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Does Finance Matter for Growth and Inequality in Hungary?

PhD Dissertation

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Contents

LIST OF ABBREVIATIONS

SDGs	Sustainable Development Targets
FD	Financial development
FL	Financial Liberalisation
FC	Financial crises
BC	Banking Crisis
GDP	Gross Domestic Product
FDI	Foreign Direct Investment
HCSO	Hungarian Central Statistical Office
ECB	European Central Bank
MNB	Magyar Nemzeti Bank
V4	Visegrád (Czechia, Hungary, Poland, and Slovakia)
EGT	Endogenous growth theory
BSE	The Budapest Stock Exchange
MMTS	MultiMarket Trading System
TFP	Total Factor Productivity
HDI	Human Development Index
HC	Human Capital
UMP	Unemployment
GNI	Gross National Income
GINI	Gini coefficient
KOF	Financial Globalization indicator
GFDD	Global Financial Development Database
FAS	Financial Access Survey
FDS	Financial Development and Structure Dataset
NPLs	Non-Performing Loans to gross loans
ILO	International Labour Organisation
IMF	International Monetary Fund
UNDP	United Nations Development Programme
WBI	World Bank Development Indicators
WGI	Worldwide Governance Indicators
UNCTAD	United Nations Conference on Trade and
LIS	LIS Luxembourg Income Study
SWIID	SWIID Standardised World Income Inequality
OECD	Organization for Economic Cooperation and
UNINDO	United Nations Industrial Development Organisation
UNU-WIDER	United Nations University World Institute for
UTIP	The University of Texas Inequality Project
WIID	World Income Inequality Database
CEEC	Central and Eastern European Countries
EU	European Union
WID	World Inequality Database

TY	Toda and Yamamoto
ARDL	Autoregressive Distributed Lag
ECM	Error Correction Model
GMM	Generalised Method of Moments
IV	Instrumental Variable
2SLS	Two-Stage Least Squares
OLS	Ordinary Least Squares
AIC	Akaike Information Criterion
FPE	Final Prediction Error

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CHAPTER 1

INTRODUCTION

1. RESEARCH BACKGROUND

Economic growth and equality are among the goals of the 2030 Sustainable Development Targets (SDGs), and financial development (FD) is essential to achieving these objectives (Galor and Zeira, 1993; Banerjee and Newman, 1993). Financial theories and the endogenous growth theory give grounds to believe that the development of financial policies boosts economic growth and that low-income persons acquire disproportionately (Banerjee and Newman, 1993; Galor and Zeira, 1993). Those theories, however, came under fire, especially after FL and FD expanded quickly in the 1980s and 1990s, which was followed not only by rapid economic development but also by an increase in inequalities and Financial Crises (FC). Especially when FD turned into rent-seeking practices, which harmed the economy and equality. As a result, experts in academia, politics, and economics have cast doubt on the relationship between FD, economic growth, and inequality over the past thirty years (Stiglitz, 2016; Piketty, 2014; Morelli and Atkinson, 2015; Rinosha and Mustafa, 2021).

Furthermore, since the 2008 financial crisis, there has been a growing anxiety about the interdependencies among the three pillars (Rajan, 2011; Stiglitz, 2012; Dabla-Norris et al., 2015; Swamy and Dharani, 2019; de Haan and Sturm, 2017; Levine, 2021). And this topic has become a significant topic of discussion (Levine, 2021; Biyase et al., 2023; Chisadza and Biyase, 2023). In particular, there is strong evidence that countries with a high FD level have a higher rate of income inequality (de Haan, 2017; de Haan et al., 2022) and low economic growth or stagnation, as seen in pre-crisis 2008 years (Rajan, 2010, Peia and Roszbach, 2015; and Haiss et al., 2016; Elijah and Hamza, 2019). In addition, over the past thirty years, the literature has used various indicators of FD and growth (and inequality) with different econometric approaches, using aggregate macro (and micro)-level data. However, there is no consensus among the researchers about the shape of the relationships and the impact of FD on economic growth and inequality. Thus, more empirical literature is still needed.

Theoretically, Bagehot (1873) and Schumpeter (1912) were among the first to discuss this relationship between finance and growth. However, schools of thought have not reached a conclusive

answer to the questions of whether FD is good or bad for growth and whether FD is a cause or outcome of economic growth. For example, (Schumpeter, 1912; Romer, 1986; Hao et al., 2018) stated that FD causes growth, while Robinson (1952) and Guru and Yadav (2019) suggested that FD is the outcome of the process of growth. Patrick (1966) assumes two-way causality, implying FD and economic growth exert mutual influence (Nayak and Yingnan, 2019; Al-Qudah, 2017; Okpara and al., 201; Ekanayake and Thaver, 2021). Finance harms growth (Minsky, 1983; Schularick and Taylor, 2012) indicated that maybe FD is a destabilizing element because it causes macro- and financial turbulence through massive risks and is a source of crises. Other famous experts, however, including Nobel laureates in economics, have ignored the function of FD in development and economic growth (e.g., Lucas, 1988).

A literature review of factors that may contribute to exacerbating income inequality suggests that those factors are: Access to economic and financial resources (de Haan and Sturm, 2017), structural change (Kum, 2008), the reduced role of labour unions (Morelli and Atkinson, 2015; Kumhof et al., 2015), wage determination by markets (Stiglitz, 2012), technological change and globalization (Jaumotte et al., 2013), scarcity rents (Stiglitz, 2012), international trade (Stiglitz, 2015), tax and transfer system (Piketty, 2014), FD and FL (de Haan and Sturm, 2017; Furceri and Loungani, 2018), banking crises (Morelli, 2014), and unequal access to quality education as driving incomes and wealth inequalities (Rajan, 2010, the World of inequality report, 2017).

The Endogenous Growth Theory (EGT) and some literature support the positive role of finance in a country's economic growth (Valickova et al., 2015; Arestis et al., 2015; Popov, 2018). However, some argue that finance can be an obstacle rather than a facilitator (Ram, 1999; Haiss et al., 2016; Elijah and Hamza, 2019), and some FD activities may contribute to macroeconomic instability (Schularick and Taylor, 2012). This idea gained prominence after the 2008 financial crisis, questioning the finance-growth connection. Despite the significant role of finance in a country's economic growth, research does not address the disproportionate benefits of finance and growth to the rich or poor (Levine, 2021). Particularly, impoverished individuals face more constraints in accessing financing because of their income level and collateral capacity (Rajan and Zingales, 2003).

The EGT emerged in the 1990s, highlighting the importance of finance in reducing inequality. The theory suggests that low-income individuals benefit disproportionately from financial services (FD/FL) and help reduce income disparities across generations (Banerjee and Newman, 1993; Galor and Zeira, 1993). This hypothesis has been supported empirically in recent studies (e.g., Zhang and

Naceur, 2019; Cihak and Sahay, 2020). However, some scholars argue that FD/FL may disproportionately benefit the rich (Rajan and Zingales, 2003), improving intensive margins and rent extraction (Stiglitz, 2016; Bolton et al., 2016; Piketty, 2014). This hypothesis has been empirically investigated and supported by recent studies (e.g., Law et al., 2014; De Haan and Sturm, 2017; Sehrawat and Giri, 2016; Adams and Klobodu, 2016; Maldonado, 2017; Bittencourt et al., 2018; De Haan et al., 2022).

Financial instability and income disparity are often linked to financial instability, which can have devastating effects on inequality (De Haan and Sturm, 2017). The last global FC has heightened interest in the connection between income inequality and FC. Specifically, there is mounting evidence that growth tends to be more fragile and less resilient when ignoring and focusing on distributional concerns (Rajan, 2010; Piketty, 2014). Studies suggest that rising inequality affects financial stability, leading to the "keeping up with the Joneses effect" and mortgage booms and recessions (Rajan, 2010; Stiglitz, 2012). FD encourages low-income groups to use more leverage to sustain consumption levels. Research shows a favorable correlation between loan expansion and income disparity (Perugini et al., 2016). However, some argue that credit booms increase the likelihood of a banking crisis, but robust economic expansion and low interest rates cause credit booms rather than income concentration (Bordo and Meissner, 2012).

The relationship between leverage and inequality is influenced by a combination of factors, including financial deregulation, political transformation dynamics, and monetary policy (Atkinson and Morelli, 2011). Financial factors, such as financial rent seekers, have increased inequality and the relationship between them. These factors lead to an unequal distribution of income and increased risk while also causing volatility and credit crunch (Stiglitz, 2012, 2016; Bolton et al., 2016). There is no consensus among researchers about the impacts of financial crises on income inequality. The financial crisis would increase inequality (De Haan and Sturm, 2016; Bazillier and H'ericourt, 2017). Some studies suggest that the poor household before the crisis was not the hardest hit (Baldacci et al., 2002), while others find no evidence that the global crisis affects inequality (Amate-Fortes et al., 2017). There is no general pattern of distributional impact of financial crises, which may hide the massive distributional impact of financial crises (Piketty and Saez, 2013). More evidence is needed to determine the relationship between inequality and financial crises.

Rising inequality is a significant social and economic issue, causing concern among policymakers and researchers. The primary concern arises from the potential negative economic and social impacts

of inequalities rather than the issue itself (Rajan, 2011; Stiglitz, 2012; Dabla-Norris et al., 2015). Including such as preventing human capital accumulation, decreasing inter-generational mobility (Stiglitz 2012), affecting growth drivers (Galor and Moav, 2004; Aghion et al., 1999), increasing gender inequality, and reducing social cohesion and values. It also increases fragmentation between ethnic groups, regions, and classes, further exacerbating social problems (Ravallion, 2004; Stiglitz, 2012; Dabla-Norris et al., 2015).

Inequality is more than a sign of low income in the lower deciles, or perhaps an indication of a lack of chance and income mobility or a signal of a lack of income mobility and opportunity, which requires attracting considerable attention and calls for action. Because of this concern, the inequality topic has received greater attention from international organizations. For example, Goal 10 of the UN's SDGs (https://SDGs.un.org/goals/goal10) emphasizes reducing inequality as a crucial priority and its role in achieving the Agenda 2030 SDGs. Policymakers worldwide prioritize increasing equality, with income distribution and wealth inequality being their top priorities. Researchers have raised questions about these issues, particularly after the 2007-08 global financial crisis, leading to a public debate on inequality and income distribution (e.g., Stiglitz, 2012, 2016; Piketty, 2014; Morelli and Atkinson, 2015). The COVID-19 pandemic has deepened existing inequalities and poverty, particularly in vulnerable communities, as it has hit the poorest people and most vulnerable communities the hardest (United Nations Development Programme (UNDP), 2023; World Bank, 2023). Research has highlighted the importance of addressing these issues to address the inequality issue and improve the well-being of all citizens.

The interplay between inequalities, economic growth, and finance concepts has become a significant topic of conversation since the 2007-08 financial crisis (Levine, 2021; Biyase et al., 2023; Chisadza and Biyase, 2023). These concerns continue to grow daily. Countries with high FD levels have been found to have higher income inequality and low economic growth (De Haan, 2017; De Haan et al., 2022). Figure (1) summarizes how, according to previous literature, FD can affect both economic growth and inequalities through five channels: first, increasing equality by improving capital allocation efficiency, expanding economic opportunities for lower-income workers, and boosting economic growth, which increases labor demand (Galor and Zeira, 1993). However, it can also exacerbate inequality by increasing the demand for skilled labor (Demirguc-Kunt and Levine, 2009; Piketty, 2014). Second, reduced borrowing costs can encourage new enterprises, boost labor market competitiveness, decrease discrimination, and promote economic development (Beck et al., 2009).

Third, FDs can improve wealth equality by enabling lower-income households and talented individuals to earn high returns, thereby boosting economic development and enhancing wealth and income equality, as per Greenwood and Jovanovic (1990). Fourth, FD reduces inequality and promotes growth by expanding economic opportunities, regardless of parental income (Galor and Zeira, 1993; Magyar Nemzeti Bank (MNB). Human Capital (HC) has a bidirectional causal relationship with economic development and income disparity (Beck et al., 2007). Finally, finance can reduce poverty and discrimination by boosting incomes for lower-income individuals, promoting economic development, and reducing poverty's negative impact on growth (Beck et al., 2007).

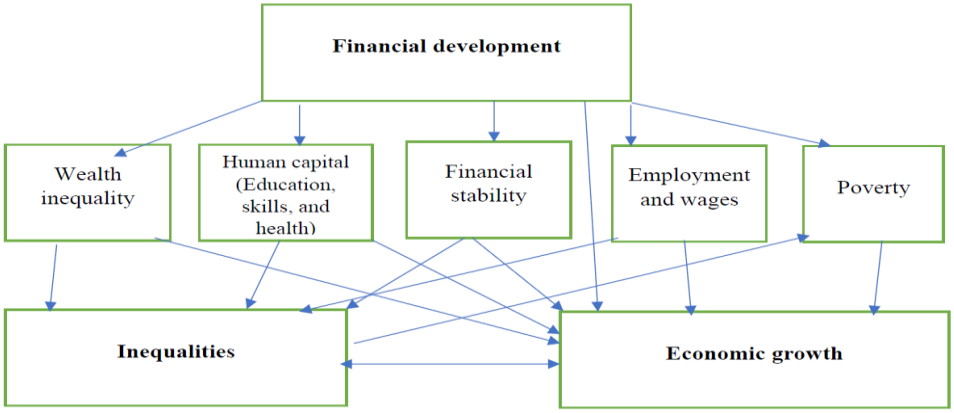

Figure 1. How FD may affect economic growth and inequality

Besides that, FD contributes to economic growth through investments, productivity, HC accumulation, exports, and consumption due to rising employment rates and wage improvements, which is one determinant of growth (Keynes, 1936). In particular, raising the earnings of low- and middle-income people promotes growth through consumption more than high-income people. The financial system promotes growth through functions like information exchange, cost reduction, resource allocation, fund mobilization, risk management, and diversification (Levine, 2005). These functions and their effects vary across economics but are influenced by institutions and are country-specific, as noted by Panizza (2014) and Loayza et al. (2018).

2. RESEARCH PROBLEM

Hungary, as per the 1992 Maastricht Treaty, is obligated to promote balanced economic and social advancement, including high economic performance and employment and social protection to enhance interpersonal solidarity and quality of life. Despite the country's financial system being one of the best developed in the EU, it has made some progress in the SDGs and requirements of the

1992 Maastricht Treaty. However, its performance in the UN SDG 8 and 10 targets lags behind that of its regional peers, and it experienced two financial crises in 1991 and 2008. Highlighting the need for further scrutiny of the relationship between FD and economic growth in Hungary.

Hungary, a pioneer in Eastern Europe (Botos, 2019), implemented financial reform in the early 1990s, focusing on FD and FL as key engines for social and economic goals, driven by the growing popularity of EGT and World Bank recommendations. Hungary, a pioneer in Eastern Europe (Botos, 2019), implemented financial reform in the early 1990s, focusing on FD and FL as key engines for social and economic goals, driven by the growing popularity of EGT and World Bank recommendations. The sector has experienced rapid privatization, with foreign-held shares increasing in banks' total assets (Hasan and Marton, 2003). Budapest resumed stock market activities after the communist era, and a regulatory framework was established, allowing banks to perform investment transactions. The Hungarian financial system, once one of the best developed in the EU, experienced growth owing to the increased efficiency of banks. But also faced external vulnerability because of heavy reliance on foreign finance, short-term debt, derivative instruments, and high government debt. Credit expansion was often associated with persistent slowdowns and middle-income traps because of an incorrectly organized economic model, and Total Factor Productivity (TFP) developed slower than capital accumulation (MNB, 2014). These factors contributed to a stronger decline in the Hungarian economy than in the other V3 countries during the years of the crisis and needed longer recovery years. New investments in Hungary led to regional income and development inequality, causing a liquidity issue during the 2008 crisis and an economic recession until 2012. However, the turnaround in both fiscal policy in 2010 and then monetary policy in 2013 helped to balance creating a healthy economic structure and vigorous growth together in recent years. The Hungarian economy, which avoided a slowdown in 2019 due to the international pandemic, experienced significant economic growth due to the COVID-19 pandemic. Real GDP growth only surpassed pre-crisis levels in 2015, and GDP per capita remained the lowest in V4 until 2018. The Hungarian financial sector also experienced two crises, and the 2008 financial crisis raised concerns about the finance-growth debate. The financial system, once one of the most developed in the region, has slowed down since 2005.

The Hungarian economy, which avoided a slowdown in 2019 due to the international pandemic, experienced significant economic growth due to the COVID-19 pandemic. Real GDP growth only surpassed pre-crisis levels in 2015, and GDP per capita remained the lowest until 2018 (World Bank

Indicators (WBI), 2022). The Hungarian financial sector also experienced two crises, and the 2008 financial crisis raised concerns about the finance growth debate. The financial system, once one of the most developed in the region, has slowed down since 2005 (Figure 2).

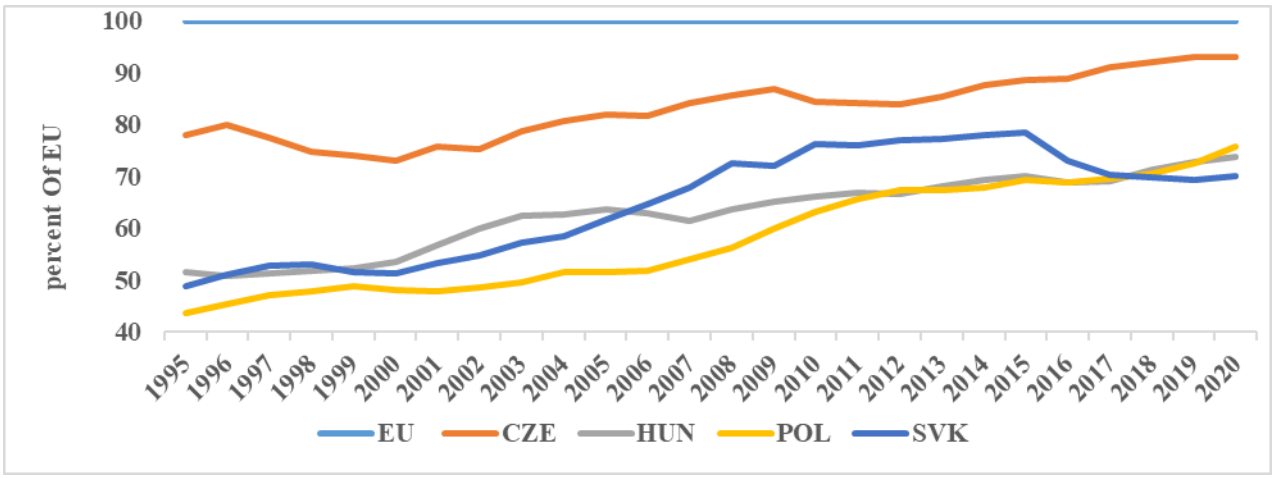

Figure 2. Gross domestic product, PPS, percentage of EU 27

Source: own calculation based on data from Eurostat.

The finance-growth nexus is crucial for scholars and policymakers, but there is a lack of empirical studies on this relationship. Existing findings reveal a paradox, with cross-country analysis dominating the discussion. For instance, in Hungary, FD and FL promoted economic growth (Varela, 2018). However, in other European countries, such as Hungary, the difference between lending and borrowing rates negatively impacted growth (Djalilov and Piesse, 2011; Ono and Iwasaki, 2022). The finance-growth link is unclear in Hungary (Tsaurai, 2015), and the impact of credit to households' ratio on economic growth is ambiguous (Angjelkovska et al., 2016). More evidence is needed to fill the gap in the literature on the specific relationship between FD and growth.

From an inequality's perspective, similar to other countries, Hungary's income gap and wealth inequality have widened over the past 40 years, with the wealthiest 10% holding a sharper increase in real disposable household income. FD may reduce inequality by boosting economic growth. Hungary has experienced a robust economic boom, one of the best in the EU (Eurostat (EUs), 2022), and improved the financial sector after the 2008 crisis. However, there is a deterioration in the SDG 10 indicator of inequality (EUs, 2021) https://ec.europa.eu/eurostat/web/sdi/indicators. In contrast to other V3 countries, Hungary has shown a steadily increasing tendency over the past ten years for

both the Palma indicator (top 10 percent/bottom 40 percent income share) and the Gini inequality indicator (where "0" indicates equality, 1 total inequality) (Hungarian Central Statistical Office (HCSO), 202l). Suggesting that marketable growth's advantages have not been shared fairly (Benczúr et al., 2018). Even still, income inequality remains low when compared to the rest of the EU. According to EUs (2021), although absolute poverty in Hungary is still significant, the country is among those with a relatively low overall risk of poverty. Despite Hungary's historically low levels of inequality when compared to the rest of the world and the EU, intergenerational inequality persists (MNB, 2021b), but it is higher than the average ratios of the Visegrád's (V3) competitors in Czechia, Poland, and Slovakia, and inequality has been rising since the middle of the 1980s. Furthermore, wealth disparity has grown significantly in recent decades (European Central Bank (ECB), 2016, 2021), resulting in greater income inequality. Given that they controlled about 70% of financial assets in 2017 (ECB, 2021), financial assets may appear to be the key drivers of income growth and wealth concentration (Mavridis, 2017; Evans et al., 2022; Chancel et al., 2021; Wang et al., 2023). In recent decades, financial rents have become the primary source of income for people at the top of the distribution ladder (Stiglitz, 2012, 2016; Bolton et al., 2016). Despite major advances in employment equality over the last decade, labour market inequality, notably incomes disparity, has widened. Inequality has a spatial dimension, with major gender disparities in employment and income. Opportunities and healthcare outcomes are among the lowest in the EU (EUs, 2020), with socioeconomic status remaining a significant predictor of life outcomes and access to quality education and healthcare, according to the 2020 World Economic Forum report (WEF); Róbert, 2019; Medgyesi, 2019; Hordósy and Szanyi, 2020; Bukowski et al., 2021.

As the previous studies reported, FD/and or FL are frequently associated with financial crises (FC) since they are often linked to financial rent activities (FD) and financial instability (FL), which can have devastating effects on inequality. Poor and low-income families are most vulnerable to shocks and are most harmed by policy responses to FC (Bazillier and Hericourt, 2017; De Haan and Sturm, 2017). Inequalities are the main reason for financial and political instability (Rajan, 2010). Hungary’s financial system has experienced two FCs, followed by a recession and rising income inequalities. Financial rent activities may have been the key drivers of the 2008 crisis in Hungary. Raising leverage ratios, FL, and FD strengthened the correlation between FC and inequality in Hungary (De Haan and Sturm, 2017). In 2008, the share of loans from all sectors to the private non-financial sector was 130 percent, greater than the ratios of the other V3 nations (WDI, 2022). Participating in rent-seeking behaviours exacerbated Hungary's causal relationship between FC and

inequality. Especially when there was little inspection or regulation of the financial industry, as well as regulation that favoured the wealthy and powerful elite (Claessens and Perotti, 2007; Atkinson, 2015; Piketty, 2015).

Existing studies on finance and inequality are contradictory and inconclusive, often influenced by cross-country analyses (e.g. De Haan and Sturm, 2017; Bezemer and Samarina, 2016; Zhang and Naceur, 2019; Nguyen et al., 2019; Kavya and Shijin, 2020; Mbona, 2022). These results lead to conflicting predictions about the finance-inequality nexus in Hungary and other countries. For instance, De Haan and Sturm (2017) support the finance-inequality widening hypothesis, while Zhang and Naceur (2019) and Cevik and Correa-Caro (2020) suggest that extending financial services to low-income consumers and small projects could reduce inequality. However, Kavya and his colleagues failed to find clear-cut evidence to support reducing income inequality. In contrast to the findings of Nguyen et al.'s (2019) study, Mbona (2022) indicated that financing lowers inequality in the first stage but raises it in the second.

Studies related to finance (FD, FL, and FC) and inequality have also been contradictory. For example, Hungary was found to have exacerbated inequality due to the 2008 financial crisis (De Haan and Sturm, 2017), leading to decreased employment ratios (Brzezinski, 2018), reduced social protection benefits, and the introduction of the flat-rate personal income tax. De Agostini et al. (2016) and Aristei and Perugini (2015) suggested that the adoption of the Hungarian flat-rate personal income tax in 2011 increased inequality. Contrarily, Amate-Fortes and colleagues revealed that inequality in the 27 EU countries—including Hungary—did not alter because of the global recession (2008–2011). There is a need for more research on the relationship between finance and inequality, as well as the effects of financial reforms over thirty years on income inequality.

3. RESEARCH OBJECTIVES AND QUESTIONS

The hypothesis that FD should have positive repercussions on the development of the real sector and reduce income equality is not necessarily valid in all countries in the same ways and must not be taken for granted in all cases and all countries; rather, its validity needs to be theoretically examined and empirically tested (Ang, 2008). Others, in particular, have claimed that FD impedes rather than promotes economic progress (Ram, 1999), as well as creating disparities (Rajan and Zingales, 2003). In addition, FD can devolve into rent-seeking behaviour (Zingales, 2015), and so may be the principal driver of financial instability and crises (Schularick and Taylor, 2012).

Furthermore, advances in financial sector services mostly benefit those who already use them (Greenwood and Jovanovic, 1990), as well as the wealthy and elites with strong political ties (Rajan and Zingales, 2003).

Understanding the impact of FD on economic growth and income inequality in Hungary is critical because it can assist policymakers in dealing with the era's growing challenges, determining whether Hungary's FD and FL policies can meet the UN SDGs' economic growth and equality targets, and developing strategies for achieving Hungary's financial stability goals.

Therefore, the primary aim of this thesis is to investigate the correlation between finance, economic growth, and inequality in Hungary and the nature of these relationships.

To achieve the primary aim, the secondary objectives are the following:

1. ***The study explores the theoretical and empirical aspects of financial dimensions that could impact Hungary's economic growth, focusing on the relationship between FD and economic growth in Hungary.***

   It assumes that higher FD levels lead to higher economic growth, as FD promotes capital accumulation, technological progress, and productivity growth.

2. ***Investigate the theoretical various financial factors that could influence the inequalities in Hungary, and then empirically examine whether the FD/FL of Hungary has a relationship with income inequality.***

   The study assumes that higher FD levels lead to lower inequality as households have better investment decisions, regardless of inherited wealth. This benefits those at the lower income distribution by increasing employment, earnings, profits, opportunities, and investment in HC.

3. ***The study also aims to evaluate the distributional effects of FC in Hungary***.

   The study assumes that the crises contribute to increased inequality through their impacts on economic growth, increased unemployment, decreased share of real wages and salaries in total income, reduced government expenditure, and gross school enrollment ratio.

Before answering the questions and developing a hypothesized model of the relationships between financial factors and economic growth and inequalities. Based on the descriptive and deductive analysis, it provides a basis for studying the development of the financial sector, its impact on the Hungarian economy, and the components of these effects. The empirical test is based on literature and insights from the Hungarian economy and inequality. The dissertation questions whether the development of finance through the banking industry and financial market can enhance or harm the economy and improve or decrease equality in Hungary. The study proposes to answer the three fundamental research questions (RQs) and sub-sets of research questions (sub-RQs).

First, RQ 1: Is there a bidirectional causal relationship between financial crises and income inequality in Hungary? Sub-RQ 1. a: Do FC cause income inequality in Hungary? Sub-RQ 1. b: Does income inequality cause FC in Hungary?

Second, the basis of RQ 2: Is there a relationship between finance dimensions and economic growth in Hungary? Sub-RQ 2. a: Does FD stimulate economic growth in Hungary? Sub-RQ 2. b: Does financial depth stimulate economic growth in Hungary? Sub-RQ 2. c: Does financial efficiency stimulate economic growth in Hungary?

Finally, the third question is (RQ3): Does FD affect inequality? Sub-RQ 3. a: Does FD reduce income inequality in Hungary? Or Sub-RQ 3. b: Does FD increase income inequality in Hungary?

4. RESEARCH HYPOTHESES

To To answer the above research questions and based on the theoretical literature, in the current study, we develop the following hypotheses:

H1: There is a bidirectional causal relationship between financial crises and income inequality in Hungary. H 1. a: Financial crises cause income inequality in Hungary; and H 1. b: Income inequality causes financial crises in Hungary.

H2: There is a relationship between each financial development dimension and Hungary's economic growth. H2. a: Financial development stimulates economic growth in Hungary. H2. b: Financial depth stimulates economic growth in Hungary; H2. c: Financial efficiency stimulates economic growth in Hungary.

H3: There is a relationship between financial development and income inequality in Hungary.

H3. a: Financial development reduces income inequality in Hungary (inequality narrowing hypothesis); H3. b: Financial development increases income inequality in Hungary (inequality widening hypothesis).

5. RESEARCH MOTIVATION AND CONTRIBUTIONS

a. Research Motivation

I have chosen this topic for the following considerations:

1. Growth and equality as sustainable development goals are critical for a country's long-term success and the well-being of millions of people.
2. Rising inequality is a major social and economic issue and the most contentious worldwide subject, causing concern for policymakers and researchers.
3. The impact of FL and FD on economic growth and disparities has recently emerged as a major concern. Particularly with the 2007-08 global financial crisis, which exposed the interdependence of these pillars.
4. Despite having a more sophisticated financial system, Hungary's economic and social performance falls below that of its regional countries. Policymakers must assess the impact of FL/FD policies on economic growth performance as well as income and wealth inequalities before reconsidering or pursuing their policies.
5. Three reasons make Hungary an appropriate case study for studying financial inclusion and economic inequality: First, the concept of FC is a nightmare for policymakers and Hungarians, particularly those who have been impacted the hardest. Second, Hungary endured a recession following the two FCs, which increased the number of households facing material hardship, unemployment, or financial difficulties. Third, the foreign currency debt crisis was focused on the household sector in 2008, which disproportionately affected lower-income deciles.
6. The researcher is interested in sustainable development and societal issues, and her study would not have been possible without the Hungarian scholarship.

b. Contributions of the Study

This study has made the following main contributions:

1. The available financial literature on the effect of the FD on economic growth and inequality in Hungary is insufficient and dominated by cross-country analyses. Therefore, this will be among the first studies that focus on the FD’s role in economic growth and income inequality in Hungary. The

research findings will contribute to filling the gap in the literature (e.g., Petkovski and Kjosevski, 2014; Zhang and Naceur, 2019; Kavya and Shijin, 2020; Mbona, 2022; Varela, 2018; Cave et al., 2020).

2. Contributing to the discussion of the impact of FD on growth and to the hot debate on the effectiveness of FD/LF on inequalities (Nguyen et al., 2019; Stiglitz, 2016; Levine, 2021)
3. Besides the theoretical contributions, the current research reviews the key features of the financial sector and the primary financial drivers of growth in Hungary since the 1980s. In addition, it gives a comprehensive analysis of how inequalities in Hungary have evolved over the last forty years and how they were affected by financial aspects.
4. Besides increasing our understanding of these relationships, addressing the questions is critical for policymakers to determine if Hungary's FD and FL policies can accomplish the UNSDGs.
5. The empirical results of this study may help policymakers create strategies for achieving Hungary's financial and macroeconomic stability goals.
6. The study examines Hungary's financial system, economic environment, and institutional quality, offering policy guidance for developing countries, particularly transition ones. It uses new proxies and longer data to accurately reflect Hungary's reality and offers valuable insights for policy formulation.

6. DATA AND RESEARCH METHODOLOGY

For the descriptive and deductive analysis used on primary data, some secondary data is collected from the published reports and from several websites that offer free data such as the Hungarian Central Static Office (HCSO), the Organisation for Economic Co-operation and Development (OECD), Eurostat (EUs), the ECB, the MNB, AMECO database of the European Commission, the World Income Inequality Database (WIID), World Inequality Database (WID), International Monetary Fund (IMF), the World Bank Indicators (WBI), the International Labour Organisation (ILO),.... etc. Although the importance of the information about the relationships between series which have been gained through the descriptive and deductive analysis, is not enough to determine the relationship between analyzed variables. Therefore, to get more reliable outcomes about the relationship among the analyzed series the econometric methods will be utilized in the dissertation. For empirical analysis, data in this study were collected from the WBI, the IMF including the World Economic Outlook, the Global Financial Development, Financial Development and Structure (FDS), the Federal Reserve Economic Data, the United Nations Conference on Trade and Development

(UNCTAD), the World Institute for Development Economics Research (WIDER); database of Laeven and Valencia (2013, 2020), and the Standardized World Income Inequality Database (SWIID), WID, and Financial Globalization Database (KOF). In the empirical estimation of the models, the study is based on annual time series data from 1971 to 2019 for finance inequality models, 1970 to 2017 for the financial crisis and inequality models, and from 1980q1 to 2019q1 for finance and growth models. The descriptive method: to describe the problem specification and explain it, define its relationship with the different concerned variables. Based on the books, articles, reports, and reviews about this subject.

Empirically, suitable statistical methods are used to test the above hypotheses:

- Checking the stationarity of the variables
- Testing causality between the FC and income inequality variables in Hungary by using Toda and Yamamoto's (1995) procedure for the Granger non-causality test in the context of the VAR model.
- Testing the cointegration relationship between FD, economic growth, and income inequality in Hungary by employing the Autoregressive Distributed Lag Approach (ARDL) model with bound testing procedures of Pesaran et al., (2001) which has become increasingly popular in the last few years.

Several approaches to cointegration have been utilized in the empirical literature, for example, (Engle-Granger, 1987; Johansen 1988, 1991; Johansen and Juselius, 1990; Gregory and Hansen, 1996), and autoregressive distributed lag (ARDL) bounds test, developed by Pesaran and Shin (1995). However, this study employed the ARDL bounds testing technique to examine the results of cointegration tests among the variables of the model, this technique was developed by Pesaran and Shin (1995 and 1998), Pesaran et al., (1996), Pesaran (1997) and Pesaran et al., (2001). The ARDL approach has several advantages over other estimation approaches, is preferable in estimating the co-integration relation according to the Canadian Center of Science and Education (Al-Malkawi et al., 2012), it can be applied without consideration of the order of integration such as I (0) or I (1) (Pesaran et al., 2001). In addition, is a more reliable technique than the conventional one (Lawal et al., 2016). Further, it’s more statistically significant and more robust when we don't have a large sample size (Lawal et al., 2016; Al-Malkawi et al., 2012). Moreover, the ARDL allows for the variables to have different optimal lags, which are not available to other approaches. Also,

from the equation of the model, simultaneously, the relationship among variables for the long run and the short run is estimated by using the ARDL technique (Pesaran and Shin, 1999; Lawal et al., 2016).

The ARDL bounds testing approach to cointegration is based on the following error-correction model: $\Delta Y_t = \alpha_0 + \sum_{i=1}^{p} \alpha_{1i} \Delta Y_{t-i} + \sum_{i=0}^{q1} \alpha_{2i} X_{t-i} + \beta_1 Y_{t-1} + \beta_2 X + \varepsilon_t$

Where Y is the dependent variable, X is the independent variable. Δ represents the first difference operator, α 0 is the constant term; and β1, β2 represent the short-run coefficients, and α1, and α 11 are the long-run coefficients. *εt* is the error term.

The Pesaran et al.,'s (2001) bound test uses the calculated F-statistic, which is compared with the lower and upper critical bound provided by Pesaran (2001) and modified by Narayan (2005). According to the null hypothesis of no cointegration H0: θ1 = θ2 = 0, if rejected, the alternative hypothesis of the existence cointegration is accepted, H1: θ1 ≠ θ2 ≠ 0, which means there is a long-run relationship between the variables. The conditional ARDL model is used to estimate the following long-run coefficients: $\Delta y_t = \alpha_0 + \sum_{i=1}^{p} \alpha_i y_{t-i} + \sum_{i=0}^{q1} \theta_{1i} X_{t-i} + \sum_{i=0}^{q2} \theta_{2i} X + \mu_t$

The long-run equation is: $Y_t = \alpha_0 + \beta_1 X_t + \mu_t$

Finally, if the long-run relationship is found, an ARDL error correction model to assess the error correction term (ECT) is estimated, as in the following equation:

$$\Delta Y_t = \alpha_0 + \sum_{i=1}^{p} \alpha_{1i} \Delta Y_{t-i} + \sum_{i=0}^{q1} \alpha_{2i} \Delta X_{t-i} + \vartheta ECT + \varepsilon_t$$

Where ECT is the error correction model result which indicates the speed of adjustment back to long-run equilibrium after a short-run shock (Pesaran et al., 2001).

7. DISSERTATION STRUCTURE

To address the study questions and objectives, I wrote eight chapters, which were incorporated into this dissertation. Chapter One presents a brief research background and examines the topic, research questions, aims, and hypotheses. This chapter also provides a summary of the research motives, contributions, and methodology employed to answer each study issue.

Subsection One of Chapter Two provides a literature review related to the finance-growth nexus, and the various theories on the relationship between finance concepts and economic growth are discussed, such as the supply-leading hypothesis, the supply-leading hypothesis, the bidirectional causality hypothesis, and the no relationship between them theory. The second section provides a literature analysis on the finance-inequality nexus by examining several views that have developed in the existing literature. Three theoretical and empirical views on the relationship between FD and income inequality are explored, namely the inequality-narrowing hypothesis, the inequality-widening hypothesis, and the inverted U-shaped relationship. Each paragraph is followed by an assessment of the relevant empirical studies in order to highlight the major research gaps in the existing literature, particularly in Hungarian literature. In the final subsection, Chapter Two includes a literature assessment on the financial crises—the inequality nexus. The many strands of theoretical literature on the relationship between FC and income inequality are reviewed, followed by an overview of income disparity and the FC in Hungary.

The third chapter outlines the Hungarian financial system and its many stages of development. The most significant elements influencing this evolution from 1980 to 2021 are discussed. Following that, there will be a discussion of the present FD measures in Hungary, as well as their many characteristics in terms of depth, access, efficiency, and stability. In the second subsection of this chapter, I investigated the causal relationship between FC and income inequality in Hungary using empirical methods. The major empirical results were then presented utilizing Toda and Yamamoto's technique (TY) for the Granger non-causality test.

Chapter Four presents an overview of Hungary's economic growth and the financial channels that influence it, including population and HC channels, income and consumption channels, productivity channels, capital accumulation channels, and loan channels. Also concerned with empirically measuring the impact of FD and FL measures on the performance of the Hungarian economy by investigating the relationships between finance and economic growth. After discussing the model, data, and other econometric difficulties, choose the best estimation technique. The descriptive statistics, ARDL estimation results, and robustness checks are then presented. Finally, some final remarks are made, including how finance contributed to economic growth and the key conclusions of this empirical study.

Chapter Five: This chapter examines the concepts and many dimensions of inequality in Hungary, focusing on income disparity, wealth inequality, and poverty. And on the Human Development

Index (HDI) and its dimensions (education and health), as well as their impact on economic prospects and labour market inequality. Following a discussion of the model and data, descriptive statistics are presented, followed by ARDL estimation results and robustness checks. Finally, some final remarks are made, including how finance contributes to inequality and the key conclusions of this empirical study.

Finally, Chapter Six provides an overall conclusion and recommendations, as well as fresh scientific findings with theoretical and practical applications.

CHAPTER 2

A REVIEW OF FINANCE-GROWTH AND INEQUALITY NEXUS: THEORIES AND EVIDENCE

1. A REVIEW OF FINANCE-GROWTH NEXUS

a. Theoretical Research

Growth is a key goal in sustainable development, affecting a country's long-term stability and benefiting millions. However, regional disparities exist due to various factors affecting economic growth. While certain nations experience rapid economic growth, others do not (North, 1994). For over 200 years, economists have proposed theories explaining these differences, but no single theory offers a definitive answer. The classical growth theory posits that a country's economic growth will diminish with a growing population and limited natural resources (Smith, 1776; Malthus, 1798). This theory ignores efficient technological growth's role in enhancing economic operations. The neoclassical growth theory, based on the Solow-Swan Growth Model, proposes two economic growth hypotheses: the first, which assumes population growth rate, savings/investment rate (are internal factors), and technical advancement (as an external factor) are driving economic growth in the short run, and the second, the "convergence hypothesis," which asserts that poor countries grow at higher rates than rich countries, leading to a similar standard of living in both countries (Harrod, 1939; Domar, 1946; Solow, 1957). The endogenous growth model, similar to the Solow model, assumes that capital accumulation at the economic enterprise level has positive external effects that limit the law of diminishing returns at the aggregate level. Capital accumulation, both material and human, plays a role in determining growth rates in the long term (Barro, 1991; Mankiw et al., 1992; Romer, 1986), unlike the Solow model. The endogenous growth model does not have a definite justification for convergence, instead focusing on the "divergence hypothesis," which suggests an increase in the gap between rich and poor countries. Other factors affecting economic growth include public infrastructure, government spending (Barro and Sala-i-Martin, 1992; Barro, 1991), price mechanism efficiency, inflation (Tobin, 1965; Fischer, 1993), international trade, and real exchange rate stability (Dollar, 1992). The Neoclassical economic theory suggests that financial system development is a key driver of economic growth. However, there is no consensus on whether financial development (FD) is always the cause of economic growth. Theories of finance and growth

provide different predictions about the impact of financial systems on growth and their connection. Despite this, the relationship between FD and economic growth remains complex and multifaceted.

The finance-growth nexus originated with Bagehot in 1873, who attributed British economic development to the efficient role of the financial sector. Schumpeter's work in 1911 developed the finance-led growth hypothesis, which suggests a well-developed financial sector is necessary for economic growth. This view was later supported by Goldsmith (1969) and Rinosha and Mustafa (2021), among others. However, Schumpeter's viewpoint was not widely accepted until the mid-1950s, when evidence showed that causality goes from FD to growth (Gurley and Shaw, 1956) rather than from growth to FD, as Robinson (1952) had claimed. This delay was partly due to the World War, the Great Depression, and the emergence of Keynesian theory in 1936.

During the 1970s, financial discussions focused on repression, particularly after the Bretton Woods breakdown. McKinnon (1973) and Shaw's (1973) financial liberalization and economic growth theory suggested governments adopt financial liberalization policies to achieve high growth through saving and investment. During the 1970s, financial discussions focused on repression, particularly after the Bretton Woods breakdown. McKinnon (1973) and Shaw's (1973) financial liberalization and economic growth theory suggested governments adopt financial liberalization policies to achieve high growth through saving and investment. However, disagreements arose, for example, in Nigeria (Lewis and Stein, 1997) and Thailand (Leightner and Knox-Lovell, 1998), where severe banking crises followed financial liberalization. The link between these issues has grown over the days (Stiglitz, 2000) and has increased after the 2008 global financial crisis. The experiences of the 1970s and 1980s motivated the development of financial models related to financial contract markets and intermediaries. During the 1980s, growth models emerged (e.g., Fama and Jensen, 1983a, b; Stiglitz and Weiss, 1981; Jensen and Meckling, 1976; and Grossman and Hart, 1986), particularly endogenous models like Lucas (1988), Romer (1986), and Aghion and Howitt (1990). These models provided advanced methods for investigating economic growth drivers. However, not all growth models support the idea that finance is essential for growth. Nobel Laureates Robert and Ram (1999) argue that the literature overemphasized finance's role in economic growth. Romer's model suggests that finance indirectly influences aggregate investment efficiency by redirecting resources to productive projects. Greenwood and Jovanovic's (1990) model investigated a causal link between FD and growth. Financial markets promote growth by enabling businesses to lower risks through portfolio diversification and increased liquidity (Saint-Paul, 1992; Greenwood and Smith, 1997).

They also support entrepreneurship, specialization, and the adoption of new technology. Later on, several studies supported this view. Studies have shown that occupational choices and financial deepening explain about three-quarters of TFP growth (Jeong and Townsend, 2008; Michalopoulos and others, 2009). However, some economists argue that FD can prevent or harm growth (Buffie, 1984; Van, 1983; Levine, 1997). Later (Andersen and Trap, 2003; Ayadi et al., 2015; Ductor and Grechyna, 2015) supported this view.

Recent studies have raised the issue of "too much finance," suggesting that FD contributes to economic growth up to a point, after which it causes economic growth to decline. The point is when credit to the private sector reaches 100% of GDP (e.g., Rousseau and Wachtel, 2011; Arcand et al., 2015). The concept of "too much finance" can be explained by non-linearities, such as not all credit being equal and non-intermediation financial activity (Beck, 2012). FDI can help catch up with productivity frontiers, safety net subsidies, talent misallocation, and political capture (Demirgüç-Kunt and Huizinga, 2010; Panizza, 2018).

A well-developed financial system promotes economic growth through four main functions: allocating resources, mobilizing savings, reducing risks, facilitating trading, facilitating transactions, and exercising corporate control (Levine, 2005). These functions are country-specific and rely on institutions. The impact of FD or FC on growth varies based on factors such as economic development level and country characteristics, as reported by Panizza (2014) and Loayza et al. (2018).

b. Empirical Literature

The question of whether FD contributes to quicker economic growth has been investigated in the empirical literature, but the results appear to be equivocal. The impact of FD on economic growth has been studied in the empirical literature, with some supporting Schumpeter's supply-leading hypothesis (1934). Goldsmith (1969) documented a positive relationship between FD and GDP per capita, while others, like King and Levine (1993) and Atje and Jovanovic (1993); Levine and Zervos (1996), found a positive impact of the financial market on economic growth. Ibrahim and Alagidede (2018) and Mollaahmetoğlu and Akçalı (2019) found that rapid credit growth in Sub-Saharan African countries costs economic growth by financing risky investments and fuelling inflation. They also found that FD and innovation significantly impact economic growth. Several studies have found a positive relationship between FD and economic growth (e.g., Zhang et al., 2012; Bojanic, 2012;

Uddin et al., 2013; Herwartz and Walle, 2014; Samargandi et al., 2015; Bist, 2018; Bist and Bista, 2018; Jobarteh and Kaya, 2019; Arestis et al., 2015; Popov, 2018; Valickova et al., 2015; Durusu-Ciftci et al., 2017; Shen et al., 2018; Guru and Yadav, 2019; Abeka et al., 2021; Bayar 2016; Epstein and Shapiro, 2019). Empirical research has shown that FD positively impacts growth in specific countries (e.g., Chen, 2006) in China (Yang and Yi, 2008) in Korea, and Adusei (2013) in Botswana; (Shittu, 2012; Ndako, 2017; Kamalu et al., 2019) in Nigeria. Recent studies have also confirmed the growth impact of the FD hypothesis in Vietnam and supported this view using industry data. Studies using industry-level and firm-level data have also shown a positive correlation between FD and economic growth in Sri Lanka (Rinosha and Mustafa, 2021), Vietnam (Tran et al., 2020), and other countries. These findings highlight the importance of FD in driving economic growth and development. (Rajan and Zingales, 2003; Beck and Demirgüç-Kunt, 2008) also supported this view by using industry data. In contrast, studies have found a negative or weak relationship between FD and economic growth, suggesting that more finance negatively impacts growth. For example, De Gregorio and Guidotti (1995) found that in Latin America, a poor regulatory environment and efficiency channels contributed to a negative relationship between FD and economic growth. FD has been found to negatively impact growth in 120 nations (Ghimire and Giorgioni, 2013) and 101 developed and developing countries (Ductor and Grechyna, 2015). In Nigeria, studies using various techniques, such as the ECM model (Ujunwa and Salami, 2010), OLS regression (Bernard and Austin, 2011; Gregory and Hansen), and the ECM test (Elijah and Hamza, 2019), found a significant negative relationship between FD and economic growth. Other studies (Andersen and Tarp, 2003; Gouider and Trabelsi, 2006; Naceur and Ghazouani, 2007; Narayan and Narayan, 2013; Ayadi et al., 2015; Peia and Roszbach, 2015; and Haiss et al., 2016) have also highlighted the negative impact of banking sector development on economic growth.

