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Ricardo Barradas
Rishi Lakhani

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Ricardo Barradas*

Rishi Lakhani**

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*Iscte - Instituto Universitário de Lisboa, DINÂMIA'CET - Iscte, Lisboa, Portugal. Email: ricardo_barradas@iscte-iul.pt (corresponding author)

** BNP Paribas, Porto, Portugal. E-mail: lakhanirishi@gmail.com

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ABSTRACT

Since the 1980s, Portuguese policy makers have engaged in a strong process of liberalisation, deregulation and privatisation of the financial system to adhere to the rules imposed by the European Economic Community and to promote financial growth, boost economic growth and reduce inequality. However, the Portuguese economic growth has exhibited a weaker performance and inequality has continued to widen in the last decades, a situation that seems to contradict the mainstream beliefs regarding the supportive role played by financial growth in the era of financialisation. This paper undertakes an empirical assessment of the finance–inequality nexus by performing a time series econometric analysis for Portugal from 1980 to 2020 through the estimation of both linear and non-linear models. It finds strong evidence for a positive (linear) relationship between finance and inequality and some evidence for a convex quadratic (non-linear) relationship between finance and inequality in Portugal, corroborating the hypothesis that the financial growth has been prejudicial, enhancing inequality in Portugal. These findings highlight the urgent need to abandon the so-called 'trickle-down theory' or the 'horse and sparrow theory' and to implement the so-called 'trickle-up theory' with the support of pro-poor public policies to decrease inequality in Portugal.

KEYWORDS: Financial Growth, Financialisation, Inequality, Portugal, Time Series, Generalised Method of Moments Estimator

JEL CLASSIFICATION: C32, D31, D63 and E44

1. INTRODUCTION

Rising inequality is a stylised fact in both developed and developing countries (Zalewski and Whalen, 2010; Piketty, 2014; Haan and Sturm, 2017; Westcott and Murray, 2017; Bolarinwa *et al*., 2021), representing a widespread concern for economists (and other social scientists) and for policy makers all over the world (Seven and Coskun, 2016). Several consequences are directly

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and/or indirectly related to this increasing trend of inequality, namely the rise of mendicity, criminality, corruption, injustice, insider privilege, unequal opportunities and socio-political unrest (Tan and Law, 2012); hunger, poor health and the decrease of life expectancy at birth (Claessens and Perotti, 2007; Bolarinwa *et al*., 2021); the increase in abstention in elections, the emergence of populism, the appearance of more extreme political parties, the existence of more defragmented parliaments and the corresponding absence of political majorities and, consequently, less political stability; the growth of the informal sector (Claessens and Perotti, 2007); the reduction of entrepreneurial activities and the corresponding harmful effects on productive investment and on labour productivity (Claessens and Perotti, 2007); the slowdown of economic growth and the rise of unemployment due to higher levels of taxation to implement public policies to address inequality (Seven and Coskun, 2016); and the more frequent recurrence of financial crisis episodes due to the greater indebtedness of poorer people, in a context of stagnant wages, as a way to maintain their consumption standards (Haan and Sturm, 2017).

Against this backdrop, the majority of governments all over the world have engaged in a strong process of liberalisation, deregulation and privatisation of the financial system since the 1970s and 1980s in an attempt to restrain financial repression, to support financial development and the corresponding growth of finance, to boost economic growth and to reduce inequality (Barradas, 2016). This behaviour has been exacerbated by the mainstream theoretical claims about the positive role played by financial growth, specifically promoting easy access to financial services for the poor, which favours a reduction of inequality (Greenwood and Jovanovic, 1990).

Nonetheless, we have not observed a fall in inequality in recent decades (Zalewski and Whalen, 2010; Piketty, 2014; Haan and Sturm, 2017; Westcott and Murray, 2017; Bolarinwa *et al*., 2021) because financial growth in the era of financialisation has not provided democratised access to financial services for all people (Seven and Coskun, 2016), has favoured banking systems that are highly concentrated and dominated by large financial groups that demand high prices for financial services (Claessens and Perotti, 2007; Arora, 2012), has not been accompanied by strong political and economic institutions and/or hard supervision, making economies more prone to experience financial and economic crises (Seven and Coskun, 2016; Haan and Sturm, 2017), has been associated with asset price booms (Hein, 2012; Lagoa and Barradas, 2021), has been prejudicial (beneficial) to the labour income (profit) share (Hein, 2012; Barradas and Lagoa, 2017a; Barradas, 2019), has been linked to a huge amount of foreign direct investment that is more detrimental to poorer people (Jaumotte *et al*., 2013), has increased the political power of financial elites and the corresponding adoption of several pro-rich public policies and practices (Kaldor, 2021; Lagoa and Barradas, 2021) and has been associated with weaker economic growth (Tridico and Pariboni, 2018; Pariboni *et al*., 2020).

This paper aims to undertake an empirical assessment of the finance–inequality nexus by performing a time series econometric analysis for Portugal from 1980 to 2020. The paper contributes to the existing literature by presenting at least six important novelties. The first one is the analysis of the finance–inequality nexus in a context in which the majority of empirical studies are more focused on the finance–growth nexus (Arora, 2012; Tan and Law, 2012; Adeleye *et al*., 2017; Meniago and Asongu, 2018; Nandelenga and Oduor, 2020). The second novelty is the analysis of the finance–inequality nexus for the specific case of Portugal. Portugal is a very interesting case study to assess the relationship between financial growth and inequality in the era of financialisation. On the one hand, Portugal has undergone a process of financialisation and sustained financial growth in recent decades (Figure 1), particularly after its integration into the European Economic Community in 1986 and the corresponding imposition of a strong wave of liberalisation, deregulation and privatisation of the Portuguese financial system (Barradas *et al*., 2018). On the other hand, Portugal has exhibited an increasing trend for inequality, particularly prior to the Great Recession (Figure 1). Note also that inequality in Portugal is at one of the highest levels among the European Union countries (Lagoa and Barradas, 2021). The third novelty is the study of the finance–inequality nexus through a time series econometric analysis in a context in which the majority of empirical studies on this subject perform panel data econometric analysis. Time series econometric analysis facilitates a better comprehension of the historical, social, economic and institutional factors responsible for the evolution of inequality in a specific country over time, which is not possible through panel data econometric analysis because this only offers the average factors that explain the evolution of inequality in a set of different countries as a whole. The fourth novelty is the analysis of the finance–inequality nexus using three different variables as proxies for the level of inequality, namely the Gini coefficient, the top 1% income share and the top 10% income share. This approach allows us to capture the overall distribution of income in the population and the top income shares by isolating the wealthy cohort, which tends to have other sources of income that are omitted from the Gini coefficient (Furceri and Loungani, 2015; Makhlouf *et al*., 2020). The fifth novelty is the analysis of the finance–inequality nexus using the pre-tax and pre-transfer values (i.e., the gross values) and the post-tax and post-transfer values (i.e., the net values) for the variables as proxies for the level of inequality because they give us different perspectives on inequality, specifically with regard to governments' responses to reduce inequality (Makhlouf *et al*., 2020). The sixth novelty is the analysis of the finance–inequality nexus using seven variables as proxies for the role of finance, namely credit, liquid liabilities, the loan-to-deposit ratio, foreign direct investment, financial value added, stock market capitalisation and shareholder orientation. This approach allows us to take into account the many-sided dimensions through which the growth of finance has undermined the level of inequality in the era of financialisation by reflecting the different scopes (e.g., size, depth,

efficiency and stability) of different financial intermediaries (e.g., banks and financial markets) and shareholders (Barradas, 2020; Bolarinwa *et al*., 2021).

The paper estimates both linear and non-linear models by employing the generalised method of moments (GMM) estimator, popularised by Hansen (1982), because our estimates are produced by relapsing in dynamic models due to the incorporation of the lagged level of inequality among the independent variables and to overcome potential problems of endogeneity. The paper confirms that inequality is strongly persistent in Portugal, positively affected by government spending and negatively affected by inflation, educational attainment and trade openness. It also reports the existence of a 'Kuznets curve', according to which there is a concave quadratic (non-linear) relationship between economic growth and inequality in Portugal. The paper also presents strong evidence for a positive (linear) relationship between finance and inequality in Portugal and some evidence for a convex quadratic (non-linear) relationship between finance and inequality in Portugal, which corroborate the hypothesis that financial growth has been prejudicial in Portugal in the era of financialisation.

The remainder of this paper is organised as follows. Section 2 discusses the theoretical and empirical evidence on the finance–inequality nexus in the era of financialisation. In Section 3, we provide the specification of our models and the concomitant hypotheses. Data and stylised facts regarding the finance–inequality nexus in Portugal are presented in Section 4. Section 5 describes the econometric method used to produce our estimations. In Section 6, the findings are presented and discussed. Finally, Section 7 concludes.

2. THEORETICAL AND EMPIRICAL LITERATURE ON THE FINANCE–INEQUALITY NEXUS IN THE ERA OF FINANCIALISATION

Conventional economic theory tends to sustain the idea that financial growth is in general a positive phenomenon and a crucial condition for promoting a decrease in inequality all over the world. Two traditional arguments are claimed to support these beliefs (Beck *et al*., 2007; Seven and Coskun, 2016).

On the one hand, financial growth reduces credit constraints and transaction costs by improving the access of the poor to financial services, which favours a reduction of inequality (Greenwood and Jovanovic, 1990). Effectively, poorer people are more financially constrained due to their lower probability of repaying loans, and they are the most affected by financial market imperfections, information asymmetries, moral hazard problems, contract enforcement costs, transaction costs and the costs of screening and subsequent monitoring due to their lack of collateral, credit histories and connections (Galor and Zeira, 1993; Beck *et al*., 2007; Claessens

and Perotti, 2007; Kim and Lin, 2011; Tan and Law, 2012). According to this argument, financial growth allows the financial system to start to cover a large number of people who were previously unable to obtain loans (i.e., the so-called 'extensive margin') by alleviating entry barriers, promoting competition, favouring a decrease in prices, improving the efficiency of capital allocation and expanding its activities to riskier and poorer people (but with high expected returns), among whom the demand is higher, and thus diminishing inequality (Galor and Zeira, 1993; Makhlouf *et al*., 2000; Beck *et al*., 2007; Adeleye *et al*., 2017)[2]. Financial growth supports the greater availability of credit and the deterioration of creditworthiness standards, making credit possible even for poorer people (Hein, 2012) due to financial innovation and engineering (e.g., debt securitisation and the 'originate to distribute' strategies of banks), the increase in 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), the technological improvement of the methods to assess the credit risk and the loosening of financial regulations (Boone and Girouard, 2002; Cynamon and Fazzari, 2008; Stockhammer, 2009; Hein, 2012; Justiano *et al*., 2019).

On the other hand, financial growth boosts economic growth (Levine, 2005; Ang, 2008; Beck *et al*., 2014; Arestis *et al*., 2015), which exerts a positive effect even for poorer people and favours a reduction in inequality due to the corresponding reduction in information and transaction costs (Jalilian and Kirkpatrick, 2002; Beck *et al*., 2007; Seven and Coskun, 2016). According to this argument, financial growth allows a better reallocation of savings to fund entrepreneurs' investments and the development of the non-financial sectors through productive investments. This is the so-called 'intermediation or financial facilitator view' (Beck *et al*., 2014). This argument rests on the seminal work by Kuznets (1955), who posits that there is a non-linear relationship between economic growth and inequality as a concave quadratic function, in a context in which economic growth has an inverted U-shaped effect on inequality (i.e., the so-called 'Kuznets curve') due to a shift from low-skilled workers from sectors with low productivity to sectors with high productivity. According to this author, the relationship between economic growth and inequality is positive in the short term and negative in the long term, that is, after a certain threshold. This happens because low-skilled workers would have lower wages than high-skilled workers who have already been working in sectors with high productivity immediately after the transference (i.e., in the short term) from the two sectors, which will widen inequality. Barro (2000) adds that the rise in inequality in the short term could instigate socio-political unrest

[2] The demand from poorer people for financial services (especially for credit) is higher due to their aspiration to emulate the lifestyle and consumption patterns of richer people (Gonçalves and Barradas, 2021; Barradas, 2022a). This is the so-called 'demonstration effect' or 'Duesenberry effect' (Duesenberry, 1949), according to which poorer people exhibit 'expenditure cascades' behaviour or 'keeping up with the Joneses' behaviour in terms of durable goods in the wake of conspicuous consumption (Gonçalves and Barradas, 2021). The availability of new goods and services (e.g., smartphones and other information and communication technological devices) – too attractive and tempting to be resisted even by the poor – and the corresponding influence of advertising, marketing and mass media have fed this type of behaviour (Cynamon and Fazzari, 2008; Barba and Pivetti, 2009).

but that inequality decreases in the long term due to the adoption of pro-poor public policies to mitigate this socio-political unrest. In the long term, the relationship between economic growth and inequality also tends to be negative due to its redistributive effects (Bolarinwa *et al*., 2021).

