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THE IMPACT OF FINANCIAL DEVELOPMENT AND FINANCIAL INCLUSION ON INCOME INEQUALITY: EVIDENCE FROM OECD COUNTRIES

Fatos Geci, Valentin Toçi

Abstract

This study examines the relationships between financial sector development, financial inclusion, and income inequality in OECD countries by utilizing panel data from 38 countries for the period 2010-2022. The impact of financial sector development and financial inclusion on Gini coefficient is examined, while applying fixed effects, random effects and GMM modeling. The results suggest that financial inclusion is associated with lower income inequality, while the effect of financial development, proxied by private sector credit, is positive but not statistically robust. We find that financial development, measured by private-sector credit, is associated with higher income inequality — a pattern consistent with credit concentration in favor of higher-income groups — whereas financial inclusion is associated with lower inequality, through channels of broadened access to savings, credit, and risk-management. This study adds value to the existing literature by providing new empirical evidence on the dynamic interplay between financial and real sectors.

Keywords: *Financial Development, Financial Inclusion, Inequality, OECD countries*

JEL CODES*: G10, G21, O16, D31*

1. Introduction

The significance of financial development and access to financial resources as determinants of economic and social processes, especially related to income inequality, should not be overlooked. The financial system through institutions, markets, and instruments can enable economic growth, job creation, and financial inclusion, all of which suggest reducing the income inequality (Kim, Daekyun and Lin 2011). Financial development has dual effects as it can also elevate inequality if the benefits are limited to a small group that receives the resources and privileged information (Bonini and Capizzi 2019). Financial inclusion is a measure of equitable access to financial services, and it plays a central role of boosting a sustainable and inclusive financial system, particularly for the middle class (Ozili 2021).

Fatos Geci
PhD candidate
Faculty of Economics, University of Prishtina
Kosovo
E-mail: fatos.geci1@student.uni-pr.edu
ORCID: 0000-0002-2468-6647

Valentin Toçi (corresponding author)
Professor of Banking and Finance
Faculty of Economics, University of Prishtina
Rr. "Agim Ramadani", 10000 Prishtinë
Kosovo
E-mail: valentin.toci@uni-pr.edu
ORCID: 0000-0003-1062-918X

In this study, we use two key indicators related to financial development: private sector lending and financial inclusion. Private sector lending measures the total value of loans granted by financial institutions to individuals and private businesses, expressed as a percentage of GDP. This indicator shows the intensity of financing of the real sector of the economy and reflects the level of lending activity that can affect economic growth and potentially the distribution of income. However, a high level of lending does not necessarily imply broad financial inclusion, as credit may be concentrated in higher-income groups, thus deepening inequalities. Financial inclusion is an indicator that measures the level of access to, and use of, financial services by all segments of society, including the most disadvantaged groups. An inclusive financial system aims to provide equal opportunities for participation in financial activities, by reducing barriers to access and increasing the capacity of individuals and businesses to benefit from formal finance.

This study responds to existing gaps in the academic literature by providing empirical evidence on the interconnection between financial development, financial inclusion, and income inequality in OECD countries, a relationship that has rarely been explored jointly. Previous studies tend to analyze these dimensions separately—focusing either on financial development's effect on growth, or on financial inclusion's role in reducing income inequality—without integrating them into a single framework. By employing advanced econometric techniques on cross-country panel data, this study offers a comprehensive assessment of how financial development and inclusion interact to shape income inequality dynamics, thereby filling a critical gap and generating insights with direct implications for both economic and social policy design.

Financial development and access to financial resources are fundamental aspects of economic structures with substantial implications on income income inequality in OECD countries. In these countries there has been the highest income inequality in the last 50 years and the income gap between the 10 percent of the richest versus the 10 percent of the poorest has grown to approximately nine times, whereas in the last 25 years has grown seven times (OECD 2019). While there have been reductions in inequality in some countries (Turkey, Chile and Mexico), the income gap remains substantial, as in Chile and Mexico the richest 20% of the population earn more than 25 times the income of the poorest 20%. International data suggests that while developed nations have an average level of financial development of 70.54% and access to financial services of 90.84%, moderately developed nations were at only 60.43% and 48.80%, respectively. This may indicate a possible correlation between financial development, access to finance and inequality (OECD 2023).

Therefore, important research questions that emanate in this context are: (i) what is the impact of financial development on reducing inequality; (ii) what impact does financial inclusion have on inequality; and (iii) what are the possible policies that can be used to reduce inequality?

While our empirical sample is restricted to OECD member countries (38 countries, 2010–2022) and thus represents largely high or upper-middle income economies, the mechanisms we study — the interaction between private-sector lending, financial inclusion and inequality — may operate differently in transitional economies. We therefore highlight policy transferability with caution: countries with weaker institutions or underdeveloped financial infrastructures will require complementary institutional reforms (e.g., strengthening property rights, improving regulatory capacity, targeted inclusion programs) before the same financial-inclusion policies yield equivalent distributional outcomes

This paper is structured as follows. Section 2 summarizes theoretical mechanisms and prior evidence; Section 3 describes data, methods and model specifications; Section 4 reports results (main, alternative and sensitivity analyses); Section 5 discusses policy implications, limitations and directions for future research.

2. Literature review

2.1. Financial development and inequality

A great deal of research has focused on the complex relationships between financial development and income distribution. Some studies have demonstrated that financial development influences inequality, e.g. Beck et al. (2004), among others. They show that financial development does not affect inequality in a uniform way across countries. Instead, the relationship depends on country-specific factors—such as institutional quality, economic structure, and policies—as well as on the time period considered. In some contexts, financial development can reduce inequality by improving access to credit and investment opportunities, while in others it can increase inequality if the benefits are captured mainly by wealthier segments of the population. Utilizing empirical research from a

variety of countries, the research considers these relationships and investigates the areas of theory that inform the mechanisms through which financial development affects income distribution and welfare. Beck et al. (2004) note that many emerging market economies and developing countries have seen substantial financial sector growth in the last few decades, which generates interest in practice and reasons understanding of how financial development affects inequality, structure, and poverty. Tabash et al. (2023) suggest that financial development promotes access to financial services for the poorest segments of society and leads to increased equitable income distribution. Similarly, Anakpo et al. (2023) argue that a well-developed financial sector expands access to financial services for individuals and small businesses—particularly those with low income—thereby promoting a more equitable distribution of income by enabling broader participation in economic activities. For example, low-income people need access to banking sector and opportunities for obtaining credit, and they can use it to invest into education or entrepreneurship which gives them a better chance to increase income. The new opportunities from finance can enable small business creation, which can be significant to different components of society to improve their economic situation.

