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Does Finance Matter for Growth and Inequality in Hungary?

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LIST OF ABBREVIATIONS

SDGs	Sustainable Development Goals
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) countries
EGT	Endogenous Growth Theory
HD	Human Development
HC	Human Capital
GINI	Gini Coefficient
AIC	Akaike Information Criterion
FPE	Final Prediction Error
FAS	Financial Access Survey
IFS	International Financial Statistics
ILO	International Labour Organisation
IMF	International Monetary Fund
UNDP	United Nations Development Programme
WBI	World Development Indicators
WGI	Worldwide Governance Indicators
UNCTAD	United Nations Conference on Trade and Development
SWIID	SWIID Standardised World Income Inequality Database
OECD	Organization for Economic Cooperation and Development
UNINDO	United Nations Industrial Development Organisation
UNU-WIDER	United Nations University World Institute for Development
WIID	World Income Inequality Database
CEEC	Central and Eastern European Countries
EU(s)	European Union (Eurostat)
WID	World Inequality Database
TY	Toda and Yamamoto
ARDL	Autoregressive Distributed Lag
ECM	Error Correction Model

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INTRODUCTION

RESEARCH BACKGROUND

The 2030 Sustainable Development Goals (SDGs) aim for economic growth and equality, with Financial Development (FD) playing a crucial role (Galor and Zeira, 1993; Banerjee and Newman, 1993). However, academic, political, and economic experts have raised concerns over the relationship between FD, economic development, and inequality over the past 30 years (Stiglitz, 2016; Piketty, 2014; Morelli and Atkinson, 2015; Rinosha and Mustafa, 2021). The relationship between FD and economic growth and inequalities has been a topic of debate since the 2008 crisis (Rajan, 2010; Stiglitz, 2012; Dabla-Norris et al., 2015; Swamy and Dharani, 2019). High FD levels have been linked to higher income inequality and low economic growth, as seen in the pre-crisis 2008 years (de Haan, 2017; Rajan, 2010; Elijah and Hamza, 2019; Petkovski and Kjosevski, 2014). Additionally, FD may lead to rent-seeking activities, increasing the risk of Financial Crises (FC) as occurred in 2008 (Stiglitz, 2016). Over the past thirty years, the empirical literature has used various indicators of FD and growth and inequality, using different econometric approaches. However, there is no consensus among researchers on the shape of these relationships and the impact of FD on economic growth and inequality, suggesting the need for more empirical literature.

Bagehot (1873) and Schumpeter (1912) were early in discussing the relationship between finance and growth. However, there is no definitive answer on whether finance (FD) is beneficial or detrimental to growth. Some scholars argue that FD causes growth (Schumpeter, 1912; Romer, 1986; Hao et al., 2018), while others suggest it is the outcome of growth (Robinson, 1952; Guru and Yadav, 2019). Patrick (1966) suggests two-way causality, suggesting mutual influence between FD and economic growth. Nobel laureates have also ignored the role of finance in development and economic growth (e.g., Lucas, 1988). Despite these debates, the relationship between finance and growth remains a contentious issue. The Endogenous Growth Theory (EGT) and some literature support the positive impact of finance on a country's economic growth (e.g., Rinosha and Mustafa, 2021). However, some argue that FD can hinder economic progress (Ram, 1999; Ono and Iwasaki, 2022) and contribute to macroeconomic instability and crises (Minsky, 1983; Schularick and Taylor, 2012), with some FD activities being the primary cause of these issues. 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 on economic growth and inequality vary across different economies since the functions are influenced by institutions and are country-specific, as noted by Panik and Loayza et al. (2018).

Finance plays a crucial role in a country's economic growth, but research often overlooks the disproportionate benefits of financial services (FD) to the rich or poor (Levine, 2021). Access to financing is particularly constrained for impoverished individuals, based on their income level and capacity to provide collateral (Rajan and Zingales, 2003; de Haan et al., 2022). The Emerging Global Theory (EGT) in the 1990s highlighted the importance of finance in reducing inequality, suggesting that low-income individuals acquire disproportionately from FD/FL (Banerjee and Newman, 1993; Galor and Zeira, 1993). FD helps reduce income disparities across generations by making financial services more accessible to those previously unable to access them because of high costs (Greenwood and Jovanovic, 1990; Zhang and Naceur, 2019; Cihak and Sahay, 2020). However, some argue that FD/FL does not have to assist low-income individuals but may fall disproportionately on the rich (Rajan and Zingales, 2003; Law et al., 2014; de Haan and Sturm, 2017; de Haan et al., 2022) since FD enhances rent extraction and improves intensive margins. Furthermore, financial instability associated with FL and FD is often linked to inequality (de Haan and Sturm 2017). Thus, further highlighting the need for further research on this issue.

Rising inequality is a significant social and economic issue, causing controversy and global concern. The major concern comes from inequalities' potential negative economic and social effects rather than the inequality issue itself (Rajan, 2010; Dabla-Norris et al., 2015). Its negative effects include affecting economic growth through human capital accumulation (Stiglitz, 2012), increased gender inequality, reduced social cohesion, and fragmentation among ethnic groups, regions, and class communities (Stiglitz, 2016; Dabla-Norris et al., 2015). Inequalities also contribute to financial and political instability (Rajan, 2010). Thus, inequality is more than a sign of low income in the lower deciles, or perhaps an indicator of a lack of chance and income mobility, or a signal of a lack of opportunity. This issue requires significant attention and calls for action, leading to increased 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 for achieving the 2030 SDGs. Policymakers worldwide prioritize increasing equality, including Hungary. Researchers have raised questions about wealth inequality, bringing the issue into the public debate (e.g., Stiglitz, 2016; Piketty, 2014; Morelli and Atkinson, 2015). Recent crises have deepened existing inequalities and poverty, particularly targeting the poorest and most

vulnerable communities (UNDP, 2023; World Bank, 2023). The financial system's development can shape inequality by reducing investment costs, improving Human Development (HD), and expanding economic opportunities independent of parental income (Beck et al., 2007; Piketty, 2014; Magyar Nemzeti Bank (MNB), 2018). Intergenerational changes in wealth distribution can mitigate poverty and discrimination (Stiglitz, 2012; Beck et al., 2007; de Haan et al., 2022).

The link between inequality and FC has acquired attention because of the 2008 global crisis. Economists have debated the relationship between increasing inequality and financial unsuitability (Rajan, 2010), with some arguing that higher inequality leads to a "keeping up with the Joneses" effect, where low-income groups have more leverage to maintain consumption levels (Rajan, 2010; Stiglitz, 2012; Perugini et al., 2015). Others, however, suggest that credit booms increase the likelihood of a financial crisis owing to robust economic expansion and low interest rates rather than income concentration (Bordo and Meissner, 2015).

Scholars have differing opinions on the impact of FC on inequality. Some argue that FC would worsen inequality (de Haan and Sturm, 2017; Bazillier and H'ericourt, 2017), while others suggest that the impoverished household was not always the most severely affected (Baldacci et al., 2002). Recent studies have failed to find evidence of the distributional effects of the FC (Amate-Fortes et al., 2017). Some suggest a combination of coincidental circumstances or indirect causal relationships between inequality and FC, including policies like financial transformation, monetary policy, and deregulation.

