Why does the nexus between finance and inequality break in times of financialisation?

Empirical evidence for the European Union countries

Ricardo Barradas

Abril de 2023

WP n.º 2023/01

DOCUMENTO DE TRABALHO

WORKING PAPER

dinamia'cet _iscte
Centro de Estudos sobre a Mudança Socioeconómica e o Território

iscte INSTITUTO UNIVERSITÁRIO DE LISBOA

FCT Fundação para a Ciência e a Tecnologia

Why does the nexus between finance and inequality break in times of financialization?

Empirical evidence for the European Union countries

Ricardo Barradas*

WP n. º 2023/01

DOI: 10.15847/dinamiacet-iul.wp.2023.01

Why does the nexus between finance and inequality break in times of financialization? Empirical evidence for the European Union countries[1]

ABSTRACT

The majority of policy makers in developed countries have, since the 1970s and 1980s, put in place a strong process for the liberalization, deregulation and privatization of the financial system, particularly persuaded by the mainstream assumption that this represents the best strategy to sustain the growth of finance, enhance economic growth and lessen inequality. Nonetheless, economic growth has been quite anaemic in the majority of developed countries, and inequality has continued to widen in the last four decades, which feeds non-mainstream beliefs regarding the disruptive role played by the growth of finance in contemporary societies in times of financialization. This paper aims to contribute to the current debate between the mainstream and the non-mainstream literature on the effect of the growth of finance on the level of inequality by performing a panel data econometric analysis for all the European Union countries from 1980 to 2019. Our findings confirm that finance, economic growth, educational attainment and degree of trade openness have a positive long-term effect on the level of inequality in the European Union countries, whilst government spending has a negative impact in the short term. Our findings imply that policy makers should rethink the functioning of the financial system and adopt public policies that are more in favour of the poor in order to constrain the growth of inequality in the European Union countries.

KEYWORDS

Financial Growth, Financialization, Inequality, European Union, Panel Autoregressive Distributed Lag, Dynamic Fixed-Effects Estimator

JEL CLASSIFICATION: C23, D31, D63 and E44

[1] The authors thank the helpful comments and suggestions of Hashem Pesaran, Jan Ditzen and Ron Smith. The usual disclaimer applies.

1. INTRODUCTION

Inequality has continued to widen all over the world, and has even reached its historical maximum level in some countries in the last few years (Zalewski and Whalen, 2010; Piketty, 2014; Haan and Sturm, 2017; Westcott and Murray, 2017; Bolarinwa *et al*., 2021). This translates into a great scourge for contemporary societies because of its deleterious effects, which include the following: the spread of destitution, criminality, corruption, injustice, insider privilege, unequal opportunities and social-political unrest (Tan and Law, 2012); hunger, poor health and a fall in life expectancy at birth (Claessens and Perotti, 2007; Bolarinwa *et al*., 2021); the rise of abstentions in elections, the proliferation of populism, the emergence of more extreme political parties, the recurrence of more defragmented parliaments and the absence of political majorities and, consequently, less political stability; the growth of the informal sector (Claessens and Perotti, 2007); a decrease in entrepreneurial activities and consequent harmful effects on labour productivity and on productive investment (Claessens and Perotti, 2007); weak economic growth and an increase in unemployment, due to higher levels of taxation to implement public policies to mitigate inequality (Seven and Coskun, 2016); the recurrence of episodes of financial and economic crisis due to the greater indebtedness of poorer people as a way to overcome their stagnant wages and maintain their consumption standards (Haan and Sturm, 2017; Romão and Barradas, 2022); and even climate change.

Moreover, inequality tends to exhibit a strong persistence over time (Liang, 2006; Beck *et al*., 2007; Kus, 2012; Tan and Law, 2012; Seven and Coskun, 2016; Adeleye *et al*., 2017; Meniago and Asongu, 2018; Lee and Siddique, 2021; Barradas and Lakhani, 2022), due to the transmission through families of both wealth and ability, the imperfections of the financial markets, geographical or local segregation and self-fulfilling beliefs (Piketty, 2000). This requires the adoption of various public policies that could be inequality-constraining, and imposes the need to gain a better understanding of the role played by the financial system on the level of inequality, particularly because of the contradictory views between the mainstream literature and the non-mainstream literature.

The mainstream view is that the growth of finance tends to constrain inequality by promoting easier access to financial services for those who are poorer (Greenwood and Jovanovic, 1990). The non-mainstream view is that the growth of finance tends to enhance inequality by contributing to anaemic economic growth (Tridico and Pariboni, 2018; Barradas, 2020, 2022b; Pariboni *et al*., 2020), by failing to provide democratized access to financial services for all people (Seven and Coskun, 2016), by favouring banking systems with strong market power (Claessens and Perotti, 2007; Arora, 2012), by promoting more economic downturns and a consequent increase in unemployment (Seven and Coskun, 2016; Haan and Sturm, 2017), by feeding asset

price booms (Hein, 2012; Lagoa and Barradas, 2021), by pushing down (up) the labour income (profit) share (Hein, 2012; Barradas and Lagoa, 2017; Barradas, 2019), by sustaining the flows related to foreign direct investment that are more detrimental to low-skilled and unskilled workers (Jaumotte *et al*., 2013) and by exacerbating the political power of the financial elites and the consequent adoption of various public policies and practices that favour the rich (Kaldor, 2021; Lagoa and Barradas, 2021). Empirical evidence has also provided mixed results that corroborate both the mainstream and the non-mainstream literature.

This paper aims to contribute to the current debate between the mainstream and the non-mainstream literature on the role played by the growth of finance in relation to the level of inequality by performing a panel data econometric analysis for all the European Union (EU) countries from 1980 to 2019. This paper extends the existing literature by offering at least five different contributions. First, it assesses the nexus between finance and inequality; the empirical evidence on this is scarce due to the proliferation of econometric works on the nexus between finance and economic growth (Arora, 2012; Tan and Law, 2012; Adeleye *et al*., 2017; Meniago and Asongu, 2018; Nandelenga and Oduor, 2020). Secondly, this paper focuses on the EU countries in a context in which the majority of econometric works are centred on the developing countries (Tan and Law, 2012; Seven and Coskun, 2016; Adeleye *et al*., 2017; Meniago and Asongu, 2018; Nandelenga and Oduor, 2020; Bolarinwa *et al*., 2021). The EU countries represent a very interesting case study for two different reasons. On the one hand, the EU countries, like most developed countries, have experienced a sharper increase in the level of inequality in the last few decades in comparison to the developing countries (Makhlouf *et al*., 2020). On the other hand, the EU countries have had a strong process of liberalization, deregulation and privatization of the financial system since the 1970s and 1980s, which has contributed to a strong growth of finance during that time (Figures A7 to A10 in the Appendix) but along a path of anaemic economic growth (Figure A11 in the Appendix) and a trend of growing and severe inequality (Figures A1 to A6 in the Appendix), contradicting the mainstream beliefs regarding the supportive role played by the growth of finance in contemporary societies in times of financialization. Thirdly, this paper employs three different variables as proxies for the level of inequality (the Gini coefficient, the top 1% income share and the top 10% income share), aiming to take into account the overall distribution of income in a country and to isolate the wealthy cohort of each country, who typically have other sources of income (Furceri and Lougani, 2015; Makhlouf *et al*. 2020). Fourthly, this paper measures the variables that are proxies for the level of inequality in terms of pre-tax and pre-transfer values (i.e., as gross values, with the aim of assessing inequality before income redistribution) and as post-tax and post-transfer values (i.e., as net values, with the aim of assessing inequality after income redistribution), which allows a broad picture related to inequality to be obtained, namely extending to the public intervention to mitigate inequality

(Makhlouf *et al*., 2020). Fifthly, this paper uses four different variables as proxies for the role of finance (credit, credit-to-deposit ratio, liquid liabilities and stock market capitalization), in order to reflect the different aspects of finance (e.g., size, activity, depth, access, efficiency and stability) and the roles played by different financial intermediaries (e.g., banks and financial markets) in the widening of inequality in times of financialization (Beck *et al*., 2014; Breitenlechner *et al*., 2015; Adeleye *et al*., 2017). Sixthly, this paper relies on a panel autoregressive distributed lag framework, which allows the long-term and short-term determinants of inequality in the EU countries to be distinguished. Note that the majority of econometric works on the nexus between finance and inequality use static models and/or dynamic models based on a generalized method of moments estimator, which only models the short-term determinants and tends to generate inefficient and inconsistent estimates in the case of macro panels with a relatively small number of cross-sectional units (countries) (Makhlouf *et al*., 2020).

We estimate a linear model and a non-linear model by employing a panel autoregressive distributed lag approach and relying on the dynamic fixed-effects (DFE) estimator because of the existence of variables that are stationary in levels and stationary in the first differences (Pesaran and Smith, 1995; Pesaran, 1997; Pesaran *et al*., 1997, 1999). Our findings confirm that finance, economic growth, educational attainment and degree of trade openness exert a positive long-term effect on the level of inequality in the European Union countries, whilst government spending has a negative impact in the short term. All of these findings are robust to the different proxies chosen. Our findings imply that policy makers should rethink the functioning of the financial system and adopt more public policies that favour the poor in order to constrain the widening of inequality in the European Union countries.

This paper is organized as follows. In Section 2, we provide the theoretical and empirical evidence on the nexus between finance and inequality in times of financialization. Section 3 presents the linear model and the non-linear model to estimate the level of inequality, and derives the respective hypotheses. In Section 4, we describe the dataset. Section 5 explains the economic framework that is employed to produce the estimates. The empirical findings are presented and discussed in Section 6. Section 7 concludes, presents the main policy implications and suggests further research.

2. THE NEXUS BETWEEN FINANCE AND INEQUALITY IN TIMES OF FINANCIALIZATION: THEORETICAL AND EMPIRICAL EVIDENCE

It is widely acknowledged that the majority of policy makers in the more developed economies have been promoting a strong process of liberalization, deregulation and privatization

of the financial system since the 1970s and 1980s as an excuse to curb financial repression, to boost the growth of finance and the consequent financial development, to stimulate economic growth and to narrow inequality (Barradas, 2016; Barradas and Lakhani, 2022). This strategy has clearly been fostered by the conventional economic theory about the beneficial role of the financial system in promoting an acceleration of economic growth and a reduction of inequality, for which there has been strong empirical evidence.

On the theoretical side, the growth of finance tends to be growth-enhancing in line with the so-called 'supply-leading hypothesis' (Alexiou *et al*., 2018) and the so-called 'intermediation or financial facilitator view' (Beck *et al*., 2014). The idea is that the growth of finance allows a better reallocation between savings and productive investments, and the consequent development of non-financial sectors (Levine, 2005; Ang, 2008; Beck *et al*., 2014; Arestis *et al*., 2015). This supportive or optimistic view of the effect of the growth of finance on economic growth also suggests that inequality fades because information and transaction costs, which are particularly detrimental for the poor, are reduced (Jalilian and Kirkpatrick, 2002; Beck *et al*., 2007; Seven and Coskun, 2016). This view rests on the seminal work of Kuznets (1955), according to which there is a concave quadratic (non-linear) relationship between finance and inequality, which sustains the idea that economic growth has an inverted U-shaped effect on inequality and that economic growth only negatively affects inequality after reaching a certain threshold. This is the so-called Kuznets curve, according to which there is a positive relationship between economic growth and inequality in the short term and a negative relationship in the long term (i.e., after the threshold has been reached). Several reasons could explain this duality in the effects of economic growth on inequality in the short term and in the long term. First, Kuznets (1955) argues that this is due to a transference of low-skilled workers from sectors with lower levels of productivity to sectors with higher levels of productivity, in a context where low-skilled workers will continue to have lower wages in comparison to the wages received by high-skilled workers in the short-term, that is, after the shift between the sectors, which will contribute to amplifying inequality. In the long term, Kuznets (1955) stresses that inequality will decline because of the greater equality in the wages received by low-skilled workers and high-skilled workers. Secondly, Barro (2000) emphasises that economic growth exerts a positive effect on inequality in the short term, which will incite socio-political unrest that tends to reduce inequality in the long term because of the adoption of pro-poor policies to contain these tensions. Thirdly, Bolarinwa *et al*. (2021) stress that economic growth exerts a negative effect on inequality in the long term because of its redistributive effects.

Also on the theoretical side, the growth of finance tends to constrain inequality by allowing the reduction of credit constraints and transaction costs, which improves the access of poorer people

to financial services and, therefore, attenuates inequality (Greenwood and Jovanovic, 1990)[2]. On the one hand, this happens because the growth of finance allows the financial institutions to start to serve many more customers and, particularly, to serve those who were previously incapable of obtaining loans, because of the consequent alleviation of entry barriers, the rise in competition, the decrease in prices, the improvement in the efficiency of capital allocation and the expansion of their activities to customers who are riskier and poorer (i.e., the so-called 'extensive margin') (Galor and Zeira, 1993; Beck *et al*., 2007; Adeleye *et al*., 2017; Makhlouf *et al*., 2020). On the other hand, it happens because the growth of finance increases the accessibility of credit even for poorer people, due to the consequent higher availability of credit, the deterioration of creditworthiness standards, financial innovation and engineering (e.g., debt securitization and the 'originate to distribute' strategies of banks), the rise of competition among financial institutions and the adoption of more aggressive commercial campaigns in the credit segment, the emergence of new financial instruments (e.g., home equity loans and credit cards with high credit limits and/or without any credit limits), technological enhancement of the methods used to obtain information about the credit risk of potential borrowers, and the slackening of financial regulations (Boone and Girouard, 2002; Cynamon and Fazzari, 2008; Stockhammer, 2009; Hein, 2009, 2012; Justiano *et al*., 2019).

On the empirical side, we can identify several econometric works that support the beneficial effect of finance on economic growth and on inequality. Atje and Jovanovic (1993), King and Levine (1993a, 1993b), Levine (1997), Levine and Zervos (1998), Luintel and Khan (1999), Ang (2008), Boubakari and Jin (2010), Falahaty and Hook (2013), Valickova *et al*. (2014), Arestis *et al*. (2015), Seven and Yetkiner (2016) and Shahbaz *et al*. (2022) report a positive (linear) relationship between finance and economic growth. Li *et al*. (1998), Das and Mohapatra (2003), Clarke *et al*. (2006), Beck *et al*. (2007), Gimet and Lagoarde-Segot (2011), Hamori and Hashiguchi (2012), Li and Yu (2014), Rashid and Intarglia (2017), Rewilak (2017), Meniago and Asongu (2018), Jung and Vijverberg (2019) and Thornton and Di Tommaso (2019) report a negative (linear) relationship between finance and inequality. Kim and Lin (2011), Law *et al*. (2014) and Chiu and Lee (2019) report a concave quadratic (non-linear) relationship between finance and inequality that confirms that finance has an inverted U-shaped effect on inequality and that finance only negatively affects inequality after reaching a certain threshold.

[2] As posited by Galor and Zeira (1993), Beck *et al*. (2007), Claessens and Perotti (2007), Kim and Lin (2011) and Tan and Law (2012), the poorer face more financial constraints as a result of their lower likelihood of repaying loans, and are the most affected by financial market imperfections, information asymmetries, moral hazard problems, contract enforcement costs, transaction costs, screening costs and monitoring costs because of their lack of collateral, credit histories and connections. Nonetheless, poorer people have higher levels of demand for financial services, especially for credit, because of their 'expenditure cascade' or 'keeping up with the Joneses' behaviour, in terms of consumption of durable goods and/or conspicuous consumption (Gonçalves and Barradas, 2021; Barradas, 2022a). As emphasized by these authors, this occurs because poorer people tend to imitate the lifestyle and consumption standards of richer people because of the strong influence of advertising, marketing and mass media on the attractiveness and temptingness of the new goods and services that are constantly released, such as smartphones and other technological devices (Cynamon and Fazzari, 2008; Barba and Pivetti, 2009).

Nonetheless, economic growth has been quite anaemic in the majority of the developed countries (Tridico and Pariboni, 2018; Barradas, 2020, 2022b; Pariboni *et al*. 2020), and inequality has continued to widen in recent decades (Zalewski and Whalen, 2010; Piketty, 2014; Haan and Sturm, 2017; Westcott and Murray, 2017; Bolarinwa *et al*., 2021), which refutes the mainstream claims regarding the supportive role of the financial system and also clearly shows that the strategy around the liberalization, deregulation and privatization of the financial system since the 1970s and 1980s has been ineffective.

Effectively, the non-mainstream literature has successively highlighted that the growth of finance, a phenomenon that is commonly treated as financialization, has been prejudicial in contemporary societies in recent decades by having many harmful effects on economies and on societies that arise from an excessive financial deepening that has occurred simultaneously with an environment of strong financial liberalization and deregulation.

This strand of the literature presents several explanations of why the nexus between finance and inequality breaks in times of financialization[3]. In what follows, we discuss each of these in more detail. First, the growth of finance contributes to anaemic economic growth in times of financialization (Tridico and Pariboni, 2018; Barradas, 2020, 2022b; Pariboni *et al*., 2020), and this also leads to the widening of inequality through the aforementioned Kuznets curve and the consequent reduction in redistributive effects (Kuznets, 1955; Bolarinwa *et al*., 2021).

Secondly, the growth of finance does not provide democratized access to financial services and, particularly, to credit for all people, which contributes to a widening of inequality in times of financialization (Seven and Coskun, 2016). As stressed by Makhlouf *et al*. (2020), the growth of finance has not prevented the increase in inequality in times of financialization because the majority of financial institutions operate on the so-called 'intensive margin' by favouring existing richer customers instead of promoting access to financial services for new poorer customers. Effectively, the growth of finance has only contributed to increasing the leverage of richer people, in a context where poorer people continue to face many difficulties in accessing financial services and credit, being required to use their savings (if they have any) or to rely on family contacts and on the informal sector to fund their investments in education, health and entrepreneurship, which slows the reduction in inequality (Antzoulatos *et al*., 2016; Beck *et al*., 2007; Seven and Coskun, 2016). As the majority of financial institutions do not operate on the so-called 'extensive margin', the spiral of low income, poor investment in education, health and entrepreneurship, low income, and so on is not interrupted, condemning future generations, too, to a situation of poverty (Arora, 2012; Meniago and Asongu, 2018).

[3] Tridico and Pariboni (2018), Barradas (2020, 2022b) and Pariboni *et al*. (2020) also discuss several explanations of why the nexus between finance and economic growth has been broken in times of financialization.

Thirdly, the growth of finance does not translate into strong competition between financial institutions because of imperfect institutional development and the absence of reforms to improve access for new and/or foreign financial institutions, which promotes the existence of high levels of market concentration and strong market power in banking activity and, consequently, a rise in inequality in times of financialization (Claessens and Perotti, 2007; Arora, 2012). The poor tend to be the most affected by the liberalization, deregulation and privatization of the financial system in times of financialization, particularly because of the consequent elimination of both interest rate ceilings and state-directed credit programmes (Claessens and Perotti, 2007; Ang, 2008; Ehigiamusoe and Lean, 2017). The rich tend to benefit most from these reforms, as a result of their preferential allocation of licences, their preferential positions in auctions and/or their greater ability to obtain credit to participate in privatizations through public offerings (Claessens and Perotti, 2007; Barradas *et al*., 2018).

Fourthly, the growth of finance in times of financialization is reflected in a higher incidence of crises with their epicentre in the financial system, a higher recurrence of corporate financial scandals and frauds, a greater vulnerability of banking systems, the emergence of inflation episodes, a greater volatility of aggregate demand and a higher prevalence of financial instability due to recurring financial bubbles and bursts (Rousseau and Wachtel, 2011; Barajas *et al*, 2013; Dabla-Norris and Srivisal, 2013; and Tridico and Pariboni, 2018). These features occur because of the absence of strong political and economic institutions and/or hard supervision which represent a constraint on the decline of inequality in the face of more economic downturns and the consequent increase in unemployment (Seven and Coskun, 2016; Haan and Sturm, 2017). As noted by Claessens and Perotti (2007), these downturn episodes are particularly harmful to the poor, because their costs (e.g., bailouts to financial institutions) are spread through society through higher levels of taxation and/or public debt, with strong regressive effects. In the same vein, Lagoa and Barradas (2021) add that these downturn episodes require the implementation of austerity measures based on internal devaluation (i.e., wage restraint) and higher fiscal discipline through the imposition of public policies that are inequality-enhancing, such as cuts in social benefits for poorer people, increased taxes and the deregulation and flexing of labour relations at the level of unemployment benefits, employment protection, employment rights and minimum wages.