Reducing transaction costs also involves increased interaction. A more sophisticated financial system can gain more economic efficiency, reducing the cost of financial interactions between the parties. This enables low-income groups better access to financial markets, reduces the cost of credit for investment in new ventures and encourages a more equitable distribution of financial resources, which contributes to reducing income inequality. The capital markets, and improved financial system we witness today, have traditionally improved economic welfare. Beck et al. emphasize that this change will not occur without the appropriate policies and strong financial institutions. In an environment devoid of appropriate policies and regulations, a developed financial sector may exacerbate inequality by benefiting wealthier groups with better access to financial actors. This demonstrates the need to create effective institutions to structure the consequences of financial development.

Institutional and policy considerations play an important role in shaping the extent to which financial development will impact on the process of reducing income inequality. These elements affect access, the distribution and utilization of financial services while also determine the potential of such uses to enhance the economic conditions of the poor. For instance, financial institutions with transparent and inclusive policies—such as fair lending practices, reduced collateral requirements, targeted microfinance programs, and non-discriminatory client selection—can profitably engage with vulnerable groups by providing credit and other financial services. However, without strong institutions and regulatory oversight, the financial system often channels its benefits primarily to the elite and wealthiest groups, leaving marginal and low-income populations excluded or disadvantaged (Tabash, Anasgreh and Adeosun 2023).

Government policies are an essential variable in determining the reach of financial development. Rule of law, subsidizing loans to small enterprises or incentivizing banks to expand services in rural and poor areas can lower the cost of borrowing, reduce collateral requirements, and physically extend financial infrastructure—thereby enabling low-income individuals to access credit and other financial services. In contrast, policies that favor the large private sector or large financial institutions can lead to credit concentration, regulatory advantages, and preferential interest rates for big borrowers, which crowd out smaller firms and marginalized groups, effectively limiting their access to finance.

The regulation of financial markets is another important aspect, as it aims to ameliorate benefits from financial development by helping financing to be fair and transparent. Regulations that increase transparency of financial activity, protecting consumer rights while restricting harmful practices like excessive speculation or irresponsible lending, create an opportunity to create a stable and inclusive financial system. Without regulation, financial systems will repeat cycles of unnecessary excessive debt that harm individuals and businesses that have little to no experience with financial risk management (Mbodj and Laye 2025). Another important consideration is how financial policies and regulations and institutions are put in place. If financial regulations and institutions are designed in ways that primarily benefit a small segment of the population—such as setting high collateral requirements, granting preferential interest rates or credit terms to large corporations, or allowing market entry barriers that limit competition—financial development can end up deepening income inequality (Anakpo, Xhate and Mishi 2023). Such frameworks channel the majority of financial resources toward already wealthy or politically connected groups, leaving small businesses and low-income households excluded from meaningful participation in the financial system. Conversely, if institutions are inclusive—by enforcing fair lending practices, expanding credit infrastructure into underserved areas, supporting microfinance initiatives, and promoting

transparent eligibility criteria—financial development can broaden access to capital and thereby reduce income inequality (Ashley and Parmeter 2020).

The administrative inability of a country to administer and manage financial policies, limits the impact of financial development. Often in situations where countries lack institutions and political corruption exists, financial development often attracts a net benefit that attracts to a narrower group. For financial development to reduce income inequality and poverty, institutions and policies need to create an opportunity for benefits of financial development to be more fairly distributed (Oanh 2023). Improved access to financial services is closely linked to greater investment in education, technology, entrepreneurship and other productive endeavors. Such enabling factors provide individuals and businesses with the capital needed to expand their activities, which in turn stimulates economic growth and contributes to reducing income inequality.

Microfinance programs have shown positive outcomes in several developing countries, with evidence that poor households gaining access to microloans are able to increase their incomes and improve their living standards, in some cases moving out of poverty (Suhrab, Chen and Ullah 2024). By contrast, in developing countries where financial infrastructure systems are weakly developed and weak or failing political systems, the efficiencies and outcomes produced by financial development may end up faster to a lower share of a broader population and serves further to deepen income inequality (Atadouanla et al. 2024).

A striking global example is the 2008 financial crisis, which exposed the risks of an insufficiently regulated financial sector and its deep implications for income inequality. While financial development had supported economic growth throughout the late 20th century, the distribution of these benefits was highly uneven. Many individuals and households were left vulnerable to the crisis, largely due to systemic reliance on capital-driven growth models (Quoc, Quoc and Van 2025).

A key theoretical contribution is provided by Greenwood and Jovanovic (1990), who propose a non-linear relationship: financial development initially benefits wealthier groups, as they are better positioned to utilize emerging financial services, thereby increasing income inequality in the early stages of development. However, as financial systems mature and access broadens, financial development can eventually reduce income inequality by providing opportunities to a wider segment of society. In early stages, financial development may amplify income inequality by favoring wealthier actors, while over time—and in the presence of inclusive policies—it may reduce income inequality by expanding access to finance, enabling investment in education and entrepreneurship, and fostering more equitable income distribution.

2.2. Financial inclusion and income inequality

Access to finance is instrumental in determining the degree of income inequality in societies (Kahn 2018). Access to financial services such as credit, savings, and insurance may assist individuals and households in changing their economic conditions, investing in education and training, thus further augmenting their productive capabilities (Xu, Asideu and Effah 2023). The lack of access to finance quite often drives inequalities further and leads to a vicious cycle of poverty that can be difficult for the poor to escape (Farahani and Ghasemi 2024). Without access to financial services such as credit, the poor often have limited opportunities to invest in education and vocational training which are essential for enhancing potential earnings.

Without access to credit, disadvantaged groups face structural barriers that limit their ability to start or expand small businesses, which in turn deepens income inequality. In the absence of formal financing, these groups are pushed toward informal funding sources that charge disproportionately high fees and impose unregulated lending conditions. Such arrangements often dictate repayment terms through value chain control, perpetuating cycles of disadvantage and widening the gap between the economically included and the excluded. Lack of access to insurance or other risk-management financial services leaves them more vulnerable to economic or health shocks, further reinforcing income inequality. An unforeseen crisis—such as illness or sudden income loss—does not only cause financial hardship but also entrenches systemic disparities, reducing any realistic opportunity to achieve upward mobility. This dynamic fuels a vicious circle where marginalized populations remain excluded from meaningful economic participation, thereby sustaining and amplifying income inequality (Ipinnaiye and Olaniyan 2023).