RESEARCH PROBLEM

Hungary, as per Articles B and G of the 1992 Maastricht Treaty, is committed to promoting balanced and sustainable economic and social advancement to achieve economic growth, improve living standards, and foster social solidarity. Despite achieving mixed results over the past three decades, Hungary's performance in the UN SDG 8 and 10 target lags behind its regional peers. Hungary was one of the first Eastern European nations to implement financial reform, which was considered a key driver for achieving social and economic goals. This sector underwent significant changes (Botos, 2019), including the establishment of a two-tier banking system, a government bailout plan, and privatization of banks (Hasan and Marton, 2003). The government also resumed Budapest stock market activities after being interrupted during the communist era. The regulatory framework for the sector was constructed, including new laws and regulations for the securities market and credit institutions. The European integration process drove improved regulation and monitoring (MNB, 2002), leading to Hungary's banks becoming integral parts of large

international banking systems (Bod, 2017; Kovács, 2019). However, this increased the country's external vulnerability and heavy reliance on foreign finance. The crisis and its effects put the Hungarian banking industry through significant challenges, and credit banks' portfolios deteriorated significantly. The financial sector has improved significantly, but the impact of these changes on economic growth and inequality remains unclear. Further research is needed to understand these implications.

The Hungarian economy underwent gradual reforms in the 1980s (Virág, 2020), but faced rapid transformations and recession in the early 1990s due to macro-financial imbalances (Bod, 2017). Following privatization, the government implemented economic and financial reforms, leading to a rapid recovery and macroeconomic stability. Hungary's growth rate helped it align with the EU but was incomparable to regional countries' ratios. However, the Hungarian economy experienced a slowdown since 2005, becoming lower than other Visegrád (Czechia, Poland, and Slovakia) countries. Real GDP growth only surpassed pre-crisis levels in 2015, and GDP per capita remained the lowest among V4 countries until 2018 (World Bank Indicators (WBI), 2022). Despite this, the Hungarian economy avoided an international growth slowdown in 2019, achieving one of the highest growth rates in Europe (Figure 1).

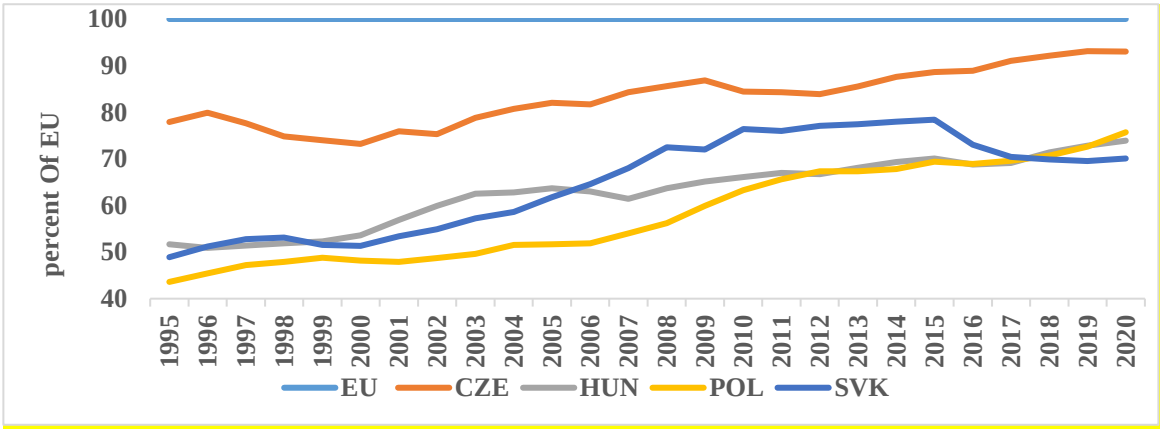

Figure 1. Gross domestic product, PPS, percentage of EU 27

Source: own calculation based on data from Eurostat(EUs)

The finance-growth nexus is crucial for scholars and policymakers in Hungary, but there is a lack of empirical studies and cross-country analysis. A paradox emerges, with some studies highlighting the promotion of FD and FL in Hungary (Varela, 2018; Ono and Iwasaki, 2022), while others find negative effects on economic growth due to credit to the private sector and interest margin (Petkovski and Kjosevski, 2014). The finance-growth link in Hungary is unclear (Tsaurai, 2015), and recent concerns have arisen due to the slowdown in the country's financial system compared to other European countries.

Hungary's income gap and wealth inequality have widened over the past 40 years, with the wealthiest 10% holding a sharper increase in household income. In the last decade, this trend has been inconsistent with other Visegrád countries, with a steady rise in both the Palma (top 10 percent / bottom 40 percent income share) and Gini inequality (where "0" indicates equality, "1" total inequality) indicators Hungarian (Central Statistical Office (HCSO), 202l). Hungary has experienced a robust economic boom, one of the best in the EU, and a significant improvement in the financial sector after the 2008 crisis. Still, we can observe some deterioration in the SDG 10 indicator of inequality (Eus, 2021), https://ec.europa.eu/eurostat/ web/sdi/ indicators. Marketable growth's advantages have not been shared fairly (Benczúr et al., 2018), with financial assets being the primary drivers of income increase and wealth concentration (Mavridis, 2017), given that they held nearly 70 percent of financial assets in 2017 (European Central Bank (ECB), 2021). 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). Economic opportunity inequalities and socioeconomic background are still strong determinants of an individual's outcomes in life and access to quality education or healthcare (Róbert, 2019; Bukowski et al., 2021).

There is little empirical evidence informing policymakers of the effects of financial reforms over forty years on income inequality. Existing studies are contradictory, inconclusive, and dominated by cross-country analyses. For example, de Haan and Sturm (2017) support the finance-inequality widening hypothesis, while Zhang and Naceur (2019) support the inequality-narrowing hypothesis of finance. Nguyen et al. (2019) and Mbona (2022) indicate that financing lowers inequality in the first stage but raises it in the second. This requires much more work on these issues to understand the potential impact of financial sector policies on inequalities and poverty.

As mentioned earlier, the Hungarian financial system had two FC in 1991 and 2008, which might have a causal relationship with inequality. Especially in the years around the two crises, inequality has witnessed considerable changes (Tóth, 2016; OECD and EU, 2019). On the other hand, the financial policies in the years preceding the two crises may have also been one channel for enhancing the role of increasing inequality in the crises (Kumhof et al., 2015). In particular, when there was insufficient oversight or regulation of the financial industry and regulation that served the special interests of a wealthy and powerful elite (Atkinson and Morelli, 2015; Piketty, 2015). Hence, this requires scrutiny and attention to the relationship between FC and inequality in Hungary. In particular, decision-makers lack evidence about that relationship. Existing research conclusions, in particular, are conflicting and inconclusive, with cross-country analyses

dominating. For example, Hungary was one nation where the FC exacerbated inequality (de Haan and Sturm, 2017; Bazillier and H'ericourt, 2017). Contrarily, Amate-Fortes and colleagues revealed that inequality in the 27 EU countries—including Hungary—did not alter because of the global crisis (2008–2011).

RESEARCH OBJECTIVES

The hypothesis that FD should have positive effects on economic growth and income equality is not universally valid. Some argue that FD hinders economic progress (Ram, 1999; Elijah and Hamza, 2019), creates disparities (Rajan and Zingales, 2003; Stiglitz, 2015), and can lead to rent-seeking behavior (Bolton et al., 2016), potentially causing financial instability (Schularick and Taylor, 2012). Advances in financial sector services primarily benefit the wealthy and elites with strong political ties (Rajan and Zingales, 2003; de Haan and Sturm, 2017). Understanding the impact of FD on economic growth and income inequality in Hungary is crucial for policymakers to address growing challenges, determine if Hungary's FD and FL policies can meet the UNSDGs' targets, and develop strategies for achieving Hungary's financial stability goals. This understanding is essential for addressing the era's challenges and achieving the UNSDGs' economic growth and equality targets.

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.

MOTIVATION AND CONTRIBUTIONS OF THE RESEARCH

Motivation Research:

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. There is a special and personal interest for the researcher in the fields of sustainable development and equality in societies. In addition, I would not have been able to continue my studies without the Hungarian scholarship.

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.

METHODOLOGY

RESEARCH QUESTIONS AND HYPOTHESES

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?

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).