This optimistic (or supportive) view of the role played by financial growth has been fed by the emergence of several empirical studies finding a positive impact of finance on economic growth (Atje and Jovanovic, 1993; King and Levine, 1993a and 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 a negative impact of finance on inequality (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; Thornton and Di Tommaso, 2019). We also find several empirical studies reporting a non-linear relationship between finance and inequality as a concave quadratic function, according to which finance has an inverted U-shaped effect on inequality (Kim and Lin, 2011; Law *et al*., 2014; Chiu and Lee, 2019). This suggests that the beneficial effects of finance on inequality only occur after a certain threshold by sustaining the mainstream beliefs about the advantages provided by financial growth.

Against this backdrop, the majority of countries have engaged in a strong process of liberalisation, deregulation and privatisation of the financial system since the 1970s and 1980s in an effort to restrain financial repression, to support financial development and the corresponding growth of finance, to boost economic growth and to reduce inequality (Barradas, 2016). As a consequence, strong financial growth has been apparent since that time and many harmful effects have arisen directly from this excessive financial deepening, namely more episodes of financial crisis, more corporate financial scandals, greater fragility of banking systems, more volatility of the aggregate demand and more financial instability due to the rise of financial bubbles and bursts (Rousseau and Wachtel, 2011; Barajas *et al*., 2013; Dabla-Norris and Srivisal, 2013; Tridico and Pariboni, 2018). Moreover, and contrary to the predictions of the conventional economic theory, economic growth has shown strong deceleration since that time (Tridico and Pariboni, 2018; Pariboni *et al*., 2020) and inequality has continued to enlarge all over the world (Zalewski and Whalen, 2010; Piketty, 2014; Haan and Sturm, 2017; Westcott and Murray, 2017; Bolarinwa *et al*., 2021). This phenomenon is typically invoked as financialisation, reflecting the negative consequences for the real economy and for the general society arising from the strong growth of finance in this new financial liberalising and deregulatory environment.

This pessimistic (or disruptive) view of the role played by financial growth in the era of financialisation has also been supported by the emergence of several empirical studies finding a

negative impact of finance on economic growth (Rioja and Valev, 2004a and 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; Barradas, 2020 and 2022b) and a positive impact of finance on inequality (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 and 2016; Sehrawat and Giri, 2015; Seven and Coskun, 2016; Haan and Sturm, 2017; Altunbas and Thornton, 2018). We also note the existence of several empirical studies that report a non-linear relationship between finance and economic growth as a concave quadratic function and a non-linear relationship between finance and inequality as a convex quadratic function, according to which finance has an inverted U-shaped effect on economic growth (Cecchetti and Kharroubi, 2012; Barajas *et al*., 2013; Dabla-Norris and Srivisal, 2013; Beck *et al*., 2014; Barradas, 2020; Pariboni *et al*., 2020) and a U-shaped effect on inequality (Tan and Law, 2012)[3]. This suggests that the beneficial effect of finance on both economic growth and inequality only occurs up to a certain threshold by sustaining the beliefs regarding the disadvantages caused by financial growth in the era of financialisation. This has been feeding the fears of a new 'secular stagnation' (Pariboni *et al*., 2020) and a long wave of growth and extreme inequality in the era of financialisation (Piketty, 2014).

Several reasons for the dissociation between the growth of finance and the corresponding widening of inequality in the era of financialisation are proposed in the literature[4]. The first one sustains that the growth of finance in the era of financialisation has not provided democratised access to financial services for all people and thus has not contributed to decreasing inequality (Seven and Coskun, 2016). This happens because financial growth has improved the quality of financial services for those who already have access to them and limited the access to financial services for the most risky and poorest people (i.e., the so-called 'intensive margin'), which has been expanding inequality (Makhlouf *et al*., 2020). As argued by Antzoulatos *et al*. (2016), the growth of finance in the era of financialisation has contributed exclusively to increasing the leverage of the rich by preventing the access of the poor to financial services and loans. Poorer people have been obliged to rely on their own limited personal wealth, on the informal sector and on family connections to obtain funds to invest in human capital (education) to become skilled, in health and in entrepreneurial activities, which tends to perpetuate the existence of strong inequalities (Beck *et al*., 2007; Seven and Coskun, 2016). This has even led to a vicious circle of low incomes, poor investment in human capital, health and entrepreneurial activities, low incomes

[3] The non-linear relationship between finance and inequality as a convex quadratic function finding by Tan and Law (2012) is consistent with the results obtained by Makhlouf *et al*. (2020), according to which the relationship is negative in the short term and positive in the long term, i.e. after a certain threshold. This happens because the aforementioned 'extensive margin' ('intensive margin') dominates the aforementioned 'intensive margin' ('extensive margin') in the short term (long term).

[4] The dissociation between the growth of finance and the corresponding slowdown of economic growth in the era of financialisation is discussed in detail by Barradas (2020, 2022b) and Pariboni *et al*. (2020).

and so on (Arora, 2012), amassing little for future generations, which will therefore continue to be poor (Meniago and Asongu, 2018).

The second reason highlights that the growth of finance in the era of financialisation has been followed by inadequate institutional development and a lack of reforms to promote easy access for new and/or foreign financial institutions and the corresponding rise of competition (Claessens and Perotti, 2007; Arora, 2012), which has contributed to banking systems being highly concentrated and dominated by large financial groups that demand high prices for financial services and to the rise of inequality. The elimination of interest rate ceilings, the abolition of state-directed credit programmes and the privatisation of the majority of financial institutions in the era of financialisation have also been especially harmful to poorer people (Claessens and Perotti, 2007; Ang, 2008; Ehigiamusoe and Lean, 2017). Some of these reforms have directly benefited richer people, specifically through preferential allocation of licences and/or preferential positions in auctions and/or through the granting of credit in these privatisations (Claessens and Perotti, 2007; Barradas *et al*., 2018).

The third reason emphasises that the financial growth in the era of financialisation has not been accompanied by strong political and economic institutions and/or by hard supervision, which has made economies more prone to suffer financial and economic crises by impairing the reduction of inequality through the corresponding economic downturns and the rise of unemployment (Seven and Coskun, 2016; Haan and Sturm, 2017). These crises have also been detrimental to poorer people because their costs (e.g., banks bailouts) have been socialised through more taxes and/or more public debt, often in a highly regressive fashion (Claessens and Perotti, 2007). In some cases, these crises have required the adoption of severe austerity programmes based on internal devaluation (i.e., wage compression) and fiscal austerity through the imposition of several public policy measures that broaden inequality, such as cuts in social benefits, the deregulation and flexibilisation of the labour market (e.g., at the level of unemployment benefits, employment protection, employment rights and the minimum wage) and the rise of direct and indirect taxes (Lagoa and Barradas, 2021).

The fourth reason states that the financial growth in the era of financialisation has been associated with asset price booms (Hein, 2012; Lagoa and Barradas, 2021), which are more favourable for richer people because they hold more financial and housing assets than poorer people, not only due to the proliferation of remuneration schemes for employees in the form of stock options (Edison and Sløk, 2011) but also due to the corresponding rise in the value of collateral, which allows them to acquire more financial and housing assets (Hein, 2012; Westcott and Murray, 2017). Richer people are indeed more involved in financial markets for short-term gains and speculative income (Lee and Sidique, 2021). This behaviour is shared by non-financial

corporations, which have been more engaged in financial activities through investments in financial assets that absorb funds that would support innovation, research and development, technological progress and productive investments, with negative repercussions for economic growth, employment creation and inequality (Barradas, 2017; Barradas and Lagoa, 2017b; Lee and Sidique, 2021). This is the so-called 'crowding out effect' or 'management preference channel' (Orhangazi, 2008; Hein 2012), which results from the shorter planning horizons, the 'managerial myopia', the focus on short-term profits instead of long-term expansion (i.e., so-called 'rent-seeking behaviour'), the reduction of profits from productive investments, the rise of external funding costs, the increase in macroeconomic uncertainty and enhanced risks, the imitation behaviour in relation to other non-financial corporations (i.e., so-called 'mimetic behaviour') and the strong influence exerted by financial executives and/or other consultants in the era of financialisation (Samuel, 2000; Crotty, 2005; Orhangazi, 2008; Baud and Durand, 2012; Akkemik and Özen, 2014; Soener, 2015). Another way in which asset price booms in the era of financialisation worsen inequality occurs through tax systems (Kus, 2012), in a context in which the income from these assets (i.e., interest, dividends, rents or capital gains) is not subject to the same level of taxation as other sources of income (e.g., wages).

The fifth point asserts that the growth of finance in the era of financialisation has occurred simultaneously with the decreasing importance of the non-financial sector, which has been prejudicial (beneficial) to the labour income (profit) share and therefore impaired the reduction of inequality (Hein, 2012; Barradas and Lagoa, 2017a; Barradas, 2019). This is because the labour (profit) share of the non-financial sector is larger (smaller) than the labour (profit) share of the financial sector (Hein, 2012). As argued by Kus (2012), the growth of finance and the corresponding decrease of the non-financial sector imply a shrinking of their levels of profitability, which have delineated a fall in the wages of middle-class and blue-collar workers with negative consequences for inequality. This author also recognises that the growing importance of the financial sector vis-à-vis the non-financial sector has promoted the decline of several public policies and institutions that typically promote a decrease in inequality (e.g., minimum wage and trade unions).

The sixth reason is that the growth of finance in the era of financialisation has been linked to a huge amount of foreign direct investment, which has exacerbated inequality in both developing and developed countries (Jaumotte *et al*., 2013). In the case of developing countries, but also in the case of developed countries, the authors state that inward flows tend to be directed to high-skilled (and high-wage) sectors, which promotes an increase in inequality due to the corresponding widening of the wage gap between low-skilled and high-skilled workers. In the case of developed countries, the authors note that outward flows reduce employment opportunities in low-skilled (and low-wage) sectors, which worsens inequality mainly between

the employed and the unemployed. This increasing trend for foreign direct investment in the era of financialisation has been sustained due to the liberalisation of trade and capital mobility and the emergence of multinational corporations that reallocate their production to high-skilled (but low-wage) countries (Ehigiamusoe and Lean, 2017; Tridico and Pariboni, 2018)[5].

The seventh reason stresses that financial growth in the era of financialisation has increased the political power of financial elites and the corresponding adoption of several pro-rich public policies and pro-rich practices that have a direct effect on the rise of inequality (Kaldor, 2021; Lagoa and Barradas, 2021), which is not consistent with the conventional economic view related to the so-called 'trickle-down theory' or 'horse and sparrow theory'. Examples include the implementation of public policies based on supply-side economics, liberal orientations, the laissez-faire paradigm, the abandonment of Keynesian policies and full employment goals, the liberalisation of trade and capital mobility, the deregulation and flexibilisation of labour markets, tax competition for corporations and capital, privatisation and retrenchments of welfare states (Zalewski and Whalen, 2010; Kus, 2012; Tridico and Pariboni, 2018; Pariboni *et al*., 2020). Further examples in this case include the proliferation of practices such as the emergence of a corporate governance model based on 'shareholder value orientation', the rise of top management compensation, the rise of outsourcing, an increase in precarious labour conditions and the deterioration of workers' bargaining power (Tridico and Pariboni, 2018). These policies and practices have increased inequality due to a transference of returns from workers or suppliers to managers or shareholders (Westcott and Murray, 2017), according to which income extraction from workers, taxpayers and debtors to the rich even takes place (i.e., the so-called 'rentiers') (Lee and Siddique, 2021).

The eighth reason underlines that the growth of finance in the era of financialisation has been associated with weaker economic growth (Tridico and Pariboni, 2018; Pariboni *et al*., 2020), which has contributed to enlarging inequality through the aforementioned 'Kuznets curve' (Kuznets, 1955).

This paper aims to assess the relationship between the growth of finance and inequality in the era of financialisation in Portugal by performing a time series econometric analysis covering the period from 1980 and 2020.

[5] As explained by Barradas *et al*. (2018), the increasing competition from emerging Asian countries due to the respective trade agreements by the European Union in the World Trade Organization in the early 2000s was especially detrimental to some traditional (low-wage) industries in Portugal (e.g., textiles, clothing, apparel, footwear, wood and paper, metal products and non-metallic minerals). The authors also note that the enlargement of the European Union to Eastern European countries in 2004 was harmful to some industries in Portugal (e.g., automotive and other related industries), in a context in which several multinational corporations shifted their productive capacity to these new member states to benefit from their lower wages, higher educational attainment levels and geographical proximity to the main European markets.

3. SPECIFICATION OF THE MODELS AND HYPOTHESES

To analyse the finance–inequality nexus in Portugal, we propose to estimate two different models, a linear model and a non-linear model, which take the following specifications:

$$I_t = \beta_0 + \beta_1 F_t + \beta_2 X_t + \varepsilon_t \quad \textbf{(1)}$$

$$I_t = \beta_0 + \beta_1 F_t + \beta_2 F_t^2 + \beta_3 X_t + \varepsilon_t \quad \textbf{(2)}$$

where *t* is the time period (years), *I* is the level of inequality, *F* is the proxy to measure the role of finance, *X* is a set of control variables and ε is an independent and identically distributed (white noise) disturbance error with a null average and constant variance (homoscedastic).

