" is commonly used in economic literature to describe income, wealth, and opportunity disparities between individuals and groups. "Inequity" refers more broadly to injustice or unfairness and is used less frequently in technical economic discussions. Atkinson's (2015) choice to use "inequality" allows for a more explicit discussion of measurable disparities in research related to economic inequality. By distinguishing between process-related (equity) and outcome-related (equality) disparities, we can measure justice and equality more effectively and produce solutions. This approach ensures that interventions address the root causes of inequality, leading to more sustainable and just outcomes.

The theoretical discussion about efficiency and equity is based on *Pareto efficiency*. To better illustrate the distinction between the rich and the poor or to measure economic inequality, let us assume a population divided into 100 parts ranked by their income level. In a decentralized system, where there is no government intervention, it is theoretically proposed that the market will yield the best results in terms of total income regardless of how it is distributed among these 100 groups (Atkinson, 2015: 245). However, the debate about market efficiency becomes more apparent when the state is introduced into the scenario. Suppose the government taxes

the top 1% and redistributes this income to the rest of society. In doing so, since the revenue from the tax cannot be transferred without any loss, the total income will decrease (see Arthur Okun's Leaky Bucket discussion from the first chapter). This scenario highlights the inherent trade-offs between equity and efficiency in economic policy. Furthermore, there is a "risk" that the income of the top 1% might be reduced to the extent that no taxes can be collected. Here, the question arises: What is the practical significance of this theoretical discussion on the trade-off between efficiency and equity? It was previously mentioned that inequality can most easily be rooted in the labor market. In this context, the practical importance of the efficiency-equity trade-off can be examined through its manifestation in the labor market. Atkinson (2015: 244-248) discusses the potential efficiency costs of government initiatives to reduce inequality in the labor market. For instance, individuals facing higher progressive income taxes might lower their work efforts compared to what they would do if they kept their entire earnings, as efficiency costs emerge from the distortion of their decisions. Likewise, employers dealing with higher wage expenses due to rising minimum wages may reduce the number of jobs they offer. Furthermore, the government's management of guaranteed job programs could be inefficient or susceptible to corruption by officials or contractors. However, it is essential to note that these outcomes are not universal and must be assessed based on individual circumstances. Moreover, Atkinson (2015) suggests that a combination of lifetime capital receipt tax and minimum inheritance could redistribute wealth, giving individuals a fresh start and overcoming barriers such as borrowing to start a business. Increased child benefits could lead to better nutrition for children, allowing them to concentrate more effectively in school. Families no longer trapped in poverty because they are not deprived of means-tested benefits could invest more in education, thereby providing the skilled workers that employers currently lack. Before all this, the realism of the assumptions of the first welfare theorem is left to the reader's judgment. These assumptions assert that firms and households are subject to perfect competition. Firms and individuals do not have control over prices (including wages). A complete set of markets balances the supply and demand for all goods and services now and in the future. And individuals and firms have perfect information.

Relaxing the strict, perfectly competitive market assumptions mentioned above could theoretically broaden the discussion of equity and efficiency trade-offs. In a fictional world where these assumptions hold, markets would function so efficiently that individuals who lose their jobs could effortlessly find employment in other sectors, thereby enhancing economic productivity growth. This scenario would ensure that labor resources are used efficiently, skills are matched with demand, and economic stability is maintained, supporting overall economic productivity. However, questioning the realism of these assumptions is essential. In reality, transitioning to new sectors is not always easy. It often requires relocation or acquiring new skills, creating significant barriers for some employees. Those without these opportunities may be trapped in declining sectors where labor demand is decreasing (Acemoglu, 2000; Autor et al., 2006). This highlights the need for state intervention to address these barriers and support a dynamic and growing economy.

A critical aspect of Kaldor's six stylized facts of economic growth sheds light on the connection between economic growth and income distribution (Kaldor, 1957: 591-593; Kaldor, 1961: 177-179). Kaldor's fifth stylized fact, which states that the labor share of income remains constant over time, has been a subject of ongoing debate in the literature on income distribution. Some scholars have argued that the constant labor share can be explained by substituting capital for labor as the economy grows, leading to a decline in the demand for labor relative to capital (Karabarbounis et al., 2013: 1-6; Caselli and Feyrer 2007; 565-566; Tallo: 2017: 24). Others have emphasized the role of institutions and policies in shaping income distribution, highlighting the potential for government policies to promote a more equitable income distribution and reduce inequality (Acemoglu and Guerrieri 2008: 492-493; Piketty and Zucman, 2014: 1255-1262; Jones et al., 2009: 24-25). Regardless of the underlying mechanisms, the relationship between economic growth and income distribution remains an important area of inquiry in both the Kaldorian and broader literature on economic development.

According to Piketty and Zucman (2014), the wealth/income ratio for the US and Europe between 1870 and 2010 follows a U-shape. The ratio of wealth to income serves as a stark indicator of economic inequality. For instance, a high wealth/income ratio signifies significant economic inequality, as the wealth the affluent hold grows

much faster than income. This underscores the urgent need to address economic inequality, as it threatens to widen the wealth gap. The theoretical foundations of Piketty and Zucman's (2014) definition of economic inequality are based on the Harrod-Domar-Solow formula. That is: $\beta = \frac{s}{g}$.

Where β is the wealth/income ratio, s represents the saving rate, which indicates the proportion of income set aside as savings, and g represents the economic growth rate, including income growth and population growth. According to this formula, a higher saving rate means more income is being set aside and accumulated as wealth. When individuals or households save a more significant portion of their income, the total wealth increases. A higher economic growth rate (including income and population growth) means the income base is expanding more rapidly. This tends to dilute the accumulated wealth over a more significant income base, thus reducing the wealth/income ratio. For example, when the saving rate is high and the growth rate is low, the wealth/income ratio becomes high, indicating that wealth accumulates rapidly compared to income. This situation can lead to greater economic inequality as wealth becomes concentrated among those who save the most. Conversely, the wealth/income ratio is lower when the saving and growth rates are low. This suggests wealth accumulation is slower than income growth, which can mitigate economic inequality. This U-shaped pattern indicates significant implications for economic inequality and the role of state intervention. Before World War I, the high wealth/income ratio reflected substantial economic inequality due to minimal restrictions on capital markets. Following the wars, interventions such as progressive taxation and social welfare programs reduced inequality, leading to a decline in the wealth/income ratio. However, post-1980s deregulation and tax cuts reversed this trend, causing the ratio to rise again and signaling an increase in inequality. This U-shaped pattern underscores the critical impact of state policies on wealth distribution and economic equality. Another crucial factor that undeniably impacts economic inequality, as measured by the wealth/income ratio, is the elasticity of substitution between labor and capital. According to Piketty and Zucman (2014), the elasticity of substitution between capital and labor has increased in the twentieth and twenty-first centuries because capital can take various forms (Piketty and Zucman, 2014: 1262). Consequently, the share of capital in production has also risen. This shift has indirectly

impacted inequality by reducing the demand for labor, thereby diminishing labor's bargaining power (Milanovic, 2016: 113). Milanovic (2016) argues that the primary reason for the labor's bargaining power reduction post-1980 is the shift from manufacturing to services globally. The service sector is much more heterogeneous in terms of occupational spectrum and skills than the manufacturing sector. Milanovic (2016) attributes the significant wage differentials to this heterogeneity. The author emphasizes that the diverse structure and more minor firm scales in the service sector make it difficult for workers to organize and unionize. Additionally, the common interests among various worker groups are often ambiguous, and workers are physically separated, reducing the effectiveness of union organizations. Milanovic (2016) highlights that post-1980, there has been a universal decline in union density in rich countries, which serves as evidence of the weakening bargaining power of labor relative to capital. Milanovic cites Solow's 2015 presentation at the City University of New York to support this conclusion, suggesting that the decline in labor share in wealthy countries can be attributed to the distribution of rents in favor of capital owners during labor-capital negotiations. Furthermore, Acemoglu's (2000) concept of skill-biased technical change can be linked to the weakening of labor's bargaining power. Skill-biased technical change, as mentioned before, refers to technological advancements that favor skilled over unskilled labor, increasing demand for skilled workers while potentially displacing unskilled workers. This dynamic exacerbates income inequality as skilled workers command higher wages, and the bargaining power of unskilled labor diminishes due to reduced demand. The thesis presents a robust model demonstrating the impact of the imperfect conversion of savings into investment on various economic ratios, including capital/labor, output/capital, and output/labor ratios. Additionally, the model uses the measure of the banking system's total factor productivity to provide insights into the shares of the factors in production. This approach highlights the significant role that financial intermediaries play in the distribution of economic resources and the resultant inequality. By incorporating these dynamics into the model, the thesis aims to comprehensively understand the interplay between savings, investment, and income distribution.

The question that needs to be asked is: Should the increase in this ratio be interpreted negatively? The answer to this question is open to debate, primarily when

evaluated within the context of Solow's (1956) and Pasinetti's (1962) studies mentioned above. Supply-side growth models (Solow, 1956) argue that increasing the saving rate will ensure income equality, while demand-side growth models emphasize the importance of effective demand (Pasinetti, 1962). Demand-side growth models suggest that capitalists have a higher propensity to save than workers and that income distribution determines consumption and investment (Kaldor, 1957; Pasinetti, 1962; Stiglitz, 2018). For example, income distribution between wages and profits is crucial in these models. Redistributing income in favor of profits will negatively impact total demand and, consequently, the growth rate. Moreover, according to this growth model, which has significant outcomes, increasing workers' savings in an economy assumed to consist of capitalists and workers will also increase inequality between workers and capitalists since it will increase the capitalists' share of the economy. These discussions on demand-side and supply-side economics concerning economic growth and inequality make policymakers consider the necessity of taxing capital. A high wealth/income ratio is significant because it indicates existing wealth inequality and potential wealth inequality passed down through generations. Suppose policymakers adopt a scenario where increased savings rates are allowed, and economic growth is targeted with these policies while permitting inequality. In that case, the burden of economic growth will fall on the wealthiest, who will be the beneficiaries of this growth. It is not difficult to predict that this wealth will be transferred to future generations unless governments are strong enough to prevent it. Elgin et al. (2023) reveal that federal (decentralized) governments that adopted fiscal and macro-financial policies to mitigate the adverse effects of COVID-19 on economies succeeded in reducing economic inequality. However, countries that adopted monetary policy tools to combat the adverse effects of COVID-19 were unsuccessful in addressing economic inequality, regardless of whether they were centralized or not. Evaluating Elgin et al.'s (2023) findings through an example helps us to understand that economic growth, despite economic inequality, risks making inequality permanent. Imagine two different countries facing COVID-19 adopting two different policies. The first adopts fiscal and macro-financial policies, while the second adopts monetary expansion. In the first case, the country will assist citizens who are likely to become unemployed due to reduced social mobility during the pandemic (such as hairdressers, clowns, public

transport drivers, dentists, etc.). In contrast, the second will be busy distributing low-interest loans to those with the most excellent access to the financial system. In the second country, economic growth will exist at the expense of equality, and those who increase their wealth due to this monetary expansion will pass their wealth to future generations, provided there is no government strong enough to prevent it. This is a matter for policymakers. The reality that emerges from these discussions in the literature is that “success” cannot be achieved by using a single indicator to measure the progress of societies. The critical issue is defining the content of “success.” Is success economic growth or economic equality for societies? Delving deeper, is success ensuring economic growth through laissez-faire markets, which are inherently “good” and “free,” or is it ensuring economic growth by intervening in “ruthless” markets through policies that promote equality, opposing the “survival of the fittest” law? Or can success be achieved by considering all these criteria? Leaving aside the debates about what is good, bad, free, or ruthless, economic policies’ multifaceted and complex nature becomes evident. As Chang (2011) stated, the key to economic success for policymakers is not knowing tricks or applying magic formulas but being dedicated. Just as a parent does not need to be a doctor, chef, and driver simultaneously for their child to succeed and grow but needs to be dedicated and want the best for their child, policymakers must show the same dedication to ensure the success and growth of societies and the economies they inhabit. The primary motivation of this thesis is to develop an approach that incorporates both supply-side and demand-side considerations in economics. This framework aims to provide a balanced analysis that does not rely solely on one school of thought. The theoretical model constructed within this thesis includes neoclassical assumptions but also addresses economic inequality and imperfect financial intermediation. By acknowledging the limitations of financial intermediaries and their potential imperfections, the model offers a more comprehensive understanding of the savings-investment process. Therefore, the theoretical foundation of this thesis is built on a diverse set of economic principles, reflecting a multifaceted approach to analyzing economic phenomena. Another theoretical debate on inequality centers around political economy. Political economy theory emphasizes that the fundamental motivation shaping the state is inherently human-centered (Weingast and Wittman, 2008). The arguments of political economy

theory suggest that progressive taxation, minimum wage laws, and social welfare programs are essential tools for reducing inequality (Stiglitz, 2012; Piketty, 2014; Alesina and Glaeser, 2004). As will be discussed in the theoretical framework of the thesis, the government and economic inequality are present. In this model, inequality is acknowledged through the median voter theorem. This theorem implies that as long as inequality exists, the state strives to address it by responding to the demands of the average voter, who is the key decision-maker. From this perspective, the state's role is to regulate economic activities and implement policies to reduce income inequality. Specifically, the median voter theorem posits that state policies are shaped by the general demand of the populace, ensuring that efforts to address inequality are central to policy formulation. Consequently, while the thesis's theoretical framework does not claim to fully encompass the assertions of political economy theory, it does incorporate the theory's concerns by demonstrating the state's role and the mechanisms through which it operates in contexts where inequality persists. The theory of political economy asserts that the state is a crucial actor in the fight against inequality and that human motivations fundamentally shape economic policies (Cornia and Andrea, 2001). By addressing the demands of the average voter, the state plays a pivotal role in creating a more equitable society. Therefore, the theoretical foundation of the thesis reflects a comprehensive approach, combining the complexity and multifaceted nature of economic and social policies aimed at reducing inequality.

The above discussion should be expanded by emphasizing that the state's economic role is not solely redistribution. While the state can directly impact inequality through redistribution, it also indirectly affects economic inequality as a significant entity that shapes markets. Stiglitz (2012: 60) states: "*Markets are shaped by laws, regulations, and institutions. Every law, every regulation, every institutional arrangement has distributive consequences.*" For example, considering the labor market, the growth of the public sector leads to increased employment in the service sector (Messina, 2004; Agostino et al., 2006)²⁴. Stiglitz (2012: 61) further explains that higher wages can result in the hiring of better-quality teachers, making it more feasible to retain good teachers, which positively impacts the economy's long-term

²⁴ This situation has indirect effects on distribution. As previously discussed, the impact of shifting labor from the manufacturing sector to the service sector on unionization can be one reason (Milanovic, 2016).

performance. Allowing public sector wages to fall below those of private sector employees with similar qualifications is a political decision. Thus, wages are “determined” without regard for labor market dynamics. According to Blanchard and Rodrik (2021), reducing state controls in labor markets, cutting social welfare programs, and loosening market constraints are no longer proposed as solutions to inequality. Instead, these measures are now debated as causes of inequality. In the past, government interventions, the appropriateness of economic measures to encourage work and rigid labor markets were cited as reasons for income declines at the lower end of the income distribution (Blanchard and Rodrik, 2021). Current literature, however, reveals a widespread acceptance that merely eliminating government intervention or promoting economic growth alone does not effectively reduce inequality. On the contrary, a more vital and direct role of the state is necessary to close gaps in living standards. The consensus among economists has shifted (Blanchard and Rodrik, 2021: 11-12). Moreover, one of the most crucial roles of the state is to set the game’s fundamental rules. For instance, while skill-biased technical change may challenge unionization, governments should enact laws that either encourage or discourage unionization, define corporate executives’ powers through corporate governance laws, and establish competition laws that limit the extent of monopoly rents (Milanovic, 2016: 108-110; Stiglitz, 2012: 130-137). Chang (2011) outlines arguments against the notion of an interventionist government in the economy²⁵. According to Chang (2011), proponents of a small-sized (non-interventionist) government argue that a large-sized government is not beneficial for the economy. The claim is that the welfare state emerged from the poor’s desire to improve their living standards by making the wealthy bear the costs imposed by market forces. The proponents of small government contend that when the government collects taxes from the rich to finance welfare measures for the poor, it disincentivizes both groups. They argue that the poor become lazier while the rich lose their drive to accumulate wealth, leading to economic stagnation. This perspective suggests that the

²⁵ The central debate revolves around the appropriate size of the government. Determining the optimal size of the government is complex and lacks a definitive answer (Pevcin, 2004; Chobanov and Mladenova, 2009). A body of literature argues that decisions regarding the size of the government should be left to the public (Grossman, 1987; Meltzer and Richard, 1981, 1983). This thesis adopts a similar stance, suggesting that the size of the government is determined by the median/decisive voter, who is adversely affected by inequality.

welfare state reduces individuals' need to adapt to new market conditions, causing delays in making necessary professional and working model changes to keep up with the rapidly evolving economic landscape. Critics often point to the dynamism of the United States compared to the perceived stagnation in Europe's large welfare states as evidence of these claims. However, Chang (2011) counters these objections by highlighting the positive impacts of a well-designed welfare state, arguing that it can encourage risk-taking and adaptability. For instance, Chang (2011) notes that European countries demand less trade protectionism than the United States. This could be misinterpreted as Europeans requiring less state intervention, but the reality differs. There is already less demand for such protections in countries where the state is active, strong, and significant. European citizens are confident that they can maintain their standard of living even if local markets suffer. For example, an unemployed European worker can rely on unemployment insurance or retrain for a different job with government support. In contrast, Americans fear that losing their job could significantly lower their standard of living or even end their working life (Chang, 2011: 279-280). In conclusion, Chang's (2011) analysis provides a nuanced view of the welfare state, suggesting that a large government can effectively support economic stability and growth by encouraging flexibility and innovation among the workforce, countering the typical criticisms leveled against it.

The discussion above demonstrates that the state's role extends beyond mere taxation, as it can indirectly influence inequality. However, taxation remains the most direct instrument for redistribution. According to Alesina and Rodrik (1994), aligning with the *Median Voter Theorem*, in societies with high inequality, the state is expected to spend more on behalf of its people. This theorem posits that individuals demand a social state when there is economic inequality. If economic growth relies on capital accumulation, such demands may lead to increased wealth taxation, negatively impacting growth performance. This presents a dilemma where taxing capital might be harmful to society overall. From a normative perspective, Alesina and Rodrik (1994) highlight that while redistributive policies can deter investment by increasing the tax burden on investors, they also have the potential to mitigate social tensions. This reduction in tensions can foster a sociopolitical environment that is more favorable to productive activities and capital accumulation. Consequently, fiscal

redistribution might stimulate economic growth through this channel. Therefore, the overall impact of redistributive policies on economic growth requires a careful assessment, weighing the costs associated with distortionary taxation against the benefits of reduced social unrest. Furthermore, if the initial wealth distribution is unequal, the economy may struggle to achieve effective growth. This aligns with the findings of Meltzer and Richard (1981), who argue that governments, even autocratic ones, cannot entirely ignore societal demands. Therefore, a tax policy favoring the majority must be applied. Alesina and Rodrik (1994) comprehensively analyze the “cost of taxation,” highlighting its positive and negative impacts. Moreover, considering the initial income distribution is underscored to prevent persistent inequality. In scenarios where the initial distribution of wealth is significantly unequal, the disadvantaged are likely to demand a social state, leading to policies taxing the advantaged. This need to address initial disparities underscores the necessity for a balanced approach considering economic efficiency and social equity. The economy may struggle to achieve sustainable growth without addressing these initial inequalities.

It is previously mentioned that the theoretical model underpinning this thesis includes financial intermediaries and the state within an economy characterized by economic inequality. Up to this point, the intricate nature of inequality—its stubborn persistence due to intergenerational transfer, the directional influence of historical changes on inequalities, and the role and scope of state intervention have been emphasized. Going forward, the impact of financial development on economic inequality will be explored, particularly focusing on financial intermediation as part of our model. The seminal work of Galor and Zeira (1993) is instrumental in this discussion. They developed an equilibrium model that connects wealth and income distribution to financial development within an overlapping generation framework. Their model posits that individuals exhibit inter-generational altruism, showing concern for the next generation’s well-being. Additionally, the model is not confined to a closed-economy context. Importantly, it assumes a disparity between the interest rates for borrowers and lenders, indicating imperfect credit markets. Intuitively, if borrowing costs are high, hindering individuals from financing their human capital investments, those with substantial inherited wealth can bypass the need for financial

system intermediation. As a result, capital market imperfections contribute to wealth and income inequality. The model elucidates these capital market imperfections and explains the disparity in interest rates between borrowers and lenders. Two significant topics regarding economic inequality have emerged in the literature on financial economics and economic growth. The first topic is the relationship between the financial system and economic development. The second primary topic is the connection between economic growth and income distribution. Greenwood and Jovanovic (1990) combined these subjects into a single model to explain the link between the financial system and income distribution. Their research demonstrates that the relationship between financial development and income distribution parallels Kuznets's (1955) theory, which suggests an inverted U-shaped relationship between economic growth and income distribution. According to Kuznets, as an economy grows, income inequality initially increases but decreases once a certain level of development is reached. Greenwood and Jovanovic (1990) extend this theory by showing that wealth inequality initially expands with economic development and financial progress. However, after reaching a specific point, this gap begins to narrow. Moreover, Greenwood and Jovanovic (1990) highlight that growth volatility—fluctuations and variability in a country's overall economic growth rate over time—tends to decrease as per capita income rises, and expected growth increases with per capita income. They argue that in the early stages of financial development, economies experience high growth volatility due to underdeveloped financial markets, leading to inefficient resource allocation and increased risks. As financial markets develop and become more efficient, growth volatility decreases. This finding highlights the critical role of financial market development in reducing economic fluctuations and promoting sustainable economic growth. The authors conclude that by improving the financial system, economies can achieve more stable and equitable growth, supporting overall economic development and a more equal income distribution. This discovery underscores the essential role of financial market development in mitigating economic volatility and fostering sustained economic progress.

Meltzer and Richard's paper "A Rational Theory of the Size of Government," published in 1981, proposes a theory of government size based on the idea that voters seek to maximize their after-tax income. The authors argue that the size of government,

measured by its share of gross domestic product (GDP), is a function of the income distribution, with higher levels of income inequality leading to more lavish government spending. This is because the wealthy, who bear a larger share of the tax burden, have a greater incentive to limit government spending to protect their after-tax income. Conversely, the poor benefit more from government spending and are less incentivized to limit it. The authors suggest that this theory can explain cross-country differences in government size and predict the effects of tax policies on government spending.

Meltzer and Richard (1981) focus on the median rather than the mean voter. They argue that the median voter, who represents the voter in the middle of the income distribution, is the decisive voter in democracies. According to their theory, if income inequality is high, the median (decisive) voter will demand more significant income redistribution through government spending. This is because the median voter will perceive that their after-tax income is low relative to the average income due to the concentration of income among the wealthy. Meltzer Richard's (1981) study is vital in that it reflects the demand for equality of the disadvantaged. Because the authors have managed to model an economy in which the institution of democracy exists.

The discussion of the acceptable and unacceptable levels of ongoing inequalities has been grounded in the current literature on economic inequality. This study aims to convey to the reader that economic inequality is a multifaceted phenomenon with many intricacies. This complex economic phenomenon is explained in this section through a theoretical model based on rigid assumptions. Still, it considers people's democratic demands for equality and questions the perfection of financial intermediaries. The previous section detailed how the world has not performed well in addressing inequality over the past four decades. The theoretical model constructed for this study incorporates prominent aspects from the literature on solving economic inequality. This includes the democratic institution, as explained by Meltzer and Richard (1981), through the Median Voter Theorem to address the demand for equality. In addition, the critical role of financial intermediaries in transforming savings into investments is active in formulating the model.

This thesis builds on existing literature by developing a theoretical model that integrates macroeconomic phenomena with microeconomic trends in individual

earnings, social transfers, and the perfection of savings-investment intermediation. The objective is to offer more precise and detailed insights into the causes and effects of economic inequality, thereby informing the design of policies that can effectively mitigate its adverse impacts. By doing so, the thesis aims to foster a more informed and constructive public debate on achieving a fairer and more equitable society. Ultimately, the goal is to contribute to developing strategies that promote economic efficiency and social justice, ensuring that progress benefits all segments of society.