Otherwise, in recent years, there has been an increasing amount of literature that has supported the nonlinearity hypothesis. For example, (Shen and Lee, 2006; Beck et al., 2014; Law and Singh, 2014; Cecchetti and Kharroubi, 2012, 2015; Cournède and Denk, 2015; Samargandi et al., 2015; Ibrahim and Alagidede, 2018; Oro and Alagidede, 2018; Eugster, 2014; Mbome, 2016; Panizza, 2018; Opoku et al., 2019; Arcand et al., 2015; Swamy and Dharani, 2019; Destek et al., 2020; Machado et al., 2021), among others. They have recorded the evidence of the non-linearity between financial system development and economic growth. However, those results have been questioned by Cline (2015), who argues that it is mostly a statistical artifact. Swamy and Dharani have indicated that there is

nonlinearity as there is an inverted U-shaped relationship between finance and growth, with, in the long run, a threshold of 142 percent of GDP; thus, more finance is harmful to economic growth. However, some studies emphasized that the shape of this nonlinearity for each component of financial systems is different (Gambacorta et al., 2014; Moosa, 2018; Swamy and Dharani, 2019; 2020). The beneficial effects of bank development may be only in countries with low FD since too much finance or credit harms growth, as has been reported by Arcand et al. (2015) and Xu and Gui (2021), among others. Botev et al. (2019) did not discover evidence to support the concept that too much finance is detrimental. In addition, there has been an increasing amount of literature reporting there are nonlinear relationships between financial system development, financial stability, and economic growth (e.g., Creel et al., 2015; Marques et al., 2015; Prochniak and Wasiak, 2017). Creel and others have applied a panel GMM to a data set from European Union countries over the period 1998–2011 and have concluded that a high degree of financial depth has risks of financial instability, which is harmful to macroeconomic performance.

Studies on the causality of financial growth have yielded contradictory conclusions. Some studies revealed one-way causality from finance to economic growth, as indicated by Hsueh et al.'s 2013 analysis of ten Asian nations between 1980 and 2007. Guru and Yadav's 2019 study examined BRICS (Brazil, Russia, India, China, and South Africa) countries from 1993 to 2014. Hussain and Kumar's 2012 study in one state of India (Assam), and Altaee and Al-Jafari's 2015 study in Bahrain. However, studies in China found unidirectional causality from economic growth to finance (Zhang et al., 2012; Hao et al., 2018). Following the pioneering works of Lewis (1956) and Patrick (1966), who confirmed a two-way causality between FD and economic growth, several studies empirically supported this view (e.g., Acaravci et al., 2009; Shan and Jainhong, 2006; Kemal et al., 2004; Abu-Bader and Abu-Qarn, 2008; Hassan et al., 2011; Bangake and Eggoh, 2011; Shahbaz and al., 2012; Musamali et al., 2014; Al-Qudah, 2017; Okpara and al., 2018), among others. In their study, Ekanayake and Thaver (2021) analysed the connection between FD and economic growth in 138 developing countries from 1980 to 2018. Used panel fully modified least-squares methods, panel least squares, and panel Granger causality tests. The findings revealed that there is a link between FD and growth in those nations, with indications of bidirectional causation in some regions, such as Europe and Central Asia. The authors, however, could not locate it in other places. Similarly, Abu-Bader and Abu-Qarn (2008) found evidence of bidirectional causation between them in Egypt and Uddin and colleagues (2013) in Kenya. However, some studies have found the results are mixed

(e.g., Rousseau and Wachtel, 2005; Kemal et al., 2004; Hassan et al., 2011; Hsueh et al., 2013; Peia and Roszbach, 2015; Pradhan, 2017; Gupta and Rao, 2018). Pradhan's study, spanning 1991 to 2011, found a bi-directional causality between growth and the insurance sector, bond market, and stock market development, while banks showed a unidirectional causality.

Research has shown that the influence of banks on economic growth differs from that of stock markets. Based on a meta-analysis of the literature using the findings of 67 studies, Valickova (2013) found that stock markets contribute more to economic growth than financial intermediaries, with a positive coefficient (0.06). However, the banking sector has a negative coefficient (-0.09). Valickova et al. (2015) and Arestis et al. (2015) reached the same conclusion. Some studies have found that stock market indicators are beneficial for economic growth, while banking and bond market development depress growth (e.g., Peia and Roszbach, 2015; Haiss et al., 2016; Shen et al., 2018). Durusu-Ciftci et al. (2017) observed that both stock market and banking development have positive long-run effects on GDP per capita, but bank development contributes more. Yu et al. (2012) reported the same results. The growth of one financial system component influences the development of another, with their effects on growth being positively correlated with economic growth. However, the relationship between banks and stock market finance can be detrimental (Deidda and Fattouh, 2008; Owen and Temesvary, 2014).

Scholars have found that the quality of funds is a crucial factor in economic growth, with bank efficiency positively related to economic development. Fu et al. (2018) supported studies across 14 Asia-Pacific economies, which found that the quality of the financial system is essential for growth. These functions, however, vary in each nation, depending on its degree of development. Diallo (2018) and Mirzaei and Moore (2019) found the same finding using industrial-level data. Ferreira (2016) discovered that bank efficiency correlated to higher GDP growth in European countries, notably during the 2008 financial crisis. However, these functions vary across nations and can vary depending on their development level. Diallo (2018) and Mirzaei and Moore (2019) found the same finding using industrial-level data. Ferreira (2016) discovered that bank efficiency correlated to higher GDP growth in European countries, notably during the 2008 financial crisis. Other research has also linked financial growth to macroeconomic variables, such as investment (e.g., Osei and Kim, 2020; Batrancea et al., 2021) and employment (Bayar, 2016). Inflation (Rousseau and Wachtel, 2011) can either promote or harm growth in different stages.

Factors such as nation characteristics, institution quality, crises, and study period can influence the finance-growth relationship (Compton and Giedeman, 2011; Cheng et al., 2014; Barajas et al., 2016; Seven and Yetkiner, 2016; Hou and Cheng, 2017; Fufa and Kim, 2018; Slesman et al., 2019; Herwartz and Walle, 2014; Moosa, 2018; Nguyen et al., 2019; Paun et al., 2019). Stock trading, financial system soundness, and net foreign assets contribute to economic progress, while domestic monetary and credit expansion hinder it. Puatwoe and Piabuo (2017) found a short-term negative relationship between private investment and bank savings, but a strong positive correlation is observed over time.

c. Empirical Literature on Finance-Growth Nexus in Hungary

The literature on Hungary's finance-growth relationship is insufficient, with cross-country analysis dominating the research. There is no consensus on the relationship between finance and economic growth. Varela (2015) uses Hungarian firm-level data to examine the impact of distortions in access to international capital markets on competition and productivity. He found that productivity increased after deregulation and increased technology investment. Tsaurai (2015) found no clear relationship between FD and economic growth in Hungary from 1991 to 2012. Felcser et al. (2015) examined the easing cycle launched by the Hungarian central bank in 2012, using the interest rate and exchange rate channels as monetary policy transmission mechanisms. They found that the easing cycle significantly contributed to economic growth, lowered inflation, and reached the rate of undershooting of the central bank's inflation target, using the central bank's forecasting model's estimations.

Among cross-country analyses, Próchniak (2011) found that financial sector development is a key economic growth driver in 10 Central European countries (CCE), including Hungary, from 1993 to 2009. Petkovski and Kjosevski (2014) have concluded the same finding. However, the effects of FD on growth vary depending on financial indicators. A meta-analysis of the finance-growth nexus in European emerging markets, including Hungary, found that credit to the private sector positively impacts growth. Bank competition, high interest rates, and high inflation damage growth, reducing the importance of credit on growth (Ono and Iwasaki, 2022).

Some studies have explored the link between FD and growth in TE, including Hungary (e.g., Koivu, 2002), which concluded that FD did not affect economic growth. In contrast, Niemke (2003) showed

that FD had a major impact on growth in such economies, with investment and TFP being key channels influenced by FD. Similarly, Akimov et al. (2009) discovered a positive and significant empirical association between FD and economic growth in 27 TE. At the same time, Koivu (2004) found that the influence of credits (amounts of credit supplied to the private sector) on economic development is less clear. And the efficiency (lower interest rate margin) of the banking sector promotes economic growth in 25 TE in the period 1992–2001. Similarly, Ferreira (2016) discovered that bank efficiency correlated to higher GDP growth in European countries, notably during the 2008 financial crisis. Contrarily, Petkovski and Kjosevski (2014) found that credit to the private sector and interest margin negatively affect economic growth. However, the ratio of quasi-money influences economic growth in 16 TE, including Hungary, over the period 1991–2011. They applied system GMM estimation. Caporale et al. (2015) studied the relationship between FD and economic growth in ten European countries, including Hungary, from 1994 to 2007. They found that stock and credit markets were underdeveloped, and financial depth limited their contribution to economic growth. The banking sector showed more efficiency, and stock market capitalization in the CEE-5 countries (Czechia, Hungary, Poland, Slovakia, and Slovenia) had a small positive effect on economic growth. In constant, Gural and Lomachynska (2017) examined the impact of FD and Foreign Direct Investment (FDI) on economic growth in V4 countries from 1992 to 2016. They found that V4 countries' financial systems are insufficient, heavily reliant on foreign capital, and bank-oriented. Government interventions also undermined FD in these countries. However, FD played a crucial role in economic growth, particularly in the stock market. Banking development positively affects growth in CEE countries, according to the work of Cojocaru et al. (2016). Sassi and Gasmi (2014) reported that in contrast to credit to the household sector, credit to the corporate sector had a positive effect on economic growth in a sample of 27 European countries, including Hungary, between the period 1995 and 2012. However, Angjelkovska et al. (2016) found that the impact of credit to households on economic growth is ambiguous in thirteen TE over the period 1995 to 2007, but they confirmed the positive effect of credit to corporations on growth. Durusu-Ciftci et al.'s 2017 study estimated 40 countries from 1989 to 2011, using means of augmented mean group, common-correlated effects, and a Solow-Swan growth model augmented with financial markets. The study found that credit and equity markets significantly impact GDP per capita and growth, with credit markets being more significant. However, findings varied across countries.

Studies have explored the causal relationship between finance and growth. Caporale et al. (2009) found a one-way relationship between finance and growth in 10 new EU members from 1994 to

2007. Another study by Caporale et al. (2012) found a one-way relationship between stock markets and economic growth, particularly after EU accession. Caporale and Spagnolo used a VAR-GARCH framework to study stock returns in Hungary, Czechia, and Poland from 1996 to 2011. The Granger causality test confirmed the importance of finance (FD) on economic growth in 19 Central, East, and Southeast European countries (CESE), with one exception being the Czech Republic. The study also found a bi-directional spectral Granger causality in Hungary and other countries between 1991 and 2017. In 2020, Prats and Sandoval's analysis of the finance-growth nexus in 10 Central and Eastern European (CEE) countries, including Hungary. Using a cointegrated Vector Autoregressive (VAR) model, Granger causality test, Toda-Yamamoto approach, and frequency domain approach. They found a stronger relationship between two variables and a bi-directional causal relationship in both directions. Research shows that the financial system's efficiency and competitiveness are more significant than bank credits for the private sector in boosting economic growth. Financial access and efficiency contribute more to growth than depth, according to studies by Cojocaru et al. (2016) and Haini and Loon (2021). However, government expenditure can slow growth by crowding out the financial sector. Prete (2013) found that literacy levels had a stronger positive effect on economic growth than FD in all the countries studied.

2. A REVIEW OF FINANCE-INEQUALITY NEXUS: THEORIES AND EVIDENCE

a. Theoretical Literature

Kuznets's (1955, a, b)' theory of an inverted U-shaped curve linking growth and finance (FD) has been the basis for the long-standing relationship between FD and inequality. He suggested that FD indirectly affects inequality through its influence on economic growth, with income disparity worsening during early economic expansion but improving later. However, in the 1990s, conflicting results led to debates and the emergence of three main theoretical frameworks explaining how FD affects inequality. Kuznets's theory was also refuted by Barro (2000), Piketty and Saez (2003), and Piketty (2015); in particular, economies with great FD now seem to have high inequality. Greenwood and Jovanovic's 1990 model posit an inverted U-shaped connection between FD and income inequality. They argue that income inequality increases in early FD phases because of limited access to financial intermediaries and high transaction costs. When reaching a certain stage of development, fixed costs diminish, and unequal distribution declines. However, their model's theoretical channels remain unclear (Brei et al., 2018). Law and Tan (2012) support their hypothesis, while Ang (2010)

rejects it, arguing for a linear impact on income inequality in India. Galor and Zeira (1993) and Banerjee and Newman (1993) rejected the inverse U-shaped hypothesis of finance and inequality and deemed the inverse U-shaped hypothesis about finance and inequality to be statistically insignificant, predicting a linear negative relationship. Those models, however, differ in the theoretical channels and shape of the relationship. Banerjee and Newman's model posits that financial market imperfections cause poor people to work for wealthy employers with low compensation, hindering their ability to finance projects. Reducing financial imperfections can increase economic opportunities, income, and equality, while also emphasizing the importance of the initial wealth distribution in determining the economy's future. Galor and Zaira's model suggest that capital market defects stem from preventing poor people from obtaining finance to invest in their HC. Empirical studies support this view, with financial services (FD) exerting a disproportionately positive influence on lower-income individuals (e.g., Clarke and Zho, 2006; Beck and others, 2007; Agnello and Sousa, 2012; Hamori and Hashiguchi, 2012), reducing income inequality. These models propose the inequality-narrowing hypothesis of finance, influencing underprivileged groups' choices and decisions regardless of inheritance wealth and increasing labor demand. The assumption that finance has a significant influence on the intense margin has been challenged, with an opposing idea emerging that it may have a larger impact on the wealthy, benefiting those currently using services (Rajan and Zingales, 2003). In the absence of inadequate protection for the impoverished, this shift towards inequality-widening suggests that the poor have unequal access to financial opportunities, leading to more wealth (Chong and Gradstein, 2007; Beck et al., 2007; De Haan and Sturm, 2017). The size of the financial sector is not enough evidence for FD theory (Demirgüç-Kunt and Levine, 2009).

The "too much finance hypothesis" suggests that early stages of FD can improve income equality, but beyond a certain point, inequality will rise, contradicting Kuznets, Greenwood, and Jovanovic's hypothesis, which suggests an inverted U-shaped curve. Over the past decade, more research indicates that FD/FL are linked to increased financial insecurity and financial crises (FC), particularly for low-income families. These families are most vulnerable to shocks and are most affected by policy responses to FC (De Haan and Sturm, 2017). Specifically, if followed by an economic downturn (Atkinson and Morelli, 2011). Evidence also suggests a cause-and-effect link between inequality and unsustainable credit expansions, leading to crises (Rajan, 2010; Kumhof et al., 2015; Malinen, 2016). Income inequality might be a good predictor of FC (Schularick and Taylor, 2012). More details on this relationship are provided in chapter six. Advocates of EGT argue

that financial services (FD) not only affect current income but also reduce income disparity across generations through wealth accumulation (Greenwood and Jovanovic, 1990). FD reduces information and transaction costs for joining financial intermediaries, allowing more people to access higher-yield investments, improving resource allocation efficiency, and boosting growth and equality (Townsend and Ueda, 2006). Financial constraints can prevent talented low-income individuals from starting businesses, resulting in low economic efficiency and slowing aggregate growth (Mookherjee and Ray, 2003; Jeong and Townsend, 2007; Levine and Rubinstein, 2020). FD also provides additional investment opportunities for savers, reducing the persistence of inequalities across generations. Increased stock prices could disproportionately affect the wealthy, widening inequality significantly (Stiglitz, 2015, 2016). Wealth inequality is higher than income inequality, highlighting theoretical limitations in understanding revenue appropriation related to wealth. Credit creation has been primarily focused on financing rent-generating activities, such as securitization and financial engineering, which promote financial system rents and wealth inequality.

Finance can increase income inequality due to the capture of financial resources by a restricted elite of well-connected actors. The richest use political power to make government policies financially beneficial, increasing their wealth through rent income and returns on capital. Atkinson (2015), in his book "Inequality: What Can Be Done?" explains more details about the contribution of a stock price increase to rising inequality. One should recall that the book "Capital in the 21st Century" by Thomas Piketty in 2015 suggests increased wealth inequality may result from the growth of the average annual rate of return on capital investment.

b. Empirical Literature

The relationship between FD and income inequality is not conclusive, as numerous studies over thirty years have investigated this relationship, categorized into three hypotheses. First, studies have shown that FD reduces income inequality, suggesting that more finance leads to less inequality. Beck et al. (2007) analysed the relationship between FD and inequality in 72 countries between 1960-2005 and 1985-2005 on average. They found that 60% of FD benefits the poorest lowest quintile, reducing inequality by 40%. Clarke et al. (2006) and Kapell (2010) also concluded that FD reduces inequality, with a 1% increase in private credit/stock market capitalization decreasing the Gini coefficient by 0.2 to 0.3 percent. Hamori and Hashiguchi (2012) found that FD indicators had a significant negative effect on household income inequality. Overall, more finance to the private sector leads to less inequality. Gimet and Lagoarde-Segot (2011) applied an unbalanced panel

Bayesian Structural Vector Autoregressive (SVAR) model to 49 countries from 1994 to 2002. They found that market imperfections increase inequality while capital market efficiency reduces it. The banking sector has a stronger distributional impact on inequality than capital markets. Mookerjee and Kalipioni (2010) found that improving access to bank branches reduces income inequality across countries. They also found that improving access to savings and transaction services may reduce poverty (Guillaumont and Kpodar, 2011). However, these improvements are associated with crises that can be harmful to poor people, especially in African countries (Batuo et al., 2010; Meniago and Asongu, 2018). This finding supports Greenwood and Jovanovic's definition of FD. The empirical literature suggests that the finance-inequality link at the country level has a negative effect, as demonstrated by Abdul Rahih et al.'s 2019 study in Singapore, which found that increasing FD improved income distribution.

Second, evidence suggests that FD can exacerbate income inequality, contrary to popular belief. This means more finance exacerbates income inequality, as we will see in the next section. Studies using panel methods and GMM estimates show that an increase in FD by 1% can increase the Gini coefficient by 0.023 percent (Jauch and Watzka, 2011). Bank development also contributes to the growth of income inequality in emerging economies (Seven and Coskun, 2016). This contradicts the popular belief that FD reduces inequality. Further research is needed to understand the true impact of FD on income inequality. Denk and Cournede (2015) found a positive relationship between financial inclusion (FD) and inequality in 33 OECD industrial countries, referred to as rent extraction. Because employees in the financial industry are highly concentrated at the top of the income distribution ladder, and their wages surpass those of employees with the same HC in other industries. In Eastern Indonesia, Elseno et al. (2020) analysed the role of financial inclusion in economic growth, income inequality, and poverty alleviation using the dynamic Panel Vector Auto regression (PVAR) and Toda-Yamamoto VAR bivariate causality model. They concluded that growth boosts financial inclusion and reduces poverty, while financial inclusion increases inequality in Indonesia. The Ang (2010)'study examines the impact of finance (FD) and finance (FL) on income inequality in India using data from 1951 to 2004. He finds that FD improves equality, while FL exacerbates it due to a rent-capturing attitude from the elite (Claessens and Perotti, 2007). Enabling higher volatility and uncertainty in FL increases the impact of FD on increasing inequality, as suggested by De Haan et al. (2018). The same result has been reached by Christopoulos and McAdam (2016). Studies suggest that the relationship between the financial system and income

inequality is influenced by institutional quality and legal protection (Rajan and Zingales, 2003; Claessens and Perotti, 2007; Kim and Lin, 2011; Law et al., 2014). Financial derivatives (FD) can reduce inequality in countries with developed financial and governance institutions. Legal protection and institutional quality also influence the impact of FD on inequality (Chong and Gradstein, 2007). Powerful institutions and FD can improve equality by allowing poor people to invest in human and physical capital (Delis et al., 2014). However, financial takeovers can lead to control over economic and work policies beneficial to the wealthy (Roberts and Kwon, 2017). Empirical studies show that finance does not significantly impact inequality in rural areas, but it can reduce inequality in urban areas (Arora, 2012).

Finally, some studies report a non-linear relationship between finance and inequality, suggesting that the relationship depends on the country's development stages. This indicates that the impact of finance on inequality varies across different regions. Studies have shown a non-linear relationship between FD and income inequality, indicating that the relationship depends on the country's development stages. Greenwood and Jovanovic's inverted U-shaped, Kuznets-type approach suggests that a minimum level of FD is necessary for reducing income inequality. Azam and Raza (2018) found evidence of the financial Kuznets curve by investigating the influence of FD on income inequality using four financial indicators: domestic credit by the banking sector, domestic credit to the private sector, money supply, and stock market capitalization. More recently, Boukraine (2022) validated the Greenwood and Jovanovich hypothesis using data from BRICS countries from 1980 to 2017. However, studies investigating nonlinear relationships due to threshold effects provided evidence to support Greenwood and Jovanovic's hypothesis at different thresholds. For example, Nikoloski (2013) found that income inequality decreases when the ratio of credit to the private sector reaches 114 percent of GDP, while Jauch and Watzka (2016) reported that inequality decreases when it reaches 82% of GDP. The “too much finance hypothesis” has been validated by various studies (e.g., Tan and Law, 2012; Loayza et al., 2018; Park and Shin, 2017), arguing that excessive financial debt (FD) contributes to reducing inequality until it increases. Park and Shin (2017) use various methods, such as the share of liquid liabilities of GDP, the share of private credit by deposit money banks of GDP and stock, and the market capitalization of GDP, to proxy FD. Some studies also explore the transmission of finance to inequality through specific channels linking banks and capital markets. Financial capital market development enhances inequality through rent extraction, and firms reward top executives who achieve short-term profits (Kus, 2012). Brei et al., (2018) analysis

of the relationship between financial structure and income inequality found that inequality increases if finance is expanded via market-based methods, while inequality does not rise if it is expanded via bank lending. Some studies show mixed results on the relationship between FD and income inequality. For instance, a study by Bahmani-Oskooee et al. (2018) found mixed results in 17 countries, with only 10 countries showing FD impact on income distribution and only three countries showing long-term effects. Financial inclusion's impact on poverty and income inequality varies across countries. Research from 176 economies, including 37 from developing Asian countries- Park and Mercado (2018) show that inclusion reduces income inequality and poverty globally, but not in developing Asia. Country characteristics significantly affect financial inclusion, with primary education completion and literacy increasing financial inclusion only in the full sample. Nguyen et al. (2021) investigated Vietnam's democracy level's impact on the relationship between FD and income disparity using data from 2000 to 2020. The findings showed mixed results, with FD increasing income inequality and democratic governments reducing it. This suggests that a country's democracy may also determine the finance-inequality nexus.

c. Empirical Literature on Finance-Inequality Nexus in Hungary

Studies on the finance-inequality nexus in Hungary are limited, with few studies at the country level. However, empirical studies have examined the relationship between FD and income inequality at the cross-country level. Mavridis and Mosberger's 2017 study analysed the share of top income at the upper tail of income distribution dynamics in Hungary between 1914 and 2008, highlighting the rapid increase in capital gains at the top of the income distribution after the market liberalization. The top 1% and 0.1% of the income distribution received over 25% and 50% of their income from capital income, respectively, before the 2008 crisis. Lower deciles received smaller shares of their income from capital, reaching the level in the USA during the two decades since the transition period.

Hungarian literature on finance-inequality effects is primarily based on cross-country analyses (e.g., De Haan and Sturm, 2017; Bezemer and Samarina, 2016; Zhang and Naceur, 2019; Nguyen et al., 2019; Kavya and Shijin, 2020; Mbona, 2022). However, these results lead to conflicting predictions about the finance-inequality nexus in Hungary and other countries. De Haan and Sturm's research supports the finance-inequality widening hypothesis, suggesting that finance increases inequality through volatility and uncertainty. Meanwhile, Manta et al. (2023) examined the impact of finance on income disparity in the CEEC, arguing that finance will lessen inequality in Hungary and other

CEEC countries. A threshold regression technique can address endogeneity and consider threshold nonlinearity. Kavya and Shijin (2020) applied unbalanced dynamic panel GMM estimation models to 85 countries, including Hungary, from 1984 to 2014. The authors used the Gini coefficient, per capita GDP, FD index, age dependency ratio, GDP deflator, trade, and urban population. They found no clear evidence to support economic growth with FD, reducing income inequality. They argued that Hungary, like high-income countries, does not benefit from FD. An empirical examination of the connection between income disparity and financial structure. Zhang and Naceur's 2019 study found that stock market development had less influence on income distribution than banking sector development in 143 countries from 1961 to 2011. Paramati and Nguyen's 2019 study revealed that income inequality decreased with the rising stock market and banking indicators in 18 emerging market economies, including Hungary, from 1981 to 2014, while only banking credit reduced income inequality in developed market economies. Cevik and Correa-Caro (2020) used the 2SLS technique and GMM estimator to support Kuznets' hypothesis that financing improved income distribution in TE from 1990 to 2018. In contrast to the findings of Nguyen et al.'s (2019) study, Mbona (2022) suggested that financing lowers inequality in the first stage but raises it in the second. Badur et al. (2023) validated the Kuznets curve hypothesis by analyzing panel time series data for twelve post-communist economies, confirming that continued economic development shifts income from the top 10% to the bottom 50% and middle 40% classes. Peña Blasco (2022) investigated the finance-inequality nexus using System GMM models and Granger tests for data from 35 OECD countries from 1970 to 2011, finding an impact of the interaction between income inequality and finance on GDP growth.

3. INCOME INEQUALITY AND FINANCIAL CRISES?

In recent decades, some scholars have argued that financial instability and crises are often linked to FD and FL, since they are often linked to financial rent activities (Rajan, 2011; Stiglitz, 2012), among others, which can have devastating effects on inequality. Poor and low-income families are most vulnerable to shocks and are most harmed by policy responses to FC (Morelli, 2014; Bazillier and Hericourt, 2017; De Haan and Sturm, 2017). Others suggest that income inequality is a predictor of financial crises because of over-indebtedness (Schularick and Taylor, 2012). Others suggest that income inequality is a result of financial crises. Plenty of studies also have shown that governments' monetary policies, financial liberalization, and reform dynamics may have both direct and indirect

effects on the finance-inequality nexus (Atkinson and Morelli, 2011). The global crisis has sparked interest in the link between income inequality and financial crises, with politicians, economists, and policymakers discussing the issue. Evidence suggests that growth is more fragile when distributional concerns are overlooked, as noted by Rajan (2010) and Stiglitz (2012) among others. Rajan and Stiglitz argued that higher inequality led to a "keeping up with the Joneses" effect. They explain that the mortgage boom and recession are a consequence of redistribution, which motivates low-income groups to have more leverage to maintain their consumption levels. However, Rajan and Stiglitz's view with other scholars has triggered a vigorous debate, as described in a recent survey by Bazillier and Hericourt (2017). Besides, Thomas Piketty's book 'Capital in the Twenty-First Century in 2015 has rekindled the debate on inequality. Recently, some theoretical arguments pointed out the role of increasing rent extraction in rising income inequality (Stiglitz, 2012, 2016; Bolton et al., 2016), either through financial innovations that are inefficient or damaging (Bolton et al., 2016) or through the wages of employees in the financial sector (Demirgüç-Kunt and Levine, 2009; Philippon and Resheff, 2012; Piketty, 2014). Similarly, there is disagreement among scholars regarding the relationship between them, as we see in the next section.

a. Literature Review on Distributional Effects of Crises

In the last decade, researchers in the finance-inequality nexus literature have looked into FC and their relationship to inequality. According to certain research, financial instability and crises have disproportionately impacted low-income persons, especially when accompanied by an economic slump (Eichengreen and Rose, 1998; Bordo and Meissner, 2015). However, the impact varies, and there is no one-size-fits-all. approach. However, it varies depending on a number of factors, including the economy's ability to withstand shocks, whether a deep recession occurs, monetary and government policy responses, labor and social security institutions, the level of FD, and structural characteristics of each economy, among others, as reported by Panizza (2014) and Loayza et al. (2018). For example, Levine et al. (2016) found that when shareholder protection measures are weak, FC have a greater negative impact on issuances, corporate profitability, and investment efficiency. According to Atkinson and Morelli (2011), the distributional repercussions of crises on income inequality vary depending on the type of crisis, its causes and consequences, and the many characteristics of economic inequality. Similarly, earlier research on the aftermath of the 2008 crisis and the Great Recession, which began in 2007, found different results (e.g., Jenkins et al., 2012;

Piketty and Saez, 2013; Amate-Fortes et al., 2017). On the other hand, if FD is high, crises will have a larger role in generating subsequent inequality through production (Bazillier and H'ericourt, 2017). Changes in macroeconomic volatility caused by crises have a significant impact on persons at the bottom of the income distribution, as they are more exposed to these negative volatilities. As a result, they suffer the brunt of it. Some studies on the distributional repercussions of FC may have looked at how it affects labour market inequality. For instance, the crises cause unemployment to rise and employment to drop (Ball et al., 2013). Especially among those with low skill or education levels who are most likely to lose their jobs first, and among the jobless who deal with lower income and difficulties finding new work (Nichols et al., 2013). However, at times of crisis, when labour and capital are engaged in more intense distributional conflicts, large government expenditures often serve to shield the more powerful. Furthermore, because of structural unemployment, FC may make labours' negotiating position worse (Mocan, 1999), particularly if capital flight is a danger to a country. Because of this, wages are typically kept low to avoid widespread layoffs, which would reduce the amount of money that is allocated to labour (Jayadev, 2007). They may offset declines in more (or less) capital than earned job income, depending on the response policy (Jenkins et al., 2012). For example, wealth differences are likely to be more affected by the recovery mechanism than income disparities (Kuhn et al., 2018).

Decreases in earned capital income may have a larger impact on the wealthy's income, temporarily reducing wealth inequality (Kuhn et al., 2018). In addition, when crises have more effects on investment income than employment income (Jenkins et al., 2012), as in the case of a stock market crash, asset losses can reduce the income of the well-off. On the other hand, the distributional consequences of FC on wealth inequality appear when the equity investment of the wealthy class may be swiftly regained, while the other assets (typically owned by the wealthier classes) may only experience a modest recovery. This view is also supported by Clifford (2021). Oxfam's 2021 report on global inequality also suggested that the COVID-19 pandemic has increased economic inequality substantially, wherein the wealthiest people across the globe were the quickest to recover their fortunes; the wealth of billionaires increased by $3.9 trillion, while increasing by 500 million the number of those living on less than $5.50 a day. Contrarily, other researchers report that the crises would reduce inequality (e.g., Agnello and Sousa, 2012). While Piketty and Saez (2013) and Atkinson and Morelli (2015) suggested that the effects of financial stability on inequality differ across countries. However, Denk and Cournede (2015), Baldacci et al. (2002), and Amate-Fortes et al. (2017) could not find any evidence of the impact of FC on inequality.

b. Empirical Studies on Financial Crisis and Inequality in Hungary

Some research suggested that the flat-rate personal income tax and unemployment were the most significant contributors to post-crisis inequality. Brzezinski (2018) noted that since 2009, the full-time employment rate has dropped by 3.8 points, as have changes in social security payments because of austerity policies. According to the author, the flat-rate personal income tax was a major contributor to the increase in income disparity between 2008 and 2012. In particular, the disparity in market incomes remained constant. The findings indicate that only changes in inequality for post-tax and disposable earnings are statistically significant. The findings indicate that only changes in inequality for post-tax and disposable earnings are statistically significant. In the same vein, De Agostini et al. (2016) found that implementing the Hungarian flat-rate personal income tax in 2011 improved the Gini index by two percentage points over 2008-2011. Similarly, Aristei and Perugini (2015) suggested that Hungary's inequality rose as a result of tax reform and the adoption of flat tax rates or progressive tax rates. According to De Haan and Sturm (2017), Hungary was one country where the FC increased inequality. Similarly, they get the same conclusions from their assessment of Bazillier and H'ericourt (2017); most data indicates that inequality rises during a financial crisis. In contrast, Amate-Fortes and colleagues discovered that inequality in the 27 EU countries remained unchanged because of the global crisis (2008-2011).

c. Literature Review on the Effect of Income Inequality on Financial Crises

Similarly, the available empirical evidence about the impact of inequality on FC provides results mixed. It is unclear how inequality can impact financial stability, and the origins, consequences, and durations of various types of crises might vary (e.g., Atkinson and Morelli, 2010, 2011; Bordo and Meissner, 2012). Scholars have demonstrated that FC may be predicted using the notable increases in global income and wealth inequality over the last few decades (e.g., Kirschenmann et al., 2016; Paul 2020). Belletini and Delbono (2013) evaluated the relationship and found insufficient evidence to establish a causal association between the level of inequality and FC. This result was also refuted by Atkinson and Morelli (2015), who do not provide any conclusive statistical support for either the growth hypothesis or the `level' of inequality hypothesis. Atkinson and Morelli (2011) examined whether earlier eras of significant inequality had a causal role in the crises, using data from 21 nations experiencing FC over 100 years (1911–2010). The writers have shown that before the banking crises,

inequality was declining just as frequently as it was growing. There is, however, mounting evidence that rising inequality follows FC. Perugini and others argued that inequality is one of the factors of credit expansion, and there is a positive relationship between the two variables, suggesting a macroeconomic risk. Similarly, according to Schullick and Taylor (2012), the credit boom is a more reliable indicator of FC than external imbalances.

Recent research has concentrated on leverage and inequality and how these contributed to the 2008 world crisis, which was preceded by a sharp rise in both. For instance, Rajan (2010); Stiglitz (2015); Kumhof et al. (2015); Perugini et al. (2016); and Bazillier et al. (2021) formulated the theory that increased inequality caused low-income households to borrow excessively and default on their loans more frequently, ultimately resulting in FC. In contrast, Bordo and Meissner (2012) investigated the relationship between income inequality and credit booms and the likelihood of a banking crisis between 1920 and 2000. They came to different conclusions, finding no evidence that an increase in top-income shares causes credit booms; rather, credit booms increase the likelihood of a banking crisis because strong economic growth and low interest rates, rather than income concentration, cause them. Mendoza and Terrones (2008). They fail to take into consideration the connection between credit booms and income disparities. On the other hand, Jordà et al. (2014) noted that the mortgage lending boom and its influence on home prices might be insufficient to forecast crises, as credit booms are also connected with economic expansion, rising asset values, and widening external deficits (Mendoza and Terrones 2008). The theoretical literature also suggested that increased domestic income inequality causes current account deficits, which are associated with FC. A series of studies provided evidence to support this view. Kumhof et al. (2012), for example, examined the relationship between income inequality and current account deficits and found that growing income inequality is associated with significantly bigger external deficits following financial deregulation.

Tables A-1–A-6 in the Appendix summarize the theoretical and empirical research on the connections between FD, FC, economic growth, and inequality.

4. CONCLUSION

To summarize, there is no single explanation in the theoretical literature that explains the relationship between FD and growth. Multiple hypotheses exist, including the finance-helps-growth hypothesis,

the finance-harms-growth hypothesis, the neutral hypothesis, and the too much finance or nonlinearity hypothesis. The nonlinear hypothesis is also linked to financial instability and changes according to the components of the financial system. Similarly, in terms of causation, either finance leads to the economic growth hypothesis or economic growth leads to the finance hypothesis and the two variables' reciprocal relationship. Similarly, the literature on the relationship between disparities and FD, as well as its consequences on low-income individuals, contains contradicting findings. The first viewpoint contends that FD provides fair opportunities and aggregate efficiency, hence encouraging high-tech use and economic progress. However, recent material calls into doubt this viewpoint, as FD can lead to the opposite outcome. The effect of FD on inequality shape has been extensively studied, but the results are unclear because of the influence of geographical and temporal aspects, as well as measurement methodologies. The relationship between FC and inequality is unclear, with some scholars claiming that FC exacerbates economic inequality and vulnerability, particularly during recessions. As some scholars have stated, income disparity is a predictor of financial crises because of over-indebtedness and social difficulties. Others argue that government policies, financial liberalization, and financial activity related to FD all have an impact on the finance-inequality nexus. Empirical investigations, like the theories mentioned above, yield contradicting conclusions and varying results in terms of causality. The studies also found no overarching pattern in the link between FC and income distribution. Furthermore, cross-country analyses dominate the studies, which frequently indicate mixed effects on income inequality and economic growth since heterogeneity prevents them from applying the same model specification to all nations. This is due to variations in data comparability and the scientific processes employed in investigations. For example, research using the GMM technique discovered a stronger positive link between income inequality and economic development with FD than those using the OLS technique. To better comprehend the finance-inequality-growth nexus, it is necessary to establish those relationships at the national or regional level since these aid in overcoming data comparability limits and methodological obstacles while taking into account country differences. However, this strategy may have data issues. The empirical literature on these correlations between variables in Hungary likewise yielded conflicting and ambiguous results, is limited, dominated by cross-country analyses, and requires additional evidence.

CHAPTER 3

HUNGARIAN FINANCIAL DEVELOPMENT, FINANCIAL CRISES AND INEQUALITY

1. OVERVIEW OF THE HUNGARIAN FINANCIAL SYSTEM

A healthy and efficient financial system is crucial for Hungary's growth and well-being. Sound macroeconomic management and prudential regulations are essential for stable growth. Although progress has been made since the transition period, reforming the capitalist-based financial system remains challenging. The Hungarian banking system has undergone significant changes over the past thirty years, driven by various factors such as crises, privatization, financial reform, and liberalization. These changes have been influenced by the transition crisis in the 1990s and the FC in 1991 and 2008. The European integration process, competition, and nationalization processes have also played a role in shaping the sector. To understand the changes and features of the banking system over the past thirty years, a brief history of the Hungarian banking system and financial market is presented, along with the use of financial indexes. A nuanced understanding of the banking and financial sector can help address economic growth and inequality. Despite progress made since the transition period, the financial system's reforms based on capitalist principles remain a challenge. To understand the changes and features of the banking system over the past thirty years, a brief history of the Hungarian banking system and financial market is presented, along with the use of financial indexes. Understanding the banking and financial sector's features can help address economic growth and inequality. Despite progress made since the transition period, the financial system's reforms based on capitalist principles remain a challenge.

a. Banking System

The Hungarian banking system was weak and inefficient by the 1980s, consisting of state-owned banks and a central bank controlling banking decisions. Reforms in the late 1980s and the creation of a two-tier banking system in 1987 partially reformed the financial sector, but the transition crisis affected its performance. Low banks' capital adequacy ratios and high nonperforming loan ratios contributed to the crisis (Abel and Siklos, 2004). The economy collapsed in 1991, leading to a

banking crisis (Botos, 2019). The government rescue plan for the sector involved exchanging nonperforming loans for government bonds and injecting capital into banks (Hasan and Marton, 2003). As part of the economic transformation, the banking sector experienced rapid privatization, with professional investors and foreigners being the main investment targets (Kovács, 2019). The regulatory framework for the sector was developed, leading to the privatization of state-owned banks and the development of private-owned banks (Iwasaki and Uegaki, 2017). The securities market transformed financial institutions into companies limited by shares, leading to the emergence of new bank foundations and the expansion of existing bank networks dominated by foreign owners (Vass, 2019; Botos, 2019). In 1995, foreign banks accounted for 65% of all banks in V3 nations; this percentage did not rise above 40 percent (IMF, 2021a). The 1996 Act on Credit Institutions allowed banks to offer investment transactions and licenses for investment banking services since 1999 (Banai et al., 2010). The Hungarian Central Bank established a new regulation in 2001 that was compliant with EU norms (MNB, 2002). Hungary also declared the Forint convertible and removed capital movement restrictions, allowing banks to offer a full range of services and transact government securities. Hungary was the first country in the region to change its banking system, while Poland's privatization mostly occurred in the new millennium. The Czech Republic's conservative privatization strategy delayed significant changes, while Slovakia's banking sector did not undergo significant changes until the early 2000s. Both countries experienced foreign ownership dominance (Banai, 2017), shielding Hungary from the 1998 global emerging-market crisis (Botos, 2019). The fast FL and FD were crucial steps towards EU membership, leading to significant growth in the financial sector. 2000 marked the beginning of the banking industry's golden age, with well-developed banking cultures, high profitability, and modernized services (Bod, 2017). Hungarian banks embraced contemporary operating paradigms and became essential components of global banking networks. To remain competitive, traditional retail banks had to enhance their services in response to foreign banks' increasing use of technology (Várhegyi, 2019). Cost-based competition emerged as the dominant strategy, offering modernized products and high-standard service at high costs. The concentration of banks in Hungary has grown due to rivalry and acquisition procedures, leading to mergers and the transition to advanced banking systems (Botos, 2019). By 2005, the three largest banks held a 43.8% market share, with foreign-owned banks holding 87% of the capital and assets in the Hungarian banking system (IMF, 2021a). Competition has also expanded sales channels and regional branch networks, improving credit accessibility and efficiency. As the MNB report on financial stability in October 2008 noted, however, some of those sales channels were also sources

of risk. Specifically, over 50 percent of mortgage loans sold in 2007 were made through agents, and these loans had excessively high default rates when compared to loans made in branches. Additionally, a fast-profit approach had a dual role in Hungary's banking sector health and the credit boom of foreign exchange loans (Lo Duca et al., 2017). The 2008 crisis in Hungary caused a liquidity crisis, economic strain, and market mistrust. Hungary's high debt led to a decline in the banking industry, affecting the supply of new loans and credit demand. The government has implemented measures to mitigate the effects on banks, including capitalizing on them and implementing monetary policy, but also restricted banking activity through regulations. The banking sector has undergone significant changes due to the crisis, with the government imposing taxation and financial transaction levies, affecting profitability and performance. New guidelines on exchange rate ceilings and foreign currency retail loans have been implemented. Hungarian banks have increased their stakes to over 50% (EU, 2021), possibly due to business transformation or societal recognition, in contrast to the Czech Republic and Slovakia.

b. Budapest Stock Exchange

The Budapest Stock Exchange (BSE), which was established in 1864, was reactivated in the late 1980s to promote the privatization of state-owned enterprises. A combination of economic liberalization policies and privatization aided its rapid growth in the 1990s. The privatization of the real sector drew both domestic and foreign institutional investors, expanding the domestic equity market and increasing the market value of privatized firms. However, focusing primarily on privatization impedes its growth. Some capital market development measures included releasing the new MultiMarket Trading System (MMTS) in 1995, as well as opening the derivatives market and making options contracts available to investors. Korányi and Szeles (2020) point out that by July 1998, the BSE was one of the world's first exchanges. included releasing the new MultiMarket Trading System (MMTS) in 1995, as well as opening the derivatives market and making options contracts available to investors. Korányi and Szeles (2020) point out that by July 1998, the BSE was one of the world's first exchanges, on the website of the BSE, https://bse.hu/bse30/BSE-history-from-1990. The Budapest Stock Exchange (BSE) experienced peak performance in the late 1990s, surpassing other V3 nations. The electronic remote trading platform of the derivatives market replaced MMTS in 1999, leading to the establishment of the Budapest Stock Exchange Company Ltd. in 2002. And became a private limited company four years after the FL of the capital market and capital account in 2001. The company joined the CEE Stock Exchange Group in 2010. However, liberalization led to financial imbalances, foreign indebtedness, speculative capital movements, and

exchange rate volatility, ultimately resulting in a currency crisis (Herr, 2014). Despite the introduction of exchange-traded derivative instruments in 1995, lenders did not hedge their positions due to a lack of financial transparency. Following the crisis, changes to BSE regulation and company practices were implemented, including a new plan for 2016-2020 to increase capital market accessibility for local businesses, focus on SMEs, liquidity, and IPOs, while providing profitable investment opportunities and improving Hungary's financial culture (EU, 2020).

The Hungarian capital market is undeveloped and does not contribute to aggregate savings and investment in the economy. However, it is improving gradually because of technological and product innovation and digitization. The market could benefit from increased retail investors. The BSE had 45 listed domestic companies in 2020 (IMF, 2021b), a decrease from the 90s. Listed domestic companies rose during the crisis but decreased to 45 in 2020. The capital market experienced a boom in the second half of the 1990s, primarily driven by foreign investors, with a thriving economy during this period. The privatization during this transition period led to an increase in debt securities by offshore investors from 17.22 percent in 1991 to 33.68 percent of the GDP peak in 1995 (IMF, 2021b). During the COVID-related crisis, the Hungarian capital market remained stable because of significant monetary easing by the central bank and the direct grants provided to companies and households. The bond market's development was more progressive than the equity capital market, reflecting the government's approach to the segment (see Figure 3).

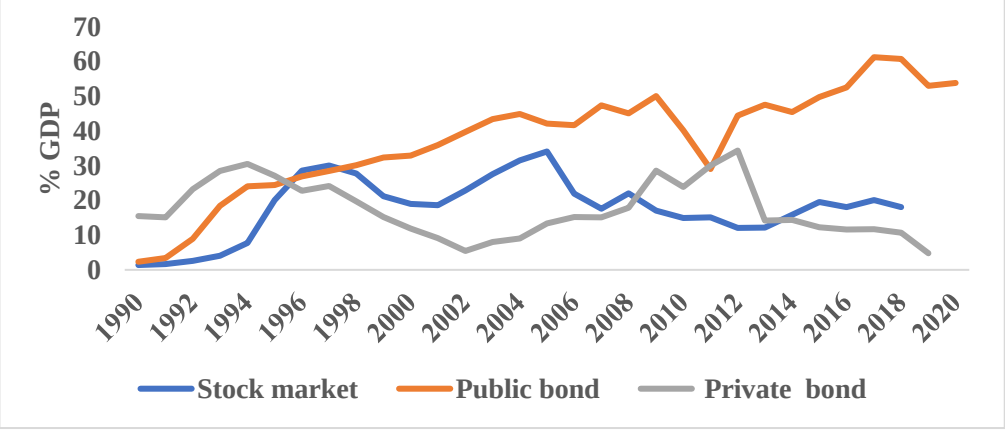

Figure 3. Development of the bond market and equity capital markets in Hungary

Source: Author`s calculations based on data from IMF (2021b)

In the 1980s, the government issued bonds to finance its budget deficit, support state-owned enterprises, and pay Treasury bills. However, inflation and rising default risk led to a struggle in the bond market. In the early 1990s, fiscal deficits, public sector borrowing, consolidation, and privatization stimulated the bond market, particularly the government bond market. Since 1990, outstanding domestic public debt securities to GDP ratios have exceeded in all V4 countries. Short-maturity government papers remain dominant, and the corporate bond market was delayed until the new millennium. The public bond equity market's size increased from 2.3% in 1990 to 64.9% in 2020, influenced by legal and institutional frameworks, efficiency, crises, and other factors, as shown in (Figure 4).