In the linear model, and as described in the previous Section, finance should exert a positive influence on inequality due to the harmful effects on inequality linked to financial growth in the era of financialisation. In the non-linear growth model, and as emphasised in the previous Section, finance should exert a U-shaped effect on inequality as a convex quadratic function in the era of financialisation, which means that the proxy to measure the role of finance is expected to exert a negative influence on the level of inequality and its term squared is expected to exert a positive influence on the level of inequality. Note also that the non-linear model could be used to determine the threshold of the expected convex quadratic function between finance and inequality in the era of financialisation. The relationship between finance and inequality is negative up to this threshold and positive after it. The respective threshold – F^* – could be obtained by determining the minimum of the convex quadratic function using the estimated coefficients, that is:

$$(\beta_1 F_t + \beta_2 F_t^2)' = 0 \Leftrightarrow \beta_1 + 2\beta_2 F^* = 0 \Leftrightarrow F^* = \frac{-\beta_1}{2\beta_2} \quad \textbf{(3)}$$

In both linear and non-linear models, our set of control variables includes variables that have been shown both theoretically and empirically to be important determinants of the level of inequality, namely the lagged level of inequality, the growth rate of the GDP per capita (and its term squared), inflation, educational attainment, government spending and the degree of trade openness. A similar set of control variables is used by 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) and Lee and Siddique (2021), among others.

The lagged level of inequality is included in both our linear and our non-linear model to take into account the typical persistence of the behaviour of inequality 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). As a consequence, the lagged level of inequality is expected to exert a positive effect on the level of inequality. The causes of the strong persistence of inequality include family transmission of wealth, family transmission of ability, financial market imperfections, geographical (or local) segregation and self-fulfilling beliefs (Piketty, 2000).

The growth rate of the GDP per capita (and its term squared) are included to take into account the aforementioned 'Kuznets curve' (Kuznets, 1955). According to the corresponding non-linear relationship between economic growth and inequality as a concave quadratic function in which economic growth has an inverted U-shaped effect on inequality, the growth rate of the GDP per capita is expected to exert a positive influence on the level of inequality and its term squared is expected to exert a negative influence on the level of inequality. We can also determine the threshold of the expected concave quadratic function between economic growth and inequality. The relationship between economic growth and inequality is positive up to this threshold and negative after this threshold. The respective threshold – *EG** – could be obtained by determining the maximum of the concave quadratic function using the estimated coefficients as follows:

$$(\beta_3 EG_t + \beta_4 EG_t^2)' = 0 \Leftrightarrow \beta_3 + 2\beta_4 EG^* = 0 \Leftrightarrow EG^* = \frac{-\beta_3}{2\beta_4} \quad \textbf{(4)}$$

The inclusion of inflation among our set of control variables aims to control for the macroeconomic environment (Beck *et al*., 2007), and it should exert a negative effect on the level of inequality for two different reasons (Kim and Lin, 2011). On the one hand, the increase in inflation hurts the poor relatively more than the rich because the latter have better access to financial instruments that allow them to hedge against inflation than the former. On the other hand, the increase in inflation functions like a hidden and highly regressive tax and therefore hurts the poor relatively more than the rich because the former hold more cash vis-à-vis other financial (or real) assets than the latter.

Educational attainment aims to control the accumulation of human capital and is expected to exert a negative influence on the level of inequality for two different reasons (Kim and Lin, 2011). On the one hand, higher educational attainment produces a greater supply of human capital, which

reduces the wage gap between skilled and unskilled workers and hence the inequality. On the other hand, higher educational attainment induces more technological innovation, which increases the demand for skilled workers to absorb new technologies into production that in turn shrinks inequality.

The level of inequality also depends negatively on government spending due to its redistributive function through the tax and transfer system towards poorer people, the provision of public goods and the welfare state intervention (Kin and Lin, 2011; Bolarinwa *et al*., 2021). The degree of trade openness is expected to exert a positive influence on the level of inequality (Kin and Lin, 2011; Bolarinwa *et al*., 2021). This positive relationship rests on the Hecksher–Ohlin–Samuelson theory, according to which trade openness allows an increase in the returns of the abundant capital (labour) and/or skilled (unskilled) labour in developed (developing) countries due its specialisation in capital (labour) and/or skilled (unskilled) labour-intensive goods by increasing (decreasing) inequality in developed (developing) countries. As such, the wage gap between skilled and unskilled workers tends to increase (decrease) in the case of developed (developing) countries, which promotes an increase (decrease) in inequality.

4. DATA DESCRIPTION AND STYLISED FACTS OF THE FINANCE–INEQUALITY NEXUS IN PORTUGAL

Our sample is composed of annual data for Portugal from 1980 and 2020, which constitute a total of 41 observations. For the majority of our variables, data are only available on a yearly basis and for this specific time span, which is suitable for proceeding with our study for two different reasons. On the one hand, inequality is a long-term, structural and persistent phenomenon, which is better captured through the utilisation of annual data. On the other hand, the growth of finance and the corresponding era of financialisation occurred relatively later in Portugal than in other European countries, only after the 1990s, and therefore our sample encompasses years with weak financial growth and years with strong financial growth (Barradas *et al*., 2018).

We use three different variables as proxies for the level of inequality, namely the Gini coefficient, the top 1% income share and the top 10% income share[6]. The Gini coefficient captures the overall distribution of income in the population, and the top income share isolates the wealthy cohort, which tends to have other sources of income that are omitted from the Gini coefficient (Furceri

[6] The Gini coefficient is based on the Lorenz curve and represents the standard indicator to assess the distribution of income within a society. By measuring deviations from perfect income equality, the Gini coefficient ranges from 0 (perfect equality, implying that everyone in the society receives the same level of income) to 1 (perfect inequality, implying that only one person receives all the income), which means that higher values imply greater income inequality. The top 1% (10%) income share represents the income received by the 1% (10%) richest members of the population, which also means that higher values suggest greater income inequality.

and Loungani, 2015; Makhlouf *et al*., 2020). It is important to take this into account because a drop (rise) in the Gini coefficient could reflect either an increase (decrease) in the income of the poor or a decrease (increase) in the income of the rich (Kim and Lin, 2011). For these three variables, we use the pre-tax and pre-transfer values (i.e., the gross values) and the post-tax and post-transfer values (i.e., the net values) because they give us different perspectives on inequality (Makhlouf *et al*., 2020). According to these authors, pre-tax and pre-transfer values translate into inequality before income redistribution, whilst the post-tax and post-transfer values reflect inequality after income redistribution and the respective governments' responses to declining inequality.

In addition, and to take into consideration the many-sided dimensions through which the growth of finance has undermined the level of inequality in the era of financialisation, we use seven different variables as proxies for the role of finance, namely credit, liquid liabilities, the loan-to-deposit ratio, foreign direct investment, the financial value added, stock market capitalisation and shareholder orientation. These represent the variables that are typically used in the majority of empirical studies on the finance–growth nexus and on the finance–inequality nexus by reflecting the different scopes (e.g., size, depth, efficiency and stability) of different financial intermediaries (e.g., banks and financial markets) and of shareholders (Barradas, 2020; Bolarinwa *et al*., 2021). These variables will be used separately from each other to avoid multicollinearity problems (Table A1 in the Appendix) and to confirm the robustness of our results according to the proxy chosen.

The proxies and sources of our variables are provided in Table 1, their descriptive statistics are displayed in Table 2, the correlation matrix between our variables is presented in Table A1 in the Appendix and plots of our variables are exhibited in Figure 1. To facilitate the analysis of our results and the corresponding estimates, we will work with the variables in levels by assuming that all of them are stationary in levels for three different reasons. The first reason is related to the fact that all of our variables are measured in ratios and in growth rates (Table 1), which intuitively become plausible the assumption about their stationarity. The second reason is associated with the fact that the evolution of our variables over time seems to suggest that they are indeed stationary (Figure 1). The third reason concerns the very low power of the traditional unit root tests in the presence of small samples (Greene, 2003), which applies to our specific case due to our sample containing only 41 observations.

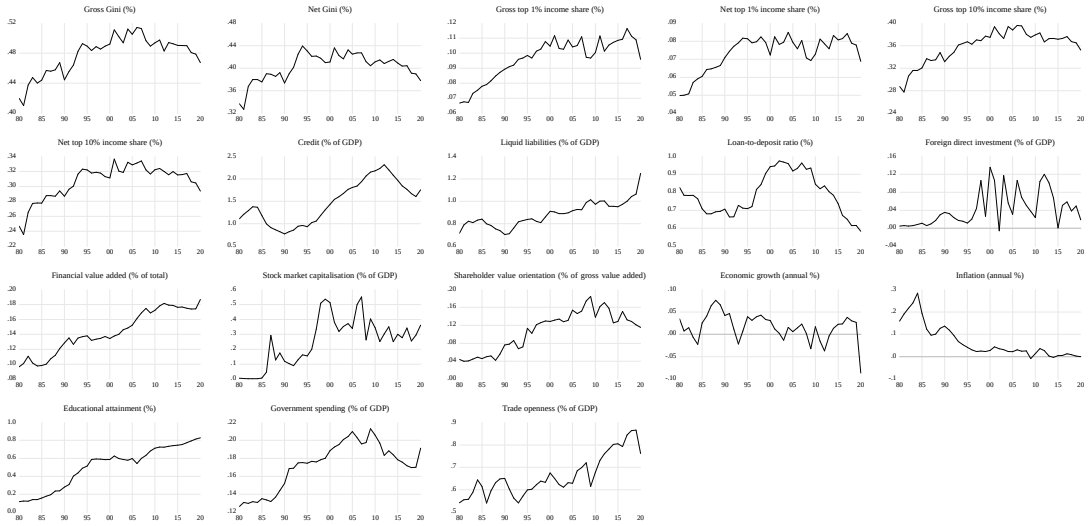
Table 1. Proxies and sources of our variables

Variable (Acronym)	Proxy	Source (Database)
Gross Gini (GG)	Gini coefficient, pre-tax national income (%)	World Inequality
Net Gini (NG)	Gini coefficient, post-tax national income (%)	World Inequality
Gross top 1% income share (GT1)	Top 1% income share, pre-tax national income (%)	World Inequality
Net top 1% income share (NT1)	Top 1% income share, post-tax national income (%)	World Inequality
Gross top 10% income share (GT10)	Top 10% income share, pre-tax national income (%)	World Inequality
Net top 10% income share (NT10)	Top 10% income share, post-tax national income (%)	World Inequality
Credit (C)	Total credit to private non-financial sector (% of GDP)	Fred St. Louis
Liquid liabilities (LL)	Liquid liabilities (% of GDP)	The Global Economy
Loan-to-deposit ratio (LDR)	Loans of the monetary financial institutions (% of deposits)	Bank of Portugal
Foreign direct investment (FDI)	Net inflows and net outflows of foreign direct investment (% of GDP)	World Bank
Financial value added (FVA)	Gross value added of financial, insurance and real estate activities (% of total)	PORDATA
Stock market capitalisation (SMC)	Stock market capitalisation of listed domestic companies (% of GDP)	World Bank and CEIC
Shareholder orientation (SO)	Net financial payments of non-financial corporations (% of gross value added)	INE
Economic growth (EG)	GDP per capita growth (annual %)	World Bank
Inflation (I)	Inflation, consumer prices (annual %)	World Bank
Educational attainment (EA)	Actual schooling rate, upper secondary education (%)	PORDATA
Government spending (GS)	General government final consumption expenditure (% of GDP)	World Bank
Trade openness (TO)	Exports and imports of goods and services (% of GDP)	World Bank

Table 2. The descriptive statistics of our variables

Variable	Mean	Median	Maximum	Minimum	Standard Deviation	Skewness	Kurtosis
GG	0.478	0.489	0.514	0.410	0.025	-0.831	3.028
NG	0.403	0.409	0.439	0.327	0.025	-1.066	4.253
GT1	0.096	0.100	0.117	0.067	0.014	-0.807	2.632
NT1	0.073	0.078	0.085	0.050	0.010	-1.090	3.208
GT10	0.359	0.367	0.396	0.278	0.029	-1.066	3.553
NT10	0.306	0.316	0.336	0.236	0.023	-1.233	4.178
C	1.475	1.428	2.316	0.771	0.474	0.135	1.716
LL	0.886	0.889	1.250	0.703	0.112	0.710	3.986
LDR	0.788	0.783	0.975	0.583	0.115	0.180	1.829
FDI	0.043	0.031	0.136	-0.006	0.039	0.900	2.592
FVA	0.143	0.138	0.187	0.097	0.028	-0.118	1.764
SMC	0.252	0.278	0.551	0.003	0.160	-0.014	2.146
SO	0.108	0.126	0.184	0.040	0.044	-0.257	1.777
EG	0.016	0.017	0.076	-0.086	0.030	-0.866	4.861
I	0.066	0.031	0.284	-0.008	0.074	1.332	3.830
EA	0.508	0.588	0.829	0.117	0.231	-0.496	1.852
GS	0.173	0.176	0.213	0.127	0.026	-0.464	2.025
TO	0.663	0.633	0.865	0.540	0.092	0.750	2.571

Figure 1. Plots of our variables



We confirm that the increase in inequality is a stylised fact in Portugal, particularly up to the Great Recession. Effectively, all of our variables that act as proxies for the level of inequality exhibit an increasing trend up to the Great Recession and a slightly decreasing trend afterwards. We also confirm that the Portuguese government has played an important role in mitigating the level of inequality in Portugal, which is clearly visible in the lower levels of inequality after income redistribution in comparison with those before income redistribution. Nonetheless, the Portuguese government's response to inequality was not enough to reverse its growing trend, particularly up to the Great Recession. Effectively, the levels of inequality after income redistribution exhibit similar trends to the ones before income redistribution, and this is clearly visible in the positive and high correlations between them (Table A1 in the Appendix). Financial growth is also a stylised fact in Portugal, apparent in the majority of proxy variables for the role of finance. This seems to suggest the existence of a positive relationship between finance and inequality in Portugal since the 1980s, which is sustained by the positive and relatively high correlations between the variables acting as proxies for the role of finance and the variables acting as proxies for the level of inequality in Portugal (Table A1 in the Appendix).

