Received: 22 September 2022 | Revised: 28 July 2023 | Accepted: 21 October 2023

DOI: 10.1002/ijfe.2910

RESEARCH ARTICLE

WILEY

Banks, financial markets, and income inequality

Yousef Makhlouf[1] | **Neil M. Kellard**[2] | **Dmitri V. Vinogradov**[3,4]

[1]Nottingham Business School, Nottingham, UK

[2]University of Essex, Colchester, UK

[3]University of Glasgow, Glasgow, UK

[4]National Research University – Higher School of Economics, Russia

Correspondence
Dmitri V. Vinogradov, University of Glasgow, Glasgow, UK.
Email: dmitri.vinogradov@glasgow.ac.uk

Abstract

While financial development is often found to raise income inequality, it remains unclear whether the composition of the financial system makes a difference. In our sample of 99 countries over the period 1975–2020, increased activity of banks relative to markets in the provision of financial services is robustly associated with less inequality in the developing world yet with more inequality in developed economies. Accounting for redistribution systems does not alter this finding; banking sector concentration amplifies the effects. Results suggest that banks work at the extensive margin at earlier stages of economic development yet shift to the intensive margin at higher levels of development, where they increasingly serve the interests of the rich. Higher market power enables banks to better pursue their objectives at each of the margins.

KEYWORDS

banks, financial development, financial structure, inequality, market power, markets

1 | INTRODUCTION

Reducing income inequality is among the core concerns of policymakers, especially with the recent discussion about increasing income inequality in most countries since the 1980s (Kellard et al., 2021; Kuhn et al., 2020; Piketty, 2014; Piketty et al., 2019; Piketty & Zucman, 2014). To try to reverse this trend, in 2015 the United Nations the Sustainable Development Goals (SDGs) included the aim to 'reduce inequality within and among countries' by 2030. The distribution of income and wealth among individuals results from a complex set of economic interactions, involving labour heterogeneity, savings behaviour, accumulated capital, and wealth (Stiglitz, 1969), as well as the social pressure for more equity (Kellard et al., 2021; Kuznets, 1955), political regimes, openness (Reuveny & Li, 2003) and quality of institutions (Gupta et al., 2002). Special attention is paid to finance, due to its role in the reallocation of resources in the economy (Beck et al., 2007; De Haan & Sturm, 2017; Greenwood & Jovanovic, 1990; Makhlouf et al., 2020). Yet results so far imply more finance is not necessarily better for equity, as we review below. Despite the above multitude of mechanisms steering inequality, the finance-inequality nexus literature mainly considers financial development in general, effectively by taking financial systems as a whole and ignoring differences between their components. As intermediated finance (banks and other intermediaries) and direct finance (commonly referred to as financial markets) differ on many levels, including but not limited to the set of decision-makers, objectives, frictions, speed of response to exogenous shocks, and so forth, they may differ in their impact on inequality. Knowing these differences is crucial to our understanding of how and when financial systems may help reduce inequality. In this article, we investigate whether it indeed matters for income inequality if financial services are provided by banks or markets.

We study this by focusing on the countries' financial structure, defined as the relative share of capital markets

and financial intermediaries in the country's financial sector; a ratio of market finance to bank finance is an example of a relevant measure. Financial development, a related concept, is usually defined as the amount of credit extended to domestic customers, and does not distinguish between the credit channels, that is, banks or markets. A large and growing body of literature examines the impact of financial systems, mainly by using the financial development measure, on income inequality (e.g., Chakroun, 2020; Selim & Güngör, 2021; Shi et al., 2022, among recent contributions). Financial development can reduce inequality as the lack of access to finance is one of the main determinants of poverty and unequal opportunities (Levine, 2008). In addition, financial development decreases inequality by expanding the economic opportunities of entrepreneurs and households (Atkinson & Stiglitz, 1980; Stiglitz, 1974) and by enhancing economic growth and smoothing household consumption and savings decisions (Gimet & Lagoarde-Segot, 2011). However, financial development may also increase inequality, especially if human capital is unevenly distributed, by raising the demand for high-skilled workers (Larrain, 2015), increasing the return to skills and entrepreneurship (Gimet & Lagoarde-Segot, 2011) and heterogeneous returns on capital (Pástor & Veronesi, 2021). Notably, the financial development—inequality nexus appears as non-linear: while Clarke et al. (2006) find that financial development reduces inequality, they also provide some empirical support in favour of increasing inequality with financial development at low levels of the latter. In contrast, Makhlouf et al. (2020) using a one-and-half centuries of data demonstrate that the inequality-reducing effect of financial development is confined to the short term, when financial expansion is at the extensive margin, making access to finance and financial services available to more people and businesses. In the long run, however, expansion follows the intensive margin, whereby more sophisticated services may be offered to richer customers, and this is when the effect of financial development on inequality becomes positive.

While the impact of financial development on inequality is rather well studied, with nuanced qualifications regarding its sign, the role of financial structure for inequality remains, to a large degree, poorly understood. The few related examples in the literature include Kpodar and Singh (2011) and Seven and Coskun (2016) who differentiate between effects of bank and market finance on poverty and inequality in the context of developing and emerging economies respectively, with inconclusive results. Kpodar and Singh (2011) find that the development of banks is on average associated with less poverty, especially when institutional quality (captured by the Rule of Law indicator of the International Country Risk Guide, ICRG) is rather weak, otherwise less poverty is achieved through better developed financial markets.[1] Specifically for financial structure, they find no effects on poverty nor inequality, although for poverty there is a strong interaction between financial structure and institutional quality. The nil effect on inequality in their study is rather surprising. A possible explanation might be in their focus on 47 developing countries only and a rather short time period of 1984–2008 collapsed in five non-overlapping 5-year periods to deal with missing annual data and smooth short-term fluctuations. Using a largely the same sample and techniques, Seven and Coskun (2016) show that although the overall financial development has no effect on poverty nor inequality, measuring it separately by the banking sector development and by the stock market development produces contradictory results: banking growth may be associated with an increase in inequality but no change in poverty, while the stock market growth may contribute to an increase in the average income of the poorest cohort but does not affect more general measures of poverty or inequality.[2] To understand the potential differences in the effects banks and markets may have on inequality, it appears indispensable to separate the financial development effect from that of the financial structure, that is, the relative proportions of the market and the banking components of the financial system, the focus of our article. Departing from these studies, we investigate the inequality effects of financial structure *net* of that of financial development, accounting for the heterogeneity in economic development. To better understand the channels through which the financial system affects inequality, we further investigate the role of banking competition, fiscal redistribution, and the quality of political institutions.

To test the nexus between banks, financial markets, and income inequality, we use data on 99 countries over the period 1975–2017. We estimate the relationship between financial structure and inequality for high- and low-to-middle income countries, as well as for developed and developing economies. Distinguishing between net and gross Gini indices allows us to judge the effectiveness of the fiscal redistribution system against the inequality effects of financial systems. We further control for redistribution by including a corruption index in our estimates. Finally, we examine the moderating effect of bank concentration, proxying for strategic considerations of banks imposed by competition forces in the banking sector. Results are robust to using lagged (to overcome endogeneity concerns) and 5-year smoothed (to account for business cycles) variables, as well as to accounting for non-linear financial development effects.

Our key result is that financial structure matters for inequality, especially so in developing and low-to-middle income countries, where being more market-based implies

more inequality. In developed and high-income economies, the effect is either opposite (bank-based[3] systems contribute to more inequality) or nil. Lack of competition in the banking sector amplifies these effects, which hold for both gross and net Gini indices, implying redistribution does not help much against financial system effects.

These findings contribute to the so far rather thin literature on the differential role banks and markets play for inequality, reviewed above. More generally, our article feeds into a broader debate on the effects the composition of financial systems has on the macroeconomy (e.g., Levine, 2002; Mavrotas & Vinogradov, 2007; Stiglitz, 1993; Vinogradov & Makhlouf, 2021, to mention a few). Finally, the article also contributes to the literature that studies effects of banking competition on consumers and the overall economy (e.g., Allen & Gale, 2004; Boyd & De Nicolo, 2005; Braggion et al., 2017; Keeley, 1990; Kokas et al., 2020; Martinez-Miera & Repullo, 2010). These strands of literature are reviewed below in more detail.

2 | FINANCIAL STRUCTURE AND INEQUALITY: THEORETICAL UNDERPINNINGS

To derive testable hypotheses with respect to the relationship between financial structure and inequality, this section reviews the body of knowledge on the differential effects banks and financial markets have on economies and people, as implied by the extant literature on financial systems and financial development.