The poor often do not have enough assets to provide as collateral, which worsens their ability to access traditional credit (Ouma, Odongo and Were 2017). In addition, financial information and education are more prevalent in wealthier groups of society and because of this, they have made themselves more aware of financial opportunities, and investments they can make. They also have experts available, more knowledge of the markets and better facilitation to make educated choices. Consequently, they benefit from

financial services and products and grow their wealth and assets (Karakurum-Ozdemir, Kokkizil and Uysal 2019).

The financial system is often structured in a way that privileges wealthier groups of society (Kahn 2018). Financial institutions mainly target their products and services to individuals perceived as lower risk because they have a superior credit profile, stable income, and accumulated wealth. These characteristics reduce the likelihood of default, making lending to wealthier clients more profitable and less risky for banks. Additionally, wealthier individuals often possess collateral and financial literacy, which further lowers the perceived lending risk. On the other hand, poorer groups frequently lack formal credit histories, steady incomes and collateral, making them riskier borrowers. Due to this higher risk perception and regulatory pressures to maintain financial stability, banks tend to exclude poorer groups from accessing financial services. This dynamic reinforces existing inequalities by limiting the financial inclusion of disadvantaged populations (Kahn 2018).

Important aspect is also financial literacy, indicating that individuals with a high degree of financial literacy have better interaction with financial services and more likely to acquire economic opportunities because of their financial literacy skills. If financial literacy is improved, it offers the capacity and agency of access to finance with greater knowledge, education and skills that can contribute towards income inequality reduction. Galor and Zeira (1993) emphasize that access to finance directly affects human capital accumulation, arguing that when credit markets are imperfect, individuals from poorer backgrounds face constraints that prevent them from investing in education, perpetuating income inequality across generations.

While financial inclusion can create less income inequality in society by providing opportunities to access finance for investments and economic development for all members, lack of such access can tend to make the gap wider between rich and poor. Policies that promote financial inclusion, access to microfinance and financial literacy are needed for better access and distribution of financial opportunities and less income inequality (Ouechtati 2023).

There is growing recognition that financial inclusion—particularly when supported by appropriate regulation—can make the distributional outcomes of financial development more equitable. According to **Bell (2019),** a well-functioning financial sector has the potential to create new channels of access to credit and financial services that directly support inclusive growth. However, to achieve this, financial systems must be complemented by protective policies that prevent the concentration of benefits among elites. In line with this perspective, **Deng (2022)** underline the importance of consumer protection and regulatory oversight in ensuring that financial services are accessible, transparent, and supportive of equitable outcomes.

2.3. Theoretical and empirical mechanisms

Financial development influences income inequality through multiple, and sometimes opposing, theoretical channels. One prominent mechanism is the access channel, according to which the expansion of financial services enables households and firms to overcome credit constraints. By improving access to savings, credit, and payment services, financial development facilitates investments in human capital, small-scale entrepreneurship, and productive activities, particularly among lower-income groups. This mechanism suggests a reduction in income inequality as financial systems become more inclusive and accessible (Greenwood and Jovanovic 1990; Beck, Thorsten and Levine 2004).

In contrast, the concentration channel emphasizes that financial development may initially benefit wealthier individuals and larger firms that already possess collateral, financial literacy, and political connections. Under conditions of imperfect information and weak regulation, credit allocation may become concentrated among higher-income groups, leading to an increase in income inequality. Empirical studies have shown that, in such contexts, financial deepening can reinforce existing disparities rather than alleviate them (Greenwood and Jovanovic 1990; Beck, Thorsten and Levine 2004).

Financial inclusion plays a distinct role by focusing explicitly on the breadth of access to financial services. Unlike traditional measures of financial development that capture financial depth, financial inclusion emphasizes the ability of households and small firms to participate in the formal financial system. Greater inclusion can reduce income inequality by promoting savings, risk-sharing, and income smoothing, thereby enhancing economic resilience among vulnerable groups (Demirgüç-Kunt, Martinez and Tressel 2022).

Relationship between financial development, financial inclusion, and income inequality is strongly conditioned by institutional quality. Effective rule of law, political stability, and secure property rights influence whether financial expansion translates into

Table 1. Summary of theoretical and empirical literature

Study / Authors	Period / Sample	Financial Development Proxy	Financial Inclusion Proxy	Main Finding on income Inequality	Key Controls / Channels
Greenwood and Jovanovic (1990)	Theoretical	Financial depth / intermediation	—	Inverted U-shape: initially increases, later reduces	Economic growth stages
Galor and Zeira (1993)	Theoretical	Credit market imperfections	Access to credit for human capital	Imperfect credit → persistent intergenerational inequality	Human capital investment, education
Beck et al. (2004)	Global (many countries)	Private credit / GDP	—	Non-linear; depends on institutions; often no uniform effect	Growth, institutional quality
Beck et al. (various follow-ups)	Cross-country panels	Domestic credit to private sector	—	Financial development can reduce inequality if inclusive	Institutions, policies
Demirgüç-Kunt and Levine (2009) / Demirgüç-Kunt et al. (2018)	Global (Findex data)	—	Account ownership, usage of formal services	Reduces inequality through access channels	Education, gender, income quintiles
Tabash et al. (2023)	Sub-Saharan Africa	Broad money, credit to private sector	—	Promotes equitable distribution when inclusive	Institutions, policy environment
Anakpo et al. (2023)	Developing economies	Financial sector depth	Digital financial inclusion	Reduces inequality if policies target low-income groups	Institutional quality, digital infrastructure
Ouechtati (2023)	Cross-country	Financial depth indicators	Financial inclusion index	Inclusion reduces inequality; interacts with institutions	Institutional quality, rule of law
Xu et al. (2023)	Africa	—	Inclusive finance (gender focus)	Reduces gender and income inequality	Gender, sustainable growth factors

broad-based access or remains concentrated among elites. Moreover, theoretical models suggest a non-linear dynamic, whereby financial development may initially increase income inequality but reduce it at more advanced stages as access becomes more widespread and institutions strengthen (Greenwood and Jovanovic 1990). This perspective motivates the empirical strategy of distinguishing between financial depth and financial inclusion and examining their respective roles in shaping income inequality dynamics.

Recent studies continue to document the complex and context-dependent relationship between financial development, financial inclusion, and income inequality. Using a broad cross-country panel, Sahay et al. (2020) show that financial inclusion can contribute to more inclusive growth and lower inequality, but only up to a certain threshold, beyond which weak regulation and excessive credit expansion may reverse these gains. Similarly, Demirgüç-Kunt, Martinez Peria, and Tressel (2022) provide evidence that inclusive financial systems enhance household welfare and resilience, particularly during economic shocks, while emphasizing the role of institutional quality and consumer protection frameworks. Manta et al. (2023) find that financial development alone does not guarantee equitable outcomes; instead, its distributional effects critically depend on institutional strength and the degree to which financial access is broadened beyond high-income groups.