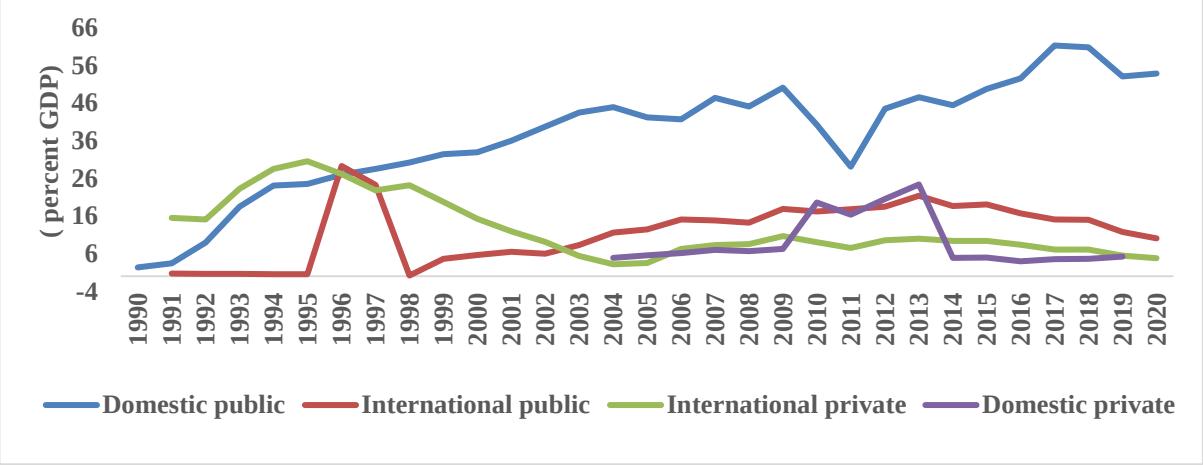

Figure 4. Evolution of debt securities to GDP ratios in Hungary

Source: Author`s calculations based on data from IMF (2021a)

As a result, the Hungarian bond market has a limited role in filling the gap between bank lending and long-term financing in Hungary because of low financial market development and culture, as the bond market analysis by the European Commission (2017) reported. Debt securities to GDP ratios show an increasing domestic public debt, indicating a lack of private and international debt securities. Losing an alternative funding source may promote growth, but high levels of public bonds may harm growth, may be because of higher long-term interest rates (Baldacci and Kumar, 2010). High external debt can lead to crises due to high risks, affecting output volatility and growth. It may also affect capital accumulation and TFP, increasing discretionary taxation and impeding growth (Dotsey,1994). Hungary’s outstanding private debt securities to GDP ratios are lower than public debt, with an uptrend between 1991-95 and 2004-2013. The highest ratio among V4 countries is the

outstanding international private debt securities to GDP, attributed to high foreign ownership and integration into financial markets.

The corporate bond market has become increasingly important in recent decades as alternative funding options for companies have become more important after the financial crisis (Tendulkar and Hancock, 2014). The bond market can provide financial resources, dampening economic slowdowns and facilitating faster recovery. Despite funding challenges faced by the Hungarian corporate sector due to the 2008 global economic and financial crisis, the bond market did not significantly contribute to financial resources. Bank credit, a primary corporate finance source, decreased due to supply and demand issues, resulting in low loan volumes for companies, particularly SMEs relying on local finance. Hungary had the lowest corporate bond proportion of GDP among V4 nations between 2000 and 2020; it has a smaller role in the real economy but can contribute more to economic progress. The highest bond market is in the Czech Republic. Contrary to V3 trends, the volume of corporate bonds as a share of GDP has climbed since 2019, which has considerably narrowed the difference between their ratios.

Likewise, the insurance industry in Hungary is small, with a share of GDP from non-life insurance premiums and life insurance premiums less than 2% over the past three decades (Figure 5). Life insurance premiums paid out in the first nine years did not exceed 1% of GDP. Since the crisis began, these indices have declined, indicating a decline in insurance development funding.

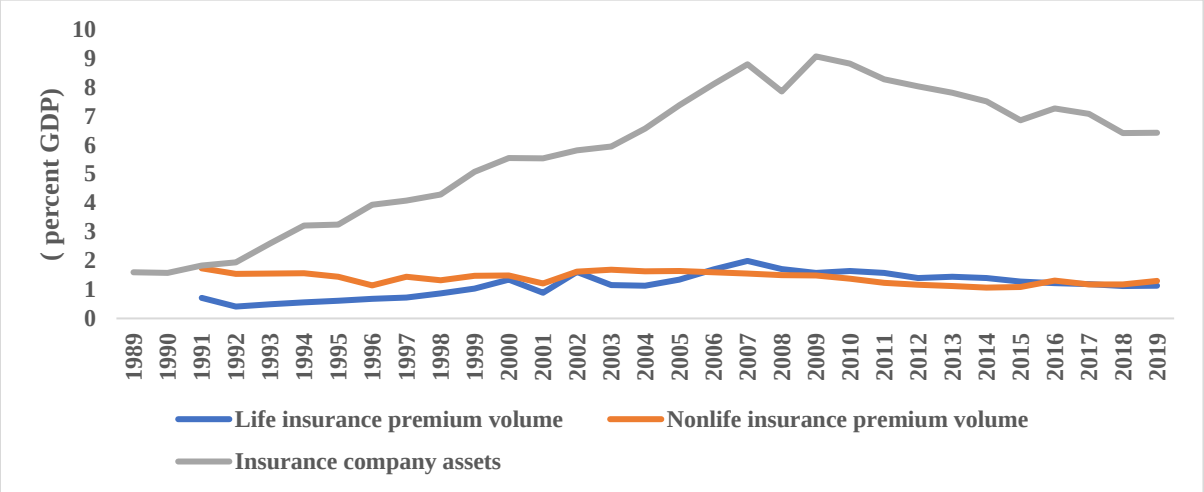

Figure 5. Size of the insurance sector in Hungarian economy (percent GDP)

Source: Author`s calculations based on data from IMF (2021b)

The asset-to-GDP ratio of insurance companies rose from 1.60 percent in 1989 to a peak of 9 percent in 2009. The number of insurance corporations declined to half between 2004 and 2020, from 65 businesses to 32 firms, indicating a downturn in the insurance sector in Hungary. Nevertheless, between 2010 and 2019, the insurance company's assets-to-GDP ratio decreased by 2.6 points. Hungary's insurance industry is small due to its small population and density, with home and property insurance being the most well-known. Life insurance accounts for over half of the total insurance market, driven by demographic structure, per capita income, and institutional and market structure. The non-life insurance industry also has an impact. Hungary has the fourth-smallest volume of households' life insurance and pension fund savings to GDP among the V4 countries, with only 9.7% compared to 13.9 percent having the 4th-smallest volume (MNB, 2018b). The insurance market is mainly invested in government bonds and corporate bonds, with the lowest investment in collective investment undertakings and equity, including real estate-related corporations. This presents an opportunity to increase investment, introduce new products, build capital, and contribute to growth.

2. MEASUREMENT FINANCIAL INDICATORS IN HUNGARY

a. Financial development index

The IMF's Global Financial Development Database indexes (GFD) are used to assess Hungary's financial sector's progress (Svirydzenka, 2016; čihák et al., 2012; Sahay et al., 2015). The FD index measures the accessibility, efficiency, and depth of financial markets and institutions in a nation. The FD index range of 0 to 1 represents the financial systems with the least and most developments. In Hungary, the FD index has fluctuated over four decades due to two FC and their repercussions. Between 1982 and 1986, the index rose by eight points owing to reforms. However, during the transition period, it decreased and reached its lowest value in 1993 due to the crisis and high Non-Performing Loans (NPLs). Following reforms and prudential measures, the FD index reached its peak in 2009 at 0.57, higher than regional and EU levels (Figure 6). However, the global crisis, high external indebtedness, structural reforms, and policy discipline played a role in this progress.

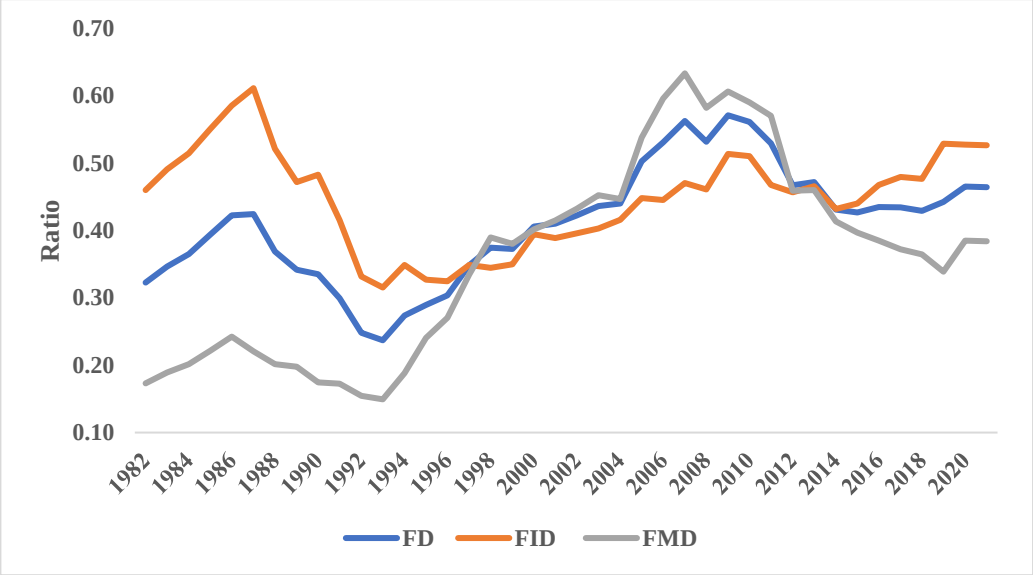

Figure 6. FD indexes in Hungary, 1982-2020.

Notes: FD: FD Index; FI: Financial Institutions Development Index; FM: Financial Markets Development Index.

Source: Author`s calculations based on data from IMF (2021a)

The three indexes are all trending in the same direction, but to varying degrees, and only in the last four years have the market and institution indexes diverged significantly. In Europe and regional comparison, (Figure 7) reveals that Hungary's present level of FD is comparatively high when compared to other countries. It has been higher than its competitors since 1998, and the EU from 2007 to 2012 and 2010, respectively. While FD has been more modest in Hungary than in the other V3 countries during the last decade, the Slovakia Republic lags behind.

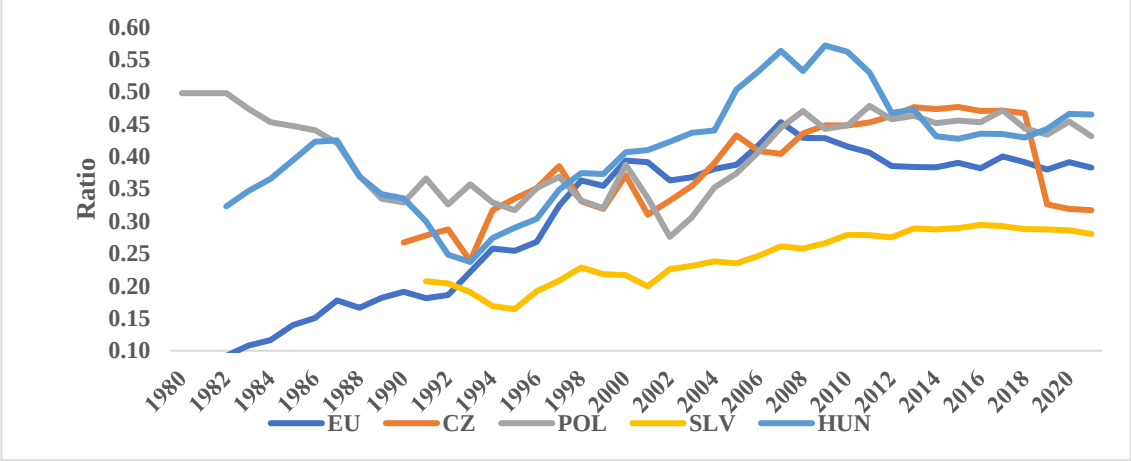

Figure 7. FD Indexes in Hungary and some comparators

Source: Author`s calculations based on data from IMF (2021a)

Higher financial development (FD) rankings may not always promote stability, inequality, or growth due to the absence of institutional, regulatory, and legal frameworks in the FD index. The index may also misrepresent the actual system's development or efficiency ratings, potentially due to government-imposed lending and deposit rate restrictions. Economic climate and country characteristics also influence the FD index.

b. Financial depth

Financial depth is the size of the financial sector relative to the economy, measured by the ratio of bank loans to GDP and stock market capitalization to GDP. The IMF has developed a more comprehensive index, which includes the volume of financial services provided by banks and non-bank financial institutions to GDP (Sahay et al., 2015; Svirydzenka, 2016). The new financial institutions' depth is the volume of financial services provided by banks and non-bank financial institutions (pension fund assets, mutual fund assets, and insurance premiums (life and non-life)) to GDP. Financial market depth is determined by the ratios of stock market capitalization, stocks traded, the value of international debt securities of the government, and the total debt securities of financial and nonfinancial corporations as percentages of GDP. The IFM financial depth indexes in Hungary show an upward trend for financial institutions and markets from the transition period until the 2008 crisis, with higher depth in institutions due to the banking sector's dominant role in controlling financial assets. However, the depth of institutions does not reach 0.40 over four decades, as illustrated in (Figure 8).

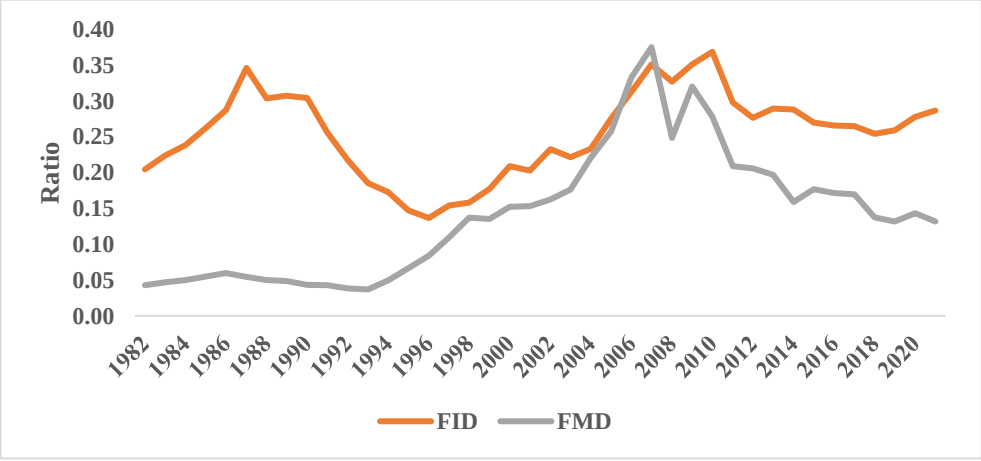

Figure 8. Financial Depth in Hungary, 1982-2018.

Notes: FID: Financial Institutions Depth Index; FMD: Financial Markets Depth,

Source: Author`s calculations based on data from IMF (2021a).

The Hungarian financial market's depth improved significantly after the 2002 BSE reforms, allowing for faster and more professional trading. The average stock market capitalization as a percent of GDP from 1992 to 2020 was 18.5%, reaching a peak of 34.07% in 2007 due to the crisis. However, it decreased to 12.6% in 2014 but improved post-crisis to 18.04% in 2020. The new market strategy and economic environment improved the market's depth, but corporate bond issuance volume remained below 7.3% of GDP between 2000 and 2020.

c. Financial Access

The Financial Access Survey (FAS) for 2021 shows that financial institutions' access and efficiency measures are more bank-specific than for other financial institutions. Hungary's access to financial services increased from 790 accounts in 2004 to 1242 in 2020, while loan accounts dropped from 791 in 2008 to 568 in 2020. However, trends in using financial system innovation have improved, with mobile money transactions increasing from 0.43 percent in 2010 to 0.57 percent in 2019. The number of mobile and internet banking transactions per 1,000 adults also increased by three times between 2014 and 2020.

Contrary to the case of Poland and the Czech Republic, the number of bank branches declined over this period in Hungary. While the number of commercial bank branches increased from 1139 branches in 2004 to 1912 branches in 2020, and also in Slovakia, it increased. Thus, that means Hungarian and Slovakian banks may have less efficiency and less use of digital financial services and high costs, which is clearly in the low efficiency of Hungary banks. Hungary's central bank is advocating for significant consolidation in the financial sector to improve efficiency. Between 2014 and 2020, the number of commercial banks decreased by 12 banks, resulting in a decrease in branch networks from 3270 to 1912. The insurance corporation also experienced a significant reduction, from 63 to 32 corporations, indicating a need for further consolidation., according to the IMF's FAS (http://data.imf.org/fas). Regarding access to the Hungarian financial market, the number of listed companies per million people, on average about 4.3 companies, with the highest number of 6.3 companies in 1999, does not appear to have improved since the early 2000s, and it remained less developing than its competitors in the region.

d. Efficiency

According to the IMF database, Hungarian banking is inefficient, even when compared to other regions. The bank's cost-to-income ratio and overhead costs-to-total assets ratio demonstrate operational inefficiency, with greater overhead costs than peers (2.12 percent) in 2019, compared to

the V3 (1.53 percent) in 2019, and higher than the EU average. Before 2019, the bank's cost-to-income ratio was higher, and despite efforts to improve digital convergence, Hungary continues to lag behind the EU and regional competitors in terms of internet banking and payment execution. Hungarian banks have struggled to enhance their efficiency and competitiveness in the banking business, resulting in branch closures and credit and insurance mergers. Despite high operating costs, the rate of non-performing loans (NPLs) is slightly lower than the average of the three V3 countries in 2018 and 2019 (EU, 2021). According to studies, Hungarian banks are the least efficient among the V4 countries, with the Czech Republic being the most cost-efficient (Svitalkova, 2014; Pancurova and Lycosa, 2013). The crisis, which began in 2005, is not the only cause of low efficiency; digitalization and e-money enterprises also have an impact on efficiency, as documented in the MNB competitiveness plan in 2019. Hungary needs a more favorable regulatory framework for financial innovation, and it is experimenting with new technologies and updating its outdated IT systems. Big digital companies are pushing into the financial industry, but the process is sluggish and requires universal financial awareness. The country's financial industry must adapt to these developments in order to stay competitive and efficient.

The Hungarian economy faces challenges because of variations in interest rates, GDP, financial literacy, high transformation costs, low financial system efficiency, and Hungarians' low trust in their banks—particularly in terms of the ethical standards that these institutions continue to uphold. Aside from the significant informal sector and high level of financial transactions (IMF, 2019a), the EU (2020) said that it was 8% of GDP in 2010 and 15.5 percent of GDP in September 2019. The stock market turnover ratio, which measures financial market efficiency, averaged 58.50 percent from 1992 to 2020, peaking at 118 percent in 2009. Hungary has a greater stock market turnover ratio than its counterparts.

e. Stability of the Hungarian Banking Sector

The NPLs to gross loans ratio is a measure of a bank's asset quality in its loan portfolio. Hungarian banks had poor loan portfolios before 1990, worsened by the recession following the collapse of corporations. The loan-to-deposit ratio increased significantly, and the stock of NPLs also rose (Banai, 2017). The accumulation of banking problems and non-compliance with Basel 1 requirements threatened the entire financial system, particularly with a high concentration of loan debt within large banks. However, government rescues partially helped banks remove bad loans, and

indicators of banking sector stability began to appear, such as the bank credit to bank deposits ratio decreasing to the lowest level in 1996.

The NPLs ratio increased significantly throughout the 1990s, reaching 3% in 2000 and 1.8% in 2004 (IMF, 2021a). However, by 2009, maintaining decreasing portfolio quality had become the most difficult problem as NPLs increased. Hungary had a higher percentage among V4 nations until 2017 when it gradually declined from 16.83% in 2013 to 4.1% in 2019 (IMF, 2021a). The NPLs ratio climbed somewhat during the first wave of the pandemic, but by the end of the year, it had continued to decline, although this proportion has decreased in the following years and will only return to pre-crisis levels in 2019. The government has implemented measures to combat problematic household debt, including an early repayment program, the conversion of foreign-currency mortgages, a debt settlement mechanism under the Personal Bankruptcy Act, which was established in 2015, and the establishment of an asset management business. According to the MNB 2021 stability report, these measurements contributed to a considerable fall in NPLs in recent years, which were 23. percent for corporations and 21.8 percent for households in early 2015 and will be 3.5 percent and 3 percent in mid-2021, respectively.

The bank regulatory capital to risk-weighted assets ratio is another important metric of financial stability, reflecting financial institutions' ability to resist balance-sheet shocks. In Hungary, the capital adequacy ratio is often high, indicating resistance to unfavorable shocks. During the changeover, banks struggled to fulfill Basel 1's capital adequacy ratio criteria. Credit policies were changed in 1994, and the organizational structure was reduced to align with international accounting standards (Szikszai and Raffai, 2013). In 1998, the bank regulatory capital to risk-weighted assets ratio was 16.5%, greater than in other V3 nations, and it has remained high. Hungarian banks' capitalization increased dramatically, reaching 16.31% in 2012, nearly double the regulation minimum of 8%, and then 18.46% in 2018, and 18% in 2019. Despite the growing number of NPLs on balance sheets, the Hungarian banking sector has maintained a robust and steady capital position, proving its ability to resist unfavorable shocks.

3. FINANCIAL CRISES

Hungary had two financial crises during the previous four decades, in 1991 and 2008. According to Laeven and Valencia's datasets (2013, 2020), the 1991 financial crisis was more costly than the 2008 global crisis. Both crises cause long-term output and losses owing to debt buildup, output loss, decreased exports, and trade balance. In addition to greater unemployment rates, reduced

employment, and falling real incomes, inflation has increased dramatically. This led to a severe recession, increased income and wealth disparity, and rising poverty rates. The two crises differ in terms of their nature, causes, and effects on macroeconomic sectors, as well as social concerns concerning crisis management response measures. Before the two crises, Hungary's twin deficits (government debt and foreign debt) grew concurrently, as did structural weaknesses in the economy, increasing NPLs and putting significant pressure on banks that faced a liquidity crisis and entered Hungary's economy in a recession phase (Lo Duca et al., 2017). The first crisis, however, was caused by the shift to a market economy in the 1980s and 1990s, as well as significant debt and a current account deficit. The second crisis was caused by macro-prudential policy, competitiveness, currency mismatches, mismatched incentives, monetary policy, and unsustainable loan expansion, particularly foreign currency credit. Later, many steps were implemented to ameliorate the effects of each crisis, beginning with the financial sector and progressing to the other sectors.

Understanding each crisis deeply depends on the availability and accuracy of data; information for the more recent crisis is often more complete (Lo Duca et al., 2017). The 1990s crisis was triggered by several factors, including the oil crisis in the 1970s, increased global interest rates, and low foreign debt-financed investments. Hungary's shock therapy approach, which transitioned to a market economy, changed the company environment and lost East European trading partners. Trade liberalization in inefficiencies economic raised trade deficits and public debt, leading to deep economic and financial crises. Several reasons for the 1990s crisis, including the 1970s oil crisis, rising global interest rates, and a lack of foreign debt-financed investments contributed to the 1990s crisis. Hungary lost trading partners in East Europe and altered the business environment as a result of its shock treatment strategy to move to a market economy. Trade liberalization exacerbated economic inefficiencies, increased trade deficits, and increased public debt, which resulted in severe financial and economic catastrophes. Price liberalization in Hungary resulted in hyperinflation and currency depreciation, which drove borrowers into debt traps. The external debt was mostly in the form of preferential loans or state-owned firms, and household income was declining. Liquidity issues, higher non-performing loan ratios, and capital losses for multiple banks ensued from this. In 1993–1994, banks underwent restructuring, and public funds were infused into insolvent businesses to rebuild trust and become ready for privatization. This resulted in raising the share of state ownership in the banking sector to over 65 percent (Lo Duca et al., 2017); however, the privatization process sharply dropped this share in 1996. The Hungarian financial system was taking advantage

of international credit and the liberalization of capital movements with the Euro area, quickly creating liquidity, capital adequacy, refinancing, and foreign exchange, as well as a significantly lower level of interest rates and more favourable for the Hungarian market.

The Hungarian financial system capitalized on international credit and capital movement liberalization with the Euro area, leading to increased liquidity, capital adequacy, refinancing, and foreign exchange (Schneider and Tornell, 2004). However, these policies also contributed to the 2008 financial crisis, as Hungarian banks had high exposure to foreign currency. The expansion in foreign currency lending was influenced by demand- and supply-side factors, the macroeconomic environment, and monetary policy. The moral hazard phenomenon, loose foreign monetary policy, and low Hungarian financial literacy contributed to the crisis (Kolozsi et al., 2015). Moreover, underestimation of the exchange rate risk by economic stakeholders is because of the exchange rate being relatively stable for years (Pellényi and Bilek, 2009), high inflation compared to regional countries, and low interest rates resulting from risk-based competition.

Hungarian bank performance was influenced by short-term market share competition, incentive systems for top managers, and loose foreign monetary policy (Ongena et al., 2018). Those led to a volume-based approach (or so-called ‘rational herding effect), ignoring longer-term risks that were the primary causes of the crisis. The lack of longer-term incentives, which became regulatory in the EU after the crisis, exacerbated the crisis. The Hungarian market experienced a surge in risk-based competition between foreign and domestic banks, leading to excessive leverage and risky lending practices (Banai et al., 2012; Józon, 2015). This led to large-scale carry trade of international credit with maturity mismatches and inexpensive rates (Aslund and Dombrovskis, 2011), with the interest rate loan differential being a crucial factor. This resulted in a housing boom but increased foreign claims, resulting in households' indebtedness due to unexpected exchange rate depreciation. In 2008, approximately 70% of total Hungarian household debt was denominated in foreign currency, and foreign currency loans to the corporate segment exceeded 30% of GDP, while this ratio was less than 10 percent of other Visegrád peers (EEAG, 2012).

In 2007, Hungary faced worse macroeconomic conditions than other Visegrád countries, with a large current account deficit, substantial foreign debt, low trust, and a budget deficit. The currency crisis increased these vulnerabilities due to the large amount of government bonds held by foreign investors. Capital inflows stopped, and the market dried up. The national bank's reputation was

tarnished, and Hungarian assets were perceived as riskier. Evaluations of market risk were modified, and the value of Hungarian assets was revised. The government took several measures to reduce exposure to households, including an agreement with banks to solve the foreign currency and mortgage loan problem, with the government and banks sharing the cost of the solution.

Income inequality is often considered a predictor of financial crises due to over-indebtedness (Schularick and Taylor, 2012). However, some researchers suggest that governments' monetary policies, financial liberalization, and reform dynamics may also impact the finance-inequality nexus (Atkinson and Morelli, 2011). The recent global crisis has sparked interest in this relationship, especially in countries like Hungary, where there is no evidence of a causal relationship. The next section will investigate the causal relationship between financial crises and income inequality in Hungary. Studies show that inequality contributes to financial crises in Hungary by increasing leverage ratios in the economy (e.g., De Haan and Sturm, 2017; Bazillier and Hericourt, 2017). Financial policies that enhance inequality's role include inefficient financial innovation (Korinek and Kreamer, 2014) and encouraging remuneration for hazardous financial activities (Philippon and Reshef, 2012; Axelson and Bond, 2015; Korinek and Kreamer, 2014). The crisis may also contribute to income inequality in Hungary, either directly or indirectly. Therefore, it is crucial to scrutinize the relationship between FC and inequality in Hungary and understand how FC affects inequality. This will help to better understand the impact of FC on Hungary's economy.

Distributional Effects of the Financial Crises in Hungary

The information about the financial 1991-3 crisis and income distribution is limited. Thus, understanding the facts about the trend of inequality and the key drivers of inequality during each crisis was based on the information available. Like most socialist countries, a relatively low level of inequality characterized Hungary during the socialist phase. However, income inequality gradually increased since the second half of the 1980s because of a labour market policy shift and a surge in capital and labour income components, an upward trend in inequality continued to a peak in the middle 1990s (Mavridis and Mosberger, 2017). As emphasized by previous literature, the factors behind this increasing inequality resulted from the financial crisis, along with other factors, such as systemic change and prevailing macroeconomic conditions (Tóth, 2016). And a severe recession and a high unemployment rate that followed the crisis (see Figure 9), along with the collapse of the major industries.

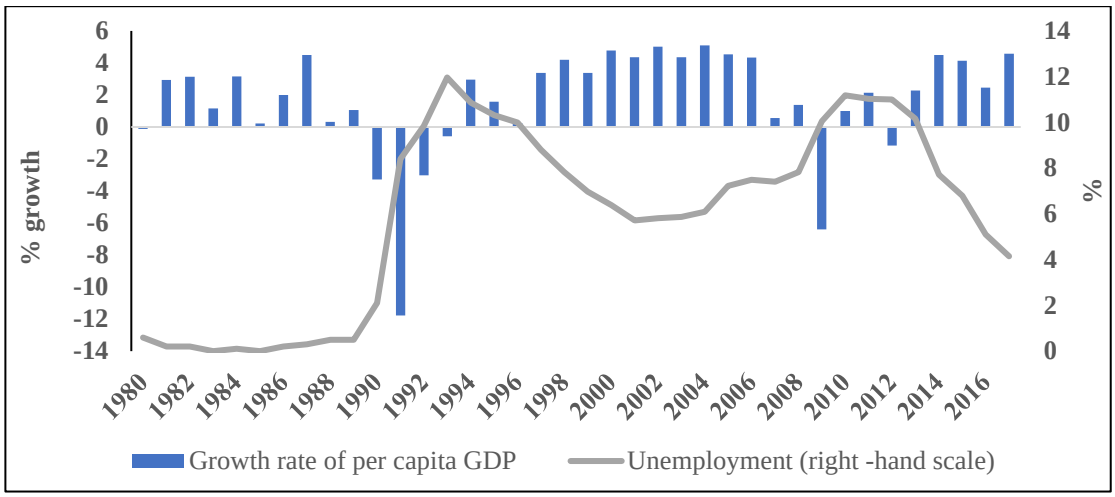

Figure 9 . The growth rate of per capita GDP and the change in unemployment.

Source: Author's computation

Rising inequality in the subsequent years was produced by a response to the crisis and as a prerequisite for the economy's transformation, including changes in social and economic policies (Perugini and Pompei, 2016), as well as FL, hyperinflation, and their interaction. Austerity policies, reductions in pensions and social payments (Milanovic 1998, 1999), wage-setting decentralization, skill-biased technological progress, and price liberalization (Mavridis and Mosberger, 2017; Flemming and Micklewright, 2000) all had an impact on inequalities and poverty rates. The Gini coefficient peaked in the mid-1990s, according to the OECD database. Similarly, during the 2008 crisis, the Gini coefficient was 33.3 in 2005 but fell to 24.1 in 2009. Although the FC had a minor influence on disparities in the first two years, by the end of 2009, inequalities had increased as a result of the crisis management approach and follow-up policies. These have been reflected in rising unemployment (Brzezinski, 2018), cuts in unemployment benefits, and a decline in real wages by around 3.4 percent during the economic crisis (Köllő, 2011; Toth, 2017), despite which inflation did not rise significantly.

As previously stated, the distributional effects of FC might be realized through a variety of pathways (Mocan, 1999; Ball et al., 2013). In Hungary, unlike in other European nations, the Hungarian government's action in response to crises widened the income disparity gap either in the 1990s or in 2010. People in the top decile have benefited the most from these interventions, which have either imposed social benefits constraints or changed labor market and tax policies, which were the primary cause of the crisis's increase in income inequality (Brzezinski, 2018). Changes in social policy have increased the income difference between employed and jobless people, while workers' bargaining

power has been reduced (Kumhof et al., 2015), resulting in inequality. The unemployment rate rose, especially among people with less education and skills, who were more likely to work on temporary or agency contracts with low pay (Vaughan-Whitehead, 2015). Similarly, austerity policies and reforms that included pension cuts disproportionately affected the elderly. The concentration of foreign currency debt in the household sector significantly contributed to the increase in interest payments and loans because of the Hungarian forint's exchange rate depreciation, which reflected in an increase in the proportion of those who faced financial difficulties in paying their public utility bills or renting a house (OECD, 2019). The lowest-income household quantile bore the brunt of the burden of loan repayment demands, since they had to pay a greater proportion of their income towards debts (Tóth, 2016). Furthermore, around 12% of Hungarian families faced catastrophic healthcare costs in 2015 (OECD/European Observatory, 2019).

Deductive and descriptive research on the links between FC and economic inequality provides useful information, but they are insufficient to demonstrate a relationship between the variables under consideration. As a result, econometric approaches will be used in the dissertation to draw more solid conclusions about the relationship between the variables being studied.

4. EMPIRICAL STUDY - DATA AND ECONOMETRIC METHODOLOGY

Following earlier research (De Haan and Sturm, 2017), the study employs the Gini coefficient on market income (a dependent variable) based on household income because it is a better proxy for disposable income inequality. Hungary, in particular, is among the countries that have created redistributive systems, as indicated by the large difference between the values of the Gini for both disposable income and market income (Figure 10). The Gini index data from Solt's (2020) Standardized World Income Inequality Database (SWIID), because it is the most comprehensive database, provides comparable Gini indices of disposable and market income disparities data annually, and it uses Luxembourg Income Study data as the reference.

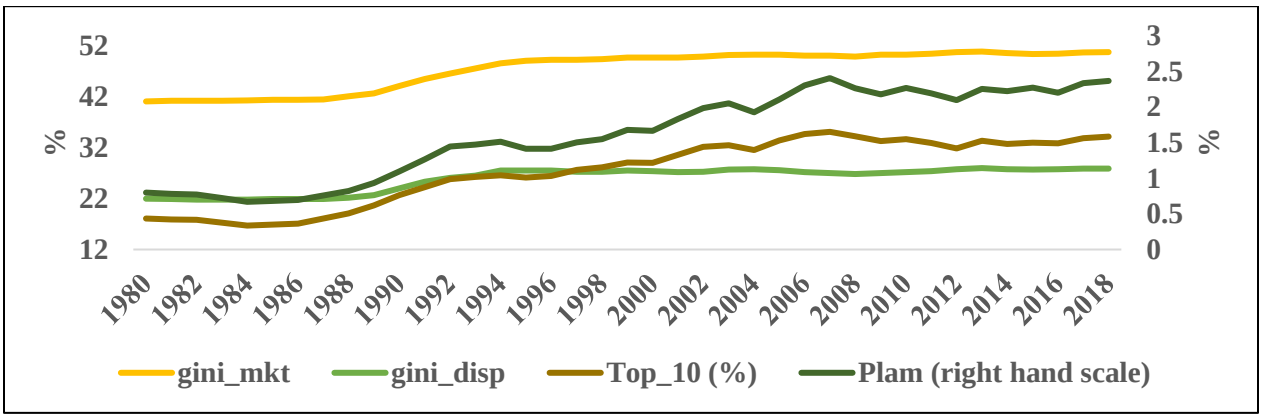

Figure 10. Income inequality indicators.

Source: data of Gini coefficients from (SWIID), and other inequality indicators from the World Inequality Database (WID)

We employ FC (independent variable) metrics based on prior research, including the Laeven and Valencia (2020) database, which detected crises based on numerous criteria and gave information on the timing of systemic banking crises. This database is more trustworthy than rival financial crisis datasets, according to Chaudron and De Haan (2014). Another financial indicator utilized in the research is private credit split by GDP, which has an association with the rise of income inequality (Perugini et al., 2016). However, Figure 11 indicates no association between the growth of income inequality (measured alternately by the sheer of both the top 10 percent and the top 1 percent) and the bank ratio credit to the private sector to GDP.

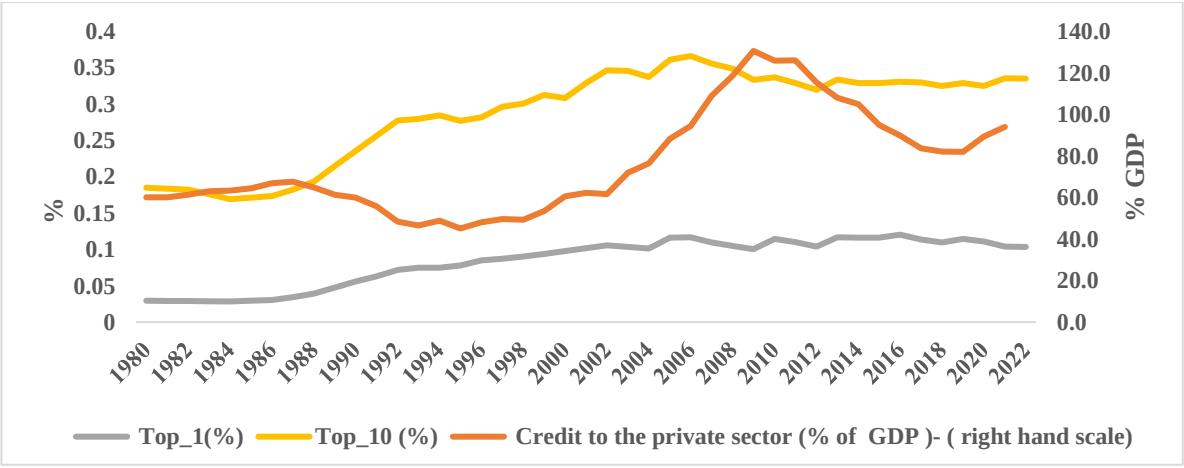

Figure 11. The evolution of income inequality and the ratio of total private credit to GDP.

Source: Data of bank credit to the private sector from the WBI database, and inequality from world inequality indicators.

Similar to other empirical models, our paper assumes that income inequality (GINI) depends on crises (BC), financial depth ratio (CRD), the growth of real domestic growth (GDP), inflation rate (inf), trade openness (tar), general government final consumption expenditure (GOV) ratio (percent of GDP), and gross school enrollment ratio (se), as given in Equation 1.

$$GINI_T = \alpha_0 + \alpha_1 BC_T + \alpha_2 CREDT_T + + \alpha_3 GRO_T + \alpha_4 GOV_T + + \alpha_5 INF_T + \alpha_6 SE_T + + \alpha_7 TRA_T + \varepsilon_{1T} \quad (1)$$

The model will be estimated using Hungary's yearly data from 1970 to 2017. The financial depth data is obtained from the GDD, whilst the other control variables are obtained from the WBI database.

Econometric methodology

Granger's (1969) causality tests are the most commonly used to determine causation between variables. The Granger-Causal Test (GCT) was computed using VAR methods, allowing us to establish the direction of the link between the two variables. The GCT is based on the following two equations:

$$Xt = \beta 0 + \Sigma k=1 \; BkXt- k + \Sigma e=1 \; ae \; Yt- 1 + \varepsilon 1t \quad (2)$$

$$Yt = \gamma 0 + \Sigma k=1 \; Yk \; Yt- k + \Sigma e=1 \; \partial e \; Xt- 1 + \varepsilon 2t \quad (3)$$

Where Yt and Xt represent the variables under investigation, and εit are the error terms, which are considered to be white noise with zero mean, constant variance, and no autocorrelation. T reflects a time e and k according to Schwarz and Akaike criteria. We examine the following hypotheses: H0: ae =∂e = 0. H1: ae ≠ 0 and ∂e ≠ 0. If we reject the two null hypotheses and accept the alternative hypothesis, we might infer that Granger has a causal link from Y to X and vice versa, or that the relationship is verified in both directions. However, the GCT has several conditions: First, the F-statistic used to test for traditional Granger causality problems, as proposed by Toda and Yamamoto (TY), 1995, and Gujarati (2006), explains that when the variables are integrated, the test statistics do not have a standard distribution, and the F-test procedure is invalid. The second criterion is that a causality test is sensitive to model specification and the number of delays, according to Gujarati (1995). The empirical evidence of GCT is unstable due to the specification bias problem caused by the two-variable GCT that does not account for the influence of additional variables. However, one of the most significant prerequisites for its employment is the stability of time series at the same level, particularly at that level. To address specification bias and spurious regression limitations in

the Granger causality (1969) test, Toda and Yamamoto (1995) developed a new approach to GCT based on augmented VAR modeling. This approach uses a modified Wald test (MWald) statistic to test zero restrictions on the parameters of the original VAR (k) model, which follows the Chi-square ($\chi 2$) distribution asymptotically, regardless of whether the variables are integrated.

T Y causality comprises four stages: The initial step is to perform unit root testing to determine the sequence of integration of the variables. However, if the integration order is different, we acquire the maximum (dmax) to apply the T-Y technique, regardless of whether the variables have a different integration order or not, such as Dickey-Fuller (1979, 1981) ADF and Phillips-Perron (1987) tests.

If the integration order is the same, proceed with the cointegration test using the Johansen approach. However, if the integration order is different, we obtain the maximum (dmax) when using the T Y technique, regardless of whether the variables have a different integration order or not. The second stage is to use the Akaike Information Criterion (AIC) and Final Prediction Error (FPE) to establish the ideal lag length (k) in the VAR process in levels among the variables, followed by testing the model's dynamic stability. The fourth stage is to apply the GCT for non-causality using paired equations, followed by a modified Wald technique to evaluate the causality of the VAR (k+dmax) model. The fundamental principle behind the new method is to increase the order of VAR models by (k+dmax) for the implementation of the causality test. The TY causality test is set up as follows:

$$y_t = \mu_0 + \left[\sum_{i=1}^{k} \alpha_{1t} y_{t-i} + \sum_{i=k+1}^{d_{max}} \alpha_{2t} y_{t-i}\right] + \left[\sum_{i=1}^{k} \beta_{1t} x_{t-i} + \sum_{i=k+1}^{d_{max}} \beta_{2t} x_{t-i}\right] + \varepsilon_{1t}$$

$$x_t = \Phi_0 + \left[\sum_{i=1}^{k} y_{1t} x_{t-i} + \sum_{i=k+1}^{d_{max}} y_{2t} x_{t-i}\right] + \left[\sum_{i=1}^{k} \delta_{1t} y_{t-i} + \sum_{i=k+1}^{d_{max}} y_{2t} x_{t-i}\right] + \varepsilon_{2t}$$

The empirical inequality – FC model in the Vector Autoregressive (VAR) system to execute Toda Yamamoto's approach to the Granger causality test is written as follows:

$$GINI_t = \mu_0 + \left[\sum_{i=1}^{k} \alpha_{1t} GINI_{t-i} + \sum_{i=k+1}^{d_{max}} \alpha_{2t} GINI_{t-i}\right] + \left[\sum_{i=1}^{k} \beta_{1t} BC_{t-i} + \sum_{i=k+1}^{d_{max}} \beta_{2t} BC_{t-i}\right]$$
$$+ \left[\sum_{i=1}^{k} \delta_{1t} CRED_{t-i} + \sum_{i=k+1}^{d_{max}} \delta_{2t} CRED_{t-i}\right] + \left[\sum_{i=1}^{k} £_{1t} GRO_{t-i} + \sum_{i=k+1}^{d_{max}} £_{2t} GRO_{t-i}\right]$$
$$+ \left[\sum_{i=1}^{k} ¥_{1t} GOV_{t-i} + \sum_{i=k+1}^{d_{max}} ¥_{2t} GOV_{t-i}\right] + \left[\sum_{i=1}^{k} \Psi_{1t} INF_{t-i} + \sum_{i=k+1}^{d_{max}} \Psi_{2t} INF_{t-i}\right]$$
$$+ \left[\sum_{i=1}^{k} \Theta_{1t} SE_{t-i} + \sum_{i=k+1}^{d_{max}} \Theta_{2t} SE_{t-i}\right] + \left[\sum_{i=1}^{k} ₺_{1t} TRA_{t-i} + \sum_{i=k+1}^{d_{max}} ₺_{2t} TRA_{t-i}\right] + \varepsilon_{1t}$$

$$BC_t = \mu_0 + \left[\sum_{i=1}^{k} \beta_{1t} BC_{t-i} + \sum_{i=k+1}^{d_{max}} \beta_{2t} BC_{t-i}\right] + \left[\sum_{i=1}^{k} \alpha_{1t} GINI_{t-i} + \sum_{i=k+1}^{d_{max}} \alpha_{2t} GINI_{t-i}\right]$$
$$+ \left[\sum_{i=1}^{k} \delta_{1t} CRED_{t-i} + \sum_{i=k+1}^{d_{max}} \delta_{2t} CRED_{t-i}\right] + \left[\sum_{i=1}^{k} £_{1t} GRO_{t-i} + \sum_{i=k+1}^{d_{max}} £_{2t} GRO_{t-i}\right]$$
$$+ \left[\sum_{i=1}^{k} ¥_{1t} GOV_{t-i} + \sum_{i=k+1}^{d_{max}} ¥_{2t} GOV_{t-i}\right] + \left[\sum_{i=1}^{k} \Psi_{1t} INF_{t-i} + \sum_{i=k+1}^{d_{max}} \Psi_{2t} INF_{t-i}\right]$$
$$+ \left[\sum_{i=1}^{k} \Theta_{1t} SE_{t-i} + \sum_{i=k+1}^{d_{max}} \Theta_{2t} SE_{t-i}\right] + \left[\sum_{i=1}^{k} ₺_{1t} TRA_{t-i} + \sum_{i=k+1}^{d_{max}} ₺_{2t} TRA_{t-i}\right] + \varepsilon_{2t}$$

Where *GINIt* and *BCt* represent the variables under study, (dmax) is the higher order of integration, k is the optimal time lag on the first VAR model, and εit are error terms and are assumed to be white noise with zero mean and constant variance and no autocorrelation.

