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João Alcobia, Frederico Silva Leal

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1249-078 Lisboa,
Portugal

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Rua Miguel Lupi, 20
1249-078 LISBOA
Portugal

Telephone: +351 - 213 925 912
E-mail: rem@iseg.ulisboa.pt

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Power, Institutions and Top Income Inequality in Portugal [*]

João Alcobia[†] Frederico Silva Leal[‡]

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Abstract

Income inequality in Portugal has risen persistently over the past four decades, placing the country among the most unequal in Western Europe. This paper analyses the determinants of top income concentration in Portugal between 1980 and 2023, using an Autoregressive Distributed Lag (ARDL) framework and six distinct post-tax inequality measures, drawing on Power Resource Theory.

The decline in trade union density and labour market flexibilisation emerge as the main drivers of rising top income concentration. Quantifying these effects, the decline in union density is the single most important factor, contributing to an average annual increase of 0.3 percentage points in the Top 1% income share. Higher top marginal tax rates and government consumption mitigate inequality, while financialisation and trade openness exert compressive effects.

These findings indicate that the balance of power between labour and capital determines income shares, with direct policy implications for reversing decades of institutional erosion.

Keywords: Income inequality; Top income; Labour market institutions; Portugal; Power Resource Theory.
JEL: E24; H23; J50

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[†] Instituto Universitário de Lisboa (ISCTE-IUL), Centro de Estudos sobre a Mudança Socieconómica e o Território (DINAMIA'CET), Lisbon, Portugal. email: joaoalcobia@live.com

[‡] ISCAL – Lisbon Accounting and Business School, Polytechnic University of Lisbon, Lisbon, Portugal; ISEG – Lisbon School of Economics and Management; ISEG Research, UECE – Research Unit on Complexity and Economics. email: fgleal@iscal.ipl.pt

1. Introduction

The increase in income inequality and the rise of the super-rich have sparked intense political and academic debate over the past decades, particularly following the theoretical and analytical contributions of Thomas Piketty and his co-authors (e.g. Alvaredo et al., 2013; Piketty, 2014), and in response to the economic consequences of the Great Recession and the subsequent policy measures that exacerbated inequality, especially in the most affected countries, such as Portugal.

The existing literature offers a range of explanations for the evolution of income inequality, emphasising both economic and institutional determinants. Standard approaches have typically focused on factors such as education, technological change, globalisation, and economic growth. However, these explanations provide only a partial account of recent inequality trends, particularly at the top of the distribution. Increasing attention has therefore been devoted to political and institutional factors, including labour market institutions, fiscal policy, and the balance of power between labour and capital, as key drivers of income distribution patterns. These mainstream narratives have not only shaped policy choices across Western economies but have also obscured the institutional and power-related mechanisms through which inequality is produced and reproduced, allowing income concentration at the top to deepen despite the broader economic growth path.

In contrast, a growing body of literature rooted in Power Resource Theory (PRT) argues that distributive outcomes reflect the balance of power between organised labour and capital, mediated by institutions such as trade unions, labour market regulations, and partisan government (e.g. Huber et al., 2019; Stephens, 1979). From this perspective, shifts in income distribution reflect changes in power resources rather than purely market-driven processes.

Building on this framework, Portugal offers a particularly instructive case. The post-1974 transition to democracy saw a sharp, politically driven compression of income inequality, including nationalisations, land expropriation, and the introduction of a statutory minimum wage (Krugman and de Macedo, 1981), a process that can be interpreted as a temporary rebalancing of power resources in favour of organised labour. Since then, however, the country has reversed course and now exhibits persistently high levels of inequality. Thus, understanding the roots of this process becomes especially pertinent, as the country has followed an upward trajectory over the last decades and

stands as the most unequal in Western Europe, ranking among the most unequal within the developed world (Centeno and Novo, 2014; Oliveira, 2024). Moreover, Portugal has experienced significant fluctuations in wage inequality and was severely affected by the last two major crises in the European Union - the Great Recession and the COVID-19 pandemic - and was subjected to a highly demanding Economic Adjustment Programme negotiated with the *Troika* (Eurogroup, ECB, and IMF), with substantial economic and social consequences. This context, applied to a small EU member state without monetary policy autonomy, provides a valuable setting to identify structural patterns and heterogeneous responses to political and economic factors.

Several empirical contributions have examined the drivers of inequality in Portugal, highlighting the role of both macroeconomic and structural factors. Existing studies have linked inequality dynamics to economic growth patterns and long-term structural transformations, including educational expansion and changes in wage dispersion (Leal and Viegas, 2025; Oliveira, 2024). Others emphasise the role of skill-biased technological change in shaping labour market outcomes (Centeno and Novo, 2014), as well as the impact of financial liberalisation on both growth performance and income distribution (Barradas and Lakhani, 2024).

Nevertheless, despite these important contributions, the economic determinants of top-income concentration in Portugal remain insufficiently explored, particularly regarding labour-market characteristics such as trade union density and labour-market regulation. This paper contributes to this debate by providing new evidence on the determinants of income distribution, focusing on the political and economic factors driving the evolution of top post-tax income shares.

Using an ARDL methodology, this paper investigates the short- and long-run determinants of six different top-income inequality measures (Top 1%, Top 5%, Top 10%, Top 0.1%, Bottom 50%, and the P90/P50 ratio) for Portugal between 1980 and 2023. The results show that lower union density and greater labour market deregulation have significantly contributed to rising top-income concentration, while stronger economic performance is also associated with higher inequality. By contrast, higher top marginal tax rates and government consumption exert a mitigating effect, whereas financialisation appears to be associated with lower inequality, although its effect is less robust across specifications.

In sum, this article contributes to the literature in three main ways. First, it provides an updated assessment of the short- and long-run determinants of inequality in a small EU

country with persistently high inequality levels such as Portugal, using a broad set of proxies. Second, it deepens the analysis of labour-market determinants that remain insufficiently explored in the literature, particularly trade union density and labour market regulation. Third, it advances the discussion on the importance of political economy dynamics in understanding long-term distributional outcomes, offering new empirical evidence on how institutional and policy-driven factors shape the evolution of top income concentration. Quantifying the economic magnitude of these effects, we show that the decline in union density is the single most important driver of rising top income shares in Portugal, a finding that carries direct policy implications for reversing long-standing institutional trends.

The paper is organised as follows. Section 2 reviews the relevant literature. Section 3 outlines the methodology and data, while Section 4 presents the empirical analysis. Section 5 concludes.

2. Literature Review

2.1. Standard economic explanations of inequality

The growth of income and wealth inequality and the rise of the super-rich have prompted intense debate and research over recent decades, particularly focused on identifying the roots of a dynamic that has undermined economic growth or, at the very least, its social outcomes (e.g. Barradas and Lakhani, 2024; Piketty, 2014; Saez and Zucman, 2016).

The literature has often highlighted education as a potential driver of income inequality over recent decades. For example, Scheve and Stasavage (2009) found a positive relationship between economic growth, education and inequality, particularly from a century-long perspective, showing that inequality was primarily driven by underlying economic factors such as technological adoption and educational attainment, rather than by partisanship or wage bargaining institutions. Using microdata from 14 European countries, Muszynska and Wedrowska (2023) show that a higher proportion of low-educated individuals is associated with greater inter-group income differentiation. In addition, countries with a larger share of well-educated individuals tend to exhibit lower levels of inequality at the bottom of the income distribution.

Beyond education, globalization is frequently identified as key determinants of income inequality. According to the assumptions of the Heckscher-Ohlin model, the increase in

globalisation leads countries to specialise in goods that intensively use the factor in which they are relatively abundant (Heckscher and Ohlin, 1991). As a result, in developed countries, which are relatively abundant in skilled labour (and capital), international trade tends to increase the demand for skilled labour, while reducing the demand for low-skilled workers. This process is further reinforced by the diffusion of new technologies, which intensifies the demand for highly skilled labour and top executives, thereby increasing their respective remuneration (Huber et al., 2019; Kaplan and Rauh, 2013), thus contributing to the rise in top-income inequality.

However, greater trade integration may, in certain contexts, lead to a reduction in top incomes (Hernández Martínez et al., 2026; Jaumotte et al., 2013). Hernández Martínez et al. (2026) show that Spain's accession to the European Single Market in 1993 reduced wage inequality, with gains at the bottom and losses at the top, a result that depended on the low skill intensity of its tradable sector and its relative position vis-à-vis more developed trading partners. The same argument may be extended to Portugal, as this country exhibits a less skill-intensive productive structure, specialising in lower value-added sectors (Alcobia et al., 2025). Accordingly, in this context, trade openness and intra-EU competition may exert downward pressure on higher incomes and compress the top of the distribution, rather than increasing inequality. These contrasting findings highlight that the distributive effects of trade are context-dependent, varying with countries' productive structures and positions within global value chains.