3. Methodology and data

The methodology used to conduct this analysis is panel data regression, covering 38 OECD countries for the period 2010–2022. This period was deliberately selected as it captures the aftermath of the 2008 global financial crisis, the policy and financial sector reforms that followed, as well as the economic disruptions caused by the COVID-19 pandemic and the initial effects of the war in Ukraine. Together, these events provide a unique context for examining how financial development and financial inclusion influence income inequality under conditions of heightened economic and social vulnerability. In panel data, standard models that are applied are fixed effects models (FE) and random effects models (RE). The Generalized Method of Moments (GMM) model was also applied to address the endogeneity problem (Gospodinov and Otsu 2012; Efendic and Pugh 2015). In addition, GMM is particularly suitable in situations where there is heteroscedasticity or autocorrelation in the residuals. Another reason for using GMM is when models include independent variables that are correlated with error terms. In these cases, GMM uses instruments to overcome the endogeneity problem and provide more accurate results. The GMM method is particularly useful for panel data analyses, as it can handle unobserved variables that vary across countries, using appropriate instruments to minimize endogeneity problem. This method helps ensure unbiased and efficient estimates, especially when there is correlation between independent variables and error terms (Kiviet, Pleus and Pildermans 2017).

In our empirical analysis we use the system GMM estimator (Arellano and Bover 1995; Blundell and Bond 1998), which combines the levels equation and the first-differenced equation to increase efficiency, especially when the lagged dependent variable is very persistent (as is the case with the Gini coefficient). This choice is preferred over the difference GMM (Arellano and Bond 1991) because our panel has a relatively small T (13 years) and a moderate N (38 countries).

Two models are used for the empirical analysis:

$$GiniCoef = \alpha + \beta 1(KSP) + \beta 2(ISF) + \beta 3(INF) + \beta 4(STABP) + \beta 5(SHQ) + \beta 6(ROL) + \beta 7(EDU) + \beta 8(ITF) + \mu \quad (1)$$

$$GiniCoef = \alpha + \beta 1(PF) + \beta 2(ISF) + \beta 3(INF) + \beta 4(STABP) + \beta 5(SHQ) + \beta 6(ROL) + \beta 7(EDU) \cdot \beta 8(ITF) + \mu \quad (2)$$

This research uses two models to analyze the impact of financial development and financial inclusion on income inequality, expressed through the Gini coefficient (GiniCoef). The first model (Equation 1) includes private sector credit (FD) as an indicator of financial development, while the second model (Equation 2) replaces PSC with financial inclusion (FI) to estimate the impact of access to financial services. Both models include independent variables such as the financial stability index (FSI), inflation rate (INF), government spending (GSE), political stability (STABP), rule of law (ROL), education (EDU) and technological/financial innovation (TFI), as control variables. The error term (μ) represents unobserved effects.

In the first specification (Equation 1), financial development is proxied by private sector credit as a percentage of GDP (FD), a widely used indicator capturing the depth of the financial system and the extent of credit intermediation (Beck, Thorsten and Levine 2004). The second specification (Equation 2) replaces this variable with a financial inclusion index (FI), which reflects the degree of access to and usage of formal financial services by households and firms. By estimating these models separately, we are able to assess whether income inequality responds differently to financial deepening and to broader access to financial services.

In addition to the baseline specifications, we estimate a combined model that includes both private sector credit (FD) and financial inclusion (FI) simultaneously. This specification allows for a direct comparison of financial deepening and access-based financial development, enabling an assessment of whether a development–inclusion trade-off exists when both dimensions are considered jointly.

In line with the existing literature, the model includes a comprehensive set of institutional, economic, and structural control variables to isolate the effects of financial development and inclusion on income inequality. Political stability (STABP) accounts for how political uncertainty can worsen income inequality by discouraging investment and distorting resource allocation. Rule of law (ROL) captures the quality of legal institutions and property rights protection, determining whether financial progress benefits the broader population or remains concentrated among elites. Education (EDU) serves as a proxy for human capital, which boosts productivity and reduces income inequality through higher earnings potential. Inflation (INF) is included due to its regressive impact, disproportionately eroding the real income of poorer households (Easterly, Fischer and Fischer 2001). Government expenditure (GEXP) reflects fiscal policy's redistributive potential, which can either mitigate or exacerbate

Table 2. Description of variables

Variable	Abbreviations	Role	Unit	Description	Source
Gini Coefficient	Gini Coef	Dependent variable	Index (0-100)	A measure of economic equality that shows the distribution of income within a population	EuroStat
Private sector lending	FD	Key explanatory	% of GDP	The value of total loans granted by financial institutions to individuals and private businesses	World Bank
Financial Inclusion	FI	Key explanatory	Index (0-100)	The level at which individuals and businesses have access to financial services	The Global Economy
Financial Stability Index	ISF	Economic control	Index (0-100)	A measure of a financial system's capacity to remain stable in the face of economic shocks	The Global Economy
Inflation Rate	INF	Economic control	%	The proportion of the increase in prices of goods and services in an economy	World Bank
Political Stability	STABP	Institutional control	Index (-2.5 – 2.5)	The index measures the political stability of countries	The Global Economy Database
Government Expenditures	SHQ	Policy control	% of GDP	Total government spending on public services, investment, and social welfare	World Bank
Rule of Law	ROL	Institutional control	Index (-2.5 – 2.5)	The index measures the functioning of the law, otherwise known as the Rule of Law index	The Global Economy Database
Education	EDU	Socio-economic control	%	Represents the percentage of the population that has completed secondary education	World Bank
Technological/ Financial Innovations	IFT	Structural control	Index (0-100)	It shows the progress and adoption of innovations in the technology and finance sectors, and is used to analyze the impact of these innovations on economic development and market competition.	The Global Economy Database