Fifthly, the growth of finance feeds asset price booms in times of financialization, and these have also limited falls in inequality (Hein, 2012; Lagoa and Barradas, 2021). Effectively, asset price booms are especially beneficial for the rich because the rich have a higher engagement in the financial markets for short-term gains and speculative income (Lee and Siddique, 2021). Richer people hold more assets than poorer people because they benefit from more remuneration schemes in the form of stock options, and typically use these as collateral to buy more and more assets (Edison and Sløk, 2011; Hein, 2012; Westcott and Murray, 2017). Tax systems also boost

inequality because income from these assets (e.g., interest, dividends, rents and capital gains) are taxed at lower levels than other sources of income (e.g., wages). Note also that non-financial corporations increase their financial investments *vis-à-vis* their productive investments in times of financialization, to generate greater short-term profits and satisfy impatient shareholders, and this has harmful effects on innovation, research and development, technological progress, productive investments, labour productivity, economic growth, job creation and inequality (Correia and Barradas, 2021; Lee and Siddique, 2021).

Sixthly, the growth of finance promotes the importance of the financial sector *vis-à-vis* the non-financial sector in times of financialization, and this has contributed to the decrease (increase) of the labour income (profit) share and, therefore, to the widening of inequality (Hein, 2012; Barradas and Lagoa, 2017a; Barradas, 2019)[4]. On the one hand, the increasing importance of the financial sector has supported the weakening of several public policies and institutions that constrain inequality (e.g., minimum wages and trade unions) (Kus, 2012). On the other hand, the decreasing importance of the non-financial sector has reinforced the shrinkage of the profitability of its corporations and the consequent reduction of the wages of the middle class and the blue-collar workers, with detrimental effects on inequality (Kus, 2012).

Seventhly, the growth of finance sustains the flows related to foreign direct investment in the wake of the liberalization of trade and capital mobility, and the consequent emergence of multinational corporations that act as nomads by successively shifting their productive capacity to high-skilled and low-wage countries, which tends to exacerbate inequality all over the world (Ehigiamusoe and Lean, 2017; Tridico and Pariboni, 2018). In the more developed countries, the outward flows shrink job opportunities in low-skilled and low-wage industries, aggravating inequality between the employed and the unemployed (Jaumotte *et al*., 2013). In the developing countries, but also in the more developed countries, the inward flows are channelled to high-skilled and high-wage industries, worsening inequality through the higher gap between the wages received by low-skilled and those received by high-skilled workers (Jaumotte *et al*., 2013).

Eighthly, the growth of finance exacerbates the political power of financial elites in times of financialization, and these elites persuade policy makers to embrace pro-rich policies and practices, which intensifies inequality and does not confirm the mainstream beliefs around the so-called 'trickle-down theory' or 'horse and sparrow theory' (Kaldor, 2021; Lagoa and Barradas, 2021). Zalewski and Whalen (2010), Kus (2012), Tridico and Pariboni (2018) and Pariboni *et al*. (2020) provide several examples, such as public policies based on supply-side economics, liberal orientations, the *laissez-faire* paradigm, the abandonment of Keynesian policies and full

[4] Hein (2012) asserts that the increasing (decreasing) importance of the financial (non-financial) sector contributes to the decrease (increase) of the labour income (profit) share because the labour income (profit) share in the non-financial sector is larger (smaller) that in the financial sector.

employment goals, the liberalization of trade and capital mobility, the deregulation and flexing of labour relations, tax advantages for corporations and capital, privatization, and retrenchment of the welfare state. Tridico and Pariboni (2018) also present other examples, such as practices based on the spread of 'shareholder value orientation', the rise of compensation for top management, the increase in outsourcing, the surge in job precariousness and the deterioration of workers' bargaining power. As noted by Westcott and Murray (2017) and Lee and Siddique (2021), all of these public policies and practices widen inequality by implying an income extraction from the poorer (e.g., workers, taxpayers, debtors, suppliers and managers) to the richer (e.g., shareholders).

From an empirical point of view, we can identify several econometric works that confirm the detrimental role played by finance in relation to economic growth and inequality, supporting beliefs in the presence of a new 'secular stagnation' (Pariboni *et al*., 2020) and a trend of growing and severe inequality in times of financialization (Piketty, 2014). Rioja and Valev (2004a, 2004b), Aghion *et al*. (2005), Kose *et al*. (2006), Prasad *et al*. (2007), Rousseau and Wachtel (2011), Breintenlechner *et al*. (2015), Ehigiamusoe and Lean (2017), Alexiou *et al*. (2018), Redmon and Nasir (2020), Barradas (2020, 2022b) and Shahbaz *et al*. (2022) report a negative (linear) relationship between finance and economic growth. Liang (2006), Motonishi (2006), Tan and Law (2009), Rodrigues-Pose and Tselios (2009), Roine *et al*. (2009), Ang (2010), Kus (2012), Jaumotte *et al*. (2013), Jauch and Watzka (2015, 2016), Sehrawat and Giri (2015), Seven and Coskun (2016), Haan and Sturm (2017), Altunbas and Thornton (2018) and Barradas and Lakhani (2022) report a positive (linear) relationship between finance and inequality. Cecchetti and Kharroubi (2012), Barajas *et al*. (2013), Dabla-Norris and Srivisal (2013), Beck *et al*. (2014), Barradas (2020) and Pariboni *et al*. (2020) report a concave quadratic (non-linear) relationship between finance and economic growth, and Tan and Law (2012) and Barradas and Lakhani (2022) report a convex quadratic (non-linear) relationship between finance and inequality, which confirms that finance has an inverted U-shaped effect on economic growth and a U-shaped effect on inequality and that finance only positively affects economic growth and inequality up to when it reaches a certain threshold[5].

This paper aims to contribute to the current debate between the mainstream and the non-mainstream literature on the role played by the growth of finance on the level of inequality by performing a panel data econometric analysis for all the EU countries from 1980 to 2019.

[5] Makhlouf *et al*. (2020) find similar results by reporting that finance exerts a negative effect on inequality in the short term and a positive effect in the long term (i.e., after reaching a certain threshold). These authors interpret these results by claiming that the aforementioned 'extensive margin' ('intensive margin') overcomes the 'intensive margin' in the short term (long term).

3. LINEAR AND NON-LINEAR MODELS AND HYPOTHESES

Our long-term models to assess the nexus between finance and inequality in all the EU countries take the following forms:

$$I_{i,t} = \beta_0 + \beta_1 F_{i,t} + \beta_2 X_{i,t} + \alpha_{i,t} \quad \textbf{(1)}$$

$$I_{i,t} = \beta_0 + \beta_1 F_{i,t} + \beta_2 F_{i,t}^2 + \beta_3 X_{i,t} + \alpha_{i,t} \quad \textbf{(2)}$$

where *i* is the country, *t* is the time period (year), *I* is the level of inequality, *F* is the proxy to assess the role of finance, *X* is a set of control variables that have been shown both theoretically and empirically to be important determinants of inequality, and α is the two-way error term component to take into account unobservable country-specific and time-specific effects.

The first model aims to take into account a positive (linear) or a negative (linear) relationship between finance and inequality, and the second model aims to consider a concave quadratic (non-linear) or a convex quadratic (non-linear) relationship between finance and inequality. As discussed previously, finance has been strongly inequality-enhancing in times of financialization, which means that finance should exert a positive linear effect on inequality in the first model and a convex quadratic effect on inequality in the second model. This expected U-shaped relationship between finance and inequality in the second model implies that finance should exert a negative effect on inequality and that its squared term should exert a positive effect on inequality. This is used to define the respective threshold (minimum) of the expected convex quadratic function, according to which the relationship between finance and inequality is negative up to this threshold and positive after that. The estimated coefficients are used to define the respective threshold – F^* – through the following formula:

$$\left(\beta_1 F_{i,t} + \beta_2 F_{i,t}^2\right)' = 0 \Leftrightarrow \beta_1 + 2\beta_2 F^* = 0 \Leftrightarrow F^* = \frac{-\beta_1}{2\beta_2} \quad \textbf{(3)}$$

As in the empirical works of Das and Mohapatra (2003), Beck *et al*. (2007), Kim and Lin (2011), Li and Yu (2014), Seven and Coskun (2016), Haan and Sturm (2017), Rashid and Intarglia (2017), Rewilak (2017), Altunbas and Thornton (2018), Bolarinwa *et al*. (2021), Lee and Siddique (2021) and Barradas and Lakhani (2022), we use the growth rate of the GDP *per capita*, the square of

the growth rate of the GDP *per capita*, the inflation rate, the educational attainment, the government spending and the degree of trade openness as control (independent) variables in our two models.

We include the growth rate of the GDP *per capita* and its square because of the theoretical predictions of the aforementioned Kuznets curve, according to which economic growth should exert a concave quadratic effect on inequality (Kuznets, 1955). This expected inverted U-shaped relationship between economic growth and inequality implies that the growth rate of the GDP *per capita* should have a positive effect on inequality and its square term should have a negative effect on inequality. This is used to define the threshold (maximum) of the expected concave quadratic function, according to which the relationship between economic growth and inequality is positive up to this threshold and negative after it. The estimated coefficients are used to define the respective threshold – EG^* – through the following formula:

$$\left(\beta_3 EG_{i,t} + \beta_4 EG_{i,t}^2\right)' = 0 \Leftrightarrow \beta_3 + 2\beta_4 EG^* = 0 \Leftrightarrow EG^* = \frac{-\beta_3}{2\beta_4} \quad \textbf{(4)}$$

The inflation rate is included in order to control for the macroeconomic environment (Beck *et al*., 2007). As postulated by Kim and Lin (2011) and Meniago and Asongu (2018), the inflation rate should have a positive impact on inequality for three different reasons. The first highlights that high-inflation episodes are more detrimental for the poor than the rich because the former lose relatively more purchasing power than the latter. The second states that high-inflation episodes are more detrimental for the poor than the rich because it is more difficult for the former to access financial instruments that would allow them to hedge against inflation. The third asserts that high-inflation episodes are more detrimental for the poor than the rich because the former hold more cash *vis-à-vis* other financial or real assets, in a context in which inflation tends to be similar to a hidden and highly regressive tax.

We include educational attainment in order to control for the accumulation of human capital, which should exert a negative influence on inequality for two different reasons (Kim and Lin, 2011). The first of these underlines the fact that an increase in educational attainment allows a rise in the supply of human capital, which reduces inequality through the smaller gap in the wages received by skilled and unskilled workers. The second one recognises that an increase in educational attainment encourages more technological innovation, which reduces inequality through the rise in the demand for skilled workers to incorporate new technologies into the production process. Makhlouf *et al*. (2020) also add that educational attainment is positively

associated with financial literacy and, therefore, negatively associated with inequality because of the consequent higher ability to make competent financial decisions.

Government spending is included among our independent variables in order to take into account its redistributive function through the tax system and social benefits towards the poor, the provision of public goods and the welfare state intervention, which should have a negative impact on inequality (Kim and Lin, 2011; Bolarinwa *et al*., 2021).

Inequality should also depend positively on the degree of trade openness, according to the Heckscher–Ohlin–Samuelson theory (Kim and Lin, 2011; Bolarinwa *et al*., 2021). Effectively, this theory postulates that greater trade openness fosters a rise in the returns from the abundant capital (labour) and/or skilled (unskilled) labour in more developed (developing) countries due to their greater specialization in capital (labour) and/or skilled (unskilled) labour-intensive goods, which is inequality-enhancing (inequality-constraining) in developed (developing) countries because of the consequent increase (decrease) in the wage gap between skilled and unskilled workers in more developed (developing) countries.

4. DATASET

Our dataset is composed of annual data for all the EU countries from 1980 to 2019, which constitutes a panel dataset with a total of 28 cross-sectional units ($N = 28$) observed over time ($T = 40$)[6]. This represents the period and the periodicity for which all data are available. Effectively, the majority of our variables are only available on a yearly basis and for this specific time span.

Three different variables are used as proxies for the level of inequality, namely the Gini coefficient, the top 1% income share and the top 10% income share[7]. As noted by Furceri and Lougani (2015) and Makhlouf *et al*. (2020), the Gini coefficient is used to take into account the overall distribution of income in the country, whilst the top income shares allow the isolation of the wealthy cohort in the country, who typically have other sources of income that are omitted in the Gini coefficient. In addition, note also that an increase (decrease) in the Gini coefficient could be attributable to a decrease (increase) in the income received by the poorer people or an increase (decrease) in the income received by the richer people (Kim and Lin, 2011). These three variables

[6] We include the United Kingdom in our panel dataset because our dataset is composed of annual data from 1980 to 2019 and Brexit only happened at the beginning of 2020.

[7] The Gini coefficient is grounded in the Lorenz curve and is the conventional proxy to evaluate the level of inequality in a certain country. The Gini coefficient measures the deviations from perfect income equality and varies from 0 (perfect equality, which means that all people in the country receive the same level of income) to 1 (perfect inequality, which means that only one person in the country receives all the income). The top 1% (10%) income share translates the income received by the 1% (10%) richest in the country. As such, an increase in the Gini coefficient, the top 1% income share and/or the top 10% income share translates as a widening of inequality.

are measured in terms of pre-tax and pre-transfer values (i.e., gross values, with the aim of assessing inequality before income redistribution) and post-tax and post-transfer values (i.e., net values, with the aim of assessing inequality after income distribution), in order to obtain a broad picture related to inequality, namely with regard to the public intervention to mitigate inequality (Makhlouf *et al*., 2020). We employ these six variables separately from each other in order to minimise the potential problems related to multicollinearity between them (Table 3), and to assess the robustness of our estimates according to the proxy used.

Because of the multifaceted way through which the growth of finance has expanded inequality in times of financialization, four different variables are used as proxies for the role of finance, namely credit, credit-to-deposit ratio, liquid liabilities and stock market capitalization. As emphasized by Beck *et al*. (2014), Breitenlechner *et al*. (2015), Adeleye *et al*. (2017) and Meniago and Asongu (2018), these four variables are those that are commonly used in the majority of empirical works on the nexus between finance and economic growth and on the nexus between finance and inequality, since they mirror the different aspects of finance (e.g., size, activity, depth, access, efficiency and stability) and the roles played by different financial intermediaries (e.g., banks and financial markets). We also employ these four variables separately from each other in order to minimise the potential problems related to multicollinearity between them (Table 3) and to assess the robustness of our estimates according to the proxy used.

It is worth noting that the available data differ slightly according to the variable used as a proxy for the role of finance, and that for all of these variables there is not data available for all years for each country. Therefore, we build four unbalanced panels in order to maximise the number of observations and to minimise the number of missing values. Table 1 displays the structure and composition of our six unbalanced panels.

Table 1 – The structure and composition of our six unbalanced panels

Country	Credit	Credit-to-Deposit Ratio	Liquid Liabilities	Stock Market Capitalisation
Austria	1981-2019	1981-2019	1981-2019	1981-2019
Belgium	1980-2019	1980-2019	1980-2019	1980-2018
Bulgaria	1991-2019	1991-2019	1991-2019	1993-2019
Croatia	1996-2019	1996-2019	1996-2019	1996-2019
Cyprus	1990-2019	1990-2007	1990-2017	2006-2019
Czechia	1993-2019	1993-2019	1993-2019	1993-2019
Denmark	1980-2019	1980-2019	1980-2019	1980-2004
Estonia	1996-2019	1996-2019	2004-2019	2000-2012
Finland	1980-2019	1980-2019	1980-2019	1982-2004
France	1980-2019	1980-2019	1980-2019	1980-2019
Germany	1991-2019	1991-2019	1991-2019	1991-2019
Greece	1980-2019	1980-2019	1980-2019	2001-2019
Hungary	1992-2019	1992-2019	1992-2019	2002-2019
Ireland	1980-2019	1980-2019	1980-2019	1997-2018
Italy	1980-2019	1980-2019	1980-2019	1980-2014
Latvia	1996-2019	1996-2019	1996-2019	1996-2012
Lithuania	1996-2019	1996-2019	1996-2019	1996-2012
Luxembourg	1985-2019	1985-2019	1985-2019	1985-2019
Malta	2006-2019	2006-2019	2006-2019	2006-2019
Netherlands	1980-2019	1980-2019	1980-2019	1980-2017
Poland	1995-2019	1995-2019	1995-2019	1995-2019
Portugal	1980-2019	1980-2019	1980-2019	1980-2018

Romania	1996-2019	1991-2019	1991-2019	1998-2019
Slovakia	1993-2019	1993-2019	2002-2019	1993-2014
Slovenia	1996-2019	1996-2019	1996-2019	1997-2019
Spain	1980-2019	1980-2019	1980-2019	1980-2019
Sweden	1980-2019	1980-2019	1980-2019	1980-2003
United Kingdom	1980-2019	2000-2019	1980-2019	1980-2014
Observations	907	880	893	745
Missing	213	240	227	375
Total	1120	1120	1120	1120

Table 2 describes the proxies, units and sources for each variable. Table 3 contains the descriptive statistics for each variable in each unbalanced panel. Table 4 includes the correlation matrices between all the variables in each unbalanced panel. Figures A1 to A15 in the Appendix show the plots for each variable[8].

All the correlations between all the variables in each unbalanced panel are less than 0.8 in absolute terms, which confirms that there is no multicollinearity among them (Studenmund, 2005). The only exceptions occur with the gross Gini, gross top 1% income share and gross top 10% income share variables because of the strong correlations among them. However, and as mentioned previously, these variables are used separately from each other in order to avoid obtaining inefficient estimates (which could arise due to the existence of multicollinearity between the variables) and also to assess the robustness of our estimates according to the proxy used.

Table 2 – The proxies, units and sources for each variable

Acronym	Variable	Proxy and Unit	Source
GG	Gross Gini	Gini coefficient, pre-tax national income (%)	World Inequality
NG	Net Gini	Gini coefficient, post-tax national income (%)	World Inequality
GT1	Gross top 1% income share	Top 1% income share, pre-tax national income (%)	World Inequality
NT1	Net top 1% income share	Top 1% income share, post-tax national income (%)	World Inequality
GT10	Gross top 10% income share	Top 10% income share, pre-tax national income (%)	World Inequality
NT10	Net top 10% income share	Top 10% income share, post-tax national income (%)	World Inequality
C	Credit	Domestic credit to the private sector (% of GDP)	The Global Inequality
CDR	Credit-to-Deposit Ratio	Bank credit (% of bank deposits)	The Global Inequality
LL	Liquid Liabilities	Liquid Liabilities (% of GDP)	The Global Inequality
SMC	Stock Market Capitalization	Stock market capitalization (% of GDP)	The Global Inequality[9]
EG	Economic Growth	GDP per capita growth (annual %)	World Bank
IR	Inflation Rate	Inflation, consumer prices (annual %)	World Bank
EA	Educational Attainment	School enrollment, secondary (% gross)	World Bank
GS	Government Spending	General government final consumption expenditure (% of GDP)	World Bank
TO	Trade Openness	Trade (% of GDP)	World Bank

Note that inequality has been widening in the last four decades in the majority of the EU countries (Figures A1 to A6 in the Appendix), and that this has occurred simultaneously with the strong growth of finance in these countries during that time (Figures A7 to A12 in the Appendix). This seems to confirm that the nexus between finance and inequality has indeed been broken in these times of financialization. The positive correlations between the variables used as proxies for the

[8] The plots for the gross Gini, the net Gini, the gross top 1% income share, the net top 1% income share, the gross top 10% income share, the net top 10% income share, economic growth, inflation rate, educational attainment, government spending and trade openness are from the unbalanced panel with the credit as proxy to assess the role of finance, because this is the panel dataset with the highest number of observations and lowest number of missing values.