5. ECONOMETRIC METHOD

The econometric method adopted to produce our estimates involves the application of the GMM estimator, widely disseminated by Hansen (1982). Our decision to apply the GMM estimator is based on three different reasons. Firstly, the GMM estimator allows the use of dynamic models, which is relevant in our case due to the incorporation of the lagged level of

inequality among our control variables. Secondly, the GMM estimator permits us to overcome the traditional problems of endogeneity related to the presence of simultaneity among the variables under study, the omission of other relevant independent variables and the existence of measurement errors in the proxies chosen for our variables. These three issues are quite relevant in our case due to the general recognition that there is simultaneity among our variables (Beck *et al*., 2007; Kim and Lin, 2011; Seven and Coskun, 2016; Haan and Sturm, 2017; Bolarinwa *et al*., 2021; Lee and Siddique, 2021), the potential omission of other relevant variables to explain the level of inequality and the existence of measurement errors mainly in the variables used as proxies for the role of finance due to their multiple harmful effects on inequality in the era of financialisation. Thirdly, the GMM estimator, under suitable conditions, produces consistent, asymptotically normal and asymptotically efficient estimates.

The application of the GMM estimator requires the definition of a set of instrumental variables (i.e., the so-called 'instruments'), which should be greater than or at least equal to the number of independent variables included in the models to be estimated and should be exogeneous with regard to the disturbance error and strongly correlated with the independent variables (Greene, 2003). The use of several lags of the independent variables is the common strategy in the choice of instrumental variables, which are validated using the traditional J-statistic proposed by Hansen (1982). Against this backdrop, our set of instrumental variables includes four lags for each independent variable, that is, the lags from *t-2* to *t-5* for the level of inequality and the lags from *t-1* to *t-4* for the remaining variables.

The estimates are produced using the EViews software (version 12). The Newey–West option for the weighing matrix, which is a heteroskedasticity and autocorrelation consistent estimator, the Bartlett kernel option and the N-step iterative procedure for the weighing matrix are employed. The stability of our estimates and the corresponding instrumental variables are assessed by calculating the Hall and Sen (1999) O-statistic.

6. EMPIRICAL RESULTS AND DISCUSSION

Our estimates for the linear models and for the pre-tax and pre-transfer values of inequality (i.e., the gross values) are presented in Table 3, Table 4 and Table 5. The estimates for the linear models and for the post-tax and post-transfer values of inequality (i.e., the net values) are exhibited in Table A2, Table A3, and Table A4 in the Appendix. Table 6, Table 7 and Table 8 contain our estimates for the non-linear models and for the pre-tax and pre-transfer values of inequality (i.e., the gross values). The estimates for the non-linear models and for the post-tax and post-transfer values of inequality (i.e., the net values) are presented in Table A5, Table A6 and

Table A7 in the Appendix. All of these estimates are produced by using seven different models, in a context in which each one uses a different variable as a proxy for the role of finance. All of these estimates describe significantly well the evolution of inequality in Portugal since the 1980s, given the high values for the R-squared and adjusted R-squared, respectively. Effectively, the R-squared and adjusted R-squared are higher than 0.8 in the majority of our estimates, which means that we can explain more than 80% of the behaviour (variation) of inequality in Portugal. We can confirm that our estimates are reliable and that our set of instrumental variables is valid because the null hypothesis of the J-statistic is never rejected. We can also dismiss the possibility of structural breaks by confirming the stability of our estimates and of our set of instrumental variables over time because the null hypothesis of the Hall and Sen (1999) O-statistic is also never rejected.[7]

Table 3. Estimates for the linear model and for the gross Gini

Variable	C	LL	LDR	FDI	FVA	SMC	SO
β_0	0.253***	0.254***	0.268***	0.279***	0.254***	0.287***	0.209***
	(0.019)	(0.013)	(0.017)	(0.015)	(0.016)	(0.013)	(0.020)
	[13.650]	[19.247]	[15.573]	[18.460]	[16.377]	[21.581]	[10.254]
NG_{t-1}	0.454***	0.398***	0.421***	0.395***	0.443***	0.350***	0.511***
	(0.038)	(0.039)	(0.042)	(0.036)	(0.026)	(0.040)	(0.044)
	[12.007]	[10.176]	[9.946]	[11.022]	[17.012]	[8.779]	[11.691]
F_t	0.001	0.024***	0.015***	0.046***	-0.152***	0.013***	-0.114***
	(0.002)	(0.009)	(0.006)	(0.008)	(0.045)	(0.005)	(0.016)
	[0.565]	[2.849]	[2.793]	[5.427]	[-3.361]	[2.865]	[-7.002]
EG_t	0.098***	0.104***	0.080***	0.080***	0.048***	0.067***	0.076***
	(0.027)	(0.018)	(0.021)	(0.019)	(0.016)	(0.018)	(0.012)
	[3.595]	[5.734]	[3.810]	[4.238]	[3.020]	[3.595]	[6.106]
EG_t^2	-2.660***	-2.115***	-2.571***	-2.327***	-2.643***	-2.200***	-2.568***
	(0.363)	(0.180)	(0.370)	(0.343)	(0.323)	(0.186)	(0.278)
	[-7.317]	[-11.775]	[-6.949]	[-6.783]	[-8.188]	[-11.814]	[-9.251]

[7] The results of the Hall and Sem (1999) O-statistic are available upon request.

I_t	-0.151*** (0.020) [-7.418]	-0.167*** (0.017) [-9.746]	-0.156*** (0.021) [-7.360]	-0.165*** (0.017) [-9.792]	-0.204*** (0.027) [-7.451]	-0.134*** (0.019) [-6.958]	-0.156*** (0.020) [-7.662]
EA_t	-0.019** (0.009) [-2.205]	-0.033*** (0.008) [-4.128]	-0.013 (0.009) [-1.498]	-0.023*** (0.006) [-3.645]	-0.034*** (0.010) [-3.455]	-0.019*** (0.006) [-3.199]	-0.021** (0.008) [-2.597]
GS_t	0.211*** (0.038) [5.567]	0.309*** (0.058) [5.331]	0.136*** (0.033) [4.060]	0.237*** (0.041) [5.773]	0.289*** (0.053) [5.507]	0.279*** (0.061) [4.549]	0.341*** (0.044) [7.701]
TO_t	-0.013 (0.012) [-1.077]	-0.018** (0.008) [-2.252]	-0.011 (0.006) [-1.663]	-0.010* (0.006) [-1.705]	0.026* (0.013) [2.018]	-0.010** (0.004) [-2.375]	0.003 (0.008) [0.365]
EG* (%)	1.842	2.459	1.556	1.719	0.908	1.523	1.480
Observations	41	41	41	41	41	41	41
R-Squared	0.849	0.858	0.853	0.860	0.854	0.861	0.863
Adjusted R-Squared	0.805	0.816	0.809	0.818	0.811	0.819	0.822
J-Statistic (P-Value)	9.164 (0.997)	8.794 (0.998)	9.180 (0.997)	9.078 (0.997)	9.184 (0.997)	8.946 (0.998)	9.237 (0.997)

Note: Standard errors in (), t-statistics in [], *** indicates statistical significance at 1% level, ** indicates statistical significance at 5% level and * indicates statistical significance at 10% level

Table 4. Estimates for the linear model and for the gross top 1% income share

Variable	C	LL	LDR	FDI	FVA	SMC	SO
β_0	0.026*** (0.003) [9.939]	0.039*** (0.006) [6.578]	0.032*** (0.003) [10.127]	0.040*** (0.002) [19.240]	0.031*** (0.003) [9.805]	0.037*** (0.003) [13.586]	0.025*** (0.003) [9.878]
$NT1_{t-1}$	0.270*** (0.030) [8.925]	0.261*** (0.040) [6.493]	0.328*** (0.027) [12.030]	0.241*** (0.022) [10.777]	0.264*** (0.029) [8.965]	0.187*** (0.023) [8.007]	0.320*** (0.034) [9.351]

F_t	-0.004*** (0.001) [-4.499]	-0.018*** (0.004) [-4.213]	0.007*** (0.001) [5.740]	0.037*** (0.004) [9.016]	-0.065*** (0.016) [-4.056]	0.015*** (0.002) [8.302]	-0.025*** (0.006) [-3.873]
EG_t	0.096*** (0.012) [7.844]	0.087*** (0.015) [5.965]	0.112*** (0.008) [14.035]	0.123*** (0.008) [14.686]	0.119*** (0.005) [22.995]	0.103*** (0.008) [13.108]	0.115*** (0.003) [34.047]
EG_t^2	-1.506*** (0.153) [-9.877]	-0.656*** (0.088) [-7.485]	-0.845*** (0.131) [-6.457]	-0.763*** (0.122) [-6.266]	-1.094*** (0.124) [-8.795]	-0.813*** (0.119) [-6.807]	-0.822*** (0.047) [-17.363]
I_t	-0.008 (0.016) [-0.505]	0.021 (0.019) [1.145]	0.040*** (0.008) [4.886]	0.047*** (0.008) [6.164]	0.030*** (0.009) [3.378]	0.076*** (0.008) [9.196]	0.035*** (0.007) [4.796]
EA_t	0.021*** (0.004) [5.177]	0.036*** (0.006) [6.562]	0.041*** (0.004) [9.103]	0.046*** (0.003) [16.136]	0.039*** (0.005) [7.939]	0.048*** (0.003) [17.026]	0.037*** (0.003) [12.763]
GS_t	0.137*** (0.013) [10.180]	0.111*** (0.018) [6.279]	0.037** (0.014) [2.586]	0.063*** (0.008) [7.730]	0.118*** (0.016) [7.598]	0.070*** (0.016) [4.243]	0.125*** (0.015) [8.290]
TO_t	0.027*** (0.005) [5.790]	0.014*** (0.004) [3.489]	-0.003 (0.003) [-1.045]	-0.009*** (0.002) [-5.696]	0.011*** (0.004) [3.234]	-0.005** (0.002) [-2.343]	0.001 (0.002) [0.296]
EG* (%)	3.187	6.631	6.627	8.060	5.439	6.335	6.995
Observations	41	41	41	41	41	41	41
R-Squared	0.861	0.876	0.870	0.881	0.864	0.887	0.873
Adjusted R-Squared	0.819	0.839	0.832	0.846	0.823	0.853	0.835
J-Statistic (P-Value)	8.963 (0.998)	8.675 (0.998)	9.261 (0.997)	9.198 (0.997)	9.475 (0.996)	8.892 (0.998)	9.277 (0.997)

Note: Standard errors in (), t-statistics in [], *** indicates statistical significance at 1% level, ** indicates statistical significance at 5% level and * indicates statistical significance at 10% level

Table 5. Estimates for the linear model and for the gross top 10% income share

Variable	C	LL	LDR	FDI	FVA	SMC	SO
β_0	0.165***	0.157***	0.181***	0.191***	0.165***	0.200***	0.154***
	(0.016)	(0.011)	(0.011)	(0.010)	(0.014)	(0.008)	(0.013)
	[10.504]	[14.534]	[15.772]	[19.662]	[12.060]	[24.763]	[11.594]
$NT10_{t-1}$	0.431***	0.341***	0.351***	0.321***	0.400***	0.264***	0.414***
	(0.036)	(0.027)	(0.035)	(0.026)	(0.034)	(0.022)	(0.034)
	[11.911]	[12.695]	[10.120]	[12.204]	[11.740]	[12.013]	[12.203]
F_t	0.002	0.023***	0.020***	0.041***	-0.106**	0.021***	-0.025
	(0.002)	(0.007)	(0.004)	(0.009)	(0.042)	(0.002)	(0.015)
	[1.131]	[3.195]	[5.368]	[4.638]	[-2.512]	[10.642]	[-1.635]
EG_t	0.156***	0.156***	0.149***	0.136***	0.119***	0.116***	0.137***
	(0.016)	(0.015)	(0.016)	(0.017)	(0.017)	(0.013)	(0.011)
	[9.466]	[10.304]	[9.317]	[8.127]	[6.855]	[8.564]	[12.596]
EG_t^2	-1.967***	-1.417***	-2.050***	-1.733***	-2.104***	-1.779***	-1.670***
	(0.246)	(0.219)	(0.256)	(0.236)	(0.194)	(0.113)	(0.199)
	[-8.004]	[-6.475]	[-7.999]	[-7.342]	[-10.829]	[-15.776]	[-8.390]
I_t	-0.100***	-0.124***	-0.098***	-0.115***	-0.144***	-0.073**	-0.094***
	(0.021)	(0.028)	(0.025)	(0.019)	(0.022)	(0.030)	(0.018)
	[-4.799]	[-4.487]	[-3.894]	[-5.975]	[-6.500]	[-2.441]	[-5.088]
EA_t	-0.005	-0.026***	0.005	-0.008	-0.020***	-0.003	-0.006
	(0.007)	(0.009)	(0.007)	(0.006)	(0.006)	(0.007)	(0.007)
	[-0.742]	[-2.995]	[0.727]	[-1.426]	[-3.222]	[-0.473]	[-0.949]
GS_t	0.307***	0.469***	0.249***	0.380***	0.400***	0.397***	0.398***
	(0.072)	(0.052)	(0.043)	(0.039)	(0.045)	(0.039)	(0.043)
	[4.273]	[8.969]	[5.842]	[9.713]	[8.936]	[10.107]	[9.181]
TO_t	-0.009	-0.001	-0.002	-0.003	0.027***	-0.003	0.001
	(0.012)	(0.008)	(0.006)	(0.004)	(0.009)	(0.004)	(0.006)
	[-0.718]	[-0.117]	[-0.379]	[-0.699]	[2.884]	[-0.707]	[0.117]