Additionally, the "superstar" theory (Rosen, 1981) provides another potential explanation for top income inequality. According to this approach, small differences in talent can translate into large differences in earnings when markets expand in scale. In this context, periods of stronger economic growth, associated with larger market size and higher aggregate demand, tend to amplify income disparities at the top of the distribution, as individuals with higher marginal productivity are able to capture a disproportionate share of the gains (Acemoglu and Autor, 2011; Kaplan and Rauh, 2013).

While these explanations highlight important economic mechanisms, they remain insufficient to fully account for the rise in income inequality, particularly at the top of the distribution.

A more comprehensive understanding of the rising inequality phenomenon requires considering the role of tax policy, labour market institutions and managerial decision-making. This is especially relevant for top incomes, which are determined not only by

labour earnings but predominantly by capital income and the dynamics of wealth accumulation (Alvaredo et al., 2013).

Also, Piketty (2014) accounts of rising top-end inequality in the 21st century rests on the growing prominence of wealth relative to national income: accumulated capital tends to grow faster than output, reflecting the well-known r > g mechanism, whereby the return on capital systematically exceeds the rate of economic growth, thereby reinforcing the concentration of income and wealth at the top of the distribution.

2.2. Political economy of inequality

A distinct and growing body of literature has reframed income as a fundamentally political and institutional outcome, rather than the result of purely market-based forces. From this perspective, distributional outcomes reflect not only economic dynamics, but also the institutional configuration and the balance of power between social groups, particularly between labour and capital.

In this vein, Huber et al. (2019), analysing 18 advanced industrial democracies from 1960 to 2012, show that income concentration at the top 1% is better explained by political and institutional factors, such as top marginal tax rates, government partisanship, union and public investment in higher education, than by market-based explanations.

Within this framework, the literature identifies the role of the state and public policy in shaping top income inequality.

In particular, taxation and the level of top marginal tax rate, is identified as a key determinant of top income inequality (Huber et al. 2019; Neal, 2013; Roine, 2009). Notably, during the so-called “thirty glorious years” of post-war growth, top income tax rates ranged between 70% and 90% in both Europe and USA (Mergulhão, 2025).

Progressive income taxation can affect top income shares through several channels. First, according to Roine et al. (2009), by reducing incentives to effort, it negatively affects labour supply and capital accumulation, implying that increases in taxation tend to be associated with lower top income shares. In addition, Huber et al. (2019) consider that higher marginal tax rates may also influence top income dynamics through a potential increase in tax evasion, weaker managerial incentives for entrepreneurial innovation, with implications for marginal productivity; and reduced incentives for engage in aggressive wage bargaining (Alvaredo et al., 2013; Feldstein, 1995). Finally, Scheve and Stavsage

(2016), argue that the level of taxation shapes pre-tax income shares by curbing excessive top-end compensation and limiting rent extraction.[1]

Beyond taxation, government expenditure also constitutes a key dimension of fiscal policy in influencing top income inequality (Hager, 2020). Government expenditure affects top income shares through multiple channels, including the provision of public goods such as healthcare, education and infrastructure; redistributive transfers to households, particularly benefiting lower-income groups, and public sector employment, which typically displays lower wage dispersion than the private sector (Neal, 2013).

Empirical evidence suggests that the distributive impact of government spending, depends critically on its composition and scale. Sidek (2021) finds that public expenditure contributes to reducing income inequality in developed countries, although its effects may vary across different levels of spending. In particular, spending tends to be more effective in mitigating inequality when towards targeted social transfers (Arnold and Rodrigues, 2015; Le et al., 2025) and public services such as education, which generate long-term equalising effects, particularly when financed through progressive taxation (Glomm and Ravikumar, 2003).

Finally, another potential factor affecting the evolution of top income is the financialization of the economy and the changing dynamics of financial markets (Epstein, 2005; Krippner, 2011).

A strand of the literature argues that financialization and the expansion of financial markets can affect income distribution by relaxing credit constraints and improving access to financial services, thereby potentially reducing inequality. In this view, greater financial deepening may facilitate household consumption and support entrepreneurial activity (e.g. Beck et al., 2014; Claessens and Perrotti, 2007). However, empirical evidence points to mixed effects. While some channels associated with financial development may contribute to reducing inequality, these gains tend to be unevenly distributed, with greater benefits accruing to households already integrated into financial markets, while lower-income groups remain reliant on informal resources. This unequal access reinforces disparities in opportunities and outcomes, thereby contributing to the persistence of income inequality (Antzoulatos et al., 2016; Barradas, 2024a; Makhlouf et al., 2020). Moreover, financialization has been associated with the expansion of large financial conglomerates, the crowding out of productive investment in the non-financial

[1] The distributive impact of taxation depends crucially on its degree of progressivity, with different tax structures producing distinct inequality outcomes (Okeke and Alexiou, 2021).

sector, and asset price inflation, which disproportionately benefits wealthier households and reinforces top income concentration (Barradas and Lakhani, 2024; Claessens and Perrotti, 2007; Volscho and Kelly, 2012). In addition, Dünhaupt (2014) shows that financialization also operates through changes in corporate governance, with the rise of shareholder value orientation shifting income from labour to capital via higher dividend payouts and lower wage shares. Overall, financialization tends to reinforce income inequality through multiple, mutually reinforcing channels, despite some potentially equalising mechanisms.

While these mechanisms highlight the importance of state policy and financial structures in shaping income distribution, they remain insufficient to explain how distributive outcomes are systematically shaped by power asymmetries between labour and capital. In particular, they tend to understate the role of organised labour and collective actors in mediating these dynamics. The PRT addresses this limitation by placing distributional conflict between social groups at the centre of the analysis, emphasising how the relative organisational capacity and political influence of labour and capital shape economic and institutional outcomes.

From this perspective, distributional outcomes are not merely the result of market forces, but reflect ongoing struggles over resources, institutions and policy design. In particular, trade unions, political parties and collective bargaining institutions emerge as key mechanisms through which workers can counterbalance the structural advantages of capital, influencing wage-setting processes, taxation and redistribution, and ultimately the evolution of top-income shares.

2.3. Power Resource Theory and income inequality

The PRT, developed by Korpi (1983) and Stephens (1979) and originally designed to explain variations in welfare state regimes, has become a central framework for analysing income distribution, particularly with regard to top incomes (Dünhaupt, 2014; Flaherty, 2015; Hager, 2020; Huber et al., 2017; Volscho and Kelly, 2012).

The main idea underlying this theory is that the capitalist class bases its power on economic resources and ownership of the means of production (which it controls), while the working class, by merely selling its labour power, is placed in a structurally weaker position in capitalist society. In this sense, and as Stephens (1979) notes, when workers sell their labour power on the market, they become subject to managerial control during

working hours, which shows that there is not only an economic exchange but also a relationship of subordination in the workplace. For this reason, according to PRT, a more favourable balance of power (through increased worker organization) will enable a more equitable distribution of income in favour of workers, helping to ensure better living conditions.

From this perspective, public policies are not neutral but instead reflect the balance of power among organised social groups. In contexts where workers predominantly support left-wing parties, exhibit strong collective mobilisation, and maintain high levels of unionisation, they are better able to influence policy outcomes and counterbalance income concentration. However, the asymmetry between labour and capital extends beyond the economic sphere into the political arena, as those at the top of the income and wealth distribution, by virtue of their control over economic resources, are often better positioned to shape policy-making processes and institutional arrangements in their favour. This structural advantage allows them not only to influence public policy but also to reinforce their control over the means of production, contributing to the persistence of top income concentration over time.

The partisan composition of governments influences the design of public policies, with important implications for state revenue and the distribution of income and wealth (Huber et al., 2019). Right and centre-right governments are generally associated with market-oriented reforms, such as labour market flexibilization and lower marginal tax rates, while left and centre-left governments tend to prioritise welfare provision and redistributive policies targeting lower-income groups (Flaherty, 2015; Volscho and Kelly, 2012).