[9] The stock market capitalization for Estonia, Latvia and Lithuania was collected from the Fred St. Louis database due to its unavailability on The Global Economy database.

level of inequality and the variables used as proxies for the role of finance support the beliefs of the non-mainstream literature that the growth of finance has increased inequality in the EU countries since the 1980s (Table 4). During that time, we also observe that inequality in terms of pre-tax and pre-transfer values (i.e., the gross Gini, the gross top 1% income share and the gross top 10% income share) was higher than inequality in terms of post-tax and post-transfer values (i.e., the net Gini, the net top 1% income share and the net top 10% income share), which reveals that public intervention has been crucial in preventing higher levels of inequality in the EU countries (Table 3). Nonetheless, the response of the public policies has been ineffective to avoid the growth in inequality, which is visible in the growing trend for inequality before and after income redistribution (Figure A1 to Figure A6 in the Appendix).

Table 3 – The descriptive statistics of each variable in each unbalanced panel

Unbalanced Panel	Variable	Mean	Median	Maximum	Minimum	Standard Deviation	Skewness	Kurtosis
Credit	***GG***	0.448	0.449	0.628	0.340	0.044	0.066	2.753
	NG	0.353	0.342	0.631	0.241	0.062	0.456	2.639
	GT1	0.104	0.104	0.196	0.037	0.025	0.447	3.666
	NT1	0.077	0.076	0.170	0.030	0.020	0.712	4.682
	GT10	0.335	0.334	0.453	0.237	0.038	0.186	2.985
	NT10	0.277	0272	0.441	0.199	0.037	0.508	3.060
	C	0.752	0.699	2.553	0.067	0.409	1.119	4.886
	EG	0.023	0.022	0.240	-0.145	0.033	-0.237	7.921
	IR	0.064	0.026	10.584	-0.045	0.380	24.319	656.296
	EA	1.031	1.005	1.639	0.539	0.174	0.919	5.035
	GS	0.198	0.195	0.281	0.117	0.031	0.224	2.785
	TO	1.001	0.846	3.801	0.316	0.568	1.867	7.490
Credit-to-Deposit Ratio	***GG***	0.448	0.448	0.628	0.340	0.045	0.088	2.739
	NG	0.353	0.342	0.631	0.241	0.063	0.451	2.620
	GT1	0.104	0.104	0.196	0.037	0.025	0.440	3.657
	NT1	0.077	0.076	0.170	0.025	0.020	0.671	4.681
	GT10	0.334	0.334	0.453	0.237	0.038	0.194	2.981
	NT10	0.277	0.272	0.441	0.188	0.037	0.498	3.068
	CDR	1.050	1.012	3.760	0.004	0.515	1.518	8.262
	EG	0.023	0.022	0.240	-0.145	0.034	-0.314	8.062
	IR	0.075	0.026	10.584	-0.045	0.410	20.485	499.980
	EA	1.034	1.008	1.639	0.539	0.176	0.883	4.926
	GS	0.198	0.195	0.281	0.117	0.032	0.182	2.764
	TO	1.006	0.848	3.801	0.316	0.571	1.872	7.450
Liquid Liabilities	***GG***	0.448	0.449	0.628	0.340	0.043	0.036	2.738
	NG	0.352	0.342	0.631	0.241	0.062	0.453	2.670
	GT1	0.104	0.104	0.196	0.034	0.024	0.422	3.748
	NT1	0.076	0.076	0.170	0.025	0.019	0.470	4.320
	GT10	0.334	0.334	0.453	0.237	0.037	0.158	2.952
	NT10	0.276	0.272	0.441	0.188	0.036	0.414	2.958
	LL	0.920	0.680	9.405	0.010	1.111	5.370	34.363
	EG	0.022	0.022	0.240	-0.145	0.033	-0.371	8.103
	IR	0.073	0.025	10.584	-0.045	0.407	20.642	507.543
	EA	1.032	1.008	1.639	0.539	0.175	0.887	4.949
	GS	0.197	0.194	0.279	0.117	0.031	0.207	2.788
	TO	0.993	0.837	3.801	0.316	0.572	1.893	7.510
Stock Market Capitalization	***GG***	0.448	0.450	0.569	0.348	0.043	0.013	2.590
	NG	0.352	0.344	0.594	0.241	0.060	0.399	2.526
	GT1	0.104	0.104	0.196	0.037	0.026	0.438	3.536
	NT1	0.076	0.076	0.170	0.030	0.020	0.711	4.832
	GT10	0.334	0.335	0.453	0.237	0.038	0.165	2.962
	NT10	0.275	0.272	0.400	0.199	0.036	0.406	2.797
	SMC	0.405	0.283	3.219	0.000	0.375	1.867	8.601
	EG	0.024	0.022	0.240	-0.145	0.034	-0.234	8.033
	IR	0.059	0.026	10.584	-0.045	0.395	25.562	680.350
	EA	1.025	1.005	1.639	0.539	0.169	0.949	5.590
	GS	0.197	0.195	0.281	0.119	0.023	0.184	2.896
	TO	1.004	0.822	3.801	0.316	0.599	1.892	7.178

Table 4 – The correlation matrices between all the variables in each unbalanced panel[10]

Unbalanced Panel	Variable	*GG*	*GT1*	*GT10*	*Finance*	*EG*	*IR*	*EA*	*GS*	*TO*
Credit	*GG*	1.000								
	GT1	0.661***	1.000							
	GT10	0.948***	0.833***	1.000						
	C	0.088***	0.118***	0.100***	1.000					
	EG	0.133***	0.163***	0.157***	-0.308***	1.000				
	IR	0.019	0.001	0.026	-0.115***	-0.188***	1.000			
	EA	-0.134***	-0.064*	-0.111***	0.260***	-0.094***	-0.101***	1.000		
	GS	-0.557***	-0.406***	-0.544***	0.055*	-0.237***	-0.119***	0.409***	1.000	
	TO	0.037	0.197***	0.108***	0.067**	0.133***	-0.052	0.123***	-0.212***	1.000
Credit-to-Deposit Ratio	*GG*	1.000								
	GT1	0.661***	1.000							
	GT10	0.949***	0.831***	1.000						
	CDR	-0.110***	-0.066**	-0.105***	1.000					
	EG	0.157***	0.184***	0.182***	-0.177***	1.000				
	IR	-0.007	-0.021	0.001	-0.076**	-0.220***	1.000			
	EA	-0.133***	-0.077***	-0.119***	0.288***	-0.094***	-0.125***	1.000		
	GS	-0.536***	-0.395***	-0.527***	0.366***	-0.224***	-0.158***	0.425***	1.000	
	TO	0.036	0.191***	0.102***	-0.208***	0.139***	-0.069**	0.117***	-0.202***	1.000
Liquid Liabilities	*GG*	1.000								
	GT1	0.638***	1.000							
	GT10	0.944***	0.821***	1.000						
	LL	0.190***	0.330***	0.246***	1.000					
	EG	0.129***	0.157***	0.153***	-0.082**	1.000				
	IR	-0.009	-0.022	0.001	-0.055	-0.220***	1.000			
	EA	-0.139***	-0.065*	-0.118***	-0.008	-0.079**	-0.123***	1.000		
	GS	-0.546***	-0.398***	-0.537***	-0.245***	-0.232***	-0.158***	0.435***	1.000	
	TO	0.031	0.196***	0.104***	0.618***	0.129***	-0.068**	0.134***	-0.204***	1.000
Stock Market Capitalization	*GG*	1.000								
	GT1	0.676***	1.000							
	GT10	0.949***	0.843***	1.000						
	SMC	0.093**	0.215***	0.133***	1.000					
	EG	0.120***	0.149***	0.141***	-0.026	1.000				
	IR	0.037	0.016	0.043	-0.090**	-0.161***	1.000			
	EA	-0.129***	-0.099***	-0.112***	0.307***	-0.102***	-0.084**	1.000		
	GS	-0.565***	-0.489***	-0.571***	0.004	-0.229***	-0.123***	0.375***	1.000	
	TO	0.039	0.197***	0.109***	0.286***	0.102***	-0.041	0.124***	-0.232***	1.000

Note: *** indicates statistically significance at 1% level, ** indicates statistically significance at 5% level and * indicates statistically significance at 10% level

Table 5 displays the recent Karavias and Tzavalis (2014) panel unit root test for all the variables in each panel[11]. This panel unit root test is the most appropriate for our panel datasets and produces reliable conclusions by allowing for one or two (known or unknown) structural breaks, intercepts and linear trends, non-normal errors, cross-sectional heteroskedasticity and cross-sectional dependence (Karavias and Tzavalis, 2014). In addition, this panel unit root test can be used in panels with small or large time-series dimensions and in both balanced and unbalanced panels (Karavias and Tzavalis, 2014). We include the square of the finance term and the square of the economic growth term because our models take into account the potential non-linear relationships between finance and inequality and between economic growth and inequality, as described previously. For the majority of the variables in each panel, we reject the null hypothesis that the variable contains a unit root without breaks (i.e., that they are stationary in levels or integrated of order zero), because the respective p-values are less than the traditional significance levels. For

[10] Just for simplicity, we do not include in these correlation matrices the variables of net Gini, net top 1% income share and net 10% income share. The correlation matrices with these variables are available upon request.

[11] The Karavias and Tzavalis (2014) panel unit root test was performed in the Stata software (version 17) using the 'xtbunitroot' command, which was developed by Chen *et al*. (2022).

the remaining variables, we only reject the null hypothesis that the variable contains a unit root without breaks in the first differences, which suggests that these variables are stationary in the first differences or integrated of order one. All in all, the results of the Karavias and Tzavalis (2014) panel unit root test indicate that we are in the presence of panel datasets with a mixture of variables that are stationary in levels and stationary in the first differences.

Table 5 – *P-values* of the Karavias and Tzavalis (2014) unit root test with two unknown structural breaks

Unbalanced Panel	Variable	Levels		First Differences	
		Individual Intercepts	Individual Intercepts and Individual Linear Trends	Individual Intercepts	Individual Intercepts and Individual Linear Trends
Credit	*GG*	0.000 (1981 and 2018)	1.000	n.a.	0.000 (1982 and 1984)
	NG	0.000 (2017 and 2018)	1.000	n.a.	0.000 (1982 and 1984)
	GT1	0.000 (1981 and 2018)	0.000 (1982 and 1985)	n.a.	n.a.
	NT1	0.000 (2017 and 2018)	0.000 (1982 and 1985)	n.a.	n.a.
	GT10	0.000 (1981 and 2018)	1.000	n.a.	0.000 (1982 and 1984)
	NT10	0.000 (1981 and 2018)	1.000	n.a.	0.000 (1982 and 1984)
	C	0.000 (1981 and 2018)	1.000	n.a.	0.000 (1982 and 2016)
	C^2	0.000 (1981 and 2018)	1.000	n.a.	0.000 (2006 and 2010)
	EG	0.000 (1981 and 1982)	0.000 (1982 and 1984)	n.a.	n.a.
	EG^2	0.000 (2014 and 2016)	0.000 (2014 and 2017)	n.a.	n.a.
	IR	0.000 (1996 and 1998)	0.000 (1995 and 1998)	n.a.	n.a.
	EA	0.000 (1981 and 1982)	1.000	n.a.	0.000 (1982 and 1984)
	GS	0.000 (1981 and 1982)	1.000	n.a.	0.000 (1982 and 1984)
	TO	0.000 (1981 and 1982)	1.000	n.a.	0.000 (1982 and 1984)
Credit-to-Deposit Ratio	*GG*	0.000 (1981 and 2018)	1.000	n.a.	0.000 (1982 and 1984)
	NG	0.000 (2017 and 2018)	1.000	n.a.	0.000 (1982 and 1984)
	GT1	0.000 (1981 and 2018)	1.000	n.a.	0.000 (1982 and 1984)
	NT1	0.000 (2017 and 2018)	0.000 (1982 and 1985)	n.a.	n.a.
	GT10	0.000 (1981 and 2018)	1.000	n.a.	0.000 (1982 and 1984)
	NT10	0.000 (1981 and 2018)	1.000	n.a.	0.000 (1982 and 1984)
	CDR	0.000 (2017 and 2018)	1.000	n.a.	0.000 (1982 and 1984)
	CDR^2	0.000 (1981 and 2000)	1.000	n.a.	0.000 (1982 and 1984)
	EG	0.000 (1981 and 1982)	0.000 (1982 and 1984)	n.a.	n.a.
	EG^2	0.000 (2014 and 2016)	0.000 (2014 and 2017	n.a.	n.a.
	IR	0.000 (1996 and 1998)	0.000 (1995 and 1998)	n.a.	n.a.
	EA	0.000 (1981 and 2018)	1.000	n.a.	0.000 (1982 and 1984)
	GS	0.000 (1981 and 1982)	1.000	n.a.	0.000 (1982 and 1984)
	TO	0.000 (1981 and 1982)	1.000	n.a.	0.000 (1982 and 1984)
Liquid Liabilities	*GG*	0.000 (1981 and 2018)	1.000	n.a.	0.000 (1982 and 1984)
	NG	0.000 (2017 and 2018)	1.000	n.a.	0.000 (1982 and 1984)
	GT1	0.000 (2017 and 2018)	0.000 (2017 and 2018)	n.a.	n.a.
	NT1	0.000 (2017 and 2018)	1.000	n.a.	0.000 (1982 and 1984)
	GT10	0.000 (1981 and 2018)	1.000	n.a.	0.000 (1982 and 1984)
	NT10	0.000 (1981 and 2018)	1.000	n.a.	0.000 (1982 and 1984)
	LL	0.000 (1996 and 1997)	1.000	n.a.	0.000 (1982 and 1984)
	LL^2	0.860	1.000	0.000 (1981 and 1982)	0.000 (2007 and 2016)
	EG	0.000 (1981 and 1982)	0.000 (1982 and 1984)	n.a.	n.a.
	EG^2	0.000 (2014 and 2016)	0.000 (2014 and 2017)	n.a.	n.a.
	IR	0.000 (1996 and 1998)	0.000 (1995 and 1998)	n.a.	n.a.
	EA	0.000 (1981 and 2018)	1.000	n.a.	0.000 (1982 and 1984)
	GS	0.000 (1981 and 1982)	1.000	n.a.	0.000 (1982 and 1984)
	TO	0.000 (1981 and 1982)	1.000	n.a.	0.000 (1982 and 1984)
Stock Market Capitalization	*GG*	0.000 (2017 and 2018)	1.000	n.a.	0.000 (1982 and 1984)
	NG	0.000 (2017 and 2018)	1.000	n.a.	0.000 (1982 and 1984)
	GT1	0.000 (2017 and 2018)	1.000	n.a.	0.000 (1982 and 1984)
	NT1	0.000 (2017 and 2018)	1.000	n.a.	0.000 (1982 and 1984)
	GT10	0.000 (2017 and 2018)	1.000	n.a.	0.000 (1982 and 1984)
	NT10	0.000 (2017 and 2018)	1.000	n.a.	0.000 (1982 and 1984)
	SMC	0.000 (2017 and 2018)	0.000 (1982 and 1985)	n.a.	n.a.
	SMC^2	0.000 (1981 and 1982)	0.000 (2001 and 2008)	n.a.	n.a.
	EG	0.000 (1981 and 2018)	0.000 (1982 and 1984)	n.a.	n.a.
	EG^2	0.000 (2014 and 2016)	0.000 (2014 and 2017)	n.a.	n.a.
	IR	1.000	0.000 (1995 and 1998)	0.000 (1997 and 1998)	n.a.
	EA	0.000 (2017 and 2018)	1.000	n.a.	0.000 (1982 and 2016)
	GS	0.000 (2017 and 2018)	1.000	n.a.	0.000 (1982 and 1984)
	TO	0.000 (2017 and 2018)	1.000	n.a.	0.000 (1982 and 1984)

Note: Break dates are reported in ()

5. ECONOMETRIC FRAMEWORK

We rely on the panel autoregressive distributed lag to produce our estimates, given that we have a mixture of variables that are stationary in levels and stationary in the first differences[12]. This econometric framework was introduced by Pesaran and Smith (1995), Pesaran (1997) and Pesaran *et al*. (1997, 1999), and employs an autoregressive distributed lag approach to dynamic heterogeneous panel data regressions in an error correction form by allowing the existence of both short-term and long-term effects and the inclusion of lags for both the dependent and the independent variables.

This econometric framework uses three different estimators, namely the mean-group (MG) estimator, the dynamic fixed-effects (DFE) estimator and the pooled mean-group (PMG) estimator. The MG estimator, developed by Pesaran and Smith (1995), allows the heterogeneity of all coefficients (long-term coefficients, short-term coefficients, intercepts, the error correction terms and the error variances) because it operates in two different steps. In the first step, it estimates individual regressions for each cross-sectional unit (country) in the panel dataset. In the second step, it calculates group coefficients by the unweighted averaging of the coefficients for each individual country. According to these authors, this estimator produces consistent estimates (particularly in the case of larger panels) even in cases where endogeneity exists, because of the possibility of including lags for both the dependent and the independent variables. The DFE estimator only supposes the heterogeneity of the intercepts, assuming the homogeneity of both the long-term and short-term coefficients, the error correction terms and the error variances among all the countries. According to Blackburne III and Frank (2007), this estimator produces consistent estimates, particularly in the case of identical intercepts among the cross-sectional units (countries). The PMG estimator, developed by Pesaran *et al*. (1997, 1999), assumes the homogeneity of the long-term coefficients among all the cross-sectional units (countries), but allows the heterogeneity of the short-term coefficients, the intercepts, the error correction terms and the error variances. Indeed, the PMG estimator represents an intermediate estimator between the MG estimator and the DFE estimator (Blackburne III and Frank, 2007). According to Pesaran *et al.* (1999), the PMG estimator also produces consistent estimates, although it tends to be more efficient than the MG estimator.

We use the conventional Hausman's (1978) specification test in order to determine the choice between the MG estimator, the DFE estimator and the PMG estimator in terms of efficiency and consistency[13]. Our estimates are produced using only one lag, not only because of the use of

[12] The panel autoregressive distributed lag estimator was performed in the Stata software (version 17) using the 'xtpmg' command, which was developed by Blackburne III and Frank (2007) and produces the estimates using a maximum likelihood method.

[13] The Hausman's (1978) specification test was performed in the Stata software (version 17) using the 'hausman' command. We started by running the MG estimator and the DFE estimator and then we applied the Hausman's (1978) specification test in order to

annual data and in order not to lose so many degrees of freedom (Wooldridge, 2003), but also because this is the indication provided by the information criteria[14]. This is the traditional strategy adopted in the majority of empirical works on the nexus between finance and inequality (Makhlouf *et al*., 2020).

6. EMPIRICAL FINDINGS AND DISCUSSION

Our empirical findings are presented and discussed throughout this Section. Table 6, Table 7 and Table 8 display the long-term and short-term estimates for the linear models and for the pre-tax and pre-transfer values for inequality (i.e., gross values that assess inequality before income redistribution). Table A1, Table A2 and Table A3 in the Appendix present the long-term and short-term estimates for the linear models and for the post-tax and post-transfer values of inequality (i.e., net values that assess inequality after income redistribution). Table 9, Table 10 and Table 11 contain the long-term and short-term estimates for the non-linear models and for the pre-tax and pre-transfer values of inequality (i.e., gross values that assess inequality before income redistribution). Table A4, Table A5 and Table A6 exhibit the long-term and short-term estimates for the non-linear models and for the post-tax and post-transfer values of inequality (i.e., net values that assess inequality after income redistribution). All of these estimates are produced using the DFE estimator, because the Hausman's (1978) specification test suggests that, for all models, the DFE estimator should be preferred over the MG estimator and the PMG estimator in terms of efficiency and consistency[15]. This seems to suggest that there are no noteworthy differences among the EU countries with regard to the short-term and the long-term determinants of inequality, namely because the DFE estimator assumes the homogeneity of both the short-term and the long-term coefficients, the error correction terms and the error variances among all the cross-sectional units (countries). Note that for all of these estimates the error correction term is statistically significant and exhibits a negative coefficient that lies between -2 and 0. This confirms that there is cointegration among our variables, that is, a long-term relationship between them. This also suggests the convergence of our models to the long-term equilibrium even when there is a shock in the short term.

choose between the MG estimator and the DFE estimator. After that, we ran the PMG estimator and the Hausman's (1978) specification test in order to choose between the PMG estimator and the DFE estimator.