5. EMPIRICAL RESULTS

a. Descriptive Statistics and Correlation Matrix

Table 1, presents the statistical characteristics of the variables data in the level. The results clarify that the mean of the market income Gini coefficient is 46,2(percent). The maximum value of inequality coefficient was in 2013 (50.9 percent) and the lowest in 1977(41 percent). The crises were in the early 1990s and 2008. The mean credit to the private sector was 69.72 over GDP, and the highest value (130.6 percent GDP) was in 2009, and the lowest one in 1970.

Table 1. Summary statistics for income inequality and financial crises

Variable	GIN	BC	CRD	GDP	GOV	INF	SE	TRA
Mean	46.2	0.204	69.72	2.28	20.84	8.81	90.05	97.55
Maximum	50.9	1	130.6	6.9	27.73	34.23	104.72	168.24
Minimum	41	0	35.4	-11.89	16.99	-0.2	72.07	46.38
Std. Dev.	4.3	0.407	26.15	3.45	2.04	8.22	9.34	45.11
Observations	49	49	49	49	49	49	49	49

Source: Author`s calculations

Table 2 presents the correlations between the market income Gini coefficient, banking crises, and control variables of interest. The correlations of the FC and inequality variables are positive but generally low (0.33); they also do not significantly correlate. The highest correlation is found between the Gini coefficient and trade openness (0.85), and it is significant at 1 percent. All the variables have positive correlations with the inequality variable and crisis variables; only economic growth is exceptional and has a negative correlation with them.

Table 2. Correlation matrix of key variables for income inequality and financial crises

Correlation	GINI	BC	CRD	GDP	GOV	INF	SE	TRA
GINI	1							
BC	0.33	1						
CRD	0.60***	0.33**	1					
GDP	-0.02	-0.37***	-0.24*	1				
GOV	0.43**	0.6***	0.04	-0.33**	1			
INF	0.03	0.39***	-0.36**	-0.54***	0.65***	1		
SE	0.80***	0.17	0.68***	-0.12	0.33**	-0.06	1	
TRA	0.85***	0.13	0.82***	0.08	0	-0.41**	0.78	1

Noten: ***, **, and * refer to significance levels of 1 percent, 5 percent, and 10 percent, respectively.

Source: Author's computation.

b. Unit Root Tests

Based on the above-mentioned fifth steps to achieve the TY for the Granger non-causality test: Check the properties of the time series for estimating the relationship between the variables, test the stationarity of the time series, and determine the maximal order of integration (dmax). The lag length in the Augmented Dickey-Fuller (ADF) regression is selected using the Schwarz information criterion. The null hypothesis of the existence of a unit root has been tested for all the variables, as presented (Table 3). The credit to the private sector ratio, financial crisis, and education (se) variables

are found to be stationary at levels, while inequality, growth, trade openness, and government expenditure variables are non-stationary at levels, but they are stationary after first differencing. Thus, the maximum order of integration for these time series is 1.

Table 3. Augmented Dickey-Fuller (ADF) unit root test

Variable	t-statistic	Critical Value*	P-value	t-statistic	Critical Value*	P-value	Order of Integration
GINI				-1.891	-1.612	0.057	I (1)
GDP	-2.611	-3.511	0.278	-3.561	-2.927	0.011	I (1)
GOV				-5.584	-3.581	0	I (1)
TAR				-5.8489	-3.581	0	I (1)
INF	-1.719	-3.184	0.727	-6.495	-3.581	0	I (0)
CRD	-4.571	-3.589	0.001				I (0)
BC	-2.261	-1.948	0.024				I (0)
SE	-3.821	-3.511	0.024				I (0)

Note: *, **, and *** denote 1 percent and 5 percent, 10 percent significance levels, respectively.

Source: Author's computation

The results of the above unit-root tests suggest that, on one hand, some variables are stationary of order I (1), and others are stationary of order I (0) so we can't employ the Granger-causal procedures to test for causality among the variables because not all the variables are stationary of the same order. Therefore, these results give support to the use of the TY causality approach rather than one of the alternative causality tests.

c. Lag length selection

As pointed out in the unit root test, the maximum order of integration for these time series is =1. The VAR model (Table 4) selects the optimal lag length (k) based on the minimum value of the Akaike Information Criterion, HQC: Hannan-Quinn criteria, indicating k = 3.

Table 4. Lag length selection

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-762.655	NA	103606.4	34.251	34.573	34.371
1	-302.859	735.673	0.0025	16.661	19.551*	17.738
2	-183.9	148.037	0.0003	14.218	19.678	16.253
3	-77.015	95.009*	9.53e-05*	12.312*	20.341	15.305*

* Indicates lag order selected by the criterion. LR: sequential modified LR test statistic (each test at 5 percent level). FPE: Final prediction error. AIC: Akaike information criterion. SC: Schwarz information criterion. HQ: Hannan-Quinn information criterion.

Source: Author's computation

d. Testing Stability in VAR

After estimating a model Var (2), dmax = 1, k = 3, and before moving to causality, the model's stability was ensured. Figure 12 depicts the results of the model's dynamic stability, revealing that all roots are within the unit circle, implying that the model is stable.

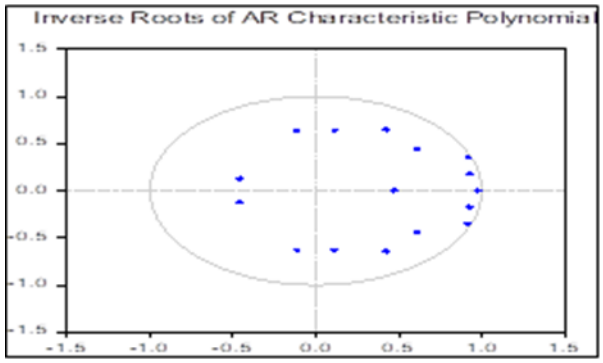

Figure 12. Stability of the model.

e. Toda-Yamamoto Causality (Modified Wald) Test

The last step in our work is to test the causality relationship between the eight variables, and as the variables are cointegrated, we use the GCT based on the VAR model of TY; causality is estimated through the MWALD test rather than the traditional GCT (1969). From unit root tests (dmax = 1) and in lag length selection, the optimum lag length (k = 3) is thus estimated at first in the VAR (2) model (2: K = 3 + dmax = 1). It is clear from the empirical results of the GCT based on the VAR model of T Y (1995) that causality is estimated through the MWALD in Table 5, which also shows non-existent causality running from BC to GINI, but causality in the other direction is valid; thus, arguably, rapid inequality growth is a strong predictor of the crisis, as Schularick & Taylor (2012) reported. Besides, the result further reveals that causality exists only from GINI to TRA at the 5 percent level and CRED at the 10 percent level. Those results are consistent with the ideas (Fischer 1932, 1933; Minsky 1977) and with the study's findings (Rajan 2010, Stiglitz 2015; Kumhof et al. 2015; Perugini et al. 2016; Bazillier et al., 2021), who suggested that the implications of inequality for financial stability could be through raising leverage, widening the current account deficit. On the other hand, the distributional impact of the crisis depends on whether it is followed by a recession or an increase in an INF. In particular, there is a bidirectional causality between inequality and both GRO and INF. Those results also have been reported by Bazillier and H'ericourt (2017), Ball et al. (2013), Panizza (2014), and Loayza et al. (2018). A one-way causality exists between GINI and GOV, as explained by the study utilizing the Gini coefficient on market income, which assesses income inequality without taking into account the influence of Hungary's existing

taxes and social expenditures. Similarly, one-way causation occurs between the GINI and SE. This finding is consistent with Róbert's (2019) conclusion that there is a substantial association between the educational achievement of parents and their children in Hungary, which became even greater during the Great Recession; in particular, the educational system is relatively selective.

Table 5. Toda-Yamamoto causality (Modified Wald) test results

Null Hypothesis	Chi-sq	Prob.	Granger Causality
BC does not Granger cause GINI	2.1993	0.333	No causality
GINI does not guarantee cause BC	17.045	0.0002*	GINI to BC
CRD does not Granger cause GINI	0.7819	0.6764	No causality
Gini does not Granger cause CRD	5.6998	0.0579***	GINI to CRD
GOV does not Granger cause GINI	0.5474	0.7606	No causality
GINI does not Granger cause GOV	6.0561	0.0484**	GINI to GOV
INF does not Granger cause GINI	6.6529	0.0359	Bidirectional
GINI does not Granger cause INF	34.5087	0*	
GDP does not Granger cause GINI	16.4085	0.0003*	Bidirectional
GINI does not Granger cause GDP	4.8829	0.087***	
SE does not Granger cause GINI	2.7027	0.2589	No causality
GINI does not Granger cause SE	7.2223	0.027**	GINI to SE
TAR does not Granger cause GINI	0.0515	0.9746	No causality
GINI does not Granger cause TAR	6.3206	0.0424**	GINI to TAR

Note: *, **, and *** denote 1 percent and 5 percent, 10 percent significance level, respectively. EViews 10.0 was used for all computations.

Hypothesis Test

1. There is no direct relationship between FC and inequality. Thus, the null hypothesis, the (H1) hypothesis (there is a bidirectional causal link between FC and income inequality in Hungary), and the (H1a) hypothesis are all rejected.

2. The analysis verifies the reverse direction of causality, implying that the fast inequality increase is a major predictor of the crisis. The (H 1. B) hypothesis, which states that economic disparity generates FC in Hungary, is accepted.

6. CONCLUSION

Chapter three provides an overview of the Hungarian financial system's development, highlighting key factors such as financial reforms in the late 1980s and 2010, economic transformation, privatization, and liberalization in the 1990s, integration into EU financial markets, and financial crises in 1991 and 2008. These factors have either positively or negatively impacted the sector's

performance, indicating inadequate financial development in both the financial market and institutions. The sector's low efficiency, particularly in comparison to regional and European markets, leads to the misallocation of resources to the productive sector. The sector's weaknesses in saving mobilization led to reliance on external finance, a high-risk factor contributing to crises. The Hungarian banking crisis in 2008-09 was not caused by the global financial crisis but by exposure to Hungarian subsidiaries by European parent banks, particularly foreign banks, and their high exposure to foreign currency, particularly Swiss francs. Hungary's bank performance was influenced by short-term market share competition, incentive systems for top managers, and loose foreign monetary policy. The Hungarian market experienced risk-based competition, leading to excessive leverage, risky lending practices, and large-scale carry trade of international credit with maturity mismatches and inexpensive rates. However, with sudden stops and reversals of capital flow associated with banking and sovereign debt crises, the financial system faced a liquidity crisis. The study examines the causal relationship between financial crises and inequality in Hungary from 1970 to 2017. It uses a time series analysis approach and the Granger non-causality test in the context of the VAR model. The results show that non-existence causality runs from FC to inequality, but causality in the other direction is valid. The causality exists only from inequality to both the FD variable and trade openness. Rapid inequality growth is a powerful predictor of the crisis, as it is one reason for financial stability. The study also found that economic growth and inflation are matters for the inequality effect of downturns. The distributional impact depends on whether the crisis is followed by a recession or an increase in the consumer price index. A one-way causality relationship exists from inequality to gross schooling and government-consumption-to-GDP ratio, explained by the Gini coefficient on market income.

CHAPTER 4

HUNGARIAN ECONOMIC GROWTH AND FINANCIAL DEVELOPMENT

1. ECONOMIC GROWTH IN HUNGARY - OVERVIEW

Economic theories have provided insights into the factors influencing economic growth throughout history. Classical growth theory suggests that international commerce, low transportation costs, a well-functioning market economy, population growth rate, and FD are key determinants of long-run growth (Smith, 1776; Malthus, 1798; Schumpeter, 1911). While Keynesian theory (1936) emphasizes effective demand, savings-investment determinants, and rigid pricing as primary driving forces. The neoclassical growth theory, the Solow (1956) model, posits two hypotheses: that capital accumulation increases short-term growth rates due to the rule of diminishing returns. The "convergence hypothesis" suggests that impoverished nations expand at greater rates than rich ones, and their living standards grow until they reach the rich standard. Endogenous growth models, like Romer (1986) and Lucas (1988), argue that investment in human capital, innovation, and knowledge are key determinants of long-term economic growth. The convergence theory between wealthy and poor nations is not valid, but rather the "divergence hypothesis" exists.

Hungary, one of the first Eastern European countries (EEC) to reform and liberalize its economy in the 1980s (Virág, 2020), experienced rapid changes in the 1990s, including collapsed external trade and bankruptcy of socialist mega-enterprises. This led to a severe economic recession in 1991, resulting in a banking crisis and the closure of unprofitable enterprises. Institution restructuring also caused unemployment to rise from 1.7% in 1990 to 12% in 1991 (OECD, 2019; Krémer, 2014), with a million jobs lost (Virág, 2020). These substantial transformations and macro-financial imbalances posed a significant challenge to economic development, alongside other macroeconomic factors (Bod, 2017). Hungary's economic development focused on Western-oriented commerce, resulting in economic and financial changes to encourage international investment. This led to technological modernization, economic recovery, and stability. In 2000, inflation rates dropped to a single digit, marking the first time since 1987. Hungary's entry into the European Union in 2004 was promoted, and between 1997 and 2004, it experienced a significant growth rate despite being incomparable to regional country ratios. Despite macroeconomic achievements, some researchers argue that the transition process and policies implemented during the transition period failed to achieve their goals and created an environment for subsequent economic problems. The transformation process, which increased growth during the first ten years, created an environment for subsequent economic

problems, such as the EU accession (Virág, 2020). Structural sector changes also harmed growth by enhancing sectors with low productivity growth (EEAG, 2012). The economic policy based on domestic factors to motivate development, implemented between 1998 and 2002, failed to achieve its goals (Botos, 2019). Macroeconomic indicators showed little improvement, with GDP reaching 1990 only in 1999 and incomes lagging until wage and pension increases in 2002 and 2004, respectively. However, the impact of FD and FL on the supply and demand side of economic growth during this period is significant.

The growth of Hungary has been linked to persistent slowdowns and the middle-income trap due to an incorrectly organized economic model. The TFP has developed slower than capital accumulation (MNB, 2014), causing it to lag behind its regional counterparts since 2005 (Figure 2). This has led to decreased productivity and Hungary's competitive advantage. Structural changes in the labor force and wages have also affected domestic demand and led to high indebtedness since the early 2000s, particularly external debt and decreased exports due to the international market recession. They supported the local small or medium firms that were newly founded (Virág, 2020) and productivity, which stimulated output to generate exports and reduced the account balance deficit. Hungary experienced a downward economic growth direction because of financial deepening, leading to low-productivity sectors like real estate and consumption rather than a significant increase in production capacities (MNB, 2014). This led to a recession of -6.7% in 2009 and -1.3 in 2012, deteriorating household consumption (-2.3 percent) and investment (-2.78 percent), according to data from (HCSO, 2022). Moreover, Low Total Factors per capita (TFP) and labor productivity were particularly problematic. Hungary’s GDP per capita has become the lowest among the V4 countries since 2011, highlighting the need for a shorter recovery year. The Hungarian economy has experienced a balance between a healthy economic structure and increased sustainability through fiscal and monetary policy changes. This has reduced the country’s dependence on foreign capital and favored national industries through legislation and regulation. Hungary has also attracted foreign investors to specific industries, such as the automotive industry. The country experienced one of the highest GDP growth rates in the EU between 2014 and 2019 (HCSO, 2022). The country’s economy managed to avoid a 2019 international growth slowdown due to supportive macroeconomic policies (EU, 2020). However, the level of real GDP growth only surpassed its pre-crisis level in 2015, while the GDP per capita remained the lowest in V4 until 2021. GDP growth between 1990 and 2019 was driven by various components (Figure 13), with each contributing to different degrees over time. The second subsection will discuss these components and their contributions to GDP growth.

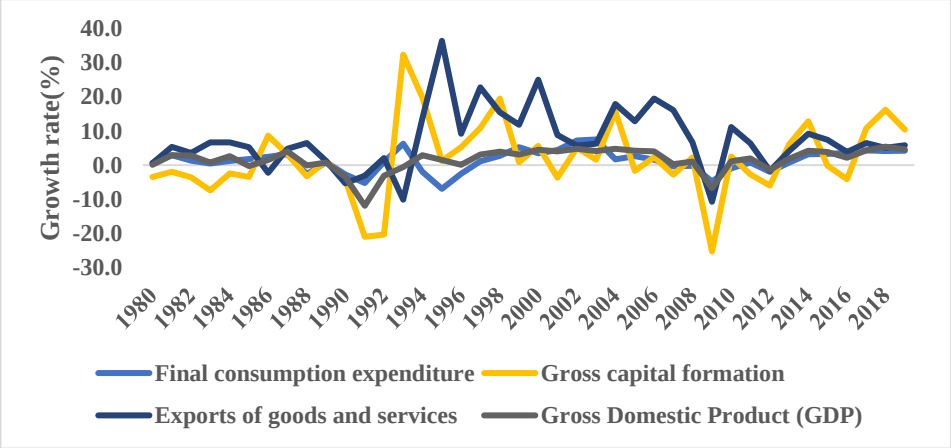

Figure 13. GDP growth and its main components (annual growth rate)

Source: Data from UNDP, 2022

FD and FL have played conflicting roles in the Hungarian economy over the past three decades, either promoting or hurting it. This is due to the current economic and financial climate, policies, and channels through which they impacted growth. For instance, Hungary's FDI and FL helped the economy by reorienting towards trade with the West and implementing reforms, attracting foreign investment, modernizing manufacturing processes, and increasing exports. However, they also had the potential to damage the economy due to the prevailing economic and financial climate. The lack of supervisory authority and increased competition among financial agents led to investors focusing on unreal industries for profit, resulting in a large current account deficit and financial imbalances. This contributed to the 2008 crisis's impact on the Hungarian economy, recession, and longer recovery times than competitors. Hungarian authorities have adopted a growth finance model that contrasts with the previous one, prioritizing SME enterprises for funding, leading to increased productivity, production, and job creation. This has resulted in increased consumption and overall growth. The government has also reduced reliance on external finance resources by mobilizing domestic savings and allocating resources to the real productive sector, resulting in increased growth while reducing risks and exposure to external crises.

Descriptive Statistics and Correlation Matrix

Table 6 presents the descriptive statistics summary of GDP growth, its components, and financial variables. The mean gross rate of domestic product is 1.69 percent, with a maximum of 7.2%, and the mean gross rate of final consumption expenditure is 1.4%. The standard deviations are 3.53 for GDP and 3.23 for final consumption expenditure. The mean gross rate of gross capital formation is 1.98 percent, with a maximum of 32.35 percent, and the mean gross rate of exports is 7.24 percent,

with a maximum of 36.41 percent. The mean credit to the private sector (percent GDP) is 76.40 percent.

Table 6. Summary descriptive statistics of the components of GDP and FD variables.

	GDPR	GFCE	GGCF	GEX	CPNF	FID	FMI	FDI
Mean	1.69	1.46	1.98	7.24	76.4	0.45	0.36	0.41
Median	2.66	1.61	0.88	6.45	65.9	0.46	0.38	0.42
Maximum	7.12	7.45	32.35	36.41	130.6	0.61	0.63	0.57
Minimum	-11.89	-6.98	-23.51	-10.72	45.1	0.32	0.15	0.24
Std. Dev.	3.53	3.23	10.66	8.97	24.69	0.07	0.15	0.09

Note: GDPR is the gross rate of domestic product (GDP), GFCE is the gross rate of final consumption expenditure, CGCF is the gross rate of gross capital formation, GEX is the gross rate of exports, CPNF is Credit to Private non-financial sector as a share of GDP, FII is financial institutions index, FMI is a financial markets index, FDI is FD index.

Source: Author`s calculations

Table 7 demonstrates a considerable positive connection between GDP, gross rate of final consumption spending, gross capital creation, and gross rate of exports, with a stronger correlation of 0.64 between final consumption and investment rates. The FD index and financial market development were both positively connected with GDP growth, encouraging it through consumption and investments but undermining it through exports. The credit to private non-financial sectors and financial institutions index has a negative correlation with GDP growth.

Table 7. Correlation coefficients between the components of GDP and FD variables

Correlation	GDPR	GFCE	GGCF	GEX	CPNF	FID	FMI	FDI
GDPR	1							
GFCE	0.64 ***	1						
GGCF	0.64 ***	0.48 ***	1					
GEX	0.55 ***	-0.04	0.26	1				
CPNF	-0.02	-0.08	-0.2	-0.19	1			
FID	-0.03	-0.01	-0.22	-0.38***	0.46 ***	1		
FMI	0.21	0.1	-0.05	0.2	0.79 ***	0.08	1	
FDI	0.16	0.09	-0.14	0	0.89 ***	0.51 ***	0.90 ***	1

Note: ***Significant at 1 percent.

Source: Author`s calculations

And Figure. A1 in Appendix. Scatter graphs also show the development of all these variables during (1980-2020).

2. CHANNELS OF THE EFFECT OF FINANCE ON ECONOMIC GROWTH

Economic growth is affected through a variety of pathways as a result of interactions between financial and real variables from both the supply and demand perspectives. Considering the economic theories and the previous evidence, the channels are the productivity growth channel (Krinichansky and Sergi, 2019) and the population and the rate of labor growth or supply labor channel (Solow, 1956; Romer, 1986; Lucas, 1988), savings (Solow, 1956), technological progress and innovations (Romer, 1986), HC (Romer, 1986; Lucas, 1988), capital formation (Romer, 1986; Lucas, 1988; Solow, 1956), and aggregate demand (Krinichansky and Sergi, 2019; Vousina 2012; Gabbi et al., 2016); consumption, the current account, and income distribution. (Gabbi et al., 2016).

a. Population and Human Capital in Hungary

Population growth is a key driver of economic growth, and demographic shifts can significantly impact an economy's growth rate, productivity, living standards, savings rates, consumption, and investments (Romer, 1986; Lucas, 1988). Demographic diversity explains the diversity in economic performance across nations and regions and helps identify better national settings for future growth. According to economic theory, FD could help boost growth by improving people's HC and productivity, along with changing labor force participation rates (Bjork, 1999). Evidence supports the role of the population in a nation and the quality and quantity of labor resources as important predictors of growth in countries like Hungary (see Barro, 1991; Nežinský and Fifeková, 2014; Ivanova et al., 2015; Tóth and Medgyesi, 2018).

Demographic trends in developed countries, such as Hungary, are influenced by factors such as labor and capital markets, macroeconomic management, trade policies, governance, and human capital accumulation (Hudák et al., 2015). In developed countries, the average age of the population rises, and birth rates fall as women get greater access to market work, leading to higher labor force participation and economic growth. However, decreasing demographic trends have heavily influenced the amount and quality of available labor, affecting economic performance in Hungary. The population's changing age composition affects economic performance in Hungary (MNB, 2018). Despite FD and GDP per capita growth since the 1980s, annual mortality rates have decreased, life expectancy has grown, and human capital has improved. However, slowing population growth presents economic concerns, impacting the economy's productive capacity per capita and preventing it from benefiting from high-income development.

Hungary's rapid population ageing similar to European countries, poses a significant challenge to growth. Further, high mortality rates among young people and children (OECD/European Observatory, 2019), particularly among poorly educated and impoverished populations, low fertility rates, and outbound youth migration (Tálas, 2020), contribute to this issue. This strain on public budgets makes the budget structure less growth-friendly, increasing the size of government social spending (OECD/European Observatory, 2019). Additionally, the demographic trend in Hungary is causing significant challenges to economic growth and development (MNB, 2018), through labor shortages and dependency rates, resulting in lower productivity and capital accumulation, with potential dis-inflationary effects in the future (Hudák et al., 2015) and implying that population ageing is expected to harm the overall economic performance by supply and demand sides, due to reduced consumption, lower savings, and increased budgetary expenditures, leading to slower economic development. And impact the supply side through the labor market, capital accumulation, and productivity channels. The Hungarian long-term economic growth faces challenges due to the quality and quantity of the FD in the labour market. The population increased during the late seventies and early eighties due to ethnic Hungarian migration from Romania to Hungary. However, population growth began to decline, and the number of people has declined from approximately 10.712 million in 1981 to 9.750 million in 2020 (HCSO in 2022).

Despite favorable demographic trends recently owing to government financial support (Hungarian Government, 2016), not because of FD. However, the fertility rate in Hungary is still low due to a lack of daycare (Hétfa, 2019), which impacts the decision to have a first and second child. This lack of FD in the population may lead to a decrease in the working-age population and a growing dependency ratio, which could undermine economic growth. This is another evidence of the absence of the FD role in the Hungarian population. Consequently, the working-age population may decrease, especially with the current outward migration trend, and the ratio of the dependent population will grow, which would undermine economic growth. To minimize the adverse impacts of aging and demographic trends, boosting employee productivity, reallocating resources appropriately (Lee and Mason, 2010; Hudák et al., 2015), and investing in healthcare and education can help overcome the issues faced by an aging population while promoting long-term economic growth (Romer, 1990; Mankiw et al., 1992; Goldin, 2014). Additionally, parents may spend more on their children, especially with fewer children, as they may spend more on their children (MNB, 2018).

Previous studies have confirmed the importance of human capital (HC) for economic growth in Hungary. Variations in GDP per person between Hungary and other V3 countries are attributed to human and physical capital (Caselli, 2005). High levels of education, HC level, and active population are major growth drivers (Próchniak, 2011). Similarly, Raileanu and Marinescu (2010) and Stanišić (2012) reported that the level of education and life expectancy at birth were among the strong determinants of growth. Meanwhile, fertility rates undermine economic growth in Central and Eastern Europe (CEE), including Hungary. Recently, Nagy (2023) highlighted the importance of HC quantity and quality in Hungary's shift to an intense growth model, but demographic trends constrain it, leading to a decreasing labor force. Nagy suggests increasing staff productivity may compensate for this effect. Hungary's Human Capital Index (HDI) has been the lowest among the V4 countries since 2010 (UNDP, 2020), and improvements in education and health status are needed to boost economic growth and productivity. The 2020 HCI shows that Hungary's child productivity is lower than the average for Europe and Central Asia and high-income countries. Life expectancy in Hungary is among the lowest in the EU and lags behind V3 countries. According to the OECD database (2023), investments in education and health are low, with public funding being the key source. The increasing population does not necessarily mean increased participation in economic growth, so it is crucial to examine labor market activity ratios, which are key drivers of economic growth in the European Union (Holobiuc, 2020). According to data from the WBI database, the labor force participation rate in Hungary—contrary to the early five years of the 1990s—was under 50 percent between 1996 and 2005. Although FD and economic growth occurred in the years up to 2008, this rate remained low for two reasons:

1. Inequality and bias toward high-skilled jobs, the social policy, and the qualitative characteristics of the labour force contributed to this low participation rate as well (EEAG, 2012).
2. Additionally, Hungary had the highest tax wedge (50%) among 21 EU countries, - as a percent of the difference between the total labour cost to the firm and take-home pay, from the total labour cost- surpassing Belgium. The Czech Republic, Slovakia, and Poland had lower tax wedges of 43%, 40%, and 37%, respectively. The financial crisis and austerity measures contributed to a decrease in low participation.

   The participation rate in Hungary's labor market has increased in the last decade owing to government measures since 2010, but in 2019, it was only 73 percent (WDI, 2021), lower than its Visegrád peers. Female participation rates are lower than male rates, particularly among older

individuals, because of factors like retirement ages, maternity periods, and child care. Outward migration, which reduces the working population, has been a significant challenge for economic growth since the 2008 crisis and slows per capita income convergence (Ortega and Peri, 2014). Labour emigration in Hungary has increased with globalization (Atoyan et al., 2016), EU membership, and the 2008 crisis, potentially impacting growth through skilled migration. Emigration has positive welfare effects for both recipients and sending countries (Di Giovanni et al., 2015), but it may have accelerated after 2008 due to labour market derogation in 2011 and high unemployment rates during the recession, leading to labour shortages in certain sectors (Bod, 2019). The emigration of young skilled workers in Hungary has accelerated since 2008, particularly after the 2011 labour market derogation and high unemployment rates during the recession (Bod, 2019). Despite low unemployment levels, the migration of Hungarian labour still faces challenges due to low wages compared to EU wages. A high percentage of young people plan to leave Hungary, particularly those with higher education, which could affect productivity growth and exacerbate the shortage of highly skilled workers. This could reduce economic growth and competitiveness (Atoyan et al., 2016), negatively impacting demographic trends. However, the global economic crisis may change migration direction, and knowledge-based migration could be an alternative.

b. Descriptive Statistics and Correlation Matrix

The descriptive statistics of the variables show that the highest and lowest numbers of the Hungarian population are 10.71 million and 10.18 million. The labour force participation rate ranges from a minimum of 45.09 percent in 1991 to a maximum of 82 percent in 1987, with a mean of 58.54 percent and a median of 53.66 percent. The mean value of human capital development is 0.80 percent, with a minimum of 71 percent in 1991, a maximum of 85 percent in 2018, and a median of 0.81 percent (see Table 8).

Table 8 . Descriptive statistics for economic growth and human development variables

	GDPR	POP	LF	HDI	UMP	FDI	FID	FMI	CPNF
Mean	1.69	10.18	58.54	0.8	5.58	0.41	0.45	0.36	76.4
Median	2.66	10.2	53.66	0.81	6.12	0.42	0.46	0.38	65.9
Maximum	7.12	10.71	82	0.85	11.29	0.57	0.61	0.63	130.6
Minimum	-11.89	9.73	45.09	0.71	0.04	0.24	0.32	0.15	45.1
Std. Dev.	3.53	0.3	12.7	0.05	3.71	0.09	0.07	0.15	24.69

Note: author's computation. GDPR is the gross rate of domestic product (GDP), POP is several populations, LF is the labour force participation rate, HDI is the human capital index, UMP is the unemployment rate, CPNF is a credit to the private non-financial sector as a share of GDP, FID is financial institutions index, FMI is a financial markets index, FDI is FD index.

Source: Author`s calculations

The matrix correlation in Table 9 shows correlation coefficients between economic growth, human development, and finance indicator variables. The number of populations, unemployment rate, financial institutions index, and credit to the private non-financial sector as a share of GDP is negatively correlated to economic growth. While the labour force participation rate, HDI is the human capital index, financial markets index, and FD index have a positive correlation with economic growth. However, only human development has a significant correlation.

Table 9 . Correlation matrix for the variables of economic growth and human capital.

Correlation	GDPR	POP	LF	HDI	UMP	FDI	FID	FMI	CPNF
GDPR	1								
POP	-0.25	1							
LF	0.08	-0.44***	1						
HCD	0.32*	-0.96***	0.26	1					
UMP	-0.23	0.36**	-0.32*	-0.29***	1				
FDI	0.15	-0.66***	-0.15	0.81***	-0.12	1			
FID	-0.13	-0.78***	0.27	0.79***	-0.42*	0.77***	1		
FMI	0.25	-0.50***	-0.32*	0.70***	0.03	0.96***	0.54***	1	
CPNF	-0.06	-0.70***	0.05	0.80***	0.1	0.89***	0.79***	0.80***	1

*Significant at 10 percent. **Significant at 5 percent. ***Significant at 1 percent. Source: Author`s calculations

And Figure. A2 in Appendix. Scatter graphs with the trend of HDI and explanatory variables show the correlations between the variables also.

c. Income and Consumption

Consumption is a key component of the economy's GDP, and household consumption is influenced by employment and real incomes, which are represented in the economy's buying power. Keynes'

Law asserts that changes in aggregate demand cause changes in real GDP and employment. And Krinichansky and Sergi (2019) discover that among the transmission routes between the financial and real sectors, is the consumption channel in Italy. On the other hand, a high FD level results in more new businesses entering the labor market and more competitiveness in labor markets (Levine, 2021), raising both salaries and consumption, so creating demand and encouraging economic growth. According to the 2021 MNB sustainability report, the major driving causes of solid economic growth in Hungary in recent years have been an increase in capital intensity and productivity, a rise in real salaries, and an increase in employment, which represents increased demand and savings as well. Between 1995 and 2020, average annual earnings increased by 172 percent (OECD, 2021), but they remain lower than growing wages in other V3, which may hurt growth. A casual looks at (Figure 14) reveals a substantial and positive association between the real pay index increase and the gross household spending trend.

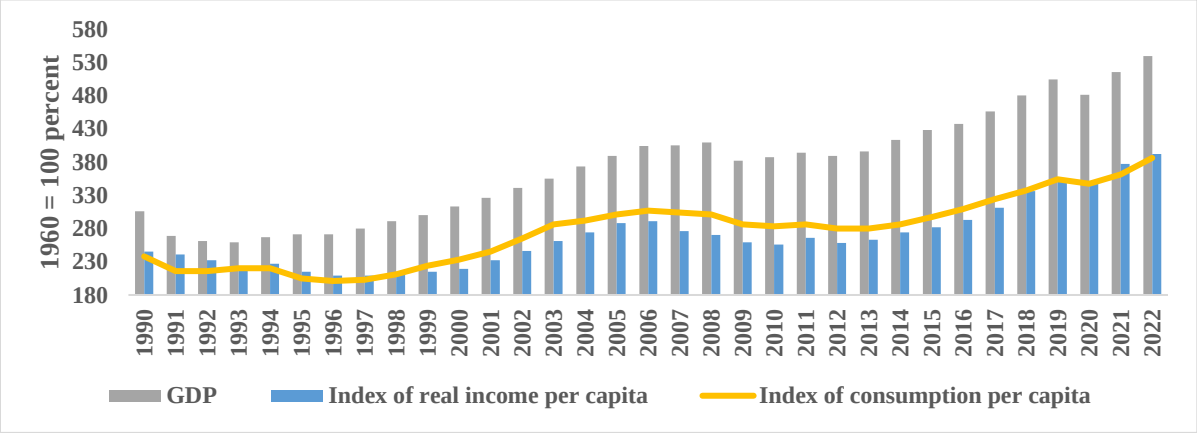

Figure 14.Trends of GDP, real income, and consumption per capita in Hungary, 1990-2022

Source: Data from HCSO (2022)

However, the influence of consumption on growth has changed over the previous three decades. According to the HSCO (2022) database, it contributed to growth by raising demand between 1995 and 2003, as well as 2013 and 2021. The increased investment provided new employment and raised real earnings, besides improving the banking system and cutting borrowing restrictions for households. Aside from some government actions since 2015, such as an increase in the minimum wage, a decrease in taxes, a reduction in the personal income tax to 15%, and the implementation of a uniform 9% business tax for enterprises and companies (Virág, 2020), this sector has seen increased demand and growth. While a rise in consumer taxes in 2004 and an austerity program in 2006 and 2010 reduced real wages (Köllő, 2011). As with any economy, shocks to the financial

sector in 2008 resulted in declines in consumption, as borrowers decreased spending due to increased prices, reducing borrowers' ability and inclination to borrow (Vousinas, 2012; Gabbi et al., 2016). Furthermore, the household sector's high debt payment load and growing unemployment rate weighed heavily on consumption and growth. Employment is also an essential aspect of consumption since it accounts for the majority of people's income and the inclusiveness of economic growth. Hungary has a comparatively low unemployment rate compared to other European countries, hovering around 7.4 percent between 1990 and 2020, particularly at the turn of the century and in recent years. However, the employment-to-population ratio for those aged 15 to 64 is low in comparison to the EU and regional ratios, with an average of 58.3 percent between 1992 and 2020 (OECD, 2022). Numerous factors contributed to low employment ratios, including the collapse of the economy and institutions in the early 1990s (Virá, 2020), the welfare state in 2003, followed by increased taxation and austerity measures in 2006, the financial crisis in 2008 (Brzezinski, 2018), and its consequences for the Hungarian economy. While FD and FDI inflows increased employment ratios, public work plans have been implemented since 2010, as have other working incentives aimed at raising pay, lowering taxes, and changing working policies. In the recent decade, labor market data revealed that the employment rate continued to increase, and the unemployment rate reached low levels at the EU level (Bod, 2019). Employment and rising salaries increased both savings and consumption, which are the primary drivers of economic expansion. According to Keynesian theory, people's spending behavior is determined by their present income level and future income expectations. As a result, consumption varies with income. People tend to consume more than their income grows, even if it is not by much. However, income has an influence on the Gross Domestic Product (GDP) in any country through savings and consumption, which are significant drivers of economic development, particularly in developing countries.

d. Descriptive Statistics and Correlation Matrix

Looking at the data in Table 10, the average value of the index of real income per capita is 260.233 percent, and a higher value of 392 percent was reached in 2016, while the lower value was in 1996-97. Fluctuations in the consumption index reflect the ups and downs in the income index, which reached its peak in 2022 and had a lower value in 1996.

Table 10. Descriptive statistics for economic growth and income and consumption variables.

	GDP	IRI	ICPC	EMP	SAV	FDI	CH
Mean	355.14	260.233	264.186	-0.332	21.788	0.411	18.45
Median	326	246	251	-0.194	21.662	0.424	18.3
Maximum	539	392	386	4.561	27.626	0.571	39.5
Minimum	259	209	201	-8.383	8.996	0.237	4.4
Std. Dev.	77.76	45.32	49.65	2.38	4.12	0.09	9.38

Note: GDP is a gross domestic product, IRI is an index of real income per capita, ICPC is an index of consumption per capita, (three variables are, 1960 = 100 percent), EMP is employment rate, SAV is savings rate as share of GDP, FDI is FD index, CH is a credit to households and NPISHs as a percentage of GDP.

Source: Author`s calculations

The matrix correlation Table 11 indicates that the correlation coefficients between economic growth, income, and consumption, as well as financial variables, are positive and substantial. Economic growth is highly correlated with both the consumption index (0.98) and the real income per capita index (0.94). It also has a greater association with the FD index (0.71) than other financial indices.

Table 11. Correlation matrix for the variables of growth, income, and consumption variables

Correlation	GDP	IRI	ICPC	EMP	SAV	FDI	CH
GDP	1						
IRI	0.94***	1					
ICPC	0.98***	0.95***	1				
EMP	0.49***	0.29***	0.40***	1			
SAV	0.48***	0.44***	0.35***	0.57***	1		
FDI	0.71***	0.53***	0.71***	0.44***	0.19	1	
CH	0.57***	0.44***	0.58***	0.15***	0.13	0.8***	1

Note: ***Significant at 1 percent.

Source: Author`s calculations

e. Productivity

As reported above, FD can enhance growth by productivity channel, however, there is no general pattern of the FD impact on the factors of productivity that change over time and from one country to another. In Hungary, as a consequence of characteristics of the economy inherited since the 1960s, such as employment-intensive with low wages, and medium quality, its productivity was low before the transition process and lost one-fifth of its productivity in the first few years of the transition. Thus, labour productivity and capital inefficiency were some of the most important challenges for the Hungarian economy in the early 1990s (Bod, 2019). According to the 2020 MNB productivity

report, Hungary's labour productivity has improved by an average of 1.9 percent during the previous 20 years, and after the transition period, TFP was characterized by fast-growing worker productivity but no concomitant capacity utilization.

Even by international norms, the TFP-to-growth ratio was high due to increased efficiency following layoffs of low-skilled and low-educated employees. Kátay and Wolf (2008) found that reallocation in Hungary during the transition period increased aggregate TFP growth by enhancing capacity utilization in Hungarian manufacturing businesses between 1993 and 2004. As a result, it made a considerable contribution to growth during the late 1990s and early 2000s.

FL and privatization increased the FDI inflow, particularly in greenfield investment projects that employed cutting-edge technology to promote total factor productivity, the primary engine of economic development. FD and FL in Hungary also contributed to growth through capital accumulation in this era, but to a smaller level than productivity (Iradian, 2007; Arratibel et al., 2007; World Bank, 2008; Kónya, 2018). These new investments boosted growth considerably but also enhanced income inequality and regional inequality as well. Those investments were more attractive for qualified labour and only worked in the more developed regions. In addition, the FTP growth did not continue for a long time since TFP has grown relatively slowly less than the growth of capital accumulation, and the increase in productivity was based on excessive capacity utilization rather than on labour productivity. Levenko et al., (2019) argue that the growth in TFP was the main contributor to output growth only before the crisis, while its contribution after the crisis has been negligible, coinciding with weak output growth.

As a result, TFP has grown relatively slowly less than the growth of capital accumulation between 2002 and 2006, leading to weak investment and increased external and internal imbalances. And deterioration in competitiveness is reflected in slow far Hungary's economic performance from its Visegrád peers (MNB, 2020). In particular, labour productivity declines considerably during the years up to 2010. Following the crisis, contrary to the EU and the Visegrád region, productivity deteriorated further in Hungary, and the average productivity of Hungary's competitors in the V3 exceeded that of Hungary since 2012. The fiscal and monetary policies' turnaround capacity utilization *has* risen since 2013 but was not yet accompanied by increasing labour productivity due to extensive employment because of the adoption of the work public plan in 2011. So, Hungary's productivity remained below the level observed before the 2008 crisis until 2017, despite in 2010 and 2011, labour productivity slightly improved while capacity utilization continued to fall.

Recently, the Hungarian economy did not begin a phase of rapid expansion until 2017, when it increased investment operations while maintaining economic balance and labour productivity increased in parallel. During the last three years, labour productivity was higher than both capital productivity and FPT, according to the AMECO database, European Commission. In a European comparison, Hungary's productivity is still lagging behind the average of other V3 countries and the developed EU countries, using a high technological level in all sectors. Labour productivity per person employed is only 71.1 percent of the EU, and labour productivity per hour worked is only 68.1 percent of the EU in 2020, based on millions of purchasing power standards (Eurostat,2021) and the average of Hungary's labour productivity is 42 percent of the top5 EU countries (MNB, 2020a). Among the factors that can explain the low productivity in Hungary thus, undermining growth is an unhealthy duality of the Hungarian economy (Palócz, 2016), even both in European and regional comparison, and low innovation activity in SMEs (Virág, 2020). In addition, there is the distribution of labour productivity inequality in regional and sector terms.

f. Descriptive Statistics

Descriptive statistics of the variables are shown in Table 12. The highest and lowest present growth of GDP per capita was 6.93 percent in 2020 and -12.12 percent in 1991, respectively, with a mean of 1.4 percent. The growth of labor productivity per person employed (percent change) ranges between 6.54 percent and -6.89 percent, while the growth of labor productivity per hour worked (percent) ranges from a minimum of -5.70 percent in 1991 to a maximum of 8.75 percent in 1992, with a mean of 58.54 percent. The mean value of the growth of labor productivity is - 0.76 percent, with a minimum of -12.8 percent in 2014 and a maximum of 5.70 percent in 1995.

Table 12. Descriptive statistics for growth and productivity, and finance variables

	GDP	OPEG	OHWG	LP	CNC	FDI
Mean	1.54	1.64	2.22	-0.76	57.94	0.41
Maximum	6.93	6.54	8.75	5.7	92.9	0.57
Minimum	-12.12	-6.89	-5.33	-12.8	37	0.24
Std. Dev.	3.8	3.14	3.17	3.67	16.17	0.09
Observations	42	42	41	42	42	40

GDP is a Growth of GDP per capita (percent change), OPEG is a growth of labour productivity per person employed (percent change), OHWG is a growth of labour productivity per hour worked (percent change), LP is a labour productivity growth (percent change), CNC is a credit to non-financial corporations' ratio (percent of GDP), FDI is an FD index.

Source: Author`s calculations

Table 13 displays the matrix connection coefficients for economic growth, productivity, and finance indicator variables. All factors exhibit a positive link with economic growth; however, only the relationships between the increase in labor productivity per person employed and the labor force participation rate are significant. They have the strongest relationships as well.

Table 13. Correlation matrix for the variables of growth, productivity, and finance variables

Correlation	GDP	OPEG	OHWG	LP	CNC	FDI
PCIG	1					
OPEG	0.76***	1				
OHWG	0.59	0.83***	1			
LP	0.52***	0.06	-0.25	1		
CNC	0.08	-0.2	-0.19	0.33	1	
FDI	0.19	-0.12	-0.08	0.34	0.88***	1

Note: *, ** and *** denote 1 percent and 5 percent, 10 percent significance level, respectively. Source: Author`s calculations

Figure A3. in Appendix. Scatter graphs for the variables of economic growth, productivity, and finance variables.

g. Capital Accumulation

The role of FD in capital accumulation is one of the primary drivers of economic growth, as stressed by theory. And, according to Hungarian empirical investigations, Levenko et al. (2019) discovered that physical capital expansion played a key role in Hungary and Slovenia from 1995 to 2016. While (Iradian, 2007; Arratibel et al., 2007; World Bank, 2008; Kónya, 2018) research found that capital accumulation had a minor impact in Hungary compared to other nations. According to many studies (Barro, 1991; Nežinský and Fifeková, 2014; Ivanova et al., 2015; Tóth and Medgyesi, 2018), growth is primarily driven by capital formation, financial sector expansion, technical advancement, and globalization. A cursory look at Figure 15 suggests a strong and positive relationship between GDP growth and gross fixed capital formation (percent of GDP) in Hungary.

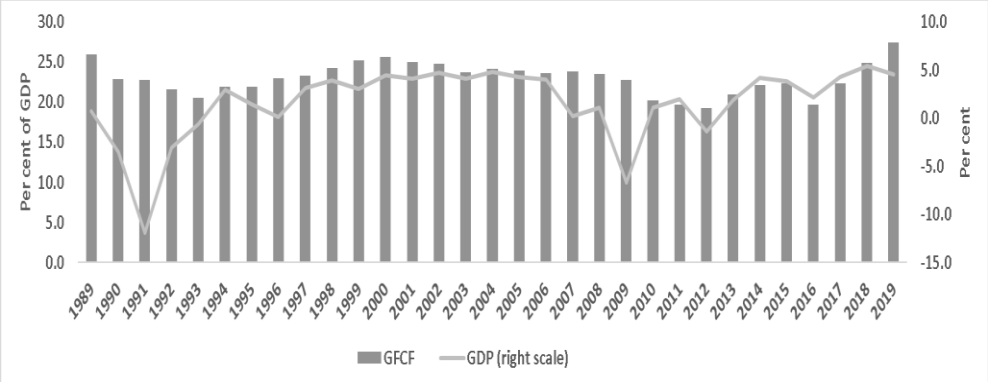

Figure 15. GDP (%, annual growth) and gross fixed capital formation (% of GDP)

Source: WBI

However, the pattern of investment during the 1980s and the first half of the 1990s showed a dramatic fall, reaching roughly 20.5 percent of GDP in 1993 as a result of capital depreciation during the socialist period. At the same time, in the early 1990s, investment was a small proportion of GDP. However, financial depth and efficiency improved dramatically as a result of financial liberalization and privatization in 1996, and FDI inflows into the economy increased gross fixed capital formation (GFCF) to 25.6 percent of GDP in 2000. Between 2001 and 2008, Hungary's entire GFCF ranged between 23.5% and 25% of GDP; nonetheless, it failed to achieve the 2008 level after just 10 years. Importantly, the fast GFCF expansion between 1995 and 2007 was mostly funded by external resources (HCSO, 2021). In international comparison, it was slightly higher than the EU28 average during the crisis but fell below the V3 and EU averages between 2011 and 2019. Interestingly, GFCF fell dramatically throughout the 1991 and 2008 crises and recovery years as a result of credit and investment restrictions, as well as foreign investment, particularly owing to deterioration in the business climate and high investment costs. In addition, the corporate deleveraging process, an unstable business climate, and increased liabilities and constraints on investors. As a result, private investment declined more than governmental investment; moreover, investment contraction led to a recession and a weakening of the country's economic potential. However, with the non-orthodox monetary policy implemented in 2013, investment was one of the most important drivers of growth, whether it was public investment co-financed with EU funds and aimed at the SMEs sector or private investment (FDI, particularly Asian FDI and domestic), which has increased significantly in recent years. In addition, the corporate deleveraging process, an unstable business climate, and increased liabilities and constraints on investors. As a result, private investment declined more than governmental investment; moreover, investment contraction led to a recession and a weakening of

the country's economic potential. However, with the non-orthodox monetary policy implemented in 2013, investment was one of the most important drivers of growth, whether it was public investment co-financed with EU funds and aimed at the SMEs sector or private investment (FDI, particularly Asian FDI and domestic), which has increased significantly in recent years.