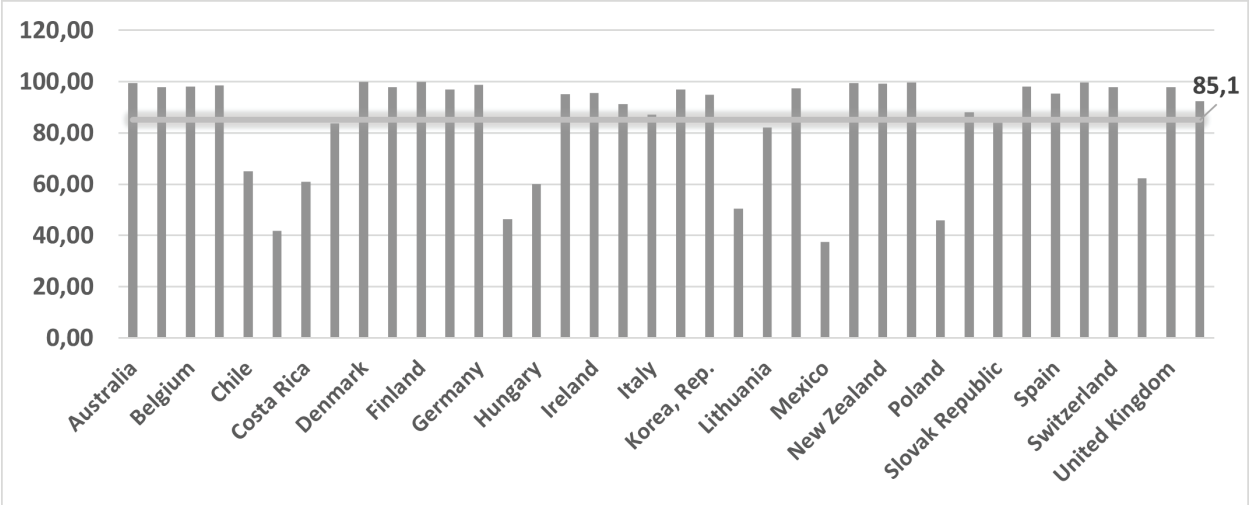
income inequality depending on efficiency and targeting. Financial stability (FSI) addresses how financial crises tend to hit vulnerable groups hardest, widening income inequality (Claessens and Perotti 2007). Finally, technological and financial innovation (TFI) is incorporated to account for structural shifts that alter skill demands, productivity, and market dynamics, often with uneven distributional consequences across income groups (Aghion, Philippe, Blundell and Hémous 2019).

Table 2 offers descriptions of the variables, stating the type, measurement unit, description and data source. The dependent variable, the Gini coefficient, is indexed (0-100), representing the distribution of income across a population and sourced from EuroStat. The independent variables of KSP and PF, represent financial development (% of GDP, World Bank) and access to financial services (index 0-100, sourced from The Global Economy) respectively. Other variables, ISF, STABP, ROL and ITF use indices for measurement, while INF and SHQ are expressed as a % of GDP and EDU is listed as the share of the population with secondary education. Data from sources such as the World Bank and The Global Economy Database provide a foundation for empirical analysis and, the determination of what effects the variables have on income inequality.

Figure 1 highlights significant variation in financial inclusion across OECD countries, measured on a 0 to 100 scale. Nordic countries like Denmark, Sweden, Norway, and Finland score near or above 100, reflecting well-developed financial systems and inclusive policies supporting vulnerable groups. In contrast, Colombia (41.77) and Mexico (37.38) have much lower inclusion levels due to structural challenges such as weak financial infrastructure and high economic informality. Countries like Italy, Portugal, and Slovakia fall near the OECD average of 85.1%, with scores between 84 and 88. Improving inclusion in low-scoring countries requires deep reforms to expand access, especially for low-income and rural populations.

Figure 2 shows significant variation in income inequality across OECD countries, measured by Gini coefficients relative to the average of 33.43. Countries like Belgium, Czech Republic, Iceland, and Slovakia have low income inequality (around 25-27), reflecting effective social and economic policies. In contrast, Chile, Colombia, and Costa Rica exhibit high income inequality (above 45), influenced by factors such as economic structure and access to services. Developed countries like the US and UK also face notable income inequality (41.11 and 34.68), highlighting ongoing challenges. Meanwhile, Norway and Sweden maintain low income inequality levels, likely due to strong social protection programs.

Figure 1. Global financial access data



Source: The Global Economy Data and Report (2023)

Figure 2. Data on income inequality in OECD countries

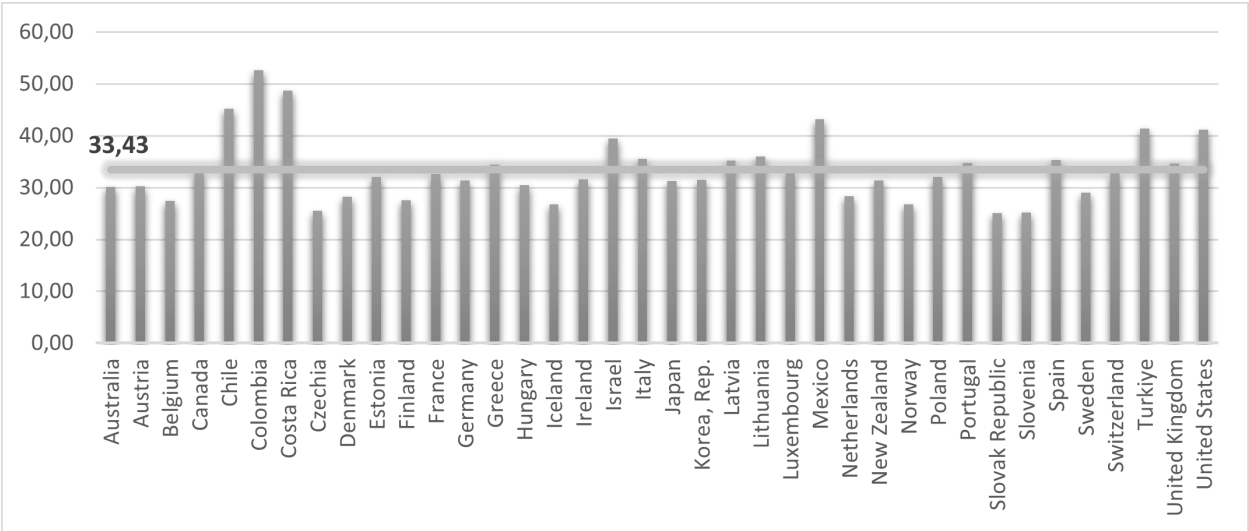


Table 3. Comparison of variables by moderately developed and developed OECD countries

Variable	Moderately Developed			Developed		
	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.
GiniCoef	46	45.887	5.413	448	32.153	4.951
PF	46	48.804	13.83	448	88.828	16.519
ISF	46	60.435	7.302	448	70.545	10.621
INF	46	5.659	4.569	447	1.74	1.467
SHQ	46	3.185	3.427	448	1.962	2.632
KSP	46	44.928	16.781	448	92.105	39.006
STABP	46	-.695	.728	448	.769	.661
ROL	46	-.214	.433	448	1.334	.514
EDU	46	102.321	8.59	448	112.4	15.714
IFT	46	35.541	2.664	448	51.044	7.948

Table 3 highlights clear differences between OECD middle-income and developed countries across key economic and financial indicators. Middle-income countries exhibit significantly higher income inequality (mean Gini 45.88 vs. 32.15), lower financial stability (FSI 60.43 vs. 70.54), and much lower financial inclusion (48.8 vs. 88.8). Inflation is also higher in middle-income countries (5.65% vs. 1.74%), while government spending is greater, reflecting a stronger need for state intervention. Access to private sector credit is much more limited in middle-income countries (44.92% of GDP vs. 92.10%), and political stability is weaker (-0.69 vs. 0.76).