Trade unions contribute to reducing top income inequality through several mechanisms. First, by increasing workers' capacity for organisation and mobilisation, for example through strikes[2] they strengthen collective bargaining power. Second, they help to constrain excessive rent extraction by managers. Third, they enhance workers' capacity to engage in the political process and shape policy outcomes (Mergulhão, 2025; Huber et al., 2019). In this context, union strength is also closely linked to the broader political environment. Volscho and Kelly (2012) show that greater right-wing representation in parliament is associated with a decline in trade union power, which in turn has contributed

[2] Neoclassical bargaining frameworks (e.g., Layard et al. 1991) recognise the credible threat of strike action as strengthening workers' bargaining position by increasing the wage they are able to demand, thereby raising the short-run negotiated equilibrium wage.

to rising top incomes in the United States, partly through reductions in marginal income and capital tax rates.

Another factor that may undermine the institutional power of workers is labour market regulation, which has increasingly moved towards greater flexibilization (Dünhaupt, 2014; Mergulhão, 2025). As a result, deregulation has contributed to a redistribution of income from labour to capital, reflected in a decline in the wage share (Liotti et al., 2024), as well as to rising wage inequality (Vlandas, 2018). With regard to top incomes, Dabla-Norris et al. (2015) provide empirical evidence that labour market flexibilization contributes to an increase in the top 10% income share. Taken together, these dynamics highlight how income distribution is shaped not only by economic forces, but fundamentally by the balance of power between labour and capital and its institutional expression.

Extending this line of research, our paper proceeds in three ways: first, by conducting a time-series econometric analysis focused on Portugal over the period from 1980 to 2023; second, by analysing the determinants of income inequality in Portugal, considering, for robustness purposes, a range of indicators, namely the post-tax income shares of the Top 1%, Top 5%, Top 10%, Top 0.1%, and Bottom 50%, as well as the P90/P50 ratio; and third, by simultaneously drawing on standard economic explanations of inequality, political economy approaches to inequality, and variables associated with PRT. By integrating these perspectives within a unified empirical framework, this paper aims to provide a more comprehensive account of the determinants of top-income inequality.

3. Econometric Model and Hypotheses

Our econometric model is based on a long-term aggregate equation that allows for the determination of top-income inequality measures in Portugal, taking the following form:

$$IM_t = \beta_0 + \beta_1 UD_t + \beta_2 LMR_t + \beta_3 X_t + \varepsilon_t \quad (1)$$

where *t* denotes the time period (in years), *IM* represents variables associated with top-income inequality measures, *UD* (union density) and *LMR* (labour market regulation) capture key dimensions of the PRT, reflecting the institutional and organizational strength of labour, and *X* corresponds to a set of control variables that are theoretically and empirically considered determinants of top-income inequality measures over recent

decades. Finally, ε represents a white-noise error term that is independently and identically distributed, exhibiting a zero mean and constant variance.

As noted in the previous section, the control variables include those commonly identified in the literature as the most relevant determinants of top-income inequality measures from both a theoretical and empirical perspective (top marginal tax rate, economic performance, government consumption, the degree of financialization, and trade openness).[3] Under the assumption that no relevant variables are omitted, the model yields more consistent and unbiased estimates (Greene, 2017). Thus, our long-run aggregate equation to identify the main determinants of top-income inequality measures in Portugal is specified as:

$$IM_t = \beta_0 + \beta_1 UD_t + \beta_2 LMR_t + \beta_3 TMT_t + \beta_4 EP_t + \beta_5 GC_t + \beta_6 F_t + \beta_7 TO_t + \varepsilon_t \quad (2)$$

where *t* denotes the time period (in years), *IM* represents variables associated with top-income inequality measures, *UD* refers to union density, *LMR* captures labour market regulation, *TMT* reflects the top marginal tax rate, *EP* measures economic performance, *GC* denotes government consumption, *F* represents the degree of financialization, *TO* reflects trade openness and ε represents a white-noise error term that is independently and identically distributed, exhibiting a zero mean and constant variance.

We expect labour market regulation and economic performance to have an intensifying effect on top-income inequality measures in Portugal. In contrast, union density, the top marginal tax rate, and government consumption are expected to have a mitigating effect on top-income inequality measures in Portugal. Finally, the degree of financialization and trade openness are expected to have an undetermined impact on top-income inequality measures in Portugal. Thus, the expected long-run estimated coefficients are as follows:

$$\beta_1 < 0,\ \beta_2 > 0,\ \beta_3 < 0,\ \beta_4 > 0,\ \beta_5 < 0,\ \beta_6 \lessgtr 0\ ,\ \beta_7 \lessgtr 0 \quad (3)$$

[3] Although education is widely recognised as a key determinant of overall income inequality, and therefore frequently highlighted in the literature, we chose not to include it among our explanatory variables. While educational attainment strongly influences broad distributional measures such as the Gini coefficient, it has limited relevance for explaining income concentration at the top of the distribution. The empirical literature on top incomes consistently shows that variations in the shares held by the Top 5%, Top 1% or Top 0.1% are driven primarily by political and institutional factors, including power relations between labour and capital, as well as by fiscal policy, labour market institutions and financial dynamics, rather than by differences in schooling levels (e.g., Alvaredo et al., 2013; Huber et al., 2019; Hager, 2020; Mergulhão, 2025).

Trade unions are expected to have a negative effect on top income inequality, as stronger collective organisation and mobilisation, including through strikes, enhance workers' bargaining power, constrain rent extraction by managers, and increase political influence in favour of redistribution, while weaker union power and declining unionisation tend to amplify top income concentration through reduced wage bargaining power and weaker redistributive pressure (Flaherty, 2015; Huber et al., 2019; Mergulhão, 2025; Volscho and Kelly, 2012).

Labour market deregulation is expected to exert a positive influence on top income inequality, as greater flexibilization weakens workers' bargaining power and shifts income from labour to capital, contributing to lower wage shares and higher income concentration at the top (Dabla-Norris et al., 2015; Dünhaupt, 2014; Liotti et al., 2024; Mergulhão, 2025; Vlandas, 2018;).

The level of top marginal tax rates is expected to lead to lower top income inequality, as more progressive taxation reduces incentives for effort and accumulation, affects labour supply and capital formation, and curbs rent extraction at the top of the income distribution (Alvaredo et al., 2013; Feldstein, 1995; Huber et al., 2019; Roine et al., 2009; Scheve and Stasavage, 2016).

Economic performance is expected to have a positive effect on top income inequality, as market expansion magnifies returns to top talent and increases income concentration at the top (Acemoglu and Autor, 2011; Kaplan and Rauh, 2013; Rosen, 1981).

Government expenditure is expected to exert a negative influence on top income inequality, as public spending on social transfers, education, healthcare, and infrastructure reduces income dispersion and strengthens equalising effects across the income distribution (Arnold and Rodrigues, 2015; Glomm and Ravikumar, 2003; Hager, 2020; Le et al., 2025; Neal, 2013).

Financialization is expected to have ambiguous effects on top income inequality, as financial deepening may reduce inequality by relaxing credit constraints and improving access to finance, while simultaneously increasing income concentration through higher capital incomes, asset price inflation, and rent extraction at the top (Barradas, 2024a; Claessens and Perotti, 2007; Dünhaupt, 2014; Epstein, 2005; Krippner, 2011; Volscho and Kelly, 2012).

Finally, trade openness is expected to have ambiguous effects on top income inequality. On the one hand, it increases the demand for skilled labour and top executives

in skill- and capital-abundant economies, raising top incomes through specialization and technological diffusion (Heckscher and Ohlin, 1991; Huber et al., 2019; Kaplan and Rauh, 2013). On the other hand, in less skill-intensive economies such as Portugal, greater trade integration may exert downward pressure on top incomes and compress the upper tail of the distribution (Alcobia et al., 2025; Hernández Martínez et al., 2026; Jaumotte et al., 2013).

3.1. Dataset

Our dataset concerns annual data for Portugal, covering the period from 1980 to 2023, totalling 44 observations. This period and data frequency represent the entirety of the available data, as data on top-income inequality measures are available starting from 1980, and most variables are reported on an annual basis. All data were collected in February 2026.

Our dataset allows us to produce empirical results for two main reasons. First, by covering a period of more than four decades, it enables us to analyse long-term trends and structural adjustments that explain the rise in top inequality in Portugal. Second, the size of the sample allows us to account for heterogeneity in the dynamics of relevant explanatory variables, namely Union Density and Labour Market Regulation.