Descriptive data on the link between economic growth (dependent variable) and other factors (independent variables) such as investment, savings, and financial conditions in Hungary during the past four decades. The descriptive data for the savings ratio as a percentage of GDP show that the highest value was 27.63 percent in 1881 and the lowest was 9 percent in 1993. The average investment ratio as a percentage of GDP is 25.56 percent, with a maximum of 32.50 percent and a minimum of 17.97 percent (see Table 14).

Table 14. Descriptive statistics for economic growth and finance variables

	GDP	CNC	CPNB	INV	SAV
Mean	1.69	57.94	39.32	25.56	21.79
Median	2.66	51.8	40.65	26.12	21.66
Maximum	7.12	92.9	59.4	32.5	27.63
Minimum	-11.89	37	23.1	17.97	9
Std. Dev.	3.53	16.17	10.02	3.23	4.12

GDP is the GDP per capita; CNC is a Credit to Non-financial corporations from all sectors percent of GDP, CNPB is a Credit to Private non-financial sector from Banks, percent of GDP, SVA is the saving ratio percent of GDP, INV is the ratio of investment to GDP.

Source: Author`s calculations

Table 15 contains coefficients that illustrate relationships between economic growth, investment, savings, and FD. There are advantages for all variables; nonetheless, bank financing hinders economic growth and has a negative association with GDP growth. However, the correlations are not statistically significant, and they are not strong, with the highest correlation occurring with an investment of 0.38.

Table 15. Correlation matrix for the variables of economic growth and finance variables.

Correlation	GDP	CNC	CPNB	INV	SAV
GDPR	1				
CNC	0.03	1			
CPNB	-0.29	0.57***	1		
INV	0.38	-0.38	-0.12	1	
SAV	0.12	0.2	0.08	0.41***	1

Note: *, ** and *** denote 1 percent and 5 percent, 10 percent significance levels, respectively.

Source: Author`s calculations

And Figure A4. in Appendix. Scatter graphs for the variables of economic growth and finance variables, also explain the correlation between the variables.

h. Lending to The Private Non-Financial Sector

According to the BIS database, which contains long-series data, the percentage of credit to the private non-financial sector to GDP increased before 1990; this credit was primarily provided by banks, but after financial liberation, this share of banking gradually decreased to its lowest value of 35.9 percent in 2015. Following a decrease in the percentage of credit to this sector in the early 1990s as a result of the macroeconomic environment and banking crisis, as well as institutional restructuring, which resulted in a large number of firm bankruptcies, lending to this sector increased between 1997 and 2009, peaking at 130.6 percent of GDP in 2009. It indicates that the increase in this percentage in 2009 was caused by, on the one hand, declining GDP, and on the other, accumulated loans from prior years grew with lowering repayments and obligations rather than new loans. This growth was caused by Hungary's promising market (Bod, 2017) and hopeful expectations following the EU's accession, which drew international investors into this area (Banai et al., 2011). Easy access to foreign investment resulted in strong economic and domestic bank credit expansion in the early 2000s, with the Hungarian banking industry having the most successful experience in the area, according to Bod (2017). However, throughout this time of credit expansion, financial deepening did not result in a genuinely growing economy, but it was still far from credit growth. This can be explained by credit expansion, which boosted the real estate industry and spending. As a result, the economy was characterized by poor productivity rather than significant development of production capabilities (MNB, 2014, 2017 c). Furthermore, it resulted in a large current account deficit and the accumulation of financial imbalances, which have been disregarded.

The 2008 crisis, followed by the European sovereign debt crisis, had a substantial and long-term impact on Hungary's real GDP and domestic bank loan growth due to its huge external and public debts, as banks modified their business strategies by decreasing balance sheets. Furthermore, the bank's operating climate had a significant impact on loans and investment, deteriorating the banking portfolio and causing the financial sector to contribute negatively to economic development. This conclusion was reaffirmed in the 2018 MNB "growth report," which stated that the banking industry contributed negatively to actual economic development in this era due to an annual credit fall of almost 5% that lasted nearly 5 years. Causing reduced the portfolio to 72 percent of its pre-crisis

level, while consumer credit fell to 78 percent. Similarly, an EU analysis from 2013 found that the stock of outstanding business loans declined by 25% during the fourth quarter of 2008 and 2012. However, the findings of the study (Tamási and Világi, 2011), utilizing Uhling's (2005) technique, suggest that credit supply shocks did not play a significant role in the economy's collapse during the crisis. Lending is decreasing from many organizations. First, households were unwilling to borrow since their monthly repayment burden remained high. Furthermore, uncertainty in the general economic climate and recessionary pressures contributed to a decrease in banks' willingness to lend (Sóvágó, 2011; MNB, 2012), along with other issues such as high credit risk and inadequate internal capital generation ability. In addition to government policies that had an impact on bank performance due to low profitability and restrictive loan conditions, these factors also contributed to fast deleveraging. Credit supply was impacted by banks' low profitability, which was influenced by the early payment plan and the new banking tax, as well as the operating climate.

Several policies were implemented by the state that had a significant impact on the financial industry (EBRD, 2020) throughout the crisis and recovery. To begin, Hungarian credit policy concentrated on deleveraging difficulties swiftly. Second, the use of unconventional instruments such as the Funding for Growth Scheme and Growth Supporting Programme contributed significantly to both economic growth and the avoidance of a credit crunch, as well as the turnaround in corporate lending, with an initial focus on supporting lending to SMEs in 2013, followed by large corporations and households in 2016, but credit standards have remained prudent overall (MNB, 2021b). Although understanding of the linkages between finance and economic growth through descriptive and deductive analysis is significant, it is insufficient to determine the relationship between the variables under consideration. As a consequence, to obtain more reliable conclusions concerning the relationship between the researched variables, econometric methodologies will be employed in the dissertation.

3. EMPIRICAL STUDY OF FD AND ECONOMIC GROWTH IN HUNGARY

a. DATA AND MODEL SPECIFICATION

To test these hypotheses and examine the long-run and short-run relationship between economic growth, this study used quarterly time series data for the period Q1 1980 to Q1 2019. Data were collected from the WBI, Federal Reserve Economic, IMF, the United Nations Conference on Trade and Development (UNCTAD), and the Conference Board (CB). All data on the variables are available as annual data (only data on the ratio of the credit to private (household and corporate) and

government are available as quarterly data). So, we transformed to quarterly data using the low-frequency to high-frequency conversion method in Eviews 10.0, using the method of Chow and Lin (1971), which finds the best linear unbiased estimator of the series used. In addition, the econometric analysis package, EViews 10, was used for data analysis.

The existing literature often puts forward the model of the finance-growth nexus, which is specified as follows: GDP = f (FD, CV) (1)

Where the real GDP per capita (GDP) was used as a proxy for economic growth, as suggested by Levin (1997), Beck et al. (2007), and Ang (2010), the current study will employ FD using the new data set on financial sector development indexes introduced by Svirydzenka (2016). The FD index is an aggregate index of three subindexes on depth, efficiency, and access. In addition, the following five alternative proxies for FD are also used: Three proxies are linked with financial depth: CRCRP: credit to non-financial corporations; CRHU: credit to households and NPISHs; CRGV: government credit, from all sectors at market value (percent GDP). Those proxies are the financial intermediation ratios (Al-Malkawi et al., 2012), which suggest the larger the size of the financial intermediaries sector, the stronger it can contribute to economic growth (Levine, 1997). Credit to the private sector (CRCRP and CRHU) signifies capital flow to them from financial institutions (banks and non-banking institutions) and financial markets in the form of loans, trade credits, and non-equity investments. Implying the extent to which funds are channelled into the private sector by financial intermediaries and, more directly linked to investment and growth. Accordingly, we expect that there is a positive correlation between credit to the private sector and economic growth, as the literature (Were et al., 2012; Ang, 2008) suggested. As pointed out in the earlier studies, the other two proxies that are linked with the efficiency of the financial sector are the FIE: financial institutions efficiency index, and the FME: financial markets efficiency index. Based on economic theory and consistent with previous research, all the FD indicators are expected to have a positive relationship with economic growth in Hungary.

Following the prior empirical literature, we also used four factors associated with economic growth. We will refer to this variable as a control variable (CV) in our study in equation (1). First, trade openness (TOP) refers to the outward or inward orientation of a given country's economy, calculated as the sum of exports and imports as a percentage of GDP (Bojanic, 2012). It is expected that openness should foster economic growth through international trade and create opportunities to serve

foreign over domestic markets, as well as increase productivity through technological advancement, knowledge sharing, and increased labour productivity as well; thus, TOP is expected to be positive and statistical. Likewise, following Levine and Renelt (1992; Barro 1991), I used gross capital formation (GFCF) as a control variable, which is the proxy of domestic investment because it is a key factor in economic growth, as the hypothesis Solow (1957) assumes that physical capital accumulation increases productivity in an economy, so the result of the impact of GFCF on growth is expected to be positive. The third control variable is GOV: government final consumption expenditure (percent GDP) is also used as government expenditure to promote economic growth by strengthening infrastructure and creating an environment conducive to the development of the private sector. The last control variable is KOF: Interpersonal Globalization Index.

$$\text{GDP} = f(CRCP, CRGF, CRHU, FDI, FIE, GFCF, GOF, TOP, KOFF) \qquad (2)$$

The model to be estimated is written as:

$$GDP_t = \alpha_0 + \beta_1 CRCRP_t + \beta_2 CRGF_t + \beta_3 CRHU_t + \beta_4 FD_t + \beta_5 FIE_t + \beta_6 FME_t + \beta_7 GFCF_t + \beta_8 GOV_t + \beta_9 TOP_t + \beta_{10} KOFF_t + \mu_t. \qquad (3)$$

After checking the stationarity of the variables, to test these hypotheses and examine the long-run relationship between economic growth as measured by the GDP per capita and FD as measured by six indicators, I used the Autoregressive Distributed Lag (ARDL) approach of Perasan et al. (2001), due to it having several advantages over other estimation approaches, as I reported in chapter One.

The model to be estimated by the ARDL approach is written as:

$$\Delta GDP_t = \alpha_0 + \sum_{i=1}^{p} \alpha_{1i} \Delta GDP_{t-i} + \sum_{i=0}^{q1} \alpha_{2i} \Delta CRCRP_{t-i} + \sum_{i=0}^{q2} \alpha_{3i} \Delta CRGF_{t-i} + \sum_{i=0}^{q3} \alpha_{4i} \Delta CRHU_{t-i} + \sum_{i=0}^{q4} \alpha_{5i} \Delta FDI_{t-i} + \sum_{i=0}^{q5} \alpha_{6i} \Delta FIE_{t-i} + \sum_{i=0}^{q6} \alpha_{7i} \Delta FME_{t-i} + \sum_{i=0}^{q7} \alpha_{8i} \Delta GFCF_{t-i} + \sum_{i=0}^{q8} \alpha_{9i} \Delta CGOV_{t-i} + \sum_{i=0}^{q9} \alpha_{10i} \Delta TOP_{t-i} + \sum_{i=0}^{q10} \alpha_{11i} \Delta KOFF_{t-i} + \beta_1 GDP_{t-1} + \beta_2 CRCRP_{t-1} + \beta_3 CRGF_{t-1} + \beta_4 CRHU_{t-1} + \beta_5 FD_{t-1} + \beta_6 FIE_{t-1} + \beta_7 FME_{t-1} + \beta_8 GFCF_{t-1} + \beta_9 GOV_{t-1} + \beta_{10} TOP_{t-1} + \beta_{11} Koff_{t-1} + \varepsilon_t \qquad (4)$$

Where GDP, CRCRP, CRGV, CRHU, FDI, FIE, FME, GFCF, GOV, TOP and KOFF are as earlier defined. Δ represents the first difference operator, α 0 is the constant term; α1, …, α 11 represent the short-run coefficients, and β1, …, β11 are the long-run coefficients.

Following the approach of (Pesaran et al., 2001), the next step after determining the optimal lag lengths p and q1… q11 for the ARDL model, which are selected automatically using AIC or SIC, is Pesaran et al.,'s (2001) bound test. This step uses the calculated F-statistic, which is compared with the lower and upper critical bound provided by Pesaran (2001) and modified by Narayan (2005).

The null hypothesis of no cointegration H0: θ1 = θ2 = θ3 = θ4 = θ5 = θ6 = θ7= θ8 = θ9 = θ10 = θ11 = 0, if rejected, the alternative hypothesis of existences of cointegration is accepted, H1: θ1 ≠ θ2 ≠ θ3 ≠ θ4 ≠ θ5 ≠ θ6 ≠ θ7≠ θ8 ≠ θ9 ≠ θ10 ≠ θ11 ≠0, that means there is a long-run relationship between the variables.

Having ensured that there is a long-run relationship has existed, then the conditional ARDL model will be conducted that can be used to estimate the following long-run coefficients:

$$\Delta GDP_t = \alpha_0 + \sum_{i=1}^{p} \alpha_i GDP_{t-i} + \sum_{i=0}^{q1} \theta_{1i} CRCRP_{t-i} + \sum_{i=0}^{q2} \theta_{2i} CRGF_{t-i} + \sum_{i=0}^{q3} \theta_{3i} CRHU_{t-i} + \sum_{i=0}^{q4} \theta_{4i} FDI + \sum_{i=0}^{q5} \theta_{5i} FIE_{t-i} + \sum_{i=0}^{q6} \theta_{6i} FME_{t-i} + \sum_{i=0}^{q7} \theta_{7i} GFCF + \sum_{i=0}^{q8} \theta_{8i} GOV_{t-i} + \sum_{i=0}^{q9} \theta_{9i} TOP_{t-i} + \sum_{i=0}^{q10} \theta_{10i} KOFF_{t-i} + \mu_t \quad (5)$$

The long-run equation is:

$$GDP_t = \alpha_0 + \beta_1 CRCRP_t + \beta_2 CRGF_t + \beta_3 CRHU_t + \beta_4 FD_t + \beta_5 FIE_t + \beta_6 FME_t + \beta_7 GFCF_t + \beta_8 GOV_t + \beta_9 TOP_t + \beta_{10} KOFF_t + \mu_t. \quad (6)$$

Finally, if the long-run relationship is found, an ARDL error correction model to assess the error correction term (ECT) is estimated, as in the following equation:

$$\Delta GDP_t = \alpha_0 + \sum_{i=1}^{p} \alpha_{1i} \Delta GDP_{t-i} + \sum_{i=0}^{q1} \alpha_{2i} \Delta CRCRP_{t-i} + \sum_{i=0}^{q2} \alpha_{3i} \Delta CRGF_{t-i} + \sum_{i=0}^{q3} \alpha_{4i} \Delta CRHU_{t-i} + \sum_{i=0}^{q4} \alpha_{5i} \Delta FDI_{t-i} + \sum_{i=0}^{q5} \alpha_{6i} \Delta FIE_{t-i} + \sum_{i=0}^{q6} \alpha_{7i} \Delta FME_{t-i} + \sum_{i=0}^{q7} \alpha_{8i} \Delta GFCF_{t-i} + \sum_{i=0}^{q8} \alpha_{9i} \Delta GOV_{t-i} + \sum_{i=0}^{q9} \alpha_{10i} \Delta TOP_{t-i} + \sum_{i=0}^{q10} \alpha_{11i} \Delta KOFF_{t-i} + \vartheta ECT + \varepsilon_t \quad (7)$$

The error correction model result (ECT) indicates the speed of adjustment back to long-run equilibrium after a short-run shock, which means the extent to which any disequilibrium in the previous period is being adjusted in the next period (Pesaran et al., 2001).

b. RESULTS OF EMPIRICAL

i. Descriptive Statistics and Correlation Matrix

According to the statistics in Table 16, the average GDP value is $ 9874.97, with the highest value ($15175.38) achieved in 2019 and the lowest value ($7324.80) in 1993 during the financial crisis. Fluctuations in FD, TOP, and credit to the private sector, particularly credit to the corporate sector, reflect changes in the worldwide credit market and FD level. Credit ratios for this sector peaked in 2009 and fell to their lowest point in 1993, and they have the strongest link with GDP. GDP.

Table 16. Descriptive statistics and correlation of the variables.

	GDP	CRCRP	CRGV	CRHU	FD	FIE	FME	GFCF	GOV	KOF	TOP
Mean	9874.97	56.96	68.51	18.14	0.38	0.61	0.52	24.45	21.43	66.46	108.50
Maximum	15175.3	96.20	91.50	40.90	0.57	0.71	1.00	35.29	27.73	85.67	168.24
Minimum	7324.80	36.80	50.90	4.40	0.21	0.42	0.21	19.31	19.65	39.61	46.38
Std. Dev.	2132.05	16.26	10.96	9.58	0.10	0.07	0.25	3.42	1.75	16.34	45.25
Observations	157	157	157	157	149	149	149	157	157	157	157
Correlation											
GDP	1										
CRCRP	0.81	1									
CRGV	0.32	0.38	1								
CRHU	0.60	0.86	0.25	1							
FD	0.79	0.83	0.10	0.65	1						
FIE	0.01	-0.26	-0.37	-0.26	-0.02	1					
FME	0.55	0.73	0.05	0.58	0.94	-0.17	1				
GFCF	-0.31	-0.47	-0.72	-0.34	-0.34	0.462	-0.38	1			
GOV	-0.51	-0.46	0.07	-0.34	-0.40	-0.30	-0.22	-0.31	1		
KOF	0.67	0.62	0.25	0.28	0.84	-0.10	0.81	-0.54	-0.16	1	
TOP	0.88	0.85	0.38	0.52	0.88	-0.13	0.75	-0.48	-0.45	0.87	1

Source: Author's computation

ii. Unit Root Test

Engle and Granger's (1987) cointegration test is not applicable when variables series are stationed of more than one order (i.e., some series is I (0) and others series is I (1)). But it applies to the ARDL approach. Despite the fact that the fact that the ARDL approach does not require pre-testing for unit roots, the stationary condition needs to be checked for all series to ensure that the variables are not (2) stationary to avoid spurious results. In terms of the unit root concept, a time series under consideration is non-stationary if it has a unit root. The mean, variance, and structure of a series vary over time; thus, a time series is considered to be stationary in the case that does not have a unit root.

I used the Augmented Dickey-Fuller (ADF) test (1979) and Philips Perron (PP) test (1988) to check the stationarity of each variable, and the lag length in the ADF regression is selected using the Schwarz information criterion and the Akaike info criterion (AIC) test. Table A-7 in the Appendix shows that only FIE is stationary at level I (0), while other variables were found non-stationary at levels but stationary at first difference as their corresponding p-values are less than 0.01 and 0.05. Thus, the null hypothesis is rejected that the variables examined have unit roots.

As a result of the above unit-root tests suggesting that, on one hand, some of the variables are stationary of the order 1(1) and others are stationary of the order (0), we can't employ the Johansen (1988, 1991) and Johansen and Juselius (1990) procedures to test for cointegration among the variables because not all the variables are stationary of the same order. Therefore, these results give support to the use of the ARDL bounds approach rather than one of the alternative co-integration tests. On the other hand, given that all the variables are stationary at I (0) and I (1), it implies the variables are not I (2) stationary; thus, the necessary condition to implement an ARDL model is achieved. We proceed to test whether there is a long-run relationship (cointegration) between economic growth and FD or not.

iii. Bounds Test and the Results of the Long-run Relationship

The ARDL model automatically determines the number of acceptable legs using the Akaike Criterion. Figure 23 depicts the strength of the selected model criteria, and the number of legs is based on a minimum basis for these criteria. The equation is estimated using the following legged level (2, 4, 3, 0,2, 1, 0, 2, 1, 0, 2, 0, 0); see Figure A8 in the Appendix. To determine whether the dependent variable (GDP) and independent variables have a cointegrating relationship in the long run. I used the ARDL approach to estimate equation (3) and obtain the F statistics for the joint importance of lagged variables. Table 17 reveals that the F-statistic is 3.94, which exceeds the upper bound (3.61) critical value reported by Pesaran et al. (2001) at the 99 percent significant level. So, we reject the null hypothesis and accept the alternative hypothesis, which states that there is a long-run relationship between economic growth represented by real GDP per capita and FD represented by (FME, FIE, FDI, CRHU, CRGV, and CRCRP), as well as between growth and control variables (GFCF, GOV, KOFF, TOP). This shows that certain variables included in the model are cointegrated and have a long-run equilibrium, thus they tend to move together in the long run.

Table 17. Results from bounds tests, dependent variable: GDP.

F-Bounds Test	Dependent Variable: D(GDP)			
Test Statistic	Value	Signif.	I (0)	I (1)
F-statistic	3.94	10%	1.76	2.77
k	10	5%	1.98	3.04
Actual Sample Size	147	1%	2.41	3.61

Source: Author's computation

Table 18 presents the results of estimating the long-run coefficients of the model, indicating that there is a positive and significant relationship that exists in the long run between CRCRP and GDP.

This implies that CRCRP has an impact on growth, and a 1 percentage point (hereafter, pp) increase in CRCRP will lead to a 242.18 pp increase in Hungarian GDP in the long run. The implication is that an increase in CRCRP can lead to an upward trend in investment, thus increasing economic growth. This finding is consistent with general evidence in the empirical literature; for example, Beck et al. (2000), Demetriades and Law (2006), and Shahbaz and Rahman (2010) have concluded that the ratio of the credit provided to the private sector affects economic growth positively. Also, the IMF (2017) reported that there is a significant positive correlation between GDP and bank lending in Hungary over the period from 2000 to 2017, but this correlation is modest.

Similarly, the findings show also that the FD index has a positive and significant relationship that exists in the long run with GDP. A 1 pp increase in FD will lead to a 48339.86 pp increase in Hungarian GDPPC in the long run. This finding is consistent with our prior expectations, with economic theory, and with general evidence in the empirical literature. (Tinoco-Zermeno et al., 2014; Lawal et al., 2016; Ghildiyal et al., 2015). While the financial market efficiency of FME will impact positively growth and investment, the results show that FME is negatively affecting the economic growth in Hungary. A one-pp increase in FME will consequently lead to a decrease in GDP by 21199.74 pp. The result is very curious and contrary to a priori expectation and is inconsistent with economic growth theory and with general evidence in the empirical literature. However, the same conclusion has been reached by Kapaya (2020), who reported that the efficiency of the financial system is strongly negatively associated with economic growth both in the short and long run. Thus, the FME has to take more attention into account policymakers to change the relationship by undertaking financial reforms to improve the efficiency of the financial sector or even at least mitigate the consequences of long-run negative effects on economic growth, which will, in turn, enhance the economic growth. Moreover, other variables, namely, FIE, CRHU, CRGV, GFCF, GOV, KOFF, and TOP, don’t have a significant effect on growth; this implies any increase or decrease in their indexes is not important for Hungarian economic growth in the long term.

Table 18 . Long-run estimation (dependent variable = GDP).

Variable	Coefficient	t-Statistic	Prob.
CRCRP	242.177	1.894	0.061
CRGV	-2.767	-0.080	0.937
CRHU	-233.628	-1.600	0.112
FD	48339.860	2.982	0.004
FIE	-6751.228	-1.547	0.124
FME	-21199.740	-4.213	0.000
GFCF	222.676	1.262	0.210
GOV	158.622	0.862	0.390
KOFF	49.808	1.075	0.285
TOP	-2.155	-0.078	0.938
C	-13782.350	-1.258	0.211

Source: Author's computation

It is possible that financial depth boosts growth in the long run only if it is provided through credit to non-financial firms, whereas financial depth provided by the government and household sector has a minor negative impact on growth. FD boosts economic growth in the long run. Although the efficiency of Hungary's financial system has a long-term impact on economic growth, only the efficiency of the financial market matters.

iv. Error Correction Model Results

The study also discovered that the (ECM t-1) of the selected ARDL, when GDPPC is used as a dependent variable, has the correct negative sign and is significant at 5%, demonstrating the presence of a long-term equilibrium relationship among the model's components. Based on the information in Table 19, the (ECM t-1) coefficient is -0.016961, which shows how fast things are adjusting from one period to the next to get back to equilibrium (Pesaran et al., 2001). Economically, this means that 1.69 percent of each quarter from the preceding quarter adjusts the short-run variation in economic growth to achieve long-term stability. The model explained 91.64 percent of the dependent variable, as indicated by the high coefficient of (R2), 0.916464. The short-run estimates also support some of the initial findings from the long-run regression, which show that FD (CRCRP) boosts economic growth at 10% levels of significance in the short term. Thus, a one-point rise in CRCRP results in a 2.752463-point increase in economic growth for each quarter of the year. Furthermore, it should be highlighted that this conclusion applies to subsequent orders, with the effect remaining statistically significant at the 5 and 1 percent levels of significance. The model explained 91.64 percent of the dependent variable, as indicated by the high coefficient of (R2), 0.916464. While the

CRHU coefficient has the same indications as the long-run equilibrium estimates, its contribution remains statistically insignificant. However, after two lags, credit to the household sector (percentage of GDP) boosts economic activity. Contrary to the long-run example, both FIE and GOV variables have a major impact on economic growth at the 1% level, but they impair it in the short run. However, with one more order, they boost economic growth, and their influence is statistically significant at the 1% level of significance. The coefficient of financial market efficiency has a different sign than the long-run estimate; it is now positively associated with growth, but the effect is statistically insignificant. The overall results indicate that financial depth as proxies by the ratio of credit to non-financial corporations affects economic growth positively in the short run, and the ratio of credit provided to the household sector also, but only with more than one order. The effects of the efficiency of the financial system vary between its major components; the effect of the financial market's efficiency does not matter for growth in the short run, while the financial institutions' efficiency matters for growth and harms it, but after one lag will promote it.

Table 19. Error correction model.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Δ (GDPPC (-1))	0.6847	0.046391	14.7602	0
Δ(CRCRP)	2.7525	1.392677	1.9764	0.0504
Δ (CRCRP (-1))	-3.3022	1.558413	-2.1189	0.0361
Δ (CRCRP (-2))	-4.5579	1.518407	-3.0018	0.0033
Δ (CRCRP (-3))	-2.2706	1.086918	-2.089	0.0388
Δ(CRHU)	-3.148	3.189782	-0.9869	0.3256
Δ (CRHU (-1))	4.3466	3.434229	1.2657	0.208
Δ (CRHU (-2))	9.735	3.324313	2.9284	0.0041
Δ(FIE)	-1379.433	178.087	-7.7458	0
Δ (FIE (-1))	595.8798	191.2283	3.11607	0.0023
Δ(FME)	169.1148	118.7446	1.4242	0.1569
Δ(GOV)	-120.5653	14.0215	-8.5986	0
Δ (GOV (-1))	72.7663	15.91479	4.5722	0
CointEq (-1) *	-0.0169	0.002364	-7.1763	0
R-squared	0.9165	Mean dependent var		49.4918
Adjusted R-squared	0.9083	S.D. dependent var		88.6729
S.E. of regression	26.8521	Akaike info criterion		9.509
Sum squared resid	95897.84	Schwarz criterion		9.7938
Log-likelihood	-684.9085	Hannan-Quinn criteria.		9.6247
Durbin-Watson stat	1.9989			

Source: Author’s computation.

To ensure the fitness of the model, we used the diagnostic test to examine the Heteroskedasticity test associated with the selected model. The results of the Heteroskedasticity test indicate that the residuals are characterized by consistent variation, and there is no autocorrelation between them according to the results in the following Table 20.

Table 20. Residual tests.

	Breusch-Godfrey Serial Correlation LM Test			Heteroskedasticity Test: ARCH		
F-statistic	0.0581	Prob. F (2,1)	0.9436	0.0334	Prob. F (19,3)	0.855
Obs*R-squared	0.1421	Prob. Chi-Square (2)	0.9314	0.0339	Prob. Chi-Square (19)	0.854

Source: Author's computation

Finally, the study also used the CUSUM, created by Borensztein et al. (1998), to assess the stability of the ARDL models used. Figure 2 demonstrates that the two models are stable for the two tests with a 5 percent degree of liberty; they are between the critical bounds (red lines), and the results are shown in the figures below. Figure vividly illustrates these indications. 16.

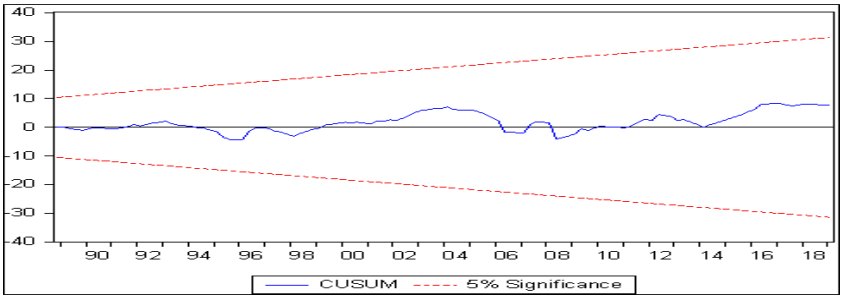

Figure 16. Cumulative Sum of Squares of Recursive Residuals.

Note: The straight lines represent critical bounds at 1percentsignificance level.

The unit root test of the residuals also confirmed the estimated ARDL model's stability of the coefficients of both the long run and the short run between economic growths and FD as well. As in Table 21.

Table 21. Results of the stability tests

	PP				ADF			
	With Constant and Trend		Without Constant and Trend		With Constant and Trend		Without Constant and Trend	
	t-Statistic	Prob.	t-Statistic	Prob.	t-Statistic	Prob.	t-Statistic	Prob.
At Level	-12.0925	0.000	-12.1907	0.000	-11.953	0.000	-12.0363	0.000
At First Difference	-95.3162	0.0001	-96.3343	0.000	-8.1857	0.000	-8.2467	0.000

Source: Author's computation

Hypothesis Test

1. The study indicates that there is long-run cointegration between economic growth and FD in the presence of other macroeconomic variables and that FD supports economic growth in Hungary. Consequently, the H2 and H2.a hypotheses are accepted. Thus, boosting FD looks to be an efficient approach to stimulate economic growth, which in turn supports FD.
2. Financial depth boosts growth only if credit is extended to non-financial corporations in both the short and long run. However, financial depth hurts growth by limiting lending to the government and the household sector. The (H. b) hypothesis states that financial depth encourages economic growth in Hungary, but this is only acknowledged for non-financial firms.
3. The efficiency of Hungary's financial market hinders both long-term economic growth and short-term financial institution efficiency. Thus, the hypothesis (H 2. C) that financial efficiency boosts economic growth in Hungary is rejected.

4. CONCLUSION

Financial theories emphasize the importance of growing finance for economic growth, promoting efficient productivity uses, and lowering transaction costs. Hungary’s underdeveloped financial sector hinders progress. FDI led to growth through investments, IT imports, and exports. However, the economy’s inefficiency hinders local and international investment spillovers, and finance does not significantly contribute to productivity, human resources, or regional development, which remain the most serious challenges to Hungary’s economic growth. The financial sector has experienced two crises and a severe recession. FDI also creates a productivity gap between foreign and indigenous enterprises, particularly SME firms with poor innovative activity. The study confirms that FD and economic growth are interconnected, implying that policies supporting FD support economic growth in Hungary. Promoting FD is an effective way to support economic growth, and financial depth stimulates growth in the long run through credit to non-financial corporations from all sectors. Financing corporations is crucial for maintaining inclusive growth momentum. While the financial depth harms growth through credit to the government or the household sector. The efficiency of the financial system in Hungary undermines long-term economic growth, but the efficiency of the financial market is significant, as is the efficiency of the financial institution in the short run.

CHAPTER 5

INEQUALITIES AND FINANCIAL DEVELOPMENT

1. INCOME INEQUALITY IN HUNGARY

Like most socialist countries, a relatively low level of inequality had characterized Hungary during the socialist phase, but it witnessed an increase in income inequality over forty decades. The size of the increases was heterogeneous because of the various factors that contributed to those increases across time. Indeed, Hungary has been making progress in several areas, including FD and economic growth, in the recent decade. However, some deterioration can be observed in inequality indicators (Svraka, 2021), despite them not being high compared with the rest of the EU. But, contrary to the Visegrád competitors, inequality has shown a rising pattern since the 2008 financial crisis. The gap between the income growth ratios of the top class of the distribution and the rest classes of the income distribution has rapidly increased over time. Similarly, the proportion of the richest 20 percent of the population increased from 3.6 times in 2008, more than that of the poorest 20 percent, to 4.2 times in 2018, and even the highest among V4 countries in 2020 (HSCO, 2021).

A literature review of factors that may contribute to shaping income inequality in Hungary suggests those factors are privatization and the intensity of socioeconomic reforms after the crises in the 1990s and 2008 (Milanovic and Ersado, 2012; Aristei and Perugini, 2014; Alvaredo and Gasparini, 2015; Perugini and Pompei, 2016). Changes in fiscal policy 1996, 2006, and 2010, in particular, income tax since 2010 (Benczúr et al., 2012; Myant and Drahokoupil, 2015; De Agostini et al., 2016; Moździerz, 2015; Brzezinski, 2018). Labor market policy changes, along with FD and FL, and their interplay (Perugini and Pompei, 2015; Mavridis and Mosberger, 2017; Botos, 2019). Moreover, salary disparities across different education, skill groups, and other workers have increased during the second half of the 1990s as the importance of HC quality has grown (Ferreira, 1999; Milanovic, 1999; Mitra and Yemtsov, 2006). Wage-setting decentralization and skill-biased technological change with FDI inflow (Milanovic, 1999; Mitra and Yemtsov, 2006; Mavridis and Mosberger, 2017) were the key factors that contributed to these disparities. The inequality of economic opportunities (Köllő, 2011; Tóth, 2016), unemployment (Brzezinski, 2018; OECD, 2019), massive welfare expansion in 2003 (Hills et al., 2014; Tóth, 2016), and profit-seeking (Mihályi and Szelényi, 2019). In particular, financial rents have been the key drivers of income for those at the top of the distribution ladder in the last decades (Stiglitz, 2012, 2016; Bolton et al., 2016).

According to the theory and empirical data presented in Chapter 3, money is one of the most important drivers of disparities in most countries, including Hungary. According to ECB data (2016, 2021), capital income accounts for a significant share of top decile income, and financial assets may be a main factor in the rise in income and wealth concentration. Furthermore, poor and low-income families may be disproportionately disadvantaged by FD and FL policies, as well as FC responses (De Haan and Sturm, 2017). However, FD helps to lessen the persistence of relative income gaps by expanding economic opportunities for the poor, independent of inheritance wealth, hence increasing labor demand. Furthermore, it helps to lessen the persistence of relative income disparities across generations by reducing wealth inequality. This will be thoroughly addressed in the following sub-chapter. Summary inequality statistics for long series can be found in several cross-national databases, including the Luxembourg Income Study and Wealth Study Databases (LIS), the World Income Inequality Database (WIID), the World and Wealth Income Database (WID), the Standardized World Income Inequality Database (SWIID), the Global Consumption and Income Project (GCIP), and the World Bank's PovcalNet (PIP). The OECO, EUS, and HSCO databases hold data for a limited period. However, the income and earnings inequality statistics reveal disparities in levels and trends. For example, the OECD database indicates a rather consistent development from 1990 to 2010, with a Gini coefficient ranging from 0.27 to 0.30. The HSCO and Eurostat datasets, for instance, show a peak in 2005 (HSCO) and 2006 (Eurostat), with the Gini hitting 0.333 before rapidly declining to roughly 0.255 the following year, then to 0.24 by 2009. However, all of the data show increasing inequality after 2010, followed by stagnation in recent years, as measured by the GINI index (Figure 17). The figure shows that GCIP and PIP are long series with the same shape as HSCO since 2004.

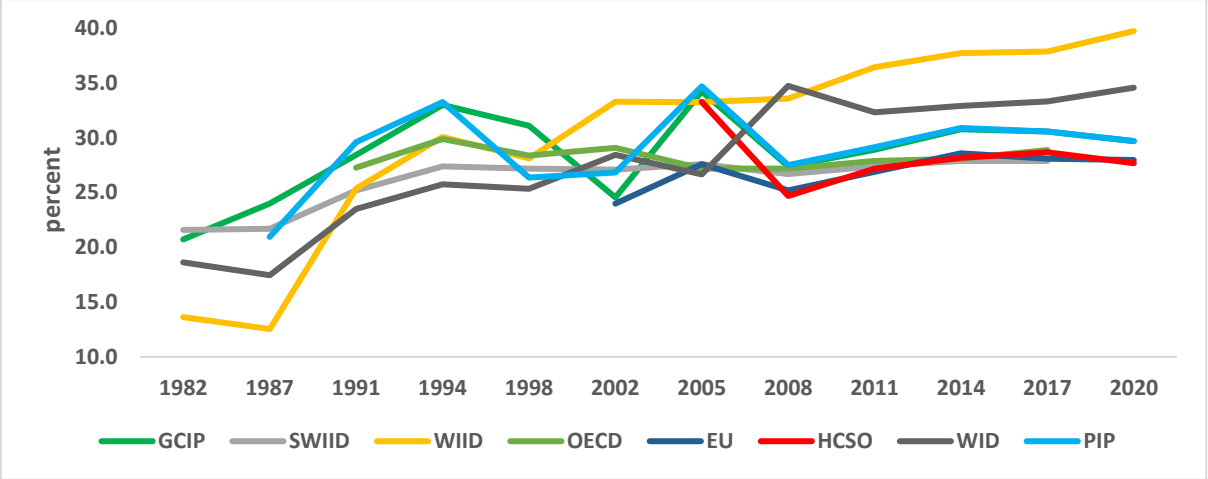

Figure 17. Development of GINI indicator.

Source: own calculation based on data from OECD, WIID, HSCO, EU-SILC, WBI, and UNDP.

The Gini coefficients, which primarily measure income disparity, are a popular measure of outcome inequality among inequality researchers, and they are the preferred income concept (United Nations, Canberra Group, 2011). This coefficient (which is 0 when everyone has the same income and 1 when one person has the entire income) is calculated using market (gross) and net disposable income (Dabla-Norris et al., 2015). Income disparity in Hungary decreased throughout the communist era. However, inequality patterns diverged throughout time from 1982 to 2020 (Figure 12). Disposable income disparity expanded significantly between the late 1980s and the mid-1990s as a result of severe job losses and the government's austerity programs. The Gini index stagnated between 1996 and 2003 due to economic growth and employment, albeit only among young, educated labor groups. Financial liberalization encouraged FDI, resulting in significant technological modernization of large production processes. Furthermore, pay increases occurred between 2001 and 2003, coupled with significant assistance programs, the majority of which benefited middle- and lower-income individuals.

According to the HCSO database (2022), Gini peaked in 2005 at 33.3 percent. The impact of the 2008-09 financial crisis and the Great Recession up to 2013, as well as changes in income tax and social policies in reaction to the crisis, all contributed to a large increase from 24 percent afterward to almost 28 percent by 2020. Despite significant increases in employment after 2010, the adjustments have hurt income equality. The people in the top decile have benefited the most from these measures, while those in the lower income distribution have been the most harmed.

Recent research on top-income (1 percent and 10%) shares has found that they have a major impact on inequality. The data utilized is from the World Income Database (WID); only the WID contains long series data. The Hungarian top income share followed a distinct U-shaped pattern during the last century, with the lowest values occurring during the communist rule, followed by a dramatic rise in top income shares beginning in the middle of the 1980s. Figure 18 depicts the evolution of the top 1- and 10%-income shares in Hungary from 1980 to 2021. It should be highlighted that the sharp movements in their shares are due to shocks to capital income. For example, after the FC in the 1991 and 2008 crises, those shares fell marginally; however, they have since increased, reaching 12.39 in 2019, with capital income accounting for the whole gain.

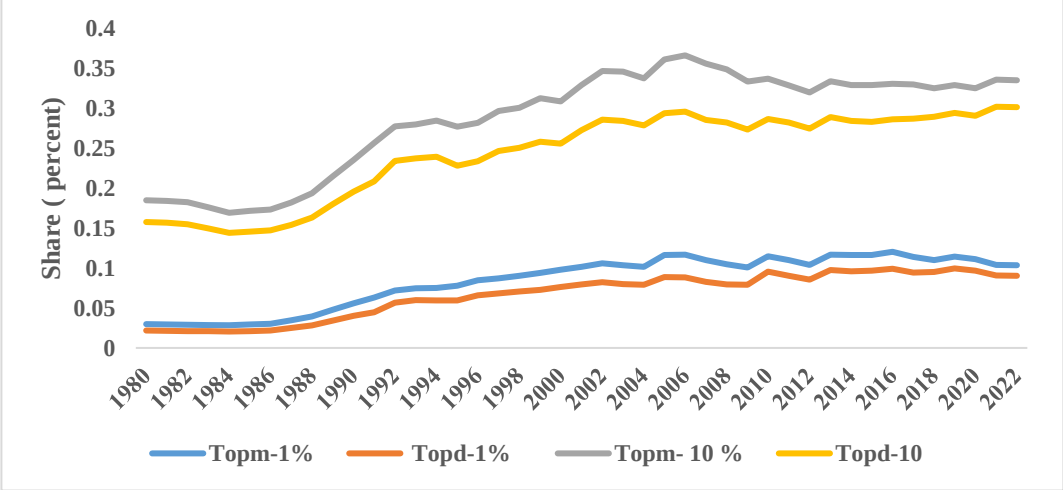

Figure 18. The top 1 and 10 percent income share in Hungary from 1980 -2022.

Note: Topm-1 percent and Topm-10 percent are the shares of the top 1 and 10 percent before tax and Topd-1percentand Topd-10percentare shares of those top percent after the tax.

Source: own calculation based on data from WID.

Similarly, the growth of the top 10%'s shares follows the same pattern; we also detect a rising long-term trend. Following World War II, the richest 10% of Hungarians received up to 23.3% of total income, which then declined significantly to a record low of 16.6% in 1984. Despite a four-point gain between 2007 and 2010, their percentage has more than doubled in recent years (about 34 percent). Importantly, the post-tax share of the top ten percent climbed faster than the pre-tax share during the period, indicating that tax changes contributed to the growth, particularly since 2010. Between 1980 and 2021, the share of Hungarian income going to the top 10% with the highest disposable incomes fluctuated between 14.4 and 31.2 percent, while the share going to the bottom 50 percent with the lowest incomes decreased from around 44 percent in 1984 to 26 percent in recent years (Figure 19).

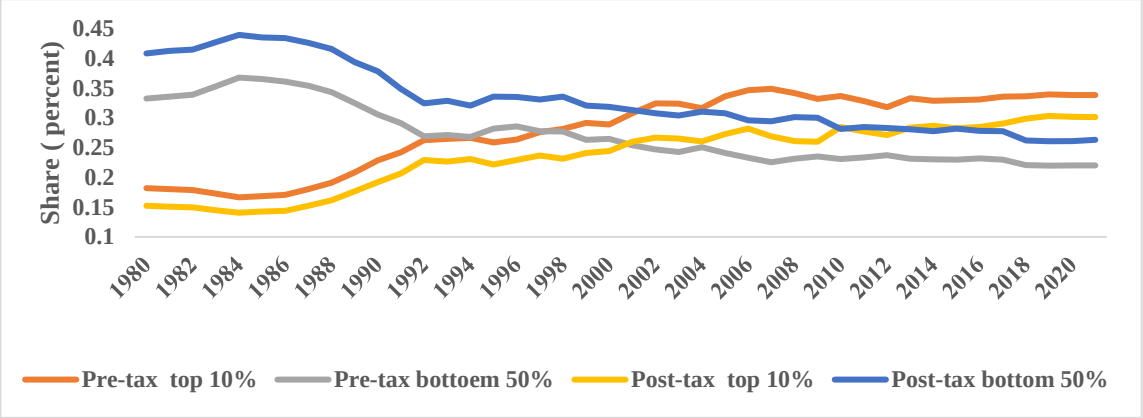

Figure 19. Top 10 percent and bottom 50 percent shares, pre- and post-tax.

Source: own calculation based on data from WID.

Between 1980 and 2020, the wealthier class in Hungary enjoyed economic growth more than the other classes, reaching a peak of 42.06 percent in 2005. It decreased about 35 percent in 2009, then increased again in recent years. The following visualization shows recent trends in income shares by five quantiles (Figure 20). It is worth mentioning that between 1962 and 1982, the poorest two quantiles of households saw their share of total income increase from 23.6 (percent) to 26.7 (percent) (Atkinson and Micklewright, 1992). Although the middle earners moved far from the lowest earners, it was neither in the degree nor speed as the top did, suggesting there was more movement up the income ladder than the middle and down the income ladder.