Additional disparities appear in rule of law, education, and innovation levels. Developed countries score higher in rule of law (1.33 vs. -0.21), education investment (112.4 vs. 102.3), and technological/financial innovation (51.0 vs. 35.5). Overall, developed OECD countries outperform middle-income ones on most variables, indicating better economic, political, and social conditions. Meanwhile, middle-income countries face significant challenges such as high income inequality, low financial and political stability, and limited innovation, which may impede their development.

4. Results

The diagnostic tests reported in Appendix A confirm the overall validity of the dynamic panel GMM specifications. Specifically, the Arellano-Bond test for first-order serial correlation in the first-differenced residuals shows AR(1) $p = 0.004$ (significant, as expected by construction due to the differencing process, which induces negative correlation between $\varepsilon_{i,t}$ and $\varepsilon_{i,t-1}$). In contrast, the test for second-order serial correlation yields AR(2) $p = 0.131$ (insignificant at conventional levels, $p > 0.10$), providing no evidence of deeper autocorrelation and thereby validating the use of lagged dependent variables (Gini_{t–1}, Gini_{t–2}, etc.) as instruments. Additionally, the Hansen/Sargan test of over-identifying restrictions returns $p = 0.957$, failing to reject the null hypothesis of instrument exogeneity. These results, combined with the number of instruments kept below the number of cross-sectional units (N = 38), mitigate concerns about instrument proliferation (Roodman 2009) and support the reliability of the two-step system GMM estimates with Windmeijer (2005) correction.

The Sargan test results ($p = 0.957$ for the main model; $p = 0.707$ for the financial access model) further confirm the validity of the instruments, as the null hypothesis of over-identifying restrictions is not rejected. This implies that the instruments are both relevant and exogenous. Although the Hausman test results ($p = 0.055$ in the main model; $p = 0.506$ in the financial access model) suggest that Random Effects could be a possible alternative, the presence of potential endogeneity in explanatory variables—such as feedback effects between financial development, inclusion, and income inequality—supports the use of GMM as the most robust specification. In addition, Appendix 3 shows no multicollinearity issues, with all Variance Inflation Factor (VIF) values below the critical threshold (mean VIF = 1.38), ensuring stable coefficient estimates. Appendix 4 indicates no heteroskedasticity concerns, as the Breusch-Pagan/Cook-Weisberg test ($p = 0.8750$) fails to reject the null of constant error variance. Together, these diagnostics confirm that the GMM framework is well-suited for analyzing the dynamic relationship between financial development, financial inclusion, and income inequality across OECD countries.

Table 4 presents the results of the GMM models, which analyze the impact of the main variables on the Gini coefficient as an indicator of income inequality in OECD countries. Model 1 represents the financial development model, in which private sector credit to GDP is used as a proxy for financial depth. Model 2 represents the financial inclusion model, where financial inclusion captures the extent of access to and usage of formal financial services. Although both specifications share the same set of control variables, they capture different dimensions of the financial system and therefore yield partially different coefficient patterns.

In the model 1, the financial stability index (FSI) has a negative and statistically significant effect with a coefficient of -0.31. This shows that more stable financial systems are associated with lower levels of income inequality, confirming the findings of Claessens and Perotti (2007), who highlight that financial stability is essential for a fairer distribution of income in society.

In the financial inclusion model, the financial stability index has a positive and statistically significant effect (+0.501, t=2.25), suggesting that in some cases financial stability may primarily benefit the wealthiest groups, thus leading to increased income inequality, as suggested in the "financial curve" theory by Greenwood and Jovanovic (1990).

Private sector credit (PSC) in the financial development model has a positive but non-significant coefficient (0.163, t=1.61), indicating that the overall level of credit is not a major factor in changes in income inequality within these countries. On the other hand, financial inclusion (FI) has a negative and significant effect on income inequality (-0.0654, t=-3.58), indicating that wider access to financial services contributes to reducing the income gap, in line with the literature of Demirgüç-Kunt and Levine (2009).

Control variables are also key in understanding the dynamics of income inequality. Political stability (STABP) has a negative and significant effect on the

Table 4. Summary results of regressions on financial development, financial inclusion and income inequality

Variable	FE	RE	GMM	FE	RE	GMM
	Financial Development			Financial Inclusion		
FD	0.00559 (0.83)	0.993* (2.18)	0.163 (1.61)	–	–	–
FI	–	–	–	-0.994 (-0.84)	-0.230* (-2.01)	-0.0654*** (-3.58)
ISF	0.027 (1.08)	-0.411*** (-3.27)	-0.31*** (-2.9)	0.355 (0.23)	0.124 (0.08)	0.501** (2.25)
INF	0.0553 (0.51)	0.0199 (0.53)	0.0339** (2.24)	0.056 (0.95)	0.411 (1.08)	-0.165 (-0.82)
STABP	-2.884*** (-7.65)	-0.134 (-1.04)	-0.765** (-2.25)	-0.0757 (-0.59)	-0.136 (-1.05)	4.41** (2.48)
SHQ	0.221** (2.69)	0.0032 (0.13)	0.247** (2.03)	-0.728 (-0.31)	-0.557 (-0.23)	0.197 (0.97)
ROL	-2.075** (-2.91)	-1.747*** (-3.36)	-0.261** (-2.10)	0.92 (-1.62)	-1.778*** (-3.43)	-3.5 (-0.99)
EDU	-0.0319* (-2.06)	0.014 (1.68)	-0.0278*** (-3.29)	0.185* (2.15)	0.168 (1.95)	-0.068*** (-3.66)
IFT	-0.122** (-2.82)	-0.00227 (-0.13)	0.114 (1.24)	0.00341 (0.20)	-0.00355 (-0.20)	-0.0322** (-2.25)
L.GiniCoef	–	–	0.394* (2.11)	–	–	0.564** (2.41)
_cons	30.98*** (16.86)	33.52*** (-17.44)	-25.04 (-1.54)	32.89*** (16.81)	35.74*** (18.18)	-4.196 (-0.15)
n	493	493	455	493	493	455
R-squared	0.616	0.7622	–	0.640	0.7835	–
Prob>F	0.000	0.004	0.000	0.000	0.0038	0.000

Note: * significant at 10%, ** significant at 5%, *** significant at 1%

financial development model (-0.765, t=-2.25), highlighting that stable political environments contribute to reducing income inequality, a conclusion supported by the studies of Acemoglu and Robinson (2012). However, in the financial inclusion model, the effect of political stability is positive and significant (+4.41, t=2.48), suggesting that in some OECD countries, policies may favor the wealthiest groups, an issue discussed by Piketty (2014).