We used six different variables as proxies to measure Portuguese income inequality, namely the Top 1%, Top 5%, Top 10%, Top 0.1%, and Bottom 50% post-tax income shares, as well as the P90/P50 ratio[4]. This represents a novel contribution of our paper, as it allows us to identify the main determinants of Portuguese top income inequality and to assess the robustness of our empirical results depending on the proxy used to measure income inequality. For this reason, we estimated six different empirical models, considering each of these six variables as the dependent variable.

Next, we present the definitions, units, and sources of all the variables included in the models. Most of the dependent variables (Top 1%, Top 5%, Top 10%, Top 0.1%, and Bottom 50%) were obtained directly from the World Inequality Database. The final dependent variable, the P90/P50 ratio, was constructed as the ratio between the Top 10% and the Bottom 50%.

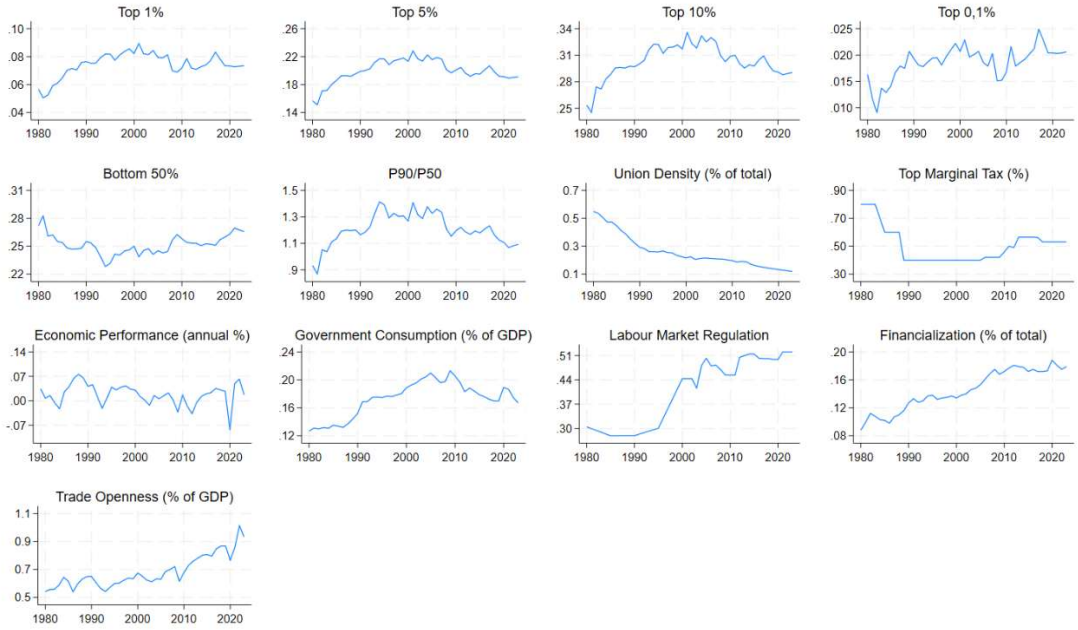
[4] For the regression with this dependent variable, the expected signs of the coefficients for each of the variables are reversed.

Union density is used as an explanatory variable and corresponds to the number of workers who are union members as a percentage of the total workforce in Portugal and was collected from the Institutional Characteristics of Trade Unions, Wage Setting, State Intervention and Social Pacts (ICTWSS) database and from Barradas (2024b). Moreover, Top Marginal Tax refers to the top statutory personal income tax rate and was obtained from the OECD database and from Alvaredo (2009). The proxy chosen to measure economic performance was the annual growth of GDP per capita, which was obtained from the Pordata database. Government consumption was calculated using General Government Final Consumption Expenditure as a percentage of GDP and was obtained from the World Bank database. To measure Labour Market Regulation, we used a composite index measuring the strictness of labour market regulations, obtained directly from the Fraser Institute[5]. The proxy chosen to assess financialization is the gross value added of financial, insurance, and real estate activities as a percentage of gross value added, which was collected from the Portuguese National Accounts, available at the Instituto Nacional de Estatística (INE). Trade openness was calculated as the sum of exports and imports of goods and services as a percentage of GDP and was obtained from the World Bank database.

Figure 1 presents the plots of all variables included in our model over the period 1980-2023 and the summary statistics are presented in Table 1. Each variable definition and sources and the correlation matrix is provided in the Appendix (Table A1 and A2, respectively). It is important to note that some of the variables in our model show correlations above 0.8 in absolute value, meaning that the possibility of multicollinearity cannot be ruled out (Studenmund, 2016). For this reason, we computed the Variance Inflation Factor (VIF) (Table A3 in the Appendix), which led to the rejection of the multicollinearity hypothesis, as the VIF values were below the rejection threshold of 20 (Greene, 2017).

[5] Note that there is no available information regarding labour market regulation for the periods between 1981 and 1984, 1986 and 1989, 1991 and 1994, and 1996 and 1999. For this reason, this information was obtained through our own calculations using the linear interpolation technique.

Figure 1 – Time-series plots of model variables



Notes: Authors' elaboration.

Table 1 – The descriptive statistics for each variable

Variable	Mean	Median	Maximum	Minimum	Standard Deviation	Skewness	Kurtosis
Top 1%	0.074	0.075	0.090	0.505	0.009	-1.007	3.923
Top 5%	0.200	0.200	0.228	0.151	0.017	-0.854	3.923
Top 10%	0.303	0.302	0.336	0.245	0.019	-0.792	3.961
Top 0.1%	0.019	0.019	0.025	0.009	0.003	-0.945	4.184
Bottom 50 %	0.252	0.252	0.283	0.228	0.011	0.406	3.627
P90/P50	1.207	1.198	1.413	0.868	0.119	-0.482	3.384
Union Density	0.257	0.216	0.548	0.118	0.117	1.129	3.286
Top Marginal Tax	0.505	0.475	0.800	0.400	0.124	1.131	3.442
Economic Performance	0.018	0.019	0.076	-0.083	0.030	-0.799	4.550
Government Consumption	0.173	0.176	0.213	0.127	0.025	-0.501	2.166
Labour Market Regulation	0.403	0.444	0.520	0.279	0.097	-0.189	1.295
Financialization	0.145	0.139	0.188	0.088	0.029	-0.237	1.794
Trade openness	0.682	0.641	1.014	0.540	0.114	0.989	3.286

In this sense, we performed a set of diagnostic tests to assess the suitability of the ARDL framework for our empirical setting.

First, Tables 2 and 3 report the results of the unit root tests for each variable, based on the traditional Augmented Dickey–Fuller (ADF) (1979) test and the Phillips–Perron (PP) (1998) test, respectively. According to the results, there is a combination of variables that are stationary in levels (i.e., integrated of order zero) and variables that are stationary in first differences (i.e., integrated of order one). Regarding conventional significance levels, the only variable that is stationary in levels according to both tests is economic performance. Top 1%, Top 5%, Top 0.1%, Bottom 50%, P90/P50, Top Marginal Tax, Government Consumption, Labour Market Regulation, Financialization, and Trade Openness are only stationary in first differences according to the results of both tests. Top

10% and Bottom 50% are stationary in levels according to the ADF test, but only stationary in first differences according to the PP test. By contrast, Union Density is only stationary in first differences according to the ADF test and stationary in levels according to the PP test. Finally, none of the variables are stationary only in second differences according to either the ADF or the PP test.