2.1 | Financial structure, economic development, and inequality

Our key interest is in the effect of the composition of the financial system on income inequality: given the size of the financial sector, does it make a difference for inequality if more financial flows go through banks than through markets? Inferences with respect to income inequality are therefore drawn from the effects bank and market finance may have on the high-income and low-income cohorts of population. As common in the literature, it is useful to distinguish between extensive (through involving more participants, both households and firms) and intensive (through those who are already part of the system) margins of expansion of financial sectors. The intensive margin typically involves households who are richer and have higher income, as well as well-established firms (Antzoulatos et al., 2016; Greenwood & Jovanovic, 1990). This latter observation serves a link from the two margins of financial development to the distribution of income in the population: financial development at the extensive margin has an inequality-reducing effect, while the intensive margin contributes to more inequality (Makhlouf et al., 2020). Our objective now is (i) to distinguish between effects of extensive and intensive development of markets and banks, and (ii) to relate the likelihood of the intensive or extensive development to the level of economic development, thus conditioning the inequality effects of financial structure on economic development.

2.1.1 | Markets

On the extensive margin, markets may improve income distribution by transferring wealth from creditors to debtors (Aghion & Bolton, 1997). However, an unrestricted and relatively costless access to markets is required to involve more people and firms into market relationships. Instead, financial markets operate to a large degree on the intensive margin, serving participants who have already obtained access to them. Well-functioning financial markets help raise investment by providing additional financing sources to the real sector, facilitate risk management (Levine, 1991), ensure performance monitoring (Holmström & Tirole, 1993) and provide information to investors by aggregating individual signals (Boot & Thakor, 1997). Large firms and rich households disproportionately benefit from the stock market development (Aggarwal & Goodell, 2009; Kuhn et al., 2020), for which reason markets are likely to further contribute to growing income inequality.

Apart from the above, markets may protect from exogenous shocks to incomes and opportunity sets of people. Poorer cohorts are known to suffer disproportionately more from recessions and adverse shocks: for example, Argente and Lee (2021) point that the richer are more flexible in adjusting their consumption baskets during a recession, while the poor cannot reduce expenditures as effectively when incomes fall.[4] Well-developed markets offer a protection from shocks through diversification (e.g., hedging against shocks can take place in international markets, Borensztein et al., 2013) and as a source of funding when it is not available elsewhere (Levine et al., 2016). However, only investors and firms with an established presence in the market may benefit from these functions. As these tend to be richer and high-income cohorts, the shock-smoothing role of financial markets disproportionately benefits those who are less vulnerable to shocks, thus contributing to more income inequality.

2.1.2 | Banks

Traditionally, banks are seen at the extensive margin, as institutions providing access to finance and savings opportunities to those who otherwise cannot overcome the

cost of accessing the market (Benston & Smith, 1976; Vinogradov, 2012), who prefer lower risks and higher liquidity (Diamond, 1984; Diamond & Dybvig, 1983)—including entrepreneurs who wish to reduce risks of renewing and renegotiating loan agreements (e.g., Chemmanur & Fulghieri, 1994; Petersen & Rajan, 1994, 1995)—and who need a mechanism to assure credibility (Boot et al., 1991; Vinogradov, 2011). Poorer individuals and young businesses are more likely to lack access to financial markets; due to credit constraints, lower savings (for individuals) and limited internal funds (for firms), access to external finance is crucial for income generation and business development (Paulson & Townsend, 2004). Improving access to financial services expands the opportunity set for the poorer part of the society (Becker & Tomes, 1986; Galor & Moav, 2004; Paulson & Townsend, 2004). Ergungor (2010) reports that new bank branches primarily affect borrowing capabilities of the poor. Hasan et al. (2020) demonstrate the importance of access and efficiency for the reduction in wealth inequality.

However, intermediation comes at a cost and creates inefficiencies of which financial markets are free. Examples include credit rationing (some borrowers are unable to obtain funding even if they are observationally indistinguishable from others, Stiglitz & Weiss, 1981), interest rate management (loan rates may be perceived as excessively high, resulting in underprovision of loans, Vinogradov, 2012), customer selection (banks prefer expanding in rich areas and favour existing customers, see Agarwal et al., 2018; Boot & Thakor, 2000; Burgess & Pande, 2005; Chemmanur & Fulghieri, 1994; Petersen & Rajan, 1994), inter alia. This suggests banks may contribute to more inequality when they work at the intensive margin. Government controls may be needed to avoid this: Burgess and Pande (2005) report that a government-controlled expansion of banks in India in 1977–1990 indeed led to a reduction in inequality.

Banks help smooth exogenous shocks intertemporally by spreading their impact in time (Allen & Gale, 1997; Mavrotas & Vinogradov, 2007; Vinogradov, 2011). In recessions and in adverse conditions (e.g., the Covid-19 pandemic), banks are able to continue lending to existing customers (Bolton et al., 2016; Sette & Gobbi, 2015), which supports businesses and helps economic growth (Vinogradov & Makhlouf, 2021). Although this argument requires an established relationship with the bank, it addresses the needs of smaller and younger firms and individuals than those who can avail of the emergency funding from the markets. In fact, Levine et al. (2016) emphasize that the emergency funding from financial markets only comes to play when banks cannot provide credit. Thus, we would expect banks to be more likely to help protect incomes of cohorts who are more vulnerable to shocks.

2.1.3 | Economic development

As the intensive margin effect counteracts that of the extensive margin, the overall impact of finance on inequality may be inequality-reinforcing (De Haan & Sturm, 2017; Denk & Cournède, 2015; Gimet & Lagoarde-Segot, 2011) or inequality-reducing (e.g., Beck et al., 2007; Zhang & Naceur, 2019). Several factors condition this effect, such as the overall level of economic development (Clarke et al., 2006), economic stability and risks (Chiu & Lee, 2019), and the time period considered (Makhlouf et al., 2020). For the intensive margin to be profitable for banks, there ought to be a large enough cohort of established customers with available resources. We may expect this cohort is large in developed economies, yet rather small in developing countries, therefore operating on the intensive margin and thus against less inequality would be more profitable for banks in the developed world. The inefficiencies argument hinges on the assumption banks are unconstrained in selecting customers, which is less likely to hold in developing markets. If banks can reduce inequality, we should therefore be more likely to observe this effect in developing countries, while inherent inefficiencies of intermediation and preferences for intensive margin may diminish or even revert this effect in developed economies.

The shock-smoothing argument also implies a distinction between developed and developing countries. Developing countries often have a high share of state-owned banks (Berger et al., 2008), which may help governments implement measures preventing an increase in inequality. Some authors find that relationship lending is more prevalent in the developing world (De la Torre et al., 2010); at higher levels of financial development, banks are more active in trading than in relationship lending (Boot & Ratnovski, 2016). This suggests, banks may offer better protection from shocks to the poorer cohorts in developing countries. For the cross-sectional argument (diversification in international markets) to work, countries need to be integrated in the global financial system, hence markets are more likely to provide effective smoothing in developed economies.

To summarize, developing countries do not have many rich customers, which makes it unlikely for banks to be able to employ the intensive margin. Expansion through the extensive margin implies banks can successfully contribute towards less inequality. Therefore, having a financial system that is more tilted towards banks than markets, is beneficial in terms of inequality reduction, while a financial system tilted towards financial markets may contribute more towards inequality. As banking sectors frictions (credit rationing, customer selection, etc.) are more apparent in the developed world, the effect of financial structure here may be different. Our Hypothesis 1 is therefore:

H1. A more market-based (as opposed to bank-based) financial structure increases inequality at lower levels of economic development and reduces inequality at high levels of economic development.

Markets are more likely to expand at the intensive margin and through that contribute to more inequality. Since banks may offset this effect in the developing world, we would expect there a less visible effect of the overall financial development on inequality than in developed countries. In the developed countries, as discussed above, both banks and markets work on the intensive margin, which leads to more inequality. We therefore formulate the following complementary hypothesis, to shed light on the results reported by Kpodar and Singh (2011) and Seven and Coskun (2016) for developing countries:

H2. In developing countries, financial development has less effect on inequality than in developed economies.

