1 THE ROLE OF AND FINANCIAL SYSTEM IN SHAPING INCOME/WEALTH INEQUALITY IN THE EUROPEAN UNION

Mihaela SIMIONESCU[1]

Abstract

Given the increasing disparities in income/wealth in the last decade, the debate around the causes is still actual. However, the research on financial development as a driver of economic inequality remains scarce. The aim of this paper is to assess the impact of financial development on income/wealth inequality in the European Union in the period 1990-2023. The main results support the inverted-U pattern between financial development and top income/wealth shares and a U-shaped connection for financial development-bottom 50%'s income/wealth share. These findings suggest that initial financial development can increase inequality, but it reduces it when financial systems become more mature and inclusive. Self-employment and banking crises played the role of mediators in these relationships. Factors like economic growth, corruption, private credit, and public spending have also significant impact on income/wealth distribution.

Keywords: wealth inequality; income inequality; financial development; self-employment

JEL Classification:

1. Introduction

Since the 1990s, an increasing trend in income and wealth inequality has been observed around the world. One major cause of this trend is related to more concentration of economic resources among the wealthiest people. According to the World Inequality Database, there is a strong concentration of global wealth, with the top 10% controlling almost 75% in 2024. Global income is also unequal, the data showing that the top 10% received 52% and the bottom 50% only 8.5% (Chancel et al., 2022). In addition, the UBS Global Wealth Report showed that nearly a quarter of the wealthiest 1% were located in Europe in 2024. Even if Europe is considered an equitable region compared to other continents, income inequality varies a lot within the zone. Western Europe has experienced a slow but constant growth of inequality in the last twenty years, but less than US. The UK's inequality has accelerated since the 1980s, but France is the most vulnerable. After pandemic, top earners in France have surpassed the levels before. On the other hand, Iceland presents very low-income inequality. The discrepancies are more significant in the Eastern Europe: Romania and Bulgaria are the most inequal countries in terms of income, while Czech Republic and Slovakia constantly reduced their income inequality since the latest financial crisis.

1 Faculty of Business and Administration, University of Bucharest, Bucharest, Romania. Institute for Economic Forecasting, Romanian Academy, Bucharest, Romania. E-mail: mihaela_mb1@yahoo.com, mihaela.simionescu@faa.unibuc.ro

It is essential to understand the real drivers of this inequality to propose the best solutions. Given this necessity, this paper assesses the impact of financial development on income/wealth inequality. Since most of the previous approaches are focused on linear connection, the main contribution of this study is to cover this research gap and to examine a potential nonlinear relationship. Therefore, it checks if there is a threshold after which the effect of financial development on income/wealth inequality changes its direction or its magnitude.

In addition, this study examines entrepreneurship as a potential mechanism through which financial development impacts income/wealth inequality. The financial development might stimulate entrepreneurship (Lecuna, 2020). However, other studies consider that over-financialization might generate resource misallocation from productive sectors to finance, which might be harmful for economic growth (Sheng, 2014). Moreover, the impact of banking crisis that reveals behavioural outcomes on inequality is assessed. By considering the entrepreneurship channel, this paper provides valuable insights for financial policies that might reduce the negative effects of financial development on wealth/income inequality (Braga et al., 2017).

To examine the financial development and income/wealth inequality nexus, the paper addresses potential endogeneity and uses mean group estimator. In addition, a dynamic panel threshold model is constructed to identify if a specific level of financial development generates a change in its effect on inequality.

This research analyses the EU-27 countries in the period 1990-2023 to show that financial development has a nonlinear effect on income/wealth inequality. Self-employment and banking crises are identified as mediating factors in these relationships. The subsequent sections of this paper will provide a detailed exposition of these results.

The other sections of this paper unfold as follows: the next section provides a brief overview of the existing scholarly work related to our topic, the second section outlines the data used, the models specified, and the econometric methods applied, the third and fourth parts present and discuss the empirical results obtained, and the last section offers the concluding ideas and implications of our study.

2. Literature review

Income inequality has led to renewed academic and public interest in identifying its underlying causes. Although a definitive understanding is still developing, various theoretical frameworks and empirical studies point to factors such as the impact of globalization and technological change on skill premiums, the effect of tax reforms that have lessened progressivity for high-income earners, alterations in labor market institutions like declining unionization and minimum wage values, and the rise of highly successful individuals in certain fields (Smith, 2001; Van Reenen, 2011; Prettner and Strulik, 2020; Prettner and Schaefer, 2021; Lai et al., 2023; Bloom et al., 2025).

Particularly, the relationship between financialisation and inequality has been the subject of previous studies. The effects of finance on income inequality have been examined in the US case (e.g. Lin and Tomaskovic-Devey, 2013), the UK (Wood, 2020), as well as EU and OECD countries (Roberts and Kwon, 2017), whereas Godachot (2016) has looked at this across a range of conceptions of financialisation and country cases. Arrigoni (2024) has looked at how financialisation drives wealth inequality, but in a narrower set of cases (UK, USA, and France). Barradas (2025) has also examined this specifically in relation to EU countries. There is also extensive work from the Post-Keynesian school on financialisation and the wage share. For example, Kohler et al. (2019) stated that financialization can reduce the wage share through four primary channels. These include (i) better "exit options" for firms, (ii) the necessity for businesses to charge higher price mark-ups to cover their financial overhead, (iii) greater capital market

competition, and (iv) the way household debt makes workers more financially vulnerable, eroding their class consciousness.

From theoretical point of view, there are two perspectives on the impact of financial development on income inequality. First, financial development might increase efficiency and reduce the cost of financial services and credit. This will allow more people to take advantage of growth, which will reduce income/wealth inequality (Beck et al., 2007). A certain degree of financial sector maturity is necessary to increase service provision and to diversify the structure (Perales-Manrique et al., 2019). However, beyond a critical point, financial development might increase income/wealth inequality because of higher debt of households and firms made for consumption and profit (Zhang and Naceur, 2019). The resources from production are used to finance and are determined by returns to capital and higher financial sector pay (Gimet and Lagoarde-Segot, 2011), and by financial crises (Grabka, 2015). It is important to compute the threshold for policy reasons and for understanding if a certain degree of financial development impacts inequality.

The connection between financial development and inequality has been the subject of many empirical studies. The period of years 1990s was characterized by simultaneous rise in inequality and fast financial sector expansion, especially in developed countries and emerging economies. Furthermore, the recent financial crises have increased inequality (Sturm et al., 2024). On the other hand, financial development might reduce credit market frictions and the costs related to transactions and information. Better access to various financial instruments for investment, saving, and risk management might increase the accumulation and transfer of wealth (Beck et al., 2007). Even if the impact of financial development on income/wealth inequality has been analyzed in other previous studies, the debate remains open (Chletsos and Sintos, 2023). An important challenge in this domain is the divergence between theoretical discussions that focus mostly on wealth inequality, and empirical studies that usually employ income inequality as a proxy. This methodological option is determined by the lack of reliable and comparable wealth data for various countries and periods (Bagchi and Svejnar, 2015). In addition, it is necessary to notice that wealth and income inequality are related concept, but they are different. Wealth shows the concentrated nature of asset ownership because of accumulation in time and across generations (Berman et al., 2016). Davies and Shorrocks (2021) show that income inequality is, in average, around half the level of wealth inequality in industrialized states, but also in emerging economies. In addition, income inequality mainly indicates differences in earnings and consumption selections, while wealth inequality shows disparities in asset accumulation and distribution that have a more direct impact on individual incentives and institutional results. A certain wealth disparity can stimulate economic activity, but a high wealth inequality can weaken institutions, political and economic systems, and can concentrate power, which will reduce social mobility and increase income and wealth inequality (Yang and Zhou, 2022).

The impact of financial globalization on wealth inequality received less attention compared to the impact on income inequality, because of data availability and more reliable estimates for income inequality. Wealth remains an important determinant of economic performance, and the mechanisms through which financial globalization influences it are different from those that affect income. Wealth does not reduce to accumulated income. It supposes fluctuations in asset prices and easier access to investment opportunities. Therefore, the connection between financial globalization and wealth inequality implies complex mechanisms that do not reduce to skill-wage differences or income-type substitution.

Financial wealth is typically more concentrated than real estate or other tangible wealth, and participation in financial markets increases with net wealth (Kuhn et al., 2020; Diwan et al., 2021; Smith et al., 2022). Consequently, the benefits and opportunities associated with international investment are also heavily skewed toward the wealthiest. High financial integration makes it easier for the rich to move a portion of their wealth to tax havens, where lower tax rates allow it to accumulate more rapidly. Assets held by households in tax havens constitute a significant 8 to

10% of global financial wealth (Zucman, 2013; Alstadsæter ets al., 2018). Foreign investors often target highly successful companies (like Tesla, Meta, or Microsoft) whose owners belong to the very top of the global wealth distribution (Saez and Zucman, 2021). This influx benefits wealthy domestic shareholders, who own the vast majority of equities, while providing little to no benefit for poorer individuals. The wealthy are also more likely to invest abroad to diversify their portfolios, while the poorest have very low or non-existent participation in financial assets.

This paper evaluates the effect of financial development on both income and wealth inequality in the EU-27 countries given that financial globalization is posited as a significant driver of within-country wealth inequality. The analysis is also deepened by making a separate evaluation for new and for old EU member states which has not been the subject of any previous study. Mechanisms and behavioral outcomes are also relevant in understanding between the inequality-financial development nexus.