Table 2 – *P-values* of the ADF unit root test for each variable

Variable	Level			First Difference		
	Intercept	*Trend and Intercept*	*None*	*Intercept*	*Trend and Intercept*	*None*
Top 1%	0.154*	0.584	0.867	0.000	0.000*	0.000
Top 5%	0.076	0.500*	0.834	0.000	0.000*	0.000
Top 10%	0.084*	0.504	0.819	0.000	0.000*	0.000
Top 0.1%	0.131	0.114	0.978*	0.000	0.000*	0.000
Bottom 50 %	0.170	0.025*	0.595	0.000	0.000*	0.000
P90/P50	0.130*	0.450	0.731	0.000	0.000*	0.000
Union Density	0.058	0.182*	0.009	0.139	0.177	0.041*
Top Marginal Tax	0.115	0.612*	0.105	0.000	0.000*	0.000
Economic Performance	0.001*	0.004	0.000	0.000	0.001	0.000*
Government Consumption	0.339*	0.978	0.847	0.000	0.000	0.000*
Labour Market Regulation	0.901	0.641*	0.978	0.000*	0.000	0.000
Financialization	0.423*	0.107	0.990	0.030*	0.070	0.028
Trade openness	0.974	0.221	0.987*	0.000	0.003*	0.000

Note: The lag lengths were selected automatically based on the AIC information criteria and * indicates the exogenous variables included in the test according to the AIC information criteria

Table 3 – *P-values* of the PP unit root test for each variable

Variable	Level			First Difference		
	Intercept	*Trend and Intercept*	*None*	*Intercept*	*Trend and Intercept*	*None*
Top 1%	0.173*	0.703	0.813	0.000	0.000*	0.000
Top 5%	0.071	0.480*	0.848	0.000	0.000*	0.000
Top 10%	0.081	0.537*	0.833	0.000	0.000	0.000*
Top 0.1%	0.131	0.114*	0.726	0.000	0.000	0.000*
Bottom 50 %	0.170	0.429*	0.593	0.000	0.000*	0.000
P90/P50	0.139	0.535*	0.740	0.000	0.000*	0.000
Union Density	0.001*	0.280	0.000	0.005	0.001*	0.013
Top Marginal Tax	0.119	0.550*	0.117	0.000	0.000*	0.000
Economic Performance	0.001*	0.004	0.001	0.000	0.000	0.000*
Government Consumption	0.342*	0.985	0.827	0.000	0.000	0.000*
Labour Market Regulation	0.891	0.548*	0.971	0.000	0.000*	0.000
Financialization	0.397	0.400*	0.993	0.000*	0.000	0.000
Trade Openness	0.896	0.275*	1.000	0.000	0.000	0.000*

Note: * indicates the exogenous variables included in the test according to the AIC information criteria

3.2. Econometric methodology

In this study, we employ the ARDL methodology, following Pesaran et al. (2001), as the variables included in our econometric models comprise both series that are stationary in levels and series that become stationary only after first differences. The literature provides support for the use of the ARDL estimator in empirical analyses for four main reasons.

The first reason lies in the greater flexibility of the ARDL estimator, as it allows for the inclusion of both variables that are stationary in levels and variables that are stationary

in first differences.[6] The second reason is that this estimator yields reliable results in the presence of simultaneity among the variables in our models (Harris and Sollis, 2003; Pesaran and Smith, 2002). The third reason is that the ARDL estimator produces consistent and unbiased estimates, even in the presence of small sample sizes (Pesaran and Shin, 1997; Phillips, 2018;). Moreover, this estimator exhibits superior small-sample properties compared to other commonly used cointegration methods (e.g., Engle and Granger, 1987; Gregory and Hansen, 1996; Johansen, 1988). Lastly, by allowing all variables to be incorporated in levels (including those that are stationary in first differences), this estimator facilitates a more straightforward and transparent interpretation of the coefficients (Romão and Barradas, 2024). Our econometric analysis was conducted using EViews software (version 12).

The ARDL estimator captures the evolution of the dependent variable (i.e., top-income inequality measures) through its lagged values, as well as the contemporaneous and lagged values of the independent variables (i.e., union density, labour market flexibilization, top marginal tax, economic performance, government consumption, financialization, and trade openness). To carry out our econometric estimations, we follow a sequence of steps described below.

First, we determine the optimal lag length to be included in our ARDL models for estimation purposes. Although we report the full set of information criteria, we place particular emphasis on the Akaike Information Criterion (AIC) and the Final Prediction Error (FPE) information criteria. This choice is justified by the fact that these two criteria are regarded as more appropriate for small samples with fewer than 60 observations (Liew, 2004).

Second, we implement the Bounds test approach in accordance with Pesaran et al. (2001). This methodology allows for the identification of cointegration relationships among all variables in our model. Given that our econometric models rely on relatively small sample sizes, we do not employ the asymptotic critical values for the upper and lower bounds proposed by Pesaran et al. (2001), as these are only appropriate for larger samples, typically exceeding one thousand observations. Although this constitutes a limitation of the ARDL methodology, it is addressed by using critical values for small

[6] According to Harris and Sollis (2003) and Mills and Narkellos (2008), unit root tests perform poorly in small samples, which is the case in our study.

samples as proposed by Kripfganz and Schneider (2020).[7] To reject the null hypothesis of the non-existence of cointegration, the F-statistic must exceed the upper critical value. Conversely, the null hypothesis of the non-existence of cointegration cannot be rejected when the F-statistic is below the lower critical value. Finally, when the F-statistic lies between the upper and lower critical values, the results are inconclusive.

Third, we implement a set of diagnostic tests required to conduct the econometric estimations. To this end, we assess whether the residuals are free from serial correlation and whether they are normally distributed and homoscedastic. We also examine whether our set of econometric models is correctly specified in terms of functional form and if yields results without structural breaks over time and. Accordingly, we employ the Breusch–Godfrey serial correlation LM test, the Jarque–Bera test, the Breusch–Pagan–Godfrey test, the cumulative sum of recursive residuals (CUSUM) test and the cumulative sum of squares of recursive residuals (CUSUMSQ) test. In cases where the models exhibit econometric issues, there are established procedures to ensure that our empirical estimates remain robust and reliable.

Fourth, we present the short- and long-run determinants of income inequality in Portugal. Our estimates were produced according to the standardized specification in EViews (i.e., a restricted constant is included).

Finally, the last step consists of assessing the economic effects of our long-run estimates, with the purpose of determining the impact of each statistically significant variable on the evolution of the determinants of Top-income inequality measures in Portugal over the period from 1980 to 2023 (McCloskey and Ziliak, 1996; Ziliak and McCloskey, 2004).

3.3. Diagnostic tests

We begin by determining the optimum number of lags to include in the six ARDL models, in order to proceed with the respective estimates (Table 4). We only considered a maximum of 3 lags for both the dependent and independent variables, because a higher number would not guarantee that our unrestricted VAR satisfies the stability condition, as there would be characteristic polynomial roots outside the unit circle (Lütkepohl,

[7] Moreover, these critical values are more precise, as they are derived from response surface regressions based on billions of simulated test statistics.

2005).[8] Thus, and in accordance with the conclusions of most information criteria, the optimal number of lags in our ARDL models was 3 lags. The estimates were obtained using EViews, which automatically determined the appropriate number of lags for each variable, subject to a maximum of three lags.

Next, we examined the existence of a cointegration relationship among the variables in our six econometric models by implementing the bounds testing procedure for each specification (Table 5). Since the F-statistic exceeds the upper bound critical value, we conclude that the variables are cointegrated in all ARDL models at the conventional significance levels.

Table 4 – Values of the information criteria by lag

Regression	Lag	LR	FPE	AIC	SC	HQ
Top 0.1%	**0**	n.a	7.76E-28	-39.720	-39.386	-39.598
	1	424.505*	3.23e-32*	-49.864	-46.855*	-48.768*
	2	57.292	9.73E-32	-49.129	-43.445	-47.059
	3	76.297	5.96E-32	-50.776*	-42.417	-47.732
Top 1%	**0**	n.a.	4.12E-27	-38.052	-37.717	-37.930
	1	427.807*	1.55E-31	-48.299	-45.289*	-47.203*
	2	71.360	2.59E-31	-48.150	-42.466	-46.080
	3	77.540	1.47e-31*	-49.874*	-41.515	-46.830
Top 5%	**0**	n.a.	1.29E-26	-36.913	-36.578	-36.791
	1	437.965	3.52E-31	-47.477	-44.468*	-46.381
	2	79.311	4.23E-31	-47.660	-41.976	-45.590
	3	107.689*	3.64e-32*	-51.268*	-42.909	-48.225*
Top 10%	**0**	n.a.	1.88E-26	-36.533	-36.199	-36.412
	1	442.188	4.51E-31	-47.230	-44.221*	-46.134
	2	82.651	4.71E-31	-47.552	-41.868	-45.482
	3	103.524*	5.26e-32*	-50.900*	-42.541	-47.856*
Bottom 50%	**0**	n.a.	1.5E-26	-36.762	-36.428	-36.640
	1	446.585	3.13E-31	-47.596	-44.587*	-46.500
	2	82.714	3.26E-31	-47.920	-42.236	-45.850
	3	86.387*	1.06e-31*	-50.197*	-41.839	-47.154*
P90/P50	**0**	n.a	1.28E-24	-32.310	-31.976	-32.188
	1	443.541	2.95E-29	-43.049	-40.040*	-41.953
	2	84.290	2.88E-29	-43.439	-37.755	-41.369
	3	95.3623*	5.35e-30*	-46.277*	-37.918	-43.233*

Note: * indicates the optimal lag order selected by the respective information criteria

[8] Results of the stability condition and the corresponding roots of characteristic polynomials are available upon request.