EG* (%)	3.965	5.505	3.634	3.924	2.828	3.260	4.102
Observations	41	41	41	41	41	41	41
R-Squared	0.883	0.890	0.886	0.893	0.885	0.897	0.888
Adjusted R-Squared	0.848	0.857	0.853	0.861	0.851	0.867	0.855
J-Statistic (P-Value)	9.166 (0.997)	9.086 (0.997)	9.326 (0.997)	9.083 (0.997)	9.140 (0.997)	8.807 (0.998)	9.031 (0.998)

Note: Standard errors in (), t-statistics in [], *** indicates statistical significance at 1% level, ** indicates statistical significance at 5% level and * indicates statistical significance at 10% level

In relation to the linear models, our estimates confirm that the majority of variables are statistically significant at the conventional significance levels and have the expected signs. Our estimates are also quite robust because they do not change considerably when we use different variables as proxies for the level of inequality and/or the role of finance. Seven notable conclusions could be drawn. Firstly, we confirm that inequality is strongly persistent in Portugal, which is in line with the findings obtained by Liang (2006), Beck *et al*. (2007), Kus (2012), Tan and Law (2012), Seven and Coskun (2016), Adeleye *et al*. (2017), Meniago and Asongu (2018) and Lee and Siddique (2021). This strong inertia in the evolution of inequality in Portugal urges the adoption of several pro-poor public policies to impair the vicious circle of high levels of inequality in the coming years.

Secondly, we find that finance is a positive determinant of inequality in Portugal in the majority of our estimates but particularly in the estimates in which the gross Gini, the gross top 1% income share, the gross top 10% income share and the net top 10% income share are used as proxies for the level of inequality. This result reinforces the pessimistic (or disruptive) view of the role played by financial growth in the era of financialisation by confirming that it has been prejudicial to inequality in Portugal. A similar result is also reported 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 and 2016), Sehrawat and Giri (2015), Seven and Coskun (2016), Haan and Sturm (2017) and Altunbas and Thornton (2018).

Thirdly, the aforementioned 'Kuznets curve' (Kuznets, 1955) is also confirmed for Portugal. Nonetheless, the economic growth in Portugal from 1980 to 2020 was around 1.6% on average (Table 2), which is considerably below the majority of the estimated thresholds of the 'Kuznets curve'. This seems to suggest that economic growth in Portugal in the last decades has not been sufficient to prevent the rise of inequality and that the Portuguese economy should grow more in

the coming years to shrink inequality. A 'Kuznets curve' is also found by Seven and Coskun (2016) and Lee and Siddique (2021).

Fourthly, and contrary to the theoretical predictions, inflation affects inequality negatively in Portugal. This counterintuitive result could be explained by two different factors. On the one hand, social transfers are commonly indexed to inflation, which means that poorer people are not directly affected by inflation because they do not lose purchasing power in inflation environments. On the other hand, inflation tends to erode the value of existing debts, which means that people who are more indebted (low-income and middle-class households, i.e. poorer people) gain purchasing power in inflation environments. This is especially relevant in Portugal due to the general recognition of the high levels of households' indebtedness in the era of financialisation (Barradas *et al*., 2018; Lagoa and Barradas, 2021). The only exceptions occur in the estimates in which the gross top 1% income share and the net top 1% income share are used as proxies for the level of inequality, according to which inflation has the expected positive effect on inequality. This result suggests that richer people are the most affected by inflation in Portugal, probably because they are relatively less indebted than poorer people and/or their financial (or real) assets lose value in inflation environments.

Fifthly, educational attainment exerts a negative influence on inequality in Portugal, confirming the positive effects arising from the accumulation of human capital (Kim and Lin, 2011). A similar result is also found by Bolarinwa *et al*. (2021) and Lee and Siddique (2021). Once again, the only exceptions occur in the estimates in which the gross top 1% income share and the net top 1% income share are used as proxies for the level of inequality, according to which the educational attainment has an unexpected positive impact on inequality. This result suggests that richer people are the most affected by the accumulation of human capital in Portugal, probably due to the corresponding reduction in the wage gap between skilled and unskilled workers.

Sixthly, government spending exerts a positive effect on inequality in Portugal. This suggests that the redistributive function through the tax and transfer system towards poorer people, the provision of public goods and the welfare state intervention have been ineffective in mitigating inequality in Portugal. As argued by Kim and Lin (2011), this positive relationship between government spending and inequality happens because richer people use their political power to exploit poorer people, specifically through the adoption of pro-rich public policies. Li and Yu (2014), Altunbas and Thornton (2018) and Bolarinwa *et al*. (2021) also find a positive relationship between government spending and inequality, although they provide different explanations for this specific result. Li and Yu (2014) justify this result by the investment in public facilities, which reduces the transaction costs of private investment and benefits richer people relatively more than poorer people, and by corruption and rent-seeking behaviour, which benefits richer people

relatively more than poorer people because the former have access to government-spending-related projects. Altunbas and Thornton (2018) justify this result by arguing that most government spending is captured by the rich, and Bolarinwa *et al*. (2021) attribute this result to the weak quality of institutions (in Africa).

Seventhly, trade openness is a negative determinant of inequality in Portugal, which does not confirm the Hecksher–Ohlin–Samuelson theory and the corresponding increase in both the wage gap between skilled and unskilled workers and inequality in the case of developed countries arising from a higher degree of trade openness (Kin and Lin, 2011; Bolarinwa *et al*., 2021). A negative relationship between trade openness and inequality is also reported by Bolarinwa *et al*. (2021) for African (developing) countries and by Lee and Siddique (2021) not only for emerging and developing countries but also for advanced countries.

Table 6. Estimates for the non-linear model and for the gross Gini

Variable	C	LL	LDR	FDI	FVA	SMC	SO
β_0	0.282***	0.028	0.328***	0.284***	0.300***	0.292***	0.223***
	(0.015)	(0.029)	(0.021)	(0.010)	(0.024)	(0.009)	(0.019)
	[18.999]	[0.941]	[15.287]	[29.219]	[12.524]	[33.360]	[11.947]
GG_{t-1}	0.319***	0.257***	0.289***	0.363***	0.349***	0.338***	0.446***
	(0.027)	(0.031)	(0.025)	(0.025)	(0.022)	(0.025)	(0.035)
	[11.608]	[8.328]	[11.604]	[14.611]	[16.127]	[13.515]	[12.035]
F_t	0.042***	0.586***	-0.034	0.029	-0.540	0.034**	-0.343***
	(0.004)	(0.070)	(0.039)	(0.025)	(0.320)	(0.013)	(0.059)
	[9.475]	[8.357]	[-0.883]	[1.171]	[-1.688]	[2.582]	[-5.849]
F_t^2	-0.012***	-0.314***	0.036	0.071	1.239	-0.027	0.778***
	(0.001)	(0.036)	(0.025)	(0.187)	(1.055)	(0.023)	(0.248)
	[-9.368]	[-8.668]	[1.421]	[0.380]	[1.175]	[-1.156]	[3.136]
EG_t	0.099***	0.049*	0.077***	0.077***	0.060***	0.060***	0.096***
	(0.019)	(0.024)	(0.016)	(0.016)	(0.019)	(0.019)	(0.014)
	[5.173]	[2.009]	[4.702]	[4.865]	[3.217]	[3.167]	[6.746]
EG_t^2	-1.796***	1.132***	-1.911***	-1.969***	-2.069***	-2.418***	-2.342***
	(0.180)	(0.386)	(0.205)	(0.228)	(0.145)	(0.222)	(0.132)

	[-9.955]	[2.933]	[-9.314]	[-8.636]	[-14.314]	[-10.874]	[-17.726]
I_t	-0.163***	-0.080**	-0.160***	-0.165***	-0.199***	-0.128***	-0.159***
	(0.036)	(0.033)	(0.017)	(0.017)	(0.030)	(0.021)	(0.017)
	[-4.581]	[-2.435]	[-9.622]	[-9.532]	[-6.657]	[-6.048]	[-9.338]
EA_t	-0.024**	-0.007	-0.014**	-0.024***	-0.031***	-0.021***	-0.016
	(0.010)	(0.010)	(0.006)	(0.005)	(0.008)	(0.006)	(0.010)
	[-2.442]	[-0.712]	[-2.476]	[-4.709]	[-3.978]	[-3.431]	[-1.574]
GS_t	0.289***	0.419***	0.229***	0.291***	0.435***	0.265***	0.485***
	(0.041)	(0.051)	(0.048)	(0.041)	(0.041)	(0.050)	(0.038)
	[6.959]	[8.284]	[4.748]	[7.070]	[10.630]	[5.277]	[12.924]
TO_t	-0.023**	-0.009	-0.005	-0.010**	0.027**	-0.008*	0.008
	(0.011)	(0.007)	(0.003)	(0.003)	(0.012)	(0.004)	(0.009)
	[-2.025]	[-1.382]	[-1.594]	[-2.776]	[2.299]	[-1.918]	[0.874]
F* (%)	175.000	93.312	n.a.	n.a.	n.a.	n.a.	22.044
EG* (%)	2.756	-2.164	2.015	1.955	1.450	1.241	2.050
Observations	41	41	41	41	41	41	41
R-Squared	0.868	0.879	0.861	0.861	0.860	0.861	0.868
Adjusted R-Squared	0.823	0.838	0.813	0.813	0.812	0.813	0.822
J-Statistic (P-Value)	9.128 (0.999)	9.147 (0.999)	9.070 (0.999)	9.125 (0.999)	8.902 (0.999)	9.076 (0.999)	9.117 (0.999)

Note: Standard errors in (), t-statistics in [], *** indicates statistical significance at 1% level, ** indicates statistical significance at 5% level and * indicates statistical significance at 10% level

Table 7. Estimates for the non-linear model and for the gross top 1% income share

Variable	C	LL	LDR	FDI	FVA	SMC	SO
β_0	0.021***	-0.027***	0.061***	0.040***	-0.043***	0.040***	0.026***
	(0.002)	(0.011)	(0.008)	(0.002)	(0.009)	(0.002)	(0.003)
	[11.567]	[-2.611]	[7.844]	[16.502]	[-4.559]	[18.048]	[8.993]
$GT1_{t-1}$	0.143***	0.282***	0.198***	0.305***	0.041	0.223***	0.199***
	(0.036)	(0.023)	(0.039)	(0.023)	(0.025)	(0.019)	(0.014)
	[3.942]	[12.459]	[5.122]	[13.285]	[1.687]	[11.888]	[14.549]
F_t	0.010***	0.119***	-0.054***	0.093***	1.187***	0.021***	0.203***
	(0.002)	(0.018)	(0.016)	(0.014)	(0.129)	(0.004)	(0.036)
	[5.247]	[6.431]	[-3.354]	[6.441]	[9.184]	[5.178]	[5.646]
F_t^2	-0.004***	-0.079***	0.040***	-0.453***	-4.385***	-0.007	-0.891***
	(0.001)	(0.010)	(0.010)	(0.103)	(0.441)	(0.007)	(0.125)
	[-5.712]	[-7.889]	[3.994]	[-4.393]	[-9.939]	[-1.128]	[-7.115]
EG_t	0.093***	0.054***	0.113***	0.106***	0.035***	0.096***	0.085***
	(0.008)	(0.010)	(0.004)	(0.004)	(0.006)	(0.005)	(0.007)
	[11.662]	[5.355]	[30.441]	[24.766]	[6.073]	[20.104]	[12.984]
EG_t^2	-0.921***	0.363**	-0.689***	-0.623***	-0.860***	-1.005***	-0.840***
	(0.088)	(0.165)	(0.028)	(0.053)	(0.030)	(0.065)	(0.122)
	[-10.523]	[2.202]	[-24.742]	[-11.797]	[-28.570]	[-15.442]	[-6.859]
I_t	0.016**	0.048***	0.044***	0.031***	-0.009	0.071***	0.005
	(0.007)	(0.015)	(0.005)	(0.007)	(0.009)	(0.008)	(0.008)
	[2.413]	[3.104]	[8.433]	[4.346]	[-1.028]	[8.490]	[0.663]
EA_t	0.029***	0.043***	0.046***	0.038***	0.025***	0.045***	0.021***
	(0.003)	(0.005)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
	[10.580]	[9.571]	[16.073]	[14.907]	[9.253]	[15.058]	[6.721]
GS_t	0.165***	0.114***	0.051***	0.056***	0.095***	0.041***	0.120***
	(0.008)	(0.013)	(0.009)	(0.010)	(0.010)	(0.010)	(0.016)
	[20.415]	[8.909]	[5.794]	[5.718]	[9.766]	[4.357]	[7.528]