Rule of law (ROL) is another factor with a negative and significant impact on income inequality in the financial development model, indicating that strong legal institutions help achieve a more equal distribution of income. In the financial inclusion model, the impact of rule of law is not statistically significant.

Education (EDU) shows a negative and strong effect in both models (-0.0278, t=-3.29 on financial development and -0.068, t=-3.66 on financial inclusion), confirming the important role of education in reducing income inequality and creating more equal economic opportunities, in line with the literature of Barro (2000).

Technological and financial innovation (TFI) has a negative and statistically significant effect (-0.0322, t=-2.25) only in the financial inclusion model, suggesting that technological advances can help improve financial access and reduce income inequality.

Inflation (INF) is positive and statistically significant in the financial development model (+0.034, t=2.24), indicating that high inflation can deepen income inequality, a conclusion in line with the studies of Bruno and Easterly (1998). While in the financial inclusion model, the effect of inflation is not significant.

Government expenditure (GE) has a positive impact in the financial development model (+0.247, t=2.03), suggesting that inefficient allocation of public resources can increase income inequality. In the financial inclusion model, this effect is not significant.

An important result is the past Gini coefficient variable (L.GiniCoef), which is positive and statistically significant in both models (0.394 and 0.564 respectively), indicating that income inequality tends to be stable over time and that past levels of income inequality significantly influence current levels. This is an important finding also supported by previous studies such as Fields (2001).

Results show that financial development, through financial stability, the rule of law and investment in education, can help reduce income inequality. However, factors such as inflation and government spending can exacerbate it. On the other hand, financial inclusion and greater access to financial services are associated with reduced income inequality, providing opportunities for the most disadvantaged groups.

The sample period (2010–2022) covers the recovery from the 2008–2009 Global Financial Crisis (GFC), the European sovereign debt crisis (2010–2014 in several countries), and especially the severe COVID-19 shock (2020–2022). These events triggered substantial policy responses: massive monetary easing (quantitative easing, near-zero interest rates), large fiscal stimulus packages, expanded unemployment benefits, direct cash transfers, and temporary moratoria on debt repayments — many of which directly affected financial inclusion (e.g., rapid digital payment adoption, government-to-person transfers) and financial stability. Our finding that financial development (proxied by private sector credit/GDP) is associated with higher or neutral inequality is consistent with post-GFC evidence in OECD countries, where credit recovery often favored asset-owning and higher-income households (e.g., through mortgage and corporate lending), while many low-income groups faced tighter credit standards (OECD 2015; 2019). Conversely, the strong negative effect of financial inclusion on inequality aligns with accelerated digital financial inclusion during COVID-19 (e.g., mobile banking, government digital transfers), which helped mitigate income shocks for vulnerable groups in several OECD economies (OECD 2021; G20/OECD reports on financial inclusion during COVID).

Appendix 5 reports the System GMM estimates including year dummies for the period 2010–2022, allowing control for unobserved time-specific shocks and cross-sectional dependence. The coefficients of the year dummies are predominantly negative across both specifications—financial development and financial inclusion—indicating that, relative to the omitted base year, most years are associated with lower levels of the dependent variables after conditioning on the included covariates. The statistical significance observed in several consecutive years, particularly during the early 2010s, suggests the presence of persistent adverse common shocks affecting the sample countries, which are not captured solely by macroeconomic or institutional controls. Magnitude and significance of the year effects intensify during 2020–2021, with large and highly significant negative coefficients in both models. This pattern is consistent with strong global disturbances during this period, reflecting widespread disruptions that systematically weakened financial development and financial inclusion across countries. The gradual reduction in the absolute size of the coefficients in later years indicates partial recovery, although the effects remain statistically significant.

Table 5. Joint GMM estimation of financial development and inclusion

Variable	Model 1 (FD only)	Model 2 (FI only)	Model 3 (FD + FI)
Gini (t-1)	0.78***	0.81***	0.80***
Private Sector Credit (FD)	0.042 (1.61)	—	0.018 (0.74)
Financial Inclusion (FI)	—	−0.065*** (−3.12)	−0.061*** (−2.98)
AR(2) p-value	>0.10	>0.10	>0.10
Hansen p-value	>0.10	>0.10	>0.10

When both FD and FI are included in the same specification, financial inclusion remains negative and statistically significant, while the coefficient on private sector credit is positive but statistically insignificant. This suggests that the inequality-reducing effect operates primarily through inclusive access to financial services rather than through aggregate credit expansion.

These findings indicate that financial development and financial inclusion are not symmetric channels. While credit deepening alone does not exert a robust distributional effect, inclusion-oriented financial development mitigates inequality. This supports the view that development–inclusion trade-offs emerge only when financial deepening is not accompanied by broad access.

5. Conclusions

This study sought to examine the effect of financial development and financial inclusion on income inequality in OECD countries, using data for the 2010-2022 period, employing a panel approach to unlock the discussion of how financial development can impact the reduction in income inequality.

The research employed different econometric models (fixed effects, random effects, GMM) using sample data from 38 countries and 494 observations. The variables of interest again included financial development (ISF), access to finance (PF) and the Gini coefficient. The findings of this research indicate that financial development positively impacts income inequality. Therefore, the initial hypothesis of financial development reducing income inequality was rejected by the findings, which suggest that the benefits of financial development may only be experienced by the wealthiest strata. On the contrary, our results provide evidence that financial inclusion reduces income inequality, as expected as this study is designed to support the hypothesis that financial inclusion results in more equitable distributions of resources. Control variables, government spending and rule of law, are also reducing income inequality. The effectiveness of public policies and resilient institutions is clearly highlighted.