3. Methods and data

This study employs a panel dataset comprising observations from all the EU-27 nations spanning the years 1990 to 2023. The 27 countries include Croatia, but exclude the UK. The selection of these countries and the specific time periods under investigation was solely driven by the availability of relevant statistical information. To smooth out short-run economic fluctuations, all variables were averaged over non-overlapping five-year intervals, resulting in a total of six observations for each variable within each country. A comprehensive list of variables included in this analysis and the associated descriptive statistics is provided in the Appendix 1 for the EU-27 countries and for the entire period (1990-2023).

While the Gini coefficient is a frequently employed measure of inequality in empirical studies, its nature as a summary statistic limits its capacity to distinguish between different forms of inequality. Therefore, we consider the share of income and wealth held by the richest segments of the population. These top income/wealth shares not only exhibit a strong positive relationship with the Gini coefficient but are also less sensitive to changes in the wealth distribution at the lower end. This analysis includes the income/wealth shares of the top 1% and 10% (pre-tax national income/ pre-tax net personal wealth held by the p99p100 and p90p100 groups, respectively). To investigate whether financial development has a disproportionately negative impact on the poor, we also examine the income/wealth share of the bottom 50% (pre-tax national income/pre-tax net personal wealth held by the p0p50 group). The data for these inequality measures are sourced from the World Inequality Database (WID).

Net wealth is the total value of all of assets minus all of their liabilities (debts). However, providing loans, i.e. debts for the households, seems the prime service the financial sector via its institutions offers to households for the building and consequent distribution of their wealth, especially for self-owned housing. The ECB's 2021 wave of the HFCS survey of 22 EU countries, shows that debts equal on average 12% of net wealth (household, not personal), with a strong variation across countries from 3% to 39%. In the same vein, via the different channel of financial markets, the sector allows households to acquire stocks, bonds and similar financial assets as profitable elements of their wealth. The two channels represent rather different mechanisms of wealth formation: immediate results for stocks etc. versus the long-run redemption of mortgages. A third mechanism concerns the formation of entrepreneurial wealth (self-employment).

In addition to wealth inequality, income inequality is also treated in the paper, in an identical way, same three-part breakdown of inequality, same regression approach. Half of the population is conceptually way beyond the concept of poverty. However, the income poor and the wealth poor are not one and the same (Balestra and Oehler, 2023). Instead, wealth is spread broadly over the income distribution. The (disposable) income-bottom-60% (50% n.a.) owns on average 40% of total (net) wealth, including 15% of the wealth-top-10%, in 21 EU countries in the year 2020

(Eurostat, using HFCS data). During the long run of wealth formation by mortgage redemption households' incomes likely evolve which helps explaining this different spread of wealth over the income distribution. Conversely, the wealth-bottom-60% comprises 51% of all incomes while its top-10% encompasses 20%, far below its 52% share of wealth. The overlap between the two bottom-60% segments concerns 10% of total wealth and 25% of total income. Clearly, the income-bottom-50% is not a proper representation of the poor. Unsurprisingly, the median debt/assets ratio varies much less for incomes (26% bottom-20% to 17% for top-10%) than for wealth above. The difference exists also for the possession of financial assets, but is less pronounced: 3% at the bottom and 32% at the top. Apparently, the two channels between the financial sector and household inequality are subject to considerable interactions and will affect both distributions simultaneously.

Financial development supposes improvement in the functions of financial system like capital allocation, savings aggregation, risk diversification and economic exchange (Levine, 2005). By reducing financial constraints and information asymmetries, the financial development can enhance growth and reduce poverty and inequality. However, it is difficult to measure the effect of financial systems on credit market imperfections, most of the previous studies using private credit or stock market capitalization that reflect only the scale of financial activity (Kim et al., 2025). Therefore, this paper employs the financial development index with data taken from the International Monetary Fund's Financial Development Index Database (FDID). This index shows the development of financial intermediaries and markets based on three dimensions: depth (market dimension and liquidity), access (availability of financial services), and efficiency (cost-effectiveness and capital market activity). This paper also considers the sub-components of this index to capture better the changing effects of financial intermediaries and markets and sizes. All index values are normalized between zero and one, with higher values indicating a more developed financial system. The datasets present limitations. For example, the WID measures ignore the composition of the distributions. The IMF indicators focus on institutional arrangements, which facilitate the sector's actual behaviors but do not determine it.

It is necessary to discuss the precise properties of the financial indicators. For example, the indicator for access to financial institutions counts bank branches and ATMs per capita. In most EU countries, this indicator falls significantly over the 2010s, sometimes even below levels of the early 1990s. This implies declining inclusiveness of the financial sector. However, such declines likely reflect the growth of on-line banking which reduces the need of offices but also suggests increased access. The indicator for depth of financial institutions serves to show the total size of a country's financial means that are available for investing in growth. Its set-up may actually conflict with the formation of household wealth to the extent that, beyond the common private credit ratio, the indicator encompasses also pension fund wealth and insurance premiums which both potentially restrain private household wealth. Similarly, depth of financial markets covers- apart from the common stock market ratio- types of debt securities.

To bolster the reliability of these estimation results, the study incorporates a set of control variables informed by the existing academic literature on the determinants of income and wealth inequality (Chen et al, 2021). First, the paper includes the GDP per capita growth, obtained from the World Development Indicators (WDI). Berisha and Meszaros (2020) suggest that economic growth can reduce wealth inequality by enabling individuals with lower incomes to reduce their debt burden or increase their savings, thereby improving their share of both income and wealth. Second, other variables refer to the enrollment rate in secondary education, the sum of exports and imports as a percentage of GDP, general government final consumption expenditure, and the rate of inflation, measured as the annual percentage change in the consumer price index, also sourced from the WDI and expressed in logarithmic form. Hasan et al. (2020) show that education might reduce the differences between the rich and the poor due to more people engaged in skilled labor markets. However, they also show that more educated people might have more lucrative

assets, contributing to wealth inequality (Black et al., 2018). Trade openness might increase inequality because of higher returns on capital (Helpman et al., 2016), but other authors consider that trade could reduce inequality through trickle-down effects (Aghion and Bolton, 1997). Inflation is a threat for lower-income people since it erodes their purchasing power increasing poverty (Fischer, 2001). Government expenditure might reduce income inequality as a tool of redistribution (Sidek, 2021).

This study also includes proxies for fiscal redistribution and governance. Fiscal redistribution, proxied by the difference between the Gini coefficients for income before and after taxes, is obtained from Solt's (2020) Standardized World Income Inequality Database (SWIID). While greater fiscal redistribution is generally expected to lead to lower wealth inequality (Hasan et al., 2020), it has also been argued that if political power is correlated with income and wealth, redistributive policies might disproportionately benefit the wealthy (Borck, 2007). Governance at the government level is assessed using the control of corruption. As previous research suggests, the level of inequality within a country can reflect the quality of its political institutions, and effective governance can contribute to a more equitable distribution of income and wealth (Gupta et al., 2002; Acemoglu et al., 2015).

A dynamic panel data model can be used to evaluate the impact of financial development on income/wealth inequality:

$$inequality_{it} = \alpha_i + \tau \cdot inequality_{it-1} + \beta \cdot fd_{it} + \gamma \cdot control_{i,t-1} + \varepsilon_{it} \quad (1)$$

inequality: measure of income/wealth inequality;

fd: measure of financial development;

control: vector of control variables with one year delay (lag) to reduce endogeneity and account for delayed effect on inequality;

α_i: parameter accounting for state-specific effect;

β and γ: parameters;

ε_{it}: error;

indexes: *i* for state and *t* for year.

The non-linear connection is revealed by introducing the squared term of financial development:

$$inequality_{it} = \alpha_i + \tau \cdot inequality_{it-1} + \beta_1 \cdot fd_{it} + \beta_2 \cdot fd_{it}^2 + \gamma \cdot control_{i,t-1} + \varepsilon_{it} \quad (2)$$

β_1 and β_2: parameters.

If β_2 is statistically significant, then two patterns might be identified: U-shaped pattern for positive β_2 and inverted U-shaped pattern for negative β_2. When $\frac{\Delta inequality_{it}}{\Delta fd_{it}} = 0$, the threshold level is given by $-\frac{\beta_1}{2 \cdot \beta_2}$.

The regressions are affected by endogeneity bias because of few causes: the presence of lagged dependent variable among explanatory variables, reverse causality between inequality measures and financial development, both types of variables being determined by common causes like cultural or political factors.

The endogeneity is handled by using mean group (MG) estimators under no cointegration.

For robustness check, dynamic panel threshold models are employed:

$$inequality_{it} = \alpha'_i + \beta' \cdot inequality_{i,t-1} + \gamma_1 \cdot fd_{it} \cdot I(fd_{it} \leq \delta) + \\ + \gamma_2 \cdot fd_{it} \cdot I(fd_{it} > \delta) + \mu \cdot control_{it} + \varepsilon'_{it} \quad (3)$$

fd acts like threshold variable and *I(.)* is indicator function showing the regime defined by *fd*.

δ is the threshold value, γ_1 and γ_2 are parameters associated to regime dependent variable.

This paper employs dynamic panel-data model allowing threshold and endogeneity to explain income inequality in the EU member states. This study also examines the mechanism by which financial development may influence income or wealth inequality, specifically exploring the role of self-employment. To do so, it employs a modification of the mechanism effect test proposed by Wen and Ye (2014), adjusted to accommodate the possibility of a non-linear association between financial development and inequality.