2.2. A TWO-PERIOD MODEL: SAVING-INVESTMENT DECISION WITH GOVERNMENT

2.2.1. Theoretical Background

Stephen D. Williamson (2014: 291-435) focuses on intertemporal decisions and their implications for how government deficits affect macroeconomic activity. Intertemporal decisions involve economic trade-offs across different periods. In economic theory, an individual's income can be allocated between consumption and savings. This allocation is critical as it determines future consumption levels. The decision to save rather than consume today implies that savings will be invested, potentially generating returns that increase future consumption capacity. Conversely, prioritizing consumption today means fewer resources will be available for future consumption. Williamson (2014) develops a two-period model to examine the Ricardian equivalence theorem, which posits that the size of the government's deficit (regardless of whether positive or negative) does not impact macroeconomic variables or individual economic welfare under certain conditions. A tax cut might not matter or involve wealth redistribution within the current population or across generations. However, *frictions* in credit markets cause departures from Ricardian equivalence. These departures occur because these frictions/imperfections prevent the smooth operation of credit markets, affecting savings and investments and impacting income distribution and economic activity. In a model where the state's role is defined as "irrelevant," the curiosity arising from changing the state's role depending on the frictions in the credit market is one of the basic building blocks of the theoretical model

built in this thesis. The main policy question for the government becomes whether it should eliminate these imperfections or directly act on income distribution. In this context, we explored the state's role in income distribution, emphasized in the study by Meltzer and Richard (1981). Their model, grounded in a neoclassical framework, demonstrates that individuals will have different preferences for the tax rate that maximizes their utility, leading to varying preferences for the size of the state. This model illustrates that everyone's optimal tax rate depends on their income level and perceived benefits from state intervention. Building on these foundations, we aim to construct a model that includes a financial intermediary (as discussed in depth in Galor and Zeira (1993)) and a government that responds to individuals' demands for income redistribution (based on Meltzer and Richard's 1981 study). This model will consider how financial intermediaries and government policies interact to influence income distribution. It highlights the critical role of financial intermediaries in mediating the savings-investment process and the government's role in addressing income inequality.

Based on these two theoretical models, this thesis constructs a new model that assumes that the state will change the tax rate determination behavior by considering the situation of the decisive or median voter according to the mean income. According to our model, if banks fail to successfully convert savings into investments due to low total factor productivity, income distribution will deteriorate.

In the model constructed in the thesis, in addition to the consumer and firm problems, there is also a financial intermediary problem. In this context, it is essential to establish a general equilibrium model in which more than one sector is defined. In this context, a multi-sector market was modeled using the theoretical background of Gillman and Kejak (2002; 2007; 2011) and Gillman (2011). The article by Meltzer and Richard (1981) was used as a basis for endogenizing the tax rate. Further, income inequality is included in the model by following Elgin et al. (2013), who define income inequality through two individuals with different wages and, therefore, different incomes.

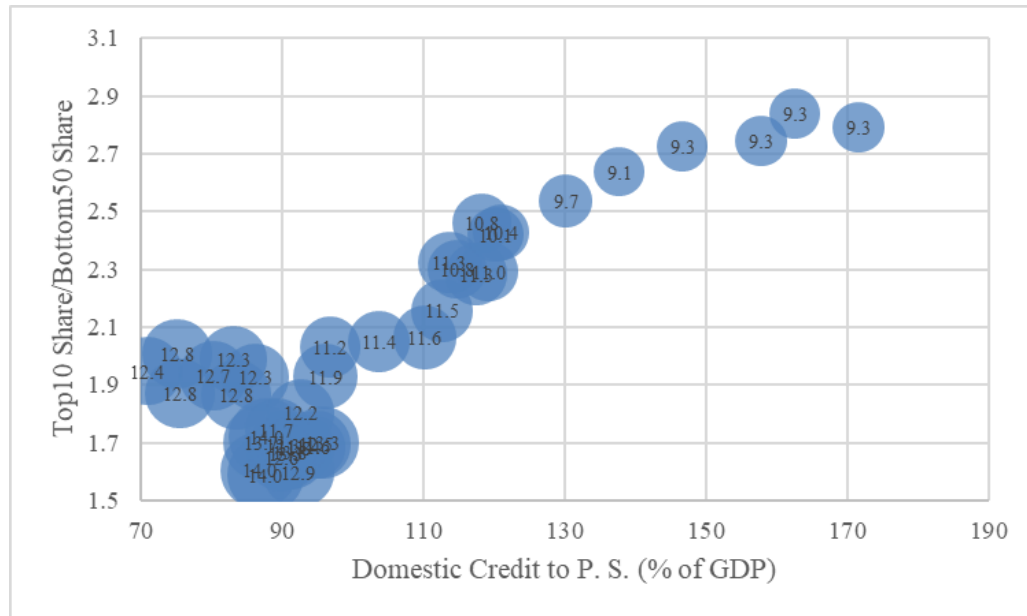
We have previously discussed studies claiming that financial development can solve the income inequality problem (Greenwood and Jovanovic, 1990; Galor and Zeira, 1993). When a two-period general equilibrium model without the state is

constructed following Gillman (2011), more productive financial intermediaries—an indicator of financial development—positively affect income equality. The higher productivity of financial intermediaries leads to a more equitable income distribution because higher banking productivity leads to increased overall economic output, higher wages, and better returns on investments. These benefits are more widely distributed across the population, thus reducing income inequality. However, the situation changes when the government is included in the model. With the endogenization of the tax rate, the effects of the change in the equilibrium value of capital on the tax rate have become observable. However, it is shown in the model that the financial intermediary's success in converting savings into investment has a positive relationship with the equilibrium value of capital. Therefore, the effect of the bank's productivity on the tax rate is shown indirectly. Gillman and Kejak (2011) and Gomme et al. (2006), in the light of the data presented in their study, the result of the theoretical model put forward in this thesis for the post-war (1954-2000) US economy contradicts the result of the theoretical model without the government. The increase in the productivity parameters of banks for the post-war US economy also brings income inequality. This is because the rise in the equilibrium value of capital negatively affects the tax rate. The government, acting to maximize the median voter's utility, sets the tax rate, which is negatively affected by increased banking productivity. This leads to a paradoxical increase in income inequality despite higher banking productivity. The question to be asked here is: Is the state unnecessary? Moreover, does the existence of the state negatively affect income distribution?

Before delving into the answers, it's crucial to examine Figure 10. This figure, a key piece of our analysis, illustrates the relationship between income inequality and the financial development of the US economy in the post-war period (1960-2000). The data in Figure 10, which includes a ratio showing income inequality, is calculated by dividing the share of income received by the top 10 percent by the share of income received by the bottom 50 percent (Top10 Share/Bottom50 Share). The horizontal axis represents the share of domestic credit to the private sector in GDP, a significant indicator of financial development (Domestic Credit to P. S. (% of GDP)). The positive relationship between these two indicators in Figure 10 is a crucial finding. As domestic credit to the private sector increased as a percentage of GDP, the Top10

Share/Bottom50 Share ratio also increased. This suggests a positive relationship between financial development and income inequality, a result that aligns with the outputs of the model in which the state is included.

Figure 10: Relationship between Domestic Credit to Private Sector (% of GDP) and Income Inequality (Top 10% Share/Bottom 50% Share) in the US (1954-2000)



Source: Author's calculations, based on the WID, GFDD, and PWT.

Figure 10, while not comprehensive, is a crucial piece of the puzzle as it illustrates the relationship between financial development and income inequality. The model's parameters and the variables' balanced growth path (BGP) values are calibrated based on the post-war US economy. The period analyzed for calibrating the model parameters coincides with the period from which the data in the figure is taken (data after 1960 available from the Global Financial Development Database - GFDD). Data points are represented as bubbles based on the share of government consumption in GDP. The figure shows that in years when the financial system is functioning "well," the share of government consumption in GDP is low, and inequality is high. The changing relationship between these three variables over the years is also noteworthy. Specifically, as domestic credit to the private sector (% of GDP) has increased over the years, income inequality has also risen, while the share of

government consumption in GDP has decreased. Importantly, the relationship shown in the figure aligns precisely with the theoretical model outputs, instilling confidence in the robustness of our analysis.

What are the reasons for this relationship? We will answer this question and questions about the necessity of the state, but first, let's thoroughly examine the model.

2.2.2. The Model

The general equilibrium model presented in this thesis addresses three fundamental problems: consumer, firm, and financial intermediary problems. Within this model, the tax rate is endogenized to reveal the impact of the banking productivity parameter, defined as the bank's ability to transform savings into investments, on the tax rate. Using the median voter theorem, the tax rate is determined as the rate that maximizes overall utility. Income inequality is subsequently defined based on the ratio of two different income levels, and the tax rate's effect on income inequality is analyzed. Finally, the relationship between the banking productivity parameter and income inequality is established through the tax rate, elucidating how financial intermediation influences inequality within the model²⁶.

2.2.2.1. The Consumer Problem

This model assumes that the consumer cannot invest directly in capital markets and must instead invest through a financial intermediary. The consumer deposits d_t into the bank, which invests these funds in capital or financial markets to earn a rate of return denoted as $R_t^d d_t$. The consumer receives a return of $(1 + R_t^d)d_t$ from the bank, which represents the rental cost of the capital. This interest income would be equal to $R_t^d d_t$, which is the bank's profit. Additionally, it is assumed that the bank does not make any extra profit beyond the interest return on deposits and pays all earnings to depositors as interest income. In other words, the bank's profit is zero after paying out the interest return on deposits.

²⁶ The variable notation can be found in Appendix 2.

The recursive utility function $V(k_t^s)$ describes the maximum utility that can be obtained given the state of capital investment, denoted as k_t^s . In other words, $V(k_t^s)$ represents the maximum expected lifetime utility that can be attained from the sequence of consumption and investment decisions that follow from the initial state k_t^s .

$$V(k_t^s) = \text{Max}_{c_t^d, x_t, l_t^s, k_{t+1}^s} u(c_t^d, x_t) + \beta V(k_{t+1}^s)$$

In this model, investment takes the form of choosing the new deposit amount for the next period, denoted as d_{t+1} . In the current period, the consumer receives a return of $(1 + R_t^d)d_t$ on their deposit, which includes dividends earned. The state variable in this model is the deposit amount, denoted as d_t . Additionally, there is a time spent working in the bank as a variable, denoted as l_{Ft}^s .

$$V(d_t) = \text{Max}_{c_t^d, x_t, l_t^s, l_{Ft}^s, d_{t+1}} \ln c_t^d + \alpha \ln x_t + \beta V(d_{t+1}) \quad (1)$$

The utility function is composed of three terms. The first term, $\ln c_t^d$, represents the utility that the consumer gets from consuming goods. The second term, $\alpha \ln x_t$, represents the utility that the consumer gets from leisure time. The third term, $\beta V(d_{t+1})$, represents the discounted utility that the consumer will get in the next period, given the investment decision made in the current period. The parameter β represents the discount factor, which determines how much weight the consumer gives to future utility.

The variable c_t^d in equation (1) represents the consumer's demand for consumption goods, while x_t stands for leisure. The parameter α indicates how much the consumer values leisure. The consumer's labor income for working in the firm is denoted as $w_t l_t^s$, where w_t is the wage rate and l_t^s is the time spent working in the firm. However, since the bank also requires labor, the consumer must allocate part of his/her time to work for the bank. Thus, $w_t l_{Ft}^s$ (l_{Ft}^s is labor supplied for the bank) must be added to the consumer's labor income. This is a strict assumption, also found in Gillman (2007), that the consumer works at the same wage for both the firm and the bank. Justifying this assumption is not straightforward because assuming individuals earn the same wage in different sectors disregards demographic and sectoral heterogeneities (Katz and Autor, 1999; Osburn, 2000). However, differentiating the wages received from the bank and the firm complicates the model's income inequality

analysis. Furthermore, if it is known that the firm's capital comes from the bank's loans and the individual supplies the same labor for both sectors, assuming the same wage ratio for both sectors would not be incorrect (That is $q_t = k_t$). However, the government imposes a tax on labor income, represented by τ_l ($\tau_l \in [0,1]$). Thus, the government collects an amount of $\tau_l w_t(l_t^s + l_{Ft}^s)$ as revenue, where l_t^s is the labor supplied to the firm. The government then uses this revenue to provide public goods for the benefit of the consumer, which is represented by G_t . Hence, we have the following equation:

$$G_t = \tau_l w_t(l_t^s + l_{Ft}^s)$$

The dividend income of $R_t^d d_t$ is added to labor income, and the net increase invested in deposits at the bank, $d_{t+1} - d_t$, is the investment subtracted from income. The budget constraint is expressed as consumption equal to minus investment in the form of

$$c_t = w_t(1 - \tau_l)(l_t^s + l_{Ft}^s) + R_t^d d_t + G_t - (d_{t+1} - d_t) \quad (2)$$

The time endowment of the consumer is allocated between work and leisure.

$$l_t^s + l_{Ft}^s + x_t = 1$$

After substituting the time constraint into the goods budget constraint and rearranging equation (2),

$$c_t = w_t(1 - \tau_l)(1 - x_t) - d_{t+1} + G_t + d_t(1 + R_t^d)$$

Using these two constraints, consumption and leisure can be solved for and substituted into the recursive utility problem directly:

$$V(d_t) = \max_{x_t} \ln[w_t(1 - \tau_l)(1 - x_t) - d_{t+1} + G_t + d_t(1 + R_t^d)] + \alpha \ln x_t + \beta V(d_{t+1}) \quad (3)$$

The first-order conditions for leisure x_t yields:

$$w_t = \frac{\alpha c_t}{x_t(1 - \tau_l)} \quad (4)$$

The consumer gets this wage income when he/she maximizes the utility concerning leisure. According to equation (4), if the exogenous tax rate increases, the wage rate must also increase to hold utility constant. If the median voter's income is

below the mean income, they will demand higher tax rates because they will receive more redistributive benefits than they contribute to taxes. This motivation is crucial for the functioning of the choice mechanism, as it ensures that voters support tax policies that enhance their utility.

2.2.2.2. The Goods Producer Problem

The firm is assumed to be subject to the Cobb-Douglas production function. Accordingly, it uses labor and capital in production. In the firm's problem, the productivity parameter is denoted by A_G , and the output elasticity with respect to labor input is represented by γ , where γ is a parameter between 0 and 1. The firm also takes out loans q_t from the bank to finance its investments, with the loan interest rate denoted by R_t^q . The firm's profit is denoted by Π_t , and it is a function of the firm's output and production costs.

In addition to labor input, the firm also uses capital as another factor of production, which is denoted by k . Depreciation of capital is also considered and represented by δ_k .

$$\Pi_t = A_G l_t^\gamma k_t^{1-\gamma} - w_t l_t (1 - \tau_l) - \tau_l w_t l_t - k_{t+1} + k_t (1 - \delta_k) + q_{t+1} - q_t (1 + R_t^q) \quad (5)$$

According to equation (5), the government collects the tax through the firm, so there won't be any change in the firm's profit function ($\tau_l w_t l_t - \tau_l w_t l_t = 0$).

The constraint is that the new capital investment, represented by i_t , is equal to the difference between the capital stock at the end of the current period and the beginning of the current period, which is denoted by k_{t+1} and k_t , respectively. This new investment is financed by new bank loans, represented by the difference between the bank's loan portfolio at the end of the current period and the beginning of the current period, denoted by q_{t+1} and q_t , respectively. Therefore, we have the following equation.

$$i_t = k_{t+1} - k_t = q_{t+1} - q_t$$

By assuming that the capital stock at time 0 is equal to the outstanding loans at time 0, the dynamic optimization problem faced by the goods producer reduces to a static problem at each point in time ($k_t = q_t$). The producer now maximizes profits

with respect to labor and capital, subject to the constraint that capital equals outstanding loans.

$$\text{Max}_{l_t, k_t} \Pi_t = A_G l_t^\gamma k_t^{1-\gamma} - w_t l_t - k_t(R_t^q + \delta_k) \quad (6)$$

The marginal product of capital then just equals the loan interest rate R_t^q plus, the depreciation rate δ_k :

$$(1 - \gamma)A_G \left(\frac{l_t}{k_t}\right)^\gamma = R_t^q + \delta_k \quad (7)$$

While the marginal product of labor equals the real wage as before:

$$w_t = \gamma A_G \left(\frac{l_t}{k_t}\right)^{\gamma-1} \quad (8)$$

Equation (7) represents the condition that the marginal benefit of investing in capital (i.e., the marginal product of capital) equals the marginal cost of financing investment through borrowing (i.e., the loan interest rate plus depreciation). Equation (8) represents the condition that the marginal benefit of hiring an additional labor unit (i.e., the marginal product of labor) equals the real wage rate. Together, these equations determine the optimal levels of capital and labor that the firm will use to maximize its profit.

2.2.2.3. Bank Profit Optimization Problem

The banking industry typically uses the financial intermediation approach, in which banks use labor, capital, and deposited funds to provide banking services. This model simplifies the equilibrium by assuming that only financial capital in the form of deposited funds is used in the production function, and no physical capital is involved.

l_{Ft} is labor in a financial intermediary, representative agent supplies l_{Ft} when working for the bank. The total cost of labor is the wage bill of $w_t l_{Ft}$.

The production function for the financial intermediary, or bank, service is that the loans q_t are producing the labor l_{Ft} and the deposited funds d_t via a Cobb-Douglas production function. With the productivity parameter $A_F \geq 0$ the production function is

$$q_t = A_F(l_{Ft})^K d_t^{1-K} \quad (9)$$

Where K is a parameter between 0 and 1; $K \in [0,1)$. If $K = 0$, the production function is simply,

$$q_t = A_F d_t$$

If $A_F = 1$, then

$$q_t = d_t$$

More generally, it is possible to be in an equilibrium where deposits do equal loans, but then there is labor cost in producing this amount of loans. From the production function with $q_t = d_t$,

$$\frac{q_t}{d_t} = A_F \left(\frac{l_{Ft}}{d_t} \right)^K = 1$$

This equilibrium would imply that a labor-to-deposit ratio is equal to

$$\frac{l_{Ft}}{d_t} = \frac{1}{(A_F)^{\frac{1}{K}}} \quad (10)$$

This means that the cost of labor in producing loans will result in a lower return on capital than in a situation with no such cost. In this context, the consumer earns a return R_t^d on deposits while the firm pays R_t^q for a loan from the bank. The difference between these two returns is solely due to the labor cost of producing loans.

Then, the bank's time t profit, denoted by Π_{Ft} , is revenue of $q_t(1 + R_t^q) + d_{t+1}$ minus the cost of $q_{t+1} + d_t(1 + R_t^d) + w_t l_{Ft}$. The dividends are paid out, $d_t R_t^q$, are equal to the residual profit so that the production function Π_{Ft} is zero in equilibrium:

$$0 = \Pi_{Ft} = -q_{t+1} + q_t(1 + R_t^q) + d_{t+1} - d_t(1 + R_t^d) - w_t l_{Ft} \quad (11)$$

This profit Π_{Ft} is subject to the production technology in equation (9). The problem is dynamic in the variables d_t and q_t and it can be stated recursively. Let $\Pi_{Ft}(q_t, d_t)$ be the value of the profit at time t and $\Pi_{Ft}(q_{t+1}, d_{t+1})$ be the value at $t + 1$. And let the firm use a discount factor that we denote by z_t . As an exception designed to simplify the understanding of the bank problem, the dynamic recursive problem will

include the production technology with a Lagrangian multiplier, λ_t , rather than substituting it into the problem. The bank problem is:

$$\Pi_F(q_t, d_t) = \text{Max}_{q_{t+1}, d_{t+1}, l_{Ft}} \left\{ -q_{t+1} + q_t(1 + R_t^q) + d_{t+1} - d_t(1 + R_t^d) - w_t l_{Ft} - \lambda_t [q_t - A_F(l_{Ft})^K d_t^{1-K}] + z_t \Pi_F(q_{t+1}, d_{t+1}) \right\} \quad (12)$$

The equilibrium conditions with respect to q_{t+1} and d_{t+1} are respectively:

$$-1 + z_t \frac{\partial \Pi_F(q_{t+1}, d_{t+1})}{\partial q_{t+1}} = 0 \quad (13)$$

$$1 + z_t \frac{\partial \Pi_F(q_{t+1}, d_{t+1})}{\partial d_{t+1}} = 0 \quad (14)$$

The derivative with respect to l_{Ft} is:

$$\lambda_t = \frac{w_t}{K A_F \left(\frac{l_{Ft}}{d_t} \right)^{K-1}} \quad (15)$$

Note that λ_t has the interpretation as the shadow cost of output of loans q_t . This makes λ_t the marginal cost of loans.

Here are the envelope conditions with respect to q_t and d_t :

$$\frac{\partial \Pi_F(q_t, d_t)}{\partial q_t} = (1 + R_t^q) - \lambda_t \quad (16)$$

$$\frac{\partial \Pi_F(q_t, d_t)}{\partial d_t} = -(1 + R_t^d) + \lambda_t (1 - K) A_F \left(\frac{l_{Ft}}{d_t} \right)^K \quad (17)$$

Equations (12) and (13) can be solved for z_t and then indexed in time back one period and written as

$$z_t = \frac{1}{\frac{\partial \Pi_F(q_{t+1}, d_{t+1})}{\partial q_{t+1}}} = - \frac{1}{\frac{\partial \Pi_F(q_{t+1}, d_{t+1})}{\partial d_{t+1}}} \quad (18)$$

$$\frac{\partial \Pi_F(q_t, d_t)}{\partial q_t} = - \frac{\partial \Pi_F(q_t, d_t)}{\partial d_t} \quad (19)$$

The equivalence of the derivative of the value function with respect to q_t to the negative of the derivative of the value function with respect to d_t can be used to equalize the two equilibrium conditions in equations (18) and (19):

$$\begin{aligned}
(1 + R_t^d) - \lambda_t(1 - K)A_F\left(\frac{l_{Ft}}{d_t}\right)^K &= -\frac{\partial \Pi_F(q_t, d_t)}{\partial d_t} \\
&= \frac{\partial \Pi_F(q_t, d_t)}{\partial q_t} \\
&= (1 + R_t^q) - \lambda_t
\end{aligned} \tag{20}$$

From these latter equations, the shadow or marginal cost λ_t can be solved as:

$$(1 + R_t^q) - (1 + R_t^d) = \lambda_t \left[1 - (1 - K)A_F\left(\frac{l_{Ft}}{d_t}\right)^K \right] \tag{21}$$

$$\lambda_t = \frac{R_t^q - R_t^d}{1 - (1 - K)A_F\left(\frac{l_{Ft}}{d_t}\right)^K} \tag{22}$$

Since the term $1 - (1 - K)A_F\left(\frac{l_{Ft}}{d_t}\right)^K \leq 1$, it is a fraction less than 1. This makes the marginal cost λ_t always equal to some multiple of interest differential $R_t^q - R_t^d$.

By condensing the equilibrium conditions into two key equations, (15) and (22), which are both solved in terms of the shadow cost λ_t , we can significantly enhance the equilibrium-solving process. Setting these two equations equal implies the solution for labor per unit of deposits, $\frac{l_{Ft}}{d_t}$, to be worked in the banking sector as a function of parameters and the real wage w_t :

$$\frac{w_t}{KA_F\left(\frac{l_{Ft}}{d_t}\right)^{K-1}} = \lambda_t = \frac{R_t^q - R_t^d}{1 - (1 - K)A_F\left(\frac{l_{Ft}}{d_t}\right)^K} \tag{23}$$

This is not a simple function in $\frac{l_{Ft}}{d_t}$. But the equilibrium solution for $\frac{l_{Ft}}{d_t}$ can be simplified further.

It is assumed now that all the deposits are turned into loans so that $q_t = d_t$. This is assumed because the model has no uncertainty, and the consumer would want to invest all funds into the firm's capital. Moreover, there is no less risky choice, such as government bonds, which might result in some deposits going into bonds and some going into capital.