	0.020***	0.013***	-0.002**	-0.010***	0.048***	-0.005***	0.015***
TO_t	(0.003)	(0.003)	(0.001)	(0.003)	(0.004)	(0.002)	(0.002)
	[5.851]	[4.455]	[-2.633]	[-3.608]	[12.705]	[-3.139]	[6.556]
F* (%)	125.000	75.316	67.500	10.265	13.535	n.a.	11.392
EG* (%)	5.049	-7.438	8.200	8.507	2.035	4.776	5.060
Observations	41	41	41	41	41	41	41
R-Squared	0.878	0.883	0.874	0.886	0.889	0.888	0.880
Adjusted R-Squared	0.836	0.842	0.831	0.846	0.850	0.849	0.838
J-Statistic (P-Value)	9.510 (0.999)	9.097 (0.999)	9.457 (0.999)	9.418 (0.999)	9.005 (0.999)	9.449 (0.999)	9.490 (0.999)

Note: Standard errors in (), t-statistics in [], *** indicates statistical significance at 1% level, ** indicates statistical significance at 5% level and * indicates statistical significance at 10% level

Table 8. Estimates for the non-linear model for the gross top 10% income share

Variable	C	LL	LDR	FDI	FVA	SMC	SO
	0.181***	-0.011	0.266***	0.190***	0.197***	0.207***	0.170***
β_0	(0.014)	(0.031)	(0.021)	(0.010)	(0.028)	(0.010)	(0.013)
	[12.810]	[-0.351]	[12.940]	[18.700]	[0.014]	[21.449]	[12.674]
	0.264***	0.232***	0.176***	0.316***	0.297***	0.240***	0.327***
$GT10_{t-1}$	(0.044)	(0.033)	(0.039)	(0.031)	(0.036)	(0.029)	(0.029)
	[6.044]	[7.097]	[4.484]	[10.090]	[8.348]	[8.266]	[11.273]
	0.040***	0.421***	-0.097***	0.111***	-0.403	0.031**	-0.039
F_t	(0.006)	(0.066)	(0.033)	(0.021)	(0.336)	(0.013)	(0.053)
	[7.065]	[6.402]	[-2.963]	[5.349]	[-1.197]	[2.409]	[-0.724]
	-0.011***	-0.221***	0.080***	-0.570***	0.938	-0.013	0.023
F_t^2	(0.002)	(0.036)	(0.022)	(0.169)	(1.144)	(0.016)	(0.255)
	[-6.683]	[-6.220]	[3.726]	[-3.373]	[0.820]	[-0.822]	[0.091]
	0.157***	0.132***	0.135***	0.128***	0.123***	0.113***	0.135***
EG_t	(0.018)	(0.027)	(0.012)	(0.009)	(0.020)	(0.014)	(0.015)

	[8.569]	[4.893]	[11.153]	[14.683]	[6.114]	[7.846]	[8.736]
EG_t^2	-1.245***	0.699*	-1.369***	-1.436***	-1.492***	-1.993***	-1.543***
	(0.139)	(0.400)	(0.208)	(0.163)	(0.125)	(0.211)	(0.138)
	[-8.944]	[1.749]	[-6.576]	[-8.814]	[-11.979]	[-9.434]	[-11.201]
I_t	-0.096***	-0.036	-0.104***	-0.108***	-0.130***	-0.073**	-0.111***
	(0.032)	(0.036)	(0.026)	(0.016)	(0.031)	(0.032)	(0.020)
	[-3.029]	[-0.988]	[-3.916]	[-6.896]	[-4.195]	[-2.291]	[-5.612]
EA_t	-0.007	0.005	0.007	-0.007	-0.014*	-0.004	-0.012
	(0.009)	(0.010)	(0.006)	(0.005)	(0.008)	(0.007)	(0.011)
	[-0.776]	[0.470]	[1.194]	[-1.478]	[-1.845]	[-0.595]	[-1.071]
GS_t	0.416***	0.529***	0.340***	0.398***	0.537***	0.396***	0.491***
	(0.058)	(0.057)	(0.037)	(0.034)	(0.048)	(0.007)	(0.035)
	[7.224]	[9.261]	[9.300]	[11.809]	[11.258]	[10.519]	[13.877]
TO_t	-0.015	-0.005	0.001	-0.007*	0.025*	-0.0004	0.007
	(0.011)	(0.008)	(0.006)	(0.004)	(0.014)	(0.005)	(0.011)
	[-1.442]	[-0.622]	[0.162]	[-1.867]	[1.857]	[-0.082]	[0.685]
F* (%)	181.818	95.249	60.625	9.737	n.a.	n.a.	n.a.
EG* (%)	6.305	-9.442	4.931	4.457	4.122	2.835	10.415
Observations	41	41	41	41	41	41	41
R-Squared	0.900	0.903	0.898	0.895	0.891	0.898	0.890
Adjusted R-Squared	0.866	0.869	0.863	0.858	0.854	0.863	0.852
J-Statistic (P-Value)	9.287 (0.999)	9.241 (0.999)	9.007 (0.999)	9.073 (0.999)	8.926 (0.999)	9.068 (0.999)	8.763 (0.999)

Note: Standard errors in (), t-statistics in [], *** indicates statistical significance at 1% level, ** indicates statistical significance at 5% level and * indicates statistical significance at 10% level

With regard to the non-linear models, our estimates also confirm that the majority of the variables are statistically significant at the traditional significance levels and have the expected signs. Our estimates are also quite robust because they do not change substantially when we use different

variables as proxies for the level of inequality and/or the role of finance. Our estimates do not change expressively in terms of statistical significance and signs in comparison with the estimates of the linear models. On the one hand, we continue to find evidence that inequality is strongly persistent in Portugal, positively affected by government spending and negatively affected by inflation (with the exception of the non-linear models in which the gross top 1% income share and the net top 1% income share are used as proxies for the level of inequality), educational attainment (also with the exception of the non-linear models in which the gross top 1% income share, the net top 1% income share and the net top 10% income share are used as proxies for the level of inequality) and trade openness. One the other hand, we continue to find evidence indicating the existence of the 'Kuznets curve' in Portugal. In addition, as in the case of the linear models, the economic growth in Portugal in the last decades was insufficient to prevent the rise of inequality because the majority of the estimated thresholds of the 'Kuznets curve' are higher than the average Portuguese economic growth during that time.

The most important finding is related to the variable of finance (and its term squared), in a context in which the non-linear relationship between finance and inequality is clearly confirmed. We find a convex quadratic function between finance and inequality, particularly when the variables of shareholder orientation (in the estimates in which the gross Gini, the net Gini and the net top 10% income share are used as proxies for the level of inequality), loan-to-deposit ratio (in the estimates in which the gross top 1% income share and the gross top 10% income share are used as proxies for the level of inequality) and credit (in the estimates in which the net top 1% income share is used as a proxy for the level of inequality) are used as proxies for the role of finance. This indicates that finance exerts a U-shaped effect on inequality in Portugal, which is a similar result to that obtained by Tan and Law (2012). Note also that these three variables are still contributing to decreasing inequality in Portugal because they have not yet supplanted the respective estimated thresholds of the corresponding convex quadratic functions (around 20%, 61% and 188% in the case of the shareholder orientation, loan-to-deposit ratio and credit, respectively). This also shows that further growth of finance in the coming years could be prejudicial to inequality in Portugal, which reinforces the pessimistic (or disruptive) view of the role played by financial growth in the era of financialisation. The variables of liquid liabilities, foreign direct investment, financial value added and stock market capitalisation are the exceptions, for which we find a concave quadratic function for inequality that indicates that they have an inverted U-shaped impact on inequality in Portugal, similar to the results obtained by Kim and Lin (2011), Law *et al*. (2014) and Chiu and Lee (2019).

To sum up, we find strong evidence for a positive (linear) relationship between finance and inequality in Portugal, which corroborates the hypothesis that financial growth has been prejudicial in Portugal in the era of financialisation. We also find some evidence for a convex

quadratic (non-linear) relationship between finance and inequality in Portugal, which supports the hypothesis that a decline in the growth of finance is necessary to decrease inequality.

7. CONCLUSION

This paper undertakes an empirical assessment of the finance–inequality nexus by performing a time series econometric analysis for Portugal from 1980 to 2020. During that period, Portuguese policy makers engaged in a strong process of liberalisation, deregulation and privatisation of the financial system to adhere to the rules imposed by the European Economic Community and to promote financial growth, to boost economic growth and to reduce inequality (Barradas *et al*., 2018; Barradas, 2021). Nonetheless, the Portuguese economic growth has exhibited strong deceleration and inequality has continued to widen in the last decades, which seems to contradict the mainstream beliefs around the supportive role played by the growth of finance in the era of financialisation (Beck *et al*., 2007; Seven and Coskun, 2016).

We estimated a linear model and a non-linear model, taking into account three proxies to assess inequality (the Gini coefficient, top 1% income share and top 10% income share), seven proxies to measure finance (credit, liquid liabilities, the loan-to-deposit ratio, foreign direct investment, financial value added, stock market capitalisation and shareholder orientation) and seven proxies as controls (the lagged level of inequality, the growth rate of the GDP per capita and its term squared, inflation, educational attainment, government spending and the degree of trade openness). We used the GMM estimator, popularised by Hansen (1982), because our estimates are produced by relapsing in dynamic models due to the incorporation of the lagged level of inequality among the independent variables and to overcome the potential problems of endogeneity (simultaneity among our different variables, the omission of other relevant independent variables and/or any measurement error in the proxies for our variables).

We are able to report substantial evidence that inequality is strongly persistent in Portugal, positively affected by government spending and negatively affected by inflation, educational attainment and trade openness. We also find strong evidence for the existence of a 'Kuznets curve' in Portugal, according to which the majority of the estimated thresholds of this quadratic relationship between economic growth and inequality are higher than the average Portuguese economic growth from 1980 to 2020. This seems to suggest that the Portuguese economy needs to grow more in the coming years to supplant these thresholds and to contribute to shrinking inequality. We are also able to provide strong evidence that there is a positive (linear) relationship between finance and inequality in Portugal, which corroborates the pessimistic (or disruptive) view of the role played by the growth of finance in the era of financialisation. We also find some

evidence that there is a convex (non-linear) relationship between finance and inequality in Portugal, which highlights that further financial growth will not imply a reversion of the increasing trend of inequality in Portugal.

These findings provide very important implications for Portuguese policy makers. The most important one is the urgent need to abandon the so-called 'trickle-down theory' or the 'horse and sparrow theory' and to implement the so-called 'trickle-up theory', supported by pro-poor public policies, to reduce inequality in Portugal. This should involve refocusing on demand-side economics, full employment goals, welfare state expansion, labour market protection (e.g., at the level of unemployment benefits, employment protection, employment rights and minimum wage), expansionary budget policies and more redistributive policies, which could be compensated for by the imposition of a new tax on financial transactions and/or an increase in taxes related to inheritances and large fortunes. It should also include the promotion of more collective bargaining (e.g., among public servants), the reinforcement of unionisation levels and the increased participation of workers' commissions in the board of directors of the majority of corporations to impair the income extraction from the poor to the rich. All efforts should also be concentrated by fostering higher levels of educational attainment in Portugal. This is important because of the negative effects of educational attainment on inequality in Portugal and the general recognition of the lower levels of educational attainment in Portugal than in other European countries due to underinvestment in public education during the dictatorship (Barradas *et al.*, 2018). Finally, finance should promote greater financial inclusion and better democratised access to financial services for all people, including poorer people, which could be achieved directly through Caixa Geral de Depósitos (the only public bank in Portugal) and/or indirectly through the promotion of greater competitiveness in the Portuguese banking system, through the creation of state credit programmes especially for poorer people and through the development of microfinance institutions. The reintroduction of fiscal advantages to the not-for-profit banks in Portugal, Caixa Económica Montepio Geral (the only mutual bank in Portugal) and Crédito Agrícola (the only co-operative bank in Portugal), is also welcomed because they are strongly attached to local communities and denote a more conservative business stance (Barradas *et al.*, 2011), which could be important for promoting the financial inclusion of poorer people. Effective regulatory and supervisory mechanisms are also desirable to increase the resilience of the Portuguese banking system and to prevent the emergence of future crises that are typically more detrimental to poorer people.