In this context, self-employment is proposed as the channel or the process through which financial development affects income or wealth inequality. The idea is that changes in the financial system can influence the prevalence and success of self-employment, which in turn impacts how income and wealth are distributed. A more developed financial system can provide more opportunities for individuals to access loans and investment, which are often crucial for starting and growing a business. This could lead to an increase in self-employment. If financial development allows more people from disadvantaged backgrounds to start successful businesses, it could lead to upward mobility and reduce income/wealth disparities. If only those who are already relatively wealthy or well-connected can access this capital, it might further concentrate wealth and income among a select few self-employed individuals.

$$self\_employment_{it} = a_0 + \boldsymbol{a_1} \cdot fd_{it} + b_i + v_{it} \quad (4)$$

$$inequality_{it} = c_0 + c_1 \cdot fd_{it} + c_2 \cdot fd_{it}^2 + \boldsymbol{c_3} \cdot self\_employment_{it} + d_i + \pi_{it} \quad (5)$$

First of all, it is necessary to verify if the parameter e_1 and/or e_2 in the next equation are/is significant:

$$inequality_{it} = e_0 + e_1 \cdot inflation_{it} + e_2 \cdot inflation_{it}^2 + e_3 \cdot X_{it} + f_i + u_{it} \quad (6)$$

v_{it}, π_{it}, u_{it}- errors

c_i, e_i, g_i- state fixed effect

If the parameters e_1 and/or e_2 in eq. (5) are/is significant, then we should test if the coefficients a_1 and c_3 are significant. If the parameters (a_1 and c_3) are significant, there is a mechanistic effect. The next step supposes to check the significance of d_1 and d_2. If c_1 and/or c_2 are/is significant, the mechanistic effect is partial, while it is full if c_1 and c_2 are not significant.

4. Results

The results based on correlation matrix and variance inflation factors (VIFs) in Appendix 2 allow us to avoid multicollinearity. There is a strong correlation only between various measures of financial development (financial development index, financial institutions access index, financial institutions depth index, financial institutions efficiency index and financial institutions index). Therefore, these variables might not appear in the same regression model. The preliminary tests before the construction of the panel data models confirm the cross-sectional dependence for all

series excepting inflation at 10% significance level and stationarity for all series at 1% significance level (Appendix 3). The cointegration relationship between inequality, GDP and fdi is not supported as Appendix 3 shows. Therefore, ARDL models with a Mean Group (MG) Estimator can be used.

Baseline estimations

According to Table 1, some indicators of financial development like financial development index, financial institutions access index, financial institutions depth index, financial institutions efficiency index and financial institutions index had a significant impact on top 1% income share with a non-linear relationship under an inverted-U pattern. Economic growth had no significant effect on top 1% income share.

Table 1. MG estimations to explain top 1% income share

Variable in the previous period	Top 1% income								
GDP	0.003 (0.898)	0.004 (0.883)	0.005 (0.832)	0.002 (0.954)	0.004 (0.878)	0.002 (0.937)	0.004 (0.865)	0.006 (0.814)	0.005 (0.819)
fdi	0.025** (0.035)								
access		0.018** (0.017)							
depth			0.022** (0.016)						
efficiency				0.056** (0.013)					
institutions					0.038** (0.011)				
market_access						0.002 (0.825)			
market_depth							0.004 (0.745)		
markets_efficiency								0.001 (0.946)	
markets_index									0.002 (0.945)
fdi^2	-0.026** (0.032)								
$access^2$		-0.015** (0.019)							
$depth^2$			-0.022** (0.016)						
$efficiency^2$				-0.056** (0.016)					
$institutions^2$					-0.033* (0.083)				

Variable in the previous period	Top 1% income								
market_access^2						-0.002 (0.845)			
market_depth^2							-0.005 (0.749)		
markets_efficiency^2								-0.006 (0.946)	
markets_index^2									-0.001 (0.938)
constant	0.053* (0.096)	0.050 (0.125)	0.048 (0.146)	0.063* (0.079)	0.056* (0.097)	0.045 (0.177)	0.046 (0.146)	0.042 (0.197)	0.045 (0.146)
No. obs.	162	162	162	162	162	162	162	162	

*Source: own calculations in Stata 15. Note: p-values in brackets; * suggests significance at 10% level, ** shows significance at 5% level, *** indicates significance at 1% level.*

According to Table 2, indicators that reflect financial development (financial development index, financial institutions access index, financial institutions depth index, financial institutions efficiency index and financial institutions index) were non-linearly connected with top 1% wealth share with an inverted-U pattern.

Table 2. MG estimations to explain top 1% wealth share

Variable in the previous period	Top 1% wealth				
GDP	-0.004 (0.485)	-0.005 (0.358)	-0.005 (0.419)	-0.006 (0.351)	-0.005 (0.362)
fdi	0.021* (0.057)				
access		0.052** (0.012)			
depth			0.045** (0.021)		
efficiency				0.095** (0.022)	
institutions					0.100** (0.011)
market_access					
market_depth					
markets_efficiency					
markets_index					
fdi^2	-0.031** (0.042)				
access^2		-0.039** (0.015)			

Variable in the previous period	Top 1% wealth				
depth^2			-0.037** (0.032)		
efficiency^2				-0.109** (0.252)	
institutions^2					-0.081** (0.014)
market_access^2					
market_depth^2					
markets_efficiency^2					
markets_index^2					
constant	-0.005 (0.993)	0.027 (0.680)	0.024 (0.723)	0.037 (0.618)	0.041 (0.547)
No. obs.	140	140	140	140	140

*Source: own calculations in Stata 15. Note: p-values in brackets; * suggests significance at 10% level, ** shows significance at 5% level, *** indicates significance at 1% level.*

Table 3 supports an inverted-U pattern relationship between top 10% income/wealth share and some indicators describing financial development (financial development index, financial institutions access index, financial institutions depth index, financial institutions efficiency index and financial institutions index).

Table 3. MG estimations to explain top 10% income/wealth share

Variable in the previous period	Top 10% income					Top 10% wealth				
GDP	0.002 (0.418)	0.002 (0.416)	0.002 (0.401)	0.002 (0.469)	0.002 (0.426)	-0.004 (0.485)	-0.005 (0.358)	-0.005 (0.419)	-0.006 (0.351)	-0.005 (0.362)
fdi	0.016* (0.053)					0.020* (0.057)				
access		0.010** (0.046)					0.052** (0.012)			
depth			0.026** (0.011)					0.045** (0.021)		
efficiency				0.053** (0.025)					0.095** (0.022)	
institutions					0.031** (0.024)					0.100** (0.012)
fdi^2	-0.013* (0.057)					-0.031** (0.042)				
access^2		-0.006* (0.058)					-0.039** (0.015)			

Variable in the previous period	Top 10% income					Top 10% wealth				
depth^2			-0.025** (0.011)					-0.037** (0.032)		
efficiency^2				-0.055** (0.022)					-0.103** (0.025)	
institutions^2					-0.025** (0.022)					-0.081** (0.014)
constant	-0.043** (0.042)	-0.048** (0.038)	-0.042** (0.043)	-0.031* (0.057)	-0.037** (0.049)	-0.0005 (0.993)	0.027* (0.068)	0.024* (0.072)	0.037* (0.061)	0.041* (0.054)
No. obs.	162	162	162	162	162	162	162	162	162	162

*Source: own calculations in Stata 15. Note: p-values in brackets; * suggests significance at 10% level, ** shows significance at 5% level, *** indicates significance at 1% level.*

According to Table 4, economic growth reduced bottom 50% income share. There is a U relationship between bottom 50% income share and financial development index, but also between bottom 50% wealth share and financial institutions efficiency.

Table 4. MG estimations to explain bottom 50% income/wealth share

Variable in the previous period	bottom 50% income					bottom 50% wealth				
GDP	-0.103** (0.011)	-0.065** (0.021)	-0.068*** (0.009)	-0.065** (0.015)	-0.068** (0.015)	0.009 (0.594)	0.001 (0.494)	0.001 (0.529)	0.001 (0.425)	0.001 (0.487)
fdi	-0.103** (0.017)					-0.008 (0.525)				
access		-0.015 (0.492)					-0.005 (0.709)			
depth			-0.011 (0.328)					-0.002 (0.896)		
efficiency				-0.041 (0.225)					-0.016* (0.087)	
institutions					-0.010 (0.684)					
fdi^2	0.117** (0.015)					0.008 (0.510)				0.004 (0.792)
access^2		0.014 (0.549)					0.004 (0.969)			
depth^2			0.010 (0.345)					0.004 (0.811)		

Variable in the previous period	bottom 50% income					bottom 50% wealth				
efficiency[2]				0.035 (0.284)					0.032* (0.082)	
institutions[2]					0.106 (0.680)					0.006 (0.670)
constant	0.200*** (0.000)	0.144*** (0.000)	0.146*** (0.000)	0.134*** (0.000)	0.145*** (0.000)	-0.005 (0.808)	-0.005 (0.792)	-0.009 (0.670)	-0.012 (0.612)	-0.011 (0.677)
No. obs.	162	162	162	162	162	140	140	140	140	140

*Source: own calculations in Stata 15. Note: p-values in brackets; * suggests significance at 10% level, ** shows significance at 5% level, *** indicates significance at 1% level.*

Robustness check- additional variables

We check the robustness of the results using other control variables and Gini index as dependent variable. Table 5 shows the positive impact of inflation on Gini index and top 1% income/wealth share and confirms the capacity of control of corruption to reduce inequality. Credit to private sector reduced top 1% income share, while government final consumption expenditure increased it. Redistribution, education and trade had no significant impact on top 1% income/wealth share. The government final consumption expenditure reduced top 1% wealth share. Trade reduced Gini index, while government final consumption expenditure increased it.