An alternative assumption is to let $d_t - q_t$ be the positive capital requirements a bank must hold, but this direction has not been taken. In a full model with uncertainty

and with a natural choice of capital invested in risk-free bonds, this quantity, $d_t - q_t$, would be the capital reserves as chosen by the bank. A government constraint to hold capital reserves may or may not be binding on the bank's free market choice. Relative to the capital invested in risky equity, q_t , the bank's choice of reserves $d_t - q_t$, this would reflect, in turn, the consumer's choice of risk that yields the market's diversification of assets between risk-free bonds and the risky market portfolio.

Assuming away these interesting complications with $q_t = d_t$, this means that the difference between the loan rate to firms and the discount rate for consumers, $R_t^q - R_t^d$, is just determined by the labor cost in producing loans that are always equal to the deposits. The bank model calculates this cost through the equilibrium production of loans. The solution shows exactly how bank productivity affects this cost.

From the equation (10), with replacing $q_t = d_t$, it results simply from the production function that the required labor is $\frac{l_{Ft}}{d_t} = \frac{1}{(A_F)^{\frac{1}{K}}}$. Substituting this into equation (23), the interest rate differential is solved as a simple function of the wage rate w_t and the productivity factor A_F :

$$R_t^q - R_t^d = \frac{w_t}{(A_F)^{\frac{1}{K}}} \quad (24)$$

According to equation (24), the lending and borrowing interest rate difference results from the low productivity parameter of the financial intermediary. In Williamson's (2014) model, a bank acts as a financial intermediary by borrowing from one group of individuals and lending to another. The challenge for the bank is that some borrowers may fail to repay their loans in the future. As a result, the gap between the two interest rates increases. However, Gillman (2012) develops a different approach for a wider interest rate gap. The two-period model developed by Gillman (2012) suggests that banks generate capital market imperfection, which cannot fully be accomplished to transform deposits into loans.

2.2.2.4. Derivation of Aggregate Demand

Bank sector productivity affects the equilibrium wage rate w and the capital stock k . This means that financial intermediation efficiency has a role in the

equilibrium of the goods and labor market indirectly through the determination of the levels of both w and k .

Consider that the aggregate supply and demand functions are unchanged by the introduction of banking, except that the deposit interest rate R^d is now the interest rate added to these functions.

With a balanced growth path, the equilibrium rate of growth of g the budget constraint.

$$c_t = w_t(1 - \tau_l)(1 - x_t) - d_{t+1} + G_t + d_t(1 + R_t^d)$$

To activate the choice mechanism, which here refers to the necessity of incentivizing individuals to pay taxes (as without incentives, individuals would naturally avoid actions that reduce their income, such as paying taxes), it is essential to consider an economy characterized by inequality, where the average income exceeds the median income. In such an economy, the decisive voter will aim to maximize his/her utility based on the tax rate, knowing that the benefits received from redistribution will surpass the amount paid in taxes. Therefore, the consumption function for the decisive voter can be described as follows:

$$c_t^d = w_t^d(1 - \tau_l)(1 - x_t) - d_{t+1} + \tau_l \bar{w}_t(1 - x_t) + d_t(1 + R_t^d) \quad (25)$$

The Median Voter Theorem is incorporated into the model using the mean/median income in the Meltzer and Richard (1981) paper, while in Elgin et al. (2013), it is included based on the mean/median wage. The approach from Elgin et al. (2013) has been utilized here. In an economy characterized by economic inequality (that is: $M = \frac{\bar{w}_t}{w_t^d}$ and, $M > 1$), the median/decisive individual will choose the tax rate that maximizes their utility, as the government, according to the assumption, cannot ignore the demands of those adversely affected by economic inequality.

Equation (25) can be expressed as:

$$c_t^d = (1 - x_t)(w_t^d(1 - \tau_l) + \tau_l \bar{w}_t) + d_t(R_t^d - g)$$

Where g is calculated as:

$$g = \frac{d_{t+1} - d_t}{d_t}$$

In equilibrium the capital stock k_t equals the amount of loans q_t which in turn equal the amount of deposit d_t , this leads to the following equation:

$$k_t = q_t = d_t$$

From the consumer's intertemporal margin, we also have:

$$R_t^d - g = \rho(1 + g)^{27}$$

Thus, the consumption demand can be written in the more familiar form of:

$$c_t^d = (1 - x_t)(w_t^d(1 - \tau_l) + \tau_l \bar{w}_t) + \rho(1 + g)k_t$$

And equation (4) implies that:

$$x_t = \frac{\alpha c_t^d}{w_t^d(1 - \tau_l)}$$

After substituting x_t concerning above equation, the consumption function can be expressed by following equation.

$$c_t^d = [w_t^d(1 - \tau_l) + \tau_l \bar{w}_t + \rho(1 + g)k_t] \left[\frac{w_t^d(1 - \tau_l)}{w_t^d(1 - \tau_l)(1 + \alpha) + \alpha \tau_l \bar{w}_t} \right] \quad (26)$$

For aggregate demand:

$$y_t^d = c_t^d + i_t$$

$$k_{t+1} = k_t(1 - \delta_k) + i_t$$

$$\frac{i_t}{k_t} = \frac{k_{t+1}}{k_t} - (1 - \delta_k)$$

$$\frac{i_t}{k_t} = \frac{k_{t+1} - k_t}{k_t} + \delta_k$$

Given that:

$$\frac{k_{t+1} - k_t}{k_t} = g$$

$$i_t = (g + \delta_k)k_t$$

²⁷ See Appendix 3 for The Ramsey (1928) equilibrium condition in case of zero growth.

Following Gillman (2012) and assuming $g = 0$:

$$y_t^d = [w_t^d(1 - \tau_l) + \tau_l \bar{w}_t + \rho k_t] \left[\frac{w_t^d(1 - \tau_l)}{w_t^d(1 - \tau_l)(1 + \alpha) + \alpha \tau_l \bar{w}_t} \right] + \delta_k k_t \quad (27)$$

In this model, the aggregate demand is considered by examining the consumption function of the decisive voter, which accounts for after-tax wage income and redistributed income from taxes. The investment function, which determines the evolution of the capital stock, plays a crucial role in maintaining economic equilibrium. The growth rate g is assumed to be zero, following Gillman (2012), in order to simplify the analysis. This focus on steady-state behavior isolates the effects of financial intermediation and tax policies on income distribution.

2.2.2.5. Endogenizing the Tax Rate

As previously discussed, the consumption function is derived based on the approaches of Elgin et al. (2013) and Meltzer and Richard (1981), assuming an economy where the consumer acts as the median or decisive voter within a context of economic inequality. In this framework, the consumption function presented in equation (26) is substituted for the variable c_t^d in the utility function below.

$$V(d_t) = \max_{\tau_l \in [0,1]} \ln c_t^d + \alpha \ln x_t + \beta V(d_{t+1})$$

Consequently, the decisive voter can select the tax rate that maximizes his/her utility. Therefore, the recursive utility function is expressed as:

$$\begin{aligned} V(d_t) = \max_{\tau_l \in [0,1]} \ln & \left[[w_t^d(1 - \tau_l) + \tau_l \bar{w}_t + \rho(1 + \right. \\ & \left. g)k_t] \left[\frac{w_t^d(1 - \tau_l)}{w_t^d(1 - \tau_l)(1 + \alpha) + \alpha \tau_l \bar{w}_t} \right] \right] + \\ & \alpha \ln \frac{\alpha [w_t^d(1 - \tau_l) + \tau_l \bar{w}_t + \rho(1 + g)k_t] \left[\frac{w_t^d(1 - \tau_l)}{w_t^d(1 - \tau_l)(1 + \alpha) + \alpha \tau_l \bar{w}_t} \right]}{w_t^d(1 - \tau_l)} + \beta V(d_{t+1}) \end{aligned} \quad (28)$$

This formulation reflects the decisive voter's objective of maximizing his/her utility by optimally choosing the tax rate. While deriving the aggregate demand, we followed Gillman (2012) and assumed zero growth. We apply the same assumption for

equation (28) and then incorporate the ratio $M = \frac{\bar{w}_t}{w_t^d}$ into the consumption function.

After these adjustments, we examine the first-order condition to determine the tax rate that maximizes utility. The first-order condition yields the following equation:

$$\left(\frac{-1+M+\rho \frac{\partial k_t}{\partial \tau_l} \frac{1}{w_t^d}}{\left[(1-\tau_l)+\tau_l M+\rho k_t \frac{1}{w_t^d} \right]} + \frac{-\alpha M}{((1-\tau_l)(1+\alpha)+\alpha \tau_l M)(1-\tau_l)} \right) (1+\alpha) + \frac{\alpha}{(1-\tau_l)} = 0 \quad (29)$$

This equation enables us to find the tax rate that maximizes utility. To achieve this, we utilize the implicit function theorem. The theorem asserts that if a function $F(x, y)$ is continuously differentiable, and the partial derivative of F with respect to y is non-zero at a point, then there exists a function $y = f(x)$ such that $F(x, f(x)) = 0$ in a neighborhood around that point. This theorem is particularly useful for finding optimal values in economic models where direct solutions are not feasible (Chiang and Wainwright, 2005: 194-204). Using equation (29), it is possible to determine the response of the tax rate to changes in the equilibrium value of capital. The equation $\frac{\partial \tau_l^*}{\partial k_t} = -\frac{F_{k_t}}{F_{\tau_l^*}}$ describes the response of the optimal tax rate to changes in the equilibrium value of capital. F_{k_t} and $F_{\tau_l^*}$ are the partial derivatives of the function F with respect to the equilibrium value of capital k_t and τ_l^* respectively. The following equation emerges after applying the implicit function rule to determine the response of the endogenous tax rate to changes in the capital stock.

$$\frac{\partial \tau_l^*}{\partial k_t} = -(1+\alpha) \frac{N}{D} \quad (30)$$

Where N and D are numerator and denominator respectively.

$$N = \frac{(1-M)\rho \frac{1}{w_t^d}}{\left[(1-\tau_l)+\tau_l M+\rho k_t \frac{1}{w_t^d} \right]^2}$$

$$D = (1 + \alpha) \left[M \left[(1 - \tau_l) + \tau_l M + \rho k_t \frac{1}{w_t^d} \right]^{-2} (-1 + M) - \alpha M \left[-((1 - \tau_l)(1 + \alpha) + \alpha \tau_l M)^{-2} (-(1 + \alpha) + \alpha M)(1 - \tau_l)^{-1} + ((1 - \tau_l)(1 + \alpha) + \alpha \tau_l M)^{-1} (1 - \tau_l)^{-2} \right] \right] + \alpha (1 - \tau_l)^{-2}$$

The sign of equation (30), which determines whether the change in the tax rate relative to the capital stock is positive or negative, is not immediately apparent. To ascertain the sign, we refer to the calibrated parameter and variables' Balanced Growth Path (BGP) values for the post-war (1954-2000) US economy, as previously discussed²⁸. It is crucial to note that the change in the tax rate with respect to the capital stock differs depending on the economy and the period in which the model is applied. For the post-war US economy, where inequality is defined according to the median voter rule, $M > 1$, N is negative. The sign of D is also negative²⁹. As a result, the tax rate's change with respect to capital stock is negative as illustrated by the inequality $\frac{\partial \tau_l^*}{\partial k_t} < 0$. However, the main question here is the effect of banking productivity on the tax rate³⁰. To explore this relationship, we must derive the equilibrium value of capital. After the derivation, it is observed that there is a positive relationship between banking productivity and capital stock, meaning that as banking productivity increases, the equilibrium capital stock also increases $\frac{\partial k_t}{\partial A_F} > 0$. Ultimately, this increase in banking productivity leads to a decrease in the tax rate, as shown in the following expression.

$$\frac{\partial \tau_l^*}{\partial A_F} = \frac{\partial \tau_l^*}{\partial k_t} \times \frac{\partial k_t}{\partial A_F} < 0$$

The interpretation of this inequality in an economic context is that improvements in banking productivity A_F result in a higher equilibrium capital stock k_t . However, as the capital stock increases, the optimal tax rate τ_l^* on labor income decreases. This suggests that more efficient banking reduces the need for higher tax

²⁸ For the table displaying these values and the referenced studies, see Appendix 4.

²⁹ For the calculation of the sign of D , see to the Appendix 6.

³⁰ For the derivation of k_t and the effect of A_F on it, Appendix 5.

rates, potentially due to increased economic growth and income from better capital allocation.

2.2.2.6. Income Inequality Application of the Model

Elgin et al. (2013) explored how economic inequality changes with variations in the belief in life after death. This thesis applies the Elgin et al. (2013) approach to examine the effect of banking productivity on income distribution, specifically within the constructed model. According to this approach, there are two agents with (measured) after-tax after-transfer incomes $y_{t_1}(w_{t_1}^d, \tau_l^*)$ and $y_{t_2}(w_{t_2}^d, \tau_l^*)$, with $y_{t_2}(w_{t_2}^d, \tau_l^*) > y_{t_1}(w_{t_1}^d, \tau_l^*)$. This condition holds whenever their pre-tax, pre-transfer incomes satisfy $w_{t_2} > w_{t_1}$, where w_{t_2} and w_{t_1} are exogenously determined. For simplicity, these incomes are denoted as $y_{t_i}(w_{t_i}^d, \tau_l^*) = y_{t_i}^*$, $i = 1, 2$. As a result, the ratio of these two agents is the definition of income inequality within the context of the model. That is:

$$\frac{y_{t_2}^*}{y_{t_1}^*} = \frac{[w_{t_2}^d(1-\tau_l)^2 + \tau_l M w_{t_2}^d(1-\tau_l) + \rho k_t(1-\tau_l)] + ((1-\tau_l)(1+\alpha) + \alpha \tau_l M) \delta_k k_t}{[w_{t_1}^d(1-\tau_l)^2 + \tau_l M w_{t_1}^d(1-\tau_l) + \rho k_t(1-\tau_l)] + ((1-\tau_l)(1+\alpha) + \alpha \tau_l M) \delta_k k_t} \quad (31)$$

To make the derivation process easier for equation (31), ϕ is substituted to $[(1-\tau_l)^2 + \tau_l M(1-\tau_l)]$ that is:

$$\phi = [(1-\tau_l)^2 + \tau_l M(1-\tau_l)]$$

In this case, equation (31) can be expressed as follows:

$$\frac{y_{t_2}^*}{y_{t_1}^*} = \frac{[w_{t_2}^d \phi + \rho k_t(1-\tau_l)] + ((1-\tau_l)(1+\alpha) + \alpha \tau_l M) \delta_k k_t}{[w_{t_1}^d \phi + \rho k_t(1-\tau_l)] + ((1-\tau_l)(1+\alpha) + \alpha \tau_l M) \delta_k k_t}$$

Taking the derivative of the above equation with respect to τ_l enables us to see the positive effect of the tax rate on income inequality³¹. The negative relationship is expressed with the following inequality.

$$\frac{\partial \left(\frac{y_{t_2}^*}{y_{t_1}^*} \right)}{\partial \tau_l^*} < 0$$

³¹ For the detailed derivation, see Appendix 7.

It has previously been shown that the effect of financial intermediary productivity on the tax rate is negative. That is:

$$\frac{\partial \tau_l^*}{\partial A_F} < 0$$

As a result, we can establish a positive relationship between income inequality and banking productivity, as represented by the following expression:

$$\frac{\partial \left(\frac{y_{t_2}^*}{y_{t_1}^*} \right)}{\partial A_F} = \frac{\partial \left(\frac{y_{t_2}^*}{y_{t_1}^*} \right)}{\partial \tau_l^*} \times \frac{\partial \tau_l^*}{\partial A_F} > 0$$

The first term on the right-hand side of the above expression $\frac{\partial \left(\frac{y_{t_2}^*}{y_{t_1}^*} \right)}{\partial \tau_l^*}$ represents the partial derivative of the ratio of the after-tax, after-transfer incomes of two agents $\frac{y_{t_2}^*}{y_{t_1}^*}$ with respect to the optimal tax rate τ_l^* . It is previously indicated that an increase in the tax rate decreases the income ratio. The second term on the right-hand side represents the partial derivative of the optimal tax rate τ_l^* with respect to the banking productivity parameter A_F . As demonstrated earlier, an increase in banking productivity leads to a decrease in the optimal tax rate. When these two derivatives are multiplied to find the effect of banking productivity on income inequality, it has been found that there is a positive relationship between banking productivity and income inequality. Therefore, enhanced banking productivity positively influences capital stock and overall economic efficiency but also exacerbates income inequality³².

The result we get when finalizing the model is that adding the government to the model presents a more reliable conclusion³³. It coincides with the relationship between financial development and income inequality in the post-war US economy, which is used for calibrating BGP values of parameters and variables (see Figure 10); however, if we add a government motivated to fight income inequality to the model, income inequality increases with the increase in banking productivity.

³² Refer to Appendix 8 for the MATLAB outputs illustrating the positive relationship between financial development and income inequality.

³³ For the results of the model without government, see Appendix 9.

Now, it's time to address the specific questions about Figure 1, which have become more evident with the model, particularly about the model itself.

2.3. CONCLUDING REMARKS

As Rodrik (2017) outlined, traditional assumptions about human progress predicted a foreseeable trajectory: advances in information and communication technologies combined with trade agreements would lower the costs of cross-border trade, leading to rapid economic globalization. Advanced democracies would be led by centrist political elites maintaining open economies while addressing domestic inequality and exclusion. The European Union member states were expected to overcome economic and financial crises, moving towards greater integration. Additionally, democratic norms—including electoral competition, separation of powers, rule of law, and freedom of expression—were expected to spread in developing countries and deepen in wealthy nations. Cosmopolitan and globalist values were anticipated to rise, gradually eroding national sovereignty. Global governance was predicted to strengthen slowly but steadily through official institutions or transnational networks of experts, policymakers, and regulators. However, asserting that these traditional assumptions have fully materialized is difficult. Economic inequality continues to be a significant concern, even with the advancement of democracy and markets, including financial markets. The idealized progress toward reducing inequality has yet to occur, and the complexity of economic inequalities persists. This reality, as eloquently articulated by Rodrik (2017), aligns with the model presented in this thesis. According to the model, inequality can increase even in the presence of a state that responds to demands for equality and financial intermediaries that facilitate investment, a fundamental component of production. As discussed earlier in this chapter, the pertinent question is whether an economic model that marginalizes the state is more suitable for addressing economic inequality. This question is overly simplistic because it considers unrealistic assumptions. First and foremost, including the state in the model is essential because a model without the state lacks the assumption of a decisive voter demanding equality. More precisely, it assumes the mean income equals the median income. Once this assumption is relaxed,

the model must include the state because the decisive voter will demand economic equality. Another assumption is the exogenous inclusion of the state in the model. When this assumption is relaxed, and the tax rate is endogenized, it becomes clear that the tax rate or state's size is not independent of capital. As the equilibrium value of capital or the productivity of the financial intermediary increases, the tax rate decreases, and the equilibrium value of capital increases. Expanding the state's role ceases to be a matter of choice in this context. For increased productivity of financial intermediaries or higher equilibrium capital values to reduce economic inequality, the size of the state must be positively correlated with the value of capital.

CHAPTER THREE

THE DYNAMICS OF FINANCIAL INTERMEDIATION, INCOME INEQUALITY, AND GOVERNMENT POLICIES: EMPIRICAL ANALYSIS

Building on our exploration of income inequality's persistence and the limitations of market mechanisms in the preceding chapters, this chapter takes a crucial step forward. It empirically examines the interplay between financial intermediation, income inequality, and government policies. This empirical analysis, a significant part of our research, is instrumental in understanding the complex dynamics of income inequality. Despite substantial theoretical advancements and proposed solutions, income inequality remains pervasive and resistant to purely market-based resolutions. In this context, the second chapter theoretically discusses the contributions of market-based and institutional solutions to solving economic inequality, revealing the complex barriers to equitable income distribution. This chapter aims to bridge the theoretical insights from previous chapters with empirical evidence, offering a nuanced understanding of the complex interplay between financial development, income inequality, and government policies. This ensures that policies for a more equitable income distribution are based on solid foundations. Consequently, the likelihood of these policies achieving their goals and maintaining sustainability is higher.

Financial development plays a pivotal role in shaping savings behavior, a concept supported by the McKinnon-Shaw (1973) hypothesis and further studies such as Bencivenga and Smith (1991). The motivation of this hypothesis is that improved access to financial services can lead to higher household savings rates, positively affecting economic growth and income distribution. As detailed in the previous chapter³⁴, an increase in savings can trigger a domino effect, leading to improved income distribution. A well-functioning financial system is crucial here as it provides the savings-investment link. This approach aligns with supply-side or neo-classical growth models, which stress the role of savings and investment in driving economic growth. However, demand-led growth models suggest that increasing savings without addressing distributional concerns can exacerbate income inequality. Pasinetti (1962)

³⁴ See Chapter 2 for a detailed explanation of the model that excludes state intervention and illustrates the domino effect of savings. The mathematical proof can be found in Appendix 8.

argues that higher savings rates among the poor may disproportionately benefit the wealthy, worsening income inequality. Therefore, while financial development and increased savings are essential for economic growth, it is equally important to consider their impact on income distribution to ensure equitable growth (Pasinetti, 1962). The comparison of Solow's (1956) neo-classical model and Pasinetti's (1962) demand-led model provides valuable insights into the complex dynamics of savings behavior and economic inequality.

The Solow model, a cornerstone of Neoclassical growth theory, posits that an increase in savings leads to higher capital accumulation, subsequently enhancing economic growth and reducing income inequality across countries. According to the Solow model, differences in savings rates across countries can explain income levels and growth rate variations. In this way, savings rates become a tool for addressing income inequality between countries.

Pasinetti's (1962) model, part of the post-Keynesian growth theory, challenges the neo-classical perspective by emphasizing the distributional aspects of economic growth. Pasinetti (1962) models an economy consisting of workers and capitalists. He argued that if inequality exists - precisely when the savings of workers are smaller than the ratio of investment required to sustain economic growth to total net income, expressed as $s_w < \frac{I}{Y}$ - there is no need for a socialist state to interfere in how much workers save or consume. In this scenario, maintaining inequality means that the workers' lower savings rate s_w is insufficient to meet the investment needs $\frac{I}{Y}$ required for economic growth. Encouraging individuals to save more in such a scenario would harm effective demand, reducing production without positively affecting income distribution (Fisher et al., 2020).

The following figures illustrate these arguments. Both figures support Solow's (1956) perspective rather than Pasinetti's (1962). Figure 11 shows a negative relationship between the lowest class's savings rate and the top class's share of the total GDP for the same year. Specifically, in years when the savings rate of the lowest class is low, the share of the total GDP by the wealthiest class is high, and vice versa.

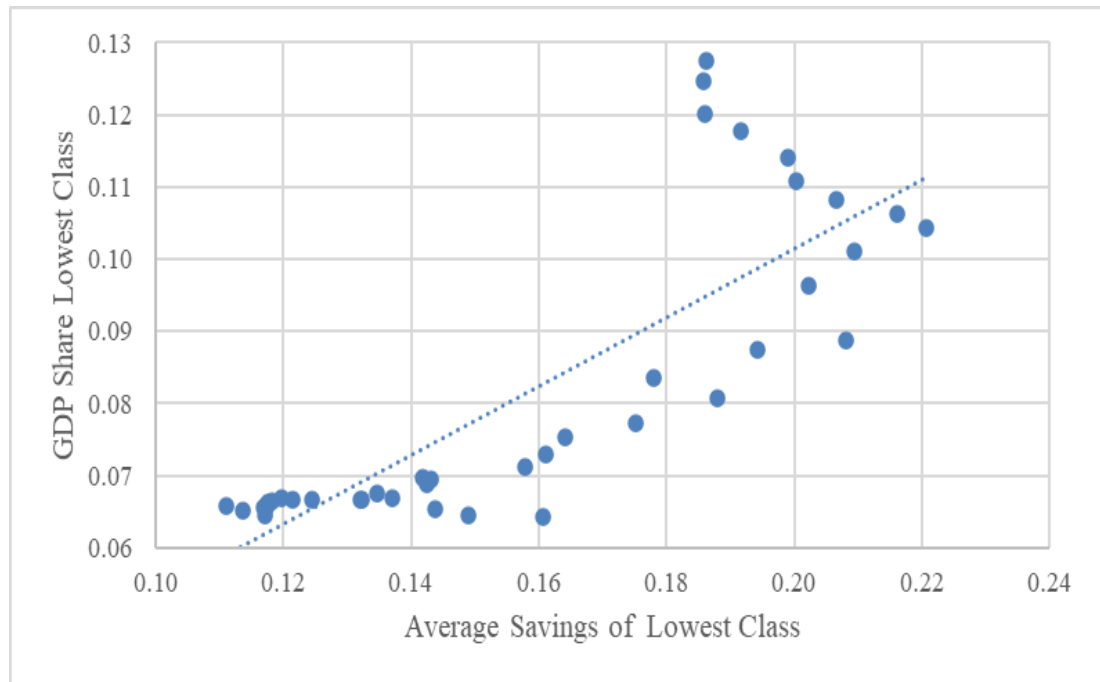
Figure 11: Average Savings Rate of the Lowest Class vs. GDP Share of the Top Class



Source: Author's calculation Based on PWT 10.01.