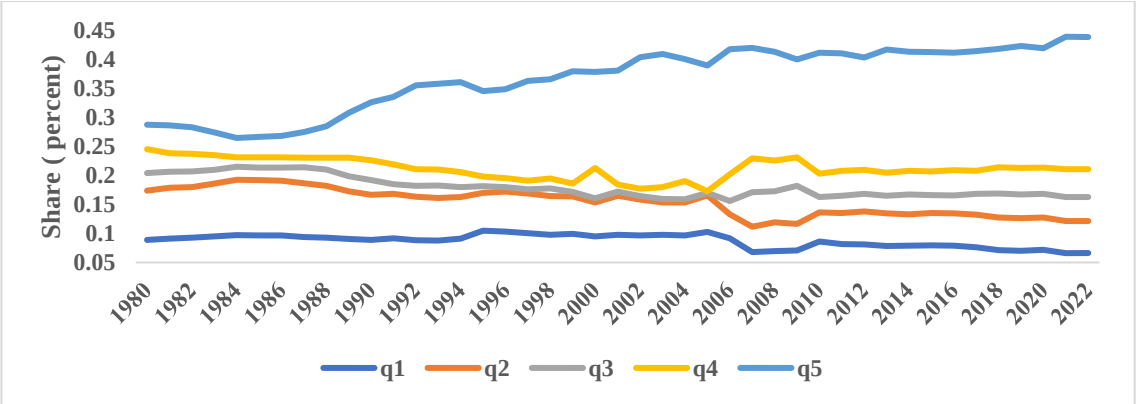

Figure 20. Changes in the income shares of the population by quintile.

Source: own calculation based on data from WID,2021.

2. POVERTY TRENDS IN HUNGARY

Income disparity has an impact on poverty reduction (Ravallion, 2004) because it exposes a substantial proportion of the population to poverty as a result of periodic shocks of various types that

weaken growth. Poverty changes are particularly influenced by social welfare systems, the dynamics of total employment growth, fair distribution, and work intensity (Kopasz et al., 2013; Gábos et al., 2015). The number of persons living on less than $6.85 per day has climbed from around 85 thousand to 2759 thousand. Between 1982 and 1989, the annual growth rate increased by more than 25 percentage points (WBI, 2024). The crisis and ensuing periods saw the highest ratios; nevertheless, the pandemic had little impact on the poverty ratio. Might the governments put social protection measures.

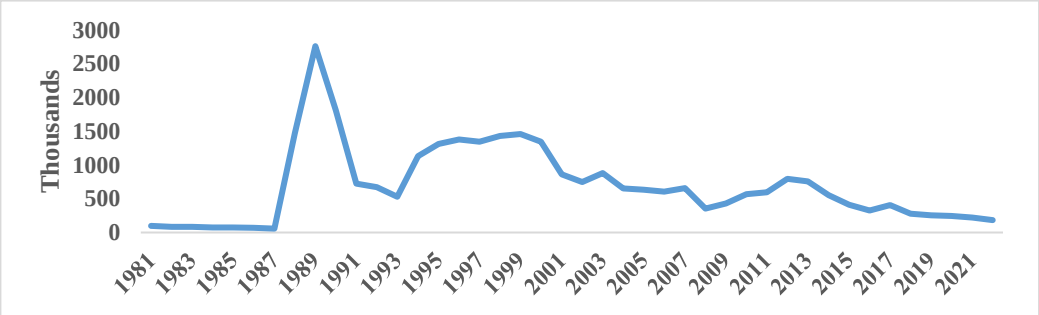

Figure 21. Number of people living below $6.85 a day, 1981- 2021, (thousands)

Source: own calculation based on data from WBI (2024), Poverty and Inequality Platform.

Figure 21 demonstrates that poverty indicators began to rise before the FC in 1991 and 2008 as a result of a drop in real income and employment, as well as the deployment of austerity measures (Branyiczki et al., 2019). However, the crisis exacerbated poverty by causing low-income households to struggle to pay their public utility bills or rent a home (OECD, 2016), as well as cuts in social and unemployment benefits and fiscal policy adjustments. The financial crisis has had a clearer influence on poverty in Hungary, raising the likelihood of poverty ratios. Hungary is one of the countries with a relatively low overall risk of poverty, but absolute poverty (as measured by the indicator of severe material deprivation ratio) remains among the highest in the EU (Branyiczki et al., 2019), although it has markedly decreased in recent years after increasing as a result of the crisis. According to HCSO data, the absolute poverty rate reached a high of 27.8 percent in 2012 before falling to 8.7 percent in 2018, as seen in Figure 22. However, it is higher by 3.92 and 3.2 points than the averages of the three V3 countries and the EU (HCSO, 2021).

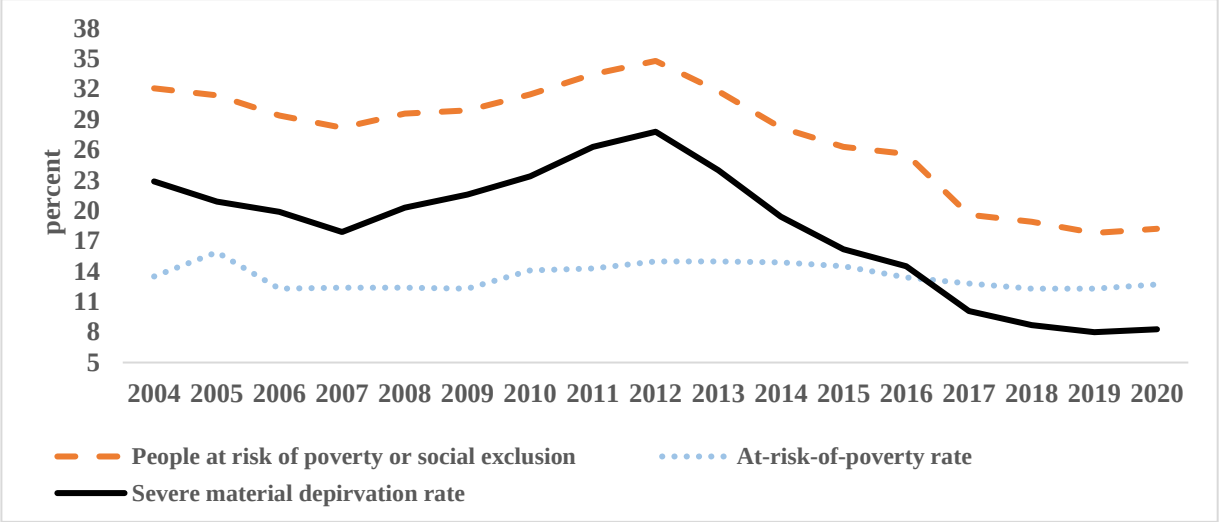

Figure 22.Dynamics of income poverty and dynamics of deprivation.

Source: own calculation based on data from HSCO, 2021.

The severe material deprivation ratio of the lowest decile of the population increased from 46.4 percent in 2004 to 64.9 percent in 2012, while this ratio among the top-income decile decreased from 5.4 percent to 4.9 percent during the period. In the recent period, those ratios slowed down to the lowest values in 2020 (HCSO, 2021). The proportion of those affected by lack of potential for covering unexpected expenses is the highest indicator of material deprivation in Hungary, which was 53.3 percent, 75.9 percent, and 34.8 percent in 2004, 2013, and 2018, respectively. Followed by no yearly one-week vacation indicator. Additionally, material and social deprivation rates have a strong territorial concentration. Northern Hungary, Southern Transdanubia, and Northern Great Plain regions have the highest ratios, which were 27.7 percent, 39.8 percent, and 32.6 percent in 2012 (HCSO, 2021), respectively. The lowest severe material deprivation rate in Central Transdanubia and Western Transdanubia regions did not exceed 24 percent even in the most difficult times.

Descriptive Statistics

Table 22 summarizes descriptive statistics on income inequality and the primary factors that lead to inequality, as well as FD variables. Looking at income inequality variables, the mean Gini coefficient is 0.27 with a high of 0.30; the mean share of the top 10% of income is 0.24, with a maximum of 0.37. The standard deviations of these variables are 0.06 and 0.06, respectively. While the average net personal wealth top 10% share is 0.61%, the maximum is 0.67%. Looking at the financial indicators, we can see that the average credit to households (percent of GDP) is 18.45 percent, with

a maximum of 39.5 percent of GDP. The mean of the share of credit to non-financial corporations (percent of GDP) is 57.94 percent.

Table 22. Summary descriptive statistics for income inequality

	Mean	Maximum	Minimum	Std. Dev.	Observations
PO_T10	0.24	0.3	0.14	0.05	42
PO_GINI	0.27	0.37	0.16	0.06	42
W10	0.61	0.67	0.59	0.03	27
HC	3.01	3.42	2.65	0.25	40
EMP	-0.27	4.56	-8.38	2.38	42
GDP	1.62	7.12	-11.89	3.54	42
KOF	66.49	89.9	41.83	18.46	42
KOJ	66.69	85.77	39.61	16.25	42
CH	18.45	39.5	4.4	9.38	42
CNC	57.94	92.9	37	16.17	42
CPNB	39.32	59.4	23.1	10.02	42
FD	0.41	0.57	0.24	0.09	40
FDI	0.45	0.61	0.32	0.07	40
FMI	0.36	0.63	0.15	0.15	40

Note: PO_Gini is the Gini coefficient after tax, PO_T10 is a share of top 10 income, W10 is the share of top 10 wealth, HC is a human capital index, EMP is a rate of employment, GDP is the GDP per capita, KOJ and KOF is the financial Globalization indicator, de jure and de factor, CH is a credit to households percent GDP, CPNB is a credit to the private non-financial sector from banks percent GDP, FD is a FD index, FDI is a financial institutions development index, FMI is a financial markets development index, CRP is a credit to non-financial corporations percent of GDP.

Source: own calculation based on data from (WID,2021) and (WBI, 2021).

Tables A-8 and Figure A5 in the Appendix show the matrix correlation of the variables of inequality. It demonstrates that the inequality indicator, share of top 10 income, has a significant positive link with all variables except the employment rate gross and GDP per capita growth, which are not significant. The connection (0.81) was stronger with the FD of financial institutions and with human capital (0.76). Financial variables were likewise positively connected with the GINI coefficient, although GINI is inversely correlated with GDP growth.

3. WEALTH INEQUALITY IN HUNGARY

Household wealth is often utilized to smooth consumption, produce capital income, save and invest, and shield individuals from unforeseen income fluctuations. A full examination of wealth and distribution, and the factors that influence this distribution, is critical for policies and business cycles

(Lucas, 1987; Stiglitz et al., 2009). Furthermore, the 2008 global financial crisis highlighted the importance of understanding and assessing unequally distributed wealth within a society, particularly financial wealth (Stiglitz et al., 2009).

On the other hand, wealth disparities received insufficient attention until recently due to a paucity of high-quality data (Cowell, 2012) and the limitations of biased theory (Stiglitz, 2015, 2016). Indeed, Davis et al. (2011) assessed the global wealth distribution for the first time. Wealth disparity is expected to be strongly linked to income inequality. Recently, the economic and social literature broadly acknowledged that wealth disparity had increased significantly as a result of a series of policy and structural changes, as well as elite interests (Piketty, 2014; Stiglitz, 2015, 2016). According to Stiglitz, the capital economy serves society when it is competitive, but it is harmful when large corporations use leverage to profit at the expense of the general public. He underlines the importance of monopolies and rent-seeking in wealth inequality. According to Piketty's book "Capital in the 21st Century," rising average annual rates of return on capital investment may lead to more wealth inequality than average yearly growth in economic production. Between 2000 and 2019, in Hungary, growth wealth was higher than growth GDP, with an annual average growth wealth per adult of 2.8 percent (in real USD), compared to 2.4 percent annual average growth GDP per adult, according to the Global Wealth Data Book in 2019. The share of non-financial assets in gross household wealth was higher until 2014, when the share of financial assets exceeded it, and those assets are held by only higher-income households, according to the Household Finance and Consumption Surveys (HFCS) at the end of 2014 and 2017 (ECB, 2021). The upper quintile has a strong financial concentration, accounting for around 74% of financial instruments in 2014 and 79% in 2017. More specifically, those in the tenth decile owned more than 70% in both years, whereas the bottom half of households owned only 1% of listed shares in 2017. Furthermore, a significant number of households at the bottom of the distribution have negative net wealth (Morrisson and Murtin, 2013; Cowell et al., 2017). Wealth disparities in families in Hungary may evolve in several ways throughout time. To some extent, the socialist period was relatively low, and the 1990s transfer of public wealth to private hands resulted in a rise in wealth concentration among the top decile. While the wealth of sole proprietorships grew rapidly. Revaluation of property values has also contributed to wealth creation and expansion of financial equity wealth, albeit on a smaller scale (MNB, 2017a).

Hungary's wealth has increased dramatically, despite a setback in 2008 due to the global financial crisis and currency changes. Total wealth climbed from 95 (USD billion) in 2000 to 547 (USD

billion) by 2021. Between 2000 and 2021, median adult wealth climbed by 4.8 times to $ 31095, at an annual average rate of 1.17 percent (GWD, 2022). In Hungary, real and financial assets account for the vast majority of household wealth. Table 23 shows the distribution of wealth in Hungary into financial and real (non-financial) categories, and the average debt level.

Table 23. Assets and debts as a percentage of gross household wealth in Hungary, 2000-2021

Share (percent)	2000	2003	2006	2009	2012	2015	2018	2021
Financial	0.39	0.45	0.53	0.56	0.57	0.57	0.51	0.47
Nonfinancial	0.67	0.66	0.64	0.65	0.61	0.55	0.58	0.61
Debt	0.05	0.12	0.17	0.22	0.18	0.12	0.09	0.08

Source: own calculation based on data from GWD raptors.

According to GWD, the median wealth per adult in Hungary increased from $5336 in 2000 to $31095 in 2021. The financial crisis in 2008 also caused a drop of 15 percent in median household wealth between 2008 and 2010. However, since 2013, as the stock of financial assets has rapidly grown, individual and household capital investments have expanded again, reaching USD 33098 in 2021, fostering wealth inequality in Hungary. For example, there is significant inequality in 2021, as evidenced because 70 percent of the adult population had a wealth of less than USD 100,000 (mainly real estate, such as a home) at the end of 2022. Only 15.5 had a net worth between USD 100,000 and less than USD 1 million. At the other end of the spectrum, only 0.4 percent of adults had a net worth of more than USD one million (GWD, 2022). In this context, the top 10 percent of wealthiest households own roughly two-thirds of total net wealth (Figure 23), with the top 1 percent owning more than 33 percent according to WID and more than 25 percent according to GWD in 2021. The net personal wealth top 1 percent share exceeded the share of the bottom 90 percent since 2017 (WID, 2023). The largest drops were observed for households at the bottom of the income and wealth distributions, while the largest increases were observed for households at the top of this distribution.

There is no comprehensive data on household wealth and its distribution in Hungary before 2014. Particularly, the aggregate statistics cannot provide information on the financial well-being of various segments of the national economy (Boldizsár et al., 2016). Indeed, the World Inequality Database (WID) has information about wealth distribution since 1995, and the Global Wealth Databook (GWD) has been published by Credit Suisse since 2010.

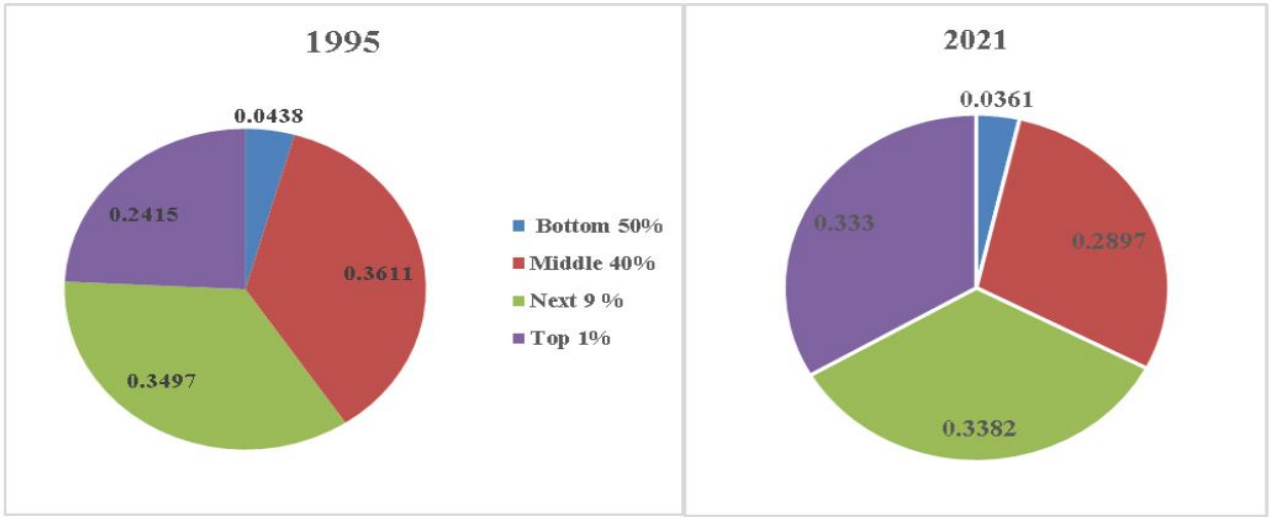

Figure 23. Distribution of household wealth in Hungary, 1995 and 2021.

Source: The author.

However, there is a difference between the two databases, owing to conceptual differences, different methodological assumptions, and measurement and estimation errors inherent in each source (Balestra and Tonkin, 2018). For example, there is more than a nine-point difference in the GINI coefficient between the two databases (see Figure 24).

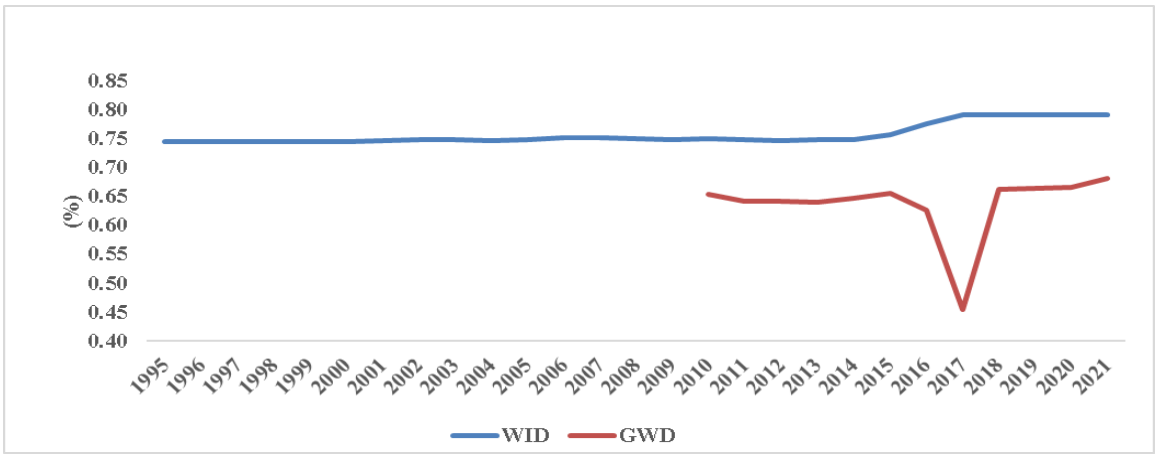

Figure 24. Hungary's Wealth Gini Index, 2010 -2021.

Source: data from Credit Suisse from 1995 to 2021 and world inequality database.

According to the WID, Hungary's wealth Gini index increased from 74 percent in 1995 to 79.2 percent in 2021 and from 64.1 percent in 2012 to 66.5 percent in 2020, slightly outperforming the Visegrád competitors' average by 0.3 points (66.2 percent), according to GWD projections. Slightly

increased wealth inequalities in 2020 as a result of the coronavirus pandemic, with equity and house prices rising, primarily for the top income categories, while incomes in other categories did not change or fall due to unemployment or reduced work hours. The wealth Gini coefficient in Hungary, however, is lower than the EU average (71.1 percent) and even in a global and EU comparison (MNB, 2021a), owing to historically high homeownership but rising inequality. This high is due to Hungarians saving or borrowing mostly for the acquisition of their main property (Boldizsár et al., 2016). However, because financial wealth is concentrated in the top decile, wealth disparity is twice as high as income inequality. The highest income quintile has the highest share of financial savings, particularly in savings accounts, stocks, bonds, and other securities. The lowest income quintile had the largest ratio when it came to household debt, whether to banks or other financial institutions (Tóth and Medgyesi, 2011). Households' net financial wealth increased steadily in 2010, owing to the reduction of household liabilities after the peak registered in 2010 (even as a percentage of GDP) through the consolidation process with the MNB's market regulation measures, such as early repayment at preferential terms and conversion into forints. Savings rates, household government securities holdings, shareholdings, and cash, on the other hand, surged sharply as earnings improved while employment and wages increased at the same time. Furthermore, increases in financial conduct and knowledge lead to an increase in household financial assets. By 2020, both the Hungarian saving rate and families' net financial wealth were high compared to the EU, with households' net financial wealth reaching 115.7 percent of GDP, up from 70 percent in 2010 (MNB, 2020). However, the rising savings rate during the coronavirus pandemic was attributable to increased prudence and suppressed spending as a result of the lockdowns, despite the fact that loan installments were suspended, which also impacted the overall savings rate. Household financial asset growth (in nominal terms) outpaced GDP growth in 2020, increasing net financial wealth (MNB, 2021). Wealth inequalities expanded slightly in 2020 as a result of the coronavirus pandemic, with equity and property values rising, especially for the highest income categories, while incomes in other categories remained constant or fell due to unemployment or reduced work hours.

Descriptive Statistics

Based on the data in Table 24 and the descriptive statistics of the variables, the wealth Gini coefficient index had an average value of 0.76. The greater value of 0.79 has been attained in recent years, beginning in 2017, whereas the lower value occurred in the mid-1990s. The 2008 financial crisis caused fluctuations in both financial and nonfinancial wealth per adult. However, with the rapid development in the stock of financial assets, individuals' capital investments grew once the

crisis had passed. The average value of nonfinancial wealth per adult was $21035.95, while financial wealth per adult was $17920.68.

Table 24. Summary statistics for wealth inequality variables

	Mean	Maximum	Minimum	Std. Dev.	Observations
GINI	0.76	0.79	0.74	0.02	27
GDP	2.55	7.12	-6.6	3	27
EMP	0.55	4.56	-2.2	1.67	27
NFW	21035.95	43366	8079	8421.66	22
FW	17920.68	33098	4693	7364.13	22
FDI	0.45	0.57	0.29	0.07	27
SMR	17.1	119.85	-24.12	35.56	26
SMT	63.47	118.35	18.82	27.33	26
CH	20.18	39.5	4.4	11.03	27
CG	24.52	48.01	14.92	8.75	26
TER	50.18	66.4	21.27	13.56	27
SEC	99.91	107.07	92.98	3.85	27

Note: GINI is the Gini coefficient of net personal wealth, GDP is the GDP per capita, MPR is the ratio of employers, total (percent of total employment, FW is financial wealth per adult, NFW is a non-financial wealth per adult, FD is financial development, SMT is a stock market turnover ratio (percent), SMR is a stock market return (percent), CH is a credit to households and NPISHs percent GDP, TER is a gross tertiary enrollment(percent), is gross secondary school enrollment(percent), CG is a stock price volatility rate.

Source: Author`s calculations

Table A-9 and Figure A6 in the Appendix show that this wealth distribution is positively associated with nonfinancial wealth (0.77) rather than financial wealth (0.69); it is also correlated with gross secondary school enrollment (percentage). The correlation matrix shows a (small) positive association between the employment rate, stock market return (percentage), and GDP per capita. The other explanatory variables, such as financial variables and gross tertiary enrollment (percent), have a negative connection with wealth inequality.

4. INEQUALITY OF OPPORTUNITIES

Inequality of opportunities is often measured by human development outcomes by income group, and by access to health services, educational attainment, employment, and basic services as well.

a. Human Development Outcomes, Education, And Health Inequalities

Access to quality education significantly affects income inequality trends, inequalities of opportunity, inclusive growth, health status, and social cohesion (Treiman and Yip, 1989). Despite significant education growth since the late 1990s in Hungary, there is growing concern that these benefits are not equally distributed among students. Parental background plays an important role in student trajectories and university access (Eurofund, 2017; Róbert, 2019; Medgyesi, 2019; WEF, 2020; UNDP, 2021), particularly in university degrees (Hordósy and Szanyi, 2020). Financial abilities also play a significant role in children's studying and future earnings. Bukowski et al. (2021) compare social mobility rates during two Communist regimes and modern liberal democracy in Hungary between 1949 and 2017. They found that social mobility rates were low for both upper- and lower-class families, with the Romani minority having lower rates.

Social mobility rates in Hungary remain constant, even with FD. Education plays a significant role in labor force market inequality (see Medgyesi, 2014; Kopasz et al., 2013; Róbert, 2019), with varying employment rates and earnings inequality. Tertiary graduates have a higher employment growth rate, with employment rates above 78% of the working-age population between 1997 and 2020. Upper-secondary graduates have employment rates between 66% and 79.9% (HCSO, 2021). The least educated individuals have the lowest employment growth rate. Graduates also have faster entry into the labor force after leaving education compared to lower-level schooling individuals (Bukodi and Róbert, 2011). The pay premium associated with higher education has significantly increased, particularly during the transition period due to economic and technological challenges(Medgyesi, 2014; Keller and Róbert, 2016).

In Hungary, the median equivalised net income of people with tertiary education exceeded that of those with less than primary and lower secondary education by 103% in 2006 and by 49.12 percent for those with upper secondary and post-secondary non-tertiary education (Eus, 2021). This gap decreased until 2009 but increased again until 2016. FD in Hungary does not contribute to improving access to education or education equality, and income inequality is still significantly explained by education in 2020, albeit with a slight change. Recent studies show that healthcare access in European countries, including Hungary, has improved in recent years (Forster et al., 2018; Baeten et al., 2018). However, health inequalities persist both between and within countries. These inequalities persist either between or within countries, highlighting the need for improved healthcare access and policies. Differences by gender, birthplace, and socio-economic background are higher

in lower socio-economic groups because of multiple hurdles. For instance, Roma health is worse than non-Roma populations, partly because of lower levels of education and unhealthy behavior (Vokó et al., 2009).

Hungarian health has seen improvements since 2000, with the government reforming healthcare, increasing access to healthcare, and boosting primary care. This has led to a decrease in life expectancy inequality from 6.6% in 2010 to 4.2% in 2019, higher than the Czech Republic, according to UNDP data, 2022). Despite universal healthcare, Hungary's coverage rate and efficacy are low, and health outcomes remain poorer than most EU nations and regional levels (EU, 2020). Hungary has a lower life expectancy at birth, high rates of avoidable mortality and non-communicable diseases, and unhealthy lifestyles, including smoking and excessive alcohol consumption, contributing to cardiovascular and cancer mortality (OECD, 2020). Hungary also falls behind in most categories of the Global Social Mobility Index.

Life expectancy indicators, which measure socioeconomic disparities in health and education, show a positive relationship between educational attainment, life expectancy, and healthy life years (Corsini, 2010). Higher mortality rates are observed among the least educated, particularly men. In Hungary, life expectancy at birth has increased from 69.8 years in 1995 to 74.2 years in 2010, and 76.4 years in 2019. However, Hungary ranks among the lowest in the EU and lags behind V3 countries. The gender gap in life expectancy at birth has decreased from 4.3 years in 1960 to 6.6 years in 2019, and 6.8 years in 2020, according to the life expectancy at birth indicator of the OECD (2021). For women, the gap between those with the lowest and highest levels of education is smaller than for men.

The Sustainable Development Goal 3 (SDG) aims to reduce healthcare inequalities and provide quality health services without financial hardship, particularly for vulnerable populations. Studies show a positive relationship between access to financial services and investment in preventive health, with effects generally higher at the lower income distribution (Ashraf et al., 2010; Dupas and Robinson, 2013). Rising inequality hinders individuals from maintaining their health and acquiring physical and mental health, making strengthening health financing a crucial objective (Galor and Moav, 2004; Dabla-Norris and others, 2015). Hungary’s health spending as a percentage of GDP in 2019 is equal to 1991, a low figure compared to other V3 countries and the EU average. This low expenditure results in weak healthcare effectiveness, limited benefits, and limited access for poorer households. Waiting lists also increase. People are pushed to private care, relying on out-of-pocket

expenditures for medicines. This limits healthcare access and increases financial difficulties for Hungarian families, exacerbating disparities between the wealthy and poor. The OECD/European Observatory (2019) found modest differences between income groups in terms of access to medical examinations and treatment but a higher gap in unmet needs or less well-covered services. The limited benefits package, high excess fees, and informal payments require high out-of-pocket payments, which accounted for approximately 27% of health spending in Hungary in 2018. This spending exceeds 40% of total household spending net of subsistence needs, causing financial hardship for the lowest income group.

Access to pharmaceutical products in Hungary is a significant factor in inequality because of high charges for pharmaceuticals and medical devices, which are one of the highest rates in EU countries. This exclusion of vulnerable populations contributes to their exclusion (Baeten et al., 2018). Financial protection mechanisms or exemptions for low-income or high-risk groups are lacking. The financial crisis in 2008 and subsequent economic crisis led to an increase in unmet health needs, with 12 percent of households facing catastrophic spending on health in 2015, as the OECD/European Observatory (2019) has reported. In Hungary, socio-economic background remains a significant determinant of an individual's life outcomes, with health and well-being being strongly correlated to their financial abilities. Access to education and healthcare is a human right, but inequalities exist between individuals and regions. Despite Hungary's developed financial system, the availability of quality education and health services varies due to financial reasons. The theory suggests that FD can influence health and well-being equality by increasing fiscal revenue and spending on public goods and services, improving income disparity (Barro, 2000; Li and Zou, 2002). However, low investments in education and health limit the scope of benefits and constrain access for poorer households, especially in remote regions. Widening rich-poor health increases fertility, reducing health accumulation and hindering economic growth (Berg et al., 2018). FD in Hungary may not boost investment in health and skilled workforce. Inequality in access to health and quality of education persists across generations due to human development outcomes. High-income populations tend to live longer lives and have good jobs, but finance is not the sole driver of education and health inequalities.

Contrary to economic theory, in Hungary, socio-economic background significantly influences life outcomes, with health and education being correlated with financial abilities. Despite the development of the financial system, inequalities persist between individuals and regions, with

differences in the quality of education and healthcare services because of financial reasons, even though access to education and healthcare is a human right in Hungary. The theory suggests that FD can improve HC equity by increasing fiscal revenue and government spending on public goods and services like education and health (Barro, 2000; Li and Zou, 2002). However, low investments in these areas limit the benefits package's scope and restrict access for poorer households, particularly in remote regions where investments are distant. Widening rich-poor health disparities increases fertility in poor and low-poor public health, reducing health accumulation and hindering economic growth (Berg et al., 2018). In Hungary, FD may not boost investment in health and skilled workforce. Inequality in access to health and education is a significant challenge, particularly in poorer households. Lack of finance perpetuates this gap across generations, affecting future outcomes. High-income populations tend to live longer and have better jobs, but finance is not the sole driver of education and health inequalities.

b. Labour Market Inequalities in Hungary

Labor market inequality is a result of various factors such as health care, macroeconomics, FD, and institutional quality. The main influence is HC outcomes, which can lead to disparities in pay and employment opportunities (Atkinson and François, 2015). In Hungary, macroeconomic variables, globalization, HC outputs, and labor work rules contribute to work inequality. For example, the early 1990s transition process led to job destruction and lower employment rates, particularly among older and less qualified workers (Milanovic, 1999). Skill-biased technology has primarily benefited educated and skilled labor since the 1990s, further exacerbating the issue (Tóth, 2016). Technological advancements and regulatory reforms have led to increased machine replacements and a decline in trade union membership, resulting in greater labor market inequality (Köllő, 2011; Alvadero et al., 2013; Tóth, 2016; Brzezinski, 2018; Benczúr et al., 2018). The lower half of the distribution is particularly affected by changes to social policy redistribution and transfer systems in the public goods market (Brzezinski, 2018; Martinez, 2020). Although the 2010 regulatory reforms increased employment, they also increased inequality, as noted by Jaumotte and Buitron (2015) and Telegdy (2018). Employment inequality arises from the gap between private and public sectors, with the public sector being more volatile due to wage and employment sensitivity to electoral periods and political change. Despite a rise in employment in both sectors over the last decade, public sector employment is heavily gender-biased, with more women workers (Köllő, 2014). The theory suggests that FD contributes to income equality by increasing employment during economic growth but also contributes to unemployment because of financial crises followed by a great recession and a high

unemployment ratio and inequality rates. However, the government can mitigate these impacts, as seen during the epidemic, where unemployment rates were lower than in the European Union and employment losses were marginal.

Hungary's rising earnings inequality because of globalization and FD is attributed to the wealthy exploiting economic and work policies to maximize profits (Wilkinson and Pickett, 2010). This has resulted in a decrease in trade union coverage and labor bargaining power. For example, in 2012, a new Labour Code was established, with less security for jobs and more flexibility for the amendments of the labor code—to somehow have longer probation periods, options for firing without giving detailed reasons, and even cuts in severance pay (Tóth, 2016). In addition, a low labor share as a percentage of GDP and the gross minimum wage. The labor share as a percentage of GDP, a significant indicator of earnings inequality during the communist era, remained constant until the early 1990s and then gradually decreased to less than 49% in 2020. Implying that, inequality increased when the share of capital increased at the expense of the share of work. Regrettably, FDI, particularly with SME firms, has contributed to wage inequality and the difference between foreign and domestic companies (MNB, 2017b).

Average real salaries grew gradually from 1995 to 2007 but stalled in 2016 due to financial crises. They reached the 2008 wage level in 2017. Workers' pay gains varied based on factors like gender, geography, industry, company, and educational attainment. University graduates experienced a significant increase in salary premiums in the 1990s, but these declined or remained stagnant until 2014. Middle-skilled workers lost the most since 2000. Not all low-skilled workers or university graduates have high wage premiums. Labor income inequality in Hungary persists, with the dispersion of gross monthly earnings increasing before the transition began. The P90/P10 ratio increased from 2,6 in 1986 to 4.2 in 2019 and reached its highest value in 2000, while the low and middle-wage percentiles (P5/P1 and P90/P50) follow different paths. Wages in the 10th, 50th, and 90th percentiles show different wage inequality trends than wage differences between education groups from 1992 to 2019, according to data from the OECD database.

In comparison to earnings among the economic activities, the average gross incomes of full-time employees in financial and insurance activities are the highest among all economic activities, followed by information and communication activities (94%). Agriculture, forestry, and fishing only contributed 44% of the gross income of full-time employees in these activities in 2019. Despite a

significant improvement in the Hungarian financial system, the self-employment rate (percent of employment) declined from 20.5 percent in 1991 to 10.8% in 2019 (according to data from the WBI), contradicting the theory of a decline in employment. Otherwise, there are problems like the Roma group facing challenges in labour market integration because of their lower educational attainment and less favourable home environments for cognitive development (Kertesi and Kézdi 2016). Additionally, their regional development levels are lower. However, a significant wage gap between Roma and non-Roma in Hungary has been reported by Kertesi and Kézdi (2011).

Hungary faces challenges with gender employment and the achievement of Sustainable Development Goal 5, with a growing difference between the sexes' employment rates. In 2018, the difference was 15.3 percentage points between men and women aged 20 to 64, which was slightly smaller than in other Visegrád countries but still higher than the EU average by 3.7 percentage points. Factors contributing to gender earnings inequality include males holding top decile income shares and working in high-paying jobs, while men have more opportunities in the private sector. For instance, the number of workers in the R&D sector increased by 75% between 2007 and 2019, but the proportion of women in all researchers remained low at approximately 30%, which is comparable to the 1992 figure (OECD, 2022). Women are more likely to work in minimum-wage jobs and the public sector, particularly in low-productivity fields like healthcare and education. The female employment gap and low fertility are largely because of the lack of daycare. Which significantly influences the decision to have a first or second child (Hétfa, 2019). Despite efforts to reduce childcare burdens, such as increasing childcare places, these efforts are insufficient. The gender employment gap is lower in cities than in rural areas and less in part-time employment compared to full-time.

According to the Hungarian Central Statistics Office data, Budapest, central Hungary, and the west Transdanubia areas have the highest labour income per capita values in the country. The differences in labour income per capita between central and northern Hungary in 2020 are 91.7% in central Hungary and 56.7% in the latter. Hungary's employment rate has also seen a significant increase, reaching parity with the EU average. However, the northern country region saw the fastest rise, but its employment ratios are still lower than other regions. The regions with the lowest employment ratios were Northern Hungary, Northern Great Plain, and Southern Transdanubia, where the ratios did not get over 60 percent even in the best of years. The highest ratios were found at 66 percent in Central Hungary and Budapest (66.5 percent). The coronavirus pandemic has significantly impacted

employment in less developed areas, resulting in increased regional labour market disparities. Central Hungary had a 2.3% unemployment rate in 2019, while Western and Central Transdanubia had the lowest rates at less than 2%, which is less than the 3.3 percent national average. The highest rates were found in Southern Transdanubia, Northern Hungary, and the Northern Great Plain at 4.3% and 4.7%, respectively.

c. Descriptive Statistics

Table 25 presents the statistical characteristics of the data; the mean HDI is 0.80 and its median am is 0.81. The maximum HDI value (0.85) was in 2019, while the minimum (0.71) was in 1992. The results also clarify that the maximum years (76 years) of life expectancy at birth (LFB) in Hungary, and its minimum is 69 years, were in the same years. While the higher number of expected years of schooling is 15.6 years and the minimum is 11 years, they were in 1991 and 2013, respectively.

Table 25. Displays descriptive statistics for human development inequality

	Mean	Median	Maximum	Minimum	Std. Dev.	Observations
HDI	0.8	0.81	0.85	0.71	0.05	32
MRI	7.32	6.25	15.2	3.3	3.52	32
EDX	4.75	4.62	6	3.89	0.6	32
TER	44.8	50.48	66.4	14.34	17.78	32
GDI	0.99	0.99	1	0.98	0.01	32
FD	0.42	0.43	0.57	0.24	0.09	32
FIA	0.38	0.38	0.54	0.24	0.09	32
FMA	0.48	0.53	0.59	0.22	0.11	32
CH	18.29	17.5	39.4	3.9	10.97	31
CRP	61.17	63.7	91.9	36.6	17.32	31
CB	37.51	32.8	59.8	23.1	11.18	31
INF	10.05	5.65	34.82	-0.23	9.46	33

Note HDI(HDI), MRI is the Mortality rate, infant (per 1,000 live births), EDX is Education expenditure (percent of GNI), TER is School enrollment, tertiary (percent gross), GDI is Gender Development Index, GNI is Gross National Income Per Capita, INF is Inflation, consumer prices (annual percent), FDI FD Index, FIA is Financial Institutions Access Index, FMA is Financial Markets Access Index, CH is Credit to Households and NPISHs from All sectors - Percentage of GDP, CRP is Credit to Non-financial corporations from All sectors - Percentage of GDP, CB is Credit to Private non-financial sector from Banks, total - Percentage of GDP., INF is inflation index.

Source: own calculation based on data from (WID,2021; WBI, 2023) and Human development reports.

Table -10. and Figure A7. in the Appendix show that the HDI is correlated positively with all the explanatory variables, including financial variables, and only negatively with inflation (inf), mortality rate, infant (per 1,000 live births), and education expenditure. However, the HDI has a higher correlation (0.99) with life expectancy at birth (LEB) and (0.97) with mean years of schooling

(MYS) and is also relatively highly correlated with gross national income (GNI), per capita, expected years of schooling (EYS), and the and the gross enrollment ratio for tertiary (TER) school (0.94, 0.93, 0.88), respectively. The financial variables and HDI have correlations ranging between (0.86) with the financial markets access (FMA) index and (0.45) with credit to the private non-financial sector from banks (CB), total- percentage of GDP. Deductive and descriptive analysis provide valuable insights into the relationships between finance and inequalities, but they are insufficient to establish the relationship between the variables under investigation. Therefore, econometric approaches will be used in the following subsection to obtain more trustworthy results regarding the link among the examined series.

5. EMPIRICAL STUDY

a. Data and Econometric Model

This study is based on annual time series data from 1971 through 2019. The statistics are sourced from the WBI's WBI, the World Institute for Development Economics Research (WIDER) International Financial Statistics (IFS), and the Standardized World Income Inequality Database (SWIID, 2020). The present research frequently proposes the notion of the finance-inequality nexus, as indicated below:

$$GINI = f(FD, CV) \qquad (1).$$

In the economic literature, the GINI coefficient represents income inequality, and FD provides a collection of variables that can be used as a proxy for FD (Rao, 2003; Ouyang and Li, 2018; Rao, 2003). The impact of financial resources on inequality is defiance among sectors. Thus, in addition to the credit-to-GDP ratio variable (CRPR), we used other variables as proxies for FD, such as credit to the private corporate sector by all sectors to GDP (CRCRP) and credit to the private household sector by all sectors to GDP (CRHU), both of which are expected to harm inequality. To account for the omitted variable bias, additional explanatory factors were included in the empirical model. Especially since several studies have found that they have an impact on the relationship between FD and income inequality, as well as the ratio of government expenditure to GDP. For example, Jauch and Watzka (2016) stated that government expenditure in the economy could exacerbate inequality through rent-seeking behaviors; nevertheless, in this study, it is projected to have a negative impact on inequality. Following Ang (2010), the consumer price index (CIP) as a proxy for inflation was

introduced to the empirical model as an explanatory variable. Because inflation has a significant negative impact on income inequality (Fischer, 1983), I expected the connection between CIP and income equality to be negative. The reverse effect might be expected with increased school enrollment rates (SEC) or a growth in the number of employees (EMP), reducing income inequality, although this impact is equally influenced by education quality as well as labor market supply and demand. However, increased education and skills result in higher pay and job prospects.

For robustness testing, this work used inequality in disposable (post-tax, post-transfer) income, credit to the household sector, and credit to the corporate sector. As a result, we employ inequality in market (pre-tax, pre-transfer) income and credit to the private sector to ensure robustness. It has also employed secondary and tertiary school enrollment (percent of gross) as robustness checks. Similar to how we utilized GINIM.

Thus, to analysis of the relationship between economic growth and FD in Hungary will be employed based on the following general model:

$$\text{GINI} = f(CRCRP,\ CRHU, EMP, GOV, SEC, CIP) \qquad (2)$$

As discussed above the ARDL approach is an appropriate method to investigate the cointegrating links among different series in this study. The error correction formulation of the ARDL model, according to Pesaran et al., (2001), is:

$$\Delta GINI_t = \alpha_0 + \sum_{i=1}^{p} \alpha_{1i}\, \Delta GINI_{t-i} + \sum_{i=0}^{q1} \alpha_{2i} \Delta CRCRP_{t-i} + \sum_{i=0}^{q2} \alpha_{3i} \Delta CRHU_{t-i} + \sum_{i=0}^{q3} \alpha_{4i} \Delta EMP_{t-i} + \sum_{i=0}^{q4} \alpha_{5i} \Delta GOV + \sum_{i=0}^{q5} \alpha_{6i} \Delta SEC_{t-i} + \sum_{i=0}^{q6} \alpha_{7i} \Delta CIP + \beta_1 GINI_{t-1} + \beta_2 CRCRP_{t-1} + \beta_3 CRHU_{t-1} + \beta_4 EMP_{t-1} + \beta_5 GOV_{t-1} + \beta_6 SEC_{t-1} + \beta_7 CIP_{t-1} + \varepsilon_t \quad (3)$$

Where GINI represents income inequality as a dependent variable, while the other variables are independent variables as identified above, and ε t is an error term. Where the variables are as earlier defined. Δ represents the first difference operator, α 0 is the constant term, α1, …, α 11 are the short-run coefficients, and β1, …, β11 represent the long-run coefficients.

Following the approach of (Pesaran et al., 2001), the next step after determining the optimal lag lengths p and q1… q7 for the ARDL model, which are selected automatically using AIC or SIC, is Pesaran et al.,'s (2001) bound test. This step uses the calculated F-statistic, which is compared with the lower and upper critical bound provided by Pesaran (2001) and modified by Narayan (2005). The null hypothesis of no cointegration H0: θ1 = θ2 = θ3 = θ4 = θ5 = θ6 = θ7 = 0, if rejected, the

alternative hypothesis of existences of cointegration is accepted, H1: θ1 ≠ θ2 ≠ θ3 ≠ θ4 ≠ θ5 ≠ θ6 ≠ θ7 ≠0, which means there is a long-run relationship between the variables.

Having ensured that there is a long-run relationship has existed, then the conditional ARDL model will be conducted that can be used to estimate the following long-run coefficients:

$$\Delta GINI_t = \alpha_0 + \sum_{i=1}^{p} \alpha_i GINI_{t-i} + \sum_{i=0}^{q1} \theta_{1i} CRCRP_{t-i} + \sum_{i=0}^{q2} \theta_{2i} CRHU_{t-i} + \sum_{i=0}^{q3} \theta_{3i} EMP_{t-i} + \sum_{i=0}^{q4} \theta_{4i} GOV_{t-i} + \sum_{i=0}^{q5} \theta_{5i} SEC_{t-i} + \sum_{i=0}^{q6} \theta_{6i} CIP_{t-i} + \mu_t \quad (4)$$

The long-run equation is:

$$GINI_t = \alpha_0 + \beta_1 CRCRP_t + \beta_2 CRHU_t + \beta_3 EMP_t + \beta_4 GOV_t + + \beta_5 SEC_t + \beta_6 CIP_t + \mu_t \quad (5)$$

Finally, if the long-run relationship is found, an ARDL error correction model to assess the error correction term (ECT) is estimated, as in the following equation:

$$\Delta GINI_t = \alpha_0 + \sum_{i=1}^{p} \alpha_{1i} \Delta GINI_{t-i} + \sum_{i=0}^{q1} \alpha_{2i} \Delta CRCRP_{t-i} + \sum_{i=0}^{q2} \alpha_{3i} \Delta CRHU_{t-i} + \sum_{i=0}^{q3} \alpha_{4i} \Delta EMP_{t-i} + \sum_{i=0}^{q4} \alpha_{5i} \Delta GOV_{t-i} + \sum_{i=0}^{q5} SEC + \sum_{i=0}^{q6} \alpha_{7i} \Delta CIP_{t-i} + \vartheta ECT + \varepsilon_t \quad (6)$$

The result (ECT) shows the speed of adjustment back to long-run equilibrium after a short-run shock, which means the extent to which any disequilibrium in the previous period is being adjusted in the next period (Pesaran et al., 2001).

b. Empirical Results

i. Descriptive Statistics and Correlation Matrix

According to the data in Table 26, the average values for GINID (and GINIM) are 25.16 and 46.21. The highest values of the GINID and GINIM were 28 in 2019 and 51 (since 2013), respectively, while the lowest values were in the early 1980s. Credit to the private sector, particularly credit to firms, fluctuates in response to changes in the international credit market and the quantity of FD. Credit ratios for this sector peaked in 2009 and fell to their lowest point in 1993.