[14] The results of the information criteria for each panel dataset are available upon request.

[15] The only exception occurs in the non-linear model in which the net top 10% income share is used as a proxy for the level of inequality and credit is used as a proxy for finance (Table A6 in the Appendix). Here, Hausman's test indicates that the DFE estimator is preferred over the MG estimator but that there are no differences in terms of efficiency and consistency between the DFE estimator and the PMG estimator. Here, we also use the DFE estimator in order to obtain fully comparable results with the remaining estimates that employ the DFE estimator.

With regard to the linear models, our findings are quite robust, because our long-term and short-term estimates do not change dramatically in terms of statistical significance and signs of the coefficients when we use different variables as proxies for the level of inequality and/or different variables as proxies for finance. In what follows, we discuss the long-term and short-term estimates for each independent variable in more detail.

Table 6 – Estimates for the linear model and for the gross Gini

Variable	Credit	Credit-to-Deposit Ratio	Liquid Liabilities	Stock Market Capitalisation
Long-term Coefficients				
	0.019**	0.011*	0.001	0.022**
F_t	(0.010)	(0.007)	(0.005)	(0.011)
	[2.02]	[1.68]	[0.26]	[2.08]
	0.331***	0.428***	0.276**	0.238***
EG_t	(0.115)	(0.114)	(0.110)	(0.093)
	[2.87]	[3.76]	[2.51]	[2.56]
	-1.627	-1.823	-1.329	-0.975
EG_t^2	(1.237)	(1.206)	(1.237)	(1.072)
	[-1.32]	[-1.51]	[-1.07]	[-0.91]
	-0.002	-0.001	-0.004	-0.005
IR_t	(0.009)	(0.008)	(0.009)	(0.007)
	[-0.17]	[-0.10]	[-0.50]	[-0.62]
	0.017	0.019	0.029	0.025
EA_t	(0.022)	(0.021)	(0.021)	(0.021)
	[0.5]	[0.90]	[1.37]	[1.16]
	-0.227	-0.178	-0.207	0.007
GS_t	(0.164)	(0.165)	(0.173)	(0.156)
	[-1.38]	[-1.08]	[-1.19]	[-0.04]
	0.013	0.020*	0.020	-0.0004
TO_t	(0.012)	(0.012)	(0.014)	(0.011)
	[1.04]	[1.65]	[1.37]	[-0.04]
Short-term Coefficients				
	0.077***	0.074***	0.074***	0.079***
Intercept	(0.010)	(0.010)	(0.010)	(0.011)
	[7.48]	[7.57]	[7.49]	[7.29]
	-0.171***	-0.172***	-0.169***	-0.191***
Error Correction Term$_t$	(0.020)	(0.020)	(0.019)	(0.021)
	[-8.51]	[-8.71]	[-8.74]	[-9.07]
	-0.003	-0.006*	0.002	0.003
ΔF_t	(0.005)	(0.003)	(0.002)	(0.002)
	[-0.57]	[-1.73]	[1.14]	[1.40]
	0.001	-0.004	0.004	-0.018
ΔEG_t	(0.017)	(0.016(	(0.016)	(0.016)
	[0.07]	[-0.24]	[0.22]	[-1.14]
	0.144	0.150	0.136	0.086
ΔEG_t^2	(0.151)	(0.148)	(0.151)	(0.144)
	[0.95]	[1.02]	[0.90]	[0.59]
	0.001	0.001	0.001	0.001
ΔIR_t	(0.001)	(0.001)	(0.001)	(0.001)
	[0.61]	[0.69]	[0.68]	[0.61]
	0.001	-0.0003	0.0003	0.002
ΔEA_t	(0.009)	(0.009)	(0.009)	(0.010)
	[0.10]	[-0.04]	[0.03]	[0.22]
	-0.048	-0.045	-0.046	-0.155***
ΔGS_t	(0.058)	(0.059)	(0.061)	(0.059)
	[-0.82]	[-0.76]	[-0.75]	[-2.61]
	-0.002	-0.003	-0.0003	0.003
ΔTO_t	(0.006)	(0.006)	(0.006)	(0.006)
	-0.26]	[-0.49]	[-0.05]	[0.42]
EG* (%)	n.a.	n.a.	n.a.	n.a.
Hausman Test (MG vs DFE)	1.000	1.000	1.000	1.000
Hausman Test (PMG vs DFE)	1.000	1.000	1.000	1.000
Estimator	DFE	DFE	DFE	DFE

Note: Standard errors in ( ), z-statistics in [], Δ is the operator of the first differences, *** indicates statistically significance at 1% level, ** indicates statistically significance at 5% level and * indicates statistically significance at 10% level

Table 7 – Estimates for the linear model and for the gross top 1% income share

Variable	Credit	Credit-to-Deposit Ratio	Liquid Liabilities	Stock Market Capitalisation
Long-term Coefficients				
	0.018***	0.010***	0.003	0.021**
F_t	(0.006)	(0.004)	(0.003)	(0.008)
	[3.05]	[2.62]	[0.78]	[2.50]
	0.281***	0.351***	0.252***	0.182***
EG_t	(0.071)	(0.069)	(0.072)	(0.073)
	[3.99]	[5.08]	[3.49]	[2.49]
	-0.997	-1.125	-0.660	-1.140
EG_t^2	(0.741)	(0.709)	(0.784)	(0.840)
	[-1.35]	[-1.59]	[-0.84]	[-1.36]
	-0.002	-0.001	-0.004	-0.004
IR_t	(0.006)	(0.005)	(0.006)	(0.006)
	[-0.40]	[-0.29]	[-0.68]	[-0.63]
	0.032**	0.033***	0.044***	0.030***
EA_t	(0.013)	(0.013)	(0.014)	(0.017)
	[2.43]	[2.58]	[3.21]	[1.81]
	-0.173*	-0.119	-0.104	-0.147
GS_t	(0.100)	(0.098)	(0.111)	(0.122)
	[-1.74]	[-1.22]	[-0.94]	[-1.21]
	-0.001	0.005	0.0003	-0.003
TO_t	(0.008)	(0.007)	(0.009)	(0.009)
	[-0.19]	[0.62]	[0.03]	[-0.33]
Short-term Coefficients				
	0.020***	0.017***	0.015***	0.021***
Constant	(0.005)	(0.005)	(0.006)	(0.006)
	[3.73]	[3.23]	[2.83]	[3.33]
	-0.224***	-0.222***	-0.208***	-0.218***
Error Correction Term$_t$	(0.021)	(0.021)	(0.021)	(0.024)
	[-10.53]	[-10.56]	[-10.01]	[-8.99]
	-0.006	-0.008***	0.002	0.002
ΔF_t	(0.004)	(0.003)	(0.002)	(0.002)
	[-1.35]	[-3.00]	[1.14]	[0.99]
	-0.018	-0.021*	-0.011	-0.024*
ΔEG_t	(0.013)	(0.013)	(0.013)	(0.014)
	[-1.38]	[-1.63]	[-0.84]	[-1.68]
	0.116	0.096	0.078	0.129
ΔEG_t^2	(0.120)	(0.114)	(0.120)	(0.128)
	[0.97]	[0.84]	[0.65]	[1.00]
	-0.0001	0.0002	0.0001	-0.0004
ΔIR_t	(0.001)	(0.001)	(0.0009)	(0.001)
	[-0.13]	[0.27]	[0.11]	[-0.36]
	-0.007	-0.008	-0.009	-0.008
ΔEA_t	(0.007)	(0.007)	(0.007)	(0.009)
	[-0.97]	[-1.11]	[-1.17]	[-0.86]
	-0.127***	-0.119***	-0.140***	-0.198***
ΔGS_t	(0.047)	(0.045)	(0.049)	(0.053)
	[-2.73]	[-2.62]	[-2.87]	[-3.73]
	0.001	-0.001	0.001	0.003
ΔTO_t	(0.005)	(0.005)	(0.005)	(0.006)
	[0.21]	[-0.18]	[0.13]	[0.51]
EG* (%)	n.a.	n.a.	n.a.	n.a.
Hausman Test (MG vs DFE)	1.000	1.000	1.000	1.000
Hausman Test (PMG vs DFE)	1.000	1.000	1.000	1.000
Estimator	DFE	DFE	DFE	DFE

Note: Standard errors in ( ), z-statistics in [], Δ is the operator of the first differences, *** indicates statistically significance at 1% level, ** indicates statistically significance at 5% level and * indicates statistically significance at 10% level

Table 8 – Estimates for the linear model and for the gross top 10% income share

Variable	Credit	Credit-to-Deposit Ratio	Liquid Liabilities	Stock Market Capitalisation
Long-term Coefficients				
	0.018**	0.012**	0.003	0.027**
F_t	(0.009)	(0.006)	(0.005)	(0.011)
	[2.03]	[1.96]	[0.59]	[2.47]
	0.335***	0.449***	0.297***	0.222**
EG_t	(0.107)	(0.105)	(0.103)	(0.096)
	[3.14]	[4.29]	[2.88]	[2.31]
	-0.809	-1.080	-0.604	-0.885
EG_t^2	(1.132)	(1.090)	(1.137)	(1.115)
	[-0.71]	[-0.99]	[-0.53]	[-0.79]
	-0.004	-0.002	-0.005	-0.006
IR_t	(0.009)	(0.008)	(0.008)	(0.008)
	[0.42]	[-0.20]	[-0.62]	[-0.76]
	0.035*	0.034*	0.047***	0.032
EA_t	(0.020)	(0.019)	(0.020)	(0.022)
	[1.74]	[1.76]	[2.37]	[1.45]
	-0.210	-0.158	-0.172	-0.103
GS_t	(0.153)	(0.151)	(0.161)	(0.162)
	[-1.38]	[-1.04]	[-1.07]	[-0.63]
	0.001	0.008	0.005	-0.005
TO_t	(0.012)	(0.011)	(0.013)	(0.012)
	[0.09]	[0.73]	[0.35]	[-0.37]
Short-term Coefficients				
	0.060***	0.057***	0.057***	0.063***
Constant	(0.009)	(0.008)	(0.009)	(0.010)
	[6.99]	[6.97]	[6.73]	[6.46]
	-0.186***	-0.186***	-0.183***	-0.199***
Error Correction Term$_t$	(0.019)	(0.019)	(0.019)	(0.022)
	[-9.58]	[-9.73]	[-9.70]	[-9.15]
	-0.005	-0.009***	0.002	0.004
ΔF_t	(0.005)	(0.003)	(0.002)	(0.003)
	[-0.90]	[-2.58]	[1.17]	[1.56]
	-0.015	-0.021	-0.011	-0.030*
ΔEG_t	(0.017)	(0.016)	(0.016)	(0.017)
	[-0.91]	[-1.27]	[-0.67]	[-1.75]
	0.132	0.126	0.120	0.120
ΔEG_t^2	(0.153)	(0.147)	(0.153)	(0.156)
	[0.86]	[0.85]	[0.79]	[0.77]
	0.0003	0.0005	0.0004	0.0001
ΔIR_t	(0.001)	(0.001)	(0.001)	(0.001)
	[0.23]	[0.39]	[0.31]	[0.12]
	-0.003	-0.004	-0.004	-0.002
ΔEA_t	(0.009)	(0.009)	(0.009)	(0.011)
	[-0.37]	[-0.48]	[-0.46]	[-0.21]
	-0.089	-0.086	-0.094	-0.194***
ΔGS_t	(0.059)	(0.059)	(0.062)	(0.065)
	[-1.51]	[-1.47]	[-1.51]	[-3.00]
	0.002	-0.001	0.002	0.004
ΔTO_t	(0.006)	(0.006)	(0.006)	(0.007)
	[0.28]	[-0.12]	[0.27]	[0.57]
EG* (%)	n.a.	n.a.	n.a.	n.a.
Hausman Test (MG vs DFE)	1.000	1.000	1.000	1.000
Hausman Test (PMG vs DFE)	1.000	1.000	1.000	1.000
Estimator	DFE	DFE	DFE	DFE

Note: Standard errors in ( ), z-statistics in [], Δ is the operator of the first differences, *** indicates statistically significance at 1% level, ** indicates statistically significance at 5% level and * indicates statistically significance at 10% level

We are able to report strong evidence that finance exerts a positive impact on levels of inequality in the EU countries, particularly in the long term. This positive relationship between finance and inequality is in line with the non-mainstream literature, reinforcing the idea that the growth of finance has been inequality-enhancing and confirming the results obtained by Liang (2006), Motonishi (2006), Rodrigues-Pose and Tselios (2009), Roine *et al*. (2009), Tan and Law (2009), Ang (2010), Kus (2012), Jaumotte *et al.* (2013), Jauch and Watzka (2015, 2016), Sehrawat and

Giri (2015), Seven and Coskun (2016), Haan and Sturm (2017), Altunbas and Thornton (2018) and Barradas and Lakhani (2022).

We also confirm the existence of a positive and linear relationship between economic growth and the level of inequality, and the non-existence of a non-linear relationship between them, in the EU countries. This is mainly visible in the long-term estimates, in a context in which the short-term estimates for the growth rate of the GDP *per capita* and the square of this term are not statistically significant in the majority of our models. As found by Seven and Coskun (2016), this counterintuitive result does not confirm the aforementioned Kuznets curve (Kuznets, 1955), and suggests that economic growth has not been generating significant redistributive effects in the EU countries. This is particularly relevant for the EU countries, given that the majority of them have exhibited quite timid growth rates since the 1980s (Figure A11 in the Appendix), with the average growth rate of all the EU countries having been only around 2% from 1980 to 2019 (Table 3). Bolarinwa *et al*. (2021) also report a positive and linear relationship between economic growth and the level of inequality for African countries, claiming that the rich get richer and the poor get poorer as income increases.

We also find that the inflation rate does not have any effect on the level of inequality in the EU countries over either the long term or the short term, given the lack of statistical significance of its coefficients in all the linear models. This could be attributable to the existence of social benefits for the poor that are traditionally directly indexed to inflation and that ensure that poorer people are directly hedged against inflation and do not lose purchasing power during high-inflation episodes. Adeleye *et al.* (2017) also report the lack of statistical significance of the relationship between inflation rate and inequality in the case of African countries.

Another unexpected finding is related to educational attainment, which has a positive impact on the level of inequality in the EU countries, mainly in the long term since it is statistically insignificant in the case of the short-term estimates. This is mainly visible in the linear models in which the gross and the net top 1% income share and the gross and the net top 10% income share are used as proxies for the level of inequality. A similar result has been found by Barradas and Lakhani (2022) for Portugal and by Bolarinwa *et al*. (2021) for African countries; these authors provide two different reasons to explain this positive relationship between educational attainment and the level of inequality. First, it could be the result of the consequent decrease in the wage gap between skilled and unskilled workers that tends to have a relatively greater effect on richer people than on poorer. Secondly, it could be the result of higher levels of unemployment and precariousness among young people and particularly among graduates.

Government spending is a negative determinant of inequality in the EU countries, especially in the short term. As emphasized by Kim and Lin (2021), and Bolarinwa *et al*. (2021), this suggests

that the redistributive function, through the tax system and social benefits aimed at the poor, the provision of public goods and the intervention of the welfare state have been relatively effective to alleviate the level of inequality in the EU countries. A negative relationship between government spending and the level of inequality is also reported by Lee and Siddique (2021) for both developing and developed countries.

The degree of trade openness tends to have a positive effect on the level of inequality in the EU countries, albeit only in the long term. In the short term, all of our estimates for the linear models reveal that trade openness is not statistically significant at the traditional significance levels. This result is in accordance with the Heckscher–Ohlin–Samuelson theory and the consequent increase in both the wage gap between skilled and unskilled workers and inequality, in the case of developed countries such as the EU countries, as the degree of trade openness increases (Kim and Lin, 2011; Bolarinwa *et al*., 2021). A similar result is found by Makhlouf *et al*. (2020) for the OECD countries.

Regarding the non-linear models, our findings are also quite robust, because our short-term and long-term estimates do not change radically in terms of statistical significance and the signs of the coefficients when we use different variables as proxies for the level of inequality and/or different variables as proxies for finance and/or in comparison to the long-term and short-term estimates of the linear models. Four different similarities should be addressed. First, we continue to find evidence suggesting the existence of a positive and linear relationship between economic growth and the level of inequality, and the non-existence of a non-linear relationship between them, for the EU countries. Secondly, educational attainment and the degree of trade openness remain statistically significant at the traditional significance levels, exerting a positive impact on the level of inequality in the EU countries in the long term. Thirdly, we are also able to report that government spending continues to have a negative influence on the level of inequality in the EU countries, mainly in the short term. Fourthly, the inflation rate remains statistically insignificant at the traditional significance levels in both the long term and the short term.

The most important finding is associated with the non-existence of a non-linear relationship between finance and the level of inequality for the EU countries, particularly the lack of statistical significance for the different variables used as proxies for finance (and their square terms) in all the non-linear models. By itself, this result does not exclude the existence of a convex quadratic (non-linear) relationship between finance and inequality in the EU countries, similar to what was found by Tan and Law (2012) for developing countries and by Barradas and Lakhani (2022) for Portugal. The result could simply indicate that finance has a positive effect on inequality in the EU countries because the threshold (minimum) of the convex quadratic function was already

reached a long time ago, which is more possible given the strong growth of finance in these countries in times of financialization (Figure A7 to A12 in the Appendix).