2.2 | Competition and market power

The lending function of banks is substantially affected by their competitiveness. One view suggests high market power makes banks riskier—and thus risk-constrained in their lending decisions—because higher rates shift borrower selection towards riskier loans (Boyd & De Nicolo, 2005; Martinez-Miera & Repullo, 2010). An alternative view is that competition reduces bank profits and makes them more willing to grant loans and keep less reserves (Allen & Gale, 2004; Keeley, 1990). Empirically, both high market power (Braggion et al., 2017; Jiménez et al., 2013) and high competition (Liebersohn, 2017) make banks select borrowers with lower risks. Kokas et al. (2020) demonstrate that both banks with high market power and competitive banks may sustain shocks to deposits and keep lending unaffected.

The shock-smoothing role of banks is weaker or nil if banks are competitive (Allen & Gale, 1997; Vinogradov, 2011): to digest large shocks and recover afterwards, banks have to be sufficiently profitable, the capacity for which is substantially restricted by competition. Empirically, higher bank market power is associated with higher capital buffers (Fonseca & González, 2010), yet competitive banks may also have reserves in excess of requirements, if they search for growth opportunities and due to that set higher target capital ratios (Berger et al., 2019). While competitive banks lack the flexibility and the internal funding of monopolists, they can issue new liabilities, engage in repurchases, and make changes in dividend policy to achieve that. Generally, in competitive banking sectors recovery after crises or exogenous shocks appears to be slower and recessions are deeper than if an economy is served by a small number of banks with high market power (Mavrotas & Vinogradov, 2007), implying more income inequality, which tends to grow during recessions (Meyer & Sullivan, 2013).

A rare explicit account of the effect increased banking competition has on inequality is Beck et al. (2010): with more competitive banks, poorer cohorts earn more, whilst the richer cohorts remain unaffected, hence inequality reduces. This result stems from the U.S. data and depends on the availability of earning opportunities for the poor; the effect may be different in developing economies. Controlling for competition in heterogeneous samples is especially important given Berger et al. (2004) report banking markets in the developing world are usually associated with less competition.

Concluding from the above, the ability of competitive banks to accumulate reserves and continue lending in hard times appears to be more characteristic of developed economies. The disadvantages of high market power, such as the preferential treatment of larger and richer customers by monopolistic banks are also more likely for high levels of development. In contrast, in developing markets with a lower number of wealthy customers and well-established businesses, having monopolistic banking sectors may be advantageous exactly due to their ability to keep higher reserves and through that to ensure smooth lending, effectively acting against deterioration in inequality. It follows that more market power in developing countries may further enhance the inequality reducing role of banks:

H3. Concentration in banking sectors counteracts the inequality-enhancing effects of market-based financial structure (as opposed to bank-based) in developing countries. The effect reverses in developed countries.

2.3 | Fiscal redistribution

Countries' redistribution systems may suppress many factors adversely affecting inequality. Our interest therefore will be in assessing the effects formulated in H1–H3 with and without redistributive effects. Confirming the sign of these effects *without* redistribution helps better understand how financial systems work. Estimating the effects *with* redistribution sheds light on the relative strengths of these effects, if they are observable despite redistribution towards more equity taking place.

3 | DATA

In our sources (reviewed below for each variable) data on financial market indices is available from 1975 only, which explain the beginning of our sample time period. As financial system data is crucial for our research, we only selected countries with 10 or more years of this data, resulting in a sample of 99 countries. To test our hypotheses, we split the sample into two subsamples; high-income countries and low-to-middle income countries (which includes low, lower- and upper middle-income countries). The former captures the features of developed economies that were important for the distinctions made in our hypotheses, primarily the availability and profitability of intensive margin expansion strategies for banks; the latter proxies for environments where banks are more likely to expand using extensive margin strategies. While we find this split more suitable for our purposes, later we report results using the more traditional classification of countries into developing and developed (jumping ahead, all key results are robust to this change in classification). The high-income subsample includes 48 countries, mainly developed economies,[5] whilst low-to-middle income subsample includes 51 countries, all developing. We use both gross and net Gini indices to measure income inequality. These two indices are commonly used in related studies.[6]

We follow other studies such as Levine (2002), Kpodar and Singh (2011), and Luintel et al. (2016) by measuring the financial structure as the first principal component of two ratios, Structure-Activity and Structure-Size. Structure-Activity represents the activity of stock markets relative to that of banks and other intermediaries and is defined as the logarithm of the total value traded to private credit ratio. Total value traded (reported as ratio to GDP) equals the total value, by the end of the year, of domestic and foreign equities, except for investment funds, unit trusts and alike, traded on domestic exchanges (divided by GDP). Private credit equals the value of domestic deposit institutions credit to the private sector (also reported as a share of GDP). Structure-Size reflects the size of stock markets relative to that of banks; it is measured by the logarithm of the market capitalization to private credit ratio. Market capitalization is the value of domestic shares listed on domestic exchanges at the end of the year (as ratio to GDP). Private credit is defined above. Larger values of the financial structure index indicate a more market-based (or less bank-based) financial system.

Financial development is the first principal component of two variables, Finance-Activity and Finance-Size. Finance-Activity measures the activity of the overall financial system and equals the logarithm of total value traded times private credit (both as fractions of GDP). Finance-Size reflects activity of both stock markets and intermediaries and is measured by the logarithm of market capitalization ratio plus private credit ratio. Financial development reflects the development of the whole financial system, that is, stock markets and intermediaries. Larger values of this index signify higher level of development of the financial system.

Several control variables are also employed: GDP per capita, education, inflation, government expenditure and trade openness. These variables are commonly used in the inequality literature (see, e.g., Beck et al., 2007; Zhang & Naceur, 2019). In addition, we consider the quality of institutions and bank concentration. The latter is available from 1996, thus we estimate our model with and without this variable. The source of Gini indices is Standardized World Income Inequality Database (SWIID) whilst we obtain the financial variables used to construct financial structure and financial development measures form Global Financial Development Database. The source of GDP per capita, Inflation, trade openness and government expenditure is World development Indicators (WDI). We use years of schooling as a proxy of education level form Penn World Table (PWT) database and regime corruption index as a proxy of the quality of institutions from V-Dem database. The source of bank concentration index is Financial Development and Structure Dataset. Table 1 provides summary statistics of our variables. It is worth to note that financial variables have less observations comparing with other variables because the limitation of financial market variables. In addition, the average of financial structure is positive for high income countries, which refers to market-based system, whilst low-to-middle income countries have, on average, bank-based system as the average of the financial structure variable is negative. This is consistent with the literature that suggests the weight of financial markets in the overall financial system increases with the level of development.

4 | METHODOLOGY

We estimate the relationship between financial structure, financial development and income inequality using the following model:

$$\ln(Gini)_{i,t} = \beta_0 + \beta_1 FS_{i,t} + \beta_2 FD_{i,t} + \theta X_{i,t} + \varepsilon_{i,t}, \quad (1)$$

where, $\ln(Gini)$ is the logarithm of gross or net Gini index in country i at year t. FS is measure of financial structure, FD is financial development index and X is set of control variables. We include also country fixed-effects

TABLE 1 Summary statistics.

	All			High income			Low-to-middle income		
	Obs.	Mean	*SD*	Obs.	Mean	*SD*	Obs.	Mean	*SD*
Gini net	3710	3.583	0.243	1831	3.434	0.205	1879	3.727	0.182
Gini gross	3710	3.815	0.135	1831	3.820	0.108	1879	3.810	0.157
Theil index	2768	−3.493	0.969	1506	−3.841	0.963	1262	−3.077	0.798
Financial structure	2651	−0.000	1.266	1400	0.108	1.170	1251	−0.121	1.356
Financial development	2651	−0.000	1.358	1400	0.596	1.099	1251	−0.667	1.308
GDP per capita	4494	8.957	1.331	2159	10.073	0.693	2335	7.926	0.865
Trade openness	4256	4.187	0.643	2053	4.407	0.604	2203	3.982	0.610
Government consumption	4256	2.682	0.435	2053	2.856	0.312	2203	2.520	0.470
Inflation	4286	4.736	0.337	2103	4.678	0.194	2183	4.792	0.425
Years of schooling	4451	1.963	0.505	2158	2.232	0.284	2293	1.710	0.536
Bank concentration	2444	4.112	0.329	1219	4.206	0.303	1225	4.018	0.328
Corruption	4492	−1.649	1.509	2159	−2.690	1.531	2333	−0.685	0.533

to capture time-invariant factors such as country size and location. We estimate this model for high-income and low-to-middle income countries separately to test H1 and H2. Specifically, H1 suggest that β_1 is positive for low-to-middle income countries and negative for high-income countries. According to H2, β_2 is positive, especially for high-income sub-sample.