Table 26. Descriptive statistics and correlation of the variables

	GINID	GINIM	CRCRP	CRHU	CRPR	EMP	GOV	CIP	TER	SEC
Mean	25.16	46.21	53.66	16.76	70.42	4.64	20.86	8.88	32.14	90.05
Maximum	28.00	51.00	92.90	39.50	130.60	5.44	27.73	34.24	68.28	104.72
Minimum	21.60	40.70	31.60	4.40	39.20	3.92	16.99	-0.22	9.96	72.07
Std. Dev.	2.65	4.39	16.78	9.31	25.35	0.60	2.02	8.15	20.96	9.34
Observations	49	49	49	49	49	49	49	49	49	49
Correlation										
GINID	1									
GINIM	0.990	1								
CRCRP	0.598	0.687	1							
CRHU	0.262	0.365	0.88	1						
CRPR	0.492	0.589	0.98	0.95	1					
EMP	-0.935	-0.937	-0.60	-0.31	-0.51	1				
GOV	0.415	0.386	0.01	0.00	0.01	-0.52	1			
CIP	0.031	-0.024	-0.40	-0.38	-0.40	-0.12	0.65	1		
TER	0.788	0.851	0.90	0.72	0.86	-0.76	0.12	-0.37	1	
SEC	0.732	0.793	0.73	0.50	0.67	-0.72	0.28	-0.13	0.77	1

Source: Author`s calculations

ii. Unit Root Test

The results of unit roots are provided in Table A-11 in the Appendix, revealing that only TER does not have unit roots at the level, although all other series have, hence the null hypothesis cannot be rejected. However, all series are stationary at the first difference, and all variables are significant, with levels of significance ranging from 1 to 5 and 10 percent; thus, the null hypothesis of the unit root problem is rejected at the first difference for all series of studies, implying that the variables are integrated at I (0) and I (1).

iii. Bounds Test and the Results of the Long-run Relationship

In addition to unit root estimations, the second step in the ARDL approach is determining the optimal lag length based on Akaike information criteria over another criterion (the top 20 models). Figure 25 shows the optimal model (GINID) ARDL (3, 4, 3, 1, 4, 0, 2) and the optimal model (GINIM) ARDL (5, 3, 5, 4, 5, 5); see Figures A9 and A10 in the Appendix. Table 27 provides the results of the bound-test for testing the existence of a long-run relationship among the variables in both cases when the GINID (model 1) and GINIM (model 2) as a dependent variable are used. The findings indicate that the calculated F-statistic for model (1) is equal to 10.01526 and 6.64095 for model 2, those values larger than the upper bound 4.931 and 5.256, respectively, the critical value reported in Pesaran et al. (2001) at the 99 percent significance level. Therefore, the null hypothesis of no

cointegration, suggesting the existence of long-run cointegration relationships amongst the variables in both models, has been rejected and accepts the alternative hypothesis.

Table 27. Results from bounds tests (dependent variable = income inequality)

F-Bounds Test	Dependent Variable: D(GINID)				Dependent Variable: D(GINIM)			
Test Statistic	Value	Signif.	I (0)	I (1)	Value	Signif.	I (0)	I (1)
F-statistic	10.02	10%	2.19	3.25	6.64	10%	2.3	3.4
k	6	5%	2.59	3.77	6	5%	2.7	3.9
Actual Sample Size	45	1%	3.54	4.93	45	1%	3.66	5.26

Source: Author's computation

That is, there is a long-run relationship between income inequality GINID and GINIM and FD representatives (CRCRP and CRHU or CRPR), as well as income inequality and control variables (GDP, GOV, SEC (or TER), and CIP). This shows that the variables included in the model are cointegrated and have a long-run equilibrium, implying that they will tend to move together over time. Table 28 shows the results of estimating the long-run coefficients of the model (1), indicating that income inequality is associated and positive but not significant with both FD representors (CRCRP and CRHU), contrary to expectations, implying that changes in FD in Hungary have no long-run impact on inequality.

I am unable to compare the findings to existing literature since the impact of the ratio of credits to household and business development on the Gini coefficient has not been explored. As expected, inflation is positively associated with income inequality at 1% levels of significance. A one percentage point (pp) rise in CIP will raise GINID by 0.9388 PP. This is consistent with the a priori expectation and with Berisha et al. (2022), but differs from the findings of Jauch and Watzka (2016) and Park and Shin (2017). While the other three factors are connected negatively with income inequality, only EMP is affected considerably at the 5% level and a 1 PP increase. While the other three factors are adversely associated with income inequality, only EMP has a substantial effect at the 5% level, with a 1 PP rise in EMP lowering GINID in Hungary by 9.944 points. While both GOV and SEC factors have a negative link with income inequality, they have no long-term effect on it. This contradicts the conclusions of Jauch and Watzka (2016), who claimed that government spending in the economy could exacerbate inequality through rent-seeking behaviors.

Table 28. Long-run estimation (dependent variable = income inequality)

Dependent Variable: D(GINID)				Dependent Variable: D(GINIM)			
Variable	Coefficient	t-Statistic	Prob.	Variable	Coefficient	t-Statistic	Prob.
CRCRP	0.1239	1.4252	0.1688	CRPR	0.0473	0.642	0.534
CRHU	0.0825	0.488	0.6306	EMP	-8.5079	-2.3609	0.0378
EMP	-9.9445	-2.7821	0.0112	GOV	-1.4163	-2.6493	0.0226
GOV	-2.6097	-1.6654	0.1107	TER	0.0891	0.7569	0.465
SEC	-0.0987	-1.5937	0.1259	CIP	0.6741	4.0241	0.002
CIP	0.9388	1.8136	0.0841	C	105.4304	4.2995	0.0013
C	120.1033	2.6742	0.0142				

Source: Author's computation

The results of estimating the long-run coefficients of model 2, using the GINIM as the dependent variable, indicate that income inequality is associated positively with FD (as a proxy by CRCRP), but also is insignificant. Therefore, the long-run estimations for both models confirm that FD directly does not affect income inequality. Income inequality is negatively correlated with EMP and GOV and is significant at 5 percent levels of significance. This means that in the long run, the GINIM will decrease by 8.51 pp and by -1.4 pp when a 1 pp increase in EMP and GOV, respectively. The results are consistent with our expectations and with economic theory and some studies (e.g., Ang, 2010; Cutler and Katz, 1991; Clarke et al., 2006; Naceur and Zhang, 2016). However, inequality correlated positively with TER and CIP; however, those relationships were only significant with CIP at a 1 percent level of significance, due to inflation may hurt real wages and, hence, income inequality. The results are consistent with the work of Easterly and Fischer (2001; Beck and Levine, 2007; Bolarinwa et al., 2021). And it stands in sharp contrast to Ang (2010). But both TER have no statistically significant impact on income inequality in the long run, thus are not important for income inequality in the long run.

iv. Error Correction Model Results

Table A-13 in the appendix shows the short-run estimations in model 1 also support some initial findings obtained by the long-run regression that FD (CRCRP) is associated positively with income inequality, but this effect is insignificant also. However, it should be noted that this result changes for further orders, and the effect becomes statistically significant at 1 percent levels of significance. Contrary to the long run, a one-page increase in the ratio of the credit to a household increases GINID as a proxy of income inequality by 0.05 pp. In the short run, it is at the 1 percent level of significance. The results of the estimation of the ECM model show also that the measure of FD (CRCRP) is

positive but insignificantly associated with GINID. These findings further support the idea that FD increases inequality. Regarding the control variables, the sign of the coefficients of the inflation indicator seems the same in the long run, suggesting that inflation increases income inequality at a 1 percent level of significance also. This result is valid for further orders and is still statistically significant at 1 percent levels of significance. The result is consistent with the general literature on inflation and inequality. Contrarily, I did not find a reliable statistically significant correlation between EMP variables and inequality in disposable income in the short run. Or between GINID and GOV, but with further orders, the government expenditure will contribute to rising income inequality.

Similarly in the model (GINIM), Table A-12 in the Appendix shows that the short-run estimations also support the initial findings obtained by the long-run regression that FD does not affect income distribution in the short run as well. It should be noted that this result is different for further orders, and the effect becomes statistically significant at the 1 percent level of significance, suggesting that credit to the private sector does not matter for income inequality in the short run; however, it will be a matter with further orders.

Contrarily to the long run, the coefficient of the EMP variable in the short run has positive effects on inequality, which can be explained by short-run contracts and labor market regulations, including the decline in organized labor institutions and reduced bargaining power of lower-income workers, which is associated with higher market inequality (Jaumotte and Buitron, 2015). However, with further orders, it has the same signs as in the long-run equilibrium estimations, and their effect is still statistically significant. Similarly, only with further orders, an increase in GOV will lead to an increase in GINIM, and the effect becomes statistically significant at 1 percent, while D (GOV) in the short term has a negative but is not significant. Further, the coefficients of TER and CIP variables have the same signs as in the long-run equilibrium estimations, and the CIP effect is still statistically significant at a 1 percent level of significance, while the TER effect is still not statistically significant, but this result is different for further orders, and the effect has different signs and becomes statistically significant at 10 percent levels of significance. It can be said that FD is insignificant for income inequality in the long run, but in the short run, the FD contributes to raising inequality through the ratio of the credit to the household sector. However, with further orders, both the ratios of the credit to the private sector and credit to the corporate sector will decrease inequality.

v. Residual Tests

To ensure the fitness of the model, I used the diagnostic test to examine the Heteroskedasticity test associated with the selected model. The results in following Table 29 of the serial correlation and autoregressive conditional Heteroskedasticity tests do not present between the variables used in the short-run model.

Table 29. Residual tests

	Dependent Variable: D(GINID)				Dependent Variable: D(GINIM)			
Breusch-Godfrey Serial Correlation LM Test:	F-statistic	2.7669	Prob. F (3,18)	0.0717	F-statistic	3.1049	Prob. F (5,6)	0.1002
	Obs*R-squared	14.2024	Prob. Chi-Square (3)	0.1026	Obs*R-squared	31.735	Prob. Chi-Square (5)	0.2103
Heteroskedasticity Test: ARCH	F-statistic	0.6888	Prob. F (1,42)	0.4113	F-statistic	1.4818	Prob. F (1,41)	0.2304
	Obs*R-squared	0.7099	Prob. Chi-Square (1)	0.3995	Obs*R-squared	1.4999	Prob. Chi-Square (1)	0.2207

Source: Author's computation

The study applied also the CUSUM which was developed by Borensztein et al., (1998), to test the stability of the ARDL models used. Figure 25 shows that the two models are stable for the two tests in 5 percent degree of liberty, they lie between the critical bounds (red lines), and the following figures show the results.

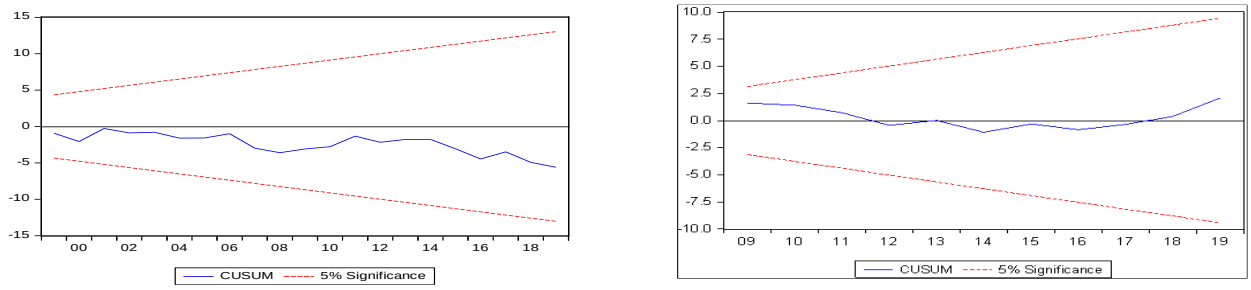

Figure 25. CUSUM tests, dependent variable: D (GINID), and D(GINIM).

Note: The straight lines represent critical bounds at a 1 percent significance level.

All in all, the estimated parameters seem to be substantially stable within the study period in the case of Hungary's economy.

Hypothesis Test

1. The analysis provides evidence indicating that there is a relationship between FD and income inequality, and FD contributes to increased inequality in Hungary in the short run via credit to the household sector. Thus, we accepted the (H2) hypothesis, that there is a relationship between FD

and income inequality in Hungary, and the (H2.b) hypothesis, that FD increases income inequality in Hungary (inequality widening hypothesis).

2. And the study failed to find evidence for the inequality-narrowing hypothesis; thus, the H2.a hypothesis is rejected.

6. CONCLUSION

Hungary's FD policies aim to combat poverty and inequality, but earnings and wealth inequalities have increased over the past thirty years. Finance, including FDI, over-indebtedness, financial crises, political money capture, taxation, and redistribution, contributes to these inequalities directly and indirectly. The impact of FD, FL, and FDI inflows contribute to regional inequalities and income inequality because of their concentration in specific areas and has bias toward skilled and educated labor. On the other hand, deregulation led to inequality by allowing the wealthy to control financial and economic policies, benefiting themselves and increasing their wealth. Money capturing the work policies that were financially beneficial to the wealthy played a key role in inequality. Wealth inequality in Hungary has grown significantly during the transition era, with households at the bottom of income and wealth distributions experiencing the largest drops and the largest increases. Financial assets are the primary drivers of income increase and wealth concentration, with financial rents being the key driver for those at the top owing to the political capture of financial and economic policies. Strengthening oversight institutions can enhance the efficient use of public funds and reduce the capture of financial and economic policies. The analysis shows a relationship between FD and income inequality in Hungary, with FD contributing to increased inequality in the short run through credit to the household sector. However, the disparity widening hypothesis is only valid in the short run, as increasing credit to the household sector raises the GINID coefficient. This suggests that FD matters more to income inequality in the short and long run. Education is not directly related to income inequality but may be a factor in employment, the most significant factor in the long run. Inflation will enhance income inequality in Hungary in the long and short run.

CHAPTER 6

CONCLUSIONS, RECOMMENDATIONS, AND NEW SCIENTIFIC RESULTS

1. CONCLUSIONS, DISCUSSIO AND RECOMMENDATIONS.

Financial literature acknowledges finance's role in economic growth by directing resources towards productive uses, with low-income individuals benefiting disproportionately from financial FD (Galor and Zeira, 1993; Banerjee and Newman, 1993). However, the mutual relationships between the three pillars are subject to question in recent literature, and more concern has increased since the 2008 crisis (Rajan and Zingales, 2003; de Haan and Sturm, 2017; Schularick and Taylor, 2012; Stiglitz, 2012, 2016). While empirical studies have examined this relationship, their conclusions are inconclusive, and questions remain regarding specific countries like Hungary.

Hungary, an emerging economy, has made progress in financial, economic, and social development but still struggles with critical SDGs. Understanding the impact of finance on economic growth and income inequality is crucial for better addressing the questions that are critical for policymakers to determine if Hungary's FD and FL policies can accomplish the UN SDG (8 and 10) targets. In particular, there is a strong paradox that emerges among empirical findings that are dominated by cross-country analysis. This dissertation examines the relationship between FD, financial liberalization, and banking crises in Hungary, providing evidence for policymakers to determine if Hungary's FD and FL policies can achieve UN SDG (8 and 10) targets.

To answer the questions and test the hypotheses of the research, following the review, the synthesis of the various theoretical financial aspects and their replantation with economic growth and inequalities. The study analyzes the Hungarian financial sector's development over four decades, its impact on economic growth, and inequalities, using descriptive and deductive analysis and econometric analysis to test empirical models and identify research gaps in the Hungarian context. Since the 1980s, Hungarian financial restructuring initiatives have been introduced, particularly after the 1991 crisis. Despite being among the most advanced EU systems, these policies led to the 2008 financial crisis. The lack of regulation and oversight contributed to external indebtedness and system fragility, importing the crisis into the European financial market. The 2008 crisis impacted the banking industry, government response strategies, and macroeconomics, resulting in recession and increased unemployment.

The Hungarian financial sector has seen significant improvements in indicators such as the FD index, depth, and access—which were high even in the EU and regional comparison—and has improved dramatically until the 2008 crisis. However, stability and efficiency indicators remained low, as did high interest rates. The capital market, which is still in its infancy, has not played a significant role in providing funding for bank lending. The BSE's securities exchange is far behind in other European economies comparison. A higher value of FD rankings may not always be beneficial for stability, inequality, or growth. In Hungary, FD contributed to external indebtedness and financial system fragility, leading to a financial crisis with material implications for economic growth and inequalities.

The Hungarian economy experienced rapid changes in the early 1990s due to macro-financial imbalances. Economic and financial reforms helped recover and stabilize Hungary, leading to steady growth until 2004. FD contributed to growth by increasing credit, foreign investment, and productivity. However, the high growth ratio of TFP in the late 1990s and early 2000s could be attributed to efficiency gains after layoffs. Besides, FD could not sustain rapid expansion, leading to chronic slowdowns and the middle-income trap (MNB, 2018). Issues such as misallocation of financial resources to low-productivity sectors and FDI staying away from isolated areas exacerbated internal and external imbalances. Since 2005, these factors have contributed to Hungary's economy by veering off the development path of other Visegrád countries. The GDP per capita fell short of the Hungarian GDP, requiring longer recovery years. It could have highlighted those further issues with the economy's structure and composition that contributed to the recession that followed the financial crisis, exacerbating the decline and entering the economy into a recession.

Hungary's financial policy has helped balance economic growth and healthy structure, with one of the highest GDP growth rates in the EU in recent years (EUs, 2020). However, the COVID-19 pandemic and the current crisis have significantly affected economic growth and inequality. Low HC is a key determinant of growth and productivity, which is still low compared to the region and the EU level, especially for small and medium-sized enterprises (SMEs), but it's still challenging for the Hungarian economy. Labor productivity inequality in regional and sector terms undermines growth and reduces incomes.

To achieve balanced growth, Hungary should encourage growth in all sectors and provide investment incentives like tax breaks or credits. Improving infrastructure will support job creation, economic growth, and information sharing for the microfinance sectors. Funding public services for human development can increase productivity and improve working population quality. The financial system can also play a critical role in mobilizing savings and directing investment, facilitating capital accumulation and production in a macroeconomic stability environment, and tackling corruption.

Inequality in Hungary has worsened despite historically low income and wealth disparities in contrast to worldwide and EU comparisons (MNB, 2021), but it is greater than the ratios of Visegrád competitors, and inequality has been rising since the mid-1980s. The highest income shares have witnessed significant growth patterns, with financial assets and capital income accounting for a sizable portion of their incomes and wealth concentration, with about 70% of financial assets and more than half of total household wealth in 2017. The lower 50% of households own only 8.9% (ECB, 2016; 2021). Inequality indicators imply that FD in Hungary may have increased income and wealth disparities among dynasties rather than eliminating them, as the EGT expected (Greenwood and Jovanovic, 1990). According to the study, redistribution measures, such as taxes and transfers, can help to reduce inequality and promote wealth and income equality. However, because indirect taxes impose higher tax burdens, they may have a greater impact at the bottom of the income distribution. Progressive taxes can reduce inequality by lowering income for higher-income earners and redirecting taxes to public spending on education, healthcare, welfare benefits, and disadvantaged groups. Tax modifications should be made to minimize the negative impact on job development. Tax breaks for businesses that disperse more profits to employees can also help lessen inequality. Hungary has a low poverty risk but a high geographical concentration, which contradicts Kuznets' premise that inequality would improve with prosperity. However, FD policies and FDI exacerbate development and income disparity, resulting in poverty in remote places. This regional dimension is reflected in income, development, and poverty risk. Poverty reduction and equality can be achieved by ensuring universal access to critical social services and promoting healthcare accumulation and income.

The idea suggests that FD may influence HC equality through fiscal revenue generated by FD and growth, which can enhance government investment in public goods and services like education and health, hence improving income disparities (Barro, 2000; Li and Zou, 2002). Nonetheless, education

and health investments remain inadequate, even in regional comparisons. The low expenditure reflects a lack of efficacy and quality of education and health care, limits the extent of the benefits package, and restricts access for poorer households, particularly in remote areas. As a result, HC is substantially connected with an individual's financial ability to afford a high-quality education or healthcare. Despite decades of FD, parental background continues to play an increasingly important influence on student trajectories and is a strong predictor of life outcomes. Education disparities are reflected in rising income and wealth inequalities because of the vast discrepancy in monetary returns, and the employment opportunities between the well-educated and the less-educated are enormous. As a result, tackling education difficulties in Hungary is a top concern because it affects not only the supply of trained labour but also the reduction of education and health disparities, as well as income inequality. Furthermore, to make the Hungarian educational system competitive, should the government fund education programs, including alternative education, and offer possibilities for skill-based learning to young people who are not enrolled in school? Teachers are compensated with raises besides ongoing professional development because their wages are deemed inadequate. The construction of more public schools across the country, particularly high-quality science schools, benefits the nation's educational system. Maintain curriculum updates to help early childhood development programs and to account for changes in the labour market.

Similarly, Hungarian health has improved since 2000, particularly in recent years, with the government taking steps to reform healthcare and increase primary care and access to healthcare, but there is greater inequality in cases of unmet needs or under-covered services, especially when the benefits package is limited. In addition, extra fees and informal payments are considerable, necessitating significant out-of-pocket expenses. Hungary, on the other hand, has universal healthcare; yet, coverage rates and efficacy are low, and health outcomes remain lower than in the majority of other EU countries and regions (EU, 2020). Low finance increases the likelihood of financial difficulties for Hungarian families, exacerbating disparities in access to care between the wealthy and poor. Moreover, widening rich-poor HC increases the fertility of the poor and low-poor public health and hence reduces HC accumulation and hinders economic growth. This view is clear in remote areas in Hungary. The 2008 financial crisis negatively impacted everyone's access to timely and affordable healthcare because of the austerity policies and draconian budget cuts.

Addressing and changing the Hungarian health system's weaknesses could be accomplished by shrinking the hospital sector while raising health expenditure to cover all benefit packages, including all pharmaceuticals, medical devices, dental, and others, thereby improving access to care. And it enhances primary care, improves health outcomes, and increases the sector's efficiency gains significantly. These issues, which resulted in opportunity disparities and income inequality, are unquestionably the root causes of inequality in Hungary's health and education systems. The study suggests that measures to eliminate healthcare disparities in Hungary include improving education, increasing the share of highly educated people, providing continual coaching, cultivating a creative work atmosphere, and adopting health and educational reforms.

Aside from that, there are other measures to reduce inequality, such as increasing the wages of the poorest and most disadvantaged people and supporting their upward mobility through wage increases, increased employment, and assistance payments. In addition, we should improve unemployment insurance and increase the minimum wage. Contrary to popular belief, FD does not reduce information costs or make financing assets easier. Rather, it exacerbates inequality by growing the wage gap between domestic and international businesses, particularly SMEs. And by overpaying employees, notably senior executives in the finance and insurance industries. This appears to be a contributing element to Hungary's growing inequality. When there is a considerable discrepancy between their top gross profits and earnings from other industries. According to new theoretical models (Stiglitz, 2015, 2016; Brei et al., 2018), FD causes this gap and allows for greater rent extraction, which contributes to rising inequality in industrialized nations, including Hungary. Accordingly, improving oversight mechanisms will improve the effectiveness and efficiency with which public monies are used while also reducing political capture of financial and economic policy. Furthermore, enhancing labour market institutions may enable employees to band together and bargain collectively for better pay and conditions, reducing wage gaps, increasing employee protection, and putting a stop to labour abuses. Finally, progressive tax governance aimed at increasing fiscal policy's redistributive potential can play an important role in tackling inequality, and reforms in tax and transfer policies are required. The study found evidence of regional inequality in all domains, including development, education, health, employment, and earnings. These findings contradict economic theory because all investments are concentrated in a few areas, reducing the benefits of FD for other regions and widening the imbalance between them.

In three empirical investigations utilizing Hungarian data, I want to assess the validity of economic theories that make inconsistent predictions about FD, FC, inequality, and economic growth.

In the first empirical study that analyzes the distributional effects of FC, the findings are:

1. The study confirmed our findings in the theoretical section, and there is non-existent causality running from FC to inequality. These findings further support the idea that FC do not cause income inequality and are consistent with those of Denk and Cournede (2015), Bazillier and Najman (2017), Baldacci et al. (2002), and Amate-Fortes et al. (2017), who could not find any evidence of the impact of FC on inequality. However, the findings of the current study do not support the previous research (De Haan and Sturm, 2017; Bazillier and H'ericourt, 2017), which suggested that the FC exacerbated inequality.
2. But there is an indirect distributional impact of the crisis when it is followed by a recession or/and an increase in a consumer price index. In particular, there is a bidirectional causality between inequality and both real GDP and consumer price index, which implies that the distributional impact of crises depends on whether a recession or an increase in consumer price follows it. Those results also have been reported by Bazillier and H'ericourt (2017), Ball et al. (2013), Panizza (2014), and Loayza et al. (2018), who reported that changes in macroeconomic volatility triggered by crises have a profound effect on the people who are at the bottom of the income distribution.
3. The study also confirms causality in the other direction is valid, thus arguably rapid inequality growth is a strong predictor of the crisis. This finding is in agreement with Kirschenmann et al.'s (2016; Paul, 2020) findings.
4. Inequality might be causing FC by raising leverage (Ragen, 2010; Stiglitz, 2016) and widening the current account deficit (Kumhof et al., 2012). Particularly, inequality has one-way causality to the ratio of the private domestic credit (% GDP) and trade openness, which are the primary causes of the FC, as economists (Minsky, 1977; Stiglitz, 2012) reported.
5. Or, the banking crisis and inequality crisis may be due to other mechanisms like transitional processes and reforms or shifts in political thinking, especially in the 1990s, as has been argued by Atkinson and Morelli (2011).

The second empirical study evaluated the role of finance in economic growth, and the result showed:

1. Economic growth and FD are long-run cointegrated in the presence of other macroeconomic factors, and FD stimulates economic growth in Hungary. This finding validates prior research on the relationship between FD and economic growth (Kjosevski, 2014; Próchniak, 2011; Felcser et al., 2015; Varela, 2015; Rinosha and Mustafa, 2021). This implies that policies that encourage FD also promote economic growth in Hungary. Thus, boosting FD looks to be an efficient approach to stimulate economic growth, which in turn supports FD.
2. Financial depth boosts growth only if credit is extended to non-financial corporations in both the short and long run. Economic growth would be greater if more credit was offered to firms. This finding is consistent with Sassi and Gasmi (2014), who found that, unlike credit to the home sector, credit to the business sector had a positive influence on economic growth in Hungary and other countries. In addition, there is broad evidence in the theoretical and empirical literature (e.g., Beck et al., 2007; Tinoco-Zermeno et al., 2014; Lawal et al., 2016; Ghildiyal et al., 2015; Skare and Porada, 2019; Prats and Sandoval, 2020). However, these findings contrast with Petkovski and Kjosevski (2014), who discovered that credit to the private sector negatively affects economic growth in Hungary.
3. Furthermore, the study discovered that financial depth reduces growth through credit to the government or the household sector. As a result, FD policies should focus not only on quantity but also on the quality of Hungary's financial system supervision and regulation, as well as credit distribution mechanisms for productive investments and businesses. FD also helps banks and the capital market allocate funds more efficiently to these sectors.
4. The efficiency of Hungary's financial market undercuts long-term economic growth and short-term financial institution efficiency. This finding is puzzling and contradicts earlier expectations, as well as economic growth theory, which holds that high efficiency promotes growth and broad empirical evidence (e.g., Gural & Lomachynska, 2017). According to Demetriades and Rousseau (2016), the finding could be attributed to insufficient financial system monitoring and legislation. However, Kapaya (2020) came to the same conclusion, reporting that the efficiency of the financial system is substantially negatively associated with economic growth in both the short and long term.

The third empirical study investigates how FD affects inequality in Hungary. The result of the study showed that:

1. There is a link between FD and income disparity, and FD contributes to higher inequality in Hungary in the short run by providing credit to the household sector. These findings are consistent with the findings of Christopoulos and McAdam (2017) and De Haan et al. (2018), which imply that FD has a positive and significant impact on growing inequality in Hungary.

2. The study found no evidence for the inequality-narrowing theory, which states that the FD contributes to rising inequality in the near run by increasing the ratio of credit to the household sector as a proportion of GDP. Credit to the private sector or credit to the corporate sector has a positive impact on income inequality in both the long and short run. However, because they create jobs, these credits may have a long-term detrimental impact. In particular, employment is the most important factor in reducing inequality in the long run. Inflation, on the other hand, exacerbates inequality in both the short and long run.
3. Government spending can also help to reduce inequality, but only with market (pre-tax, pre-transfer) income in the long term.
4. In Hungary, education has little direct impact on economic disparity. However, it affects employment and is the most major element in long-term economic disparity.

2. NEW SCIENTIFIC RESULTS

The sustainable economic growth and equality goals are the most important of the 2030 Sustainable Development Goals (SDGs). Finance is a critical component in reaching those goals and has gained more attention since the EGT emerged in the period around 1990. The financial literature has long acknowledged the importance of finance in economic growth by channeling financial resources into the most productive uses. In addition, the theory gives grounds to believe that low-income persons gain disproportionately from FD. However, the mutual relationships between the three pillars are subject to question in recent literature, and more concern has increased since the 2008 crisis. The relationship between them has been extensively explored in the empirical literature and the economic literature, employing a variety of FD, economic growth, and inequality indicators. They used different econometric techniques, along with aggregate macro- and micro-level data. They have concluded results but are not definitive, and there are still unsolved questions about particular nations, like Hungary. In the 2030 Agenda for Sustainable Development in Hungary, an understanding of the effects that FD can have on economic growth and income inequality is required to better articulate the financial, economic, and social policy agenda. Addressing the questions is critical for policymakers to determine if Hungary's FD and FL policies can accomplish the UN SDG (8 and 10) targets. Particularly, the empirical literature on this relationship in Hungary is insufficient, and there is no consensus on the obtained results. The focus has been primarily on European countries by region, not Hungary countries, which showed conflicting and ambiguous results.

Accordingly, the new scientistic of this research is as follows:

1. Applying the time series datasets and new notorious statistical methods such as the Toda-Yamamoto causality (modified Wald) test, the study found a non-existent bidirectional causal relationship between FC and income inequality in Hungary. FC do not cause income inequality in Hungary. However, the crises have an indirect distributional impact when followed by a recession or/and an increase in a consumer price index. In particular, a bidirectional causality exists between inequality and real GDP and consumer price index.
2. The results from the Toda-Yamamoto causality test confirmed the causality relation in the other direction is valid, and rapid inequality growth is a strong predictor of the crisis.
3. The Toda-Yamamoto causality test approach confirmed that inequality is one reason for financial instability through raising leverage and widening the current account deficit.
4. Applying the time series quarterly datasets and the most appropriate econometric techniques, such as the autoregressive distributed lag (ARDL) in the form of an ECM, focusing on the short-run and long-run. The study confirms that FD and economic growth are integrated, and FD stimulates economic growth in Hungary.
5. Applying the time series quarterly datasets and employing the ARDL bounds test and ECM, I have demonstrated that financial depth stimulates growth in the long run only through corporations' funding.
6. The financial depth harms growth through credit to the government or household sector.
7. Applying the time series quarterly datasets and employing the ARDL bounds test and ECM, I have demonstrated that the efficiency of the financial market in Hungary undermines economic growth in the long run and the efficiency of the financial institutions in the short run.
8. Applying the time series datasets and using the ARDL bounds test and ECM, I have observed that there is a relationship between FD and income inequality.
9. The results from the ARDL bounds test and ECM test confirmed that FD contributes to increased inequality in Hungary in the short run via credit to the household sector.

3. LIMITATIONS OF THE STUDY

Despite the significant theoretical and empirical consequences, my research has some limitations. For example, although every attempt has been made to assure the data's validity, the primary constraint is its dependability and correctness. As previously indicated, this study is based on data from an international database, so there is the risk of data inaccuracies. As a result, the data's correctness and reliability have an impact on the study. In the future, create a Hungarian database for long-term time series that incorporates all variables to improve the reliability of research results. The second restriction, common to all empirical research that examines the relationship between FD and economic growth, is the issue of proxy variables.

The investigation supported the variables employed both experimentally and theoretically. The third constraint is that, while the study used a set of variables in three models and performed robustness tests, there is still a need for additional literature due to the limited number of models. As a result, for future study on the effects of finance on economic growth and inequality, we recommend taking into account additional characteristics such as HD, wealth, economic opportunities, gender, education equity, and health equality. Although the specific data from Hungary provides valuable insight and strong policy guidance that can be used as a reference for policy formation in developing nations, particularly transition countries, the study's conclusions cannot be extended to all countries. Thus, additional research in other European and global countries is necessary to confirm the findings.

4. SUMMARY

The world is taking steady steps towards SDGs supported by financing economic growth and social policies (UNDP, 2024). Finance is a primary driver of sustainable growth and development in any economy, and underdeveloped financial and capital markets in developing countries like Hungary are a challenge for a country's sustainable development, especially during the current sustainable development crisis. Hungary is an emerging economy that has made some progress on FD during the last four decades, while its performance in critical SDG sectors lags behind that of its regional peers, especially in the areas of human development, inequality, and GDP per capita. This dissertation examined the impact of finance on economic growth and inequality in Hungary using descriptive and deductive analysis and econometric analysis. Results of the descriptive and deductive analysis showed that the Hungarian financial system has undergone financial restructuring since the 1980s, with improvements in depth and access and FD indicators. However, higher FD ranks may not always be advantageous to stability, inequality, or growth because the index does not show actual FD or efficiency ratings. Efficiency remains still a challenge, with low efficiency compared to the EU and regional competitors. The system's weaknesses in saving mobilization at the beginning of the new millennium led to reliance on external finance and two financial crises. Recently, the Hungarian banking system has been healthier and has a stable capital position, but the efficiency issue still needs more work. Financial changes in Hungary have had an impact on the financial system's contribution to growth and equality.

Financial policies such as FD and FL helped to boost economic growth and stability, particularly at the turn of the 2000s and throughout the last decade. However, these policies resulted in financial crises and recessions, with FDI contributing to regional disparities and a productivity gap between foreign and indigenous firms. Hungary's FD policies may not increase investment in human capital and skilled labour, both of which are critical for economic growth and productivity, as well as economic equality. In Hungary, access to education and health services remains influenced by financial factors, with parental background playing a significant role. This is evident in the human development gap and income inequality, particularly between well-educated and poorly educated individuals.

The study also found that FD in Hungary may have increased income and wealth inequalities rather than reducing them across dynasties, as assumed by the EGT. The wealthiest households showed a sharper increase in household income and wealth shares than other deciles (ECB, 2016; 2021). Financial deregulation and globalization have increased inequality in Hungary by allowing the

wealthy to control economic, monetary, and work policies that benefit them (Mavridis and Mosberger, 2017). The booming remuneration of workers, particularly senior executives in the financial and insurance sectors, is also a factor in increasing inequality. FDI also contributes to wage inequality and the gap between foreign and domestic companies, particularly SME firms. Hungary's low poverty risk but strong territorial concentration contradicts Kuznets's hypothesis. This has led to rising income and wealth inequality (Stiglitz, 2012, 2016; Bolton et al., 2016) and damaging stability, especially when the financial sector is not adequately regulated.
In the empirical analysis, the researcher found that inequality causes financial crises in Hungary, but non-existent causality runs from financial crises to inequality directly. However, the distributional impact of crises depends on whether a recession or an increase in consumer price follows it because a bidirectional causality exists between inequalities and real GDP and the consumer price index. The empirical study found that FD and economic growth are interconnected, with financial depth stimulating growth through credit to non-financial corporations. However, financial efficiency negatively impacts economic growth because of weak financial system supervision and regulations. The third empirical investigation in Hungary supports the inequality-widening hypothesis in both the long and short run, but it is not significant in the long run. In the short run, FD contributes to rising inequality by lending to the household sector. Credit to private sector lending may have an indirect role in lowering inequality by providing jobs, with employment being the most important factor in reducing inequality in the long run.

Based on these findings, the paper suggests that policymakers focus on the routes and mechanisms by which financial efficiency influences and transforms the real economy while maintaining stable macroeconomic policies. FD policies in Hungary should emphasize not just quantity but also the quality of supervision and regulation of the financial system. Economic development in Hungary necessitates balanced growth across all regions and sectors. Increasing investment in innovative activity, particularly among SMEs. Rethinking education and health policy is required to create high-quality human capital and avoid wasteful government spending. Finally, governance is required to redress inequities and implement reforms in tax and transfer systems. Based on existing literature, the dissertation finalizes new scientific findings and gives theoretical and practical consequences, which are then examined in depth.

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APPENDIX 1

Tables A1–A12 and Figures. A1 – A10

Table A- 1. Theoretical review (Finance-growth nexus)

Author(s)	Theory	Relation
Schumpeter (1912), and Romer (1986, 1990),	The endogenous growth theory	Financial development promotes economic growth through capital accumulation and technological progress, and human capital accumulation.
(Meier and Seers, 1984). Robert Lucas (1988)	Neutrality theory	They deny that finance is a key factor in determining economic growth calling its role "over-stressed
Arcand et al. (2015),	Too much finance	More finance is not always better and it tends to harm economic growth after a point.
Loayza et al. 2018	Financial development harms real growth	Financial development harms growth by misallocating talent between sectors, or by furthering services with lower growth potential, and or increasing vulnerability to financial crises.

Table A- 2. Empirical research on the connections between FD and economic growth

Author(s)	Sample coverage	Period	Methodology	Findings
Peia & Roszbach (2015)	22 countries,	1973- 2011	VAR	SMD leads growth, while growth leads BD
Barajas et al. (2016)	146 countries,	1991-2011	GMM	Contrarily to stock market liquidity, growth effects of bank credit are vary heterogeneity according to regions and countries.
Seven & Yetkiner (2016)	146 countries,	1975-2005	OLS, FE, and GMM	BD has a heterogeneity impact on growth according to income level countries, while SMD is positively associated with economic growth in both middle- and high-income countries.
Haiss et al. (2016)	29 countries,	1990-2009	POLS, and FGLS	Contrarily to banking sector indicators, the stock market variable exerts a positively influence economic growth.
Luintel et al. (2016)	69 countries	,1989–2011	DOLS	In high-income countries the market-based financial systems are more benefit, whereas in middle- and low-income countries the aggregate financial development is more benefits
Hou & Cheng (2017)	31 countries, 1981-2008		GMM, OLS, and PMG	The banking depth has a positive effect on economic growth in short run, and only in countries with low financial development in long run. While stock market depth is insignificant in short run, and benefits growth only in low-income countries in long run.

Naceur. et al. (2017)	145 countries	1960- 2011	GMM	Failed to establish positive relationships between FD and economic growth, FD reduces productivity growth in low income
Pradhan et al. (2017)	17countries,	1991- 2011	VECM, GC, FMOLS, and DOLS	B-bidirectional casualty between BD and SMD
Durusu-Ciftci et al. (2017)	40 countries	1989 - 2011	AMG, and CCE	FD has positive effects on GDP level
Shen et al. (2018)	48 countries	1988–2014	LSDVC, and LTC	Positive stock market effects on GDP contrast with the banking sector's reliance on outliers
Fufa & Kim (2018)	40 countries	1990-2012	OLS, and GMM	Stock market liquidity enhances economic growth, while bank credit boosts growth only in middle-income countries and harms growth in high-income countries
Botev et al. (2019)	100 countries,	1995- 2012	DOLS and GMM	Depth of SMD reinforce positive effects of depth of BD on economy, but not vice versa
Ngo and Le (2019)	86 countries	2006–2011	GMM	Contrarily to effect of banking efficiency on stock market capitalization, the later has a negative effect on banking efficiency
Lin (2029)	The US	1994- 2014	OLS, FE, and IV	Stock market booms reduced both growth finance and employment growth, as well as, they are correlated with slower bank deposit growth
Slesman et al. (2019)	77 countries	1976-2010	DPTE	FD promote economic growth only in environments with high institutional quality
Asteriou & Spanos (2019)	26 countries,	1990- 2016	FE	Contrarily to before financial crisis, effects of FD on economic growth change to negative after financial crisis.
Benczúr et al. (2019)	23 countries,	1990-2014	IV	Bank credit indicator has a nonlinear impact on economic growth
Swamy & Dharani (2019)	24 countries	1983-2013	GMM, GC, and panel threshold	The nonlinear hypothesis is valid between FD and economic growth,
Swamy & Dharani (2020)	7economies	1983-2013	GMM, GC, panel threshold	The nonlinear hypothesis is valid between FD and economic growth,
Cave et al. (2020)	101 countries,	1991-2014	GMM	The inverted U-shaped hypothesis is valid between SMD and economic growth,
Chu (2020)	99 countries	1971-2915	GMM	The nonlinear hypothesis is valid

Table A- 3. Theoretical review (Finance-inequality nexus)

Author(s)	Theory	Relation
Kuznets (1955); Greenw & and Jovanovic's (1990)	Inverted U-shaped relationship	Inequality increases in the primary stages of financial development with the savings rate, then at threshold starts to reduce inequality.
Banerjee and Newman (1993); Galor and Zeira (1993)	Financial narrowing hypothesis	Financial development reduces inequality by increasing investment in the human capital of low-income groups regardless of parental wealth, disproportionately economic opportunities to lower-income workers, and reducing discrimination, as well as decreasing wealth inequality and its intergenerational persistence
Greenwood and Jovanovic's (1990)	Inverted U-shaped relationship	Inequality increases in the primary stages of financial development with the savings rate, then at threshold starts to reduce inequality.
(Rajan and Zingales 2003).	Financial widening hypothesis	Financial development increases income inequality with more benefits by the rich household who have higher access to the credit market
Swamy and Dharani (2019)	The U-shaped hypothesis,	The FD reduces inequality in the primary stages until a certain threshold, the FD exacerbates inequality

Table A- 4. Some recent empirical research on the connections between FD and inequality

Author(s)	Country (s)	Period	Methodology	Findings
Çetin & Şeker (2016)	Turkey	1963-2006,	ARDL	Inequality-narrowing hypothesis
Sehrawat & Giri (2016)	11 South Asian Economies	1990-2013,	PDOLS	Inequality-widening hypothesis
Adeleye et al. (2017)	42 Sub-Saharan African Countries	1996-2015,	GMM	Linear-insignificant effect
De Haan & Sturm (2017)	121 Countries	1975-2005,	RE	Inequality-widening hypothesis
Hepsağ (2017)	G7 Countries	1961-2015,	DOLS	FKC hypothesis is valid for USA, Italy and, Canada.
Brzezinski, (2018)	10 CEE	2008-2012	SD	Gini for disposable incomes has increased during the crisis period
Younsi and Bechtini (2018)	BRICS	1995-2015	GMM	Nonlinear-inverted U-shape
Nguyen et aL (2019)	21 Emerging Country	1961-2017	DOLS, FMOLS	FKC hypothesis is valid.
Cuesta-González et al. (2020)	9 OECD Countries	2000-2015	GMM	FKC hypothesis is valid.
Weychert (2020)	52 Countries	2003-2014	FE	Inequality-narrowing hypothesis
Kavya & Shijin 2020)	85 countries	1984 - 2014	GMM	There is no clear-cut evidence to support financial development reducing income inequality
Hassan& Meyer (2021)	South Africa	1970-2018	ARDL	FKC hypothesis is valid.
Selim & Güngör (2021)	11 MENA Region countries	1990-2015	PMG	Inequality-narrowing hypothesis.
Wajid& Awan (2021)	Pakistan	1980-2016	ARDL	Inequality-narrowing hypothesis in the short run. Inequality widening hypothesis in the long run. FKC hypothesis is rejected.
Peña (2022)	35 OECD countries	1970 - 2011	GMM, Granger	There is an impact of the interaction between income inequality and financial development on GDP growth.

Table A- 5. Theoretical review (Financial crises-inequality nexus)

Author(s)	Relation
Rajan (2010) and Stiglitz (2012)	High- or rising-income inequality may cause low-income groups to rely on borrowing to increase or maintain consumption levels, increasing the probability of a financial crises.
(Atkinson and Morelli (2011), Bordo and Meissner (2012), Gu and Huang (2014)	Rising inequality as a significant determinant of financial crises
Atkinson and Morelli (2011)	Financial crises increase inequality, but not all the times banking crises were preceded by rising inequality.
Jenkins et al. (2013); Piketty and Saez (2013); Li and Yu (2014).	The causal relationship between banking crises and income inequality reports mixed findings

Table A- 6. Some recent empirical research on the connections between financial crises and inequality

Author(s)	Relation
Perguni et al. (2015); de Haan and Sturm (2016).	Financial crises increase the inequalities because the poor are disproportionately affected by recessions that follow a financial crisis
Denk and Cournede (2015, OECD); Amate- Fortes et al. (2017)	Do not find significant effects of banking crises on income inequality
De Agostini et al. (2016)	Hungarian flat-rate personal income tax in 2011 increased the Gini index by 2 percentage points over 2008–2011.
Brzezinski, (2018)	Gini for disposable incomes has increased during the crisis period

VECM: Vector error correction model, VAR: Vector autoregression, OLS: Ordinary least squares, GMM: Generalized method of moment, MG: Pooled mean group. FE: fixed effect, POLS: Pooled ordinary least squares. FGLS: Feasible generalized least squares. DOLS: Dynamic ordinary least squares. SMD: stock market development. BD: banking development. PMG: Pooled mean group. AMG: Augmented mean group. CCE: common correlated effects. LSDVC: Least square dummy variable correction. LTC: least trimmed squares. GC: Granger correlation. IV: Instrumental Variable. RE: Random-effects. ARDL: Autoregressive distributed lag.