Table 5. MG estimations to explain top 1% income/wealth and Gini index

Variable in the previous period	Gini	top 1% income			top 1% wealth		
fdi	0.031* (0.061)	0.041** (0.014)	0.041** (0.016)	0.041** (0.014)	0.016* (0.075)	0.023* (0.060)	0.025* (0.057)
fdi[2]	-0.019* (0.054)	-0.038** (0.014)	-0.039** (0.015)	-0.041** (0.015)	-0.013* (0.077)	-0.019* (0.064)	-0.021* (0.063)
inflation	0.001* (0.054)	0.002** (0.049)	-	-	0.001* (0.088)	-	-
trade	-0.302* (0.067)	0.001 (0.685)	0.001 (0.697)	0.001 (0.647)	-0.004 (0.680)	-0.005 (0.956)	-0.002 (0.793)
gov	0.054* (0.088)	0.046* (0.093)	-	-	-0.061** (0.017)	-	-
red	0.004 (0.372)	0.005 (0.499)	0.005 (0.490)	0.002 (0.727)	-0.002 (0.778)	-0.003 (0.645)	-0.002 (0.810)
corruption	-0.004** (0.045)	-0.002** (0.034)	-0.002** (0.035)	-0.002** (0.031)	-0.002* (0.066)	-0.005** (0.036)	-0.003** (0.049)
edu	-	-	-0.005 (0.994)	-	-	0.0145 (0.237)	-
credit	-	-	-	-0.004* (0.096)	-	-	0.005 (0.947)

Variable in the previous period	Gini	top 1% income			top 1% wealth		
constant	-0.352 (0.329)	-0.103 (0.282)	0.045 (0.136)	0.068** (0.023)	0.193 (0.222)	-0.078 (0.370)	-0.009 (0.869)
No. obs.	98	109	111	108	94	95	92

*Source: own calculations in Stata 15. Note: p-values in brackets; * suggests significance at 10% level, ** shows significance at 5% level, *** indicates significance at 1% level.*

Table 6 shows that inflation and government expenditure increased top 10% income share, while government expenditure and credit reduced top 10% wealth share. Control of corruption diminished top 10% income/wealth share. Redistribution, education and trade had no impact on these indicators.

Table 6. MG estimations to explain top 10% income/wealth share

Variable in the previous period	top 10% income			top 10% wealth		
fdi	0.025** (0.037)	0.025** (0.042)	0.030** (0.027)	0.016* (0.076)	0.023* (0.060)	0.025* (0.057)
fdi^2	-0.019** (0.041)	-0.020** (0.043)	-0.028** (0.246)	-0.013* (0.077)	-0.019* (0.066)	-0.021* (0.063)
Inflation	0.003* (0.057)	-	-	0.0001 (0.885)	-	-
Trade	0.002 (0.529)	0.002 (0.947)	0.004 (0.288)	-0.004 (0.680)	-0.005 (0.956)	-0.002 (0.793)
Gov	0.059* (0.0613)	-	-	-0.060** (0.017)	-	-
Red	0.007 (0.370)	0.007 (0.359)	0.004 (0.823)	-0.002 (0.778)	-0.003 (0.645)	-0.002 (0.810)
Corruption	-0.001* (0.093)	-0.001* (0.099)	-0.002* (0.092)	-0.002* (0.066)	-0.005** (0.036)	-0.003** (0.049)
Edu	-	-0.005 (0.509)	-	-	0.014 (0.237)	-
Credit	-	-	-0.009** (0.021)	-	-	0.005 (0.793)
constant	-0.212 (0.108)	-0.006 (0.876)	0.019 (0.558)	0.193 (0.222)	-0.078 (0.370)	-0.009 (0.869)
No. obs.	109	111	108	111	95	92

*Source: own calculations in Stata 15. Note: p-values in brackets; * suggests significance at 10% level, ** shows significance at 5% level, *** indicates significance at 1% level.*

Table 7 indicates that inflation had no significant impact on bottom 50% income/wealth share, while government expenditure reduced it. Redistribution and control of corruption reduced bottom

50% income share, but increased bottom 50% wealth share. Education significantly reduced only bottom 50% wealth share.

Table 7. MG estimations to explain bottom 50% income/wealth share

Variable in the previous period, excepting fdi	bottom 50% income			bottom 50% wealth		
fdi	-0.102** (0.015)	-0.100** (0.021)	-0.091** (0.045)	-0.0009 (0.958)	-0.004 (0.823)	-0.003 (0.839)
fdi^2	0.124** (0.010)	0.123** (0.013)	0.113** (0.029)	0.0007 (0.967)	0.004 (0.812)	0.002 (0.867)
inflation	0.006 (0.723)	-	-	-0.0009 (0.273)	-	-
trade	-0.011 (0.118)	-0.010 (0.228)	-0.008 (0.262)	-0.0007 (0.799)	-0.002 (0.398)	-0.001 (0.721)
gov	-0.021* (0.073)	-	-	-0.004* (0.089)	-	-
red	-0.001** (0.022)	-0.0013** (0.010)	-0.0016** (0.010)	0.007* (0.078)	0.008* (0.092)	0.001* (0.077)
corruption	-0.007* (0.099)	-0.008* (0.069)	-0.007* (0.094)	0.001* (0.095)	0.002** (0.048)	0.001* (0.072)
edu	-	0.002 (0.847)	-	-	-0.011* (0.056)	-
credit	-	-	-0.008 (0.193)	-	-	0.004 (0.265)
constant	0.336* (0.070)	0.259*** (0.003)	0.312*** (0.000)	-0.004 (0.973)	0.029 (0.152)	-0.053 (0.132)
No. obs.	108	111	108	94	95	92

*Source: own calculations in Stata 15. Note: p-values in brackets; * suggests significance at 10% level, ** shows significance at 5% level, *** indicates significance at 1% level.*

Robustness check- old and new EU member states

Old EU member states

Table 8 suggests that financial development index had no effect on bottom 50% wealth share, while there was an inverted-U pattern in the relationship between financial development index and the other measures on income/wealth inequality. Inflation enhanced top 1%/10% income/wealth inequality. Control of corruption reduced top 1% income inequality, while government expenditure reduced inequality based on top 1% income share and top 10% income/wealth.

Table 8. MG estimations to explain income/wealth inequality in the old EU member states

Variable in the previous period, excepting fdi	top 1% income	top 1% wealth	top 10% income	top 10% wealth	bottom 50% income	Bottom 50% wealth
fdi	0.009* (0.077)	0.309* (0.057)	0.010* (0.076)	0.082** (0.031)	0.047* (0.061)	0.033 (0.151)
fdi^2	-0.003* (0.092)	-0.030* (0.061)	-0.014* (0.067)	-0.069** (0.037)	-0.054** (0.025)	-0.020 (0.370)
Inflation	0.003*** (0.006)	0.001 (0.527)	0.006*** (0.000)	0.006** (0.015)	-0.0003 (0.870)	-0.0009 (0.588)
Trade	-0.006 (0.315)	-0.013 (0.424)	-0.006 (0.369)	0.008 (0.584)	-0.005* (0.078)	-0.0007 (0.824)
Gov	-0.068** (0.019)	0.006 (0.929)	-0.097*** (0.001)	-0.199** (0.029)	-0.005 (0.932)	-0.013 (0.570)
Red	0.0001 (0.870)	0.0001 (0.924)	0.0005 (0.670)	0.0001 (0.995)	-0.0001 (0.601)	-0.0004 (0.347)
Corruption	-0.002* (0.074)	0.001 (0.837)	0.002 (0.196)	0.003 (0.672)	-0.002 (0.414)	-0.003 (0.531)
constant	0.306*** (0.009)	-0.033 (0.906)	0.330*** (0.009)	0.868 (0.254)	0.195 (0.380)	0.071 (0.442)
No. obs.	58	51	58	51	58	51

*Source: own calculations in Stata 15. Note: p-values in brackets; * suggests significance at 10% level, ** shows significance at 5% level, *** indicates significance at 1% level.*

New EU member states

Table 9 indicates that financial development index had no effect on bottom 50% wealth share, while there was a U pattern in the financial development index - bottom 50% income share nexus and an inverted-U pattern in the relationship between financial development index and the other measures on income/wealth inequality. Inflation and trade had no impact on income/wealth inequality. Control of corruption reduced top 1%/10% income inequality and bottom 50% income, while redistribution enhanced bottom 50% wealth. Government expenditure reduced inequality based on all measures excepting bottom 50% income.