DATA

Some secondary data is gathered from published reports and websites that provide free data, like the HCSO, the OECD, the EUs, the ECB, the MNB, the AMECO database of the European Commission, the World Income Inequality Database (WIID), the World Inequality Database

(WID), the International Monetary Fund (IMF), the World Bank Indicators (WBI), the International Labour Organization (ILO), etc., in order to support the descriptive and deductive analysis performed on primary data. Even though descriptive and deductive analysis are crucial for ascertaining the relationship between the examined variables, the dissertation will employ econometric methodologies to produce more trustworthy results regarding the relationships among the analysed series.

Data for this study's empirical analysis came from the World Bank and IMF, as well as sources such as the World Economic Outlook, Global Financial Development (GFD), Financial Development and Structure (FDS), Federal Reserve Economic, the World Institute for Development Economics Research (WIDER), the United Nations Conference on Trade and Development (UNCTAD), Laeven and Valencia's (2013, 2020) database, Standardized World Income Inequality Database (SWIID), and WID. The research uses annual time series data for the empirical estimation of the models. The data spans three time periods: 1970 to 2017 for the financial crisis and inequality models, 1981 to 2019 for the finance and growth models, and 1980 to 2017 for the finance inequality models. Only the quarterly data on the ratio of credit to government and private is available for the second model; all other variable data are provided as annual data. I, therefore, converted to quarterly data using EViews 10.0's low-frequency to high-frequency conversion method, which selects the best linear unbiased estimator of the series employed by Chow and Lin (1971). Moreover, data analysis was done using the econometric analysis program EViews 10.

ECONOMETRIC MODELS

To fulfil the objectives of the dissertation and answer the research questions, the study estimates three econometric models to test the three hypotheses:

- **1st MODEL: Examine the Causal Relationship between Financial Crises and Inequality**

Following earlier research (De Haan and Sturm 2017), the study uses the Gini coefficient on market income (a dependent variable) based on households' income at the market as a better proxy than disposable income inequality to test these hypotheses and investigate the causal relationship between inequality and FC. In particular, Hungary is one of the nations that has developed redistributive systems, as seen by the notable disparity in the market and disposable income Gini values. According to the current study, trade openness (TAR), real domestic growth (GDP), inflation rate (INF), banking crises (BC), financial depth ratio (CRD), trade openness (TAR),

general government final consumption spending (GOV) ratio (percent of GDP), and gross school enrollment ratio (SE), as given in Equation 1.

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

The study used the Toda-Yamamoto (TY) approach (1995) rather than the traditional Granger (1969) test to determine causality between the inequality variable and financial crisis variables because it is justifiable regardless of whether the variables are co-integrated or not at the orders of I (0) or I (1). The TY technique modifies Granger causality in a VAR test with stationary variables by using a modified Wald test (MWald) statistic to test zero limitations on the parameters of the original VAR (k) model, following a Chi-square ($\chi 2$) distribution asymptotically. The key idea behind the new strategy is to increase the order of VAR models by (k+dmax) to implement the causality test. The TY causality test is designed as follows:

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

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

Where *Yt* and *Xt* 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 constant variance and no autocorrelation. The T Y causality process involves four stages: determining the maximum order of integration of variables using unit root testing procedures like Dickey-Fuller (AFD), 1981, and Phillips-Perron (PP), 1988; determining the optimal lag length (K) using the Akaike Information Criterion (AIC) and Final Prediction Error (FPE); testing the dynamic stability of the model; applying the Granger causality test for non-causality using pairwise equations; and modifying the Wald procedure to test the VAR (k+dmax) model for causality.

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

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

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

- **2nd MODEL: The Role of Finance in the Performance of Economic Growth.**

The existing literature often presents a finance-growth nexus model, which is specified as follows:

GDP = f (FD, CV)

Where GDP is per capita GDP (at constant 2015 prices in US dollars), was used as a proxy for economic growth, as suggested by Beck et al. (2007) and Ang (2010). The three sub-indices of depth, efficiency, and access combine to form the FD index. Furthermore, the five other FD proxies listed below are also in use: Credit to non-financial corporations (CRCRP), credit to households and NPISHs (CRHU), and credit to government to GDP (CRGV) ratios are three proxies that are associated with financial depth. The financial intermediation ratios serve as such stand-ins as they are more closely associated with investment and growth and have a strong correlation with both. The financial markets efficiency index (FME) and the financial institutions efficiency index (FIE), two proxies associated with the effectiveness of the financial sector, were

also employed in the study. All of the financial indicators are anticipated to positively correlate with Hungary's economic growth, in line with prior research and economic theory. In line with previous empirical research (Bojanic, 2012), I also used four control variables (CV) that are linked to economic growth: trade openness (TOP) and gross capital formation (GFCF), which, according to Solow's (1957) hypothesis, is a crucial factor in economic growth and a proxy for domestic investment. Alongside them are the Globalization Index (KOF) and government final consumption expenditure (% GDP).

Therefore, economic growth (GDP) is presented as the function of the following variables:

$$GDP = f(CRCRP, CRGF, CRHU, FD, FIE, FME, GFCF, GOV, TOP, KOF)$$

The model to be estimated is written as:

$$GDP_t = \alpha_0 + \beta_1 CRCRP_t + \beta_2 CRGF_t + \beta_3 CRHU_t + \beta_4 FD_t + \beta_5 FIE_t + \beta_6 FME_t + \beta_7 GFCF_t + \beta_8 GOV_t + \beta_9 TOP_t + \beta_{10} KOF_t + \mu_t. \quad (2)$$

The study examines the long-run relationship between economic growth, GDP per capita, and FD using the Autoregressive Distributed Lag (ARDL) approach of Perasan et al. (2001). The ARDL approach is popular and has several advantages over other estimation methods. It is preferred for estimating cointegration relations, applicable regardless of integration order, and more reliable than traditional methods. It is also more resilient and statistically significant in the absence of a large sample size (Lawal et al., 2016). The variables can have distinct optimal lags with the ARDL technique, which is not possible with other methods. The ARDL technique simultaneously estimates long- and short-term relationships between variables (Pesaran and Shin, 1999; Lawal et al., 2016). The formulation for estimating the model in the ARDL approach is written as-is.

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

Where the variables 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… q10 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 bounds 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 a long-run relationship has existed, the conditional ARDL model will be conducted, which can be used to estimate the following short-run coefficients:

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

The long-run equation is:

$$GDP_t = \alpha_0 + \beta_1 CRCRP_t + \beta_2 CRGF_t + \beta_3 CRHU_t + \beta_4 FD_t + \beta_5 FIE_t + \beta_6 FME_t + \beta_7 GFCF_t + \beta_8 GOV_t + \beta_9 TOP_t + \beta_{10} KOF_t + \mu_t. \quad (5)$$

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:

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

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).

➢ **3rd MODEL: The Role of FD in Inequality in Hungary**

The existing literature often puts forward the model of the finance-inequality nexus is specified as follows:

$$\text{GINI} = f(\text{FD}, \text{CV}) \qquad (1)$$

Where income inequality is represented by the GINI coefficient, and FD is a set of financial variables to be a proxy for FD. And the impact of financial resources on inequality is different between sectors. Thus, in addition to the credit to the private sector-GDP ratio variable (CRPR), we also employed other variables as proxies for FD, including credit to the private corporate sector to GDP (CRCRP) and credit to the private household sector to GDP (CRHU), which are expected to affect inequality negatively. Other explanatory variables were added to the empirical model to control for the omitted variable bias, including government expenditure to GDP (GOV), school enrolment rates (SEC), or number of employees (EMP). With an increase in those variables, the income inequality will reduce. The opposite effect can be expected with the consumer price index (CIP) as a proxy for inflation because inflation is an important detrimental to income inequality (Fischer, 1983). I expected the relationship between CIP and income equality to be adverse.