The relationship expressed in Figure 11 is significant as it demonstrates how increasing savings rates influence income distribution among different country groups. It suggests that as the savings rates of countries in the lowest class increase, the share of income held by those in the top class decreases. This inverse relationship highlights the impact of savings behavior on income distribution. Moreover, Figure 12 illustrates that in years when the lowest class has higher savings rates, their share of total GDP also increases. This observation supports the neo-classical approach to addressing income inequality, posing that higher savings can lead to more significant economic shares for disadvantaged countries. Therefore, increasing savings could be an effective strategy for countries in the lowest class to secure a more significant portion of global production. These findings underscore the importance of understanding savings behavior in the context of income distribution and suggest that policies encouraging savings among lower-income countries could contribute to reducing global economic disparities.

Figure 12: Average Savings Rate of the Lowest Class vs. GDP Share of the Lowest Class



Source: Author's calculation Based on PWT 10.01

However, it would be premature to reject Pasinetti's (1962) hypothesis based on these figures alone. The conclusion drawn from Figures 11 and 12 is that increasing the savings rates of the lowest group would position them more favorably in the global economic distribution. However, when comparing the current population, savings rates, and shares of total GDP between the lowest and the highest groups in the global economic distribution, it is audacious to claim how positively the increased savings rates will impact economic distribution. A closer examination of the data is necessary to understand these dynamics fully. The top class's highest savings rate reaches 30%, with a minimum of 23% and a standard deviation of 0.015. In contrast, the lowest class's highest savings rate is 22%, with a minimum of 11% and a standard deviation of 0.035. Furthermore, as of 2019, the lowest class comprises 40% of the global population, while the top class only accounts for 13%. The top class's share of GDP fluctuates between 40% and 70%, whereas the lowest class's share varies between 6% and 13%. The difference between the top class's smallest GDP share value and the lowest class's highest GDP share value is more than threefold. Although Figures 11

and 12 provide valuable insights into the effects of savings, they are incomplete as they do not include the detailed aspects mentioned above. Therefore, an additional figure has been created to combine the two figures on the same scale.

Figure 13: Unified View of Lowest Class's Savings Impact



Source: Author's calculation Based on PWT 10.01

Figure 13 is a compelling reminder of why premature conclusions should be avoided. We can observe the relationship between savings rates and income shares across different country groups by presenting the top and lowest-class GDP shares on the same scale. This figure highlights that increasing the savings rate of the lowest class correlates with a decreasing share of the GDP for the top class. The overlapping nature of this data provides a more holistic view, revealing that as the lowest class saves more, their share of GDP increases, while the top class's share decreases. Furthermore, it is crucial to consider the scale used in the graph. With an equal-scale comparison, the disparities in income shares between the two groups become more apparent. The visual representation underscores the significant economic distance between these groups. Therefore, Figure 13 underscores the importance of a nuanced

approach in analyzing economic data, highlighting the necessity of considering multiple perspectives and factors before drawing definitive conclusions about global economic inequalities.

It is necessary to revisit the discussion of maintaining this inequality—where workers' savings are insufficient to meet the investment needs essential for economic growth—thanks to Pasinetti (1962). We develop a different perspective on supply-side approaches that suggest increasing savings to reduce economic inequality. Looking at Figure 13, it is highly questionable whether countries in the lowest class, whose saving propensities are relatively lower than those in the highest class, can save more and secure a share of the income proportional to their population. In other words, it is overly optimistic to assume that saving behavior, transforming income into wealth, will reduce global economic inequality.

In the previous chapter, we demonstrated that increasing savings improved income distribution without state intervention. However, when the state was included in the model, increased savings indirectly and negatively affected income distribution. This was because of the decreased size of the state with increasing capital and could not meet the pluralist demand for fair income distribution. Although Pasinetti's (1962) model differs from the theoretical approach presented in this thesis, it yields a similar outcome. For savings (or financial development, considering its positive relationship with savings) to positively affect the income distribution, the relationship between the state's size and capital must be positive.

The figures used to discuss Solow's (1956) and Pasinetti's (1962) arguments aim to explain economic inequality across countries. Although this thesis focuses on economic inequality within countries, understanding cross-country inequality is crucial for analyzing economic disparities within countries. This approach is valuable because societies are not isolated from their individuals. Understanding the dynamics of savings and income distribution across countries can provide valuable insights for addressing income inequality within countries. While Solow's (1956) model suggests that increasing savings can lead to income convergence among countries, Pasinetti's (1962) perspective warns of potential adverse effects on effective demand and inequality. Policymakers must consider these nuances to formulate effective economic policies that balance growth and equity. The macro-level analysis provides a broader

understanding of how financial policies impact income distribution across different countries. Given the limitations of microdata and the necessity to contextualize individual behaviors within larger economic frameworks, this perspective is essential. Understanding the dynamics at the country level offers valuable insights that can inform more effective policy-making aimed at achieving equitable growth. According to the figures, we need neo-classical and demand-led approaches to understand economic growth and distribution dynamics. Although the graphs are based on macro data, they show that savings and inequality require external intervention. This brings us to the core of this thesis. As previously stated, we highlight the importance of financial intermediaries in transforming savings into investments. While savings can positively impact income distribution in the absence of state intervention, our model shows that the state's ability to ensure equitable income distribution is constrained by its inverse relationship with capital. As savings increase and enhance the productivity of financial intermediaries, income inequality tends to worsen. Our empirical analysis examines how financial development influences income inequality and the role of government policies in this dynamic.

3.1. DATA AND METHODOLOGY

This section details the data sources and methodology used in the empirical analysis. We use various databases to construct a comprehensive panel dataset for robust cross-country comparisons and time-series analysis.

The Standardized World Income Inequality Database (SWIID) is the most comprehensive database for conducting research on income inequality, as it standardizes income data, making it comparable across countries and periods (Haan and Strum, 2017; Delis et al., 2014; Solt, 2020). Standardization involves adjusting data from different sources and methodologies to ensure consistency, allowing for meaningful comparisons of income inequality across countries. In our analysis, we use two types of Gini coefficients from SWIID as dependent variables: *Gini Market*, which reflects income inequality before taxes and transfers, and *Gini Disposable*, which measures inequality after taxes and transfers. We used the IMF's *Financial Development Index* to measure financial development (Svirydzenka, 2016).

Svirydzienka (2016) highlights the limitations of relying solely on indicators such as domestic credit to the private sector or stock market capitalization to assess financial development and instead develops a comprehensive index that captures the development of both financial markets and institutions. The dataset covers 183 countries from 1980 to 2021. We refer to the Penn World Table (PWT 10.01) for *the share of government consumption in GDP*. PWT 10.01 is a widely used database that provides national accounts and economic time series, offering data on relative income levels, output, inputs, and productivity across countries. It is valuable for cross-country comparisons and long-term economic analysis (Feenstra et al., 2015). *Inflation* and *real GDP per capita* data are sourced from the World Development Indicators (WDI) (World Bank, 2023). To address the issue of endogeneity, we utilize *Latitude* and *British Legal Origins* as instrumental variables in our dynamic panel data models. The latitude data were sourced from the Simple Maps website, while the British Legal Origins variable was taken from LaPorta et al. (1999). The rationale for using British legal origin dummies, as supported by the literature, is that legal origins significantly influence the structure and development of financial institutions (Beck et al., 2003; Asongu, 2015). According to Asongu (2015), countries with British legal origins tend to have more substantial property rights and more efficient financial systems, affecting economic outcomes such as income distribution. Using this instrument, we control for institutional differences that could confound the relationship between financial development and income inequality. Table 3 shows the names, definitions, and sources of the variables used in the analysis.

Based on the variables introduced above and summarized in Table 3, the following section is divided into two main parts. In the first part, we graphically illustrate the relationship between financial development and income inequality using a fixed effects model for the countries classified in Chapter 1, which have consistently remained in the lowest and highest income groups from 1980 to the present. The second part presents the results for all countries with available data, using three different estimation methods: Pooled OLS, Fixed Effects, and Difference GMM. This second part is divided into three subsections: one for all world countries, one for high and upper-middle-income countries, and one for low and lower-middle-income countries. The classification is based on the World Bank's income classification.

Table 3: Variables Descriptions and Sources

Variable	Description	Source
<i>Main Variables</i>		
Gini Market	Gini coefficient using (pre-tax, pre-transfer) household income.	SWIID
Gini Disposable	Gini coefficient using (after-tax, after-transfer) household income.	SWIID
FDI	The Financial Development Index (FDI) measures the development of financial institutions and markets across three dimensions: depth, access, and efficiency. It is summarized as an overall indicator of financial system maturity.	IMF
<i>Control Variables</i>		
RGDPPC	GDP per capita is gross domestic product divided by the midyear population, expressed in constant 2015 US dollars.	WDI
Inflation	Inflation is measured by the consumer price index, which reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services.	WDI
Gov. Consumption	Measures government consumption as a share of GDP, reflecting public sector expenditure on goods and services.	PWT 10.01
<i>Instrumental Variables</i>		
Latitude	A country's geographic latitude, typically expressed in degrees north or south of the equator, is used to study its potential influence on economic, social, or environmental outcomes.	Simple Maps
British Legal Origin	A binary (dummy) variable indicating whether a country's legal system is based on British common law. It takes the value 1 if the country has a British legal origin and 0 otherwise.	LaPorta et al. (1999)

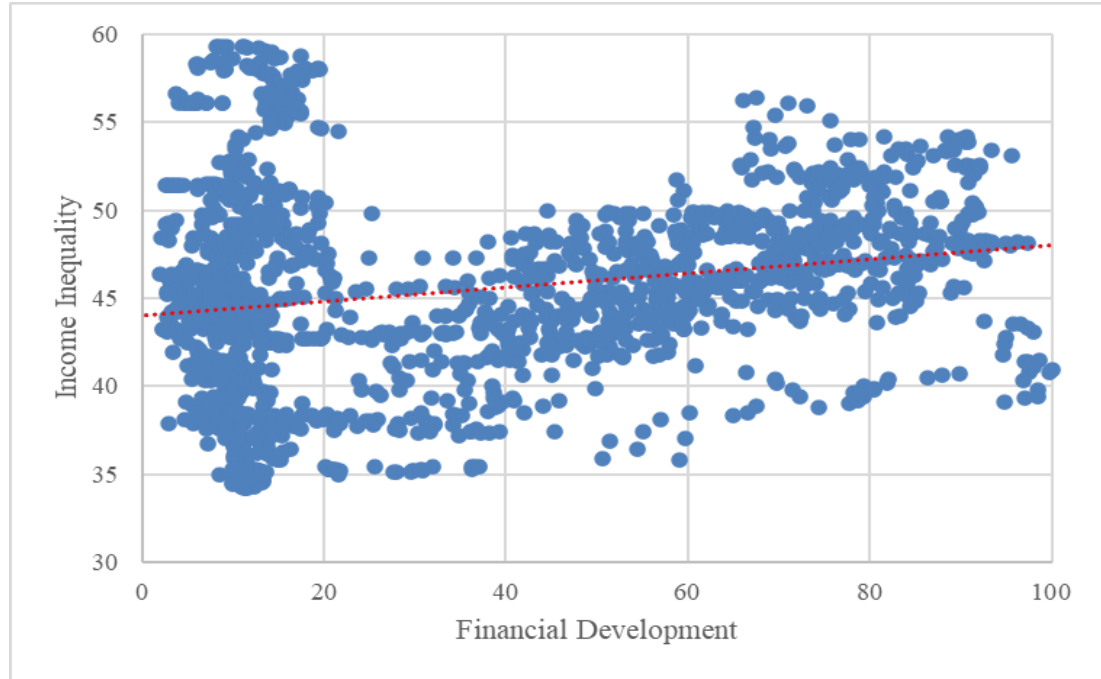
Source: Created by the author.

3.2. EMPIRICAL RESULTS

3.2.1. Exploring Financial Development and Income Inequality in Stable Income Groups (1980-2019)

The sample used in this section consists of data from 43 lowest-class countries and 20 top-class countries, which were also analyzed in detail in Chapter 1. Bringing together these two groups, which represent two economic extremes, in the same sample may present various challenges in examining the effects of financial development on income inequality. For instance, a country in the top-income group might be considered unsuccessful in terms of financial development compared to its peers yet deemed successful compared to the lowest-income countries. In this context, the fixed effects model is crucial for controlling for the unique characteristics of different countries. As a result, following Haan and Strum (2017), Figure 14 demonstrates the relationship between the Financial Development Index and the Gini Market index across these 63 countries that have remained in their respective income categories since 1980. At first glance, the scatter plot does not reveal a clear relationship between financial development and income inequality.

Figure 14: Relationship Between Financial Development (FDI) and Income Inequality (Gini Market)



Source: Author's calculations based on IMF and SWIID.

The fixed effects model controls for time-invariant characteristics of the entities (countries in this case), which means any country-specific characteristics that do not change over time are accounted for. This reduces omitted variable bias. This model examines the variation within an entity (country) over time, allowing for the assessment of how changes in independent variables affect the dependent variable within the same entity. Fixed effects models are particularly suitable for panel data where the goal is to analyze the impact of variables that vary over time within entities.

The fixed effects model can be explained as follows:

$$Y_{i,t} = X_{i,t}\beta + c_i + \varepsilon_{i,t}$$

$Y_{i,t}$: Dependent variable in country i at time t .

$X_{i,t}$: Independent variables in country i at time t .

c_i : Unobserved fixed effect specific to country i .

$\varepsilon_{i,t}$: Error term.

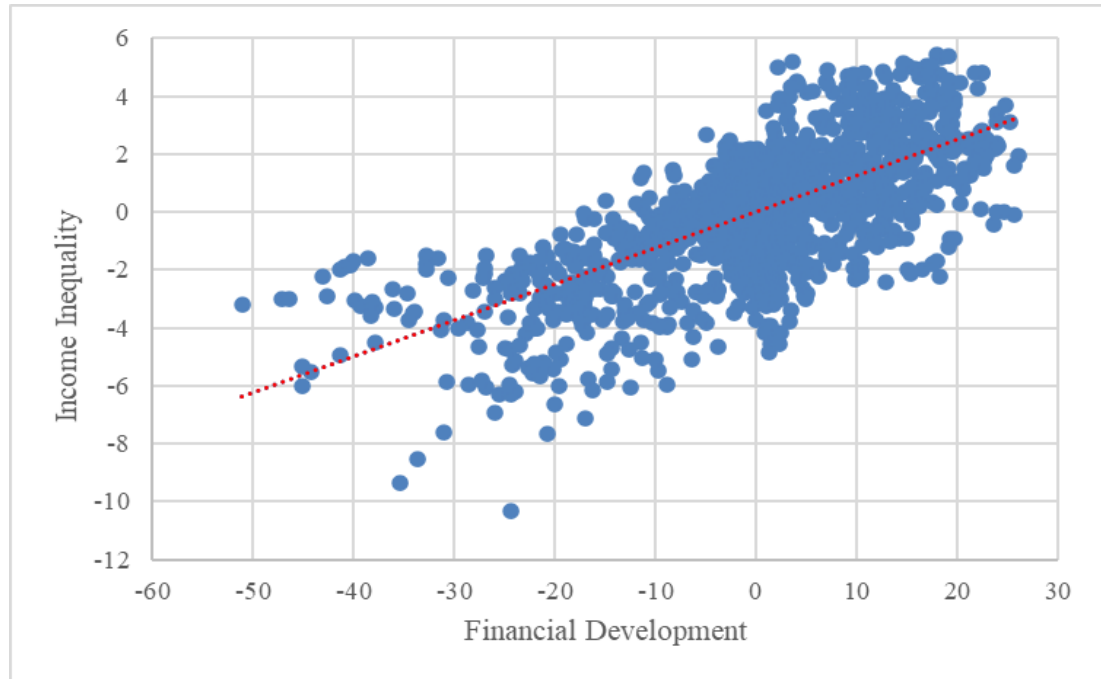
$$Y_{i,t} - \bar{Y}_i = (X_{i,t} - \bar{X}_i)\beta + (c_i - \bar{c}_i) + (\varepsilon_{i,t} - \bar{\varepsilon}_i)$$

where $\bar{Y}_i = \frac{1}{T} \sum_{t=1}^T Y_{i,t}$, $\bar{X}_i = \frac{1}{T} \sum_{t=1}^T X_{i,t}$ and $\bar{\varepsilon}_i = \frac{1}{T} \sum_{t=1}^T \varepsilon_{i,t}$.

We know that c_i is a constant and $(c_i - \bar{c}_i) = 0$ in this case. Thus, the effect of c_i will be eliminated from the model. The fixed effect estimator in the demeaned equation is nothing more than the regressor of the regression of $(Y_{i,t} - \bar{Y}_i)$ on $(X_{i,t} - \bar{X}_i)$ (Greene, 2012: 359-370).

Based on the information above, the following figure, which controls for country-fixed effects by removing the averages, presents a more distinct positive relationship between financial development and income inequality. This suggests that increased financial development is associated with higher income inequality when accounting for country-specific factors. By accounting for these fixed effects, the model helps us to isolate the proper relationship between the variables, providing more reliable and insightful results.

Figure 15: Relationship between Financial Development (FDI) and Income Inequality (Gini Market) with Country Fixed Effects



Source: Author's calculations based on IMF and SWIID.

As previously mentioned, the sample used in the first section represents two contrasting groups in terms of economic welfare. The panel data analysis conducted for these two groups provides a preliminary exploration, as illustrated in Figures 14 and 15. However, it is not feasible to separately apply GMM methods for these country groups due to sample size limitations. According to Roodman (2009), GMM methods work best when N (the number of cross-sections) is large and T (the number of periods) is small, which is not the case with our current sample. Therefore, in the following section, we extend the analysis to include all countries with available data—168 in total.

3.2.2. Panel Data Analysis for World Countries: Financial Development and Income Inequality

The model framework employed to analyze the connection between financial development and economic inequality is as follows:

$$\ln EI_{i,t} = \beta_0 + \beta_1 \ln FD_{i,t} + \sum_{k=2}^n \beta_k \ln X_{k,i,t} + \varepsilon_{i,t} \quad (32)$$

$\ln EI_{i,t}$: This is the natural logarithm of the income inequality measure for country i at time t . EI typically stands for the Gini coefficient or other metrics of economic inequality.

$\ln FD_{i,t}$: This is the natural logarithm of financial development for country i at time t . FD is often measured as the domestic credit to the private sector as a percentage of GDP.

$\sum_{k=2}^n \beta_k \ln X_{k,i,t}$: This term represents the sum of the natural logarithms of various control variables X_k for country i at time t , each multiplied by their respective coefficients β_k .

$\varepsilon_{i,t}$: The error term for country i at time t .

Using equation (32), the effects of financial development on income inequality will be examined in three sections. Natural logarithms are used to linearize the variables' relationship and accurately capture proportional changes. This approach is beneficial when dealing with multiplicative relationships, such as the ones expressed

in the equation (31). The equation in the previous chapter illustrates why natural logarithms are employed. It highlights how different factors, such as taxes and capital, interact multiplicatively to influence income levels. By taking natural logarithms, we simplify these multiplicative effects into additive ones, making the model easier to estimate and interpret. Using natural logarithms for the variables ensures that the results are interpretable in terms of elasticities, providing insights into the proportional changes in income inequality associated with changes in financial development and government policies.

The analysis includes all countries with available data, resulting in a dataset of 168 countries. Following the World Bank classification, the static and dynamic panel data estimates were verified for two major income groups. This section explores the relationship between financial development and income inequality using unbalanced panel data from 1980 to 2019, covering 101 high-income and upper-middle-income countries and 67 low-income and lower-middle-income countries³⁵. The analysis employs two primary models to explore different aspects of income inequality.

$$\ln Gini\ Market_{i,t} = \alpha + \beta_1 \ln Fin_{i,t} + \beta_2 \ln RGDPpc_{i,t} + \beta_3 \ln Inf_{i,t} + \beta_4 \ln Gov.\ Cons_{i,t} + \varepsilon_{i,t} \quad (33)$$

$$\ln Gini\ Disposable_{i,t} = \alpha + \beta_1 \ln Fin_{i,t} + \beta_2 \ln RGDPpc_{i,t} + \beta_3 \ln Inf_{i,t} + \beta_4 \ln Gov.\ Cons_{i,t} + \varepsilon_{i,t} \quad (34)$$

These models help us to elucidate how financial development and other macroeconomic factors influence different dimensions of income inequality.

This section's analysis differs from the earlier sections, which relied on static panel data models to test the theoretical model presented in Chapter 2. While the static models offered valuable insights, they did not fully account for potential endogeneity issues, which can arise when explanatory variables correlate with the error term, leading to biased estimates. Endogeneity is particularly common when the model has reverse causality, omitted variable bias, or measurement error. The Generalized Method of Moments (GMM) approach addresses these challenges, explicitly using dynamic panel data models. The GMM method is well-suited for handling endogeneity using instruments to mitigate the correlation between the error term and the

³⁵ See Appendix 1 for the list of the countries.

explanatory variables. Unlike static models, dynamic panel data models account for the time-dependent nature of the data by including lagged dependent variables, which helps us to capture persistence in the dependent variable over time. The GMM method allows for more robust estimation by using lagged values as instruments, thus correcting for potential endogeneity and providing more reliable results (Roodman, 2009). This approach significantly improves over the static models used in the previous sections because understanding the relationship between financial development and income inequality in a dynamic context is critical.

To measure income inequality, we use two different dependent variables. The first is the *Gini Market* variable, which captures income inequality before taxes and transfers. It reflects the unequal income distribution in the market before any government intervention through taxation or social transfers. The second dependent variable is the *Gini Disposable*, which represents income inequality after taxes and transfers. This variable captures how redistribution policies affect inequality. Using these two different income inequality measures, we can analyze how financial development impacts inequality in both the market (pre-tax) and disposable income (post-tax) contexts. Each model examines one of these dependent variables separately to provide a more nuanced understanding of the income inequality-financial development relationship.

We use the *Financial Development Index* (FDI) from the IMF to measure financial development. This index aggregates the development of both financial institutions and financial markets across three key dimensions: depth, access, and efficiency. The depth dimension refers to the level of financial activity, such as credit or assets, while access measures how easily individuals and businesses can utilize financial services. Efficiency, in turn, reflects how well financial resources are allocated. This index provides a comprehensive measure of the financial sector's maturity, and its high quality and broad coverage across countries make it a reliable indicator for this analysis.

Given the complex relationship between financial development and income inequality, there is a risk of endogeneity. We use the GMM method to address this issue, which allows us to apply instrumental variables to remove the bias. In this analysis, we employ *Latitude*, a geographic variable often used as a proxy for historical

and institutional differences, and *British Legal Origin*, a dummy variable indicating whether a country's legal system is based on British common law, as instrumental variables (Elgin et al., 2013). Following Jauch and Watzka (2016), the lagged values (up to three lags) of Gini disposable, the financial development index, and real GDP per capita were also used as instrumental variables. These variables are considered exogenous to the model and serve as proxies for historical and institutional factors that shape financial development and income inequality but are not affected by short-term fluctuations in these variables.

The difference GMM method that deals with endogeneity can be summarized as follows:

$$\ln Y_{it} = \phi \ln Y_{it-1} + \beta X'_{it} + (\eta_i + \varepsilon_{it})$$

Y_{it} : is the dependent variable for a country (or entity) i at time t .

Y_{it-1} : is the lagged dependent variable (one period back).

X'_{it} : represents a set of independent variables.

η_i : is the unobserved country-specific effect (fixed effect), which does not vary over time.