Table 9 – Estimates for the non-linear model and for the gross Gini

Variable	Credit	Credit-to-Deposit Ratio	Liquid Liabilities	Stock Market Capitalisation
Long-term Coefficients				
	-0.020	-0.008	0.013	0.006
F_t	(0.026)	(0.023)	(0.017)	(0.020)
	[-0.80]	[-0.32]	[0.75]	[0.30]
	0.019*	0.006	-0.001	0.009
F_t^2	(0.011)	(0.007)	(0.002)	(0.010)
	[1.65]	[0.83]	[-0.72]	[0.91]
	0.351***	0.413***	0.279**	0.250***
EG_t	(0.118)	(0.114)	(0.113)	(0.095)
	[2.98]	[3.61]	[2.46]	[2.63]
	-1.508	-1.844	-1.360	-0.988
EG_t^2	(1.241)	(.1209)	(1.242)	(1.079)
	[-1.22]	[-1.52]	[-1.09]	[-0.92]
	-0.007	-0.001	-0.005	-0.005
IR_t	(0.009)	(0.009)	(0.009)	(0.007)
	[-0.72]	[-0.17]	[-0.57]	[-0.65]
	0.022	0.022	0.024	0.030
EA_t	(0.022)	(0.021)	(0.023)	(0.022)
	[0.98]	[1.00]	[1.08]	[1.34]
	-0.259	-0.184	-0.217	0.027
GS_t	(0.168)	(0.165)	(0.174)	(0.159)
	[-1.54]	[-1.11]	[-1.25]	[0.17]
	0.015	0.020	0.015	-0.001
TO_t	(0.013)	(0.012)	(0.015)	(0.011)
	[1.23]	[1.61]	[1.00]	[-0.07]
Short-term Coefficients				
	0.079***	0.076***	0.075***	0.078***
Constant	(0.010)	(0.010)	(0.010)	(0.011)
	[7.53]	[7.64]	[7.52]	[7.08]
	-0.169***	-0.172***	-0.168***	-0.190***
Error Correction Term$_t$	(0.020)	(0.019)	(0.019)	(0.021)
	[-8.45]	[-8.65]	[-8.71]	[-9.00]
	-0.024**	0.004	-0.002	0.004
ΔF_t	(0.012)	(0.008)	(0.003)	(0.004)
	[-1.98]	[0.45]	[-0.72]	[0.85]
	0.011**	-0.003	0.001*	-0.0003
ΔF_t^2	(0.005)	(0.002)	(0.0004)	(0.002)
	[1.97]	-1.24	[1.72]	[-0.21]
	-0.0002	-0.002	0.004	-0.019
ΔEG_t	(0.017)	(0.016)	(0.016)	(0.016)
	[-0.01]	[-0.12]	[0.22]	[-1.19]
	0.127	0.150	0.133	0.085
ΔEG_t^2	(0.151)	(0.147)	(0.151)	(0.144)
	[0.84]	[1.01]	[0.88]	[0.59]
	0.001	0.001	0.001	0.001
ΔIR_t	(0.001)	(0.001)	(0.001)	(0.001)
	[0.71]	[0.60]	[0.70]	[0.64]
	0.0003	-0.001	0.001	0.001
ΔEA_t	(0.009)	(0.009)	(0.009)	(0.010)
	[0.04]	[-0.10]	[0.06]	[0.12]
	-0.053	-0.043	-0.046	-0.155***
ΔGS_t	(0.059)	(0.059)	(0.061)	(0.060)
	[-0.91]	[-0.73]	[-0.74]	[-2.61]
	-0.002	-0.003	-0.001	0.003
ΔTO_t	(0.006)	(0.006)	(0.006)	(0.006)
	[-0.26]	[-0.52]	[-0.16]	[0.41]
F* (%)	n.a.	n.a.	n.a.	n.a.
EG* (%)	n.a.	n.a.	n.a.	n.a.
Hausman Test (MG vs DFE)	1.000	1.000	1.000	1.000
Hausman Test (PMG vs DFE)	1.000	1.000	1.000	1.000
Estimator	DFE	DFE	DFE	DFE

Note: Standard errors in ( ), z-statistics in [], Δ is the operator of the first differences, *** indicates statistically significance at 1% level, ** indicates statistically significance at 5% level and * indicates statistically significance at 10% level

Table 10 – Estimates for the non-linear model and for the gross top 1% income share

Variable	Credit	Credit-to-Deposit Ratio	Liquid Liabilities	Stock Market Capitalisation
Long-term Coefficients				
	0.001	0.008	0.017*	0.004
F_t	(0.015)	(0.014)	(0.011)	(0.016)
	[0.06]	[0.55]	[1.64]	[0.28]
	0.008	0.001	-0.001	0.009
F_t^2	(0007)	(0.004)	(0.001)	(0.008)
	[1.16]	[0.22]	[-1.50]	[1.18]
	0.296***	0.348***	0.261***	0.192***
EG_t	(0.072)	(0.069)	(0.073)	(0.074)
	[4.12]	[5.01]	[3.56]	[2.58]
	-0.922	-1.149*	-0.689	-1.148
EG_t^2	(0.742)	(0.708)	(0.777)	(0.845)
	[-1.24]	[-1.62]	[-0.89]	[-1.36]
	-0.005	-0.001	-0.004	-0.004
IR_t	(0.006)	(0.005)	(0.006)	(0.006)
	[-0.90]	[-0.27]	[-0.74]	[-0.67]
	0.035**	0.033***	0.038***	0.035**
EA_t	(0.014)	(0.013)	(0.014)	(0.017)
	[2.55]	[2.60]	[2.67]	[2.05]
	-0.182*	-0.122	-0.116	-0.128
GS_t	(0.102)	(0.097)	(0.111)	(0.123)
	[-1.80]	[-1.25]	[-1.05]	[-1.04]
	-0.003	0.005	-0.005	-0.003
TO_t	(0.008)	(0.007)	(0.010)	(0.009)
	[0.968]	[0.64]	[-0.50]	[-0.38]
Short-term Coefficients				
	0.021***	0.017***	0.016***	0.020***
Constant	(0.006)	(0.005)	(0.006)	(0.006)
	[3.80]	[3.16]	[2.98]	[3.10]
	-0.223***	-0.223***	-0.210***	-0.217***
Error Correction Term$_t$	(0.021)	(0.021)	(0.021)	(0.024)
	[-10.49]	[-10.56]	[-10.11]	[-8.94]
	-0.023**	-0.001	-0.003	0.001
ΔF_t	(0.009)	(0.006)	(0.003)	(0.004)
	[-2.47]	[-0.18]	[-1.27]	[0.31]
	0.009**	-0.002	0.001**	0.0002
ΔF_t^2	(0.004)	(0.002)	(0.0003)	(0.001)
	[2.12]	[-1.14]	[2.26]	[0.11]
	-0.020	-0.020	-0.012	-0.025*
ΔEG_t	(0.013)	(0.013)	(0.013)	(0.014)
	[-1.48]	[-1.56]	[-0.93]	[-1.74]
	0.103	0.098	0.076	0.127
ΔEG_t^2	(0.120)	(0.114)	(0.120)	(0.128)
	[0.86]	[0.86]	[0.63]	[0.99]
	-0.0001	0.0001	0.0001	-0.0003
ΔIR_t	(0.001)	(0.001)	(0.001)	(0.001)
	[-0.08]	[0.13]	[0.09]	[-0.32]
	-0.007	-0.008	-0.008	-0.009
ΔEA_t	(0.007)	(0.007)	(0.007)	(0.009)
	[-1.01]	[-1.13]	[-1.11]	[-0.98]
	-0.132***	-0.116**	-0.139***	-0.200***
ΔGS_t	(0.047)	(0.045)	(0.049)	(0.053)
	[-2.83]	[-2.56]	[-2.87]	[-3.76]
	0.001	-0.001	-0.0001	0.003
ΔTO_t	(0.005)	(0.005)	(0.005)	(0.005)
	[0.23]	[-0.22]	[-0.01]	[0.48]
F*	n.a.	n.a.	n.a.	n.a.
EG*	n.a.	15.144	n.a.	n.a.
Hausman Test (MG vs DFE)	1.000	1.000	1.000	1.000
Hausman Test (PMG vs DFE)	1.000	1.000	1.000	1.000
Estimator	DFE	DFE	DFE	DFE

Note: Standard errors in ( ), z-statistics in [], Δ is the operator of the first differences, *** indicates statistically significance at 1% level, ** indicates statistically significance at 5% level and * indicates statistically significance at 10% level

Table 11 – Estimates for the non-linear model and for the gross top 10% income share

Variable	Credit	Credit-to-Deposit Ratio	Liquid Liabilities	Stock Market Capitalisation
Long-term Coefficients				
	-0.019	-0.007	0.014	0.010
F_t	(0.024)	(0.021)	(0.016)	(0.021)
	[-0.80]	[-0.31]	[0.86]	[0.49]
	0.017*	0.006	-0.001	0.010
F_t^2	(0.010)	(0.006)	(0.001)	(0.010)
	[1.66]	[0.90]	[-0.74]	[0.93]
	0.354***	0.434***	0.298***	0.233**
EG_t	(0.109)	(0.105)	(0.106)	(0.098)
	[3.25]	[4.12]	[2.81]	[2.38]
	-0.691	-1.096	-0.629	-0.892
EG_t^2	(1.137)	(1.092)	(1.141)	(1.121)
	[-0.61]	[-1.00]	[-0.55]	[-0.80]
	-0.008	-0.002	-0.006	-0.006
IR_t	(0.009)	(0.008)	(0.008)	(0.008)
	[-0.96]	[-0.28]	[-0.71]	[-0.80]
	0.041**	0.037*	0.043**	0.038*
EA_t	(0.021)	(0.020)	(0.021)	(0.023)
	[1.96]	[1.87]	[2.04]	[1.64]
	-0.240	-0.163	-0.182	-0.082
GS_t	(0.156)	(0.151)	(0.162)	(0.165)
	[-1.54]	[-1.08]	[-1.12]	[-0.50]
	0.003	0.008	0.001	-0.005
TO_t	(0.012)	(0.011)	(0.014)	(0.012)
	[0.28]	[0.69]	[0.06]	[-0.42]
Short-term Coefficients				
	0.062***	0.059***	0.058***	0.061***
Constant	(0.009)	(0.008)	(0.009)	(0.010)
	[7.05]	[7.03]	[6.79]	[6.25]
	-0.184***	-0.186***	-0.183***	-0.198***
Error Correction Term$_t$	(0.019)	(0.019)	(0.019)	(0.022)
	[-9.51]	[-9.68]	[-9.69]	[-9.10]
	-0.025**	0.001	-0.003	0.004
ΔF_t	(0.012)	(0.008)	(0.003)	(0.005)
	[-2.12]	[0.17]	[-0.86]	[0.75]
	0.011**	-0.003	0.001*	0.000
ΔF_t^2	(0.005)	(0.002)	(0.017)	(0.002)
	[1.96]	[-1.31]	[-0.66]	[0.00]
	-0.017	-0.019	-0.011	-0.031*
ΔEG_t	(0.017)	(0.016)	(0.017)	(0.017)
	[-0.99]	[-1.14]	[-0.66]	[-1.79]
	0.115	0.125	0.117	0.119
ΔEG_t^2	(0.153)	(0.147)	(0.153)	(0.156)
	[0.75]	[0.85]	[0.76]	[0.76]
	0.0004	0.0004	0.0004	0.0002
ΔIR_t	(0.001)	(0.001)	(0.001)	(0.001)
	[0.33]	[0.31]	[0.33]	[0.16]
	-0.004	-0.005	-0.004	-0.003
ΔEA_t	(0.009)	(0.009)	(0.009)	(0.011)
	[-0.42]	[-0.54]	[-0.43]	[-0.31]
	-0.094	-0.084	-0.093	-0.195***
ΔGS_t	(0.059)	(0.059)	(0.062)	(0.065)
	[-1.59]	[-1.43]	[-1.49]	[-3.01]
	0.002	-0.001	0.001	0.004
ΔTO_t	(0.006)	(0.006)	(0.006)	(0.007)
	[0.29]	[-0.15]	[0.15]	[0.55]
F*	n.a.	n.a.	n.a.	n.a.
EG*	n.a.	n.a.	n.a.	n.a.
Hausman Test (MG vs DFE)	1.000	1.000	1.000	1.000
Hausman Test (PMG vs DFE)	1.000	1.000	1.000	1.000
Estimator	DFE	DFE	DFE	DFE

Note: Standard errors in ( ), z-statistics in [], Δ is the operator of the first differences, *** indicates statistically significance at 1% level, ** indicates statistically significance at 5% level and * indicates statistically significance at 10% level

Summing up, we find strong evidence for a positive and linear relationship between finance and the level of inequality in the EU countries, which supports the beliefs of the non-mainstream literature that the growth of finance has harmful effects on contemporary societies in times of financialization.

7. CONCLUSION

This paper aimed to contribute to the current debate between the mainstream and the non-mainstream literature on the role played by the growth of finance on the level of inequality by performing a panel data econometric analysis for all the EU countries from 1980 to 2019.

We confirm that inequality has been widening in the last four decades in the majority of the EU countries, and that this has occurred simultaneously with a strong growth in finance in these countries during that time. This seems to confirm that the nexus between finance and inequality is indeed broken in times of financialization, refuting the mainstream claims of the supportive effect of the growth of finance on the level of inequality.

A linear model and a non-linear model were estimated, using six different proxies to measure the level of inequality (the gross Gini, the net Gini, the gross top 1% income share, the net top 1% income share, the gross top 10% income share and the net top 10% income share), four different proxies to assess the role of finance (credit, credit-to-deposit ratio, liquid liabilities and stock market capitalization) and six different proxies as controls (economic growth and the square of this term, inflation rate, educational attainment, government spending and degree of trade openness). Estimates were produced using a panel autoregressive distributed lag approach and, particularly, by relying on the DFE estimator, because of the existence of variables that are stationary in levels and stationary in the first differences (Pesaran and Smith, 1995; Pesaran, 1997; Pesaran *et al*., 1997, 1999).

Our findings confirm that finance, economic growth, educational attainment and the degree of trade openness exert a positive long-term effect on the level of inequality in the EU countries, whilst government spending has a negative impact in the short term. All of these findings are robust to the different proxies chosen.

Our findings imply that policy makers should rethink the functioning of the financial system and adopt more pro-poor public policies in order to constrain the widening of inequality in the EU countries. Instead of pursuing processes of liberalization, deregulation and privatization of the financial system, policy makers should ensure the maintenance of public banks and the development of alternative forms of financial institutions (e.g., state development and investment banks, cooperative and mutual banks, ethical banking, microfinance institutions, and local financial institutions) because they are not oriented towards profit and could contribute to promoting greater financial inclusion and more democratized access to financial services for poorer people. The adoption of state credit allocation policies especially for the poor would also be welcomed, and this could be achieved through the introduction of interest rates subsidies, loan guarantee programmes and tax incentives. The re-regulation of the financial system is also

desirable in order to avoid the resurgence of more episodes of financial scandal, fraud and crisis, which typically affect the poor more severely. More redistributive policies and increases in taxes related to inheritances and large fortunes could also be important to interrupt the vicious cycles of poverty in the EU countries.

Further research on this topic should focus on the analysis of the direct and/or indirect consequences related to this increasing trend in the level of inequality in times of financialization, namely at the level of social tensions, political instability, household indebtedness, labour productivity and economic growth. The empirical analysis of the nexus between finance and poverty in times of financialization could also represent an important research area.

REFERENCES

Adeleye, N., Osabuohien, E., and Bowale, E. (2017). The Role of Institutions in the Finance-Inequality Nexus in Sub-Saharan Africa. *Journal of Contextual Economics, 137* (1-2), 173–192.

Aghion, P., Howitt, P., and Mayer-Foulkes, D. (2005). The Effect of Financial Development on Convergence, Theory and Evidence. *Quarterly Journal of Economics, 120* (1), 173–222.

Alexiou, C., Vogiazas, S., and Nellis, J. (2018). Reassessing the relationship between the financial sector and economic growth, Dynamic panel evidence. *International Journal of Finance and Economics, 23* (2), 155–173.

Altunbas, Y., and Thornton, J. (2019). The impact of financial development on income inequality, A quantile regression approach. *Economics Letters, 175*, 51–56.

Ang, J. B. (2008). A Survey of Recent Developments in the Literature of Finance and Growth. *Journal of Economic Surveys, 22* (3), 536–576.

Ang. J. B. (2010). Finance and Inequality, The Case of India. *Southern Economic Journal, 76* (3), 738–761

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

Arestis, P., Chortareas, G., and Magkonis, G. (2015). The Financial Development and Growth Nexus, A Meta-Analysis. *Journal of Economic Surveys, 29* (3), 549–565.

Arora, R. U. (2012). Finance and inequality, a study of Indian states. *Applied Economics, 44* (34), 4257–4538.

Atje, R., and Jovanovic, B. (1993). Stock markets and development. *European Economics Review*, *37* (2/3), 632–640.

Barba, A., and Pivetti, M. (2009). Rising household debt, Its causes and macroeconomic implications – a long-period analysis. *Cambridge Journal of Economics, 33* (1), 113–137.

Barajas, A., Chami, R., and Yousefi, S. R. (2013). The Finance and Growth Nexus Re-Examined, Do All Countries Benefit Equally?. *IMF Working Paper 13/130*.

Barradas, R. (2016). Evolution of the Financial Sector – Three Different Stages, Repression, Development and Financialization. In Gomes, O., and Martins, H. F. (ed.), *Advances in Applied Business Research, the L.A.B.S. Initiative*, New York, Nova Science Publishers.

Barradas, R. 2019. Financialization and Neoliberalism and the Fall in the Labour Share, A Panel Data Econometric Analysis for the European Union Countries. *Review of Radical Political Economics, 51* (3), 383–417.

Barradas, R. (2020). Does the financial system support economic growth in times of financialization, Evidence for Portugal. *International Review of Applied Economics, 34* (6), 785–806.

Barradas, R. (2022a). The Finance-Growth Nexus in the Age of Financialization, An Empirical Reassessment for the European Union Countries. *Panoeconomicus, 69* (4), 527–554.

Barradas, R. (2022b). Drivers of Private Consumption in the Era of Financialization, New Evidence for European Union Countries. *Review of Keynesian Economics, 10* (3), 406–434.

Barradas, R., and Lagoa, S. (2017a). Functional Income Distribution in Portugal, The Role of Financialization and Other Related Determinants. *Society and Economy, 39* (2), 183–212.

Barradas, R., and Lakhani R. (2022). The Finance-Inequality Nexus in the Era of Financialization, Evidence for Portugal. *Working Paper nº 2022/03*. DinâmiaCET – Iscte. Lisboa.

Barradas, R., Lagoa, S., Leão, E., and Mamede, R. P. (2018). Financialization in the European Periphery and the Sovereign Debt Crisis, The Portuguese Case. *Journal of Economic Issues, 52* (4), 1056–1083.

Barro, R. J. (2020). Inequality and Growth in a Panel of Countries. *Journal of Economic Growth, 5* (1), 5–32.

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

Beck, T., Degryse, H., and Kneer, C. (2014). Is more finance better? Disentangling intermediation and size effects of financial systems. *Journal of Financial Stability, 10* (1), 50–64.

Blackburne III, E. F., and Frank, M. W. (2007). Estimation of nonstationary heterogeneous panels. *The Stata Journal, 7* (2), 197–2008.

Bolarinwa, S. T., Vo, X. V., and Olufolahan, T. J. (2021). The effect of financial development on income inequality in Africa. *Development Southern Africa, 38* (2), 311–329.

Boone, L. and Girouard, N. (2002). The Stock Market, The Housing Market and Consumer Behaviour. *OECD Economic Studies, 35*, Paris.

Boubakari, A., and Jin, D. (2010). The Role of Stock Market Development in Economic Growth, Evidence from Some Euronext Countries. *International Journal of Financial Research, 1* (1), 14–20.

Breitenlechner, M., Gächter, M., and Sindermann, F. (2015). The finance-growth nexus in crisis. *Economics Letters, 132* (1), 31–33

Cecchetti, S. G., and Kharroubi, E. (2012). Reassessing the impact of finance on growth. *BIS Working Paper 381*.

Chen, P., Karavias, Y., and Tzavalis, E. (2022). Panel unit-root tests with structural breaks. *The Stata Journal, 22* (3), 664–678.

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

Claessens, S., and Perotti, E. (2007). Finance and inequality, Channels and evidence. *Journal of Comparative Economics, 35* (4), 748–773.

Clarke, G. R. R., Xu, L. C., and Zou, H. (2006). Finance and Inequality, What Do the Data Tell Us?. *Southern Economic Journal*, *72* (3), 578–596.

Correia, D., and Barradas, R. (2021). Financialization and the slowdown of labour productivity in Portugal, A Post-Keynesian approach. *PSL Quarterly Review, 74* (299), 325–346.

Cynamon, B. Z. and Fazzari, S. M. (2008). Household Debt in the Consumer Age, Source of Growth – Risk of Collapse. *Capitalism and Society, 3* (2), 1–32.

Dabla-Norris, E., and Srivisal, N. (2013). Revisiting the Link Between Finance and Macroeconomic Volatility. *IMF Working Paper 13/29*.

Das, M., and Mohapatra, S. (2003). Income inequality, the aftermath of stock market liberalization in emerging markets. *Journal of Empirical Finance, 10* (1-2), 217–248.

Edison, H. and Sløk, T. (2001). Wealth Effects and the New Economy. *IMF Working Paper 01/77*.

Ehigiamusoe, K. U., and Lean, H. H. (2018). Finance-Growth Nexus, New Insights from the West African Region. *Emerging Markets Finance and Trade*, *54* (11), 2596–2613.

Falahaty, M., and Hook, L. S. (2013). The Effect of Financial Development on Economic Growth in the MENA Region. *Journal of Economic Cooperation and Development, 34* (3), 35–60.

Furceri, D., and Loungani, P. (2015). Capital Account Liberalization and Inequality. *IMF Working Paper 15/243*.

Galor, O., and Zeira, J. (1993). Income Distribution and Macroeconomics. *Review of Economic Studies, 60* (1), 35–52.

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

Gonçalves, A., and Barradas, R. (2021). Financialization and the Portuguese Private Consumption, Two Contradictory Effects?. *Brazilian Journal of Political Economy, 41* (1), 79–99.

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

Haan, J. de, and Sturm, J. E. (2017). Finance and income inequality, A review and new evidence. *European Journal of Political Economy, 50* (5), 171–195.