We estimate the following model to test H3:

$$\ln(Gini)_{i,t} = \beta_0 + \beta_1 FS_{i,t} + \beta_2 FD_{i,t} + \beta_3 FS_{i,t} XBC_{i,t} + \theta X_{i,t} + \varepsilon_{i,t}, \quad (2)$$

where, *BC* is bank concentration index. H3 suggests that β_3 is positive (negative) for high-income (low-to-middle income) subsample. To estimate Equations (1) and (2), we apply the fixed-effect regression model with Driscoll–Kraay standard errors that are robust to very general forms of cross-sectional and temporal dependence as well as to heteroscedasticity and autocorrelation. Driscoll and Kraay (1998) allow to address the violation of the classical assumptions on the error term, however, still assume exogeneity of the regressors. Thus, we follow Wigley (2017) by using the first lag of all regressors for robustness check.

5 | RESULTS

5.1 | Financial structure and inequality

We first consider the impact of financial structure and financial development on our inequality measures, see Table 2, where columns (1–3) present effects on the net Gini index (after fiscal redistributions), and columns (4–6)—on the gross Gini index, which pictures inequality in gross incomes, pre-tax and pre-transfers.[7] Our Hypothesis 1 was that more markets contribute to more inequality in developing countries—this is confirmed for both inequality measures. The estimated coefficient of the financial structure for developed countries is insignificant, although it has the predicted sign. This speaks rather in favour of the equality and alignment of effects of banks and markets on inequality in developed countries. On a balance, the estimates confirm the differential impact of financial structure on income inequality in developed and developing countries. For the overall sample we observe a significant positive effect on gross Gini (column 5), which means prevalence of financial markets on average contributes towards more inequality. Note that redistributive systems do not seem to be efficient nor sufficient to counter this effect in the developing world (see coefficients for Fin. Structure in columns 2 and 5).[8]

Our Hypothesis 2 was that due to aligning effects of markets and banks, financial development would have a more pronounced effect on inequality in the developed world than in developing countries—this is confirmed, see the significant coefficient for financial development in columns (3) and (6), and less economically and statistically significant coefficient for developing countries in columns (2) and (5). Again, note the lack of any moderating effect of redistributive systems (compare the coefficients for net and gross Gini).

Table 3 shows results are robust to the inclusion of additional controls and in particular includes the regime

TABLE 2 Financial structure and income inequality, 1975–2020.

	Net Gini			Gross Gini		
	(1) All	(2) Low-to-middle income countries	(3) High income countries	(4) All	(5) Low-to-middle income countries	(6) High income countries
Panel A: baseline						
Fin. structure	0.007**	0.013***	−0.003	0.006***	0.010***	0.002
	(2.40)	(5.95)	(−0.63)	(3.44)	(5.17)	(0.57)
Fin. development	0.013***	−0.008*	0.035***	0.022***	−0.003	0.044***
	(3.00)	(−1.82)	(6.03)	(4.25)	(−0.91)	(6.80)
Constant	3.579***	3.743***	3.402***	3.822***	3.824***	3.792***
	(1303.96)	(708.38)	(633.62)	(1391.78)	(942.28)	(618.62)
Observations	2509	1206	1303	2509	1206	1303
Countries	99	51	48	99	51	48
R^2	0.072	0.047	0.180	0.147	0.037	0.325
F statistic	48.193	25.442	62.642	35.075	18.962	71.225
Panel B: with macroeconomic controls						
Fin. structure	0.009***	0.015***	−0.004	0.009***	0.012***	0.001
	(2.65)	(4.62)	(−0.71)	(3.81)	(4.03)	(0.30)
Fin. development	0.009*	−0.006	0.021***	0.014**	−0.003	0.027***
	(1.84)	(−1.23)	(3.20)	(2.52)	(−0.76)	(3.59)
GDP per capita	0.016*	−0.012	0.039***	0.029***	−0.002	0.046***
	(1.68)	(−0.93)	(4.06)	(3.40)	(−0.22)	(3.76)
Inflation	0.020	0.020	−0.144**	0.021*	0.016	−0.203***
	(1.51)	(1.65)	(−2.38)	(1.73)	(1.52)	(−3.08)
Constant	3.332***	3.744***	3.685***	3.461***	3.764***	4.275***
	(27.42)	(26.26)	(11.52)	(34.06)	(31.50)	(11.67)
Observations	2493	1190	1303	2493	1190	1303
Countries	99	51	48	99	51	48
R^2	0.081	0.072	0.212	0.165	0.054	0.374
F statistic	38.933	20.375	73.791	41.263	13.558	75.243

Note: *t* statistics in parentheses.
*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

corruption index. This extended set of controls is only available until 2019, hence the reduced time period in Table 3. The regime corruption index proxies for the quality of political institutions, and thus for the redistribution effect: in countries with more corrupt regimes the redistributive effect should be smaller. Indeed, we observe its strong effect on inequality, especially so for the after-tax inequality measure (net Gini): in countries with corrupt regimes, redistribution is less efficient in terms of combatting inequality. However, our main interest is in the effects of financial systems: these are the same as before, redistribution does not mitigate the effect financial structure or financial development have on inequality.

5.2 | Industrial organization

We now proceed with the estimates that control for the industrial organization of the banking sector. Due to the availability of the banking concentration data, this sample begins in 1996. Bank concentration per se has nil effect on inequality, see Table 4, which is reassuring as in our discussion it is the markets/banks ratio that matters, while banking competition is only expected to moderate this effect. However, on this shorter time period we observe a more pronounced effect of financial structure on inequality in developed countries, as predicted by Hypothesis H1. It appears that the

TABLE 3 Financial structure and income inequality, 1975–2019 (with extended controls and regime corruption).

	(1) All	(2) Low-to-middle income countries	(3) High income countries	(4) All	(5) Low-to-middle income countries	(6) High income countries
Fin. structure	0.008***	0.019***	−0.006	0.008***	0.015***	−0.001
	(2.91)	(4.99)	(−1.28)	(4.00)	(4.52)	(−0.33)
Fin. development	0.012**	−0.001	0.021***	0.016***	0.002	0.024***
	(2.48)	(−0.18)	(3.75)	(2.78)	(0.51)	(3.52)
GDP per capita	0.037***	0.009	0.037	0.042***	0.017	0.012
	(3.23)	(0.58)	(1.56)	(4.43)	(1.18)	(0.59)
Inflation	0.016	0.019	−0.144**	0.019	0.015	−0.145*
	(1.19)	(1.67)	(−2.04)	(1.63)	(1.46)	(−1.86)
Years of schooling	−0.075***	−0.075***	−0.019	−0.070***	−0.067***	0.032
	(−5.95)	(−5.19)	(−0.70)	(−6.30)	(−5.19)	(1.53)
Trade openness	0.026***	−0.002	0.047**	0.039***	−0.005	0.083***
	(3.10)	(−0.19)	(2.30)	(4.36)	(−0.56)	(3.99)
Govt consumption	−0.016**	0.011	−0.073***	−0.001	0.009	0.004
	(−1.99)	(1.44)	(−3.07)	(−0.11)	(1.32)	(0.19)
Regime corruption	0.010*	0.019*	0.016*	0.003	0.017*	0.010
	(1.69)	(1.79)	(1.86)	(0.61)	(1.75)	(0.98)
Constant	3.272***	3.718***	3.800***	3.336***	3.755***	3.934***
	(31.61)	(28.17)	(9.37)	(39.17)	(34.21)	(9.04)
Observations	2463	1175	1288	2463	1175	1288
Countries	99	51	48	99	51	48
R^2	0.123	0.140	0.257	0.210	0.123	0.430
F statistic	63.320	37.525	57.305	48.787	30.216	177.563

Note: *t* statistics in parentheses.
*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

development of the banking sector and the emergence of new bank products and models (especially within private banking) after 1996 has contributed more to inequality in the developed world than it did before (compare with Table 2).

For our Hypothesis 3, we estimate the interaction effect of financial structure with bank concentration, see Table 5. More monopolistic banking sectors (higher concentration ratio) indeed reduce the inequality-reinforcing effect of financial structure in developing countries (which means monopolistic banks contribute more towards inequality reduction) and amplify it in the developed world. Recall that our financial structure indicator represents a ratio of market finance to bank finance, hence a negative coefficient stands for inequality-reinforcing role of banks, while a positive coefficient means more market-based systems contribute more to inequality.