ε_{it} : is the idiosyncratic error term that varies over time and across countries (entities).

$$\Delta \ln Y_{it} = \phi \Delta \ln Y_{it-1} + \beta \Delta X'_{it} + \Delta \varepsilon_{it}$$

To remove the unobserved country-specific effect η_i , we apply the first differencing to the model. The first differencing subtracts the previous period's value from the current period's value:

$$\Delta Y_{it} = Y_{it} - Y_{it-1}$$

This eliminates the fixed effects because η_i is constant over time and disappears after differencing.

The new model (after differencing) no longer includes η_i but endogeneity can still remain due to the potential correlation between the lagged dependent variable and the error term.

Endogeneity arises when regressors are correlated with the error term. After differencing, we have:

$$\Delta u_{it} = \Delta \eta_i + \Delta \varepsilon_{it}$$

where Δu_{it} represents the error term after differencing. η_i is time-invariant so $\Delta \eta_i = 0$, leaving only the differenced idiosyncratic error term $\Delta \varepsilon_{it}$. The *Difference GMM* transforms the model by differencing the data to eliminate country-specific fixed effects. Endogeneity remains even after eliminating fixed effects because the lagged dependent variable may be correlated with the error term. GMM methods, such as Difference GMM and System GMM, address endogeneity by using internal instruments.

Large N (many units) and small T (short time series) are important conditions for GMM methods like Difference GMM. With a large N , sufficient internal instruments can be generated, enhancing the effectiveness of these instruments. In small T cases, endogeneity becomes more pronounced, as past values of the dependent variable can influence the current values. GMM methods address this by using lagged observations as instruments, which helps us to mitigate endogeneity. However, if T is too large, the number of instruments can become excessive, weakening the validity of tests like the Sargan or Hansen test (Roodman, 2009; Tatoglu 2018).

Before testing the empirical model expressed in equations (33) and (34), it is essential to present the descriptive statistics and correlation matrix for the main variables used in this study. Descriptive statistics help us to understand the data's central tendency (mean), variability (standard deviation), and range (minimum and maximum values). Additionally, the correlation matrix will provide a preliminary understanding of how financial development and other macroeconomic factors interact with income inequality by presenting the strength and direction of the linear relationships between the variables.

Table 4: Descriptive Statistics for World countries 1980-2019

Variable	Obs	Mean	Std. Dev.	Min	Max
govcons	6498	19.57	9.84	0.52	179.17
ginidisp	4699	38.55	8.76	16.8	65.4
ginimarket	4699	45.69	6.25	30.7	72.3
inflation	5772	21.76	160.96	-17.64	4734.91
rgdppc	6401	11706.96	16536.96	163.57	118142
fdi	6264	28.46	20.93	0.01	100
latitude	6717	19.67	23.68	-40.63	64.66
legalorg	6558	0.31	0.46	0	1

Source: Created by the author.

Table 4 provides an overview of the descriptive statistics for each variable in the analysis, covering 168 countries between 1980 and 2019. Inflation values exceeding 5000 percent per year were excluded from the dataset as they are considered outliers.

Table 5: Correlation Matrix for World countries 1980-2019

Variable	govcons	ginidisp	ginimarket	inflation	rgdppc	fdi	latitude	legalorg
govcons	1							
ginidisp	-0.18***	1						
ginimarket	-0.11***	0.58***	1					
inflation	0.09***	0.01	0.01	1				
rgdppc	-0.16***	-0.51***	0.01	-0.06***	1			
fdi	-0.11***	-0.44***	0.10**	-0.06***	0.74***	1		
latitude	0.13***	-0.72***	-0.32***	-0.02	0.37***	0.36***	1	
legalorg	-0.08***	0.27***	0.17***	-0.05***	0.04***	0.07**	-0.27***	1

Note: ***, **, * show statistical significance levels at 1, 5, and 10 %, respectively.

Source: Created by the author.

The correlation matrix shows the pairwise relationships between the variables, highlighting potential relationships and any multicollinearity issues that could affect the regression results. The correlation matrix presented in Table 5 reveals significant relationships between financial development, economic growth, and income inequality. Notably, financial development (*fdi*) is positively correlated with economic

growth (*real GDP per capita*), suggesting that higher financial development is associated with increased income per capita. However, its relationship with income inequality is more complex, showing weaker or insignificant direct correlations with the pre-tax measure of inequality (*Gini Market*) while exhibiting a stronger negative relationship with post-tax inequality (*Gini Disposable*).

Including inflation and government consumption further enriches the analysis. Government consumption negatively correlates with the indicators of income inequality, indicating that higher government spending tends to reduce income inequality. Conversely, inflation shows weaker relationships with income inequality, suggesting its role in income distribution may be more context-dependent. These variables provide a nuanced view of the complex dynamics between financial development, economic growth, and income inequality, underscoring the importance of institutional and policy frameworks in shaping these outcomes. While these correlations provide insight into potential relationships between variables, they do not account for country-specific or time effects, nor do they address issues of endogeneity. To gain a more robust understanding, further analysis using dynamic and static panel data models is required, as these models control for country and time effects while also addressing potential endogeneity.

Table 6: Global Estimation Results (1980-2019): Financial Development and Income Inequality

Dep. Var.	Gini Market (Nat. Log.)					Gini Disp. (Nat. Log.)				
	P. OLS	P. OLS	F. E.	F. E.	Diff. GMM	P. OLS	P. OLS	F. E.	F. E.	Diff. GMM
<i>L.Dependent</i>					0.741*** (0.0346)					0.624*** (0.0356)
<i>fdi</i>	0.0007*** (-0.0001)	0.0001 (-0.0002)	0.0012*** (-0.0004)	0.0010*** (-0.0004)	0.0005** (-0.0003)	-0.0047*** (0.0001)	-0.0013*** (0.0002)	0.0006 (0.0004)	0.0002 (0.0004)	0.0009** (0.0004)
<i>lrgdpcc</i>		0.0126*** (-0.0025)		0.0130 (0.0259)	-0.0437*** (0.0126)		-0.0666*** (0.0036)		0.0225 (0.0249)	-0.0625*** (0.0196)
<i>linflation</i>		0.0042* (-0.0023)		-0.0015 (-0.0024)	0.0025* (-0.0014)		0.0076** (0.0033)		-0.0009 (0.0026)	0.0016 (0.0020)
<i>lgovcons</i>		-0.0190*** (-0.0044)		0.0041 (-0.007)	-0.0074 (-0.0064)		-0.0926*** (0.0065)		0.0050 (0.0083)	-0.0139 (0.0108)
<i>Constant</i>	3.773*** (0.0188)	3.731*** (0.0301)	3.768*** (0.0173)	3.652*** (0.235)		3.717*** (0.0333)	4.451*** (0.0446)	3.595*** (0.0188)	3.397*** (0.228)	
<i>Observations</i>	4,600	4,119	4,600	4,119	2,699	4,600	4,119	4,600	4,119	2,699
<i>R-squared</i>	0.018	0.025	0.185	0.184		0.217	0.330	0.123	0.117	
<i>Sargan</i>					164.65***					80.39
<i>Hansen</i>					62.18					62.93
<i>AB AR(1)</i>					-3.01***					-2.00**
<i>AB AR(2)</i>					0.08					-0.50
<i># of Countries</i>			165	161	127			165	161	127

Note: ***, **, * show statistical significance levels at 1, 5, and 10 %, respectively. All estimations are with time dummies and robust standard errors.

Values in parentheses indicate standard errors.

Source: Created by the author.

Table 6 presents an empirical analysis examining the relationship between financial development (*fdi*) and income inequality, measured through the *Gini Market* and the *Gini Disposable* (both in natural logarithms) as dependent variables. The analysis uses three estimation methods: Pooled OLS, Fixed Effects (F.E.), and Difference GMM.

The results show that the coefficient for the lagged dependent variable is highly significant in the Difference GMM estimations for both models using the *Gini Market* and the *Gini Disposable* as dependent variables. This indicates that income inequality exhibits strong persistence over time, meaning that past levels of inequality significantly influence current inequality. For financial development, the relationship with income inequality differs across the models. In the models using the *Gini Market* as the dependent variable, the coefficient of the financial development index is positive and statistically significant in most models, particularly in fixed effects and the difference GMM estimations. This suggests that financial development is associated with higher inequality in the market before taxes and transfers. On the other hand, the results for the *Gini Disposable* are more varied. In the Pooled OLS estimation, financial development has a negative and significant impact on inequality, suggesting that it reduces inequality after taxes and transfers. However, in the difference GMM estimation, the relationship becomes positive and significant again, indicating that financial development may still contribute to increased inequality after redistribution, though to a lesser extent than in the market-based measure.

The direction of the relationship between financial development and income inequality is quite controversial in the literature. It can be claimed that there is a positive relationship between financial development and income inequality because financial development requires solid institutional structures to positively impact income distribution (Rajan and Zingales, 2003; Jauch and Watzka, 2016). Because financial development often benefits high-income groups more than low and middle-income groups (Denk and Cournede, 2015). On the other hand, financial development increases economic activities, creating employment and facilitating access to financial services, which can reduce income inequality (Demirguc-Kunt and Levine, 2009; Nikoloski, 2013; Law and Tan, 2009). Additionally, developed credit and stock

markets increase the incomes of the poor, thus reducing inequality (Kappel, 2010; Baiardi and Morana, 2016). In conclusion, our findings indicate that financial development has contributed to increasing income inequality. As highlighted in the literature, the complexity of the financial system's impact on income inequality arises from its dependence on the strength of inclusive institutions. Considering the global context from 1980 to the present, based on the literature, it can be argued that the institutional quality necessary to fully realize the potential positive effects of financial development has not reached a sufficient level worldwide. As a result, rather than promoting economic fairness, financial systems have often fallen short of delivering the intended reductions in inequality.

Control variables also play a crucial role. The natural logarithm of GDP per capita (*lrgdpcc*) shows mixed effects. In the models using the Gini Market as the dependent variable, it is positive and significant in the Pooled OLS estimations, indicating that higher economic development increases inequality. However, for the GMM estimation, this relationship turns negative. For the models using the Gini Disposable as the dependent variable, *lrgdpcc* consistently shows a negative relationship with inequality, indicating that economic development tends to reduce inequality after taxes and transfers. In the previous chapter, we discussed the groundbreaking impact of the Kuznets hypothesis in literature. Following Kuznets' (1955) study, numerous works have been conducted on the effect of economic growth on income distribution. Barro (2000) posits that the growth of GDP per capita can explain economic equality. According to Barro (2000), this relationship may vary depending on the development levels of countries and other structural factors, such as the pace of adopting new technologies. The increase in real GDP per capita can reduce income inequality by encouraging investments in human capital among the lowest income groups, thereby enhancing social mobility and leading to a more equitable income distribution (Galor and Tsiddon, 1995). However, the hypothesis that economic growth will improve income inequality has been refuted by Jauch and Watzka (2016), who examined the period from 1960 to 2008. The authors attribute this to the difference in the periods covered by their study and Kuznets' (1955) work.

The effect of inflation on income distribution remains a contentious issue, as Jauch and Watzka (2016) noted. While some studies suggest a negative relationship

between inflation and income inequality, others propose that the wealthy are better able to shield themselves from inflation due to superior access to financial markets (Easterly and Fischer, 2001; Albanesi, 2007). Looking at Table 6, in the models using Gini Market as the indicator of income inequality, log-transformed inflation (*linflation*) has a positive and significant impact on inequality in both Pooled OLS and GMM estimations. This relationship may be explained by the fact that debtors benefit from unexpectedly high inflation, which reduces the real value of their debt, as most contracts are fixed in nominal terms (Monnin, 2014; Namini and Hudson, 2019). However, the impact of inflation (*linflation*) on Gini Disposable is weaker and often not significant. This aligns with the literature, which remains divided on the effect of inflation on income distribution, with some studies emphasizing the advantages the wealthy hold in mitigating inflation's effects (Easterly and Fischer, 2001; Albanesi, 2007).

Similar to the ambiguous impact of inflation on income inequality, the effect of the government's share of the economy on income inequality is also debated in the literature. On the one hand, a large government share might indicate a strong commitment to income redistribution, potentially reducing inequality (Tanninen, 1999; Guzi and Kahanec, 2019). On the other hand, it could reflect rent-seeking activities by an elite within the government, exacerbating inequality (Krueger, 1974; North et al., 2009; Milanovic, 2016).

In the empirical analysis, the natural logarithm of government consumption (*lgovcons*) shows a negative and significant relationship with income inequality in the pooled OLS estimation results. However, no significant relationship is found in the other models, suggesting that the government's ability to promote economic fairness may be limited. Even after controlling for government consumption, financial development still positively and significantly impacts inequality, aligning with the theoretical model. This suggests that financial development can undermine the state's capacity to reduce inequality by weakening its ability to impose taxes or redistribute wealth effectively.

The core argument of this thesis is that the impact of financial development on inequality depends on the strength of the state and its institutions. If the state weakens alongside financial development, inequality increases. Conversely, strong institutions

allow the state to regulate financial systems effectively, reducing inequality. This finding is consistent with the literature, which suggests that financial development exacerbates inequality when institutions are weak (Rajan and Zingales, 2003; Acemoglu et al., 2012). As highlighted by La Porta et al. (1999), the strength of institutions is closely tied to the size of the state. To prevent financial development from worsening income inequality, it is crucial that the state itself does not become weakened by the financial system. The adverse effects of financial development on inequality are primarily mediated through its influence on the state's ability to regulate and implement redistributive policies effectively.

The theoretical model proposes that the interaction between financial development and the endogenous tax rate is key. While taxes typically reduce inequality, financial development limits the state's capacity to implement such policies, leading to a net positive effect on inequality. Although the empirical analysis does not directly measure the response of the endogenous tax rate to financial development, the model provides an intuitive explanation. Financial development, by concentrating wealth and influencing political structures, likely reduces the state's ability to maintain higher tax rates or implement redistributive policies, as noted in previous research (Rajan and Zingales, 2003; Acemoglu et al., 2012).

Diagnostic tests reveal some crucial insights. The *Sargan* test for the model using the Gini Market as the dependent variable is significant, indicating potential issues with the overidentifying restrictions, meaning that the instruments used may not be entirely valid. However, the *Hansen* test is insignificant, suggesting that the instruments are valid overall. In the model using the Gini Disposable as the dependent variable, the *Sargan* test is insignificant, indicating no issues with overidentifying restrictions, while the *Hansen* test remains insignificant, further supporting the validity of the instruments. Additionally, the first-order autocorrelation test $AR(1)$ is significant in both models, indicating the presence of first-order autocorrelation, which is expected in the difference GMM estimations. The second-order autocorrelation test $AR(2)$, however, is not significant in either model, meaning that there is no second-order autocorrelation, indicating that the model specification is appropriate in both cases.

3.2.3. Assessing Financial Development and Income Disparities in Wealthier Economies (1980-2019)

This section and the proceeding section examine more homogeneous country groups to better understand the financial development and income inequality nexus. By focusing on these groups, we aim to explore the internal dynamics that drive the relationship between financial development and inequality. For this purpose, 101 high—and upper-middle-income countries and 67 low—and lower-middle-income countries have been analyzed separately. This approach allows us to investigate how financial development interacts with income distribution within these distinct economic contexts, shedding light on potential differences in the drivers of inequality between wealthier and less affluent economies.

Table 7: Descriptive Statistics for High and Upper-Middle-Income countries 1980-2019

Variable	Obs	Mean	Std. Dev.	Min	Max
govcons	3869	20.068	8.975	2.69	179.17
ginidisp	2970	36.432	9.288	16.8	65.4
ginimarket	2970	46.692	6.303	30.7	72.3
inflation	3538	20.378	141.328	-17.64	3398.68
rgdppc	3810	18710.36	18368.12	355.91	118142
fdi	3778	37.942	21.334	0.01	100
latitude	4039	24.654	26.017	-40.63	64.66
legalorg	3999	0.33	0.47	0	1

Source: Created by the author.

Table 7 presents the descriptive statistics for each variable encompassing 101 countries classified as high-income and upper-middle-income countries from 1980 to 2019. Inflation values exceeding 5000 percent per year were excluded from the dataset as they are considered outliers.

Table 8: Correlation Matrix for High and Upper-Middle-Income Countries 1980-2019

Variable	govcons	ginidisp	ginimarket	inflation	rgdppc	fdi	latitude	legalorg
govcons	1							
ginidisp	-0.14***	1						
ginimarket	-0.11***	0.64***	1					
inflation	0.10***	0.03	0.02	1				
rgdppc	-0.33***	-0.48***	-0.14***	-0.09***	1			
fdi	-0.26***	-0.36***	-0.01	-0.10***	0.66***	1		
latitude	0.09***	-0.71***	-0.35***	-0.01	0.32***	0.29***	1	
legalorg	0.0004	0.30***	0.23***	-0.08***	0.02	0.07***	-0.33***	1

Note: ***, **, * show statistical significance levels at 1, 5, and 10 %, respectively.

Source: Created by the author.

The main differences between the correlation matrix for high-income countries and that for all countries lie in two key relationships. First, the relationship between the Financial Development Index (*fdi*) and Gini Market (*ginimarket*) (pre-tax income inequality) is positive and significant in the global sample, indicating that financial development is associated with higher income inequality before redistribution. However, in high-income countries, this relationship becomes negative and insignificant, suggesting that financial development has a less clear or weaker impact on pre-tax inequality in wealthier economies.

Second, the correlation between real GDP per capita (*rgdppc*) and the Gini Market is positive and insignificant for all countries. Still, in high-income countries, this relationship turns negative and significant. This shift implies that higher income levels are associated with lower pre-tax inequality in wealthier economies, whereas this relationship is not evident when considering the global sample. The following table presents a more detailed analysis of the relationship between financial development and income inequality while accounting for control variables such as real GDP per capita, government consumption, and inflation.

Table 9: Estimation Results for High and Upper-Middle Income Countries (1980-2019): Financial Development and Income Inequality

Dep. Var.	Gini Market (Nat. Log.)					Gini Dispos. (Nat. Log.)				
	P. OLS	P. OLS	F. E.	F. E.	Diff. GMM	P. OLS	P. OLS	F. E.	F. E.	Diff. GMM
<i>L.Dependent</i>					0.712*** (0.0385)					0.614*** (0.0396)
<i>fdi</i>	-0.0002* (0.0001)	0.0009*** (0.0002)	0.0008 (0.0005)	0.0008* (0.0004)	0.0004 (0.0004)	-0.0044*** (0.0002)	0.0004 (0.0003)	0.0003 (0.0005)	0.0001 (0.0005)	0.0012** (0.0006)
<i>lrgdpcc</i>		-0.0403*** (0.0046)		-0.0032 (0.0385)	-0.0485*** (0.0166)		-0.174*** (0.0064)		0.0036 (0.0355)	-0.0758*** (0.0248)
<i>linflation</i>		0.0006 (0.0029)		-0.0012 (0.0034)	0.0008 (0.0015)		-0.0016 (0.0042)		-0.0009 (0.0036)	-0.0004 (0.0022)
<i>lgovcons</i>		-0.0340*** (0.0068)		0.0038 (0.0150)	-0.0111 (0.0107)		-0.220*** (0.0114)		0.0092 (0.0165)	-0.0319* (0.0178)
<i>Constant</i>	3.806*** (0.0226)	4.258*** (0.0511)	3.810*** (0.0282)	3.835*** (0.397)		3.671*** (0.0438)	5.787*** (0.0762)	3.553*** (0.0289)	3.503*** (0.368)	
<i>Observations</i>	2,905	2,620	2,905	2,620	1,786	2,905	2,620	2,905	2,620	1,786
<i>R-squared</i>	0.025	0.066	0.244	0.238		0.155	0.432	0.154	0.138	
<i>Sargan</i>					129.97***					77.87
<i>Hansen</i>					32.27					27.57
<i>AB AR(1)</i>					-2.36**					-2.16**
<i>AB AR(2)</i>					0.58					-0.69
<i># of Countries</i>			98	95	76			98	95	76

Note: ***, **, * show statistical significance levels at 1, 5, and 10 %, respectively. All estimations are with time dummies and robust standard errors. Values in parentheses indicate standard errors.

Source: Created by the author.

The models where the Gini Market is the dependent variable reveal that financial development tends to increase pre-tax income inequality, particularly in the Pooled OLS and Fixed Effects estimation results when economic growth inflation and government consumption are controlled. This suggests that financial development benefits higher-income groups more than others. However, in the difference GMM estimations, the relationship between financial development and the Gini Market is positive and insignificant. In the models where the Gini Market is used as an indicator of income inequality, real GDP per capita (*lrgdpcc*) generally shows a negative and significant relationship with income inequality, suggesting that economic growth reduces pre-tax inequality. In the Pooled OLS estimations, this relationship is significant, indicating that higher levels of development are associated with lower inequality. However, this effect becomes insignificant in the fixed effects estimations, possibly due to country-specific factors. The negative relationship reappears in the models using the difference GMM estimation method, confirming that economic growth has a robust inequality-reducing effect in the pre-tax income distribution. This supports the idea that inequality tends to decrease as economies grow, consistent with the Kuznets curve's second phase.

In the models using the Gini Market as the dependent variable, government consumption (*govcons*) significantly reduces income inequality, as shown in the Pooled OLS estimation results. This suggests that higher levels of government spending can reduce pre-tax inequality by redistributing resources more equitably. However, in more robust models estimated with fixed effects and the difference GMM methods, this relationship weakens, indicating that the redistributive effect of government spending may be limited when controlling for other factors such as country-specific characteristics and endogeneity.

On the other hand, inflation (*linflation*) does not show a significant relationship with income inequality in any of the models, suggesting that inflation does not play a major role in driving income inequality in this context. Given that inflation lacks statistical significance, it can be concluded that its impact on inequality is not strong enough to warrant further discussion in this analysis.

A fundamental limitation in the models using the Gini Market as an indicator of income inequality is the validity of the instruments, as indicated by the *Sargan* test.

The significant *Sargan* test results raise concerns about potential overidentification, which means the instruments used in these models may not be entirely valid. This issue compromises the reliability of the results in the Gini Market models, particularly in the difference GMM estimations, where instrument validity is crucial for accurate estimation.

Given the limitations of the dynamic model using the Gini Market as the dependent variable, the Gini Disposable model emerges as a more reliable alternative. The Sargan test for the Gini Disposable model indicates no issues with overidentifying restrictions, confirming the validity of the instruments. This strengthens the case for using Gini Disposable as a more robust framework for analyzing the relationship between financial development and income inequality. Notably, the difference GMM estimation results reveal a crucial feature of the Gini Disposable model. While financial development also shows a positive relationship with income inequality, similar to the Gini Market model, this relationship becomes statistically significant in the Gini Disposable model. This suggests financial development may still contribute to increasing inequality even after taxes and transfers. Additionally, government consumption (*govcons*) continues to exhibit a negative relationship with income inequality. Unlike the models with the Gini Market, this effect is now statistically significant in the models with Gini Disposable as the measure of income inequality, indicating that higher government spending effectively reduces inequality in the post-tax income distribution.

The validity of the instruments in the models with Gini Disposable estimated by the difference GMM methodology for developed countries is confirmed by diagnostic tests, indicating that the instruments are appropriate for addressing endogeneity issues. However, a key distinction arises when comparing the results for all countries with those for developed countries. In the Gini Disposable models estimated by the difference GMM for developed countries, the control variable government consumption (*govcons*) shows a notable difference. Specifically, in developed countries, government consumption reduces income inequality significantly. This provides strong evidence that higher government spending in developed economies effectively reduces inequality, which is consistent with robust redistributive policies in these nations.

Moreover, in both models—across all countries and developed countries—financial development tends to increase inequality. This trend supports the thesis’s theoretical argument that financial development exacerbates income inequality by amplifying the advantages of the rich, further deepening income disparities.

3.2.4. Examining Financial Development and Income Inequality in Developing Economies (1980-2019)

This section examines the relationship between financial development and income inequality in 67 developing countries from 1980 to 2019. The analysis utilizes dynamic panel data methods, which are consistent with the methods applied in the previous sections. These methods address potential endogeneity issues while controlling for country-specific and time effects. The focus is on how financial development interacts with income inequality, considering other key factors such as economic growth (real GDP per capita), government consumption, and inflation. In developing economies, fiscal and monetary policies—particularly those related to inflation control and government spending—are explored to assess their significance in shaping income inequality. The analysis will explore whether financial development exacerbates or mitigates inequality and how these fiscal and monetary policies influence this relationship.