The empirical assessment of the finance–poverty nexus in Portugal and the analysis of the consequences of this increasing trend for inequality levels in Portugal should represent the first steps in further research about this specific subject.

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9. APPENDIX

Table A1. The correlation matrix between our variables

	GG	NG	GT1	NT1	GT10	NT10	C	LL	LDR	FDI	FVA	SMC	SO	EG	I	EA	GS	TO
GG	1.000																	
NG	0.923***	1.000																
GT1	0.894***	0.760***	1.000															
NT1	0.858***	0.856***	0.926***	1.000														
GT10	0.988***	0.896***	0.927***	0.881***	1.000													
NT10	0.976***	0.956***	0.885***	0.905***	0.977***	1.000												
C	0.544***	0.284*	0.543***	0.316**	0.543***	0.471***	1.000											
LL	0.495***	0.249	0.584***	0.366**	0.523***	0.436***	0.787***	1.000										
LDR	0.480**	0.397**	0.238	0.149	0.426***	0.397***	0.425***	0.034	1.000									
FDI	0.538***	0.427***	0.574***	0.468***	0.551***	0.522***	0.471***	0.320**	0.445***	1.000								
FVA	0.696***	0.478***	0.812***	0.667***	0.734***	0.680***	0.787***	0.823***	0.095	0.467***	1.000							
SMC	0.793***	0.620***	0.787***	0.643***	0.815***	0.732***	0.510***	0.508***	0.515***	0.622***	0.624***	1.000						
SO	0.821***	0.623***	0.834***	0.694***	0.848***	0.794***	0.789***	0.687***	0.479***	0.606***	0.861***	0.780***	1.000					
EG	-0.132	-0.063	-0.083	-0.018	-0.118	-0.124	-0.534***	-0.604***	-0.182	-0.141	-0.385**	-0.077	-0.333**	1.000				
I	-0.818***	-0.664***	-0.878***	-0.806***	-0.846***	-0.794***	-0.525***	-0.622***	-0.206	-0.467***	-0.827***	-0.790***	-0.831***	0.110	1.000			
EA	0.782***	0.597***	0.905***	0.785***	0.816***	0.764***	0.696***	0.807***	0.147	0.495***	0.931***	0.722***	0.880***	-0.329**	-0.912***	1.000		
GS	0.883***	0.751***	0.817***	0.747***	0.894***	0.863***	0.646***	0.594***	0.536***	0.536***	0.776***	0.771***	0.898***	-0.388**	-0.829***	0.823***	1.000	
TO	0.397**	0.153	0.652***	0.447***	0.453***	0.366**	0.643***	0.738***	-0.191	0.381**	0.795***	0.419***	0.576***	-0.126	-0.547***	0.741***	0.351**	1.000

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

Table A2. Estimates for the linear model and for the net Gini

Variable	C	LL	LDR	FDI	FVA	SMC	SO
β_0	0.257***	0.277***	0.258***	0.280***	0.273***	0.271***	0.226***
	(0.010)	(0.013)	(0.018)	(0.010)	(0.016)	(0.014)	(0.023)
	[25.986]	[21.433]	[14.439]	[27.240]	[16.694]	[19.198]	[9.873]
NG_{t-1}	0.471***	0.488***	0.511***	0.467***	0.462***	0.446***	0.492***
	(0.022)	(0.021)	(0.029)	(0.016)	(0.030)	(0.029)	(0.051)
	[21.203]	[22.822]	[17.615]	[28.446]	[15.533]	[15.145]	[9.622]
F_t	-0.004***	-0.027***	-0.007	0.062***	0.098**	-0.008*	-0.182***
	(0.001)	(0.006)	(0.005)	(0.011)	(0.046)	(0.004)	(0.021)
	[-5.110]	[-4.832]	[-1.536]	[5.837]	[2.161]	[-1.916]	[-8.831]
EG_t	0.026*	-0.022	0.051**	0.051***	0.088***	0.072***	0.053***
	(0.015)	(0.019)	(0.022)	(0.016)	(0.021)	(0.015)	(0.015)
	[1.726]	[-1.159]	[2.365]	[3.237]	[4.229]	[4.871]	[3.487]
EG_t^2	-3.278***	-2.356***	-3.342***	-2.689***	-2.924***	-2.544***	-3.377***
	(0.204)	(0.117)	(0.220)	(0.274)	(0.217)	(0.132)	(0.099)
	[-16.050]	[-20.120]	[-15.182]	[-9.798]	[-13.488]	[-19.218]	[-34.165]
I_t	-0.159***	-0.159***	-0.150***	-0.123***	-0.103***	-0.141***	-0.154***
	(0.027)	(0.025)	(0.045)	(0.027)	(0.033)	(0.043)	(0.035)
	[-5.981]	[-6.393]	[-3.692]	[-4.609]	[-3.136]	[-3.290]	[-4.460]
EA_t	-0.015*	-0.007	-0.009	0.005	0.010	0.002	-0.005
	(0.008)	(0.007)	(0.008)	(0.007)	(0.007)	(0.008)	(0.007)
	[-1.812]	[-1.031]	[-1.114]	[0.743]	[1.370]	[0.208]	[-0.690]
GS_t	0.096**	0.054***	0.047	-0.009	0.003	0.106**	0.263***
	(0.037)	(0.018)	(0.045)	(0.032)	(0.029)	(0.046)	(0.033)
	[2.577]	[2.923]	[1.040]	[-0.291]	[0.090]	[2.324]	[8.040]
TO_t	-0.048***	-0.058***	-0.067***	-0.086***	-0.099***	-0.080***	-0.046***
	(0.007)	(0.005)	(0.006)	(0.007)	(0.011)	(0.004)	(0.006)
	[-6.489]	[-11.200]	[-10.418]	[-12.612]	[-9.255]	[-22.141]	[-8.138]
EG* (%)	0.397	n.a.	0.763	0.948	1.505	1.415	0.785
Observations	41	41	41	41	41	41	41
R-Squared	0.787	0.790	0.785	0.803	0.789	0.787	0.818
Adjusted R-Squared	0.726	0.728	0.721	0.745	0.726	0.724	0.765
J-Statistic (P-Value)	9.257 (0.997)	9.105 (0.997)	9.167 (0.997)	9.246 (0.997)	9.165 (0.997)	8.885 (0.998)	9.327 (0.997)

Note: Standard errors in (), t-statistics in [], *** indicates statistical significance at 1% level, ** indicates statistical significance at 5% level and * indicates statistical significance at 10% level

Table A3. Estimates for the linear model and for the net top 1% income share

Variable	C	LL	LDR	FDI	FVA	SMC	SO
β_0	0.043***	0.080***	0.048***	0.053***	0.046***	0.041***	0.039***
	(0.004)	(0.005)	(0.005)	(0.005)	(0.002)	(0.004)	(0.004)
	[11.069]	[16.655]	[10.260]	[11.236]	[19.351]	[9.809]	[8.986]
$NT1_{t-1}$	0.330***	0.268***	0.383***	0.428***	0.454***	0.420***	0.400***
	(0.061)	(0.046)	(0.048)	(0.038)	(0.041)	(0.062)	(0.065)
	[5.442]	[5.819]	[8.055]	[11.127]	[11.129]	[6.774]	[6.148]
F_t	-0.004***	-0.044***	-0.003	0.025***	0.144***	-0.004***	-0.053***
	(0.001)	(0.002)	(0.003)	(0.003)	(0.032)	(0.001)	(0.014)
	[-3.224]	[-19.464]	[-1.269]	[8.927]	[4.496]	[-2.923]	[-3.919]
EG_t	0.054***	0.0004	0.080***	0.069***	0.101***	0.079***	0.068***
	(0.011)	(0.006)	(0.007)	(0.005)	(0.007)	(0.009)	(0.009)
	[4.913]	[0.076]	[11.741]	[13.778]	[14.793]	[8.727]	[7.406]
EG_t^2	-1.046***	-0.443***	-1.045***	-0.878***	-0.740***	-0.451***	-0.858***
	(0.130)	(0.069)	(0.118)	(0.127)	(0.069)	(0.115)	(0.137)
	[-8.044]	[-6.457]	[-8.856]	[-6.932]	[-10.707]	[-3.936]	[-6.275]
I_t	0.027	0.026**	0.052***	0.051***	0.068***	0.054***	0.049***
	(0.017)	(0.010)	(0.012)	(0.009)	(0.006)	(0.011)	(0.010)
	[1.644]	[2.598]	[4.376]	[5.462]	[11.914]	[5.004]	[4.939]
EA_t	0.031***	0.045***	0.038***	0.040***	0.039***	0.040***	0.040***
	(0.006)	(0.002)	(0.003)	(0.003)	(0.002)	(0.005)	(0.005)
	[5.464]	[19.739]	[11.167]	[14.744]	[16.532]	[8.056]	[8.865]
GS_t	0.029**	-0.017	-0.008	-0.057***	-0.071***	0.012	0.041**
	(0.013)	(0.014)	(0.018)	(0.016)	(0.011)	(0.012)	(0.017)
	[2.211]	[-1.217]	[-0.455]	[-3.461]	[-6.510]	[0.945]	[2.348]
TO_t	-0.014**	-0.011***	-0.031***	-0.037***	-0.059***	-0.036***	-0.027***
	(0.006)	(0.002)	(0.002)	(0.004)	(0.005)	(0.004)	(0.003)
	[-2.237]	[-4.424]	[-13.371]	[-9.737]	[-11.267]	[-9.372]	[-8.604]
EG* (%)	2.581	n.a.	3.828	3.929	6.824	8.758	3.963
Observations	41	41	41	41	41	41	41
R-Squared	0.735	0.796	0.734	0.741	0.743	0.723	0.745
Adjusted R-Squared	0.656	0.735	0.642	0.664	0.667	0.641	0.670
J-Statistic (P-Value)	9.292 (0.997)	9.247 (0.997)	9.088 (0.997)	9.260 (0.997)	9.044 (0.998)	9.540 (0.996)	9.540 (0.996)

Note: Standard errors in (), t-statistics in [], *** indicates statistical significance at 1% level, ** indicates statistical significance at 5% level and * indicates statistical significance at 10% level

Table A4. Estimates for the linear model and for the net top 10% income share

Variable	C	LL	LDR	FDI	FVA	SMC	SO
β_0	0.168***	0.165***	0.168***	0.174***	0.179***	0.159***	0.144***
	(0.017)	(0.014)	(0.016)	(0.008)	(0.014)	(0.016)	(0.016)
	[10.038]	[12.047]	[10.724]	[20.984]	[12.808]	[9.992]	[9.214]
$NT10_{t-1}$	0.405***	0.438***	0.432***	0.424***	0.379***	0.443***	0.455***
	(0.060)	(0.034)	(0.051)	(0.030)	(0.050)	(0.047)	(0.047)
	[6.736]	[12.889]	[8.492]	[14.177]	[7.583]	[9.332]	[9.697]
F_t	-0.0001	-0.010**	0.003	0.045***	0.155***	-0.004	-0.065**
	(0.001)	(0.004)	(0.004)	(0.006)	(0.053)	(0.003)	(0.026)
	[-0.116]	[-2.392]	[0.737]	[7.154]	[2.924]	[-1.313]	[-2.455]
EG_t	0.085***	0.044**	0.088***	0.073***	0.125***	0.086***	0.089***
	(0.011)	(0.017)	(0.017)	(0.009)	(0.016)	(0.007)	(0.011)
	[7.739]	[2.561]	[5.118]	[7.777]	[7.678]	[12.470]	[8.455]
EG_t^2	-1.956***	-1.328***	-2.212***	-1.725***	-1.790***	-1.680***	-2.064***
	(0.132)	(0.220)	(0.235)	(0.103)	(0.069)	(0.100)	(0.101)
	[-14.860]	[-6.043]	[-9.396]	[-16.826]	[-25.827]	[-16.843]	[-20.432]
I_t	-0.070**	-0.102***	-0.071**	-0.069***	-0.039*	-0.084***	-0.064***
	(0.028)	(0.020)	(0.030)	(0.019)	(0.020)	(0.029)	(0.019)
	[-2.507]	[-5.105]	[-2.238]	[-3.663]	[-1.907]	[-2.911]	[-3.359]
EA_t	0.002	-0.010	0.005	0.004	0.013***	-0.001	0.005
	(0.006)	(0.007)	(0.006)	(0.005)	(0.003)	(0.005)	(0.003)
	[0.418]	[-1.400]	[0.863]	[0.783]	[3.934]	[-0.155]	[1.521]
GS_t	0.219***	0.243***	0.158***	0.167***	0.169***	0.228***	0.276***
	(0.046)	(0.021)	(0.035)	(0.026)	(0.036)	(0.027)	(0.027)
	[4.762]	[11.730]	[4.481]	[6.551]	[4.692]	[8.450]	[10.169]
TO_t	-0.027***	-0.018***	-0.029***	-0.036***	-0.064***	-0.029***	-0.020***
	(0.006)	(0.005)	(0.004)	(0.005)	(0.012)	(0.004)	(0.004)
	[-4.908]	[-3.795]	[-7.018]	[-6.837]	[-5.566]	[-8.322]	[-5.472]
EG* (%)	2.173	1.657	1.989	2.116	3.492	2.560	2.156
Observations	41	41	41	41	41	41	41
R-Squared	0.845	0.841	0.840	0.858	0.849	0.842	0.849
Adjusted R-Squared	0.799	0.794	0.793	0.816	0.804	0.796	0.804
J-Statistic (P-Value)	9.160 (0.997)	9.061 (0.997)	9.196 (0.997)	9.287 (0.997)	8.960 (0.998)	8.702 (0.998)	9.315 (0.997)