5.3 | Robustness

First, we re-estimate the baseline model using a different classification of countries in groups: we now split the sample into 34 developed and 65 developing countries. Results in Table 6, confirm that being more market-based contributes stronger to inequality in developing countries. For the subsample of developed countries, financial structure is rather irrelevant for inequality. Financial development leads to more inequality in both, but fiscal redistribution alleviates this effect in developing countries (statistically nil effect for net Gini).

Further, to ensure our results are free of endogeneity concerns, we use two approaches. First, we re-estimate the baseline regressions replacing all dependents with their first lags (see Table 7). Second, in Table 8 we apply the Lewbel's method of the identification of structural parameters in models with endogenous regressors in the

TABLE 4 Financial structure and income inequality, 1996–2020 (with bank concentration ratio).

	(1) All	(2) Low-to-middle income countries	(3) High income countries	(4) All	(5) Low-to-middle income countries	(6) High income countries
Fin. structure	0.005***	0.011***	−0.001	0.002	0.009***	−0.005**
	(3.07)	(4.12)	(−0.24)	(0.99)	(3.29)	(−2.06)
Fin. development	0.007	−0.001	0.016***	0.006	−0.001	0.014***
	(1.61)	(−0.17)	(3.86)	(1.38)	(−0.25)	(2.83)
GDP per capita	−0.025**	−0.036***	−0.007	−0.005	−0.013	0.009
	(−2.16)	(−3.28)	(−0.65)	(−0.44)	(−1.47)	(0.50)
Inflation	−0.022**	−0.015	−0.197***	−0.019**	−0.012*	−0.195***
	(−2.07)	(−1.38)	(−4.10)	(−2.23)	(−1.72)	(−3.98)
Bank concentration	0.002	−0.004	0.002	0.003	0.001	−0.007
	(0.30)	(−0.84)	(0.16)	(0.46)	(0.45)	(−0.84)
Constant	3.917***	4.111***	4.417***	3.957***	3.971***	4.675***
	(25.33)	(37.70)	(15.07)	(25.78)	(48.02)	(12.71)
Observations	1752	888	864	1752	888	864
Countries	97	49	48	97	49	48
R^2	0.029	0.070	0.059	0.013	0.035	0.092
F statistic	15.331	19.643	11.248	12.647	14.511	47.280

Note: *t* statistics in parentheses.
*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

TABLE 5 Financial structure and income inequality, 1996–2020 (with bank concentration ratio and interaction).

	(1) All	(2) Low-to-middle income countries	(3) High income countries	(4) All	(5) Low-to-middle income countries	(6) High income countries
Fin. structure × Bank concentration	−0.009***	−0.019***	0.032***	−0.011***	−0.017***	0.023***
	(−3.64)	(−6.36)	(5.84)	(−5.08)	(−8.16)	(4.99)
Fin. structure	0.042***	0.089***	−0.136***	0.047***	0.079***	−0.101***
	(4.17)	(7.61)	(−5.84)	(5.25)	(9.28)	(−4.90)
Fin. development	0.007*	0.000	0.016***	0.006	−0.000	0.014***
	(1.69)	(0.05)	(4.21)	(1.46)	(−0.05)	(2.98)
GDP per capita	−0.025**	−0.033***	−0.003	−0.005	−0.011	0.012
	(−2.19)	(−3.43)	(−0.32)	(−0.39)	(−1.40)	(0.67)
Inflation	−0.026**	−0.024**	−0.179***	−0.024***	−0.020***	−0.182***
	(−2.52)	(−2.49)	(−3.85)	(−3.11)	(−3.67)	(−3.77)
Bank concentration	0.003	−0.005	−0.012	0.004	0.001	−0.017
	(0.43)	(−0.90)	(−0.73)	(0.70)	(0.23)	(−1.61)
Constant	3.928***	4.137***	4.353***	3.970***	3.995***	4.629***
	(26.41)	(46.96)	(15.48)	(27.46)	(62.94)	(12.83)
Observations	1752	888	864	1752	888	864
Countries	97	49	48	97	49	48
R^2	0.034	0.093	0.099	0.022	0.060	0.116
F statistic	18.021	34.574	20.517	19.207	31.406	38.108

Note: *t* statistics in parentheses.
*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

TABLE 6 Financial structure and income inequality, 1975–2020 (developed vs. developing countries).

	(1) Developing countries	(2) Developed countries	(3) Developing countries	(4) Developed countries
Fin. structure	0.014***	−0.005	0.011***	0.001
	(4.11)	(−0.80)	(3.64)	(0.42)
Fin. development	−0.004	0.012*	−0.001	0.015**
	(−0.82)	(2.03)	(−0.17)	(2.71)
GDP per capita	−0.016	0.114***	−0.007	0.126***
	(−1.51)	(7.13)	(−0.65)	(8.78)
Inflation	0.017	−0.123	0.014	−0.267***
	(1.37)	(−1.56)	(1.24)	(−3.77)
Constant	3.772***	2.766***	3.808***	3.747***
	(29.20)	(6.10)	(31.31)	(8.48)
Observations	1463	1030	1463	1030
Countries	65	34	65	34
R^2	0.068	0.331	0.050	0.526
F statistic	20.315	65.148	16.504	213.067

Note: *t* statistics in parentheses.
*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

TABLE 7 Financial structure and income inequality, using first lag of all regressors, 1975–2019.

	(1) All	(2) Low-to-middle income countries	(3) High income countries	(4) All	(5) Low-to-middle income countries	(6) High income countries
Fin. structure (−1)	0.008***	0.013***	−0.003	0.008***	0.010***	0.001
	(2.81)	(4.16)	(−0.72)	(3.98)	(3.67)	(0.31)
Fin. development (−1)	0.011**	−0.004	0.022***	0.015***	−0.002	0.028***
	(2.27)	(−0.93)	(3.79)	(2.74)	(−0.43)	(3.77)
GDP per capita (−1)	0.009	−0.022*	0.032***	0.024***	−0.011	0.044***
	(0.96)	(−1.72)	(3.47)	(2.78)	(−1.04)	(3.47)
Inflation (−1)	0.022*	0.020	−0.132**	0.023*	0.017	−0.179**
	(1.67)	(1.65)	(−2.03)	(1.95)	(1.61)	(−2.58)
Constant	3.393***	3.831***	3.698***	3.500***	3.831***	4.194***
	(29.47)	(26.71)	(10.62)	(35.51)	(32.35)	(11.08)
Observations	2459	1172	1287	2459	1172	1287
Countries	98	51	47	98	51	47
R^2	0.075	0.072	0.217	0.157	0.051	0.373
F statistic	32.263	16.581	64.352	27.102	12.014	47.005

Note: *t* statistics in parentheses.
*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

absence of traditional identifying information such as external instruments. Particularly, the method's instruments are constructed as simple functions of the model's data, and the identification comes from having regressors uncorrelated with the product of heteroscedastic errors (Lewbel, 2012). Both approaches confirm our previous

TABLE 8 Financial structure and income inequality, 1975–2019, instrumental variables regression model using Lewbel's method.

	Net Gini			Gross Gini		
	(1) All	(2) Low-to-middle income countries	(3) High income countries	(4) All	(5) Low-to-middle income countries	(6) High income countries
Fin. structure	0.001	0.027***	−0.027*	−0.001	0.022**	−0.020
	(0.08)	(2.65)	(−1.76)	(−0.10)	(2.38)	(−1.19)
Fin. development	0.003	−0.007	0.050*	0.018	−0.006	0.064*
	(0.12)	(−0.37)	(1.73)	(0.68)	(−0.39)	(1.89)
GDP per capita	0.047	0.017	0.005	0.041	0.025	−0.036
	(1.57)	(0.47)	(0.09)	(1.25)	(0.63)	(−0.59)
Inflation	0.008	0.023*	−0.122	0.012	0.018	−0.079
	(0.54)	(1.75)	(−1.30)	(0.94)	(1.51)	(−0.82)
Years of schooling	−0.057	−0.083**	−0.003	−0.059*	−0.071**	0.047
	(−1.49)	(−2.42)	(−0.05)	(−1.71)	(−2.12)	(0.87)
Trade openness	0.035*	−0.007	0.045	0.045**	−0.008	0.077**
	(1.86)	(−0.35)	(1.46)	(2.21)	(−0.51)	(2.13)
Govt. consumption	−0.020	0.013	−0.096	−0.006	0.011	−0.022
	(−0.82)	(0.87)	(−1.38)	(−0.28)	(0.87)	(−0.34)
Observations	2463	1175	1288	2463	1175	1288
Countries	97	51	46	97	51	46

Note: *t* statistics in parentheses.
*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

TABLE 9 Financial structure and income inequality, 1975–2020 (5-year obs.).