Table 10: Descriptive Statistics for Low and Lower-Middle-Income Countries 1980-2019

Variable	Obs	Mean	Std. Dev.	Min	Max
govcons	2629	18.829	10.95	0.52	81.62
ginidisp	1729	42.186	6.3	25.1	60.4
ginimarket	1729	43.957	5.774	32.6	59.3
inflation	2234	23.937	187.907	-16.86	4734.91
rgdppc	2591	1408.64	1153.07	163.57	9037.09
fdi	2486	14.049	8.254	0.02	50.88
latitude	2678	12.144	17.093	-29.5	48.73
legalorg	2559	0.281	0.45	0	1

Source: Created by the author.

Table 10 provides the descriptive statistics for each variable across 67 low-income and lower-middle-income countries between 1980 and 2019. Inflation rates above 5000 percent annually were excluded from the dataset as they were deemed outliers.

Table 11: Correlation Matrix for Low and Lower-Middle-Income Countries 1980-2019

Variable	govcons	ginidisp	ginimarket	inflation	rgdppc	fdi	latitude	legalorg
govcons	1							
ginidisp	-0.24***	1						
ginimarket	-0.16***	0.88***	1					
inflation	0.08***	-0.05**	-0.03	1				
rgdppc	0.13***	-0.04	-0.08***	-0.01	1			
fdi	-0.01	-0.12***	-0.12***	-0.03	0.53***	1		
latitude	0.18***	-0.66***	-0.56***	-0.04*	0.29***	0.27***	1	
legalorg	-0.19***	0.18***	0.12***	-0.02	-0.21***	-0.01	-0.22***	1

Note: ***, **, * show statistical significance levels at 1, 5, and 10 %, respectively.

Source: Created by the author.

Table 11 presents the correlation matrix for low and lower-middle-income countries from 1980 to 2019. The matrix shows that government consumption (*govcons*) is negatively correlated with both the Gini Disposable (*ginidisp*) and the Gini Market (*ginimarket*) measures of income inequality, suggesting that higher government spending is associated with reduced inequality, although the correlation is relatively modest. The Gini Disposable and the Gini Market are highly correlated, indicating that income inequality in these countries before and after taxes and transfers tends to follow similar patterns. Inflation shows a weak and inconsistent relationship with income inequality and other variables, implying that its effect on inequality may be minimal in this context. The real GDP per capita (*rgdppc*) has a weak negative correlation with the Gini Market, suggesting that economic growth may be limited in reducing pre-tax inequality. Interestingly, the financial development index is negatively correlated with the Gini Disposable and the Gini Market, hinting that financial development might reduce inequality in this sample, though the effect appears weak. However, whether financial development indeed contributes to income

equity in developing countries will be determined through more comprehensive analyses in the following table.

Table 12: Estimation Results for Low and Lower-Middle Income Countries (1980-2019): Financial Development and Income Inequality

Dep. Var.	Gini Market (Nat. Log.)					Gini Disp. (Nat. Log.)				
	P. OLS	P. OLS	F. E.	F. E.	Diff. GMM	P. OLS	P. OLS	F. E.	F. E.	Diff. GMM
<i>L.Dependent</i>					0.809*** (0.0587)					0.738*** (0.0690)
<i>fdi</i>	-0.0014*** (0.0003)	-0.0021*** (0.0004)	-0.0003 (0.0008)	-0.0011 (0.0009)	0.0001 (0.0003)	-0.0016*** (0.0003)	-0.0029*** (0.0004)	-0.0007 (0.0009)	-0.0018* (0.0009)	-0.0003 (0.0005)
<i>lrgdpcc</i>		0.0203*** (0.0058)		0.0652** (0.0281)	0.0013 (0.0129)		0.0362*** (0.0066)		0.0829** (0.0377)	0.0103 (0.0229)
<i>linflation</i>		0.0001 (0.0036)		0.0011 (0.0018)	-0.0001 (0.0007)		0.0018 (0.0042)		0.0007 (0.0020)	0.0008 (0.0010)
<i>lgovcons</i>		-0.0440*** (0.0059)		-0.0035 (0.0059)	-0.0025 (0.0037)		-0.0647*** (0.0073)		-0.0037 (0.0077)	-0.0038 (0.0055)
<i>Constant</i>	3.708*** (0.0378)	3.769*** (0.0529)	3.717*** (0.0202)	3.253*** (0.214)		3.667*** (0.0594)	3.713*** (0.0586)	3.680*** (0.0252)	3.088*** (0.286)	
<i>Observations</i>	1,695	1,499	1,695	1,499	913	1,695	1,499	1,695	1,499	913
<i>R-squared</i>	0.027	0.068	0.122	0.198		0.026	0.103	0.115	0.205	
<i>Sargan</i>					195.99***					234.02***
<i>Hansen</i>					16.46					6.73
<i>AB AR(1)</i>					-1.65*					-0.26
<i>AB AR(2)</i>					-0.85					-0.33
<i># of Countries</i>			67	66	51			67	66	51

Note: ***, **, * show statistical significance levels at 1, 5, and 10 %, respectively. All estimations are with time dummies and robust standard errors. Values in parentheses indicate standard errors.

Source: Created by the author.

Table 12 presents the estimation results for low and lower-middle-income countries from 1980 to 2019, focusing on the relationship between financial development and income inequality, using the Gini Market and the Gini Disposable as dependent variables.

A key finding from the models using the Gini Market is that financial development shows a negative and significant relationship with inequality only in the Pooled OLS estimations, suggesting that financial development might reduce inequality under less complex model specifications. However, in more robust models, such as the fixed effects and the difference GMM estimations, no evidence supports the claim that financial development reduces inequality. This raises questions about the robustness of the results from the simpler models. Additionally, the *Sargan* test in the difference GMM estimation results suggests potential issues with instrument validity, further weakening confidence in the GMM results for the models using the Gini Market as an indicator of income inequality. One of the few noteworthy findings is related to real GDP per capita (*rgdppc*). In both the pooled OLS and the fixed effects estimation results, an increase in real GDP per capita is associated with a rise in income inequality, aligning with the first half of the Kuznets curve, which suggests that inequality increases during the initial stages of economic growth.

The results for the models with the Gini Disposable as an indicator of income inequality follow a similar pattern. The impact of financial development is significant only in the pooled OLS estimations, while no significant effects are found in the fixed effects or the difference GMM estimations. The difference GMM estimation results for the Gini Disposable also show issues with autocorrelation and over-identifying restrictions, as indicated by the *AR(1)* and the *Sargan* test results, respectively. In conclusion, the most consistent findings across these models are the significant relationship between economic growth and increasing inequality in the early stages of development, which supports the Kuznets curve hypothesis. However, the role of financial development in reducing inequality remains inconclusive, especially in more robust model specifications.

The differences observed in the analysis for developing and developed countries are noteworthy. Similar to the inconclusive results highlighted in Chapter 1 for the lowest-income group of countries (as seen in Figures 6 and 9), a lack of significant findings also emerges in this section. This inconclusiveness can be explained by the current statistical procedures in poor countries, which contribute to misrepresenting economic phenomena such as global poverty and development (Deaton 2005; Jerven 2013).

CONCLUSION

The prominence of income distribution in economic literature and its continued relevance on the agenda is crucial for researchers interested in studying economic inequality. As mentioned, economic justice has always been and will continue to be a significant issue for humanity. In the first chapter, we presented our critiques regarding the correct interpretation of humanity's progress in addressing economic inequality. We argued that while progress in economic inequality is evident, interpreting this progress without delving into the details is erroneous. This thesis is written precisely with this motivation. Yes, market-driven progress is possible, but it is not independent of the effectiveness of the state. This thesis emphasizes the indispensable role of government intervention in creating a more equitable economic landscape. The comprehensive examination of historical, theoretical, and empirical perspectives reveals that the government should not merely act arbitrarily but actively participate in market dynamics to ensure justice and inclusivity.

The literature highlights that the state's role cannot be simply categorized as good or bad (Acemoglu and Robinson, 2019). Freedom and equality can be preserved when the state operates in balance with a resilient society. In this balance, democracy plays a particularly critical role by ensuring the state's accountability and empowering society. However, the state can be viewed as "good" when it serves as a mechanism for individuals to seek justice when they are denied their rightful claims, but it can also be seen as a "bad" force when powerful elites control the state's institutions (Tanninen, 1999; Guzi and Kahanec, 2019; Krueger, 1974; North et al., 2009; Milanovic, 2016).

As we have emphasized throughout this thesis, it is clear that the state may not be sufficiently effective in ensuring equality, especially in the dilemma between capital and democracy. The dual understanding of the state supports the central argument of this thesis: the state is not only an existing power but also an actor shaped by societal dynamics and, at times, weakened in the face of these dynamics. Achieving equality requires effective state intervention, but when capital elites control such intervention, the state's role in promoting equality can be undermined. However, it should not be overlooked that a strong democracy can enhance societal oversight and enable the state to maintain balance against capital more successfully. Democracy plays a crucial role

in maintaining the balance of power between the state and society, and the erosion of this balance increases the risk of the state being controlled by capital elites.

Financial development has often been credited with reducing poverty and promoting inclusive growth (Beck et al., 2007; Levine, 2005), but its effects on income inequality remain ambiguous. Many studies argue that financial development can foster greater equality by expanding access to financial resources, allowing lower-income groups to improve their economic standing (Greenwood and Jovanovic, 1990; Clarke, Xu, and Zou, 2006). However, the findings of this thesis suggest that financial development tends to exacerbate inequality. This can be explained by the theoretical model presented in this study, which shows how financial development restricts the state's role. This restriction limits the state's ability to regulate the financial system effectively, allowing capital to accumulate disproportionately among those with access to financial resources. In such cases, financial development deepens income inequality rather than addressing it, reinforcing the importance of state intervention in ensuring more equitable outcomes.

Examining the financial development variables from different perspectives is essential to gain a more comprehensive understanding of the relationship between financial development and income inequality. In this context, while Figures 5 and 6 presented in Chapter 1 offer valuable insights into the relationship between financial development, income inequality, and the state's role, it also has notable limitations that warrant further investigation. Firstly, the sample is limited, comprising only 20 developed and 43 developing countries. This small sample size raises concerns about the generalizability of the findings to a broader set of economies, particularly in developing or emerging markets. Furthermore, the mathematical relationship between the top 1% income share and the Gini99 is somewhat predictable. In countries where the top 1% holds a significant portion of the wealth, it is expected that the Gini99 – which excludes this group – would naturally show lower levels of inequality. This inherent mathematical correlation may skew the visual interpretation, making it seem that financial development might contribute to more equitable outcomes for the bottom 99%. However, the more intriguing aspect of the visual lies in the relationship between the size of the state and income inequality. In countries where the top 1% income share is high, the state tends to be smaller, a finding that aligns with the thesis argument

regarding the inability of the state to adequately regulate financial markets and curb inequality when captured by elite interests. On the other hand, the relationship between the state's size and the Gini99 raises questions. In countries where the Gini99 is lower, the state also appears minor, complicating the narrative. While providing an engaging narrative, these visuals underscore the need for a more detailed examination of the relationship between financial development, the state, and income inequality across a larger sample of countries and variables. A more comprehensive future study focusing specifically on the impact of financial development on the Gini99 and considering the varying roles of the state across different contexts is crucial to further understanding these dynamics. This research would not only enhance the robustness of the findings but also clarify the nuanced role the state plays in moderating or exacerbating income inequality.

In academic research, the theoretical model is expected to align with empirical analysis. However, the financial development discussed in the theoretical framework does not fully correspond to the financial development variable used in the empirical analyses. We used the Financial Development Index provided by the International Monetary Fund as a more comprehensive indicator of financial development. Unlike previous measures, such as domestic credit to the private sector as a percentage of GDP, the Financial Development Index reflects a broader range of financial activities, including market and institutional efficiency. This provides a clearer picture of financial development. However, it still does not fully capture the productivity aspect emphasized in the theoretical model—where bank efficiency is linked to minimizing losses in the process of transforming deposits into loans, resembling the concept of the *Solow residual*. In this context, calculating and using the banking productivity parameter in place of the Financial Development Index would enable a more aligned empirical analysis with the theoretical model. This would allow for a more accurate reflection of the productivity aspect emphasized in the theoretical framework. Such an approach could be a key focus of future studies, providing deeper insights into the role of financial efficiency in shaping income inequality and the broader economic landscape.

Türkiye presents a significant research opportunity regarding income distribution, yet there is a notable gap in the literature on this subject. As discussed in

Figure 4 of Chapter 1, Türkiye stands out among OECD countries with its high levels of inequality and poverty. When examining the reasons for this, population growth appears as a potential factor. Sundrum (1974) suggests that population growth can contribute to economic inequality, as wealthier segments of society tend to experience lower population growth than poorer segments. The affluent, with their lower population density, have greater access to education and healthcare and tend to save more, thereby perpetuating inequality. While this view requires further validation in the context of Türkiye, it is worth considering that different income groups may experience varying rates of population growth. Additionally, Piketty (2020) classifies Türkiye as a Middle Eastern country and attributes its persistent inequality to a lack of social democratic governments in the country's history. This observation opens up opportunities for future research into how political institutions and governance structures have influenced income inequality in Türkiye over time. Furthermore, in our dataset, Türkiye is categorized as an upper-middle-income country, indicating that it falls into the group where financial development has exacerbated economic inequality. Given that Türkiye is a country with a predominantly Muslim population, the dynamics of financial development could be interpreted differently. In this context, Kumru and Sarntisart (2016) highlight the growth of Islamic banking as a factor that may influence economic trends in Türkiye, presenting another avenue for future research. In summary, the causes of economic inequality in Türkiye could be analyzed through a wide lens, encompassing political factors, financial system intricacies, and population dynamics. Future research should delve deeper into how these elements interact to shape economic inequality in Türkiye.

A fundamental limitation of this thesis is the absence of an empirical test for the endogenous tax rate, which plays a crucial role in the theoretical model. Future studies should explore this variable to understand better how financial development interacts with government capacity, particularly in tax policy. Testing the impact of an endogenous tax rate could provide deeper insights into the mechanisms through which financial development influences income inequality. This remains a critical area for further investigation and could significantly enhance the empirical robustness of future studies in this field.

From a policy perspective, the findings of this thesis highlight the critical role of solid institutional frameworks and state intervention in mitigating the adverse effects of financial development on income inequality. While the theoretical model simplifies the dynamics by focusing on the endogenous tax rate, the broader insights gained from this research demonstrate that the state's role extends far beyond what neo-classical approaches may suggest. Redistributive policies, although essential, are not sufficient on their own. To achieve equitable outcomes, the quality of governance—measured by the efficiency of public services, the independence of institutions, and the credibility of policy formulation—must be emphasized. Without these robust institutional safeguards, financial development risks deepening inequality by disproportionately benefiting those already integrated into the financial system. In this sense, the state must not be reduced to a passive actor or limited solely to tax mechanisms; it plays a crucial role in ensuring that the benefits of financial development are more broadly distributed. Thus, policy approaches that resist the constraints of purely market-driven solutions and bolster the state's capacity to govern effectively are essential for promoting inclusive growth and social justice.

This perspective is grounded in the discussion presented in the first chapter, where a more comprehensive understanding of inequality is explored through various lenses. The first chapter sets the foundation by reviewing influential works in the literature that challenge the traditional neo-classical approaches to inequality. These works introduce theoretical frameworks and utilize innovative visual tools to present economic inequality in new and revealing ways. These visual representations, which capture the complex realities of inequality, highlight that market-driven solutions alone are insufficient to address the deeper structural issues. Therefore, understanding inequality requires a multidimensional approach, combining theory, empirical analysis, and critical insights from previous studies to grasp its intricacies and develop practical solutions.

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APPENDICES

APPENDIX 1: The Lists of Countries

63 Countries with Stable Income Categories

High-Income Countries	Low-Income Countries	
Australia	Bangladesh	Liberia
Austria	Benin	Madagascar
Belgium	Burkina Faso	Malawi
Canada	Burundi	Mali
Denmark	Cambodia	Morocco
Finland	Cameroon	Mozambique
France	C. A. Republic	Myanmar
Germany	Chad	Nepal
Hong Kong	Congo, Dem. Rep.	Niger
Ireland	Congo, Rep.	Pakistan
Italy	Côte d'Ivoire	Rwanda
Japan	Ethiopia	Senegal
Netherlands	Gambia, The	Sierra Leone
New Zealand	Ghana	Sudan
Norway	Guinea	Syrian Arab Republic
Spain	Guinea-Bissau	Tanzania
Sweden	Haiti	Togo
Switzerland	Honduras	Uganda
United Kingdom	India	Vietnam
United States	Kenya	Zambia
	Lao PDR	Zimbabwe
	Lesotho	

All Countries with Available Data (168 in Total)

High-income and Upper-Middle-income Countries (101 Countries)

Albania	Dominican Rep.	Mauritius
Antigua and Barbuda	Ecuador	Mexico
Argentina	Equatorial Guinea, Rep.	Namibia
Armenia, Rep. of	Estonia, Rep. of	Netherlands, The
Aruba	Fiji, Rep. of	New Zealand
Australia	Finland	North Macedonia R.
Austria	France	Norway
Azerbaijan, Rep. of	Gabon	Oman
Bahamas, The	Georgia	Panama
Bahrain, Kingdom of	Germany	Paraguay
Barbados	Greece	Peru
Belarus, Rep. of	Grenada	Poland, Rep. of
Belgium	Guatemala	Portugal
Belize	Guyana	Qatar
Bosnia and Herzegovina	Hungary	Romania
Botswana	Iceland	Russian Federation
Brazil	Ireland	Saudi Arabia
Brunei Darussalam	Israel	Serbia, Rep. of
Bulgaria	Italy	Seychelles
Canada	Jamaica	Singapore
Chile	Japan	Slovak Rep.
China, P.R.: Hong Kong	Jordan	Slovenia, Rep. of
China, P.R.: Macao	Kazakhstan, Rep. of	South Africa
China, P.R.: Mainland	Korea, Rep. of	Spain
Colombia	Kuwait	St. Kitts and Nevis
Costa Rica	Latvia	St. Lucia
Croatia, Rep. of	Lithuania	St. Vincent and the Gr.
Cyprus	Luxembourg	Suriname
Czech Rep.	Malaysia	Sweden

Denmark	Maldives	Switzerland
Dominica	Malta	Thailand
Trinidad and Tobago	Turkmenistan	United Kingdom
Türkiye	United Arab Emirates	United States
Uruguay	Venezuela, Rep. Bol.	

Low-income and Lower Middle-income Countries (67)

Algeria	Kyrgyz Rep.	Ukraine
Angola	Lao People's Dem. R.	Uzbekistan, Rep. of
Bangladesh	Lebanon	Vietnam
Benin	Lesotho, Kingdom of	Yemen, Rep. of
Bhutan	Liberia	Zambia
Bolivia	Madagascar, Rep. of	Guinea-Bissau
Burkina Faso	Malawi	Haiti
Burundi	Mali	Honduras
Cabo Verde	Mauritania, Islamic R.	India
Cambodia	Mongolia	Indonesia
Cameroon	Morocco	Iran, Islamic Rep. of
Central African Rep.	Mozambique, Rep. of	Kenya
Chad	Myanmar	Sudan
Congo, Dem. Rep. of the	Nepal	Syrian Arab Rep.
Congo, Rep. of	Nicaragua	Tajikistan, Rep. of
Côte d'Ivoire	Niger	Tanzania, United Rep.
Djibouti	Nigeria	Togo
Egypt, Arab Rep. of	Pakistan	Tunisia
El Salvador	Philippines	Uganda
Eswatini, Kingdom of	Rwanda	
Ethiopia, The Federal Dem. R.	São Tomé and Príncipe	
Gambia, The	Senegal	
Ghana	Sierra Leone	
Guinea	Sri Lanka	

APPENDIX 2: The List of Variables

A_F : Banking productivity parameter

A_G : Productivity parameter for the firm

G_t : Government spending

R_t^d : Dividend return

R_t^q : Loan interest rate

c_t^d : Represents the consumer's demand for consumption goods

d_t : Deposits

k_t : Investment of capital.

l_{Ft} : Labor supplied for the bank

l_t : Labor supplied for the firm

q_t : Bank loans

w_t : Wage income

x_t : Leisure

y_t : After-tax, after- transfer income

z_t : Discount factor that is used for bank's profit maximization problem

Π_{Ft} : Profit of the bank

Π_t : Profit

δ_k : Depreciation of capital

λ_t : Lagrangian multiplier

τ_l : Tax levied on labor income

K : Cobb-Douglas Parameter

$V(d_{t+1})$: The recursive utility

g : Growth rate

α : A parameter to indicate how much the consumer likes leisure

K : Labor share in credit production

β : The discount factor for future income

γ : Output elasticity w.r.t. labor input

ρ : Subjective rate of discount or time preference factor

APPENDIX 3: The Ramsey (1928) Equilibrium Condition in Case of Zero Growth

$V(k_t^s)$ represents the maximum expected lifetime utility that can be attained from the sequence of consumption and investment decisions that follow from the initial state k_t^s .

$$V(k_t^s) = \text{Max}_{c_t^d, x_t, l_t^s, k_{t+1}^s} u(c_t^d, x_t) + \beta V(k_{t+1}^s)$$

Subject to the following equation:

$$T = x_t + l_t$$

The consumption of the individual is defined as the sum of various income sources and adjustments. Specifically, it is calculated as:

$$c_t^d = w_t l_t^s + r_t k_t^s + \Pi_t - k_{t+1}^s + k_t^s(1 - \delta_k)$$

$w_t l_t^s$: The wage income, which is the product of the wage rate w_t and the amount of labor supplied for the firm l_t^s

$r_t k_t^s$: The return on capital, where r_t is the rate of return on capital and k_t^s is the amount of capital supplied.

Π_t : Profit at time t comes from the firm to the consumer

k_{t+1}^s : The capital stock at the next period.

$k_t^s(1 - \delta_k)$: The depreciated value of the current period's capital stock, where δ_k is the depreciation rate.

$$V(k_t^s) = \text{Max}_{l_t^s, k_{t+1}^s} u[w_t l_t^s + r_t k_t^s + \Pi_t - k_{t+1}^s + k_t^s(1 - \delta_k), T - l_t] + \beta V(k_{t+1}^s)$$

Now a choice problem in terms of only labor l_t^s and next period's capital stock k_{t+1}^s , the first order conditions are

$$\frac{\partial u(c_t^d, x_t)}{\partial c_t^d} (w_t) + \frac{\partial u(c_t^d, x_t)}{\partial x_t} (-1) = 0$$

$$\frac{\partial u(c_t^d, x_t)}{\partial c_t^d} (-1) + \beta \frac{\partial V(k_{t+1}^s)}{\partial k_{t+1}^s}$$

And the envelope condition is

$$\frac{\partial V(k_t^s)}{\partial k_t^s} = \frac{\partial u(c_t^d, x_t)}{\partial c_t^d} [1 + r_t - \delta_k]$$

The three equilibrium conditions in last three equations can be reduced to two margins. First compute the derivatives of log utility function of $u(c_t, x_t) = \ln c_t + \alpha \ln x_t$, $\frac{\partial u(c_t, x_t)}{\partial x_t} = \frac{\alpha}{x_t}$ and $\frac{\partial u(c_t, x_t)}{\partial c_t} = \frac{1}{c_t}$. Next, substitute these into the three equations. Then take the solution for $\frac{\partial V(k_t^s)}{\partial k_t^s}$ in the envelope condition and increase its time subscript from t to $t + 1$ to get the solution for $\frac{\partial V(k_{t+1}^s)}{\partial k_{t+1}^s}$; substitute this solution in for $\frac{\partial V(k_{t+1}^s)}{\partial k_{t+1}^s}$ in equation $\frac{\partial u(c_t^d, x_t)}{\partial c_t^d} (-1) + \beta \frac{\partial V(k_{t+1}^s)}{\partial k_{t+1}^s}$. This eliminates $\frac{\partial V(k_t^s)}{\partial k_t^s}$ and $\frac{\partial V(k_{t+1}^s)}{\partial k_{t+1}^s}$ and gives the two equilibrium conditions. Defining the rate of time preference ρ in terms of β as $\frac{1}{1+\rho} \equiv \beta$, these equations are

$$\frac{1}{c_t} (w_t) - \frac{\alpha}{x_t} = 0$$

$$-\frac{1}{c_t} + \beta \frac{\partial V(k_{t+1}^s)}{\partial k_{t+1}^s} = 0$$

$$\frac{\partial V(k_t^s)}{\partial k_t^s} = \frac{1}{c_t} [1 + r_t - \delta_k]$$

$$\frac{\partial V(k_{t+1}^s)}{\partial k_{t+1}^s} = \frac{1}{c_{t+1}} [1 + r_t - \delta_k]$$

$$\frac{c_{t+1}^d}{c_t^d} = \frac{1+r_t-\delta_k}{1+\rho}$$

$$w_t = \frac{\frac{\alpha}{x_t}}{\frac{1}{c_t^d}}$$

Consumer demand can be further simplified when there is zero growth since the equilibrium interest rate r_t can be solved in this case and substituted back into the consumer demand for goods. By equation $\frac{c_{t+1}^d}{c_t^d} = \frac{1+r_t-\delta_k}{1+\rho}$, the consumer's equilibrium conditions, which says that consumption growth is determined by the relation of the interest rate r_t to the rate of preference ρ , or $\frac{c_{t+1}^d}{c_t^d} = \frac{1+r_t-\delta_k}{1+\rho}$, we can determine r_t given

the growth rate. With no equilibrium growth, the capital stock is stationary, and none of the variables grow over time. This means that $\frac{c_{t+1}^d}{c_t^d} = 1$. Therefore, it follows from the equation $\frac{c_{t+1}^d}{c_t^d} = \frac{1+r_t-\delta_k}{1+\rho}$ that

$$r_t = \rho + \delta_k$$

This is Ramsey's (1928) equilibrium condition for this case of no growth.