Table 9. MG estimations to explain income/wealth inequality in the new EU member states

Variable in the previous period, excepting fdi	top 1% income	top 1% wealth	top 10% income	top 10% wealth	bottom 50% income	Bottom 50% wealth
fdi	-0.059** (0.017)	-0.078** (0.021)	-0.043** (0.028)	-0.088** (0.011)	0.145* (0.055)	0.034 (0.138)
fdi^2	0.054** (0.017)	0.067** (0.029)	0.034** (0.035)	0.053** (0.034)	-0.167** (0.036)	-0.032 (0.116)

Variable in the previous period, excepting fdi	top 1% income	top 1% wealth	top 10% income	top 10% wealth	bottom 50% income	Bottom 50% wealth
inflation	0.0007 (0.589)	-0.0009 (0.692)	0.0009 (0.471)	0.0005 (0.868)	0.001 (0.611)	0.0001 (0.898)
trade	0.006 (0.231)	0.001 (0.956)	0.008* (0.078)	0.025 (0.249)	-0.017 (0.150)	0.001 (0.814)
gov	-0.176*** (0.002)	-0.021* (0.064)	-0.236*** (0.000)	-0.130** (0.048)	0.032 (0.690)	-0.134** (0.035)
red	0.0004 (0.533)	-0.0001 (0.929)	0.0005 (0.467)	-0.001 (0.230)	-0.001 (0.387)	0.001** (0.016)
corruption	-0.002** (0.018)	-0.0001 (0.988)	-0.002** (0.025)	-0.001 (0.811)	-0.010** (0.022)	0.003 (0.384)
constant	-0.519*** (0.004)	0.085 (0.592)	-0.770*** (0.000)	0.307 (0.513)	0.127 (0.603)	0.366* (0.084)
No. obs.	51	43	51	43	51	43

*Source: own calculations in Stata 15. Note: p-values in brackets; * suggests significance at 10% level, ** shows significance at 5% level, *** indicates significance at 1% level.*

Robustness check- dynamic panel threshold models

The dynamic panel-data models allowing threshold and endogeneity for EU in Table 10 show a direct impact of financial development index on top 1% income/wealth and bottom 50% income and a negative one of the rest of proxies for inequality. Inflation enhanced then decreased top 1%/10% income share. Control of corruption had no significant impact in this case.

According to Lagrange Multiplier test, there is no relationship between endogenous variable and instrument variable. According to Hausman test, the exogeneity hypothesis is not rejected, which implies that the model is consistent. For a financial development index below 0.488, financial development index has a positive impact on top 1% income, while the impact becomes negative when its value is higher than 0.488. In the case of top 10% income, a financial development index below 0.632 positively impacts inequality, while the effect is inverse for financial development index higher than 0.632. The situation is different in the case of bottom 50% income. The effect of financial development index on bottom 50% income is negative for values below 0.699 and positive for higher values.

From economic point of view, a low degree of financial development increases the inequality based on top 1% and 10% and reduces the inequality based on bottom 50%. In the early stages of financial development, financial deepening (e.g., the expansion of capital markets or more sophisticated financial instruments) disproportionately benefits the wealthiest. The rich will access first new financial products and will have higher returns, growing their income share. When financial development is mature, the institutions will become robust and regulated. This phase is characterized by more financial inclusion, with new services more available to a broader population, which will reduce inequality.

In countries with poor financial systems, there is a better access to credit for the wealthiest. The poor or near-poor face severe credit constraints (e.g., lack of collateral, high interest rates). Without access to capital for education, entrepreneurship, or smoothing consumption during crises, their relative income share tends to decrease (a negative impact on the bottom 50%'s share). Once the financial system is deeply developed, microfinance, small-scale lending, and

affordable banking services become widespread. This access to credit and savings allows the bottom 50% to invest in human capital, start small businesses, and escape poverty traps, thereby increasing their overall income share. The threshold being higher than those for the top income groups suggests that democratization of finance is the final stage of financial development.

Table 10. Dynamic panel-data model allowing threshold and endogeneity to explain income inequality in the EU member states

Variable in the previous period, excepting fdi	top 1% income		top 10% income		bottom 50% income	
Threshold value	0.488*** (0.000)		0.632*** (0.000)		0.699*** (0.000)	
	lower	upper	lower	upper	lower	upper
Dependent variable in the previous period	0.581*** (0.006)	-0.530* (0.051)	0.723*** (0.000)	0.221* (0.064)	0.378*** (0.002)	-1.194*** (0.000)
fdi	0.058** (0.032)	-0.015* (0.076)	0.029* (0.093)	-0.041** (0.043)	-0.017** (0.011)	0.081** (0.025)
Inflation in the previous period	0.007*** (0.002)	-0.007*** (0.000)	0.009* (0.053)	-0.012*** (0.000)	0.003*** (0.000)	0.004 (0.262)
Trade in the previous period	-0.008 (0.663)	0.013 (0.460)	0.001 (0.879)	-0.003 (0.832)	-0.006 (0.480)	-0.003 (0.767)
Gov in the previous period	0.819** (0.027)	-0.580*** (0.005)	0.512** (0.037)	-0.204** (0.014)	-0.215* (0.057)	-0.133** (0.045)
Red in the previous period	-0.001 (0.817)	0.003 (0.816)	0.003 (0.424)	-0.004 (0.466)	-0.003 (0.507)	0.002 (0.770)
Corruption in the previous period	0.009 (0.813)	-0.010 (0.843)	-0.026 (0.385)	0.037 (0.313)	-0.008 (0.781)	0.002 (0.966)
constant	-0.385*** (0.000)		-0.025 (0.534)		0.172*** (0.000)	
p-value (Lagrange Multiplier test)	0.023		0.032		0.030	
p-value Hausman test	0.386		0.764		0.688	

*Source: own calculations in Stata 15. Note: p-values in brackets; * suggests significance at 10% level, ** shows significance at 5% level, *** indicates significance at 1% level.*

Table 11. Mechanisms and behavioural outcomes

Variable	top 1% wealth	top 1% wealth	self-employment	top 1% wealth		self-employment		top 1% wealth	banking crisis	top 1% wealth		banking crisis	
	MG	MG	MG	DPT		DPT		MG	MG	DPT		DPT	
Threshold value	-	-	-	0.271*** (0.000)		0.342*** (0.009)		-	-	-	-	-	-
				lower	upper	lower	upper			lower	upper	lower	upper
Depended variable in the previous period	1.233*** (0.000)	1.228*** (0.000)	-0.587*** (0.000)	1.467*** (0.000)	1.034*** (0.000)	-0.967*** (0.003)	0.810** (0.028)	1.373*** (0.000)	-0.563*** (0.000)	1.237*** (0.000)	1.046*** (0.000)	0.957*** (0.005)	1.357*** (0.003)
fdi	0.025** (0.047)	0.024* (0.051)	0.605** (0.014)	0.184** (0.0345)	-0.098* (0.084)	3.161*** (0.000)	-2.984*** (0.001)	0.017* (0.067)	0.359** (0.037)	0.019* (0.072)	-0.022* (0.067)	0.545*** (0.007)	-0.593*** (0.004)
fdi^2	-0.036** (0.035)	-0.035** (0.038)	-0.615** (0.013)	-	-	-	-	-0.027** (0.045)	-0.463** (0.015)	-	-	-	-
self-employment	-	0.001* (0.085)	-	-0.002* (0.067)	0.001 (0.224)	-	-	-	-	-	-	-	-
banking crisis	-	-	-	-	-	-	-	0.038* (0.062)	-	0.023* (0.096)	-0.024* (0.083)	-	-
fd x banking crisis	-	-	-	-	-	-	-	-0.056** (0.047)	-	-0.035* (0.087)	0.031* (0.075)	-	-
constant	-0.047** (0.021)	-0.042** (0.032)	4.330*** (0.000)	1.557*** (0.000)	-	-1.492* (0.072)	-	0.579*** (0.002)	2.836*** (0.000)	1.385 (0.004)		1.363*** (0.000)	
No. obs.	140	137	157	-	-	-	-	134	154	-	-	-	-
p-value linearity test	-	-	-	-	0.000	0.000	-	-	-	-	-	0.000	0.000
No. instruments	-	-	-	-	10	10	-	-	-	-	-	9	9
p-value Hansen J	-	-	-	-	0.177	0.481	-	-	-	-	-	0.247	0.375
P-value AR(2)	-	-	-	-	0.413	0.582	-	-	-	-	-	0.427	0.285

*Source: own calculations in Stata 15. Note: p-values in brackets; * suggests significance at 10% level, ** shows significance at 5% level, *** indicates significance at 1% level.*

Mechanisms and behavioural outcomes

According to Table 11, financial development index significantly influences self-employment under an inverted U pattern. In addition, self-employment positively impacted top 1% wealth share according to MG approach and had a non-linear connection with a U pattern. These results provide evidence supporting the mediating role of self-employment in the association between financial development and top 1% wealth share.

Banking crisis had a positive influence on top 1% wealth, while financial development impacted banking crisis under an inverted U shape. The interaction between financial development and banking crisis reduced wealth inequality. These results confirm the mediating role of banking crisis and capacity of financial development to reduce the negative effects of a crisis in the banking system.

5. Discussion

The inverted-U pattern suggests that as financial development initially increases, it leads to a rise in the income share of the top 1% and 10% income/wealth share. Early stages of financial development might create new avenues for investment, entrepreneurship, and wealth accumulation that are more readily accessible to those who already possess significant capital. Our results are in line with those of Kim et al. (2025) for 128 states in the period 1995-2021. In poor financial systems, only the rich people might efficiently take advantage of new opportunities (Tan and Law, 2012). However, after a certain point, the financial development reduces the income share of the top 1% and 10%, because better access to credit and investment opportunities widespread across different income groups. A mature financial sector increases concurrence between financial institutions, which might translate in lower fees and better contractual terms for many categories of borrowers and investors (Claessens, 2009). Stronger financial systems have better regulatory frameworks ensuring a more equitable distribution of resources and more investments in education which supposes higher incomes for more people.