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, an examination of the relationship between economic growth and FD in Hungary will be conducted using the following basic 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. Thus, after checking the stationarity of the variables, the error correction formulation of the ARDL model, according to Pesaran et al. (2001), is:

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

Where GINI represents income inequality as a dependent variable, while the other variables are independent as identified above, and ε t is an error term. Δ represents the first difference operator,

α 0 is the constant term; α1, …, α 7 represent the short-run coefficients, and β1, …, β7 are the long-run coefficients. Following the approach of Pesaran et al. (2001), and after determining the optimal lag lengths p and q1... q7 for the ARDL model, we compared the calculated F-statistic with the lower and upper critical bounds provided by Pesaran (2001) and modified by Narayan (2005) to the null hypothesis of no cointegration. Having ensured that 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, an ARDL error correction model to assess the error correction term (ECT) is estimated, as in the following equation:

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

EMPIRICAL RESULT

- **Results of the 1st Model: The Causal Relation between Financial Crises and Inequality**

Descriptive statistics and correlation matrix

The data in Table 1 reveals a mean market income Gini coefficient of 46.2%, with the highest inequality coefficient in 2013 and the lowest in 1977. The crises were in 1991-94 and 2008-12. The mean credit to the private sector was 69.72 over GDP; the highest value (130.6 percent GDP) was in 2009, and the lowest one in 1970. The correlation between FC and inequality variables is positive but low, with a low correlation of 0.33. The highest correlation is found between the Gini coefficient and trade openness at 0.85, with all variables showing positive correlations except economic growth.

Table 1. Descriptive statistics and correlation of the variables

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
Correlation								
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

Notes: ***, **, and * refer to significance levels of 1 percent, 5 percent, and 10 percent, respectively.
Source: Author`s calculations

Unit root

The study tested the null hypothesis of a unit root, finding BC and GDP stationary at levels, while GINI, CRD, GOV, SE, TRA, and INF are non-stationary at levels but stationary after first differencing (Table 2).

Table 2. Unit root test

			At Level		At First Difference					
Variable			BC	GDP	GINI	CRD	GOV	SE	TRA	INF
PP	Cons & Trend	t-St	-2.78	-3.38	-2.21	-3.46	-5.61	-3.02	-5.84	-6.62
		Prob.	0.21	0.07*	0.47	0.06*	0***	0.1371	0***	0***
	No Cons & Trend	t-St	-2.43	-2.84	-1.93	-3.45	-5.69	-3.04	-5.51	-6.65
		Prob.	0.016**	0.006***	0.05*	0***	0***	0***	0***	0***
ADF	Constant & Trend	t-St	-2.559	-3.463	-2.202	-1.894	-5.65	-3.053	-5.849	-6.607
		Prob.	0.3*	0.06*	0.4773	0.6411	0***	0.1294	0***	0***
	No Cons & Trend	t-St	-2.285	-2.944	-1.934	-1.882	-5.704	-3.039	-5.511	-6.648
		Prob.	0.02**	0***	0.05*	0.06*	0***	0***	0***	0***
Order of Integration			I (0)	I (0)	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)

Note: ***, **, and * refer to significance levels of 1 percent, 5 percent, and 10 percent, respectively.
Source: Author`s calculations.

The unit-root tests indicate that some variables are stationary in the order I (1) and I (0), supporting the use of the TY causality approach. The optimal lag length (k) in the VAR process is determined using the AIC and FPE. The maximum order of integration for these time series is 1, and the

optimal lag length is chosen from the minimum value of AIC and Hannan Quinn criteria (HQC), indicating k=3(Table 3). Thus, estimate at first the VAR (2) model (2: K=3 + dmax =1).

Table 3. Lag length selection

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-762.655	NA	103606.4	34.2513	34.572	34.371
1	-302.859	735.672	0.002	16.660	19.551*	17.738
2	-183.9	148.037	0.0003	14.217	19.677	16.253
3	-77.015	95.009*	0. 00000*	12.311*	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.

The study tested the dynamic stability of the model, which appears in Figure 2. All roots are inside the unit circle; thus, the stability of the model is valid.

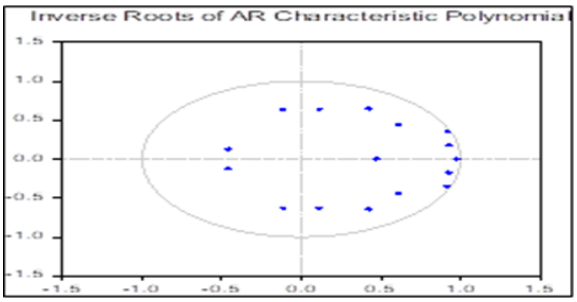

Figure 2. Stability of the model

Toda-Yamamoto causality (modified Wald)

The fourth step in the study is to apply the modified Wald procedure to test the VAR (k+dmax) model for causality. The Granger-causal test based on the VAR model of T Y in Table 4 shows that there is non-existent causality running from BC to GINI. But the causality in the other direction is valid. Thus, rapid inequality growth is a powerful predictor of the crisis, as Schularick and Taylor (2012) reported. Besides, causality exists only from GINI to TRA at the 5 percent level and CRED at the 10 percent level. This result is consistent with the ideas of Fischer (1983) and Minsky (1977) and the study's findings (Rajan, 2010; Stiglitz, 2015; Kumhof et al., 2015; Perugini et al., 2015; Bazillier et al., 2021), which suggests that inequality can impact financial stability through raising leverage and widening the current account deficit. The distributional impact of crises depends on whether they are followed by a recession or an increase in an INF. There is a bidirectional causality between GINI and both GRO and INF, as well as a one-way causality from GINI to GOV and SE. These results correspond to Róbert's (2019) conclusion that there is a strong

correlation between the educational attainment of parents and their children in Hungary, and even stronger during the great recession. The educational system is somewhat selective.

Table 4. Toda-Yamamoto causality (modified Wald) test results.

Null Hypothesis	Chi-sq	Prob.	Granger Causality
BC does not Granger cause GINI	2.1994	0.333	No causality
GINI does not Granger cause BC	17.0453	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	0.058***	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	6.6530	0.0359	Bidirectional
GINI does not Granger cause INF	34.5088	0*	
GDP does not Granger cause GINI	16.4086	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	7.2224	0.027**	GINI to SE
TAR does not Granger cause GINI	0.0515	0.9746	No causality
GINI does not Granger cause TAR	6.3207	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.

- **Results of the 2nd Model: The Role of Finance in Economic Growth in Hungary**

Table 5 shows an average GDP value of $9874.97, with a higher value of $115175.38 in 2019 and a lower value of $7324.80 in 1993. Fluctuations in FD, TOP, and CRCRP, particularly in the credit to corporations sector, reflect fluctuations in the international credit market and FD levels. The peak credit ratio was in 2009, and the lower ratio was in 1993.

Table 5. 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	15175.38	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	-0.176	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	-0.309	-0.22	-0.31	1		
KOF	0.67	0.62	0.25	0.28	0.84	-0.103	0.81	-0.54	-0.164	1	
TOP	0.88	0.85	0.38	0.52	0.88	-0.139	0.75	-0.48	-0.459	0.87	1

Source: Author`s calculations

Unit root

The study used Augmented Dickey-Fuller (ADF) and Philips Perron (PP) tests to verify the stationarity of variables. The lag length in the ADF regression was chosen using the Schwarz information criterion and the AIC test. Results showed that only FIE is stationary at level I (0), while other variables were non-stationary at levels but stationary at first difference (Table 6).