Hamori, S., and Hashiguchi, Y. (2012). The effect of financial deepening on inequality, Some international evidence. *Journal of Asian Economics, 23* (4), 353–359.

Hausman, J. A. (1978). Specification Tests in Econometrics. *Econometrica, 46* (6), 1251–1271.

Hein, E. 2012. *The Macroeconomics of Finance-dominated Capitalism – and its Crisis*. Cheltenham, Edward Elgar Publishing Limited.

Jalilian, H., and Kirkpatrick, C. (2002). Financial development and poverty reduction in developing countries. *International Journal of Finance & Economics, 7* (2), 97–108.

Jauch, S., and Watzka, S. (2016). Financial development and income inequality, a panel data approach. *Empirical Economics, 51* (1), 291–314.

Jaumotte, F., Lall, S., and Papageorgiou, C. (2013). Rising Income Inequality, Technology, or Trade and Financial Globalization?. *IMF Economic Review, 61* (2), 271–309.

Jung, S. M., and Vijverberg, C. P. C. (2019). Financial development and income inequality in China – A spatial data analysis. *The North American Journal of Economics and Finance, 48*, 295–320.

Justiniano, A., Primiceri, G. E., and Tambalotti, A. (2019). Credit Supply and the Housing Boom. *Journal of Political Economy, 127* (3), 1317–1350.

Kaldor, Y. (2021). Financialization and income inequality, bringing class struggle back in. *Critical Sociology, 48* (3), 381–396.

Karavias Y., Tzavalis E. (2014). Testing for unit roots in short panels allowing for a structural break. *Computational Statistics and Data Analysis, 76*, 391–407.

Kim, D. H., and Lin, S. C. (2011). Nonlinearity in the financial development – income inequality nexus. *Journal of Comparative Economics, 39* (3), 310–325.

King, R. G., and Levine, R. (1993a). Finance and Growth, Schumpeter Might be Right. *Quarterly Journal of Economics, 108* (3), 717–737.

King, R. G., and Levine, R. (1993b). Finance, entrepreneurship and growth, Theory and evidence. *Journal of Monetary Economics, 32* (3), 513–542.

Kose, M. A., Prasad, E., Rogoff, K. S., and Wei, S. (2006). Financial Globalization, A Reappraisal. *IMF Staff Papers, 56* (1), 8–62.

Kus, B. (2012). Financialization and Income Inequality in OECD Nations, 1995-2007. *The Economic and Social Review, 43* (4), 477–495.

Kuznets, S. (1955). Economic Growth and Income Inequality. *American Economic Review, 45* (1), 1–28.

Lagoa, S., and Barradas, R. (2021). Financialization and Inequality in the Semi-Periphery, Evidence from Portugal. In A. C. Santos, and N. Teles (eds.), *Financialization in the European Periphery, Work and Social Reproduction in Portugal*. London, Routledge.

Law, S. H., Tan, H. B., and Azman-Saini, W. N. W. (2014). Financial Development and Income Inequality at Different Levels of Institutional Quality. *Emerging Markets Finance and Trade, 50* (1), 21–33.

Lee, K., and Siddique, M. A. B. (2021). Financialization and income inequality, An empirical analysis. *The Japanese Political Economy, 47* (2-3), 121–145.

Levine, R. (1997). Financial Development and Economic Growth, Views and Agenda. *Journal of Economic Literature, 35* (2), 688–726.

Levine, R. (2005). Finance and Growth, Theory and Evidence. In P. Aghion, and S., Durlauf, Handbook of Economic Growth, 865–934. Amsterdam, Elsevier.

Levine, R., and Zervos, S. (1998). Stock Markets, Banks, and Economic Growth. *American Economic Review, 88* (3), 537–558.

Li, H., Squire, L., and Zou, H. (1998). Explaining International and Intertemporal Variations Income Inequality. *Economic Journal, 108* (446), 26–43.

Li, J., and Yu, H. (2014). Income inequality and financial reform in Asia, the role of human capital. *Applied Economics, 46* (24), 2920–2935.

Liang, Z. (2006). Financial development and income distribution, a system GMM panel analysis with application to urban China. *Journal of Economic Development, 31* (2), 1–21.

Luintel, K. B., and Khan, M. (1999). A quantitative reassessment of the finance–growth nexus, evidence from a multivariate VAR. *Journal of Development Economics, 60* (2), 381–405.

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

Meniago, C., and Asongu. S. A. (2018). Revisiting the finance-inequality nexus in a panel of African countries. *Research in International Business and Finance, 46*, 399–419.

Motonishi, T. (2006). Why has income inequality in Thailand increased?, An analysis using surveys from 1975 to 1998. *Japan and the World Economy, 18* (4), 464–487.

Nandelenga, M. W., and Oduor, J. (2020). Assymetric analysis of finance – Inequality nexus, Evidence from sub-Saharan Africa. *The Journal of Economic Asymmetries*. 22, e00184.

Pariboni, R., Paternesi, M., and Tridico, P. 2020. When *Melius Abundare* Is No Longer True, Excessive Financialization and Inequality as Drivers of Stagnation. *Review of Political Economy, 32* (2), 216–242.

Pesaran, M. H. (1997). The role of econometric theory in modelling the long run. *Economic Journal, 107* (440), 178–191.

Pesaran, M. H., and Smith, R. P. (1995). Estimating long-run relationships from dynamic heterogeneous panels. *Journal of Econometrics, 68*, 79–113.

Pesaran, M. H., Shin, Y., and Smith, R. P. (1997). Estimating long-run relationships in dynamic heterogeneous panels. *DAE Working Papers Amalgamated Series 9721.*

Pesaran, M. H., Shin, Y., and Smith, R. P. 1999. Pooled mean group estimation of dynamic heterogeneous panels. *Journal of the American Statistical Association, 94*, 621–634.

Piketty, T. (2000). Theories of persistent inequality and intergenerational mobility. *Handbook of Income Distribution, 1*, 429–476.

Piketty, T. (2014). *Capital in the Twenty-First Century*. Cambridge, Harvard University Press.

Prasad, E. S., Rajan, R. G., and Subramanian, A. (2007). Foreign Capital and Economic Growth. *NBER Working Paper 13619*.

Rashid, A., and Intarglia, M. (2017). Financial development – does it lessen poverty?. *Journal of Economic Studies, 44* (1), 69–86.

Redmond, T., and Nasir, M. A. (2020). Role of natural abundance, international trade and financial development in the economic development of selected countries. *Resources Policy, 66*. 101591.

Rewilak, J. (2017). The role of financial development in poverty reduction. *Review of Development Finance, 7* (2), 169–176.

Rioja, F., and Valev, N. (2004a). Finance and the Sources of Growth at Various Stages of Economic Development. *Economic Inquiry, 42* (1), 127–140.

Rioja, F., and Valev, N. (2004b). Does one size fit all? A reexamination of the finance and growth relationship. *Journal of Development Economics, 74* (1), 429–447.

Rodríguez-Pose, A., and Tselios, V. (2009). Education and income inequality in the regions of the European Union. *Journal of Regional Science, 49* (3), 411–437.

Roine, J., Vlachos, J., and Waldenström, D. (2009). The long-run determinants of inequality, what can we learn from top income data?. *Journal of Public Economics, 93* (7-8), 974–988.

Romão, A., and Barradas, R. (2022). Macroeconomic determinants of households indebtedness in Portugal, what really matters in the era of financialization?. *International Journal of Finance & Economics*. 1–19.

Rousseau, P. L., and Wachtel, P. (2011). What is happening to the impact of financial deepening on economic growth?. *Economic Inquiry, 49* (1), 276–288.

Sehrawat, M., and Giri, A. K. (2015). Financial development and income inequality in India, an application of ARDL approach. *International Journal of Social Economics, 42* (1), 64–81.

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

Seven, U., and Yetkiner, H. (2016). Financial intermediation and economic growth, does income matter?. *Economic Systems, 40* (1), 39–58.

Shahbaz, M., Nasir, M. A., and Lahiani, A. (2022). Role of financial development in economic growth in the light of asymmetric effects and financial efficiency. *International Journal of Finance & Economics, 27* (1), 361–383.

Stockhammer, E. (2009). The finance-dominated accumulation regime, income distribution and the present crisis. *Papeles de Europa*, *19*, 58–81.

Tan, H. B., and Law, S. H. (2012). Nonlinear dynamics of the finance-inequality nexus in developing countries. *Journal of Economic Inequality, 10* (4), 551–563.

Thornton, J., and Di Tommaso, C. (2020). The long-run relationship between finance and income inequality, Evidence from panel data. *Finance Research Letters, 32*, 1–6.

Tridico, P., and Pariboni, R. (2018). Inequality, financialization, and economic decline. *Journal of Post Keynesian Economics, 41* (2), 236–259.

Valickova, P., Havranek, T., and Horvath, R. (2014). Financial Development and Economic Growth, A Meta-Analysis. *Journal of Economic Surveys, 29* (3), 506–526.

Westcott, M., and Murray, J. (2017). Financialization and inequality in Australia. *Economic and Labour Relations Review, 28* (4), 519–537.

Zalewski, D. A., and Whalen, C. J. (2010). Financialization and Income Inequality, A Post Keynesian Institutionalist Analysis. *Journal of Economic Issues, 44* (3), 757–777.

APPENDIX

Figure A1 – Gross Gini (%)

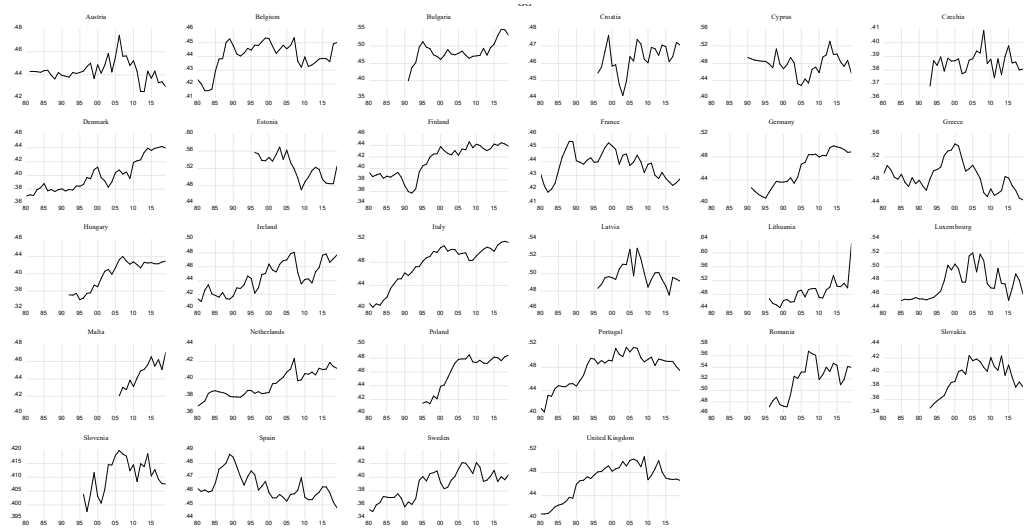

Figure A2 – Net Gini (%)

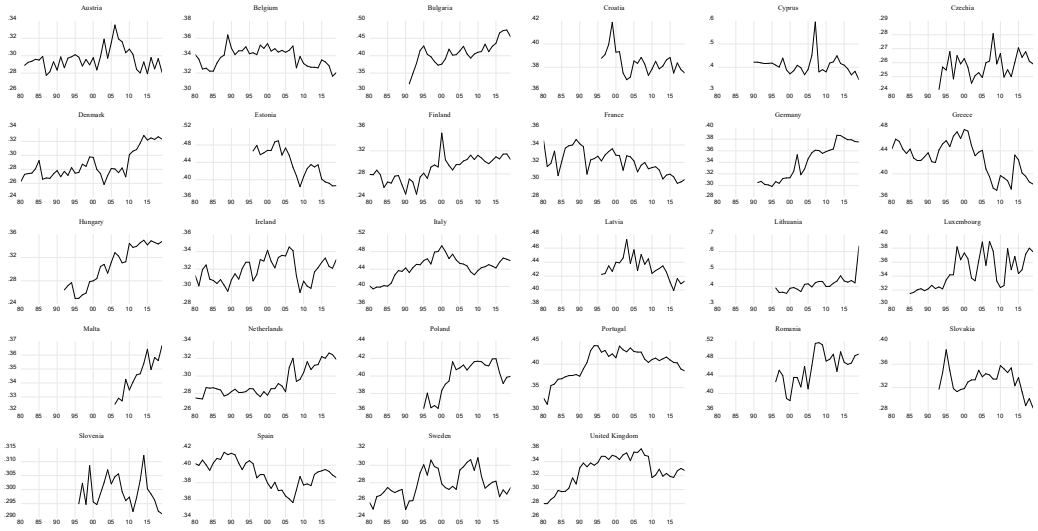

Figure A3 – Gross top 1% income share (%)

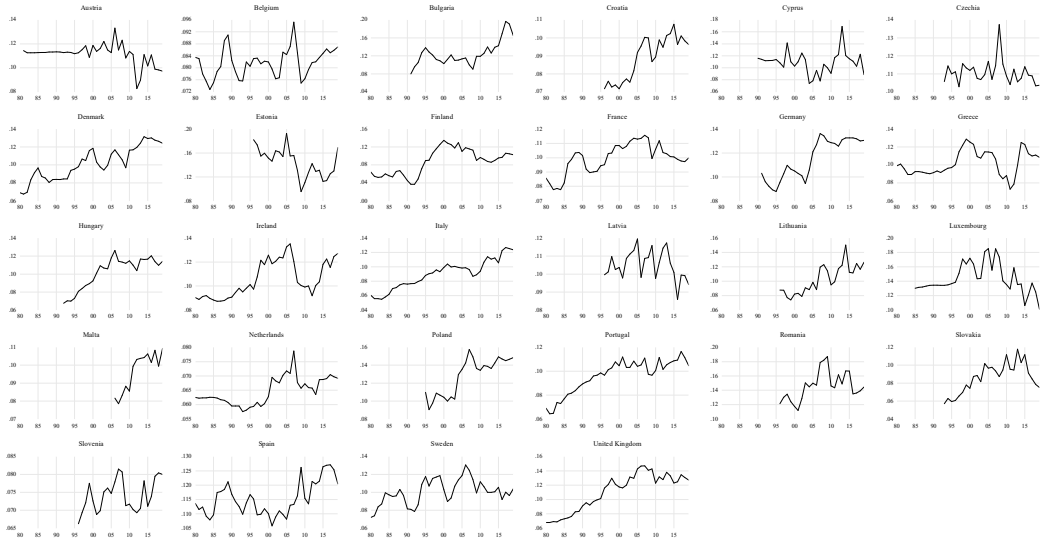

Figure A4 – Net top 1% income share (%)

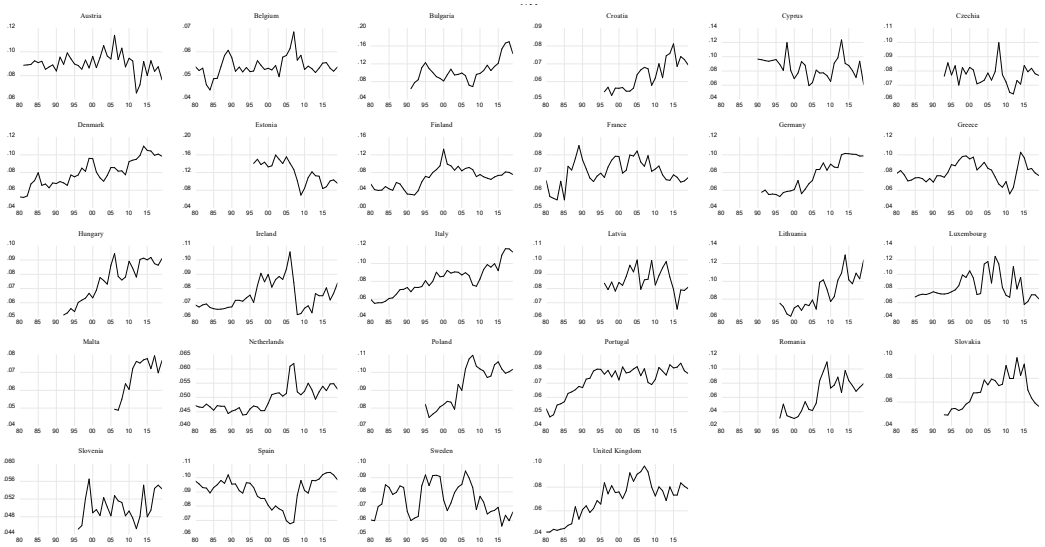

Figure A5 – Gross top 10% income share (%)

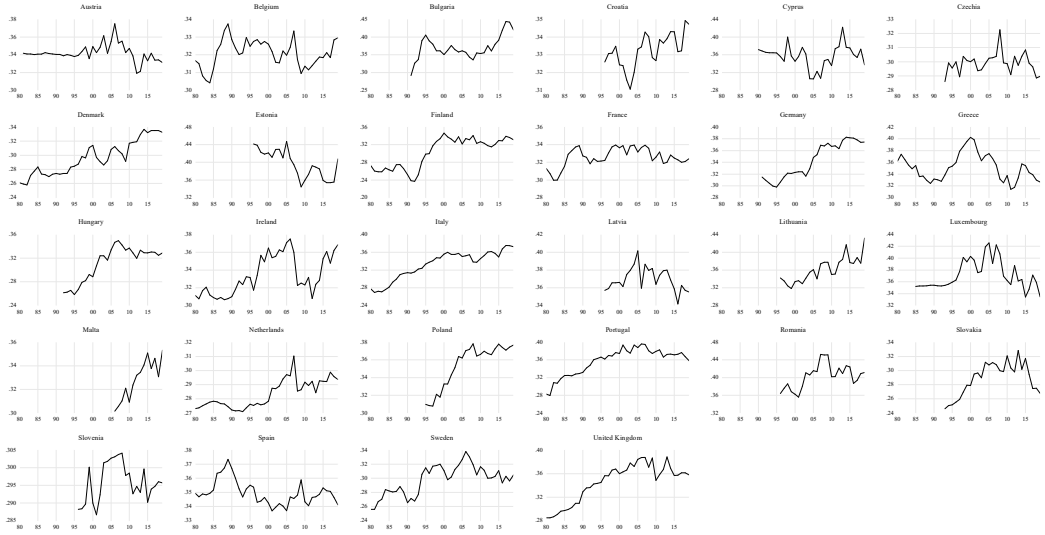

Figure A6 – Net top 10% income share (%)

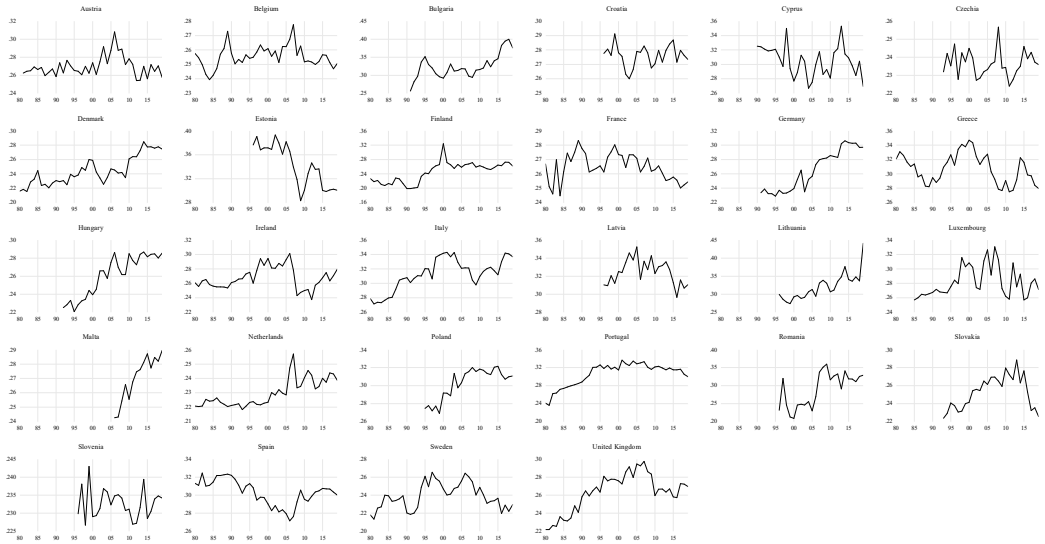

Figure A7 – Credit (% of the GDP)