Financial development, better institutional quality or suitable government policies might control income inequality. In the old EU member states, the financial development index did not have a significant impact on the bottom 50% wealth share. This shows that financial development increased the income share of the bottom 50%, but this does not necessarily imply a change in their accumulated wealth. This might be explained by limited access to asset-building opportunities.

When economic development is registered, the income of the bottom 50% of the population decreases. Economic growth can be generated by those sectors that bring benefits especially for higher-income earners. Technological progress can promote economic growth, but skilled workers take advantage of it and will have higher salaries (Murphy and Topel, 2016). Less unionization might stop salary growth for lower-income people even in times of economic expansion. Economic growth might also generate asset price inflation (eg, housing, stocks). The bottom 50% cannot take advantage of this wealth creation if they have lower assets.

The financial development initially increases and then decreases the income share of the bottom 50%, which is in line with Kim et al. (2025) that showed this for 128 countries in the period 1995-2021. However, after a degree of financial development, income share of the bottom 50% increases. Poor financial development focuses more on formal sector which is determinantal for vulnerable populations in the bottom 50% (Matsuyama, 2007). A mature financial system supposes more financial inclusion, with more access to credit for bottom 50% that help them to invest more in education and businesses, especially SMEs that come up with job creation and income growth for the bottom 50%.

The efficiency of financial institutions initially increases the wealth share of the bottom 50% and then decreases it. After a threshold, more financial institution efficiency increases the wealth share of the bottom 50%. In the first phase of efficiency growth, financial institutions should ensure maximum profits, which might bring higher fees for smaller clients. Then, a more efficient financial system brings lower transaction costs even for poorer and stability (Fasnacht, 2018).

Higher inflation is beneficial for top 1% and 10% that will have higher income and wealth shares, because they own more assets that appreciate during inflationary periods. Better control of corruption means lower income and wealth share for the top 1% and 10%, because these categories might be more involved in illicit enrichment. More credit to private sector decreased the top 1% income share and 10% wealth share. This shows that easier access to credit can accelerate entrepreneurship in more segments of population. In the new EU member states, inflation and trade had no significant impact on income and wealth inequality.

More government spending concentrates income at the top due to public contracts and public sector salaries or policies that help high-income earners. However, it reduces the wealth share of the top 1% and 10%, which might suggest that government spending could be financed in ways that draw down the assets of the wealthy (e.g., certain types of taxation). In the old EU member states, government expenditure has an equalizing effect on income and wealth concentration at the higher end of the distribution. The negative effect on the top 10% wealth shows that government policies could impact the asset holdings of the wealthy people (Wenglinsky, 1998).

The direct effect of redistribution on the bottom 50% wealth in the new EU countries is in line with the fact that policies for wealth transfer are effective. There is an inverted-U pattern in the financial development index-self-employment nexus. In the initial stage of financial development, the self-employment increases since they get access to credit. However, after a certain point, self-employment declines since a mature financial sector often supports big firms and industries and higher regulatory could discourage self-employment (Parker, 2004).

Self-employment increased the top 1% wealth share in the long-run. Actually, self-employment is non-linearly connected with the top 1% wealth share, under a U pattern. This suggests that initially, an increase in self-employment might be associated with a decrease in the wealth share of the top 1%. This could happen if early self-employment growth is broad-based and empowers a wider range of individuals to build wealth. However, beyond a certain point, further increases in self-employment might be linked to an increase in the top 1% wealth share. This could occur if the most successful self-employment ventures lead to significant wealth concentration at the very top. The combined findings – the inverted-U relationship between financial development and self-employment, and the positive (and U-shaped) relationship between self-employment and top 1% wealth share – provide evidence for the mediating role of self-employment. Financial development influences the level of self-employment, which in turn affects the wealth share of the top 1%. The non-linearities suggest that this mediation is not straightforward and depends on the stage of financial development and the overall level of self-employment.

The inverted-U pattern between financial development and banking crises shows that initial financial development might increase severity of banking crises because of inadequate regulation. However, after a certain level, the regulation might improve and the financial development becomes more stable financial system with a more diversified financial structure. The results show that banking crises mediates the relationship between wealth inequality and other factors. A mature financial system determines a more equitable distribution of the impact of financial shocks.

Policies to reduce inequality should be adapted to each stage of financial development. In developing economies, the financial reforms can initially increase inequality. This effect might be reduced if financial regulation is promoted to create market stability and prevent predatory lending.

Conclusions

Considering the increasing income and wealth inequality, the role of the financial sector has grown and its effect on economic disparities is still debated. Most of the previous papers focused on income inequality, but this study concentrates also on wealth inequality. Analysing the EU states in the period 1990-2023, the results indicate an inverted U-shaped connection between financial development and wealth inequality. Initially, financial development increases inequality by concentrating wealth at the top, while the share of the bottom 50% declines. However, after a certain point, this trend reverses. Similar findings are observed for income inequality, and the study showed that entrepreneurship mediates the way in which financial development influences inequality. All in all, a poor financial development determines greater wealth and income inequality.

To ensure a more equitable financial system, governments should implement policies for inclusive financial development (easier access to financial services by reducing barriers to entry for new institutions, better financial literacy). It is also necessary to manage the negative impacts of economic growth on the bottom 50% income share. Policies promoting asset ownership (better access to housing and incentivizing savings) could reduce inequality. Anti-corruption measures, more transparency and better institutional quality are necessary for financial development.

The study's limitations are related to the fact that specific inequality measures were employed (top 1%, 10%, bottom 50% income/wealth shares), neglecting other dimensions of inequality. The utilization of panel data does not allow a clear knowledge of connections in each country. Additionally, establishing clear causal relationships between financial development and inequality is challenging, and data limitations could affect the accuracy of the results.

As a limitation, the paper does not examine these compositional aspects of wealth in spite of the fact that they differ very strongly over (the three parts of) the distribution. Again, from the HFCS, for the Euro Area as a whole, the percentage of households holding shares varies from 1% in the net-wealth-bottom-20% to 36% in the top-10% (HFCS database, https://www.ecb.europa.eu/home/html/index.en.html). By contrast, the median debt/assets ratio varies from 96% for the same wealth-bottom-20% to only 6% for the top-10% (ECB, 2023). These differences are fundamental to understanding the generation of wealth inequality. Almost up the ninth wealth decile the self-owned house is the very basis of wealth formation. Only the top-10% has substantial means left to invest in financial assets to build further wealth. Thus, the financial sector entertains principally dissimilar relations with different parts of the wealth distribution that have a direct bearing on inequality. This aspect is a limitation of the paper's analysis.

The financial sector's actual behaviour in relation to household debt is largely driven by mortgages for self-owned housing, though populations' owning rates remained largely unchanged. These debts do correlate (2024, $r^2 = 0.64$) with the financial institutions indicator (unsurprisingly as private credit to GDP is part of that indicator). However, there is no correlation at all of debts with either the Access ($r^2 = 0.03$) or the Efficiency indicator ($r^2 = 0.0003$). This gives credence to the view that national housing markets may be drivers of financial sector output. Those markets differ significantly between countries with regard to, e.g., rental and other housing supply, government regulation including mortgage interest subsidies, interest rates and housing prices (strongly affected by the financial crisis). It potentially turns behavioural causality around, from the household to the financial sector.

Some researchers might argue that the nine indicators of financial development may be valid for studying economic growth from low levels of economic development but they are unsuited for the analysis of wealth and income inequality, where the two common ratios mentioned would seem much more useful as they concern actual behaviour in the two channels. The indicators concern the national level and disregard the international features of the financial sector, which showed

up so disastrously in the global spread of the financial crisis and which have also been increasing with the rapid growth of on-line banking. Equally, the international aspects of the wealth distribution are ignored.

Future research might consider other dimensions of inequality and the effect of specific policy interventions. It is also necessary to understand the relationship between financial development and aspects like globalization, technological challenges, and political institutions. Employing long-term longitudinal studies could provide more robust insights into the dynamic relationship between financial development and inequality.

Acknowledgement:

A part of this paper disseminates the results included in the research plan for 2026 of the Institute for Economic Forecasting entitled ”Income inequality in the context of sustainable development”.

References

Acemoglu, D., Naidu, S., Restrepo, P. and Robinson, J.A., 2015. Democracy, redistribution, and inequality. In: A.B. Atkinson and F. Bourguignon, eds. Handbook of Income Distribution. Amsterdam: Elsevier, pp.1885-1966.

Aghion, P. and Bolton, P., 1997. A theory of trickle-down growth and development. The Review of Economic Studies, 64(2), pp.151-172. https://doi.org/10.2307/2971707

Alstadsæter, A., Johannesen, N. and Zucman, G., 2018. Who owns the wealth in tax havens? Macro evidence and implications for global inequality. Journal of Public Economics, 162, pp.89-100. https://doi.org/10.1016/j.jpubeco.2018.01.008

Arrigoni, S., 2024. Who gets the flow? Financial globalisation and wealth inequality. Journal of Macroeconomics, 81, pp.1-30. https://doi.org/10.1016/j.jmacro.2024.103618

Bagchi, S. and Svejnar, J., 2015. Does wealth inequality matter for growth? The effect of billionaire wealth, income distribution, and poverty. Journal of Comparative Economics, 43(3), pp.505-530. https://doi.org/10.1016/j.jce.2015.04.002

Balestra, C. and Oehler, F., 2023. Measuring the joint distribution of household income, consumption and wealth at the micro level. OECD Papers on Well-Being and Inequalities, 11, pp.1-108. https://doi.org/10.1787/f9d85db6-en

Barradas, R., 2025. Why does the nexus between finance and income inequality break in times of financialisation? Empirical evidence for the European Union countries. Journal of Economic Studies, 52(3), pp.449-463. https://doi.org/10.1108/JES-10-2023-0608

Beck, T., Demirgüç-Kunt, A. and Levine, R., 2007. Finance, inequality and the poor. Journal of Economic Growth, 12, pp.27-49.