Table A- 7 Unit root tests on variables

At Level													
			GDPP	**CRCR**	**CRGV**	**CRHU**	**FDI**	**FIE**	**FME**	**GFCF**	**GOV**	**TOP**	**KOFF**
Phillips-Perron	With Constant and Trend	t-St	-0.58	-1.14	-1.99	-1.18	-1.06	-2.66	0.06	-1.72	-2.12	-1.92	-0.29
		Prob	0.98	0.92	0.60	0.91	0.93	0.25	1.00	0.74	0.53	0.64	0.99
	Without Constant and Trend	t-St	3.22	0.41	0.01	-0.39	0.62	-0.13	-0.36	-1.20	-0.17	1.59	1.46
		Prob	1.00	0.80	0.69	0.54	0.85	0.64	0.55	0.21	0.62	0.97	0.96
Augmented-Dickey Fuller	With Constant and Trend	t-St	-1.58	-1.64	-2.25	-3.32	-2.85	-3.98	-1.51	-1.62	-2.96	-2.23	-0.71
		Prob	0.80	0.77	0.46	0.0678	0.18	0.0113*	0.82	0.78	0.15	0.47	0.97
	Without Constant and Trend	t-St	1.56	0.09	0.05	-1.04	0.05	-0.06	-0.91	-0.20	-0.25	0.77	0.77
		Prob	0.97	0.71	0.70	0.27	0.70	0.66	0.32	0.61	0.60	0.88	0.88
	Order of Integration							I (0)					
	At First Difference												
			GDPP	**CRCR**	**CRGV**	**CRHU**	**FDI**	**FIE**	**FME**	**GFCF**	**GOV**	**TOP**	**KOFF**
Phillips-Perron	With Constant and Trend	t-St	-3.21	-13.17	-11.80	-9.97	-3.95	-4.89	-4.41	-3.98	-4.08	-3.98	-4.39
		Prob	0.0866*	0***	0***	0***	0.0125*	0.000**	0.002**	0.0114*	0.008**	0.0113*	0.003**
	Without Constant and Trend	t-St	-2.21	-13.20	-11.86	-9.98	-3.89	-4.92	-4.36	-3.76	-4.08	-3.89	-4.68
		Prob	0.0265*	0***	0***	0***	0.001**	0***	0***	0.002**	0.001**	0.001**	0***
Augmented-Dickey Fuller	With Constant and Trend	t-St	-2.66	-3.75	-3.66	-1.93	-2.72	-4.11	-2.13	-3.31	-3.52	-2.43	-3.18
		Prob	0.26	0.022**	0.0285*	0.64	0.23	0.007**	0.52	0.0692*	0.0406*	0.36	0.093*
	Without Constant and Trend	t-St	-1.66	-3.74	-3.68	-1.93	-2.67	-4.08	-1.92	-2.94	-3.47	-2.11	-2.44
		Prob	0.0917*	0.002**	0.003**	0.0514	0.007**	0.001**	0.0528*	0.003**	0.006**	0.034**	0.0147*
			I (1)	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)

Note: *, **, and *** denotes statistically significant at 1 percent, 5 percent and 10 percent level, respectively.

Source: Author's computation

Table A- 8. Matrix correlation of explanatory variables of income inequality

Correlation	PO_T10	PO_GINI	W10_	HC	EMP	GDP	KOF	KOJ	CH	CPNB	CNC	FD	FDI	FMI
PO_T10	1													
PO_GINI	0.80***	1												
W10_	0.43**	0.52*	1											
HC	0.76***	0.89***	0.67	1										
EMP	0.32	0.26	0.41	0.41**	1									
GDP	0.16	-0.19	0.27	-0.09	0.39*	1								
KOF	0.74***	0.89***	0.28	0.84***	0.13	-0.38*	1							
KOJ	0.71***	0.48**	-0.14	0.28	0.07	-0.07	0.52	1						
CH	0.64***	0.76*	0.04	0.68	-0.14	-0.50*	0.92	0.55***	1					
CPNB	0.54**	0.66***	-0.14	0.51	-0.27	-0.55	0.84	0.59***	0.97	1				
CNC	0.63***	0.82***	0.1	0.76	0.05	-0.52**	0.95	0.52	0.95	0.91	1			
FD	0.74***	0.75***	0.03	0.56*	-0.14	-0.39*	0.87*	0.73*	0.90***	0.92**	0.86*	1		
FDI	0.81***	0.9	0.53***	0.88***	0.1	-0.25	0.89	0.47**	0.81***	0.71***	0.83***	0.81***	1	
FMI	0.59***	0.55*	-0.25	0.29	-0.25	-0.40**	0.72***	0.76***	0.80***	0.89***	0.74***	0.95***	0.58***	1

Notes: ***, ** and * significant at 0.01, 0.05 and 0.10 levels, respectively.

Table A- 9. Correlation matrix of key variables with wealth inequality variables

Correlation	GINI	GDP	EMP	NFW	FW	FDI	SMR	SMT	CH	CG	TER	
GINI	1											
GGDP	0.01	1										
EMP	0.2	0.5**	1									
NFW	0.77***	-0.36	-0.07	1								
FW	0.69***	-0.34	0.12	0.9***	1							
FDI	-0.27	-0.58	-0.56***	0.23	0.23	1						
SMR	0.05	0.47**	0.12	-0.2	-0.2	-0.08	1					
SMT	-0.59**	-0.44**	-0.54***	-0.3	-0.31	0.74***	0.05	1				
CH	-0.23	-0.57	-0.3	0.37	0.45**	0.86***	-0.21	0.50**	1			
CG	-0.47**	-0.63	-0.55***	-0.24	-0.27	0.57*	-0.24	0.79***	0.42*	1		
TER	-0.24	-0.37	-0.43**	0.27	0.27	0.82**	0.04	0.47**	0.79***	0.17	1	
SEC	0.41*	-0.01	0.62***	0.45**	0.62	-0.21	-0.19	-0.55***	0.16	-0.36	-0.18	
SEC	0.41*	-0.01	0.62	0.65***	0.45**	0.62	-0.21	-0.19	-0.55	0.16	-0.36	1

Significance levels: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$

Source: Author's computation

Table A- 10. Matrix correlation of explanatory variables of human development in Hungary

Correlation	HDI	MRI	EDX	TER	GDI	FD	FIA	FMA	CH	CRP	CB	INF
HDI	1											
MRI	-0.98*	1										
EDX	-0.6**	0.63***	1									
TER	0.88***	-0.88***	-0.31	1								
GDI	0.51***	-0.51	0.18	0.79***	1							
FD	0.81***	-0.79***	-0.31	0.94***	0.74*	1						
FIA	0.84***	-0.75**	-0.45	0.69***	0.36***	0.7***	1					
FMA	0.86***	-0.89	-0.58	0.87***	0.5***	0.83***	0.55***	1				
CH	0.68***	-0.62*	-0.12	0.79***	0.74***	0.83***	0.74***	0.48***	1			
CRP	0.85***	-0.81*	-0.41	0.85***	0.63***	0.89***	0.81***	0.68***	0.92***	1		
CB	0.45***	-0.36	0.09	0.63	0.7***	0.74***	0.59***	0.29	0.95***	0.8***	1	
INF	-0.92*	0.93***	0.47	-0.88	-0.59***	-0.78***	-0.65*	-0.89**	-0.58	-0.75*	-0.35	1

Significance levels: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Source: Author's computation

Table A- 11. Unit root tests on variables

			GINID	GINIM	GOV	CIP	SEC	CRHU	CRCRP	EMP	TER	CRP
At Level												
PP	With Const.	t-Sta	-1.855	-1.60	-1.681	-1.80	-0.563	-1.883	-1.681	-0.69	-1.67	-
		Prob	0.661	0.774	0.744	0.68	0.976	0.647	0.744	0.967	0.748	0.702
	Without Const.	t-Sta	1.091	1.702	-0.090	-1.10	-0.138	-0.572	0.365	-0.65	0.504	0.056
		Prob	0.9262	0.9771	0.6474	0.23	0.6304	0.4641	0.7863	0.4304	0.8209	0.696
ADF	With Const.	t-Sta	-2.298	-2.434	-2.2781	-1.76	-0.5636	-3.7194	-2.477	-1.961	-3.847	-3.42
		Prob	0.4267	0.3582	0.4371	0.70	0.9765	0.03**	0.3374	0.6068	0.02**	0.06*
	Without Const.	t-Sta	0.8237	0.937	0.0542	-1.08	-0.1358	-0.8217	0.0002	-0.412	0.2843	-0.46
		Prob	0.8862	0.9047	0.6948	0.24	0.6315	0.3547	0.6776	0.5294	0.764	0.508
At First Difference												
PP	With Const.	t-Sta	-3.097	-2.26	-5.740	-6.5	-2.821	-2.871	-5.78	-2.54	-1.97	-3.59
		Prob	0.118	0.442	0***	0***	0.197	0.180	0.***	0.305	0.597	0.04*
	Without Const.	t-Stat	-2.9835	-1.9933	-5.7509	-6.62	-2.8554	-2.8952	-5.6754	-2.3798	-1.8344	-3.53
		Prob.	0***	0.0453**	0***	0***	0.***	0.0047**	0***	0.0182**	0.0638	0***
ADF	With Constant	t-Stati	-3.0737	-2.2247	-4.8392	-6.56	-1.6232	-2.7705	-2.6569	-3.0488	-2.5662	-2.02
		Prob.	0.1244	0.4653	0***	0***	0.7625	0.215	0.2585	0.131	0.2969	0.574
	Without Const.	t-Stat	-2.9714	-1.9635	-4.6761	-6.62	-1.7687	-2.8046	-2.5657	-2.2311	-2.3781	-1.97
		Prob.	0.***	0.0483**	0***	0***	0.073*	0.006***	0.0114**	0.0262**	0.0183	0.04*
	Order of Integration		I (1)	I (1)	I (1)	I (1)	I (1)	I (0)	I (1)	I (1)	I (0)	I (1)

Note: *, **, and *** denotes statistically significant at 1 percent, 5 percent and 10 percent level, respectively.

Source: Author's computation

Table A- 12. ARDL error correction regression, dependent variable: D(GINID)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Δ(CRCRP)	0.0075	0.0071	1.0568	0.3026
Δ(CRCRP(-1))	-0.0680	0.0075	-9.0670	0
Δ(CRCRP(-2))	-0.0589	0.0086	-6.8881	0
Δ(CRCRP(-3))	-0.0246	0.0085	-2.8861	0.0088
Δ(CRHU)	0.0506	0.0138	3.6751	0.0014
Δ(CRHU(-1))	-0.0243	0.0172	-1.4177	0.171
Δ(CRHU(-2))	0.0938	0.0145	6.4621	0
Δ(EMP)	-0.1145	0.3589	-0.3189	0.7529
Δ(GOV)	0.0179	0.0217	0.8252	0.4186
Δ(GOV(-1))	0.3278	0.0342	9.5828	0
Δ(GOV(-2))	0.1346	0.03469	3.8790	0.0009
Δ(GOV(-3))	0.1552	0.0306	5.0775	0
Δ(CIP)	0.0691	0.0072	9.57473	0
Δ(CIP(-1))	-0.0210	0.0072	-2.8948	0.0087
CointEq(-1)*	-0.1065	0.0103	-10.3359	0
R-squared	0.9444	Mean dependent		0.1244
Adjusted R-squared	0.9126	S.D. dependent		0.3886
S.E. of regression	0.1148	Akaike info		-1.2093
Sum squared resid	0.3693	Schwarz criterion		-0.5268
Log likelihood	44.210	Hannan-Quinn		-0.9549
Durbin-Watson stat	2.4468			

Source: Author’s computation

Table A- 13. ARDL error correction regression, dependent variable: D (GINIM)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Δ(CRPR)	0.0075	0.005593	1.3511	0.2038
Δ(CRPR (-1))	-0.0223	0.006246	-3.5710	0.0044
Δ(CRPR (-2))	-0.0309	0.006528	-4.7404	0.0006
Δ(CRPR(-3))	-0.0491	0.008414	-5.8416	0.0001
Δ(CRPR(-4))	-0.0405	0.009116	-4.4521	0.001
Δ(EMP)	0.0703	0.454972	0.1545	0.88
Δ(EMP(-1))	0.8596	0.652988	1.3165	0.2148
Δ(EMP(-2))	-1.7842	0.576711	-3.0938	0.0102
Δ(GOV)	-0.0304	0.028848	-1.0556	0.3138
Δ(GOV(-1))	0.4973	0.058526	8.4985	0
Δ(GOV(-2))	0.4418	0.067937	6.5033	0
Δ(GOV(-3))	0.3668	0.04285	8.5623	0
Δ(GOV(-4))	0.2234	0.047748	4.6792	0.0007
Δ(TER)	0.0322	0.022392	1.4388	0.178
Δ(TER(-1))	0.0764	0.034832	2.1957	0.0505
Δ(TER(-2))	0.05174	0.032771	1.5790	0.1426
Δ(TER(-3))	-0.0551	0.025347	-2.1759	0.0522
Δ(CIP)	0.0955	0.008586	11.1239	0
Δ(CIP(-1))	-0.0369	0.010162	-3.6311	0.0039
Δ(CIP(-2))	0.0261	0.007323	3.5643	0.0044
Δ(CIP(-3))	0.0463	0.00835	5.5533	0.0002
Δ(CIP(-4))	0.0229	0.006893	3.3339	0.0067
CointEq(-1)*	-0.3143	0.037081	-8.4760	0
R-squared	0.9794	Mean dependent		0.2295
Adjusted R-squared	0.9480	S.D. dependent		0.4185
S.E. of regression	0.0953	Akaike info		-1.5859
Sum squared resid	0.1545	Schwarz criterion		-0.4911
Log likelihood	61.8914	Hannan-Quinn		-1.17995
Durbin-Watson stat	2.5069			

Source: Author’s computation

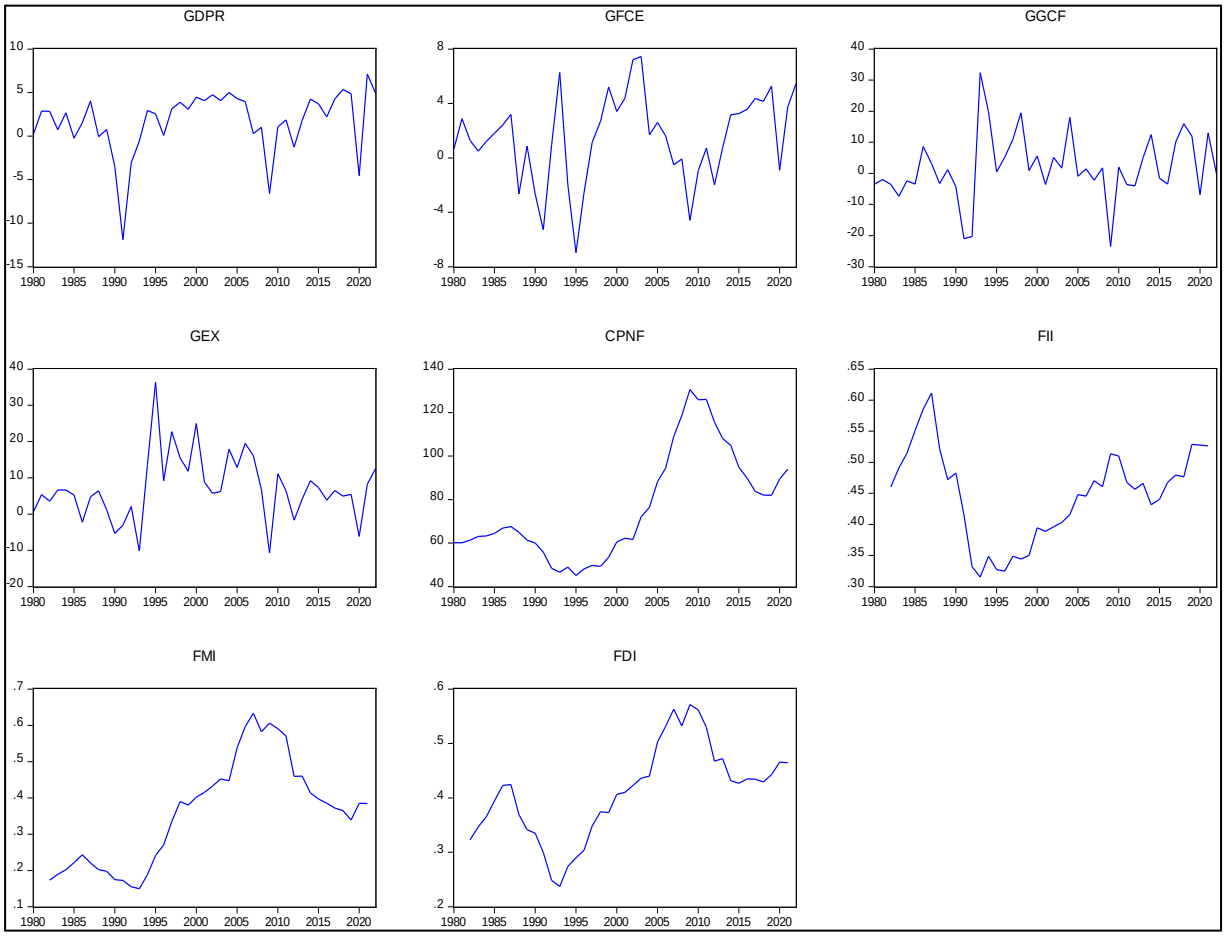

Figure A- 1 Progress of the components of GDP variables, during the period 1980–2020.

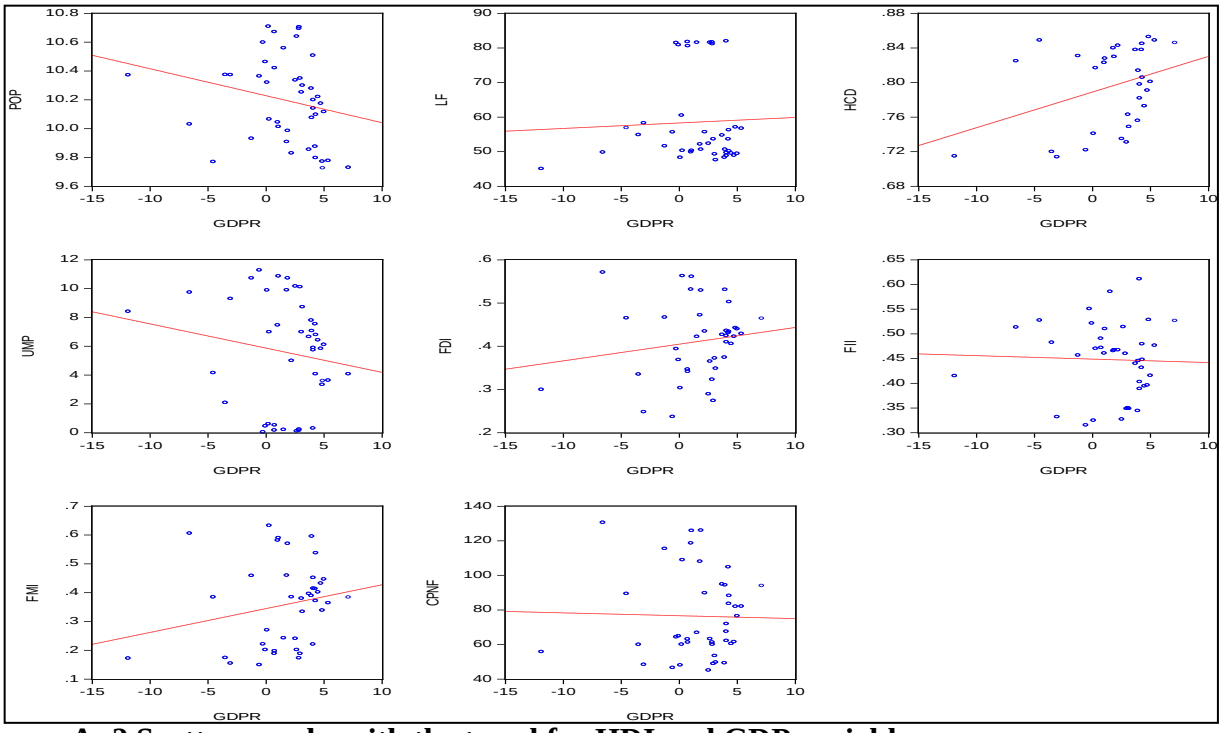

Figure A- 2 Scatter graphs with the trend for HDI and GDP variables

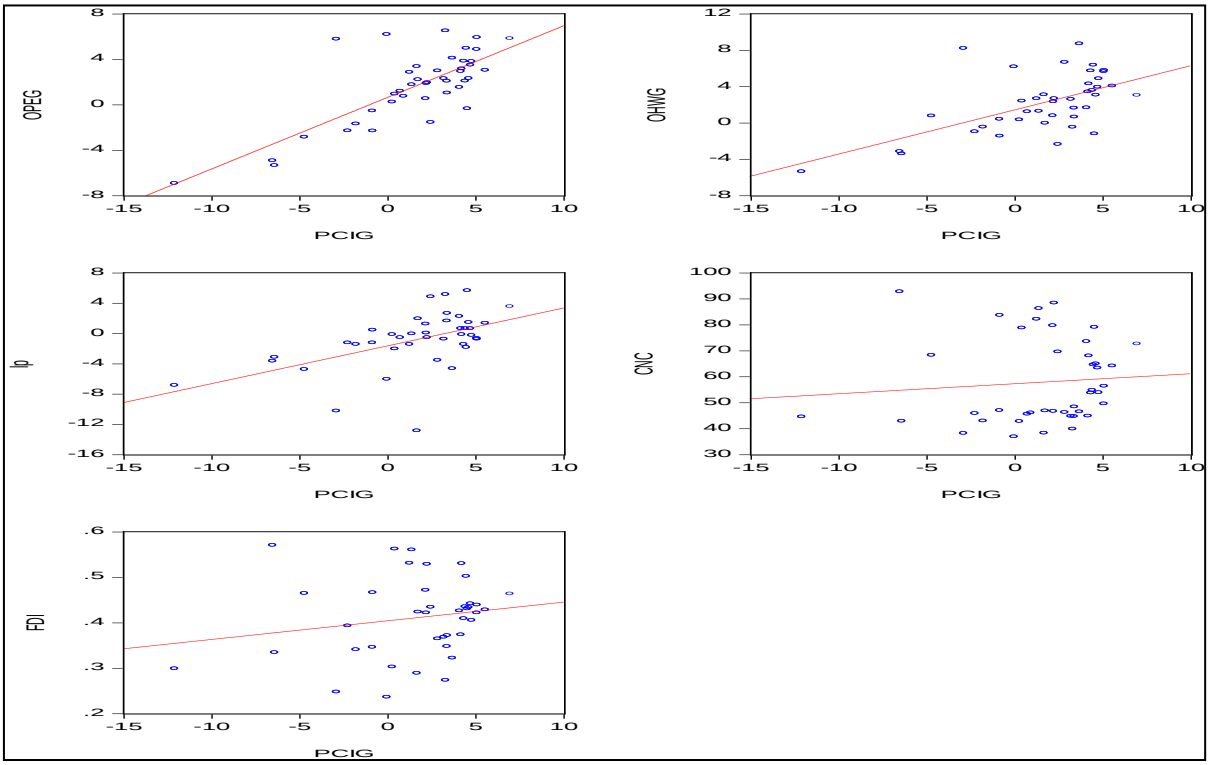

Figure A- 3 Scatter graphs for the variables of economic growth, productivity, and finance variables.

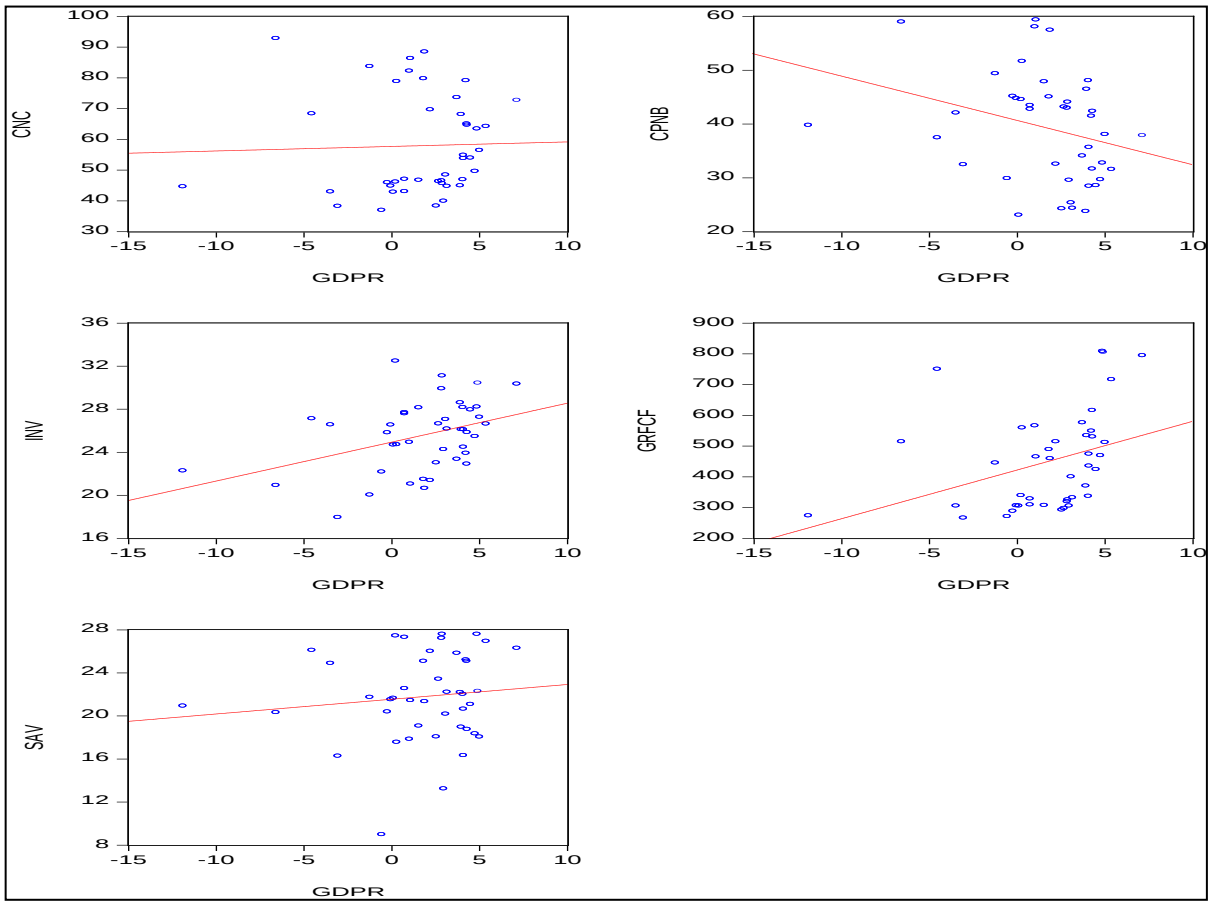

Figure A- 4 Scatter graphs for the variables of economic growth and finance variables.

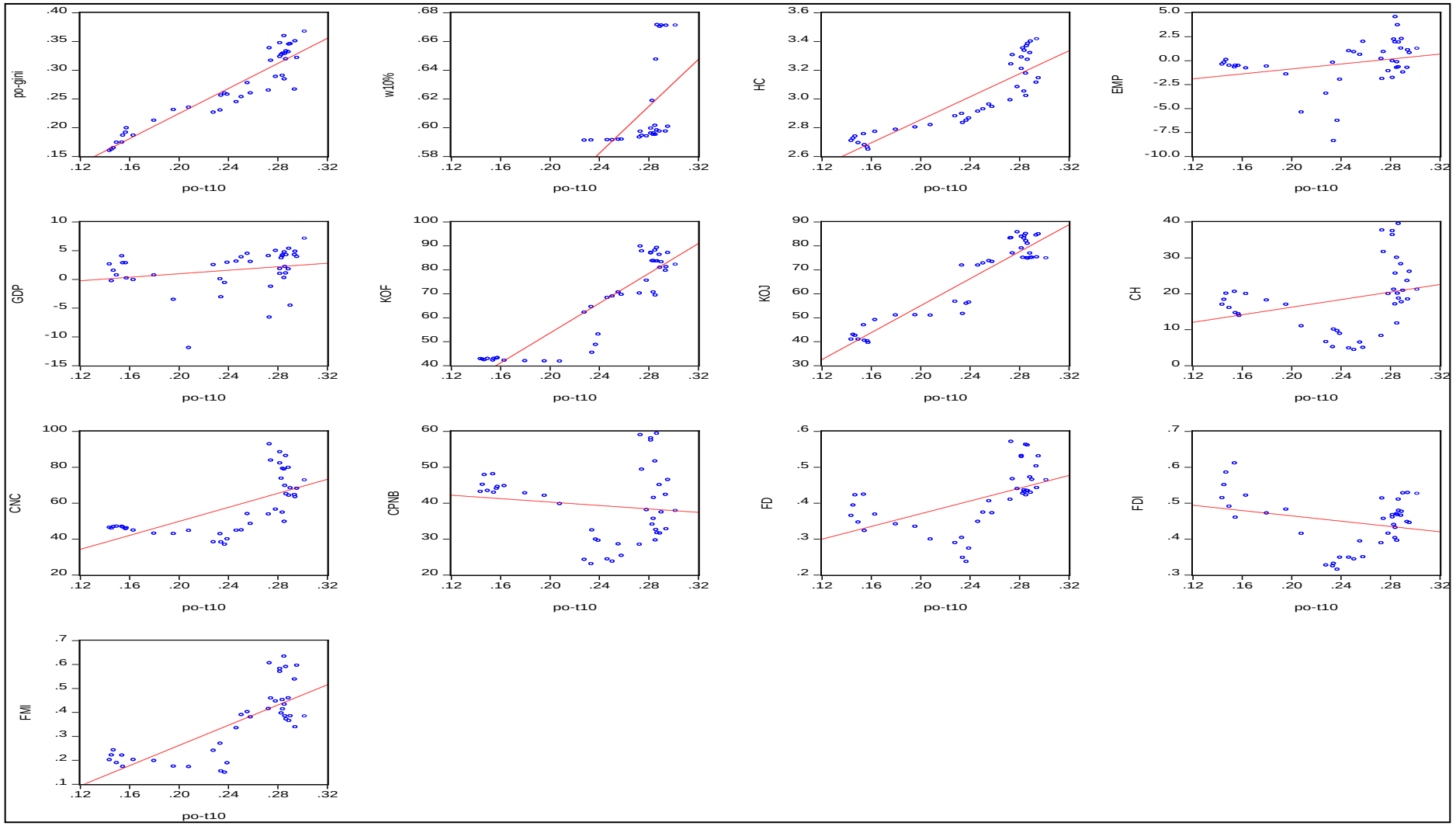

Figure A- 5 Matrix correlation of explanatory variables of income inequality.

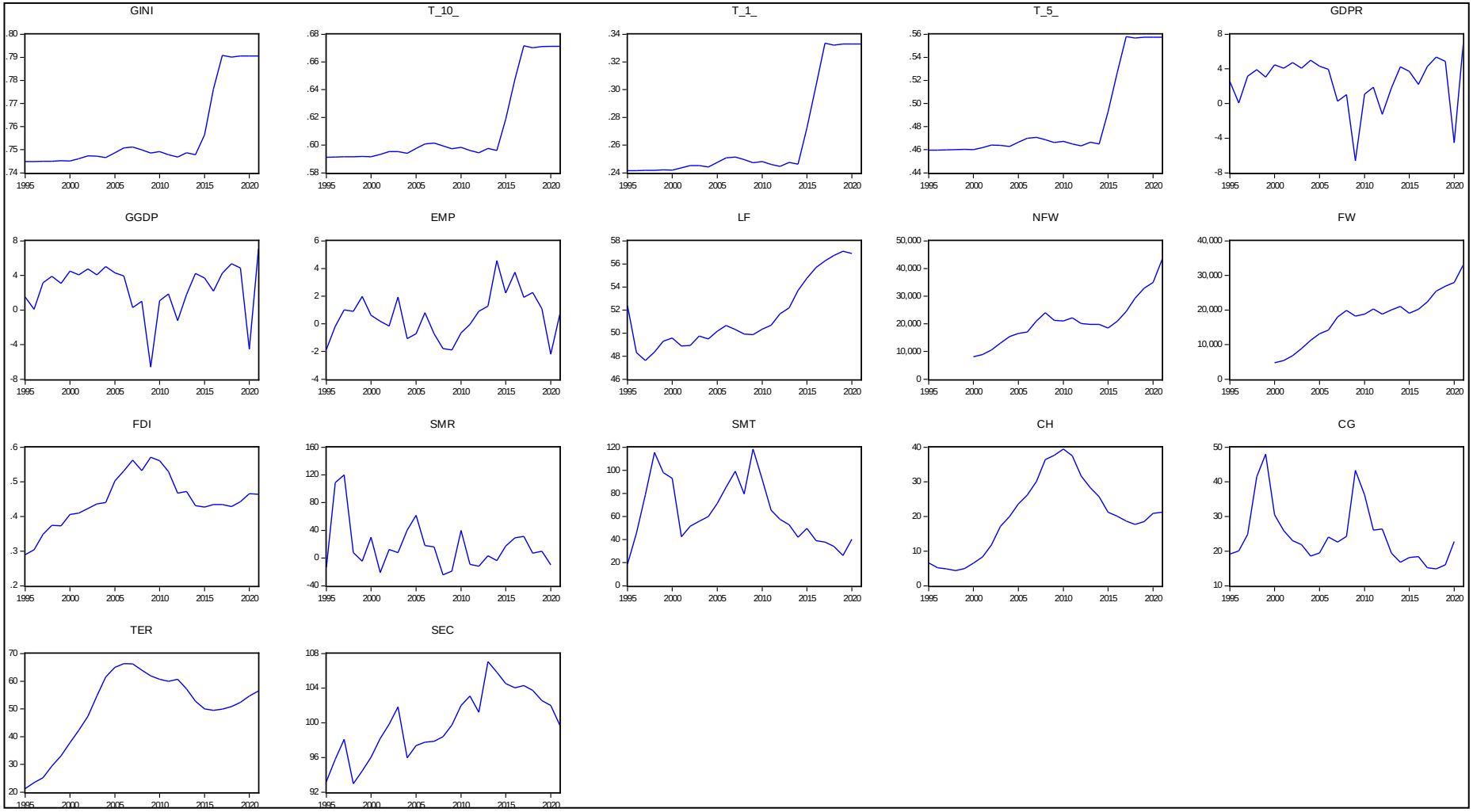

Figure A- 6 Progress of the wealth inequality variables, during the period 1995–2020.

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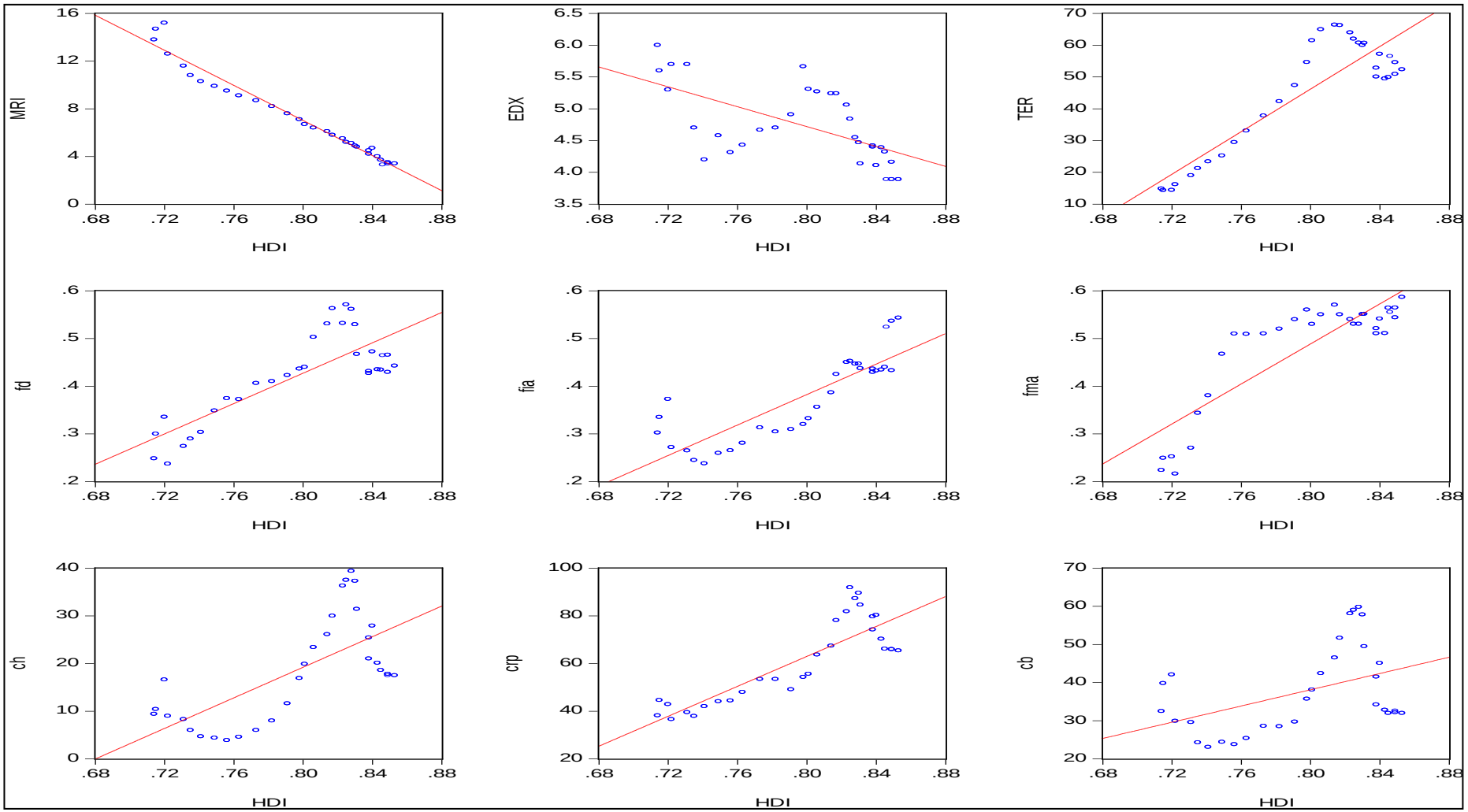

Figure A- 7. Scatter graphs with the trend of HDI and explanatory variables.

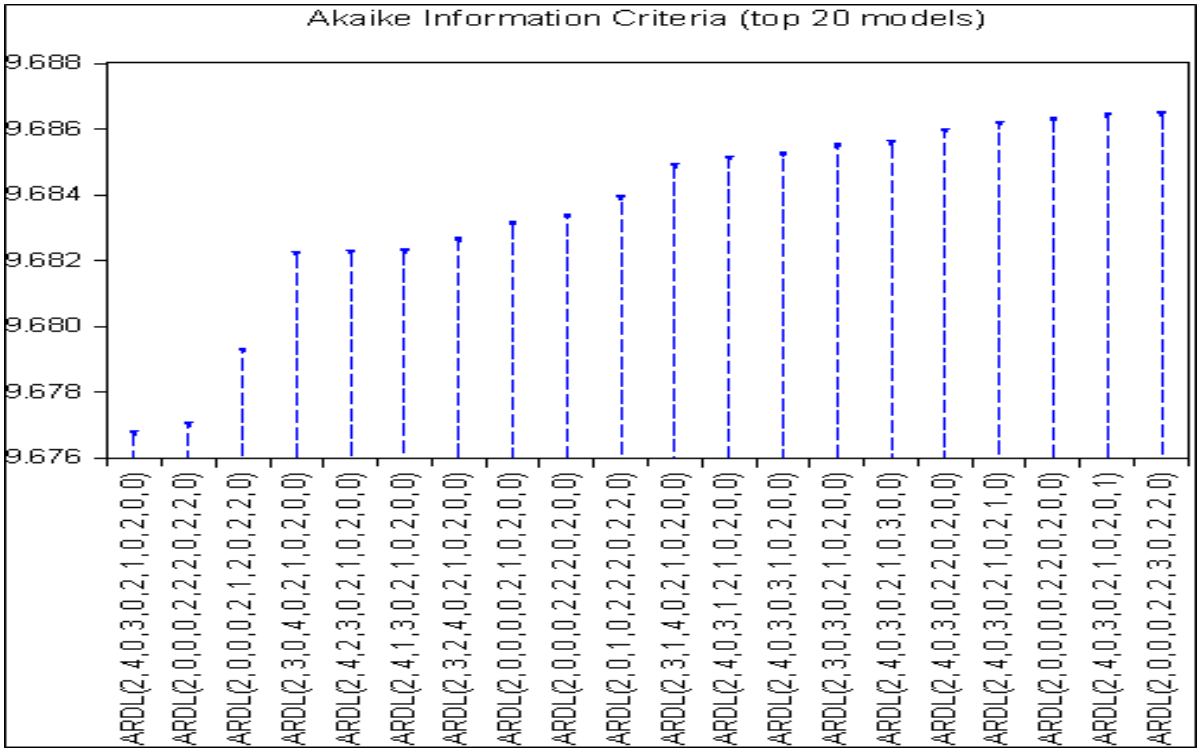

Figure A- 8The strength of model selection criteria, (GDP), ARDL (2, 4, 3, 0,2,1,0, 2,0,0).

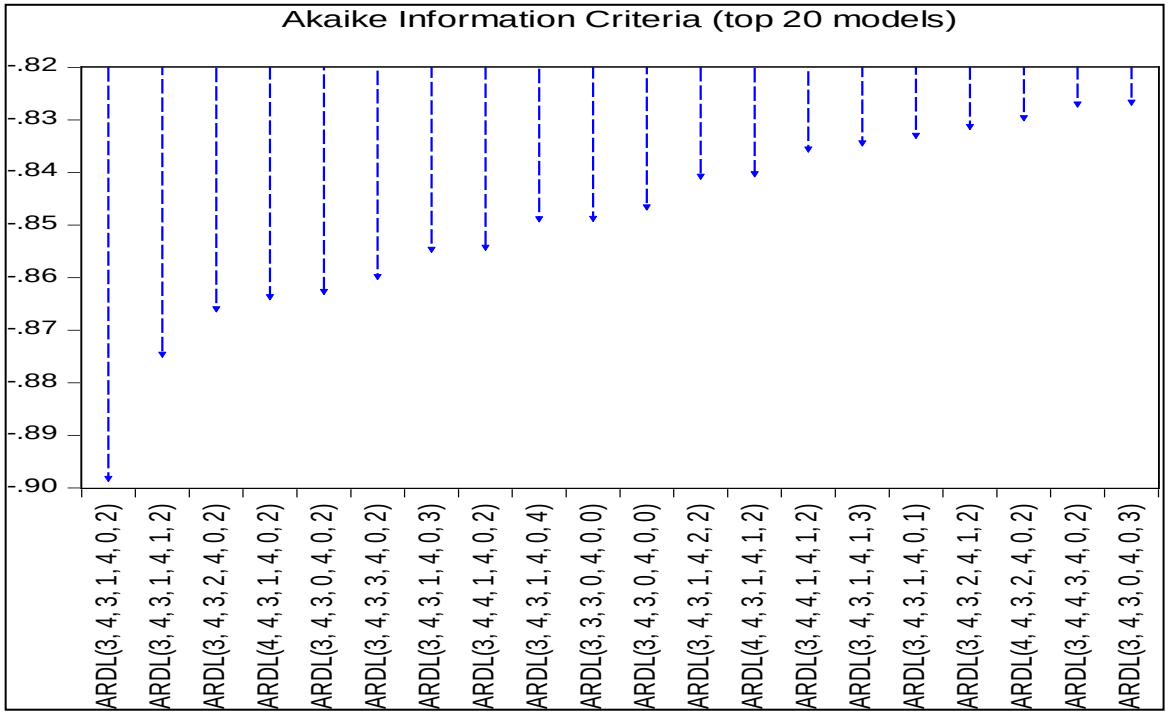

Figure A- 9. The strength of model selection criteria, (GINID) ARDL (3, 4, 3, 1, 4,0,2).

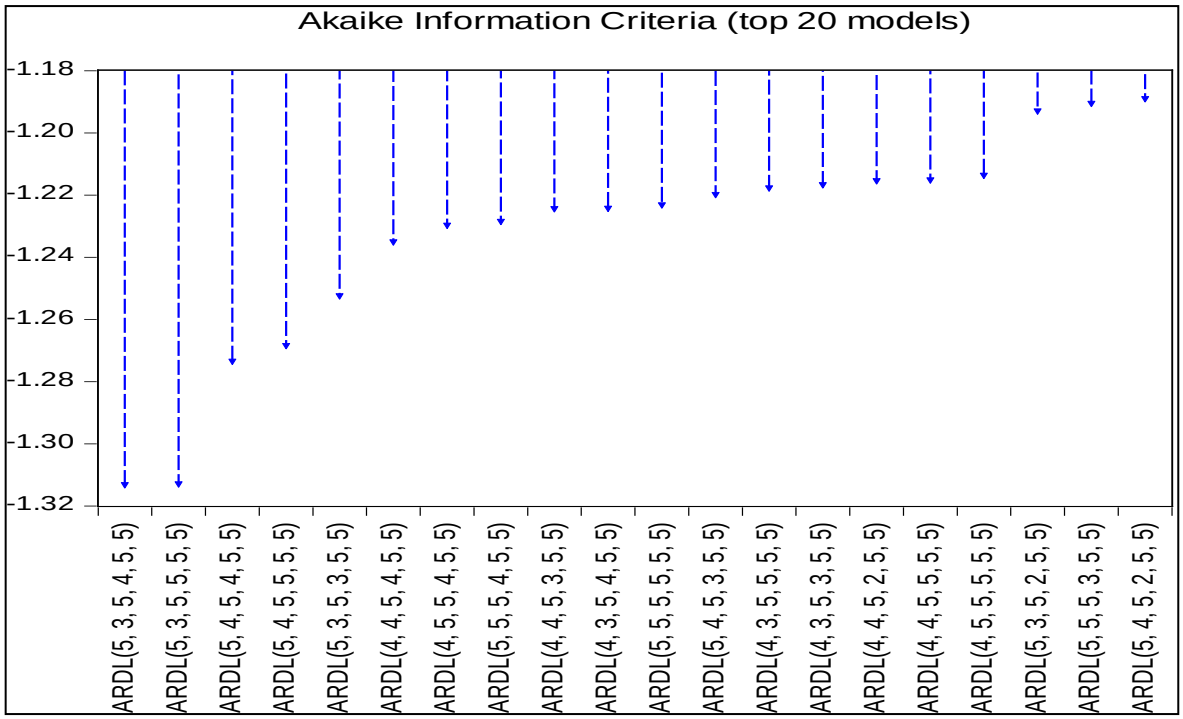

Figure A- 10. The strength of model selection criteria, (GINIM) ARDL (5, 3, 5, 4, 5, 5).

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SHORT PROFESSIONAL CV

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She has worked in the Planning and International Cooperation Commission (PICC) in Syria since 1992 in various posts in different fields such as human resources and training, foreign trade and competitiveness, health and population planning, monetary and financial planning, industrial manufacturing planning, and studies and projects evaluation. She served on a task force team for the Institutional and Sector Modernization Facility (ISMF), which was formed in collaboration with the European Union. On the other hand, she has completed numerous training courses and holds a diploma in development policies from the Arab Institute for Planning in Kuwait and a diploma in socioeconomic planning from the Institute of Planning for Social and Economic Development in Damascus. She has also attended numerous seminars in other countries, including Japan, Greece, China, Sweden, France, Kuwait, India, and Egypt, while working at the PICC. Her major research interests are management, financial and macroeconomic policies, human development, and social equality.