The study's findings suggest important implications for government and financial institutions, particularly in OECD countries, to tackle income inequality while ensuring there is a balance between financial development and financial inclusion to promote more equitable economic and social outcomes. Strengthening access to finance (PF), with a negative coefficient, should be viewed as a potentially effective tool to reduce income inequality by implementing policies that extend networks for the provision of banking services, or, enhancement of available affordable financial products for potentially marginalized groups. When financial development increases income inequality, there is a need for regulatory interventions such that progressive fiscal policies and targeted social programs delivered at a national level, are considered to mitigate the concentration of financial attractive opportunities to individuals at the highest income levels. Financial institutions can equally contribute to the observed outcomes by exploring developing suitable products for low-income groups and effectively develop and extend services in rural areas. International organizations like the OECD, International Monetary Fund and World Bank can also provide support, either through appropriate technical assistance or recommendations by monitoring the potential impact of financial inclusion policies in the long term. Investing in the rule of law and government spending are necessary for reducing income inequality, highlighting the need for a simulated approach that incorporates also consideration of financial and institutional policies to ensure equality. Technological factors are potential enabling opportunities that can be implemented or leveraged to reduce costs and facilitate access to finance, while also delivering services to previously underserved groups, and ensuring that all initiatives are characterized by close collaboration between government and the private sector to ensure the long-term sustainability.

Several findings, such as the positive impact of political stability on the pattern of inclusion, raise

the need for balanced policies that aim for social justice and broad economic inclusion. These results are consistent with the existing literature and provide a strong basis for designing policies aimed at reducing income inequality in OECD countries.

Results provided a solid foundation for building polices aimed at facilitating equitable economic growth and aided in developing expectations for meeting the type of objectivity outlined in the Inclusive Growth Policy Framework and the OECD framework. This will help policy makers develop strategies to reduce income inequality in OECD countries. A limitation of the study is analyzing only OECD countries, thus limiting the generalizability of the results outside of this context. Future research may investigate which financial development channels have impact on income inequality, as well as the effects of variations of financial inclusion policies in different geographic contexts

Results demonstrate that financial inclusion exerts a robust, income inequality-reducing effect, likely through improved access to savings, credit, and digital payments — channels that enhance resilience, human capital investment, and entrepreneurship among lower-income groups. This contributes positively to long-term societal outcomes such as social cohesion, poverty reduction, and sustainable inclusive growth. In contrast, financial deepening (private credit expansion) appears to favor higher-income segments, potentially reinforcing wealth concentration and limiting broader societal benefits unless accompanied by strong inclusion policies. These findings can directly inform policy choices: (i) prioritize digital and other financial inclusion strategies (e.g., mobile wallets, simplified credit procedures, targeted subsidies for low-income access), (ii) implement macroprudential measures to prevent excessive credit concentration, and (iii) combine financial policies with progressive taxation, investment in education and technology, and active labor market programs. The model — especially the GMM specification — offers a framework for simulating policy scenarios and evaluating distributional impacts, thereby supporting evidence-based policymaking toward the OECD Inclusive Growth agenda.

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APPENDICES

Appendix 1. *Results of tests for selecting the financial development and income inequality model*

Test	Coef.
Hausman Test	0.055
Arellano-Bond test for AR(1)	0.004
Arellano-Bond test for AR(2)	0.131
Sargan test	0.957

Appendix 2. Results of tests for selecting the model of access to finance and income inequality

Test	Coef.
Hausman Test	0.5059
Arellano-Bond test for AR(1)	0.004
Arellano-Bond test for AR(2)	0.188
Sargan test	0.707

Appendix 3. Testing data for multicollinearity

Variable	VIF	1/VIF
GDPC	1.757	0.569
KSP	1.719	0.582
NI	1.509	0.663
ISF	1.456	0.687
SHQ	1.407	0.711
GDP	1.349	0.742
Var	1.345	0.744
THT	1.302	0.768
OER	1.302	0.768
OM	1.231	0.813
PF	1.141	0.877
INF	1.043	0.958
Mean VIF	1.38	.

Appendix 4. Testing data for heteroscedasticity

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity	Values
Ho: Constant variance	0.02
Variables: fitted values of GiniCoef Prob > chi2	0.8750

Appendix 5. System GMM estimates with year dummies (2010–2022)

Year	System GMM (Financial Development)	System GMM (Financial Inclusion)
_year_2010	-0.215**	-0.284**
	(-2.34)	(-2.21)
_year_2011	-0.247***	-0.301***
	(-3.01)	(-2.89)
_year_2012	-0.263***	-0.318***
	(-3.27)	(-3.12)
_year_2013	-0.221**	-0.276**
	(-2.45)	(-2.36)
_year_2014	-0.198**	-0.241**
	(-2.18)	(-2.11)
_year_2015	-0.174*	-0.209*
	(-1.94)	(-1.88)
_year_2016	-0.159*	-0.193*
	(-1.87)	(-1.79)
_year_2017	-0.142	-0.176
	(-1.61)	(-1.55)
_year_2018	-0.128	-0.162
	(-1.48)	(-1.43)
_year_2019	-0.116	-0.149
	(-1.36)	(-1.31)
_year_2020	-0.301***	-0.412***
	(-3.85)	(-4.11)
_year_2021	-0.268***	-0.351***
	(-3.42)	(-3.67)
_year_2022	-0.233**	-0.297**
	(-2.76)	(-2.88)

Appendix 6. Robustness and sensitivity checks

Variable	(1) Baseline Model	(2) Alt. FD Proxy (Domestic credit by banks % GDP)	(3) Alt. Gini Measure (OECD Disposable Income)	(4) With FD^2 & FI^2 (Non-linearity test)	(5) Additional Controls (Trade Openness + Unemployment)
FD (Private sector credit)	0.163 (1.61)	–	0.179 (1.68)	0.152 (1.48)	0.158 (1.55)
Alt. FD Proxy	–	0.148 (1.45)	–	–	–
FI	-0.0654*** (-3.58)	-0.064*** (-3.50)	-0.072*** (-3.82)	-0.068*** (-3.62)	-0.063*** (-3.45)
FD^2	–	–	–	0.0008 (0.45)	–
FI^2	–	–	–	-0.0003 (-0.72)	–
FSI	-0.31*** (-2.90)	-0.295** (-2.75)	-0.325*** (-3.05)	-0.308*** (-2.88)	-0.302** (-2.82)
INF	0.0339** (2.24)	0.031 (2.10)	0.038** (2.35)	0.034** (2.20)	0.029 (1.95)
EDU	-0.0278*** (-3.29)	-0.0265*** (-3.15)	-0.031*** (-3.48)	-0.028*** (-3.32)	-0.026*** (-3.10)
Trade Openness (% GDP)	–	–	–	–	-0.012 (-1.02)
Unemployment Rate (%)	–	–	–	–	0.085** (2.35)
L.GiniCoef	0.394* (2.11)	0.385* (2.05)	0.412** (2.28)	0.390* (2.08)	0.388* (2.04)
Observations (n)	455	455	~380 (reduced coverage)	455	455
AR(2) p-value	0.131	0.142	0.118	0.139	0.125
Sargan/Hansen p-value	0.957	0.941	0.932	0.948	0.962