APPENDIX 4: Table of Baseline Calibration³⁶

	Value	Definition	Source
A_F	1.44	Banking productivity parameter	Gillman and Kejak (2011)
A_G	1	Goods productivity parameter	Gillman and Kejak (2011)
l_t	0.255	Labor used in goods sector	Gillman and Kejak (2011)
K	0.171	Labor share in credit production	Gillman and Kejak (2011)
α	1.935	Leisure weight	Gillman and Kejak (2011)
γ	0.64	Effective labor share in goods production	Gillman and Kejak (2011)
ρ	0.04	Subjective rate of discount	Gillman and Kejak (2011)
δ_k	0.071	Depreciation of capital	Gillman and Kejak (2011)
y_t	0.516	Output	Gomme et al. (2006)
k_t / y_t	5.951	Capital-output ratio	Gomme et al. (2006)
k_t	3.07	Capital	Gomme et al. (2006)
τ_l	0.2263	Tax rate on labor income	Gomme et al. (2006)
M	1.25	Mean-median family income ratio ³⁷	U.S. Census Bureau via Russell Sage Foundation-Chartbook of Social Inequality

³⁶ Drawing from the post-war U.S. calibrations by Gomme et al. (2006) and Gillman and Kejak (2011), the baseline calibration establishes parameters and Balanced Growth Path (BGP) target values for variables, grounded in post-war U.S. annual data spanning 1954–2000. These parameters and target values are presented in the table.

³⁷ The mean-median family income ratio serves as a proxy for the mean-median wage ratio, covering the period from 1947 to 2012.

APPENDIX 5: Derivation of Capital Stock Dynamics

To show how capital market imperfection (lower A_F) effects income distribution. Solution for all the variables can be found first by letting the loan rate R_t^q that is found in the goods producer equilibrium be set equal to the loan rate R_t^q found in the bank sector. From equation (7) and (24) this gives that

$$(1 - \gamma)A_G \left(\frac{l_t}{k_t}\right)^\gamma - \delta_k = R_t^q = R_t^d + \frac{w_t}{(A_F)^{\frac{1}{K}}}$$

Since the wage is given as the marginal product of labor in the goods producer problem, in equation (16), with $w_t = \gamma A_G \left(\frac{l_t}{k_t}\right)^{\gamma-1}$ and since $R_t^d = \rho$ the equilibrium, the above equilibrium condition gives an implicit solution for $\frac{l_t}{k_t}$ in terms of given parameters:

$$(1 - \gamma)A_G \left(\frac{l_t}{k_t}\right)^\gamma - \delta_k = R_t^q = \rho + \frac{\gamma A_G \left(\frac{l_t}{k_t}\right)^{\gamma-1}}{(A_F)^{\frac{1}{K}}}$$

With the solution for $\frac{l_t}{k_t}$, the other variables can be determined. Next, the solution for k_t as a function of $\frac{l_t}{k_t}$ will be determined. One way to proceed is to take allocation of time constraint, $1 = l_t + l_{Ft} + x_t$ and substitute in for l_{Ft} from the financial intermediary problem. For l_{Ft} , at $\frac{q_t}{d_t} = 1$, from equation (10)

$$\frac{l_{Ft}}{d_t} = \frac{1}{(A_F)^{\frac{1}{K}}}$$

And with $k_t = d_t$

$$l_{Ft} = \frac{k_t}{(A_F)^{\frac{1}{K}}}$$

Substituting this l_{Ft} solution into the time allocation constraint,

$$1 = l_t + \frac{k_t}{(A_F)^{\frac{1}{K}}} + x_t$$

For x_t , it holds from the consumer's intratemporal margin between goods and leisure that $x_t = \frac{\alpha c_t^d}{w_t^d(1-\tau_l)}$. And also consumption is given as

$$c_t^d = [w_t^d(1-\tau_l) + \tau_l \bar{w}_t + \rho(1+g)k_t] \left[\frac{w_t^d(1-\tau_l)}{w_t^d(1-\tau_l)(1+\alpha) + \alpha \tau_l \bar{w}_t} \right].$$

Combining these, the solution for x_t is

$$x_t = \frac{\alpha [w_t^d(1-\tau_l) + \tau_l \bar{w}_t + \rho(1+g)k_t] \left[\frac{w_t^d(1-\tau_l)}{w_t^d(1-\tau_l)(1+\alpha) + \alpha \tau_l \bar{w}_t} \right]}{w_t^d(1-\tau_l)}$$

$$1 = l_t + \frac{k_t}{(A_F)^{\frac{1}{K}}}$$

$$+ \frac{\alpha [w_t^d(1-\tau_l) + \tau_l \bar{w}_t + \rho(1+g)k_t] \left[\frac{w_t^d(1-\tau_l)}{w_t^d(1-\tau_l)(1+\alpha) + \alpha \tau_l \bar{w}_t} \right]}{w_t^d(1-\tau_l)}$$

$$1 = l_t + \frac{k_t}{(A_F)^{\frac{1}{K}}} + \alpha \left[\frac{w_t^d(1-\tau_l) + \tau_l \bar{w}_t + \rho(1+g)k_t}{w_t^d(1-\tau_l)(1+\alpha) + \alpha \tau_l \bar{w}_t} \right]$$

$$\left[\frac{w_t^d(1-\tau_l) + \tau_l \bar{w}_t + \rho(1+g)k_t}{w_t^d(1-\tau_l)(1+\alpha) + \alpha \tau_l \bar{w}_t} \right] \frac{\frac{1}{w_t^d}}{\frac{1}{w_t^d}} = \left[\frac{(1-\tau_l) + \tau_l M + \frac{\rho(1+g)k_t}{w_t^d}}{(1-\tau_l)(1+\alpha) + \alpha \tau_l M} \right] \text{ where } M = \frac{\bar{w}_t}{w_t^d}$$

$$1 = l_t + \frac{k_t}{(A_F)^{\frac{1}{K}}} + \alpha \left[\frac{(1-\tau_l) + \tau_l M + \frac{\rho(1+g)k_t}{w_t^d}}{(1-\tau_l)(1+\alpha) + \alpha \tau_l M} \right]$$

This leads directly to a solution for k_t in terms of $\frac{l_t}{k_t}$. Divide by k_t , where $g = 0$ for simplification.

$$\frac{1}{k_t} = \frac{l_t}{k_t} + \frac{1}{(A_F)^{\frac{1}{K}}} + \alpha \left[\frac{(1-\tau_l) + \tau_l M + \frac{\rho k_t}{w_t^d}}{(1-\tau_l)(1+\alpha) + \alpha \tau_l M} \right] \frac{1}{k_t}$$

$$\frac{1}{k_t} = \frac{l_t}{k_t} + \frac{1}{(A_F)^{\frac{1}{K}}} + \alpha \left[\frac{\frac{(1-\tau_l) + \tau_l M}{k_t} + \frac{\rho}{w_t^d}}{(1-\tau_l)(1+\alpha) + \alpha \tau_l M} \right]$$

Substitute $w_t^d = \gamma A_G \left(\frac{l_t}{k_t}\right)^{\gamma-1}$; and solve for k_t as

$$\begin{aligned}
\frac{1}{k_t} &= \frac{l_t}{k_t} + \frac{1}{(A_F)^{\frac{1}{K}}} + \alpha \left[\frac{\frac{(1-\tau_l) + \tau_l M}{k_t} + \frac{\rho}{\gamma A_G \left(\frac{l_t}{k_t}\right)^{\gamma-1}}}{(1-\tau_l)(1+\alpha) + \alpha \tau_l M} \right] \\
\frac{1}{k_t} &\left[1 - \alpha \frac{(1-\tau_l) + \tau_l M}{(1-\tau_l)(1+\alpha) + \alpha \tau_l M} \right] \\
&= \frac{l_t}{k_t} + \frac{1}{(A_F)^{\frac{1}{K}}} + \alpha \left[\frac{\rho \left(\frac{l_t}{k_t}\right)^{1-\gamma}}{\gamma A_G ((1-\tau_l)(1+\alpha) + \alpha \tau_l M)} \right] \\
\frac{1}{k_t} &= \left[\frac{(1-\tau_l)(1+\alpha) + \alpha \tau_l M}{(1-\tau_l)} \left[\frac{l_t}{k_t} + \frac{1}{(A_F)^{\frac{1}{K}}} \right] + \left[\frac{\alpha \rho}{(1-\tau_l)} \left(\frac{l_t}{k_t}\right)^{1-\gamma} \right] \right] \frac{1}{\gamma A_G} \\
k_t &= \frac{1}{\left[\frac{(1-\tau_l)(1+\alpha) + \alpha \tau_l M}{(1-\tau_l)} \left[\frac{l_t}{k_t} + \frac{1}{(A_F)^{\frac{1}{K}}} \right] + \left[\frac{\alpha \rho}{(1-\tau_l)} \left(\frac{l_t}{k_t}\right)^{1-\gamma} \right] \right] \gamma A_G} \\
k_t &= \frac{1}{\left[\left((1+\alpha) + \frac{\alpha \tau_l M}{(1-\tau_l)} \right) \left[\frac{l_t}{k_t} + \frac{1}{(A_F)^{\frac{1}{K}}} \right] + \left[\frac{\alpha \rho}{(1-\tau_l)} \left(\frac{l_t}{k_t}\right)^{1-\gamma} \right] \right] \gamma A_G}
\end{aligned}$$

And taking derivative of k_t with respect to banking productivity parameter A_F yields

$$\begin{aligned}
\frac{\partial k_t}{\partial A_F} &= -1 \left[\left[(1+\alpha) + \frac{\alpha \tau_l M}{(1-\tau_l)} \right] \left[\frac{l_t}{k_t} + \frac{1}{(A_F)^{\frac{1}{K}}} \right] \right. \\
&\quad \left. + \left[\frac{\alpha \rho}{(1-\tau_l)} \left(\frac{l_t}{k_t}\right)^{1-\gamma} \right] \right]^{-2} \left(-\frac{1}{K} \left[(1+\alpha) + \frac{\alpha \tau_l M}{(1-\tau_l)} \right] (A_F)^{-\frac{1}{K}-1} \right) \\
&> 0
\end{aligned}$$

As it is seen from the equation, k_t is a function of τ_l . Equilibrium value of k_t is dependent on parameters, but τ_l is an endogenous variable anymore. So, while finding $\frac{\partial \tau_l^*}{\partial k_t}$ this expression k_t is treated as if it were independent of the tax rate.

The change of capital stock with respect to the exogenous tax rate can also be found via following derivation.

$$\begin{aligned} \frac{\partial k_t}{\partial \tau_l^*} &= -1 \left[\left[\frac{(1-\tau_l)(1+\alpha)+\alpha\tau_l M}{(1-\tau_l)} \right] \left[\frac{l_t}{k_t} + \frac{1}{(A_F)^{\frac{1}{K}}} \right] + \left[\frac{\frac{\alpha\rho}{(1-\tau_l)} \left(\frac{l_t}{k_t} \right)^{1-\gamma}}{\gamma A_G} \right] \right]^{-2} \left[\left[\frac{l_t}{k_t} + \right. \right. \\ &\quad \left. \left. \frac{1}{(A_F)^{\frac{1}{K}}} \right] \frac{\alpha M}{(1-\tau_l)^2} + \left(-1(1-\tau_l)^{-2} \frac{\alpha\rho}{\gamma A_G} \left(\frac{l_t}{k_t} \right)^{1-\gamma} (-1) \right) \right] < 0 \\ \frac{\partial k_t}{\partial \tau_l^*} &= -[k_t]^2 \left[\left[\frac{l_t}{k_t} + \frac{1}{(A_F)^{\frac{1}{K}}} \right] \frac{\alpha M}{(1-\tau_l)^2} + \left((1-\tau_l)^{-2} \frac{\alpha\rho}{\gamma A_G} \left(\frac{l_t}{k_t} \right)^{1-\gamma} \right) \right] < 0 \\ \frac{\partial k_t}{\partial \tau_l^*} &= -[k_t]^2 \left[(1-\tau_l)^{-2} \left(\left[\frac{l_t}{k_t} + \frac{1}{(A_F)^{\frac{1}{K}}} \right] \alpha M + \left(\frac{\alpha\rho}{\gamma A_G} \left(\frac{l_t}{k_t} \right)^{1-\gamma} \right) \right) \right] < 0 \end{aligned}$$

APPENDIX 6: Analysis of the Optimal Tax Rate Derivative

$$D = (1 + \alpha) \left[M \left[(1 - \tau_l) + \tau_l M + \rho k_t \frac{1}{w_t^d} \right]^{-2} (-1 + M) \right. \\ \left. - \alpha M \left[-((1 - \tau_l)(1 + \alpha) + \alpha \tau_l M)^{-2} (-(1 + \alpha) + \alpha M)(1 - \tau_l)^{-1} \right. \right. \\ \left. \left. + ((1 - \tau_l)(1 + \alpha) + \alpha \tau_l M)^{-1} (1 - \tau_l)^{-2} \right] \right] + \alpha (1 - \tau_l)^{-2}$$

$$D = (1 + 1.935) \left[1.25 \left[(1 - 0.23) + 0.23 \times 1.25 + 0.04 \times 3.07 \times \frac{1}{w_t^d} \right]^{-2} (-1 + 1.25) - 1.935 \right. \\ \times 1.25 \left[-((1 - 0.23)(1 + 1.935) + 1.935 \times 0.23 \times 1.25)^{-2} (-(1 + 1.935) + 1.935 \right. \\ \times 1.25)(1 - 0.23)^{-1} + ((1 - 0.23)(1 + 1.935) + 1.935 \times 0.23 \times 1.25)^{-1} (1 - 0.23)^{-2} \left. \right] \left. \right]$$

$$((1 - 0.23)(1 + 1.935) + 1.935 \times 0.23 \times 1.25)^{-1} (1 - 0.23)^{-2} = 0.6$$

$$(-(1 + 1.935) + 1.935 \times 1.25)(1 - 0.23)^{-1} = -0.67$$

$$-((1 - 0.23)(1 + 1.935) + 1.935 \times 0.23 \times 1.25)^{-2} = -0.13$$

$$\left[-((1 - 0.23)(1 + 1.935) + 1.935 \times 0.23 \times 1.25)^{-2} (-(1 + 1.935) + 1.935 \times 1.25)(1 - 0.23)^{-1} \right. \\ \left. + ((1 - 0.23)(1 + 1.935) + 1.935 \times 0.23 \times 1.25)^{-1} (1 - 0.23)^{-2} \right] = 0.69$$

$$-1.935 \times 1.25 \left[-((1 - 0.23)(1 + 1.935) + 1.935 \times 0.23 \times 1.25)^{-2} (-(1 + 1.935) + 1.935 \right. \\ \times 1.25)(1 - 0.23)^{-1} + ((1 - 0.23)(1 + 1.935) + 1.935 \times 0.23 \times 1.25)^{-1} (1 - 0.23)^{-2} \left. \right] \\ = -1.67$$

$$\alpha (1 - \tau_l)^{-2} = 3.26$$

For $w_t^d = 0.01$

$$1.25 \left[(1 - 0.23) + 0.23 \times 1.25 + 0.04 \times 3.07 \times \frac{1}{w_t^d} \right]^{-2} (-1 + 1.25) = 0.00176$$

$$(1 + 1.935) \left[1.25 \left[(1 - 0.23) + 0.23 \times 1.25 + 0.04 \times 3.07 \times \frac{1}{w_t^d} \right]^{-2} (-1 + 1.25) - 1.935 \right. \\ \times 1.25 \left[-((1 - 0.23)(1 + 1.935) + 1.935 \times 0.23 \times 1.25)^{-2} (-(1 + 1.935) + 1.935 \right. \\ \times 1.25)(1 - 0.23)^{-1} + ((1 - 0.23)(1 + 1.935) + 1.935 \times 0.23 \times 1.25)^{-1} (1 - 0.23)^{-2} \left. \right] \left. \right] \\ = -4.90$$

$$\begin{aligned}
(1 + \alpha) & \left[M \left[(1 - \tau_l) + \tau_l M + \rho k_t \frac{1}{w_t^d} \right]^{-2} (-1 + M) \right. \\
& - \alpha M \left[-((1 - \tau_l)(1 + \alpha) + \alpha \tau_l M)^{-2} (-(1 + \alpha) + \alpha M)(1 - \tau_l)^{-1} \right. \\
& \left. \left. + ((1 - \tau_l)(1 + \alpha) + \alpha \tau_l M)^{-1} (1 - \tau_l)^{-2} \right] \right] + \alpha (1 - \tau_l)^{-2} = -1.64
\end{aligned}$$

$$\frac{\partial \tau_l^*}{\partial k_t} < 0$$

For $w_t^d = 0.25$

$$1.25 \left[(1 - 0.23) + 0.23 \times 1.25 + 0.04 \times 3.07 \times \frac{1}{w_t^d} \right]^{-2} (-1 + 1.25) = 0.13$$

$$\begin{aligned}
(1 + 1.935) & \left[1.25 \left[(1 - 0.23) + 0.23 \times 1.25 + 0.04 \times 3.07 \times \frac{1}{w_t^d} \right]^{-2} (-1 + 1.25) - 1.935 \right. \\
& \times 1.25 \left[-((1 - 0.23)(1 + 1.935) + 1.935 \times 0.23 \times 1.25)^{-2} (-(1 + 1.935) + 1.935 \right. \\
& \times 1.25)(1 - 0.23)^{-1} + ((1 - 0.23)(1 + 1.935) + 1.935 \times 0.23 \times 1.25)^{-1} (1 - 0.23)^{-2} \left. \right] \left. \right] \\
& = -4.52
\end{aligned}$$

$$\begin{aligned}
(1 + \alpha) & \left[M \left[(1 - \tau_l) + \tau_l M + \rho k_t \frac{1}{w_t^d} \right]^{-2} (-1 + M) \right. \\
& - \alpha M \left[-((1 - \tau_l)(1 + \alpha) + \alpha \tau_l M)^{-2} (-(1 + \alpha) + \alpha M)(1 - \tau_l)^{-1} \right. \\
& \left. \left. + ((1 - \tau_l)(1 + \alpha) + \alpha \tau_l M)^{-1} (1 - \tau_l)^{-2} \right] \right] + \alpha (1 - \tau_l)^{-2} = -1.26
\end{aligned}$$

$$\frac{\partial \tau_l^*}{\partial k_t} < 0$$

For $w_t^d = 0.69$

$$1.25 \left[(1 - 0.23) + 0.23 \times 1.25 + 0.04 \times 3.07 \times \frac{1}{w_t^d} \right]^{-2} (-1 + 1.25) = 0.21$$

$$\begin{aligned}
(1 + 1.935) & \left[1.25 \left[(1 - 0.23) + 0.23 \times 1.25 + 0.04 \times 3.07 \times \frac{1}{w_t^d} \right]^{-2} (-1 + 1.25) - 1.935 \right. \\
& \quad \times 1.25 \left[-((1 - 0.23)(1 + 1.935) + 1.935 \times 0.23 \times 1.25)^{-2} (-(1 + 1.935) + 1.935 \right. \\
& \quad \times 1.25)(1 - 0.23)^{-1} + ((1 - 0.23)(1 + 1.935) + 1.935 \times 0.23 \times 1.25)^{-1} (1 - 0.23)^{-2} \left. \right] \left. \right] \\
& = -4.28
\end{aligned}$$

$$\begin{aligned}
(1 + \alpha) & \left[M \left[(1 - \tau_l) + \tau_l M + \rho k_t \frac{1}{w_t^d} \right]^{-2} (-1 + M) \right. \\
& \quad - \alpha M \left[-((1 - \tau_l)(1 + \alpha) + \alpha \tau_l M)^{-2} (-(1 + \alpha) + \alpha M)(1 - \tau_l)^{-1} \right. \\
& \quad \left. \left. + ((1 - \tau_l)(1 + \alpha) + \alpha \tau_l M)^{-1} (1 - \tau_l)^{-2} \right] \right] + \alpha (1 - \tau_l)^{-2} = -1.02
\end{aligned}$$

$$\frac{\partial \tau_l^*}{\partial k_t} < 0$$

$$w_t^d = 1.57$$

$$w_t = \gamma A_G \left(\frac{l_t}{k_t} \right)^{\gamma-1} = 0.64 \left(\frac{0.255}{3.07} \right)^{-0.36} = 1.57$$

$$1.25 \left[(1 - 0.23) + 0.23 \times 1.25 + 0.04 \times 3.07 \times \frac{1}{w_t^d} \right]^{-2} (-1 + 1.25) = 0.24$$

$$\begin{aligned}
(1 + 1.935) & \left[1.25 \left[(1 - 0.23) + 0.23 \times 1.25 + 0.04 \times 3.07 \times \frac{1}{w_t^d} \right]^{-2} (-1 + 1.25) - 1.935 \right. \\
& \quad \times 1.25 \left[-((1 - 0.23)(1 + 1.935) + 1.935 \times 0.23 \times 1.25)^{-2} (-(1 + 1.935) + 1.935 \right. \\
& \quad \times 1.25)(1 - 0.23)^{-1} + ((1 - 0.23)(1 + 1.935) + 1.935 \times 0.23 \times 1.25)^{-1} (1 - 0.23)^{-2} \left. \right] \left. \right] \\
& = -4.15
\end{aligned}$$

$$\begin{aligned}
(1 + \alpha) & \left[M \left[(1 - \tau_l) + \tau_l M + \rho k_t \frac{1}{w_t^d} \right]^{-2} (-1 + M) \right. \\
& \quad - \alpha M \left[-((1 - \tau_l)(1 + \alpha) + \alpha \tau_l M)^{-2} (-(1 + \alpha) + \alpha M)(1 - \tau_l)^{-1} \right. \\
& \quad \left. \left. + ((1 - \tau_l)(1 + \alpha) + \alpha \tau_l M)^{-1} (1 - \tau_l)^{-2} \right] \right] + \alpha (1 - \tau_l)^{-2} = -0.89
\end{aligned}$$

$$w_t^d = \infty$$

$$1.25 \left[(1 - 0.23) + 0.23 \times 1.25 + 0.04 \times 3.07 \times \frac{1}{w_t^d} \right]^{-2} (-1 + 1.25) = 0.28$$

$$\begin{aligned} (1 + 1.935) & \left[1.25 \left[(1 - 0.23) + 0.23 \times 1.25 + 0.04 \times 3.07 \times \frac{1}{w_t^d} \right]^{-2} (-1 + 1.25) - 1.935 \right. \\ & \times 1.25 \left[-((1 - 0.23)(1 + 1.935) + 1.935 \times 0.23 \times 1.25)^{-2} (-(1 + 1.935) + 1.935 \right. \\ & \times 1.25)(1 - 0.23)^{-1} + ((1 - 0.23)(1 + 1.935) + 1.935 \times 0.23 \times 1.25)^{-1} (1 - 0.23)^{-2} \left. \right] \left. \right] \\ & = -4.08 \end{aligned}$$

$$\begin{aligned} (1 + \alpha) & \left[M \left[(1 - \tau_l) + \tau_l M + \rho k_t \frac{1}{w_t^d} \right]^{-2} (-1 + M) \right. \\ & - \alpha M \left[-((1 - \tau_l)(1 + \alpha) + \alpha \tau_l M)^{-2} (-(1 + \alpha) + \alpha M)(1 - \tau_l)^{-1} \right. \\ & \left. \left. + ((1 - \tau_l)(1 + \alpha) + \alpha \tau_l M)^{-1} (1 - \tau_l)^{-2} \right] \right] + \alpha (1 - \tau_l)^{-2} = -0.82 \end{aligned}$$

$$\frac{\partial \tau_l^*}{\partial k_t} < 0$$

As w_t^d approaches infinity, the term $\frac{1}{w_t^d}$, in the expression “ $1.25 \left[(1 - 0.23) + 0.23 \times 1.25 + 0.04 \times 3.07 \times \frac{1}{w_t^d} \right]^{-2} (-1 + 1.25)$ ” becomes very small, effectively approaching zero. This means the contribution of this term to the overall expression diminishes, leaving us with the rest of the expression that doesn't depend on w_t^d . Given the pattern we've seen, as w_t^d increases, the result approaches approximately 0.27, indicating that the expression converges to this value when w_t^d is infinitely large. This behavior highlights how certain variables within an expression can influence the outcome, especially as their values reach extreme ends of the spectrum.