Table 5 – Bounds test for cointegration analysis

Regression	F-statistic	Critical Value	Lower Bound Value	Upper Bound Value
Top 0.1%	**9.864**	1%	2.898	4.009
		5%	2.371	3.385
		10%	2.116	3.079
Top 1%	**9.789**	1%	2.898	4.009
		5%	2.371	3.385
		10%	2.116	3.079
Top 5%	**11.640**	1%	2.898	4.009
		5%	2.371	3.385
		10%	2.116	3.079
Top 10%	**13.058**	1%	2.898	4.009
		5%	2.371	3.385
		10%	2.116	3.079
Bottom 50%	**7.808**	1%	2.898	4.009
		5%	2.371	3.385
		10%	2.116	3.079
P90/P50	**8.297**	1%	2.898	4.009
		5%	2.371	3.385
		10%	2.116	3.079

Note: Critical values for the lower bound and upper bound are from Kripfganz and Schneider (2020)

Lastly, we also conducted the usual set of diagnostic tests for all six ARDL econometric models (Table 6). For all six ARDL specifications, the residuals are normally distributed and homoscedastic. We also confirmed that the six econometric models produced stable estimates, as there is no evidence of structural breaks. Additionally, the models appear to be well specified in terms of their functional form.[9] However, the ARDL models for the Top 5% and Top 10% exhibit econometric problems. In these two cases, the respective residuals display serial correlation. To address this issue, the Newey and West (1987) estimator was employed in order to ensure the robustness of all estimates in the ARDL models with these dependent variables (Top 5% and Top 10%). The adoption of this technique does not alter the conclusions of the remaining diagnostic tests.

Table 6 – Diagnostic tests for the ARDL models

Regression	Diagnostic Test	F-statistic	*P-value*
Top 0.1%	**Breusch-Godfrey**	0.925	0.450
	Jarque-Bera	0.298	0.861
	Breusch-Pagan-Godfrey	0.695	0.665
	Ramsey's RESET	0.620	0.612
Top 1%	**Breusch-Godfrey**	1.723	0.203
	Jarque-Bera	0.533	0.766
	Breusch-Pagan-Godfrey	1.230	0.312
	Ramsey's RESET	0.380	0.769
Top 5%	**Breusch-Godfrey**	2.526	0.097
	Jarque-Bera	1.038	0.595
	Breusch-Pagan-Godfrey	0.803	0.563
	Ramsey's RESET	0.219	0.882
Top 10%	**Breusch-Godfrey**	2.700	0.083
	Jarque-Bera	1.263	0.532
	Breusch-Pagan-Godfrey	1.039	0.405
	Ramsey's RESET	1.247	0.328
Bottom 50%	**Breusch-Godfrey**	2.235	0.124
	Jarque-Bera	0.308	0.857
	Breusch-Pagan-Godfrey	1.029	0.410
	Ramsey's RESET	1.572	0.237
P90/P50	**Breusch-Godfrey**	0.223	0.878
	Jarque-Bera	2.253	0.324
	Breusch-Pagan-Godfrey	1.095	0.382
	Ramsey's RESET	1.970	0.172

[9] Results of the CUSUM stability tests and the CUSUMSQ stability tests are available upon request.

Note: Breusch-Godfrey tests were conducted with three lags and Ramsey's RESET tests were performed with one fitted term, albeit results do not change if we had used more lags and more fitted terms, respectively.

4. Empirical Analysis

Table 7 presents the short-run and long-run estimates for the six ARDL models and provides robust evidence on the relationship between the selected explanatory variables and the different measures of Portuguese top-income inequality measures.

In fact, the high R-squared (and adjusted R-squared) values indicate that our models capture the main determinants of inequality in Portugal over the last decades. In this regard, our estimates explain a substantial share of the evolution of top-income inequality measures in Portugal: more than 87% (81%) for the Top 1%, 93% (89%) for the Top 5%, 93% (90%) for the Top 10%, 85% (79%) for the Top 0.1%, 85% (78%) for the Bottom 50%, and 93% (88%) for the P90/P50 ratio.

With regard to the long-run estimates, all variables are statistically significant at conventional levels of significance and exhibit the expected effects on top-income inequality measures in Portugal.

Trade union density negatively affects top income inequality, which is in line with the PRT literature emphasising the role of organised labour in shaping distributive outcomes across the income distribution (Huber et al., 2019; Korpi, 1983; Stephens, 1979). This reflects the capacity of trade unions to strengthen workers' bargaining power, constrain managerial rent extraction and reinforce redistributive political coalitions. In this context, the observed decline in trade union density in Portugal over recent decades may have contributed to the increasing importance of top incomes, as weaker labour organisation reduces the capacity to counterbalance income concentration at the top.

The flexibilization of labour market regulation exerts a positive impact on top-income inequality measures, with empirical evidence indicating that labour market deregulation contributes to higher income concentration at the top of the distribution (Dabla-Norris et al., 2015). This result is consistent with the broader literature showing that greater labour market flexibility weakens workers' bargaining power and shifts income towards capital and top earners, thereby increasing income concentration at the upper end of the distribution (Liotti et al., 2024; Vlandas, 2018). Within the PRT framework, this highlights labour market institutions as a key determinant of top-income inequality across advanced economies (Huber et al., 2019; Korpi, 1983; Stephens, 1979). In the Portuguese context, this pattern has been reinforced by successive reforms of labour legislation

oriented towards greater flexibility over recent decades, indicating a gradual and sustained process of labour market deregulation with implications for the evolution of top-income inequality.[10] The top marginal tax rate is negatively associated with top-income inequality measures. This result supports the literature identifying taxation as a key determinant of income concentration at the top (Huber et al., 2019; Neal, 2013; Roine, 2009), according to which higher marginal tax rates are associated with lower top-income shares and reduced income concentration at the upper end of the distribution. In the regression with the Top 0.1% income share as the dependent variable, the marginal tax rate is not statistically significant at conventional levels. This result is consistent with Alstadsæter et al. (2019), who argue that elevated levels of tax evasion among top-income individuals weaken the effective progressivity of tax systems, thereby attenuating the observable impact of marginal tax rates.

Economic performance is positively associated with top-income inequality measures.[11] The effect is statistically significant at conventional levels only in the regressions where the dependent variable corresponds to the Top 1%, Top 5% and Top 10% income shares. These findings support the "superstar" theory (Rosen, 1981) and the related literature on skill-biased returns in expanding markets (Acemoglu and Autor, 2011; Kaplan and Rauh, 2013), according to which stronger economic growth, by increasing market size and aggregate demand, amplifies income concentration at the top of the distribution through disproportionate gains accruing to individuals with higher marginal productivity.

Top-income inequality measures decline with government expenditure. This result supports the literature on the redistributive role of fiscal policy (Hager, 2020; Neal, 2013; Sidek, 2021), according to which public spending reduces income concentration at the top through the provision of public goods such as healthcare, education and infrastructure, redistributive transfers to households - particularly benefiting lower-income groups - and public sector employment, with the magnitude of these effects depending on the composition and scale of expenditure.

Financialization is negatively associated with top-income inequality measures. However, its effect appears to be limited, being statistically significant at conventional

[10] According to Cardoso and Branco (2018), the request for financial assistance from the EC, the ECB, and the IMF, known as the Troika, constituted an opportunity to advance structural reforms, particularly in the direction of labour market liberalisation.

[11] The positive relationship between economic performance and top income inequality measures is robust to the use of GDP growth (annual %) as an alternative indicator. Results are available upon request.

levels only in the regressions where the dependent variable corresponds to the Top 1% and Top 5% income shares[12]. This result is partially consistent with the literature suggesting that financial development may reduce inequality by relaxing credit constraints and improving access to financial services, thereby supporting household consumption and entrepreneurial activity (Claessens and Perrotti, 2007; Beck et al., 2014).

Lastly, trade openness contributes to a reduction in top-income inequality measures. This result supports the strand of the literature emphasizing heterogeneous effects of trade across countries (Hernández Martínez et al., 2026; Jaumotte et al., 2013), according to which greater trade integration may reduce income concentration at the top in economies specialised in less skill-intensive and lower value-added sectors. In this context, Portugal's accession to the European Community in 1986 and its subsequent integration into the European Single Market in 1993 may have contributed to a compression of the income distribution by reinforcing competitive pressures and deepening economic integration, particularly given its productive structure and specialisation patterns (Alcobia et al., 2025).