	(1) All	(2) Low-to-middle income countries	(3) High income countries	(4) All	(5) Low-to-middle income countries	(6) High income countries
Fin. structure	0.013***	0.020***	−0.001	0.012***	0.015***	0.004
	(2.84)	(4.87)	(−0.13)	(3.69)	(4.12)	(1.22)
Fin. development	0.007	−0.010	0.024***	0.013*	−0.007	0.031***
	(1.20)	(−1.51)	(3.27)	(1.74)	(−1.20)	(3.42)
GDP per capita	0.015	0.001	0.021***	0.021**	0.007	0.025**
	(1.40)	(0.08)	(3.01)	(2.36)	(0.49)	(2.55)
Inflation	0.026	0.033	−0.149***	0.028	0.028	−0.147***
	(1.23)	(1.61)	(−3.18)	(1.44)	(1.54)	(−2.86)
Constant	3.322***	3.570***	3.896***	3.494***	3.630***	4.231***
	(20.80)	(18.08)	(15.28)	(25.34)	(20.89)	(14.15)
Observations	605	298	307	605	298	307
Countries	99	51	48	99	51	48
R^2	0.088	0.090	0.223	0.160	0.068	0.381
F statistic	52.679	28.858	109.868	47.199	25.785	1201.341

Note: *t* statistics in parentheses.
*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

TABLE 10 Financial structure and income inequality, 1975–2020 (with non-linear FD effect).

	Net Gini			Gross Gini		
	(1) All	(2) Low-to-middle income countries	(3) High income countries	(4) All	(5) Low-to-middle income countries	(6) High income countries
Fin. structure	0.008**	0.016***	−0.004	0.007***	0.012***	0.000
	(2.20)	(4.73)	(−0.86)	(2.92)	(4.06)	(0.02)
Fin. development	0.013**	−0.011*	0.016***	0.019***	−0.004	0.022***
	(2.46)	(−1.94)	(2.70)	(3.27)	(−0.82)	(3.40)
FD squared	0.004***	−0.002**	0.008**	0.006***	−0.000	0.007***
	(3.08)	(−2.28)	(2.63)	(3.71)	(−0.44)	(2.82)
GDP per capita	0.009	−0.008	0.028***	0.018**	−0.002	0.036**
	(0.93)	(−0.60)	(2.92)	(2.03)	(−0.16)	(2.57)
Inflation	0.015	0.021*	−0.196***	0.014	0.017	−0.253***
	(1.11)	(1.75)	(−3.48)	(1.14)	(1.55)	(−4.09)
Constant	3.414***	3.710***	4.030***	3.576***	3.758***	4.605***
	(27.76)	(25.23)	(13.94)	(33.68)	(31.49)	(12.84)
Observations	2493	1190	1303	2493	1190	1303
Countries	99.000	51.000	48.000	99.000	51.000	48.000
R^2	0.100	0.078	0.238	0.204	0.054	0.396
F statistic	31.722	16.275	104.454	32.627	11.054	90.712

Note: *t* statistics in parentheses.
*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

TABLE 11 Financial structure and income inequality (Theil index), 1975–2015.

	(1) All	(2) Low-to-middle income countries	(3) High income countries
Fin. structure	0.036***	0.047***	0.018
	(3.42)	(3.27)	(1.00)
Fin. development	0.083***	0.080***	0.065
	(3.75)	(3.88)	(1.67)
GDP per capita	0.009	−0.143	0.038
	(0.12)	(−1.08)	(0.45)
Inflation	−0.085*	−0.071	−1.302***
	(−1.68)	(−1.39)	(−3.25)
Constant	−3.146***	−1.322	1.788
	(−3.68)	(−1.03)	(0.86)
Observations	1758	704	1054
Countries	94	48	46
R^2	0.069	0.045	0.126
F statistic	30.768	18.146	40.969

Note: *t* statistics in parentheses.
*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

results. Finally, to further validate our results, we split time into non-overlapping 5-year intervals and replace all dependents with their 5-year averages on these intervals. This procedure moderates the potential effect of business cycle fluctuations and allows us to focus on longer-term effects of financial systems. Again, our results (Table 9) hold in this longer-term specification, confirming the lasting effect of financial systems.

As findings in Brei et al. (2023) show non-linear effects of bank- and market-based measures of financial development, we now estimate our main results by including a quadratic term for the financial development variable. Our main result stands: bank-based financial structure reduces inequality in LMIC, different from its effect in the high-income countries, see Table 10.

The main result also extends to a different measure of economic inequality, namely the Theil index (used, e.g., in Garnero et al., 2015; Michaels et al., 2012, and in Buonanno & Vargas, 2019 as an alternative measure of inequality). The Theil index represents an entropic distance of a given distribution of income from the uniform distribution: a zero value of the index corresponds to the equal distribution and higher values show higher levels of inequality. The source of this index is University of Texas Inequality Project (UTIP), with the coverage until 2015. Although this limits the time period, results confirm the positive impact of financial structure on inequality in low-to-middle income countries, see Table 11.

Finally, Tables A.6 and A.7 in the Appendix confirm the main result for alternative measures of financial structure by size and activity of financial institutions and markets.

6 | CONCLUSION

In this article, we have discussed the impact of financial development and financial structure on income inequality. The main idea we advocate is that the way a country's financial system grows has implications for equity. As access to markets is often restricted, financial development through stock market growth disproportionately benefits the rich. The role of intermediated finance is more nuanced as banks themselves are strategic players, and their profit-orientated decisions depend on circumstances. If banks pursue extensive development strategies by covering more customers, the opportunity sets of people expand and inequality may reduce, or at least grow slower than otherwise. Our results show this happens in lower-income and less economically developed countries where intensive development strategies are not profitable enough for banks. At higher levels of development, the inequality-restricting role of banks arrests. Market power amplifies these effects of intermediated finance. Finally, fiscal redistribution reduces the effects of financial system on inequality but is not capable of fully overriding them.

The last result draws attention to the design of fiscal redistribution systems. In particular, our analysis shows existing fiscal approaches are not suitable to oppose the inequality-strengthening effect of financial development. Taxation, the key difference between the net and the gross Gini indexes, does not resolve issues of unequal access to finance or unequal treatment of rich and poor customers by financial intermediaries, which are the key theoretical drivers behind the impact of financial systems on inequality. Instead, the industrial structure of the banking sector exemplifies forces that affect strategic behaviour of financial institutions, and these appear relevant for the finance-inequality nexus. Policies aimed at financial development should account for potential effects on inequality, whereby appropriate regulation of the banking sector may be a feasible option to reduce such effects.

ACKNOWLEDGEMENTS

We would like to thank Ioannis Kyriakou (the Editor), anonymous referees, and participants of the EFiC 2022 Conference in Banking and Corporate Finance for helpful comments. All remaining errors are ours.

DATA AVAILABILITY STATEMENT

Data sharing not applicable to this article as no datasets were generated or analysed during the current study.

ORCID

Dmitri V. Vinogradov https://orcid.org/0000-0002-5426-1690

ENDNOTES

[1] Pan et al. (2022) elucidate the disciplining effect of stock markets in this respect.

[2] Similarly, but on a larger sample of 97 countries over 1989–2012, Brei et al. (2023) find no significant relationships between inequality and bank, market and overall financial development measures in linear models. However, they provide evidence for a U-shaped relationship: at lower levels the financial sector development measures work against inequality, while at higher levels the effect reverses. These results highlight that in order to investigate the differences between potential effects of the banks and markets on inequality, along with separating these effects from those of financial development, one has to account for heterogeneities in development across countries, which is what we do.

[3] The terms 'bank-based' and 'market-based' are used for a short reference to financial systems with relatively more active or larger banking sectors or markets respectively, as measured by the

financial structure variable, following Levine (1999, 2002) and subsequent empirical and theoretical literature (e.g., Beck & Levine, 2002; Degryse & Van Cayseele, 2000; Demirgüç-Kunt & Maksimovic, 2002, etc.).

[4] Deaton (2021) and Clark et al. (2021) find that during the Covid-19 pandemic income inequality diminished, however they attribute this effect to redistributive policies which countered the impact of the pandemic. In fact, Clark et al. (2021) detect an initial rise in inequality before government policies began to work to a full scale. Both studies suggest the inequality-reducing effect may be short-lived.