Table 6. Unit root tests

			At Level	At First Difference									
Variable			FIE	GDP	CRCRP	CRGV	CRHU	FDI	FME	GFCF	GOV	TOP	KOF
PP	Cons & Trend	t-St	-4.890	-3.209	-13.168	-11.800	-9.970	-3.947	-4.410	-3.975	-4.084	-3.978	-4.387
		Prob.	0***	0.09*	0***	0***	0***	0.013**	0***	0.01**	0.01***	0.01**	0***
	No Cons & Trend	t-St	-4.924	-2.211	-13.205	-11.860	-9.980	-3.885	-4.360	-3.761	-4.076	-3.889	-4.685
		Prob.	0***	0.03**	0***	0***	0***	0***	0***	0***	0***	0***	0***
ADF	Cons & Trend	t-St	-4.115	-2.658	-3.75	-3.657	-1.93	-2.715	-2.13	-3.306	-3.522	-2.429	-3.177
		Prob.	0.01***	0.256	0.02**	0.03**	0.636	0.232	0.524	0.07*	0.04**	0.363	0.09*
	No Cons & Trend	t-St	-4.079	-1.659	-3.743	-3.680	-1.931	-2.669	-1.910	-2.944	-3.469	-2.109	-2.440
		Prob.	0***	0.09*	0***	0***	0.05**	0.01***	0.05*	0***	0***	0.03**	0.02**
Order of Integration			I (0)	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)

Note: ***, **, and * refer to significance levels of 1 percent, 5 percent, and 10 percent, respectively.
Source: Author`s calculations.

The study reveals that some variables are stationary of the order 1(1) and (0), making it impossible to use the Johansen (1991) and Johansen and Juselius (1990) procedures for cointegration tests. Instead, the ARDL bounds approach is recommended. The variables are stationary at I (0) and I (1), indicating they are not I (2) stationary. This enables the implementation of an ARDL model. The study then tests the long-run relationship (cointegration) between economic growth and FD.

Bounds Test and the Results of the Long-run Relationship

The ARDL model has (2, 4, 3, 0,2,1,0, 2,0,0) legs, determined automatically using the AIC. Table 7 shows that the F-statistic is 3.94, higher than the critical value of 3.61 reported by Pesaran et al. (2001). The null hypothesis is rejected, and the model's results support the alternative hypothesis, indicating a long-term relationship between economic growth, FD variables, and growth and control variables. This suggests that the variables are cointegrated and have a long-run equilibrium, moving together in the long run.

Table 7. 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 8 shows a positive and significant long-run relationship between CRCRP and GDP in Hungary. A 1% increase in CRCRP leads to a 242.18 pp increase in Hungarian GDP, resulting in an upward trend in investment and economic growth. This finding is consistent with theory and empirical evidence (Beck et al., 2007; IMF, 2017). The IMF reported a modest positive correlation between GDP and bank lending in Hungary from 2000 to 2017, but this correlation is modest. The FD index also shows a positive and significant long-term relationship with GDP, consistent with prior expectations, economic theory, and empirical literature. The FD index also shows a positive and significant long-term relationship with GDP, which is consistent with prior expectations, economic theory, and empirical literature (e.g., Tinoco-Zermeno et al., 2014; Lawal et al., 2016). The study reveals that the FME is negatively impacting Hungary's economic growth, contradicting previous assumptions and economic growth theory. However, it is consistent with the findings of Kapaya (2020), who found a strong negative relationship between financial system efficiency and economic growth. The FME needs to focus on financial reforms to improve efficiency and mitigate long-term negative effects on economic growth. Other variables like FIE, CRHU, CRGV, GFCF, GOV, KOFF, and TOP show no substantial growth, suggesting that changes in their indices over time will not significantly impact Hungarian economic growth.

Table 8. 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
KOF	49.808	1.075	0.285
TOP	-2.155	-0.078	0.938
C	-13782.350	-1.258	0.211

Source: Author’s computation

Error Correction Model Results

The study found a significant coefficient of (ECM T-1) is -0.016961 (Table 9), suggesting a valid long-term equilibrium relationship among the model's variables. And it also indicates that 1.69% corrects the deviation from short-run economic growth each quarter to reach steady states in the

long run. The coefficient of (R2) is high, indicating that 91.64 percent of the dependent variable was explained by the model.

The short-run estimations support the long-run regression's initial findings that FD (CRCRP) enhances economic growth at 10% significance. However, the coefficient of CRHU is not statistically significant. FIE and GOV variables significantly affect economic growth at 1% significance levels but harm it in the short run. The coefficient of financial market efficiency is positively associated with growth, but statistically insignificant.

Table 9. Error correction model test (dependent variable = GDP)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Δ(CRCRP)	2.75	1.39	1.98	0.05
Δ (CRCRP (-1))	-3.30	1.56	-2.12	0.04
Δ (CRCRP (-2))	-4.56	1.52	-3.00	0.00
Δ (CRCRP (-3))	-2.27	1.09	-2.09	0.04
Δ(CRHU)	-3.15	3.19	-0.99	0.33
Δ (CRHU (-1))	4.35	3.43	1.27	0.21
Δ (CRHU (-2))	9.74	3.32	2.93	0.00
Δ(FIE)	-1379.43	178.09	-7.75	0
Δ (FIE (-1))	595.88	191.23	3.12	0.00
Δ(FME)	169.11	118.74	1.42	0.16
Δ(GOV)	-120.57	14.02	-8.60	0
Δ (GOV (-1))	72.77	15.91	4.57	0
CointEq (-1) *	-0.016	0.00	-7.18	0
R-squared	0.916	Mean dependent var		49.49
Adjusted R-squared	0.908299	S.D. dependent var		88.67
S.E. of regression	26.85212	Akaike info criterion		9.51
Sum squared resid	95897.84	Schwarz criterion		9.79
Log likelihood	-684.9085	Hannan-Quinn criteria.		9.62
Durbin-Watson stat	1.99889			

Source: author’s calculations

The model's fitness was confirmed through a diagnostic test involving the Heteroskedasticity test. The results showed consistent variation in residuals, with no autocorrelation, as per Table 10. This confirms the model's suitability for our study.

Table 10. 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)	0.8552
Obs*R-squared	0.1421	Prob. Chi-Square (2)	0.9314	0.0339	Prob. Chi-Square (19)	0.854

Source: author's calculations

The study utilized Borensztein et al., CUSUM (1998) to test the stability of the ARDL models. Results showed that the models were stable in a 5% degree of liberty and were within the critical bounds, as shown in Figure 3.

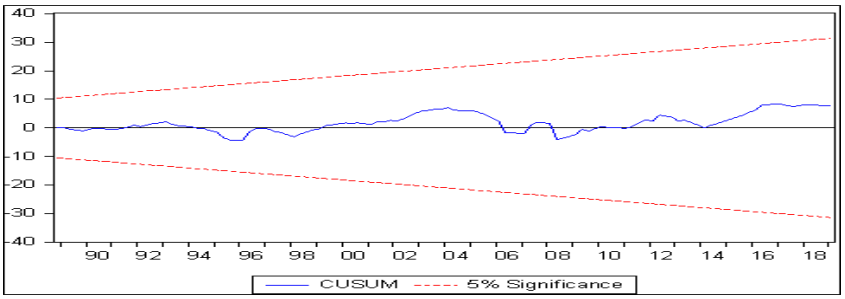

Figure 3. Cumulative sum of squares of recursive residuals.

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

- **Results of the 3rd Model: The Role of Finance in Inequality**

Table 11 presents descriptive statistics and correlation values for the series, showing a strong positive relationship between GINI and FD variables, education variables, GOV, and CIP (only for GINID), and a negative relationship with EMP, and CIP for GINIM.

Table 11. 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

Unit root

Table 12 shows that only TER and CRHU do not have unit roots in the level, while all other series have unit roots. The null hypothesis cannot be rejected, but all series are stationary at the first difference, and all variables are significant. The null hypothesis of the unit root problem is rejected at the first difference for all series of studies, suggesting variables are integrated at I (0) and I (1). These results support using the ARDL bounds approach.