Berisha, E. and Meszaros, J., 2020. Macroeconomic determinants of wealth inequality dynamics. Economic Modelling, 89, pp.153-165. https://doi.org/10.1016/j.econmod.2019.10.001

Berman, Y., Ben-Jacob, E. and Shapira, Y., 2016. The dynamics of wealth inequality and the effect of income distribution. PLoS ONE, 11(4), pp.1-19. https://doi.org/10.1371/journal.pone.0154196

Black, S.E., Devereux, P.J., Landaud, F. and Salvanes, K.G., 2020. Where does wealth come from? National Bureau of Economic Research Working Paper, w28239, pp.1-71. https://doi.org/10.3386/w28239

Bloom, D.E., Prettner, K., Saadaoui, J. and Veruete, M., 2025. Artificial intelligence and the skill premium. Finance Research Letters, 81, pp.1-7. https://doi.org/10.1016/j.frl.2025.107401

Borck, R., 2007. On the choice of public pensions when income and life expectancy are correlated. Journal of Public Economic Theory, 9(4), pp.711-725. https://doi.org/10.1111/j.1467-9779.2007.00327.x

Braga, B., McKernan, S.M., Ratcliffe, C. and Baum, S., 2017. Wealth inequality is a barrier to education and social mobility. Washington, DC: Urban Institute. https://doi.org/10.7208/chicago/9780226816043.003.0010

L. Chancel et al., eds., 2022. World Inequality Report 2022. Harvard: Harvard University Press. https://doi.org/10.4159/9780674276598

Chen, T.C., Kim, D.H. and Lin, S.C., 2021. Nonlinearity in the effects of financial development and financial structure on unemployment. Economic Systems, 45(1), pp.1-17. https://doi.org/10.1016/j.ecosys.2020.100766

Chletsos, M. and Sintos, A., 2023. Financial development and income inequality: A meta-analysis. Journal of Economic Surveys, 37(4), pp.1090-1119. https://doi.org/10.1111/joes.12528

Claessens, S., 2009. Competition in the financial sector: Overview of competition policies. World Bank Research Observer, 24(1), pp.83-118. https://doi.org/10.1093/wbro/lkp004

Davies, J. and Shorrocks, A., 2021. Comparing global inequality of income and wealth. In: C. Gradín et al., eds. Inequality in the Developing World. Oxford: Oxford University Press, pp.49-73. https://doi.org/10.1093/oso/9780198863960.003.0003

Diwan, R., Liu, Z. and Spiegel, M.M., 2021. Capital flow surges and rising income inequality. FRBSF Economic Letter, 2021(09), pp.1-5.

ECB, 2023. Household Finance and Consumption Survey: Results from the 2021 wave. ECB Statistics Paper, 46, pp.1-48. https://doi.org/10.2866/31818%0A

Fasnacht, D., 2018. Open innovation in the financial services. In: D. Fasnacht, eds. Open Innovation Ecosystems. Cham: Springer, pp.97-130. https://doi.org/10.1007/978-3-319-76394-1_4

Fischer, R.D., 2001. The evolution of inequality after trade liberalization. Journal of Development Economics, 66(2), pp.555-579. https://doi.org/10.1016/s0304-3878(01)00174-2

Gimet, C. and Lagoarde-Segot, T., 2011. A closer look at financial development and income distribution. Journal of Banking & Finance, 35(7), pp.1698-1713. https://doi.org/10.2139/ssrn.1757876

Godechot, O., 2016. Financialization is marketization!. Sociological Science, 3, pp.495-519. https://doi.org/10.15195/v3.a22

Grabka, M.M., 2015. Income and wealth inequality after the financial crisis: the case of Germany. Empirica, 42, pp.371-390. https://doi.org/10.1007/s10663-015-9280-8

Gupta, S., Davoodi, H. and Alonso-Terme, R., 2002. Does corruption affect income inequality and poverty? Economics of Governance, 3, pp.23-45. https://doi.org/10.5089/9781451849844.001

Hasan, I., Horvath, R. and Mares, J., 2020. Finance and wealth inequality. Journal of International Money and Finance, 108, pp.1-16. https://doi.org/10.1016/j.jimonfin.2020.102161

Helpman, E., Itskhoki, O., Muendler, M.A. and Redding, S.J., 2016. Trade and inequality: From theory to estimation. Review of Economic Studies, 84(1), pp.357-405. https://doi.org/10.3386/w17991

Kim, D.H., Liu, P. and Lin, S.C., 2025. Nonlinearity in the nexus between financial development and wealth inequality. Journal of International Financial Markets, Institutions and Money, 99, pp.1-22. https://doi.org/10.1016/j.intfin.2025.102117

Kohler, K., Guschanski, A. and Stockhammer, E., 2019. The impact of financialisation on the wage share. Cambridge Journal of Economics, 43(4), pp.937-974. https://doi.org/10.1093/cje/bez021

Kuhn, M., Schularick, M. and Steins, U.I., 2020. Income and wealth inequality in America, 1949-2016. Journal of Political Economy, 128(9), pp.3469-3519. https://doi.org/10.1086/708815

Lai, J.T., Zheng, D. and Zhang, J., 2023. The effect of industrial robots' adoption on urban income inequality in China. Applied Economics Letters, 30(17), pp.2388-2395. https://doi.org/10.1080/13504851.2022.2097176

Lecuna, A., 2020. Income inequality and entrepreneurship. Economic Research, 33(1), pp.2269-2285. https://doi.org/10.1080/1331677X.2019.1663545

Levine, R., 2005. Law, endowments and property rights. Journal of Economic Perspectives, 19(3), pp.61-88. https://doi.org/10.3386/w11502
Lin, K.H. and Tomaskovic-Devey, D., 2013. Financialization and US income inequality, 1970-2008. American Journal of Sociology, 118(5), pp.1284-1329. https://doi.org/10.2139/ssrn.1954129
Matsuyama, K., 2007. Credit traps and credit cycles. American Economic Review, 97(1), pp.503-516. https://doi.org/10.1257/000282807780323587
Murphy, K.M. and Topel, R.H., 2016. Human capital investment, inequality, and economic growth. Journal of Labor Economics, 34(S2), pp.S99-S127. https://doi.org/10.3386/w21841
Parker, S.C., 2004. The Economics of Self-Employment and Entrepreneurship. Cambridge: Cambridge University Press.
Perales-Manrique, J., Molina-Chirinos, J. and Shiguihara-Juárez, P., 2019. A data analytics maturity model for financial sector companies. IEEE SHIRCON, 2019, pp.1-4. https://doi.org/10.1109/shircon48091.2019.9024885
Prettner, K. and Schaefer, A., 2021. The U-shape of income inequality over the 20th century. Scandinavian Journal of Economics, 123(2), pp.645-675. https://doi.org/10.1111/sjoe.12424
Prettner, K. and Strulik, H., 2020. Innovation, automation, and inequality. Journal of Monetary Economics, 116, pp.249-265. https://doi.org/10.4324/9781003463252
Roberts, A. and Kwon, R., 2017. Finance, inequality and varieties of capitalism. Socio-Economic Review, 15(3), pp.511-538. https://doi.org/10.1093/ser/mwx021
Sheng, L., 2014. Income inequality, financial systems, and global imbalances. Global Policy, 5(3), pp.311-320. https://doi.org/10.1111/1758-5899.12126
Sidek, N.Z.M., 2021. Do government expenditure reduce income inequality. Studies in Economics and Finance, 38(2), pp.447-503. https://doi.org/10.1108/sef-09-2020-0393
Smith, J.P., 2001. Why is wealth inequality rising? In: F. Welch, eds. Causes and Consequences of Increasing Inequality. Chicago: University of Chicago Press, pp.83-116.
Smith, S.J. et al., 2022. Housing and economic inequality in the long run. Economy and Society, 51(2), pp.161-186. https://doi.org/10.1002/soej.12520
Solt, F., 2010. Does economic inequality depress electoral participation? Political Behavior, 32, pp.285-301. https://doi.org/10.1007/s11109-010-9106-0
Sturm, J.E. et al., 2024. Central bank independence, income inequality and poverty. Journal of Economic Inequality, pp.1-20. https://doi.org/10.1007/s10888-024-09637-6
Tan, H.B. and Law, S.H., 2012. Nonlinear dynamics of the finance-inequality nexus. Journal of Economic Inequality, 10, pp.551-563. https://doi.org/10.3390/su11010191
Van Reenen, J., 2011. Wage inequality, technology and trade. Labour Economics, 18(6), pp.730-741. https://doi.org/10.3386/w5110
Wen, Z. and Ye, B., 2014. Different methods for testing moderated mediation models. Acta Psychologica Sinica, 46(5), pp.714-726. https://doi.org/10.3724/sp.j.1041.2014.00714
Wenglinsky, H., 1998. Finance equalization and within-school equity. Educational Evaluation and Policy Analysis, 20(4), pp.269-283. https://doi.org/10.3102/01623737020004269
Wood, J.D., 2020. Can household debt influence income inequality? British Journal of Politics and International Relations, 22(1), pp.24-46. https://doi.org/10.1177/1369148119888830
Yang, X. and Zhou, P., 2022. Wealth inequality and social mobility. Journal of Economic Behavior & Organization, 196, pp.307-329. https://doi.org/10.1016/j.jebo.2022.02.012
Zhang, R. and Naceur, S.B., 2019. Financial development, inequality, and poverty. International Review of Economics & Finance, 61, pp.1-16. https://doi.org/10.1016/j.iref.2018.12.015
Zucman, G., 2013. The missing wealth of nations. Quarterly Journal of Economics, 128(3), pp.1321-1364. https://doi.org/10.1093/qje/qjt012