With regard to the short-term estimates, three main conclusions can be drawn. First, in all ARDL models, the error correction term is statistically significant at conventional significance levels, with coefficients ranging between 0 and -2. This indicates that all six ARDL models converge toward the long-run equilibrium, despite the presence of potential short-term shocks. The adjustment speed for any short-term disturbance is automatically corrected within one year by approximately 132%, 133%, 138%, 138%, 94%, and 123% for the Top 1%, Top 5%, Top 10%, Top 0.1%, Bottom 50%, and P90/P50, respectively. Second, the Portuguese top-income inequality measures exhibit a high degree of persistence, as the lagged values of the Top 1%, Top 5%, Top 10%, and P90/P50 positively affect their contemporaneous values. Given the persistent upward trajectory of top-income inequality in Portugal, decisive public policy action is increasingly required to address its economic and social consequences, particularly to preserve social cohesion, enhance equity, and promote a more inclusive and balanced path of economic development. Finally, the majority of our variables exert consistent effects on top-income inequality measures in Portugal across both the short and long run, with union density constituting the sole exception.

[12] The limited impact of financialization on top income inequality measures is robust to the use of alternative proxies, such as credit to the private sector (as a percentage of GDP). Results are available upon request.

We proceed to examine the economic impacts of the statistically significant variables in our long-run regressions, in order to quantify the main factors that have most influenced top-income inequality measures in Portugal since the 1980s (Table 8).

Accordingly, we find that variables associated with PRT, namely union density and labour market flexibility, were the main drivers of the increase in top-income inequality measures in Portugal over the period 1980–2023. The decline in union density had a more pronounced effect than labour market flexibility across the different top-income inequality measures. In particular, the reduction in union density contributed to an average annual increase (decrease) of approximately 0.3%, 0.3%, 0.2%, 0.2%, −0.7%, and 4.5% for the Top 1%, Top 5%, Top 10%, Top 0.1%, Bottom 50%, and P90/P50, respectively, over the period under analysis. In the case of labour market flexibilization, this contributed to an average annual increase (decrease) of approximately 0.1%, 0.2%, 0.3%, −0.1%, and 2.0% for the Top 1%, Top 5%, Top 10%, %, Bottom 50%, and P90/P50, respectively, over the period under analysis.

Additionally, economic performance also constituted an important factor in increasing top-income inequality measures in Portugal, contributing to an average annual increase of approximately 0.1%, 0.3%, and 0.3% for the Top 1%, Top 5%, Top 10%, respectively, over the period under analysis, while not exerting a significant impact on the remaining indicators.

Despite being statistically significant at conventional levels, the economic effect of the top marginal tax rate is approximately negligible in Portugal. This finding is consistent with Alvaredo (2009), who argues that in the post-1989 period, top marginal tax rates remained relatively stable while top-income shares nonetheless increased substantially, suggesting a weakening link between this indicator and the evolution of top-incomes.

By contrast, financialization, and particularly government consumption and trade openness, contributed to a reduction in top-income inequality measures in Portugal.

Table 7 – Long-term and short-term estimates

Long-term Estimates						
Variable	**Top 1%**	**Top 5%**	**Top 10%**	**Top 0.1%**	**Bottom 50%**	**P90/P50**
Constant	0.190*** (0.022) [8.699]	0.377*** (0.017) [21.546]	0.505*** (0.018) [27.960]	0.076*** (0.010) [7.581]	-0.056 (0.038) [-1.480]	4.026*** (0.470) [8.564]
Union Density$_t$	-0.093*** (0.020) [-4.581]	-0.084*** (0.016) [-5.143]	-0.061*** (0.019) [-3.212]	-0.065*** (0.013) [-4.841]	0.216*** (0.045) [4.838]	-1.318*** (0.361) [-3.654]
Labour Market Flexibilization$_t$	0.066*** (0.016) [4.072]	0.138*** (0.014) [9.909]	0.199*** (0.013) [14.965]	0.028*** (0.007) [4.008]	-0.080** (0.033) [-2.354]	1.555*** (0.259) [6.006]
Top Marginal Tax$_t$	-0.019* (0.011) [-1.798]	-0.052*** (0.009) [-5.731]	-0.068*** (0.009) [-7.331]	0.006 (0.007) [0.780]	-0.019 (0.027) [-0.724]	-0.386** (0.147) [-2.627]
Economic Performance$_t$	0.079** (0.034) [2.332]	0.164*** (0.026) [6.285]	0.189*** (0.030) [6.370]	0.028 (0.017) [1.633]	0.053 (0.062) [0.859]	0.234 (0.460) [0.508]
Government Consumption$_t$	-0.220** (0.078) [-2.804]	-0.345*** (0.068) [-5.044]	-0.461*** (0.067) [-6.845]	-0.135*** (0.034) [-3.944]	0.675*** (0.160) [4.219]	-7.544*** (1.570) [-4.806]
Financialization$_t$	-0.144** (0.061) [-2.353]	-0.088** (0.039) [-2.261]	0.016 (0.043) [0.381]	-0.044 (0.029) [-1.503]	0.034 (0.126) [0.273]	0.612 (0.979) [0.625]
Trade Openness$_t$	-0.071*** (0.016) [-4.517]	-0.158*** (0.012) [-13.395]	-0.218*** (0.011) [-20.234]	-0.037*** (0.010) [-3.613]	0.248*** (0.027) [9.109]	-2.404*** (0.302) [-7.960]
Short-term Estimates						
Variable	**Top 1%**	**Top 5%**	**Top 10%**	**Top 0.1%**	**Bottom 50%**	**P90/P50**
Error Correction Term$_t$	-1.316*** (0.118) [-11.189]	-1.332*** (0.108) [-12.301]	-1.376*** (0.106) [-13.029]	-1.383*** (0.124) [-11.149]	-0.938*** (0.094) [-9.993]	-1.231*** (0.115) [-10.700]
ΔTop Income Inequality Measures$_t$	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
ΔTop Income Inequality Measures$_{t-1}$	0.228** (0.096) [2.383]	0.255*** (0.060) [4.268]	0.178*** (0.051) [3.468]	n.a.	n.a.	0.117* (0.060) [1.967]
ΔTop Income Inequality Measures$_{t-2}$	n.a.	n.a.	n.a.	n.a.	n.a.	-0.139** (0.060) [-2.329]
ΔUnion Density$_t$	0.168*** (0.036) [4.701]	0.496*** (0.048) [10.329]	0.582*** (0.052) [11.280]	-0.005 (0.015) [-0.317]	-0.196*** (0.050) [-3.951]	3.909*** (0.480) [8.137]
ΔUnion Density$_{t-1}$	n.a.	0.233*** (0.057) [4.095]	0.339** (0.068) [5.019]	n.a.	-0.134** (0.050) [-2.687]	2.274*** (0.575) [3.954]
ΔUnion Density$_{t-2}$	n.a.	n.a.	n.a.	n.a.	0.127** (0.046) [2.738]	n.a.
ΔLabour Market Flexibilization$_t$	0.065*** (0.018) [3.699]	0.077*** (0.019) [4.085]	0.085*** (0.021) [3.993]	n.a.	0.006 (0.023) [0.261]	0.099 (0.184) [0.540]
ΔLabour Market Flexibilization$_{t-1}$	-0.019 (0.017) [-1.121]	-0.051** (0.019) [-2.717]	-0.087*** (0.021) [-4.083]	n.a.	-0.004 (0.023) [-0.159]	-0.610*** (0.199) [-3.064]
ΔLabour Market Flexibilization$_{t-2}$	0.042** (0.017) [2.564]	0.097*** (0.019) [5.204]	0.085*** (0.021) [4.030]	n.a.	-0.080*** (0.022) [-3.549]	0.579*** (0.189) [3.070]
ΔTop Marginal Rate$_t$	n.a.	n.a.	n.a.	-0.013*** (0.004) [-2.997]	0.012 (0.011) [1.072]	n.a.
ΔTop Marginal Rate$_{t-1}$	n.a.	n.a.	n.a.	-0.014*** (0.005) [-2.882]	n.a.	n.a.
ΔTop Marginal Rate$_{t-2}$	n.a.	n.a.	n.a.	-0.014*** (0.005) [-3.108]	n.a.	n.a.
ΔEconomic Performance$_t$	0.036** (0.014) [2.620]	0.080*** (0.016) [5.111]	0.105*** (0.018) [5.960]	0.001 (0.007) [0.108]	-0.058*** (0.017) [-3.370]	0.528*** (0.149) [3.547]
ΔEconomic Performance$_{t-1}$	-0.029** (0.013) [-2.208]	-0.028* (0.015) [-1.834]	-0.020 (0.017) [-1.142]	-0.022** (0.008) [-2.771]	-0.101*** (0.020) [-5.026]	0.706*** (0.171) [4.116]
ΔEconomic Performance$_{t-2}$	-0.063*** (0.011) [-5.723]	-0.064*** (0.013) [-4.928]	-0.050*** (0.015) [-3.387]	-0.025*** (0.006) [-4.361]	n.a.	n.a.
ΔGovernment Consumption$_t$	n.a.	n.a.	n.a.	n.a.	n.a.	-6.513*** (0.868) [-7.507]
ΔGovernment Consumption$_{t-1}$	n.a.	n.a.	n.a.	n.a.	n.a.	2.533*** (0.706) [3.586]
ΔGovernment Consumption$_{t-2}$	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
ΔFinancialization$_t$	-0.091 (0.060) [-1.527]	-0.039 (0.069) [-0.564]	0.100 (0.078) [1.280]	-0.046 (0.034) [-1.346]	-0.226** (0.084) [-2.684]	1.179* (0.666) [1.770]
ΔFinancialization$_{t-1}$	0.052 (0.065) [0.789]	-0.014 (0.078) [-0.175]	-0.057 (0.088) [-0.646]	0.031 (0.034) [0.909]	n.a.	-0.497 (0.733) [-0.678]
ΔFinancialization$_{t-2}$	-0.272*** (0.060) [-4.547]	-0.409*** (0.073) [-5.578]	-0.459*** (0.084) [-5.476]	-0.115*** (0.032) [-3.626]	n.a.	-2.529*** (0.771) [-3.281]
ΔTrade Openness$_t$	-0.058*** (0.011) [-5.300]	-0.114*** (0.012) [-9.488]	-0.148*** (0.014) [-10.787]	-0.018*** (0.005) [-3.549]	0.139*** (0.015) [9.025]	-1.263*** (0.142) [-8.863]
ΔTrade Openness$_{t-1}$	0.027*** (0.008) [3.414]	0.038*** (0.009) [4.198]	0.060*** (0.011) [5.619]	0.020*** (0.005) [4.283]	-0.068*** (0.014) [-4.721]	1.066*** (0.127) [8.411]
ΔTrade Openness$_{t-2}$	n.a.	n.a.	n.a.	n.a.	-0.030* (0.014) [-2.083]	0.275* (0.136) [2.025]
Observations	41	41	41	41	41	41
R-squared	0.873	0.930	0.937	0.855	0.855	0.931
Adjusted R-squared	0.813	0.892	0.903	0.793	0.786	0.880