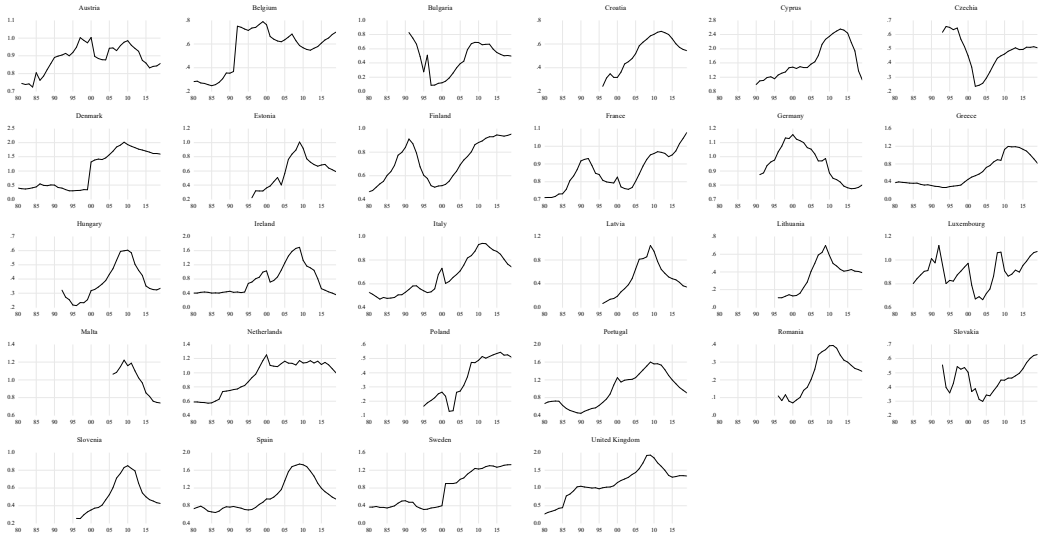

Figure A8 – Credit-to-deposit ratio (%)

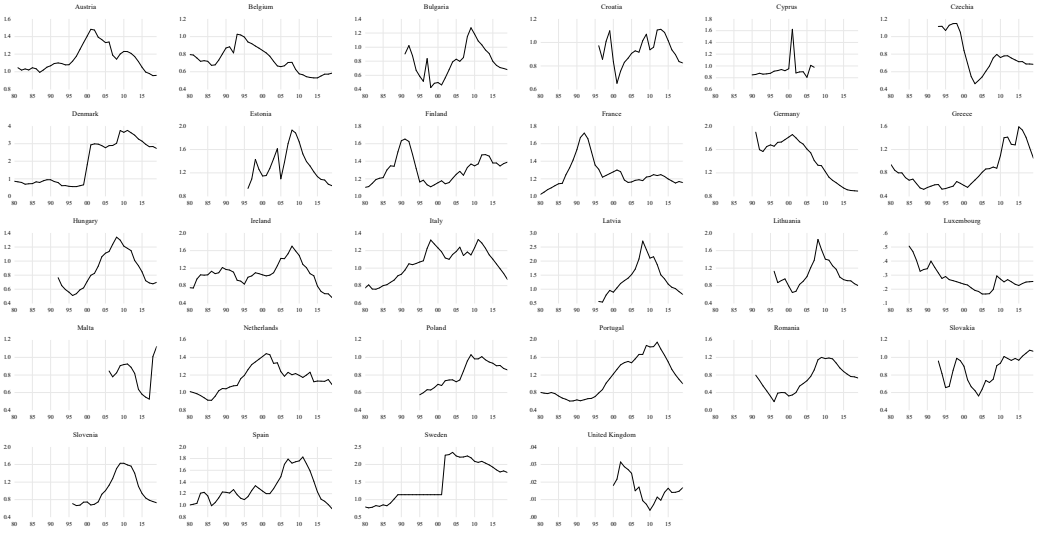

Figure A9 – Liquid liabilities (% of the GDP)

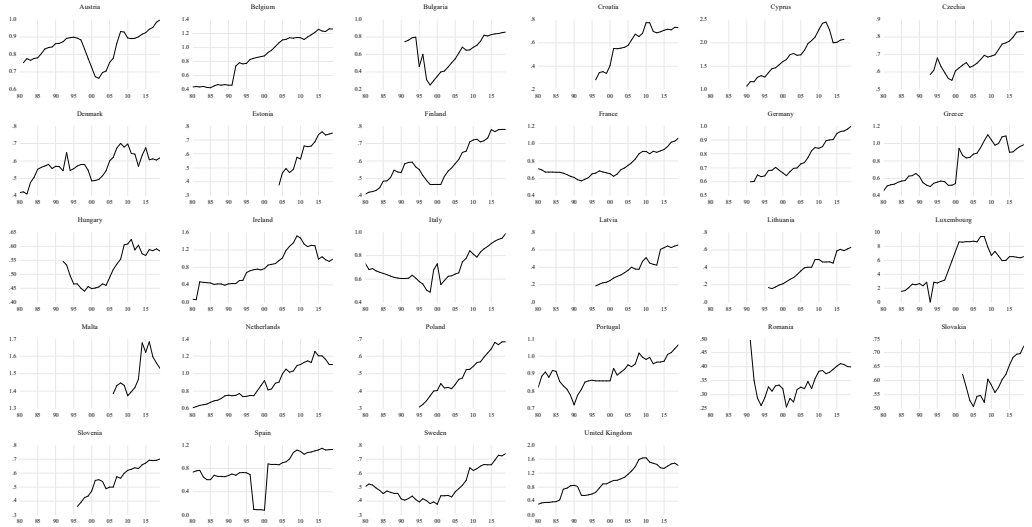

Figure A10 – Stock market capitalization (% of the GDP)

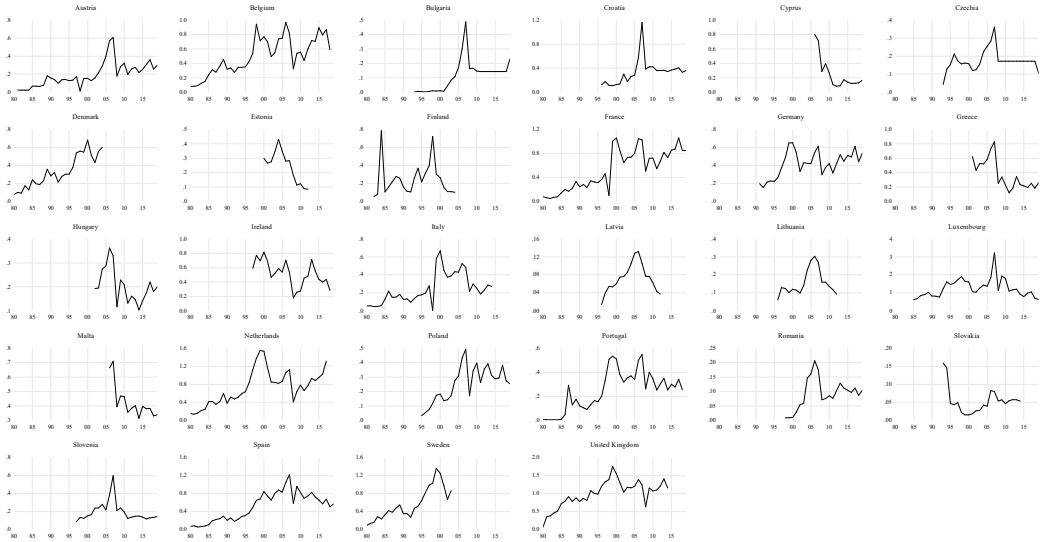

Figure A11 – Economic growth (annual %)

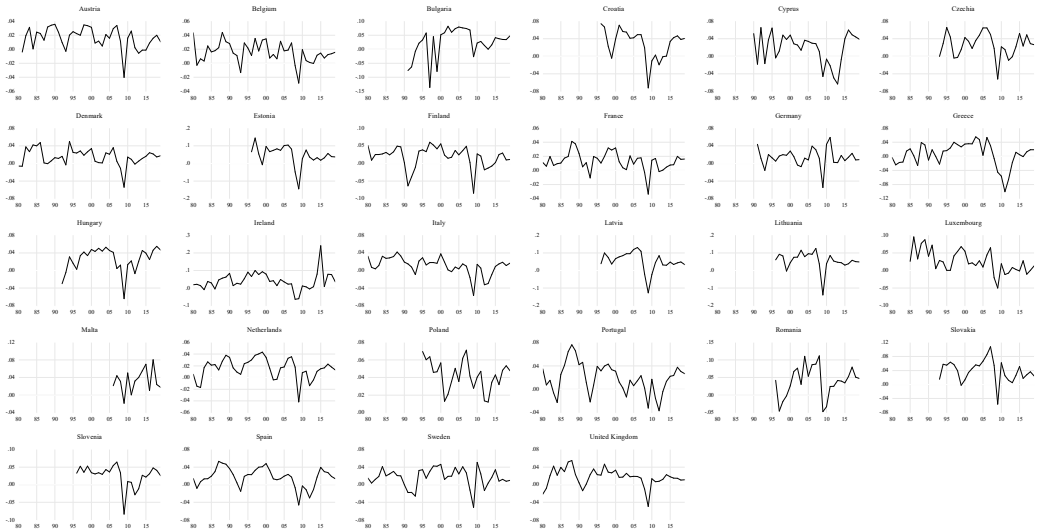

Figure A12 – Inflation rate (annual %)

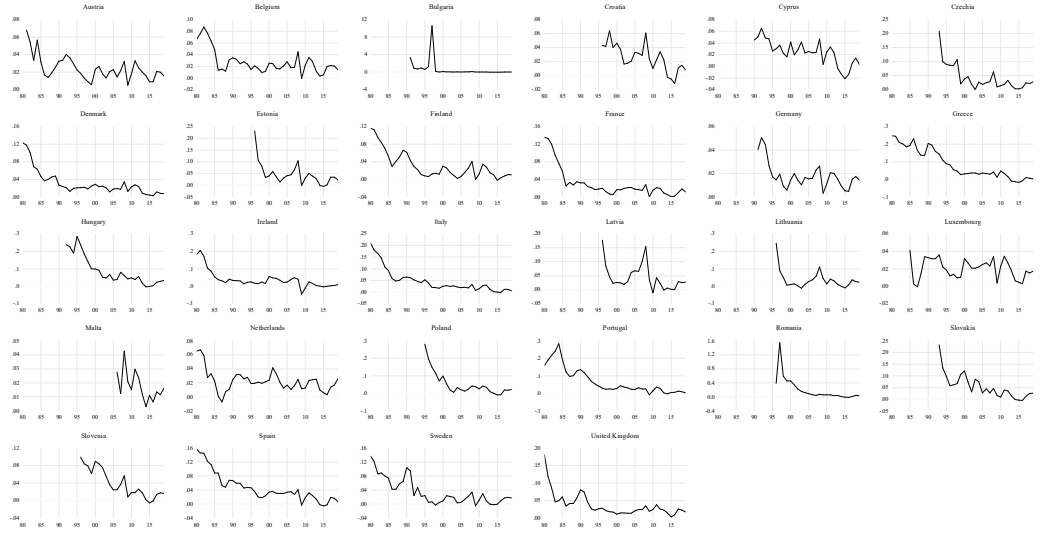

Figure A13 – Educational attainment (%)

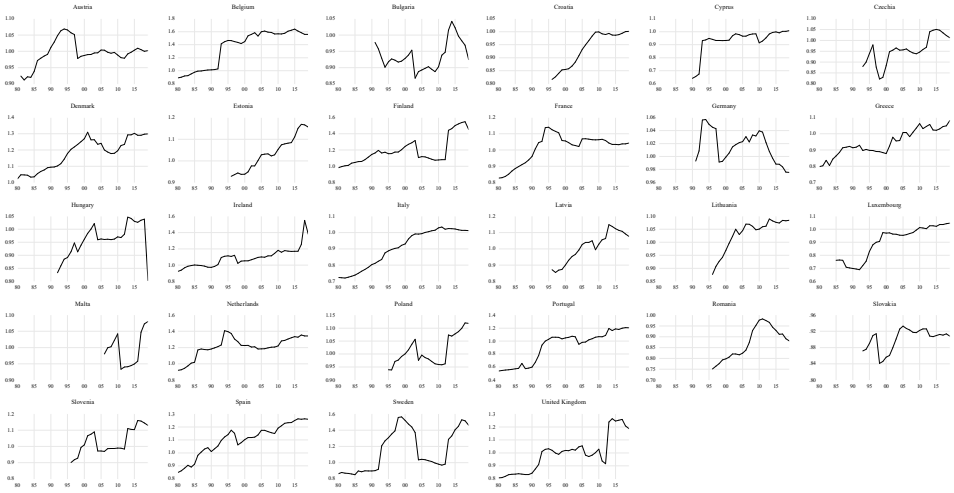

Figure A14 – Government spending (% of the GDP)

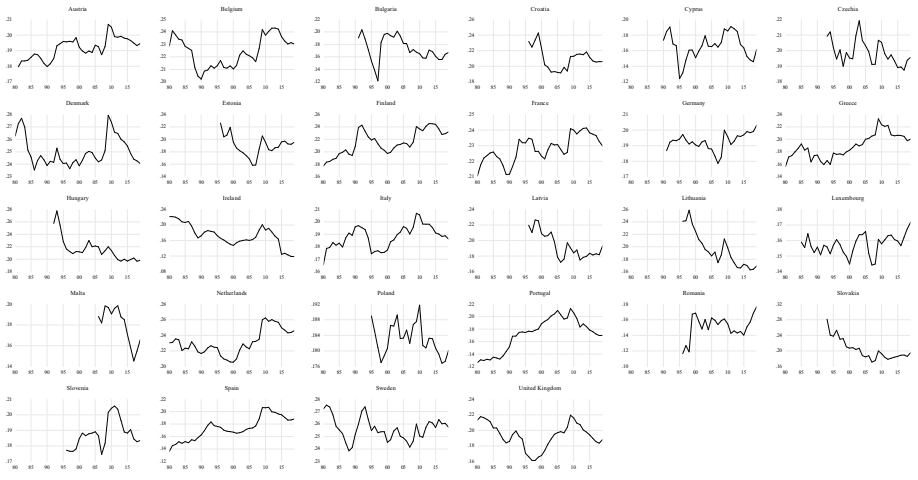

Figure A15 – Trade openness (% of the GDP)

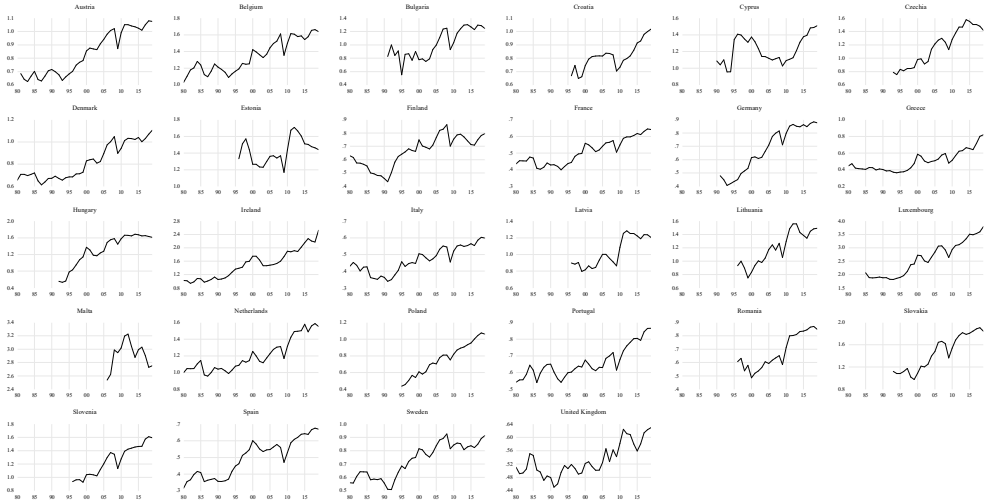

Table A1 – Estimates for the linear model and for the net Gini

Variable	Credit	Credit-to-Deposit Ratio	Liquid Liabilities	Stock Market Capitalisation
Long-term Coefficients				
	0.001	0.008	-0.0002	0.015*
F_t	(0.009)	(0.007)	(0.004)	(0.009)
	[0.08]	[1.08]	[-0.05]	[1.71]
	0.141	0.324***	0.154*	0.108
EG_t	(0.101)	(0.125)	(0.090)	(0.075)
	[1.40]	[2.60]	[1.72]	[1.43]
	-0.644	-1.709	-0.900	-0.454
EG_t^2	(1.085)	(1.342)	(1.013)	(0.891)
	[-0.59]	[-1.27]	[-0.89]	[-0.51]
	-0.008	-0.005	-0.010	-0.006
IR_t	(0.008)	(0.010)	(0.007)	(0.006)
	[-0.92]	[-0.56]	[-1.45]	[-0.98]
	0.004	-0.003	0.008	0.008
EA_t	(0.020)	(0.024)	(0.018)	(0.018)
	[0.18]	[-0.11]	[0.45]	[0.46]
	-0.113	-0.088	-0.173	0.044
GS_t	(0.147)	(0.185)	(0.144)	(0.131)
	[-0.77]	[-0.47]	[-1.20]	[0.34]
	0.021*	0.021	0.026*	0.013
TO_t	(0.011)	(0.014)	(0.012)	(0.009)
	[1.93]	[1.56]	[2.16]	[1.38]
Short-term Coefficients				
	0.101***	0.075***	0.107***	0.113***
Constant	(0.013)	(0.012)	(0.013)	(0.014)
	[7.68]	[6.09]	[8.07]	[8.12]
	-0.288***	-0.220***	-0.304***	-0.358***
Error Correction Term$_t$	(0.027)	(0.027)	(0.027)	(0.029)
	[-10.56]	[-8.24]	[-11.25]	[-12.23]
	-0.001	-0.008	0.004	0.002
ΔF_t	(0.008)	(0.005)	(0.003)	(0.004)
	[-0.08]	[-1.58]	[1.41]	[0.49]
	0.008	-0.002	0.007	-0.019
ΔEG_t	(0.025)	(0.024)	(0.024)	(0.025)
	[0.31]	[-0.09]	[0.29]	[-0.78]
	0.228	0.317	0.292	0.182
ΔEG_t^2	(0.228)	(0.213)	(0.227)	(0.225)
	[1.00]	[1.49]	[1.29]	[0.81]
	0.001	0.001	0.002	0.0003
ΔIR_t	(0.002)	(0.002)	(0.002)	(0.002)
	[0.72]	[0.60]	[1.07]	[0.20]
	0.004	0.001	0.005	0.007
ΔEA_t	(0.014)	(0.013)	(0.014)	(0.016)
	[0.26]	[0.10]	[0.36]	[0.44]
	-0.117	-0.091	-0.061	-0.273***
ΔGS_t	(0.008)	(0.009)	(0.092)	(0.093)
	[-1.33]	[-1.08]	[-0.66]	[-2.93]
	-0.005	-0.005	-0.006	-0.002
ΔTO_t	(0.009)	(0.009)	(0.009)	(0.010)
	[-0.55]	[-0.62]	[-0.66]	[-0.20]
EG* (%)	n.a.	n.a.	n.a.	n.a.
Hausman Test (MG vs DFE)	1.000	1.000	1.000	1.000
Hausman Test (PMG vs DFE)	1.000	1.000	1.000	1.000
Estimator	DFE	DFE	DFE	DFE

Note: Standard errors in ( ), z-statistics in [], Δ is the operator of the first differences, *** indicates statistically significance at 1% level, ** indicates statistically significance at 5% level and * indicates statistically significance at 10% level