Table 12. Unit root tests for stationarity

			At Level		At First Difference							
Variable			CRHU	TER	GINID	GINIM	GOV	CIP	SEC	CRCRP	EMP	CRPR
PP	With Cons	t-Sta	-1.88	-1.67	-3.1	-2.3	-5.7	-6.5	-2.8	-5.8	-2.5	-3.6
		Prob	0.65	0.75	0.1	0.4	0***	0***	0.2	0.***	0.3	0.04**
	Without Cons	t-Sta	-0.57	0.5	-3	-2	-5.8	-6.6	-2.9	-5.7	-2.4	-3.5
		Prob	0.46	0.82	0***	0.05**	0***	0***	0.***	0***	0.02**	0***
ADF	With Cons	t-Sta	-3.72	-3.85	-3.1	-2.2	-4.8	-6.6	-1.6	-2.7	-3	-2
		Prob	0.03**	0.02**	0.1	0.5	0***	0***	0.8	0.3	0.1	0.6
	Without Cons	t-Sta	-0.82	0.28	-3	-2	-4.7	-6.6	-1.8	-2.6	-2.2	-2
		Prob	0.35	0.76	0.***	0.05**	0***	0***	0.073*	0.01**	0.05**	0.04**
Order of Integration			I (0)	I (0)	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)

Note: ***, **, and * refer to significance levels of 1%, 5% and 10%, respectively.
Source: Author`s calculations

Bounds Test and the Results of the Long-run Relationship

The optimal lag length is determined using AIC over the top 20 models, with the optimal model (GINID) ARDL (3, 4, 3, 1, 4, 0, 2) and the optimal model (GINIM) ARDL (5, 3, 5, 4, 5, 5). Table 13 shows the bound-test results for a long-run relationship between GINIM and GINID as

dependent variables. The calculated F-statistics are 10.02 and 6.64, which are larger than the critical values reported by Pesaran et al. (2001) at the 99 percent significance level. This rejects the hypothesis of long-run cointegration relationships, indicating that the variables in the model are cointegrated and have a long-run equilibrium; they tend to move together in the long run.

Table 13. 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

From Table 14, the study reveals that GINID is positively associated with CRCRP and CRHU variables, but not significantly, contrary to expectations and the literature's expectations. Suggesting that changes in FD in Hungary do not significantly affect inequality in the long run. I cannot relate the findings to the literature because the impact of the ratio of both credits to household and corporate development on the Gini coefficient has not been studied in the literature. The study also found a positive correlation between CIP and income inequality at 1% levels of significance, with a 1 percentage point increase in CIP raising GINID by 0.94 PP. This result aligns with the previous study's result (e.g., Berisha et al., 2022) but differs from previous findings (Jauch and Watzka, 2016; Park and Shin, 2017). The study reveals that EMP, GOV, and SEC are negatively associated with income inequality, but only EMP is significantly affected at the 5% level. A 1 PP increase in EMP can decrease GINID in Hungary by 9.94 PP. GOV and SEC variables don't influence income inequality in the long run, contradicting the hypothesis that government expenditure could widen inequality through rent-seeking activities (Jauch and Watzka, 2016).

Table 14. 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	0.124	1.425	0.169	CRPR	0.05	0.64	0.53
CRHU	0.082	0.488	0.631	EMP	-8.51	-2.36	0.04
EMP	-9.944	-2.782	0.011	GOV	-1.42	-2.65	0.02
GOV	-2.610	-1.665	0.111	TER	0.09	0.76	0.47
SEC	-0.099	-1.594	0.126	CIP	0.67	4.02	0.00
CIP	0.939	1.814	0.084	C	105.43	4.30	0.00
C	120.103	2.674	0.014				

Source: Author's computation

The long-run coefficients of model 2, using GINIM as the dependent variable, show that GINIM is positively associated with FD but insignificant. Indicating that FD does not directly affect income inequality. Income inequality negatively correlates with EMP and GOV, with a significant decrease in GINIM in the long run. The GINIM will decrease by 8.51 pp and by 1.4 pp, with a 1 pp increase in EMP and GOV, respectively. This result aligns with the previous studies (e.g., Ang, 2010; Zhang and Naceur, 2019). However, inequality correlated positively with TER and CIP, but only significantly with CIP at a 1% level of significance. These results align with previous studies and economic theory that CIP may damage real wages and, hence, income inequality (Beck and Levine, 2007; Bolarinwa et al., 2021) but stand in contrast to previous findings (Ang, 2010). However, TER has no statistically significant impact on income inequality in the long run. Thus, education is not important for income inequality in the long run.

Error Correction Model Results

Table 15 shows that short-run estimations in model 1 support initial findings from the long-run regression that FD (CRCRP) is positively associated with income inequality. However, it should be noted that this result changes for further orders, and the effect becomes statistically significant at 1 percent levels of significance. In contrast, a 1 pp increase in CRHU increases GINID as a proxy of income inequality by 0.05 pp in the short run at 1% levels of significance, further supporting the idea that FD increases inequality.

The study found that CIP increases income inequality at a 1% level of significance in the long run. 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 relations. However, there was no reliable statistically significant correlation between EMP variable and disposable inequality in the short run, or between GINID and GOV, but with further orders, GOV will contribute to rising income inequality.

Similarly, in the model (GINIM), 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. But, for further orders, this effect becomes statistically significant at the 1% level of significance and reduces inequality. Contrary to the long run, the coefficient of the EMP variable positively affects inequality, which can be explained by short-run contracts and labour market regulations owing to low institutional quality (Jaumotte and Buitron 2015). However, with further orders, the effect remains statistically significant. Likewise, only with further orders, an increase in GOV will lead to an increase in GINIM, and the effect becomes statistically significant at 1 percent. The coefficients of TER and CIP variables have the same signs as in the long-run equilibrium estimations, and the CIP effect remains statistically significant at 1%. The TER effect is not statistically significant, but it becomes statistically significant at 10% levels.

Table 15. Error correction model test (dependent variable = income inequality)

Model 1				Model 2			
	Dependent Variable = GINID			Dependent Variable = GINIM			
Variable	Coefficient	T-ratio	Prob.	Variable	Coefficient	T-ratio	Prob.
Δ(CRCRP)	0.008	1.057	0.303	Δ(CRPR)	0.008	1.351	0.204
Δ(CRCRP (-1))	-0.068	-9.067	0.000	Δ(CRPR(-1))	-0.022	-3.571	0.004
Δ(CRCRP(-2))	-0.059	-6.888	0.000	Δ(CRPR(-2))	-0.031	-4.740	0.001
Δ(CRCRP(-3))	-0.025	-2.886	0.009	Δ(CRPR(-3))	-0.049	-5.842	0.000
Δ(CRHU)	0.051	3.675	0.001	Δ(CRPR(-4))	-0.041	-4.452	0.001
Δ(CRHU(-1))	-0.024	-1.418	0.171	Δ(EMP)	0.070	0.155	0.880
Δ(CRHU(-2))	0.094	6.462	0.000	Δ(EMP(-1))	0.860	1.317	0.215
Δ(EMP)	-0.114	-0.319	0.753	Δ(EMP(-2))	-1.784	-3.094	0.010
Δ(GOV)	0.018	0.825	0.419	Δ(GOV)	-0.030	-1.056	0.314
Δ(GOV(-1))	0.328	9.583	0.000	Δ(GOV(-1))	0.497	8.499	0.000
Δ(GOV(-2))	0.135	3.879	0.001	Δ(GOV(-2))	0.442	6.503	0.000
Δ(GOV(-3))	0.155	5.077	0.000	Δ(GOV(-3))	0.367	8.562	0.000
Δ(CIP)	0.069	9.575	0.000	Δ(GOV(-4))	0.223	4.679	0.001
Δ(CIP(-1))	-0.021	-2.895	0.009	Δ(TER)	0.032	1.439	0.178
CointEq(-1)*	-0.107	-10.33	0.000	Δ(TER(-1))	0.076	2.196	0.051
				Δ(TER(-2))	0.052	1.579	0.143
				Δ(TER(-3))	-0.055	-2.176	0.052
				Δ(CIP)	0.096	11.124	0.000
				Δ(CIP(-1))	-0.037	-3.631	0.004
				Δ(CIP(-2))	0.026	3.564	0.004
				Δ(CIP(-3))	0.046	5.553	0.000
				Δ(CIP(-4))	0.023	3.334	0.007
				CointEq(-1)*	-0.314	-8.476	0.000
R-squared		0.94	0.12	R-squared		0.979	0.230
Adjusted R-squared		0.91	0.39	Adjusted R-squared		0.948	0.419
S.E. of regression		0.11	-1.21	S.E. of regression		0.095	-1.586
Sum squared resid		0.37	-0.53	Sum squared resid		0.155	-0.491
Log likelihood		44.21	-0.95	Log likelihood		61.891	-1.180
Durbin-Watson stat		2.45		Durbin-Watson stat		2.507	