[5] We follow the World Bank classification to classify countries as high or low-to-middle income and World Economic Outlook to distinguish developing and developed countries. This classification leads to balanced sub-samples and is used in studies likes Luintel et al. (2016). Additionally, we estimate our baseline model for developed (34 countries) and developing countries (65 countries) for robustness.

[6] For example, De Haan and Sturm (2017), among others, use gross Gini index whilst Denk and Cournède (2015) use post-tax Gini index. In addition, some studies use both gross and net Gini indices (e.g., Makhlouf et al., 2020).

[7] Table 3 and Table A.1 in the Appendix shows results are robust to inclusion of additional control variables such as education, government expenditure and trade openness, which for our sample are available up to 2019.

[8] Adding government spending to controls does not change this conclusion, although government spending per se has some inequality reducing effect, see Table 3 and Table A.1 in the Appendix.

REFERENCES

Agarwal, S., Chomsisengphet, S., Liu, C., Song, C., & Souleles, N. S. (2018). Benefits of relationship banking: Evidence from consumer credit markets. *Journal of Monetary Economics*, *96*, 16–32.

Aggarwal, R., & Goodell, J. W. (2009). Markets and institutions in financial intermediation: National characteristics as determinants. *Journal of Banking & Finance*, *33*(10), 1770–1780.

Aghion, P., & Bolton, P. (1997). A theory of trickle-down growth and development. *The Review of Economic Studies*, *64*(2), 151–172.

Allen, F., & Gale, D. (1997). Financial markets, intermediaries, and intertemporal smoothing. *Journal of Political Economy*, *105*(3), 523–546.

Allen, F., & Gale, D. (2004). Competition and financial stability. *Journal of Money, Credit, and Banking*, *36*(3), 453–480.

Antzoulatos, A. A., Koufopoulos, K., Lambrinoudakis, C., & Tsiritakis, E. (2016). Supply of capital and capital structure: The role of financial development. *Journal of Corporate Finance*, *38*, 166–195.

Argente, D., & Lee, M. (2021). Cost of living inequality during the great recession. *Journal of the European Economic Association*, *19*(2), 913–952.

Atkinson, A. B., & Stiglitz, J. (1980). *Lectures on public economics*. McGraw-Hill.

Beck, T., Demirgüç-Kunt, A., & Levine, R. (2007). Finance, inequality and the poor. *Journal of Economic Growth*, *12*(1), 27–49.

Beck, T., & Levine, R. (2002). Industry growth and capital allocation: Does having a market-or bank-based system matter? *Journal of Financial Economics*, *64*(2), 147–180.

Beck, T., Levine, R., & Levkov, A. (2010). Big bad banks? The winners and losers from bank deregulation in the United States. *The Journal of Finance*, *65*(5), 1637–1667.

Becker, G. S., & Tomes, N. (1986). Human capital and the rise and fall of families. *Journal of Labor Economics*, *4*(3, Part 2), S1–S39.

Benston, G. J., & Smith, C. W. (1976). A transactions cost approach to the theory of financial intermediation. *The Journal of Finance*, *31*(2), 215–231.

Berger, A. N., Demirgüç-Kunt, A., Levine, R., & Haubrich, J. G. (2004). Bank concentration and competition: An evolution in the making. *Journal of Money, Credit and Banking*, *36*, 433–451.

Berger, A. N., El Ghoul, S., Guedhami, O., & Saheruddin, H. (2019). *Competition and bank risk: Evidence from geographic bank deregulation*. Available at SSRN 3440918.

Berger, A. N., Klapper, L. F., Peria, M. S. M., & Zaidi, R. (2008). Bank ownership type and banking relationships. *Journal of Financial Intermediation*, *17*(1), 37–62.

Bolton, P., Freixas, X., Gambacorta, L., & Mistrulli, P. E. (2016). Relationship and transaction lending in a crisis. *The Review of Financial Studies*, *29*(10), 2643–2676.

Boot, A. W., & Ratnovski, L. (2016). Banking and trading. *Review of Finance*, *20*(6), 2219–2246.

Boot, A. W., & Thakor, A. V. (1997). Financial system architecture. *The Review of Financial Studies*, *10*(3), 693–733.

Boot, A. W., & Thakor, A. V. (2000). Can relationship banking survive competition? *The Journal of Finance*, *55*(2), 679–713.

Boot, A. W., Thakor, A. V., & Udell, G. F. (1991). Credible commitments, contract enforcement problems and banks: Intermediation as credibility assurance. *Journal of Banking & Finance*, *15*(3), 605–632.

Borensztein, E., Jeanne, O., & Sandri, D. (2013). Macro-hedging for commodity exporters. *Journal of Development Economics*, *101*, 105–116.

Boyd, J. H., & De Nicolo, G. (2005). The theory of bank risk taking and competition revisited. *The Journal of Finance*, *60*(3), 1329–1343.

Braggion, F., Dwarkasing, N., & Moore, L. (2017). Nothing special about banks: Competition and bank lending in Britain, 1885–1925. *The Review of Financial Studies*, *30*(10), 3502–3537.

Brei, M., Ferri, G., & Gambacorta, L. (2023). Financial structure and income inequality. *Journal of International Money and Finance*, *131*, 102807.

Buonanno, P., & Vargas, J. F. (2019). Inequality, crime, and the long run legacy of slavery. *Journal of Economic Behavior & Organization*, *159*, 539–552.

Burgess, R., & Pande, R. (2005). Do rural banks matter? Evidence from the Indian social banking experiment. *American Economic Review*, *95*(3), 780–795.

Chakroun, M. (2020). Threshold effects in the relationship between financial development and income inequality. *International Journal of Finance & Economics*, *25*(3), 365–387.

Chemmanur, T. J., & Fulghieri, P. (1994). Reputation, renegotiation, and the choice between bank loans and publicly traded debt. *Review of Financial Studies*, *7*(3), 475–506.

Chiu, Y. B., & Lee, C. C. (2019). Financial development, income inequality, and country risk. *Journal of International Money and Finance*, *93*, 1–18.

Clark, A., Ambrosio, C., & Lepinteur, A. (2021). *The fall in income inequality during COVID-19 in five European countries*. Paris School of Economics WP 2021-21. halshs-03185534. https://halshs.archives-ouvertes.fr/halshs-03185534

Clarke, G. R., Xu, L. C., & Zou, H. F. (2006). Finance and income inequality: What do the data tell us? *Southern Economic Journal*, *72*(3), 578–596.

De Haan, J., & Sturm, J. E. (2017). Finance and income inequality: A review and new evidence. *European Journal of Political Economy*, *50*, 171–195.

De la Torre, A., Pería, M. S. M., & Schmukler, S. L. (2010). Bank involvement with SMEs: Beyond relationship lending. *Journal of Banking & Finance*, *34*(9), 2280–2293.

Deaton, A. (2021). *Covid-19 and global income inequality (No. w28392)*. National Bureau of Economic Research.

Degryse, H., & Van Cayseele, P. (2000). Relationship lending within a bank-based system: Evidence from European small business data. *Journal of Financial Intermediation*, *9*(1), 90–109.

Demirgüç-Kunt, A., & Maksimovic, V. (2002). Funding growth in bank-based and market-based financial systems: Evidence from firm-level data. *Journal of Financial Economics*, *65*(3), 337–363.

Denk, O., & Cournède, B. (2015). Finance and income inequality in OECD countries. In *OECD economics department working paper 1224*. OECD Publishing.

Diamond, D. W. (1984). Financial intermediation and delegated monitoring. *The Review of Economic Studies*, *51*(3), 393–414.

Diamond, D. W., & Dybvig, P. H. (1983). Bank runs, deposit insurance, and liquidity. *Journal of Political Economy*, *91*(3), 401–419.

Driscoll, J. C., & Kraay, A. C. (1998). Consistent covariance matrix estimation with spatially dependent panel data. *Review of Economics and Statistics*, *80*(4), 549–560.

Ergungor, O. E. (2010). Bank branch presence and access to credit in low-to moderate-income neighborhoods. *Journal of Money, Credit and Banking*, *42*(7), 1321–1349.

Fonseca, A. R., & González, F. (2010). How bank capital buffers vary across countries: The influence of cost of deposits, market power and bank regulation. *Journal of Banking and Finance*, *34*(4), 892–902.