Note: Standard errors in (), t-statistics in [], *** indicates statistical significance at 1% level, ** indicates statistical significance at 5% level and * indicates statistical significance at 10% level

Table A5. Estimates for the non-linear model and for the net Gini

Variable	C	LL	LDR	FDI	FVA	SMC	SO
β_0	0.272***	0.113***	0.193***	0.282***	0.225***	0.274***	0.208***
	(0.012)	(0.034)	(0.022)	(0.009)	(0.013)	(0.013)	(0.023)
	[22.586]	[3.358]	[8.878]	[30.739]	[17.527]	[21.294]	[8.878]
NG_{t-1}	0.447***	0.359***	0.444***	0.473***	0.436***	0.441***	0.520***
	(0.021)	(0.032)	(0.022)	(0.012)	(0.018)	(0.029)	(0.053)
	[21.581]	[11.168]	[19.994]	[39.218]	[24.379]	[15.008]	[9.843]
F_t	-0.013*	0.400***	0.180***	0.148***	0.988***	0.033**	-0.393***
	(0.007)	(0.076)	(0.046)	(0.021)	(0.155)	(0.015)	(0.090)
	[-1.717]	[5.292]	[3.932]	[7.153]	[6.390]	[2.252]	[-4.348]
F_t^2	0.003	-0.241***	-0.117***	-0.643***	-3.074***	-0.050**	0.677**
	(0.002)	(0.042)	(0.029)	(0.176)	(0.518)	(0.018)	(0.328)
	[1.301]	[-5.738]	[-4.034]	[-3.660]	[-5.932]	[-2.731]	[2.064]
EG_t	0.031**	-0.051***	0.048***	0.038***	0.026**	0.051***	0.064***
	(0.013)	(0.014)	(0.014)	(0.013)	(0.012)	(0.016)	(0.021)
	[2.349]	[-3.587]	[3.370]	[3.035]	[2.168]	[3.247]	[3.070]
EG_t^2	-2.994***	0.137	-2.530***	-2.561***	-2.830***	-2.865***	-3.237***
	(0.133)	(0.443)	(0.089)	(0.160)	(0.118)	(0.168)	(0.212)
	[-22.440]	[0.310]	[-28.516]	[-15.997]	[-23.975]	[-17.037]	[-15.239]
I_t	-0.141***	-0.066***	-0.125***	-0.112***	-0.129***	-0.103***	-0.133***
	(0.025)	(0.023)	(0.023)	(0.021)	(0.021)	(0.034)	(0.029)
	[-5.538]	[-2.824]	[-5.467]	[-5.243]	[-6.030]	[-3.025]	[-4.546]
EA_t	-0.006	0.027***	-0.005	0.009	-0.005	0.003	0.006
	(0.007)	(0.008)	(0.007)	(0.007)	(0.006)	(0.007)	(0.007)
	[-0.866]	[3.589]	[-0.730]	[1.232]	[-0.885]	[0.405]	[0.804]
GS_t	0.108***	0.107***	0.146***	-0.030	-0.031	0.055*	0.333***
	(0.029)	(0.036)	(0.032)	(0.022)	(0.036)	(0.030)	(0.044)
	[3.751]	[3.007]	[4.604]	[-1.332]	[-0.861]	[1.860]	[7.516]
TO_t	-0.059***	-0.065***	-0.071***	-0.093***	-0.080***	-0.081***	-0.044***
	(0.005)	(0.006)	(0.005)	(0.008)	(0.007)	(0.004)	(0.006)
	[-12.359]	[-11.222]	[-13.462]	[-11.950]	[-10.659]	[-18.187]	[-7.173]
F* (%)	n.a.	82.988	76.923	11.509	16.070	33.000	29.025
EG* (%)	0.518	n.a.	0.949	0.742	0.459	0.890	0.989
Observations	41	41	41	41	41	41	41

R-Squared	0.791	0.808	0.793	0.806	0.794	0.791	0.821
Adjusted R-Squared	0.718	0.742	0.722	0.738	0.722	0.719	0.759
J-Statistic (P-Value)	9.090 (0.999)	9.122 (0.999)	9.037 (0.999)	9.469 (0.999)	9.120 (0.999)	9.135 (0.999)	9.457 (0.999)

Note: Standard errors in (), t-statistics in [], *** indicates statistical significance at 1% level, ** indicates statistical significance at 5% level and * indicates statistical significance at 10% level

Table A6. Estimates for the non-linear model and for the net top 1% income share

Variable	C	LL	LDR	FDI	FVA	SMC	SO
β_0	0.050***	0.066***	0.013	0.052***	-0.013**	0.043***	0.042***
	(0.004)	(0.011)	(0.010)	(0.003)	(0.006)	(0.003)	(0.004)
	[11.569]	[6.027]	[1.247]	[16.048]	[-2.069]	[12.867]	[10.459]
$NT1_{t-1}$	0.359***	0.297***	0.451***	0.513***	0.246***	0.448***	0.330***
	(0.054)	(0.030)	(0.047)	(0.038)	(0.029)	(0.058)	(0.056)
	[6.709]	[9.793]	[9.498]	[13.470]	[8.372]	[7.796]	[5.950]
F_t	-0.015***	-0.019	0.066***	0.156***	1.350***	0.014***	0.161***
	(0.003)	(0.018)	(0.022)	(0.018)	(0.090)	(0.004)	(0.040)
	[-5.562]	[-1.043]	[2.990]	[8.670]	[14.965]	[3.590]	[3.971]
F_t^2	0.004***	-0.015	-0.045***	-0.993***	-4.214***	-0.022***	-0.834***
	(0.001)	(0.010)	(0.014)	(0.129)	(0.354)	(0.006)	(0.129)
	[4.526]	[-1.465]	[-3.111]	[-7.717]	[-11.908]	[-4.026]	[-6.484]
EG_t	0.051***	-0.010	0.069***	0.054***	0.038***	0.069***	0.047***
	(0.007)	(0.006)	(0.008)	(0.005)	(0.006)	(0.007)	(0.010)
	[7.066]	[-1.634]	[9.118]	[10.877]	[6.370]	[9.420]	[4.558]
EG_t^2	-1.100***	-0.255**	-0.773***	-0.757***	-0.974***	-0.855***	-1.040***
	(0.069)	(0.115)	(0.055)	(0.035)	(0.032)	(0.067)	(0.143)
	[-15.868]	[-2.217]	[-14.013]	[-21.555]	[-30.791]	[-12.747]	[0.143]
I_t	0.023	0.027**	0.048***	0.051***	0.032***	0.058***	0.016**
	(0.015)	(0.012)	(0.007)	(0.007)	(0.006)	(0.008)	(0.007)
	[1.525]	[2.296]	[7.203]	[6.926]	[5.554]	[7.094]	[2.128]
EA_t	0.030***	0.044***	0.032***	0.038***	0.031***	0.037***	0.023***
	(0.004)	(0.003)	(0.004)	(0.003)	(0.002)	(0.003)	(0.004)
	[6.896]	[15.395]	[8.475]	[12.887]	[14.465]	[12.500]	[5.632]
GS_t	0.028***	-0.018**	0.024	-0.077***	-0.157***	-0.022**	0.012
	(0.009)	(0.008)	(0.020)	(0.008)	(0.008)	(0.010)	(0.014)
	[3.197]	[-2.148]	[1.176]	[-9.363]	[-20.434]	[-2.171]	[0.838]

TO_t	-0.014***	-0.009***	-0.028***	-0.042***	-0.037***	-0.033***	-0.018***
	(0.004)	(0.003)	(0.003)	(0.002)	(0.004)	(0.003)	(0.003)
	[-3.203]	[-3.291]	[-9.512]	[-21.832]	[-8.184]	[-13.033]	[-6.685]
F* (%)	187.500	n.a.	73.333	7.855	16.018	31.818	9.652
EG* (%)	2.318	n.a.	4.463	3.567	1.951	4.035	2.260
Observations	41	41	41	41	41	41	41
R-Squared	0.743	0.797	0.734	0.777	0.779	0.731	0.759
Adjusted R-Squared	0.654	0.726	0.642	0.700	0.703	0.637	0.676
J-Statistic (P-Value)	9.198 (0.999)	8.933 (0.999)	9.314 (0.999)	9.387 (0.999)	9.048 (0.999)	9.352 (0.999)	9.504 (0.999)

Note: Standard errors in (), t-statistics in [], *** indicates statistical significance at 1% level, ** indicates statistical significance at 5% level and * indicates statistical significance at 10% level

Table A7. Estimates for the non-linear model for the net top 10% income share

Variable	C	LL	LDR	FDI	FVA	SMC	SO
β_0	0.187***	0.004	0.111***	0.182***	0.160***	0.185***	0.151***
	(0.014)	(0.023)	(0.019)	(0.008)	(0.022)	(0.016)	(0.016)
	[13.437]	[0.157]	[5.857]	[23.127]	[7.224]	[11.748]	[9.226]
$NT10_{t-1}$	0.345***	0.241***	0.320***	0.420***	0.334***	0.331***	0.415***
	(0.038)	(0.031)	(0.032)	(0.018)	(0.040)	(0.047)	(0.044)
	[9.089]	[7.871]	[10.063]	[23.904]	[8.367]	[2.719]	[9.397]
F_t	-0.005	0.412***	0.180***	0.202***	0.578**	0.040**	-0.209***
	(0.005)	(0.046)	(0.047)	(0.023)	(0.272)	(0.015)	(0.070)
	[-1.061]	[8.906]	[3.869]	[8.806]	[2.127]	[2.719]	[-2.975]
F_t^2	0.002	-0.241***	-0.110***	-1.114***	-1.497*	-0.053***	0.500*
	(0.002)	(0.025)	(0.031)	(0.175)	(0.872)	(0.018)	(0.261)
	[1.263]	[-9.823]	[-3.571]	[-6.368]	[-1.716]	[-2.920]	[1.916]
EG_t	0.095***	0.001	0.079***	0.064***	0.095***	0.079***	0.097***
	(0.010)	(0.012)	(0.009)	(0.009)	(0.015)	(0.014)	(0.013)
	[9.332]	[0.072]	[8.554]	[7.113]	[6.253]	[5.550]	[7.197]
EG_t^2	-1.755***	0.929***	-1.497***	-1.623***	-1.839***	-2.063***	-1.933***
	(0.084)	(0.251)	(0.050)	(0.110)	(0.089)	(0.158)	(0.153)
	[-20.806]	[3.708]	[-30.044]	[-14.811]	[-20.734]	[-13.058]	[-12.662]
I_t	-0.058***	-0.0001	-0.052***	-0.052***	-0.054***	-0.035	-0.058***
	(0.019)	(0.017)	(0.013)	(0.013)	(0.017)	(0.033)	(0.020)
	[-3.110]	[-0.008]	[-4.031]	[-4.034]	[-3.208]	[-1.069]	[-2.836]

	0.010**	0.029***	0.010**	0.013**	0.006*	0.009*	0.012**
EA_t	(0.004)	(0.003)	(0.004)	(0.006)	(0.003)	(0.005)	(0.005)
	[2.536]	[0.003]	[2.481]	[2.140]	[1.831]	[1.799]	[2.258]
	0.241***	0.314***	0.255***	0.131***	0.174***	0.223***	0.340***
GS_t	(0.027)	(0.029)	(0.028)	(0.017)	(0.032)	(0.034)	(0.031)
	[8.901]	[10.887]	[9.264]	[7.561]	[5.466]	[6.590]	[10.994]
	-0.037***	-0.019***	-0.028***	-0.050***	-0.051***	-0.036***	-0.024***
TO_t	(0.007)	(0.004)	(0.004)	(0.009)	(0.008)	(0.004)	(0.006)
	[-5.712]	[-5.308]	[-7.362]	[-5.508]	[-6.077]	[-9.752]	[-4.268]
F* (%)	n.a.	85.477	81.818	9.066	19.305	37.736	20.900
EG* (%)	2.707	n.a.	2.639	1.972	2.583	1.915	2.509
Observations	41	41	41	41	41	41	41
R-Squared	0.847	0.868	0.851	0.867	0.851	0.850	0.852
Adjusted R-Squared	0.794	0.823	0.800	0.821	0.799	0.798	0.801
J-Statistic (P-Value)	9.220 (0.999)	9.165 (0.999)	9.135 (0.999)	9.424 (0.999)	9.051 (0.999)	9.309 (0.999)	9.377 (0.999)

Note: Standard errors in (), t-statistics in [], *** indicates statistical significance at 1% level, ** indicates statistical significance at 5% level and * indicates statistical significance at 10% level