Source: Author's computation.

The diagnostic tests conducted on the two models confirmed their fitness, with Table 16 showing that the residuals of both models are free of serial correlation and heteroscedasticity, with all P values exceeding the critical value of 0.05.

Table 16. 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	14.2023	Prob. Chi-Square (3)	0.1026	Obs*R-squared	31.7350	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	1.4998	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 4 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.

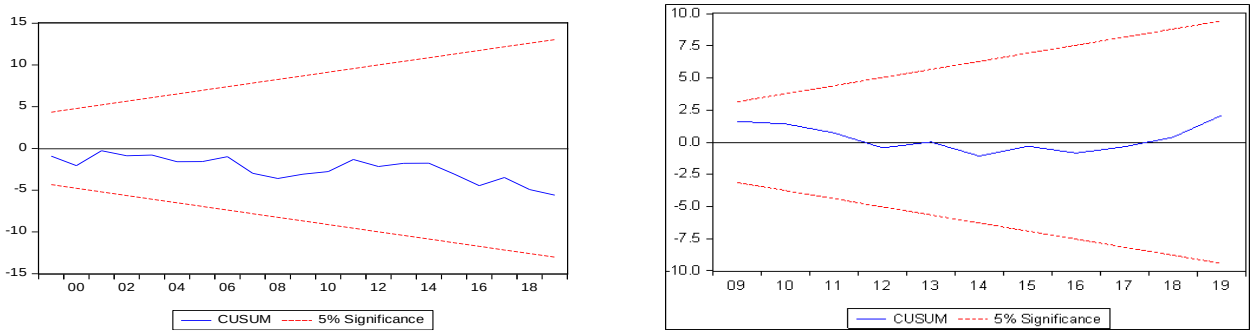

Figure 4. CUSUM tests, dependent variable: D (GINID), and D (GINIM)

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

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

MAJOR FINDINGS

The results of the hypotheses test can be summarized as the following:

1. There is non-existent causality running from FC to inequality. Therefore, the null hypothesis, the (H1) hypothesis, there is a bidirectional causal relationship between FC

and income inequality in Hungary, and the (H1a) hypothesis, FC causes income inequality in Hungary, is rejected.

2. The study confirms the causality relation in the other direction is valid; hence, the (H 1. b) hypothesis that income inequality causes FC in Hungary is accepted.
3. The study confirms that FD and economic growth are integrated, and FD stimulates economic growth in Hungary. Hence, the (H3 and H3.a) hypotheses are accepted.
4. The financial depth stimulates growth in the long run only if it will be through credit to non-financial corporations. According to the H3.B hypothesis, financial depth stimulates economic growth in Hungary, which is accepted only by non-financial corporations.
5. 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. Thus, the (H 3. C) hypothesis, that financial efficiency stimulates economic growth in Hungary, is rejected.
6. The analysis provides evidence indicating that there is a relationship between FD and income inequality. Thus, the H3 hypothesis, that there is a relationship between FD and income inequality, is accepted.
7. The FD contributes to increased inequality in Hungary in the short run via credit to the household sector. Thus, the inequality widening hypothesis is valid in Hungary, and increasing credit to the household sector leads to raising the GINID coefficient in the short run. Thus, the (H3. b) hypothesis that FD increases income inequality in Hungary (inequality widening hypothesis) is accepted. And rejected the (H3. a), FD reduces income inequality in Hungary (inequality narrowing hypothesis).

DISCUSSION AND RECOMMENDATIONS

Conclusion and Discussion

Financial literature acknowledges finance's role in economic growth by directing resources towards productive uses. Low-income individuals disproportionately benefit from F. However, recent literature questions the relationship between finance, FD, and economic growth. Concerns have increased since the 2008 crisis (Rajan and Zingales, 2003; de Haan and Sturm, 2017; Schularick and Taylor, 2012; Stiglitz, 2012, 2016). Economic literature has explored this relationship, but empirical studies have yielded equivocal results, and some problems, like Hungary's, remain unresolved. Further research is needed to better understand the relationship between finance, FD, and economic growth.

Hungary, an emerging economy, has experienced mixed economic and social development over the past decades. However, its performance is volatile and lags behind regional peers in critical SDGs. Understanding the effects of finance on economic growth and income inequality is crucial for better financial, economic, and social policies. Addressing these questions is essential for policymakers to determine if Hungary's FD and FL policies can achieve UN SDG targets. In particular, cross-country analysis dominates the emergence of empirical findings.

The study investigates the relationship between finance and both economic growth and income inequality in Hungary, providing policy recommendations for policymakers. Using descriptive and deductive analysis and econometric analysis, the researcher examines the development of the Hungarian financial sector over the past four decades and its impact on economic growth and income inequality. The results, based on the descriptive and deductive analysis, provide valuable insights into the impact of finance on economic growth and income inequality, the most important of which are:

The Hungarian financial system has undergone numerous financial restructuring programs since the 1980s, making it one of the best-developed in the EU. Before the 2008 financial crisis, the system showed significant improvements in the FD index, depth, and access, but efficiency and stability were low, comparable to regional rivals. These features led to the financial crises of 1991 and 2008. Although recent improvements in stability indicators have been noticeable, the Hungarian financial sector still faces challenges with efficiency, impacting its contribution to equality and growth.

The Hungarian economy experienced significant changes in the early 1990s, leading to financial and economic reform that helped restore stability. The economy grew rapidly until 2004, when Hungary joined the EU. Financial policies increased investment and productivity through high technology. However, misallocation of resources led to rapid growth and a financial crisis. External and internal imbalances threatened macroeconomics, resulting in material implications for economic growth and inequalities. The country’s economic growth was slowed by the financial crisis. Since 2005, the growth diverged from that of the other Visegrád nations, worsened by the financial crisis. Additional economic issues worsened the recession after the crisis, pushing the economy into a recession. Financial policy in the past decades balanced economic structure and growth, but the COVID-19 pandemic has significantly affected economic growth and inequality.

Despite the fact that the FD and FL policies in Hungary have contributed to growth, they have also damaged it. FDI remained mainly from remote regions, creating a productivity gap between foreign and domestic companies, particularly for SME firms with low innovation activity. Higher FD rankings may not always promote stability, inequality, or growth, as the FD index may not include financial stability or efficiency ratings. Additionally, FD policies in Hungary may not boost investment in HC and the skilled workforce, which is still challenging for the Hungarian economy's growth and productivity. Low SME productivity and labour productivity inequality in regional and sector terms undermine growth and reduce incomes in these regions.