APPENDIX 7: Analysis of Income Ratio Derivative with Respect to Tax Rate

$$\frac{\partial \left(\frac{Y_{t_2}^*}{Y_{t_1}^*} \right)}{\partial \tau_l^*} = \frac{\left[\left[w_{t_2}^d \frac{\partial \phi}{\partial \tau_l^*} - \rho k_t \right] - (1 + \alpha) \delta_k k_t + \alpha \delta_k k_t \right] \left[\left[w_{t_1}^d \phi + \rho k_t (1 - \tau_l) \right] + ((1 - \tau_l)(1 + \alpha) + \alpha \tau_l M) \delta_k k_t \right] - \left[\left[w_{t_2}^d \phi + \rho k_t (1 - \tau_l) \right] + ((1 - \tau_l)(1 + \alpha) + \alpha \tau_l M) \delta_k k_t \right] \left[\left[w_{t_1}^d \frac{\partial \phi}{\partial \tau_l^*} - \rho k_t \right] - (1 + \alpha) \delta_k k_t + \alpha \delta_k k_t \right]}{\left[\left[w_{t_1}^d \phi + \rho k_t (1 - \tau_l) \right] + ((1 - \tau_l)(1 + \alpha) + \alpha \tau_l M) \delta_k k_t \right]^2}$$

For numerator:

$$\begin{aligned} & w_{t_2}^d \frac{\partial \phi}{\partial \tau_l^*} w_{t_1}^d \phi + w_{t_2}^d \frac{\partial \phi}{\partial \tau_l^*} \rho k_t (1 - \tau_l) + w_{t_2}^d \frac{\partial \phi}{\partial \tau_l^*} ((1 - \tau_l)(1 + \alpha) + \alpha \tau_l M) \delta_k k_t - \rho k_t w_{t_1}^d \phi - \rho k_t \rho k_t (1 - \tau_l) - \rho k_t ((1 - \tau_l)(1 + \alpha) + \alpha \tau_l M) \delta_k k_t - (1 + \alpha) \delta_k k_t w_{t_1}^d \phi - (1 + \alpha) \delta_k k_t \rho k_t (1 - \tau_l) \\ & - (1 + \alpha) \delta_k k_t ((1 - \tau_l)(1 + \alpha) + \alpha \tau_l M) \delta_k k_t + \alpha \delta_k k_t w_{t_1}^d \phi + \alpha \delta_k k_t \rho k_t (1 - \tau_l) + \alpha \delta_k k_t ((1 - \tau_l)(1 + \alpha) + \alpha \tau_l M) \delta_k k_t \\ & - \left[w_{t_1}^d \frac{\partial \phi}{\partial \tau_l^*} w_{t_2}^d \phi + w_{t_1}^d \frac{\partial \phi}{\partial \tau_l^*} \rho k_t (1 - \tau_l) + w_{t_1}^d \frac{\partial \phi}{\partial \tau_l^*} ((1 - \tau_l)(1 + \alpha) + \alpha \tau_l M) \delta_k k_t - \rho k_t w_{t_2}^d \phi - \rho k_t \rho k_t (1 - \tau_l) - \rho k_t ((1 - \tau_l)(1 + \alpha) + \alpha \tau_l M) \delta_k k_t - (1 + \alpha) \delta_k k_t w_{t_2}^d \phi \right. \\ & \left. - (1 + \alpha) \delta_k k_t \rho k_t (1 - \tau_l) - (1 + \alpha) \delta_k k_t ((1 - \tau_l)(1 + \alpha) + \alpha \tau_l M) \delta_k k_t + \alpha \delta_k k_t w_{t_2}^d \phi + \alpha \delta_k k_t \rho k_t (1 - \tau_l) + \alpha \delta_k k_t ((1 - \tau_l)(1 + \alpha) + \alpha \tau_l M) \delta_k k_t \right] \\ & \left[w_{t_2}^d \frac{\partial \phi}{\partial \tau_l^*} \rho k_t (1 - \tau_l) + w_{t_2}^d \frac{\partial \phi}{\partial \tau_l^*} ((1 - \tau_l)(1 + \alpha) + \alpha \tau_l M) \delta_k k_t - \rho k_t w_{t_1}^d \phi - (1 + \alpha) \delta_k k_t w_{t_1}^d \phi + \alpha \delta_k k_t w_{t_1}^d \phi \right] \\ & - \left[w_{t_1}^d \frac{\partial \phi}{\partial \tau_l^*} \rho k_t (1 - \tau_l) + w_{t_1}^d \frac{\partial \phi}{\partial \tau_l^*} ((1 - \tau_l)(1 + \alpha) + \alpha \tau_l M) \delta_k k_t - \rho k_t w_{t_2}^d \phi - (1 + \alpha) \delta_k k_t w_{t_2}^d \phi + \alpha \delta_k k_t w_{t_2}^d \phi \right] \\ & \left[w_{t_2}^d \frac{\partial \phi}{\partial \tau_l^*} \rho k_t (1 - \tau_l) + w_{t_2}^d \frac{\partial \phi}{\partial \tau_l^*} ((1 - \tau_l)(1 + \alpha) + \alpha \tau_l M) \delta_k k_t - w_{t_1}^d \phi \delta_k k_t - \rho k_t w_{t_1}^d \phi \right] - \left[w_{t_1}^d \frac{\partial \phi}{\partial \tau_l^*} \rho k_t (1 - \tau_l) + w_{t_1}^d \frac{\partial \phi}{\partial \tau_l^*} ((1 - \tau_l)(1 + \alpha) + \alpha \tau_l M) \delta_k k_t - w_{t_2}^d \phi \delta_k k_t - \rho k_t w_{t_2}^d \phi \right] \\ & (w_{t_2}^d - w_{t_1}^d) \left(\frac{\partial \phi}{\partial \tau_l^*} \rho k_t (1 - \tau_l) + \frac{\partial \phi}{\partial \tau_l^*} ((1 - \tau_l)(1 + \alpha) + \alpha \tau_l M) \delta_k k_t + \phi \delta_k k_t + \phi \rho k_t \right) \end{aligned}$$

$$\phi = [(1 - \tau_l)^2 + \tau_l M (1 - \tau_l)]$$

$$\frac{\partial \phi}{\partial \tau_l^*} = -2(1 - \tau_l + \tau_l M) + M$$

$$(w_{t_2}^d - w_{t_1}^d) \left(\rho k_t [(-2(1 - \tau_l + \tau_l M) + M)(1 - \tau_l) + [(1 - \tau_l)^2 + \tau_l M(1 - \tau_l)]] \right. \\ \left. + \delta_k k_t [(-2(1 - \tau_l + \tau_l M) + M)((1 - \tau_l)(1 + \alpha) + \alpha \tau_l M) + [(1 - \tau_l)^2 + \tau_l M(1 - \tau_l)]] \right)$$

Or

$$(w_{t_2}^d - w_{t_1}^d) \left((-2(1 - \tau_l + \tau_l M) + M) \rho k_t (1 - \tau_l) + (-2(1 - \tau_l + \tau_l M) + M) ((1 - \tau_l)(1 + \alpha) + \alpha \tau_l M) \delta_k k_t \right. \\ \left. + [(1 - \tau_l)^2 + \tau_l M(1 - \tau_l)] \delta_k k_t + [(1 - \tau_l)^2 + \tau_l M(1 - \tau_l)] \rho k_t \right)$$

With the help of calibrated BGP values of the variables and the parameters, we know that the numerator is a negative is.

Determining the value of below expression will be sufficient to establish the inequality $\frac{\partial \left(\frac{y_{t_2}^*}{y_{t_1}^*} \right)}{\partial \tau_l^*} < 0$.

$$(-2(1 - \tau_l + \tau_l M) + M) (\rho k_t (1 - \tau_l) + ((1 - \tau_l)(1 + \alpha) + \alpha \tau_l M) \delta_k k_t) + [(1 - \tau_l)^2 + \tau_l M(1 - \tau_l)] (\delta_k k_t + \rho k_t)$$

$$\rho k_t (1 - \tau_l) = (0.04 \times 3.07(1 - 0.23)) = 0.09$$

$$((1 - \tau_l)(1 + \alpha) + \alpha \tau_l M) = ((1 - 0.23)(1 + 1.935) + 1.935 \times 0.23 \times 1.25) = 2.82$$

$$(\rho k_t (1 - \tau_l) + ((1 - \tau_l)(1 + \alpha) + \alpha \tau_l M) \delta_k k_t)$$

$$= (0.04 \times 3.07(1 - 0.23) + ((1 - 0.23)(1 + 1.935) + 1.935 \times 0.23 \times 1.25) 0.071 \times 3.07) = 0.7$$

$$[(1 - \tau_l)^2 + \tau_l M(1 - \tau_l)] (\delta_k k_t + \rho k_t) = [(1 - 0.23)^2 + 0.23 \times 1.25 \times (1 - 0.23)] [0.071 \times 3.07 + 0.04 \times 3.07] = 0.27$$

$$(-2(1 - \tau_l + \tau_l M) + M) = (-2(1 - 0.23 + 0.23 \times 1.25) + 1.25) = -0.86$$

$$\begin{aligned}
& (-2(1 - \tau_l + \tau_l M) + M)(\rho k_t(1 - \tau_l) + ((1 - \tau_l)(1 + \alpha) + \alpha \tau_l M)\delta_k k_t) + [(1 - \tau_l)^2 + \tau_l M(1 - \tau_l)](\delta_k k_t + \rho k_t) \\
& = -0.86 \times 0.7 + 0.27 = -0.33
\end{aligned}$$

$$\begin{aligned}
& (w_{t_2}^d - w_{t_1}^d) \left((-2(1 - \tau_l + \tau_l M) + M)\rho k_t(1 - \tau_l) + (-2(1 - \tau_l + \tau_l M) + M)((1 - \tau_l)(1 + \alpha) + \alpha \tau_l M)\delta_k k_t + [(1 - \tau_l)^2 + \tau_l M(1 - \tau_l)]\delta_k k_t + [(1 - \tau_l)^2 + \tau_l M(1 - \tau_l)]\rho k_t \right) < 0
\end{aligned}$$

As a result

$$\frac{\partial \left(\frac{y_{t_2}^*}{y_{t_1}^*} \right)}{\partial \tau_l^*} < 0 \text{ and } \frac{\partial \tau_l^*}{\partial A_F} < 0$$

$$\frac{\partial \left(\frac{y_{t_2}^*}{y_{t_1}^*} \right)}{\partial A_F} = \frac{\partial \left(\frac{y_{t_2}^*}{y_{t_1}^*} \right)}{\partial \tau_l^*} \times \frac{\partial \tau_l^*}{\partial A_F} > 0$$

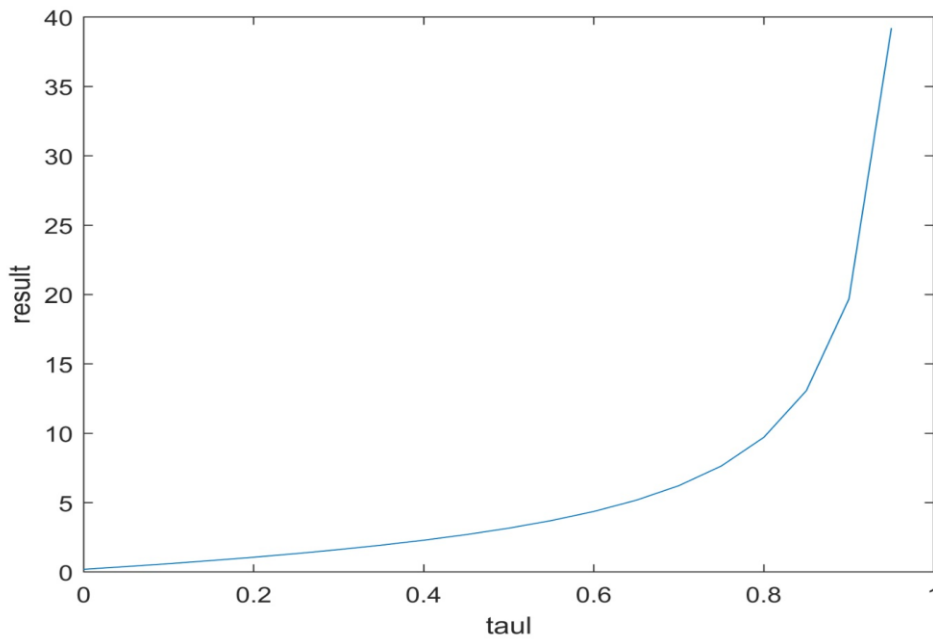
APPENDIX 8: Analysis of the Relationship between Financial Development and Income Inequality Using MATLAB

To demonstrate the positive relationship between financial development and income inequality using MATLAB, it is necessary to utilize Equation (29).

$$\left(\frac{-1+M+\rho \frac{\partial k_t}{\partial \tau_l} \frac{1}{w_t^d}}{(1-\tau_l)+\tau_l M+\rho k_t \frac{1}{w_t^d}} + \frac{-\alpha M}{((1-\tau_l)(1+\alpha)+\alpha \tau_l M)(1-\tau_l)} \right) (1+\alpha) + \frac{\alpha}{(1-\tau_l)} = 0$$

As previously noted, this equation arises from the decisive voter choosing the tax rate that maximizes their utility, thereby endogenizing the tax rate. Through this equation, it becomes possible to observe the effect of capital on the tax rate. Using the baseline calibration values presented in Appendix 4, the following figures were generated. The procedure for generating these graphs is as follows: First, the term on the left-hand side of Equation (29) is labeled as “*result*,” and its relationship with the tax rate (τ_l) is plotted. τ_l is assigned 100 values between 0 and 1, and the relationship between these τ_l values and the corresponding result values is graphed. Thus, the following figure is generated.

Figure of τ_l and Result:

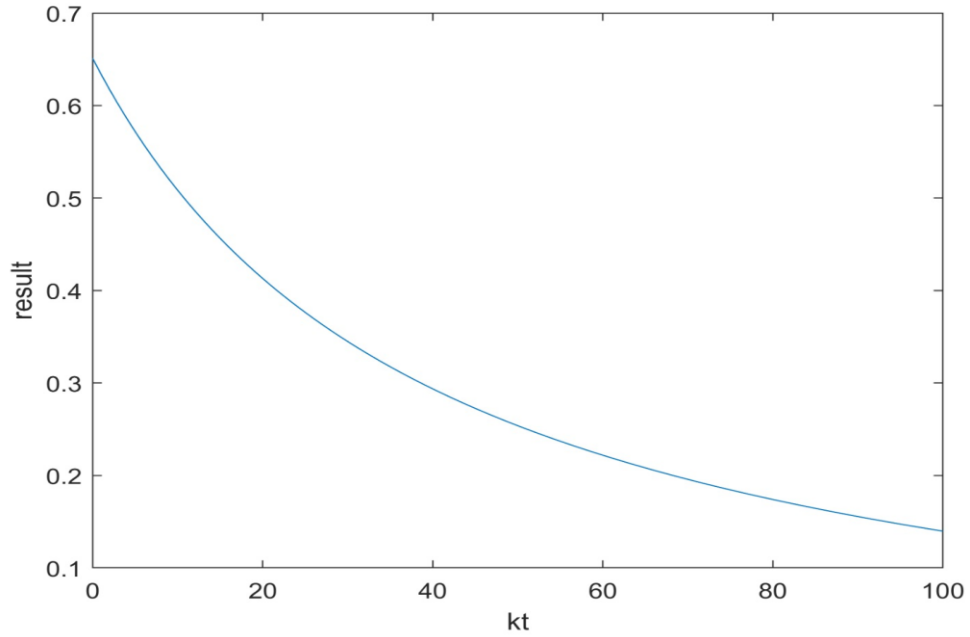


Subsequently, to determine how the endogenous tax rate is affected by capital, k_t is assigned values from 1 to 100, and the corresponding τ_l values are used to

generate the second figure. This figure illustrates a negative relationship between capital and the endogenous tax rate.

Figure of k_t and Result:

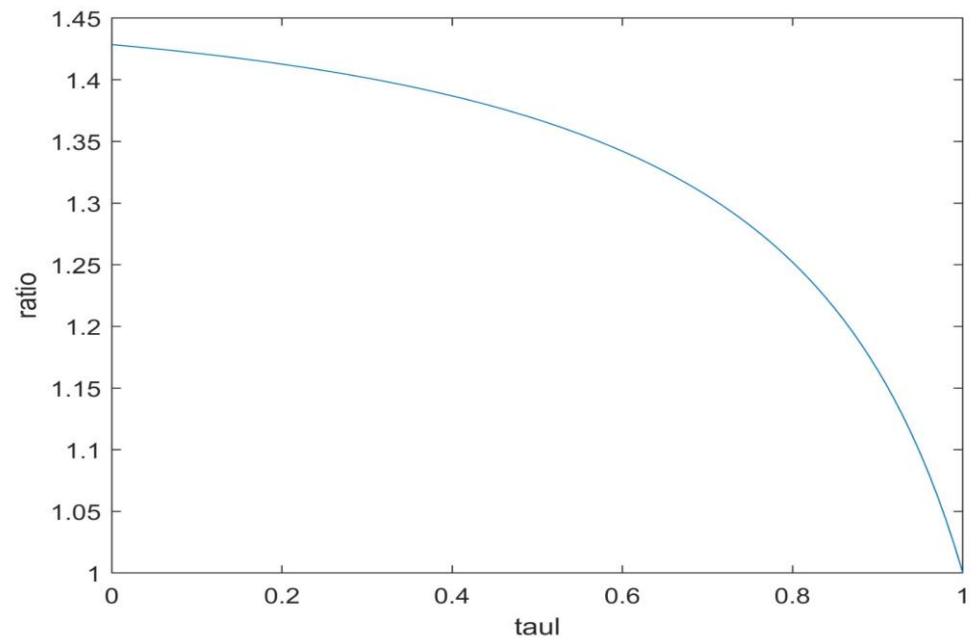
To observe how the $\frac{y_{t_2}^*}{y_{t_1}^*}$ ratio, which defines inequality, is affected by τ_l , is



again assigned 100 values between 0 and 1, and a graph is plotted with the corresponding values for the ratio in following equation (Equation (31)). As a result, the third figure is generated. The figure demonstrates a decreasing inequality pattern as the tax rate increases.

$$\frac{y_{t_2}^*}{y_{t_1}^*} = \frac{[w_{t_2}^d(1-\tau_l)^2 + \tau_l M w_{t_2}^d(1-\tau_l) + \rho k_t(1-\tau_l)] + ((1-\tau_l)(1+\alpha) + \alpha \tau_l M) \delta_k k_t}{[w_{t_1}^d(1-\tau_l)^2 + \tau_l M w_{t_1}^d(1-\tau_l) + \rho k_t(1-\tau_l)] + ((1-\tau_l)(1+\alpha) + \alpha \tau_l M) \delta_k k_t}$$

Figure of τ_l and $\frac{y_{t2}^*}{y_{t1}^*}$:



Thus, we now have two graphs that imply a positive relationship between financial development and income inequality.

APPENDIX 9: Income Inequality Application of the Model without Government

Assume an economy with two individuals with incomes $y_{t_1}(w_{t_1}^d, \tau_l^*)$ and $y_{t_2}(w_{t_2}^d, \tau_l^*)$. Following Elgin et al. (2013) to examine how the productivity of financial intermediaries might affect income inequality, we consider these two agents with the assumption that $y_{t_2}(w_{t_2}^d, \tau_l^*) > y_{t_1}(w_{t_1}^d, \tau_l^*)$. This assumption holds because one of the individuals has a greater before-tax, before-transfer income, which can be expressed by the following inequality: $w_{t_2}^d > w_{t_1}^d$.

$y_t(w_{t_i}, k_t) = y_{t_i}^*$, $i = 1, 2$ for short. Simple differentiation yields

$$\frac{y_{t_2}^*}{y_{t_1}^*} = \frac{\frac{1}{1+\alpha}\{w_{t_2} + [\rho + \delta_k(1+\alpha)]k_t\}}{\frac{1}{1+\alpha}\{w_{t_1} + [\rho + \delta_k(1+\alpha)]k_t\}}$$

$$\frac{y_{t_2}^*}{y_{t_1}^*} = \frac{w_{t_2} + \rho k_t + \delta_k k_t + \alpha \delta_k k_t}{w_{t_1} + \rho k_t + \delta_k k_t + \alpha \delta_k k_t}$$

$$\frac{\partial \left(\frac{y_{t_2}^*}{y_{t_1}^*} \right)}{\partial k_t} = \frac{(\rho + \delta_k + \alpha \delta_k)(w_{t_1} + \rho k_t + \delta_k k_t + \alpha \delta_k k_t) - (\rho + \delta_k + \alpha \delta_k)(w_{t_2} + \rho k_t + \delta_k k_t + \alpha \delta_k k_t)}{(y_{t_1}^*)^2}$$

$$\frac{\partial \left(\frac{y_{t_2}^*}{y_{t_1}^*} \right)}{\partial k_t} = \frac{(\rho + \delta_k + \alpha \delta_k)(w_{t_1} - w_{t_2} + \rho k_t + \delta_k k_t + \alpha \delta_k k_t - \rho k_t - \delta_k k_t - \alpha \delta_k k_t)}{(y_{t_1}^*)^2}$$

$$\frac{\partial \left(\frac{y_{t_2}^*}{y_{t_1}^*} \right)}{\partial k_t} = \frac{(\rho + \delta_k + \alpha \delta_k)(w_{t_1} - w_{t_2})}{(y_{t_1}^*)^2} < 0$$

$$\frac{\partial k_t}{\partial A_F} = \left[\frac{\alpha \rho \left(\frac{l_t}{k_t} \right)^{1-\gamma}}{\gamma A_G} + (1+\alpha) \frac{l_t}{k_t} + \frac{(1+\alpha)}{(A_F)^{\frac{1}{K}}} \right]^{-2} \left(\frac{1}{K} \right) (1+\alpha) (A_F)^{-\frac{1}{K}-1} > 0$$

As a result:

$$\frac{\partial \left(\frac{y_{t_2}^*}{y_{t_1}^*} \right)}{\partial A_F} = \frac{\partial \left(\frac{y_{t_2}^*}{y_{t_1}^*} \right)}{\partial k_t} \frac{\partial k_t}{\partial A_F} < 0$$