Table A2 – Estimates for the linear model and for the net top 1% income share

Variable	Credit	Credit-to-Deposit Ratio	Liquid Liabilities	Stock Market Capitalisation
Long-term Coefficients				
	0.007	0.007**	0.002	0.010
F_t	(0.005)	(0.003)	(0.002)	(0.006)
	[1.48]	[1.99]	[0.77]	[1.60]
	0.199***	0.263***	0.166***	0.116**
EG_t	(0.060)	(0.059)	(0.055)	(0.054)
	[3.33]	[4.46]	[3.03]	[2.13]
	-0.886	-0.981	-0.750	-1.271**
EG_t^2	(0.633)	(0.614)	(0.606)	(0.641)
	[-1.40]	[-1.60]	[-1.24]	[-1.98]
	-0.004	-0.003	-0.005	-0.004
IR_t	(0.005)	(0.004)	(0.004)	(0.004)
	[-0.89]	[-0.77]	[-1.27]	[-0.81]
	0.016	0.015	0.024**	0.018
EA_t	(0.011)	(0.011)	(0.011)	(0.013)
	[1.43]	[1.40]	[2.23]	[1.45]
	-0.072	-0.031	-0.049	-0.102
GS_t	(0.086)	(0.085)	(0.086)	(0.093)
	[-0.85]	[-0.36]	[-0.56]	[-1.10]
	0.005	0.008	0.006	0.005
TO_t	(0.006)	(0.006)	(0.007)	(0.007)
	[0.81]	[1.35]	[0.82]	[0.70]
Short-term Coefficients				
	0.016***	0.012***	0.014***	0.020***
Constant	(0.005)	(0.005)	(0.005)	(0.006)
	[3.01]	[2.42]	[2.60]	[3.19]
	-0.253***	-0.252***	-0.257***	-0.279***
Error Correction Term$_t$	(0.023)	(0.023)	(0.023)	(0.026)
	[-11.04]	[-10.97]	[-11.11]	[-10.53]
	-0.005	-0.006***	0.002	0.001
ΔF_t	(0.004)	(0.003)	(0.002)	(0.002)
	[-1.25]	[-2.58]	[1.39]	[0.32]
	-0.005	-0.007	0.004	-0.007
ΔEG_t	(0.013)	(0.012)	(0.012)	(0.014)
	[-0.42]	[-0.56]	[0.30]	[-0.53]
	0.063	0.041	0.033	0.097
ΔEG_t^2	(0.117)	(0.112)	(0.115)	(0.126)
	[0.54]	[0.36]	[0.29]	[0.77]
	0.001	0.001	0.001	0.0003
ΔIR_t	(0.001)	(0.001)	(0.001)	(0.001)
	[0.74]	[1.34]	[1.36]	[0.26]
	-0.007	-0.007	-0.009	-0.011
ΔEA_t	(0.007)	(0.007)	(0.007)	(0.009)
	[-1.02]	[-1.07]	[-1.22]	[-1.27]
	-0.092**	-0.065	-0.079*	-0.161***
ΔGS_t	(0.045)	(0.045)	(0.046)	(0.052)
	[-2.03]	[-1.45]	[-1.71]	[-3.12]
	-0.0001	-0.001	-0.012	-0.002
ΔTO_t	(0.005)	(0.005)	(0.005)	(0.005)
	[-0.02]	[-0.30]	[-0.33]	[-0.35]
EG* (%)	n.a.	n.a.	n.a.	4.563
Hausman Test (MG vs DFE)	1.000	1.000	1.000	1.000
Hausman Test (PMG vs DFE)	1.000	1.000	1.000	1.000
Estimator	DFE	DFE	DFE	DFE

Note: Standard errors in ( ), z-statistics in [], Δ is the operator of the first differences, *** indicates statistically significance at 1% level, ** indicates statistically significance at 5% level and * indicates statistically significance at 10% level

Table A3 – Estimates for the linear model and for the net top 10% income share

Variable	Credit	Credit-to-Deposit Ratio	Liquid Liabilities	Stock Market Capitalisation
Long-term Coefficients				
	0.007	0.011**	-0.0001	0.014
F_t	(0.008)	(0.005)	(0.004)	(0.010)
	[0.92]	[2.07]	[-0.02]	[1.47]
	0.249***	0.396***	0.251***	0.161**
EG_t	(0.093)	(0.091)	(0.084)	(0.082)
	[2.69]	[4.37]	[2.97]	[1.96]
	-0.742	-1.446	-1.061	-0.907
EG_t^2	(0.985)	(0.944)	(0.932)	(0.968)
	[-0.75]	[-1.53]	[-1.14]	[-0.94]
	-0.008	-0.003	-0.006	-0.007
IR_t	(0.007)	(0.007)	(0.007)	(0.007)
	[-1.04]	[-0.40]	[-0.94]	[-1.12]
	0.017	0.014	0.026	0.022
EA_t	(0.018)	(0.017)	(0.016)	(0.019)
	[0.93]	[0.85]	[1.59]	[1.11]
	-0.114	-0.048	-0.086	-0.074
GS_t	(0.133)	(0.131)	(0.132)	(0.142)
	[-0.85]	[-0.37]	[-0.65]	[-0.52]
	0.010	0.014	0.015	0.005
TO_t	(0.010)	(0.010)	(0.011)	(0.010)
	[0.94]	[1.49]	[1.39]	[0.54]
Short-term Coefficients				
	0.064***	0.061***	0.064***	0.064***
Constant	(0.009)	(0.009)	(0.010)	(0.010)
	[6.75]	[6.42]	[6.53]	[6.34]
	-0.240***	-0.251***	-0.255***	-0.250***
Error Correction Term$_t$	(0.023)	(0.024)	(0.024)	(0.025)
	[-20.39]	[-10.63]	[-10.74]	[-10.10]
	-0.005	-0.008**	0.003	0.002
ΔF_t	(0.006)	(0.004)	(0.002)	(0.003)
	[-0.80]	[-2.09]	[1.40]	[0.80]
	-0.013	-0.02§	-0.007	-0.019
ΔEG_t	(0.019)	(0.019)	(0.019)	(0.019)
	[-0.71]	[-1.11]	[-0.36]	[-1.03]
	0.180	0.341	0.207	0.122
ΔEG_t^2	(0.173)	(0.172)	(0.175)	(0.171)
	[1.04]	[1.40]	[1.19]	[0.71]
	0.002	0.002	0.002	0.0004
ΔIR_t	(0.001)	(0.001)	(0.001)	(0.001)
	[1.16]	[1.26]	[1.40]	[0.30]
	-0.001	-0.001	-0.002	-0.003
ΔEA_t	(0.011)	(0.011)	(0.011)	(0.012)
	[-0.05]	[-0.06]	[-0.14]	[-0.24]
	-0.067	-0.026	-0.028	-0.226***
ΔGS_t	0.067	(0.007)	(0.071)	(0.071)
	[-1.00]	[-0.39]	[-0.39]	[-3.20]
	0.005	-0.0002	0.0005	0.002
ΔTO_t	(0.007)	(0.007)	(0.007)	(0.007)
	[0.66]	[-0.04]	[0.07]	[0.32]
EG* (%)	n.a.	n.a.	n.a.	n.a.
Hausman Test (MG vs DFE)	1.000	1.000	1.000	1.000
Hausman Test (PMG vs DFE)	1.000	1.000	1.000	1.000
Estimator	DFE	DFE	DFE	DFE

Note: Standard errors in ( ), z-statistics in [], Δ is the operator of the first differences, *** indicates statistically significance at 1% level, ** indicates statistically significance at 5% level and * indicates statistically significance at 10% level

Table A4 – Estimates for the non-linear model and for the net Gini

Variable	Credit	Credit-to-Deposit Ratio	Liquid Liabilities	Stock Market Capitalisation
Long-term Coefficients				
	-0.001	-0.008	-0.002	0.014
F_t	(0.022)	(0.026)	(0.014)	(0.017)
	[-0.03]	[-0.31]	[-0.11]	[0.83]
	0.001	0.005	0.0001	0.001
F_t^2	(0.010)	(0.008)	(0.001)	(0.008)
	[0.06]	[0.64]	[0.09]	[0.09]
	0.143	0.310**	0.143	0.108
EG_t	(0.101)	(0.008)	(0.092)	(0.076)
	[1.41]	[2.47]	[1.55]	[1.42]
	-0.634	-1.735	-0.890	-0.453
EG_t^2	(1.085)	(1.340)	(1.103)	(0.892)
	[-0.58]	[-1.29]	[-0.88]	[-0.51]
	-0.008	-0.006	-0.011	-0.006
IR_t	(0.008)	(0.010)	(0.007)	(0.006)
	[-0.94]	[-0.60]	[-1.55]	[-0.98]
	0.004	-0.001	0.008	0.009
EA_t	(0.020)	(0.024)	(0.019)	(0.018)
	[0.19]	[-0.02]	[0.45]	[0.47]
	-0.113	-0.093	-0.174	0.045
GS_t	(0.149)	(0.185)	(0.144)	(0.132)
	[-0.76]	[-0.51]	[-1.21]	[0.34]
	0.022*	0.021	0.026**	0.013
TO_t	(0.011)	(0.014)	(0.013)	(0.009)
	[1.94]	[1.55]	[2.05]	[1.36]
Short-term Coefficients				
	0.101***	0.078***	0.108***	0.113***
Constant	(0.013)	(0.013)	(0.013)	(0.014)
	[7.48]	[6.12]	[8.09]	[8.00]
	-0.288***	-0.220***	-0.304***	-0.358***
Error Correction Term$_t$	(0.027)	(0.027)	(0.027)	(0.029)
	[-10.49]	[-8.24]	[-11.22]	[-12.20]
	-0.003	0.006	-0.0002	0.001
ΔF_t	(0.018)	(0.012)	(0.005)	(0.007)
	[-0.19]	[0.48]	[-0.04]	[0.14]
	0.001	-0.004	0.001	0.0003
ΔF_t^2	(0.008)	(0.003)	(0.025)	(0.003)
	[0.18]	[-1.21]	[0.37]	[0.13]
	0.007	0.0002	0.009	-0.020
ΔEG_t	(0.025)	(0.024)	(0.025)	(0.025)
	[0.29]	[0.01]	[0.37]	[-0.78]
	0.226	0.319	0.287	0.181
ΔEG_t^2	(0.229)	(0.213)	(0.227)	(0.226)
	[0.99]	[1.49]	[1.27]	[0.80]
	0.001	0.001	0.002	0.0004
ΔIR_t	(0.002)	(0.002)	(0.002)	(0.002)
	[0.72]	[0.50]	[1.13]	[0.20]
	0.004	0.001	0.005	0.007
ΔEA_t	(0.014)	(0.013)	(0.014)	(0.016)
	[0.26]	[0.05]	[0.35]	[0.42]
	-0.118	-0.088	-0.058	-0.274***
ΔGS_t	(0.089)	(0.085)	(0.092)	(0.094)
	[-1.33]	[-1.03]	[-0.63]	[-2.93]
	-0.005	-0.006	-0.007	-0.002
ΔTO_t	(0.009)	(0.009)	(0.009)	(0.010)
	[-0.54]	[-0.65]	[-0.74]	[-0.21]
F* (%)	n.a.	n.a.	n.a.	n.a.
EG* (%)	n.a.	n.a.	n.a.	n.a.
Hausman Test (MG vs DFE)	1.000	1.000	1.000	1.000
Hausman Test (PMG vs DFE)	1.000	1.000	1.000	1.000
Estimator	DFE	DFE	DFE	DFE

Note: Standard errors in ( ), z-statistics in [], Δ is the operator of the first differences, *** indicates statistically significance at 1% level, ** indicates statistically significance at 5% level and * indicates statistically significance at 10% level

Table A5 – Estimates for the non-linear model and for the net top 1% income share

Variable	Credit	Credit-to-Deposit Ratio	Liquid Liabilities	Stock Market Capitalisation
Long-term Coefficients				
	-0.002	0.007	0.007	-0.010
F_t	(0.013)	(0.012)	(0.008)	(0.012)
	[-0.15]	[0.62]	[0.78]	[-0.87]
	0.004	-0.0002	-0.0005	0.011*
F_t^2	(0.006)	(0.003)	(0.001)	(0.006)
	[0.75]	[-0.05]	[-0.61]	[1.94]
	0.206***	0.263***	0.163***	0.128**
EG_t	(0.060)	(0.059)	(0.056)	(0.055)
	[3.41]	[4.42]	[2.91]	[2.32]
	-0.843	-1.011*	-0.758	-1.280*
EG_t^2	(0.632)	(0.614)	(0.607)	(0.644)
	[-1.33]	[-1.65]	[-1.25]	[-1.99]
	-0.006	-0.003	-0.006	-0.004
IR_t	(0.005)	(0.004)	(0.004)	(0.004)
	[-1.18]	[-0.71]	[-1.40]	[-0.90]
	0.018	0.015	0.022*	0.025*
EA_t	(0.012)	(0.011)	(0.011)	(0.013)
	[1.52]	[1.40]	[1.95]	[1.91]
	-0.078	-0.033	-0.053	-0.077
GS_t	(0.087)	(0.085)	(0.086)	(0.094)
	[-0.90]	[-0.39]	[-0.62]	[-0.82]
	0.006	0.009	0.004	0.004
TO_t	(0.006)	(0.006)	(0.008)	(0.007)
	[0.91]	[1.38]	[0.54]	[0.59]
Short-term Coefficients				
	0.016***	0.012***	0.014***	0.017***
Constant	(0.005)	(0.005)	(0.005)	(0.006)
	[3.05]	[2.29]	[2.67]	[2.86]
	-0.253***	-0.252***	-0.256***	-0.277***
Error Correction Term$_t$	(0.023)	(0.023)	(0.023)	(0.026)
	[-11.06]	[-10.99]	[-11.11]	[-10.48]
	-0.015*	-0.001	-0.003	-0.001
ΔF_t	(0.009)	(0.006)	(0.003)	(0.004)
	[-1.66]	[-0.09]	[-0.97]	[-0.29]
	0.005	-0.002	0.001**	0.0004
ΔF_t^2	(0.004)	(0.002)	(0.0003)	(0.001)
	[1.26]	[-1.06]	(2.29]	[0.28]
	-0.006	-0.006	0.004	-0.009
ΔEG_t	(0.012)	(0.012)	(0.012)	(0.014)
	[-0.49]	[-0.51]	[0.34]	[-0.63]
	0.055	0.044	0.029	0.093
ΔEG_t^2	(0.117)	(0.112)	(0.115)	(0.125)
	[0.47]	[0.39]	[0.25]	[0.74]
	0.001	0.001	0.001	0.0003
ΔIR_t	(0.001)	(0.001)	(0.001)	(0.001)
	[0.77]	[1.16]	[1.41]	[0.33]
	-0.008	-0.008	-0.008	-0.013
ΔEA_t	(0.007)	(0.007)	(0.007)	(0.009)
	[-1.05]	[-1.08]	[-1.20]	[-1.48]
	-0.095**	-0.062	-0.078*	-0.165***
ΔGS_t	(0.045)	(0.045)	(0.046)	(0.052)
	[-2.09]	[-1.39]	[-1.68]	[-3.18]
	-0.0001	-0.002	-0.002	-0.002
ΔTO_t	(0.005)	(0.005)	(0.005)	(0.005)
	[3.05]	[2.29]	[-0.48]	[-0.41]
F*	n.a.	n.a.	n.a.	n.a.
EG*	n.a.	n.a.	n.a.	5.000
Hausman Test (MG vs DFE)	1.000	1.000	1.000	1.000
Hausman Test (PMG vs DFE)	1.000	1.000	1.000	1.000
Estimator	DFE	DFE	DFE	DFE

Note: Standard errors in ( ), z-statistics in [], Δ is the operator of the first differences, *** indicates statistically significance at 1% level, ** indicates statistically significance at 5% level and * indicates statistically significance at 10% level

Table A6 – Estimates for the non-linear model and for the net top 10% income share

Variable	Credit	Credit-to-Deposit Ratio	Liquid Liabilities	Stock Market Capitalisation
Long-term Coefficients				
	-0.004	0.014	0.001	-0.002
F_t	(0.020)	(0.018)	(0.013)	(0.018)
	[-0.20]	[0.76]	[0.10]	[-0.12]
	0.005	-0.001	-0.0001	0.009
F_t^2	(0.009)	(0.005)	(0.001)	(0.009)
	[0.58]	[-0.17]	[-0.13]	[1.01]
	0.259***	0.396***	0.242***	0.170**
EG_t	(0.094)	(0.091)	(0.086)	(0.084)
	[2.77]	[4.25]	[2.80]	[2.03]
	-0.685	-1.517	-1.058	-0.908
EG_t^2	(0.984)	(0.940)	(0.932)	(0.972)
	[-0.70]	[-1.61]	[-1.14]	[-0.93]
	-0.010	-0.002	-0.007	-0.008
IR_t	(0.018)	(0.007)	(0.007)	(0.007)
	[1.00]	[-0.31]	[-1.06]	[-1.17]
	0.018	0.014	0.025	0.027
EA_t	(0.018)	(0.017)	(0.017)	(0.020)
	[1.00]	[0.85]	[1.48]	[1.34]
	-0.120	-0.052	-0.089	-0.055
GS_t	(0.136)	(0.130)	(0.132)	(0.144)
	[-0.88]	[-0.40]	[-0.67]	[-0.38]
	0.010	0.015	0.015	0.005
TO_t	(0.010)	(0.010)	(0.012)	(0.010)
	[1.02]	[1.56]	[1.25]	[0.47]
Short-term Coefficients				
	0.065***	0.061***	0.064***	0.063***
Constant	(0.010)	(0.010)	(0.010)	(0.010)
	[6.69]	[6.25]	[6.58]	[6.15]
	-0.241***	-0.252***	-0.255***	-0.249***
Error Correction Term$_t$	(0.023)	(0.024)	(0.024)	(0.025)
	[-10.41]	[-10.66]	[-10.72]	[-10.06]
	-0.018	0.006	-0.002	-0.001
ΔF_t	(0.014)	(0.010)	(0.004)	(0.005)
	[-1.34]	[0.63]	[-0.39]	[-0.15]
	0.007	-0.005*	0.001*	0.001
ΔF_t^2	(0.006)	(0.003)	(0.0004)	(0.002)
	[1.12]	[-1.64]	[1.64]	[0.53]
	-0.015	-0.020	-0.005	-0.020
ΔEG_t	(0.019)	(0.019)	(0.019)	(0.019)
	[-0.77]	[-1.04]	[-0.28]	[-1.08]
	0.170	0.250	0.203	0.118
ΔEG_t^2	(0.173)	(0.172)	(0.175)	(0.171)
	[0.98]	[1.45]	[1.16]	[0.69]
	0.002	0.001	0.002	0.0005
ΔIR_t	(0.001)	(0.001)	(0.001)	(0.001)
	[1.18]	[1.00]	[1.46]	[0.34]
	-0.001	-0.001	-0.002	-0.004
ΔEA_t	(0.011)	(0.011)	(0.011)	(0.012)
	[-0.07]	[-0.08]	[-0.14]	[-0.35]
	-0.070	-0.020	-0.025	-0.230***
ΔGS_t	(0.067)	(0.068)	(0.071)	(0.071)
	[-1.05]	[-0.29]	[-0.36]	[-3.25]
	0.005	-0.001	-0.0003	0.002
ΔTO_t	(0.007)	(0.007)	(0.010)	(0.007)
	[0.67]	[-0.10]	[-0.04]	[0.27]
F*	n.a.	n.a.	n.a.	n.a.
EG*	n.a.	n.a.	n.a.	n.a.
Hausman Test (MG vs DFE)	1.000	1.000	1.000	1.000
Hausman Test (PMG vs DFE)	0.000	0.000	0.000	0.000
Estimator	DFE or PMG	DFE	DFE	DFE

Note: Standard errors in ( ), z-statistics in [], Δ is the operator of the first differences, *** indicates statistically significance at 1% level, ** indicates statistically significance at 5% level and * indicates statistically significance at 10% level