Galor, O., & Moav, O. (2004). From physical to human capital accumulation: Inequality and the process of development. *The Review of Economic Studies*, *71*(4), 1001–1026.

Garnero, A., Kampelmann, S., & Rycx, F. (2015). Minimum wage systems and earnings inequalities: Does institutional diversity matter? *European Journal of Industrial Relations*, *21*(2), 115–130.

Gimet, C., & Lagoarde-Segot, T. (2011). A closer look at financial development and income distribution. *Journal of Banking & Finance*, *35*(7), 1698–1713.

Greenwood, J., & Jovanovic, B. (1990). Financial development, growth, and the distribution of income. *Journal of Political Economy*, *98*(5, Part 1), 1076–1107.

Gupta, S., Davoodi, H., & Alonso-Terme, R. (2002). Does corruption affect income inequality and poverty? *Economics of Governance*, *3*(1), 23–45.

Hasan, I., Horvath, R., & Mares, J. (2020). Finance and wealth inequality. *Journal of International Money and Finance*, *108*, 102161.

Holmström, B., & Tirole, J. (1993). Market liquidity and performance monitoring. *Journal of Political Economy*, *101*(4), 678–709.

Jiménez, G., Lopez, J. A., & Saurina, J. (2013). How does competition affect bank risk-taking? *Journal of Financial Stability*, *9*(2), 185–195.

Keeley, M. C. (1990). Deposit insurance, risk, and market power in banking. *The American Economic Review*, *80*(5), 1183–1200.

Kellard, N., Makhlouf, Y., & Vinogradov, D. (2021). *Income inequality, institutions, and social values: Long-term pas-de-trois. mimeo*. University of Essex.

Kokas, S., Vinogradov, D., & Zachariadis, M. (2020). Which banks smooth and at what price? *Journal of Corporate Finance*, *65*, 101509.

Kpodar, K., & Singh, R. J. (2011). Does financial structure matter for poverty? Evidence from developing countries. In *Evidence from developing countries (December 1, 2011)*. World Bank policy research working paper, (5915).

Kuhn, M., Schularick, M., & Steins, U. I. (2020). Income and wealth inequality in America, 1949–2016. *Journal of Political Economy*, *128*(9), 3469–3519.

Kuznets, S. (1955). Economic growth and income inequality. *The American Economic Review*, *45*(1), 1–28.

Larrain, M. (2015). Capital account opening and wage inequality. *The Review of Financial Studies*, *28*(6), 1555–1587.

Levine, R. (1991). Stock markets, growth, and tax policy. *The Journal of Finance*, *46*(4), 1445–1465.

Levine, R. (1999). *Bank-based and market-based financial systems: Cross-country comparisons* (Vol. 2143). World Bank Publications.

Levine, R. (2002). Bank-based or market-based financial systems: Which is better? *Journal of Financial Intermediation*, *11*(4), 398–428.

Levine, R. (2008). Finance and the poor. *The Manchester School*, *76*(s1), 1–13.

Levine, R., Lin, C., & Xie, W. (2016). Spare tire? Stock markets, banking crises, and economic recoveries. *Journal of Financial Economics*, *120*(1), 81–101.

Lewbel, A. (2012). Using heteroscedasticity to identify and estimate mismeasured and endogenous regressor models. *Journal of Business & Economic Statistics*, *30*(1), 67–80.

Liebersohn, J. (2017). *How does competition affect bank lending? Quasi-experimental evidence from bank mergers*. Working paper. MIT Sloan School of Management.

Luintel, K. B., Khan, M., Leon-Gonzalez, R., & Li, G. (2016). Financial development, structure and growth: New data, method and results. *Journal of International Financial Markets, Institutions and Money*, *43*, 95–112.

Makhlouf, Y., Kellard, N. M., & Vinogradov, D. V. (2020). Finance-inequality nexus: The long and the short of it. *Economic Inquiry*, *58*(4), 1977–1994.

Martinez-Miera, D., & Repullo, R. (2010). Does competition reduce the risk of bank failure? *The Review of Financial Studies*, *23*(10), 3638–3664.

Mavrotas, G., & Vinogradov, D. (2007). Financial sector structure and financial crisis burden. *Journal of Financial Stability*, *3*(4), 295–323.

Meyer, B. D., & Sullivan, J. X. (2013). Consumption and income inequality and the great recession. *American Economic Review*, *103*(3), 178–183.

Michaels, G., Rauch, F., & Redding, S. J. (2012). Urbanization and structural transformation. *The Quarterly Journal of Economics*, *127*(2), 535–586.

Pan, Y., Pikulina, E. S., Siegel, S., & Wang, T. Y. (2022). Do equity markets care about income inequality? Evidence from pay ratio disclosure. *The Journal of Finance*, *77*(2), 1371–1411.

Pástor, Ľ., & Veronesi, P. (2021). Inequality aversion, populism, and the backlash against globalization. *The Journal of Finance*, *76*(6), 2857–2906.

Paulson, A. L., & Townsend, R. (2004). Entrepreneurship and financial constraints in Thailand. *Journal of Corporate Finance*, *10*(2), 229–262.

Petersen, M., & Rajan, R. (1994). The benefits of firm-creditor relationships: Evidence from small business data. *Journal of Finance*, *49*, 3–37.

Petersen, M. A., & Rajan, R. G. (1995). The effect of credit market competition on lending relationships. *The Quarterly Journal of Economics*, *110*(2), 407–443.

Piketty, T. (2014). *Capital in the twenty-first century*. Belknap Press of Harvard University Press.

Piketty, T., Yang, L., & Zucman, G. (2019). Capital accumulation, private property, and rising inequality in China, 1978–2015. *American Economic Review*, *109*(7), 2469–2496.

Piketty, T., & Zucman, G. (2014). Capital is back: Wealth-income ratios in rich countries, 1700–2010. *Quarterly Journal of Economics*, *123*, 1155–1210.

Reuveny, R., & Li, Q. (2003). Economic openness, democracy, and income inequality: An empirical analysis. *Comparative Political Studies*, *36*(5), 575–601.

Selim, P. M., & Güngör, H. (2021). Inequality and financial development: Evidence from selected MENA region countries. *International Journal of Finance & Economics*, *26*(2), 2732–2747.

Sette, E., & Gobbi, G. (2015). Relationship lending during a financial crisis. *Journal of the European Economic Association*, *13*(3), 453–481.

Seven, U., & Coskun, Y. (2016). Does financial development reduce income inequality and poverty? Evidence from emerging countries. *Emerging Markets Review*, *26*, 34–63.

Shi, Y., Paul, S., & Paramati, S. R. (2022). The impact of financial deepening on income inequality: Empirical evidence from Australia. *International Journal of Finance & Economics*, *27*(3), 3564–3579.

Stiglitz, J. E. (1969). Distribution of income and wealth among individuals. *Econometrica: Journal of the Econometric Society*, *37*, 382–397.

Stiglitz, J. E. (1974). Incentives and risk sharing in sharecropping. *The Review of Economic Studies*, *41*(2), 219–255.

Stiglitz, J. E. (1993). Banks versus markets as mechanisms for allocating and coordinating investment. NBER preprint no. 1821, December 1993; reprinted in "Selected works of Joseph E. Stiglitz: Volume II: Information and economic analysis: Applications to capital, labor and product markets".

Stiglitz, J. E., & Weiss, A. (1981). Credit rationing in markets with imperfect information. *The American Economic Review*, *71*(3), 393–410.

Vinogradov, D. (2011). Banks, credibility and macroeconomic evolution after a production shock. *The Manchester School*, *79*(3), 480–509.

Vinogradov, D. (2012). Destructive effects of constructive ambiguity in risky times. *Journal of International Money and Finance*, *31*(6), 1459–1481.

Vinogradov, D., & Makhlouf, Y. (2021). Two faces of financial systems: Provision of services versus shock-smoothing. *Journal of International Financial Markets, Institutions and Money*, *75*, 101456.

Wigley, S. (2017). The resource curse and child mortality, 1961–2011. *Social Science & Medicine*, *176*, 142–148.

Zhang, R., & Naceur, S. B. (2019). Financial development, inequality, and poverty: Some international evidence. *International Review of Economics & Finance*, *61*, 1–16.

SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

How to cite this article: Makhlouf, Y., Kellard, N. M., & Vinogradov, D. V. (2025). Banks, financial markets, and income inequality. *International Journal of Finance & Economics*, *30*(1), 117–133. https://doi.org/10.1002/ijfe.2910