The empirical analysis of the role of finance in economic growth in Hungary found that:

1. There is a long-run cointegration between economic growth and financial depth (FD) in the presence of other macroeconomic variables. FD stimulates economic growth in Hungary, supporting previous research linking FD to economic growth (Petkovski and Kjosevski, 2014; Varela, 2015; Rinosha and Mustafa, 2021). Promoting FD appears to be an effective way to support economic growth and further support FD.
2. Financial depth stimulates growth only through credit to non-financial corporations in the long and short run, while it harms growth through credit to the government or household sector. Financing corporations plays a critical role in maintaining inclusive growth momentum. This finding is consistent with previous research (Sassi and Gasmi, 2014), which found that credit to the corporate sector had a positive effect on economic growth in Hungary. And with general evidence in the theory and the empirical literature (e.g., Beck et al., 2007; Tinoco-Zermeno et al., 2014; Lawal et al., 2016; Prats and Sandoval, 2020). However, these results differ from Petkovski and Kjosevski (2014), who found that credit to the private sector negatively affects economic growth in Hungary.
3. The efficiency of the financial market in Hungary undermines economic growth in the long run and the efficiency of the financial institution in the short run due to weaknesses in financial system supervision and weak regulations. This finding is inconsistent with economic growth theory and empirical literature, but the same conclusion has been reached (Kapaya, 2020) that the efficiency of the financial system is strongly negatively associated with economic growth both in the short and long run.

The growth in Hungary's economy has not benefited everyone equally, and periods of FD and economic prosperity have worsened inequality. Despite Hungary's development policies aiming

to combat poverty and inequality, earnings and wealth inequalities have increased over the last forty years.

From the descriptive and deductive analysis, the most important findings related to finance and inequalities in Hungary are:

1. The wealthiest 10% of households have seen a sharp increase in their income, with capital income being a significant portion of their earnings. This inequality is influenced by financial factors, such as deregulation, funding conditions, returns on financial assets, wealth accumulation, and wages in the financial sector. This conclusion contradicts the EGT but supports the results of Rajan and Zingales in 2003 and de Haan and Sturm in 2017.
2. Financial deregulation and globalization in Hungary have exacerbated inequality by increasing wealth accumulation and portfolio equity (Mavridis and Mosberger, 2017). In 2017, the top decile possessed 70% of financial assets and over half of total household wealth, while the lower 50% held only 8.9% of total wealth (ECB 2016; 2021).
3. Deregulation has led to inequality by allowing the wealthy to control financial, economic, and social policies, benefiting themselves and increasing their wealth. This increases the share of capital at the expense of the share of the labor market because of political capture and institutional quality issues, as Rajan and Zingales (2003) reported.
4. Contrary to the theory, parental background still significantly influences access to education and health services, leading to a widening gap in monetary returns and employment opportunities between the well-educated and the poorly educated.
5. FDI has contributed to wage inequality and the gap between foreign and domestic companies, particularly SME firms. The booming remuneration of workers, particularly senior executives in the financial and insurance sectors, is also a factor in increasing inequality in Hungary, unlike in other countries. Hungary's low poverty risk but strong territorial concentration contradicts Kuznets's hypothesis (1955).
6. The pre-crisis years of 2008 saw rising income and wealth inequality owing to FD and FL policies and financial rents. Those led to over-indebtedness, particularly in the unregulated financial sector. The lowest-income households suffered the most from loan repayment obligations, high unemployment, and social and fiscal policies response to the crisis, aligning with previous (Aristei and Perugini, 2014; Tóth, 2016; Piketty, 2014) views.

In the empirical analysis, the researcher also reached several results, the most important of which are:

1. The empirical analysis revealed no causality between FC and inequality, supporting the idea that FC does not cause income inequality. This result aligns with previous research (Denk and Cournede, 2015; Baldacci et al., 2002; Amate-Fortes et al., 2017), which found no evidence of FC's impact on inequality. However, the current study contradicts previous research (De Haan and Sturm, 2017; Bazillier and H'ericourt, 2017) suggesting FC exacerbated inequality.
2. But crisis-induced recessions and increased consumer price indexes indirectly impact distributional outcomes, with inequality and real GDP and consumer price index being bidirectionally causal. Studies by Bazillier and H'ericourt (2017) and Loayza et al. (2018) have shown that macroeconomic volatility triggered by crises significantly affects those at the bottom of the income distribution, highlighting the importance of understanding these dynamics.
3. The study confirms that rapid inequality growth strongly predicts the crisis, in line with previous research's findings (Kirschenmann et al., 2016; Paul, 2020).
4. Inequality may be causing financial instability (FC) by raising leverage and widening the current account deficit, supporting (Ragen, 2010; Stiglitz, 2016; Kumhof et al., 2012)'s views. Particularly, inequality has a one-way causality to the ratio of private domestic credit (% GDP) and trade openness, which are the primary causes of FC, according to economists.
5. The analysis indicates a positive and significant relationship between FD and income inequality in Hungary, with FD contributing to increased inequality in the short run through credit to the household sector, supporting previous research by Christopoulos and McAdam (2017) and De Haan et al. (2018), who suggest that the impact of FD on increasing inequality is positive and significant in Hungary.
6. Education in Hungary may indirectly contribute to income inequality, but employment is the most significant factor in the long run. However, employment only improves disposable income distribution, and inflation will enhance income inequality in Hungary in both the long and short term.

Recommendation

1. The financial system plays a crucial role in economic growth by mobilizing savings and efficiently directing investment in the economy, facilitating capital accumulation and productivity, as demonstrated by empirical test results and the discussion above.
2. FD policies should focus not only on quantity but also on the qualities of financial system supervision and regulation in Hungary.
3. Policymakers need to target the channels and mechanisms through which financial efficiency influences and transforms the real economy and, therefore, continues to be a priority, focusing on institutional change in particular.
4. Investment in public services to improve HD has a large effect on productivity and growth and increases both the quantity and quality of the share of the population that are workers. In particular, the study suggests the importance of increasing the number of employees to GDP per capita.
5. Economic development in Hungary needs balanced growth, which can be attained by propelling growth in all regions and sectors simultaneously and encouraging investment in remote areas via some incentives, such as tax incentives and credits.
6. Using infrastructure to spur economic growth, create jobs, and increase productivity by enabling businesses to operate more efficiently, tackle corruption, and diversify.
7. In addition, supply of information, help with microfinance industries, and transfer of technology to remote regions.
8. Increasing external trade and an improved investment environment, particularly for the SMEs that are restrained by a frequently changing regulatory environment and entry barriers in network industries, are among the obstacles to increasing the contribution of those firms to the national economy in Hungary.
9. Adopting policies that prevent volatility and the application of sound prudential policies and more stringent capital regulation.
10. Enhancing social safety nets and redistribution policies can reduce the passive effects of crises on the poor but can also negatively impact the labour supply. Active labour market policies are needed to limit these effects, avoid skill mismatch, increase minimum wages, expand opportunities, and improve education and investment in skills.
11. Strengthening the building of oversight institutions will enhance the efficient use of public funds and reduce the political capture of financial and economic policies.

12. Improving labour market institutions might allow employees to unite and bargain collectively for better pay and conditions, eliminating wage disparities between employees, boosting their protection, and putting an end to labour abuses.
13. Finally, governance in progressive taxes aimed at enhancing the redistributive potential of fiscal policy can play a pivotal role in addressing inequality, and changes in tax and transfer policies are needed.

Based on existing literature, the dissertation finalizes new scientific findings and gives theoretical and practical consequences, which are then examined in depth.

NEW SCIENTIFIC 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.

LIMITATIONS OF THE STUDY AND FUTURE RESEARCH

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.

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 labor, 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. Foreign direct investment (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 contradict 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 also 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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PUBLICATIONS

1. Publication in journal

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