Appendix 1. Data description

Variable	Notation	Definition	Source	Mean	Std. dev.	Min.	Max.
Redistribution	red	Difference between values of Gini index before and after taxes	SWIID	3.80376	2.418194	2.7	3.9
GDP per cap growth	GDP	Change in GDP per capita from one year to another	WBD	10.15063	0.3413101	9.091293	10.88844
domestic credit to the private sector in natural log	credit	domestic credit to the private sector as % of GDP)		4.136039	0.5440764	2.077839	4.95306
trade openness in natural log	trade	share of exports plus imports as % of GDP		4.668487	0.3159417	3.735326	5.401636
general government final consumption expenditure (constant 2015 US$) in natural log	gov	expenditures for goods and services bought		3.188606	0.0628421	3.046455	3.309574
control of corruption	corruption	Measure of governance quality		0.9851478	0.3513793	0.2780665	1.920354
Education in natural log	edu	educational attainment at least completed upper secondary, population 25+, total %		3.964313	0.383304	2.882602	4.50563
Inflation in natural log	Inflation	Annual percentage modification in consumer price index		1.204462	1.640472	-3.925531	5.993619
Self-employment in natural log	self-employment	Self-employment (% of employment)		2.801444	0.2192919	2.268119	3.260172
Top 1% income share	Top 1% income	percentage of total income held by the richest 1% of the population	WID	0.1049693	0.0246344	0.052	0.1863
Top 1% wealth share	Top 1% wealth	percentage of total wealth held by the wealthiest 10% of the population		0.2293498	0.0490597	0.12106	0.3404
Top 10% income share	Top 10% income	percentage of total income held by the richest 10% of the population		0.3368099	0.0385313	0.24556	0.4411
Top 10% wealth share	Top 10% wealth	percentage of total wealth held by the wealthiest 1% of the population		0.5709724	0.0585403	0.41866	0.7019

Bottom 50% income share	Bottom 50% income	percentage of total income held by the least richly 50% of the population		0.2098884	0.0314499	0.0810667	0.29986
Bottom 50% wealth share	Bottom 50% wealth	percentage of total wealth held by the least wealthy 50% of the population		0.0470289	0.0332613	-0.04322	0.1333
Financial Development Index	fdi	It shows evolution and expansion of a country's financial system.	FDID	0.5057182	0.2030127	0.0356827	0.8706997
Financial Institutions Access Index	access	ease with which individuals and businesses can use financial services		0.6004376	0.2403578	0.063509	1
Financial Institutions Depth Index	depth	size and liquidity of financial markets and institutions		0.4504486	0.2489368	0.0186129	1
Financial Institutions Efficiency Index	efficiency	how effectively financial institutions and markets operate		0.5541789	0.1020458	0.0654931	0.8021045
Financial Institutions Index	institutions	the development of financial institutions		0.6040519	0.1850002	0.0617105	0.9559934
Financial Markets Access Index	market access	how easily participants can access financial markets		0.3870228	0.288905	0.0030182	1
Financial Markets Depth Index	market depth	the size and liquidity of financial markets		0.3505086	0.2888658	0.0021	0.9572059
Financial Markets Efficiency Index	markets efficiency	how efficiently financial markets function		0.4155871	0.3585609	0	1
Financial Markets Index	markets index	development of financial markets, such as stock and bond markets		0.388271	0.2479078	0.0082554	0.8685237

Note: World Inequality Database: WID; Financial Development Index Database: FDID; Standardized World Income Inequality Database: SWID; World Bank Database: WBD.

Appendix 2: Correlation matrix and VIF

	inflat~n	gdp	edu	trade	credit	corrup~n	self_e~d
inflation	1.0000						
gdp	-0.4990	1.0000					
edu	-0.6608	0.5771	1.0000				
trade	-0.3093	0.5165	0.2958	1.0000			
credit	-0.5022	0.4703	0.7027	0.3395	1.0000		
corruption	-0.0674	0.5843	0.1978	-0.1546	0.1643	1.0000	
self_emplo~d	0.2949	-0.6653	-0.4187	-0.3526	-0.4192	-0.5951	1.0000
red	-0.2764	0.1317	0.2405	0.1855	0.0210	-0.3233	0.2239
gov	-0.0729	0.0666	0.0279	-0.0179	0.0581	0.1205	-0.0455
fdi	-0.0473	0.0087	0.0826	0.0490	0.1625	-0.0010	0.0305
access	-0.1857	0.0350	0.1782	0.0136	0.2723	0.0112	0.0242
depth	0.0116	0.0132	0.0154	0.0587	0.0761	-0.0446	0.0153
efficiency	-0.0060	-0.0163	0.0588	0.0888	-0.0371	-0.1015	-0.0141
institutions	-0.0977	0.0246	0.1160	0.0531	0.1906	-0.0349	0.0204
market_acc~s	-0.0701	-0.0324	0.0116	0.0202	0.1513	0.0113	0.0315
market_depth	-0.0210	0.0469	0.0883	0.0718	0.1365	0.0061	0.0072
markets_ef~y	0.0701	-0.0286	0.0059	-0.0002	0.0043	0.0370	0.0416
markets_in~x	0.0032	-0.0072	0.0416	0.0379	0.1187	0.0236	0.0337

	red	gov	fdi	access	depth	effici~y	instit~s
red	1.0000						
gov	-0.0497	1.0000					
fdi	-0.0871	-0.0089	1.0000				
access	0.0127	0.1254	0.5839	1.0000			
depth	-0.1147	0.0117	0.8502	0.3121	1.0000		
efficiency	-0.0840	0.0433	0.4501	0.2691	0.4280	1.0000	
institutions	-0.0704	0.0846	0.8911	0.7808	0.8237	0.5490	1.0000
market_acc~s	0.0129	0.0341	0.6341	0.3596	0.4624	0.1028	0.4877
market_depth	-0.1184	-0.0400	0.9163	0.3925	0.8038	0.3516	0.7417
markets_ef~y	-0.0863	-0.1575	0.6562	0.1052	0.4884	0.2605	0.3840
markets_in~x	-0.0873	-0.0756	0.9390	0.3516	0.7485	0.3142	0.6817

	market~s	market~h	market~y	market~x
market_acc~s	1.0000			
market_depth	0.5305	1.0000		
markets_ef~y	0.1080	0.6087	1.0000	
markets_in~x	0.6545	0.9184	0.7650	1.0000

Variable	VIF	1/VIF
institutions	5631.88	0.000178
depth	1816.28	0.000551
fdi	1710.55	0.000585
access	1639.25	0.000610
markets_in~x	649.91	0.001539
efficiency	116.40	0.008591
market_depth	9.17	0.109071
markets_ef~y	3.12	0.320976

Variable	VIF	1/VIF
gdp	3.65	0.274056
corruption	3.07	0.325698
trade	2.13	0.470447
edu	1.53	0.652056
red	1.41	0.709150
credit	1.39	0.721790
inflation	1.14	0.873465

Appendix 3: The results of preliminary tests

Variable	Pesaran's CADF test	Pesaran's CADF test (data in level)
red	-3.475***	6.78***
GDP	-1.45	9.12***
credit	-3.857***	4.35***
trade	-1.47	7.89***
gov	38.94***	9.92***
corruption		3.87***
edu	-1.76*	8.54***
Inflation	-1.15	6.23***
Self-employment		4.98***
Top 1% income	14.47***	7.15***
Top 1% wealth	11.10***	9.50***
Top 10% income	11.99***	5.29***
Top 10% wealth	2.88***	8.11***
Bottom 50% income	11.21***	3.65***
Bottom 50% wealth	4.09***	7.58***
fdi	3.37***	6.94***
access	4.23***	4.10***
depth	3.26***	8.83***
efficiency	1.73*	5.97***
institutions	0.66	6.99***
market access	6.97***	7.72***
market depth	3.02***	6.15***
markets efficiency	12.72***	4.77***
markets index	6.48***	8.11***

*Source: own calculations in Stata 15. Note: p-values in brackets; * suggests significance at 10% level, ** shows significance at 5% level, *** indicates significance at 1% level.*

Westerlund test

Variable	Top 1% income income	Top 1% wealth	Top 10% income	Top 10% wealth	Bottom 50%	Bottom 50% wealth
GDP and fdi	2.55 (0.138)	2.64 (0.212)	-5.85 (0.43)	-6.03 (0.57)	-4.85 (0.21)	-5.06 (0.32)

Source: own calculations in Stata 15. Note: p-values in brackets