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

Table 8 – Economic effects of the Portuguese top-income inequality measures

Period	Measure	Variable	Long-term Coefficient	Actual Cumulative Change	Economic Effect
Full period (1980–2023)	Top 1%	Union Density$_t$	-0.093	-0.034	0.003
		Labour Market Flexibilization$_t$	0.066	0.013	0.001
		Top Marginal Tax$_t$	-0.019	-0.007	0.000
		Economic Performance$_t$	0.079	0.018	0.001
		Government Consumption$_t$	-0.220	0.007	-0.002
		Financialization$_t$	-0.144	0.018	-0.003
		Trade Openness$_t$	-0.071	0.015	-0.001
	Top 5%	Union Density$_t$	-0.084	-0.034	0.003
		Labour Market Flexibilization$_t$	0.138	0.013	0.002
		Top Marginal Tax$_t$	-0.052	-0.007	0.000
		Economic Performance$_t$	0.164	0.018	0.003
		Government Consumption	-0.345	0.007	-0.002
		Financialization$_t$	-0.088	0.018	-0.002
		Trade Openness$_t$	-0.158	0.015	-0.002
	Top 10%	Union Density$_t$	-0.061	-0.034	0.002
		Labour Market Flexibilization$_t$	0.199	0.013	0.003
		Top Marginal Tax$_t$	-0.068	-0.007	0.000
		Economic Performance$_t$	0.189	0.018	0.003
		Government Consumption$_t$	-0.461	0.007	-0.003
		Trade Openness$_t$	-0.218	0.015	-0.003
	Top 0.1%	Union Density$_t$	-0.065	-0.034	0.002
		Labour Market Flexibilization$_t$	0.028	0.013	0.000
		Government Consumption$_t$	-0.135	0.007	-0.001
		Trade Openness$_t$	-0.037	0.015	-0.001
	Bottom 50%	Union Density$_t$	0.216	-0.034	-0.007
		Labour Market Flexibilization$_t$	-0.080	0.013	-0.001
		Government Consumption$_t$	0.675	0.007	0.005
		Trade Openness$_t$	0.248	0.015	0.004
	P90/P50	Union Density$_t$	-1.318	-0.034	0.045
		Labour Market Flexibilization$_t$	1.555	0.013	0.020
		Top Marginal Tax$_t$	-0.386	-0.007	0.003
		Government Consumption$_t$	-7.544	0.007	-0.053
		Trade Openness$_t$	-2.404	0.015	-0.036

Note: The long-term coefficient corresponds to the estimated coefficient, the actual cumulative change corresponds to the average of the annual growth rate of the corresponding variable during the respective period, and the economic effect is the multiplication of the long-term coefficient by the actual cumulative change

5. Conclusions and policy implications

This paper analyses the short- and long-term determinants of top income concentration in Portugal from 1980 to 2023, using six measures of post-tax income distribution within an ARDL framework. By focusing on a small EU economy characterised by persistently high levels of inequality, the study provides novel empirical evidence on how institutional, political, and economic factors shape the dynamics of top income shares.

Our findings highlight the central role of labour-market institutions, particularly trade union density and labour-market regulation, in explaining the evolution of inequality, with declining unionisation and increasing labour market flexibilisation contributing significantly to rising top-income concentration. These results strongly support the PRT perspective, according to which distributive outcomes reflect the balance of power between organised labour and capital (e.g. Huber et al., 2019; Stephens, 1979). Quantifying these effects, the decline in union density emerges as the single most

important driver of rising top income concentration, contributing to an average annual increase of 0.3 percentage points in the Top 1% income share over the period 1980–2023.

Moreover, government intervention, through top marginal income tax rates and government consumption, plays an important role in reducing inequality, highlighting the effectiveness of fiscal policy in offsetting market-driven disparities (e.g. Hager, 2020).

In addition, financialisation and trade openness exhibit more nuanced effects. Financial deepening is associated with lower top income shares in some specifications, suggesting that its impact in Portugal may differ from that observed in more financially developed economies. Similarly, trade openness exerts a negative effect on top income shares, consistent with the view that Portugal's specialisation in lower value-added sectors and its position within the EU single market have compressed rather than widened the upper tail of the distribution.

These findings carry several important policy implications for Portugal, as well as for other similar small open economies in Europe. First, reversing the decline in trade union density should be a politically relevant objective. While unionisation rates cannot be mandated directly, governments can create a more enabling environment for collective bargaining by strengthening sectoral bargaining frameworks, reducing legal obstacles to union organisation, and promoting social dialogue as a permanent feature of economic governance.

Second, labour market deregulation should be reconsidered. The successive waves of flexibilization implemented since the 1980s - including the easing of dismissal procedures, the expansion of fixed-term contracts, and the reduction of overtime premiums - have weakened workers' bargaining power without delivering the promised gains in employment and productivity. A more balanced approach, combining reasonable flexibility with adequate worker protections and robust collective bargaining, would better serve both equity and efficiency objectives.

Third, progressive taxation remains a powerful and underutilised instrument for curbing top income concentration, while the top marginal income tax rate in Portugal has declined substantially from the early 1980s. Our results suggest that restoring higher top rates could reduce top income shares while generating additional revenue for public investment and social spending. In the same vein, government consumption should be recognised as a distributive instrument, namely on health, education, infrastructure, and public sector employment, compresses the income distribution by providing universal services and setting wage norms that anchor private sector compensation.

Finally, the findings suggest that efforts to address inequality cannot rely solely on market-based mechanisms. The persistence of high inequality in Portugal, despite decades of economic integration and educational improvements underscores the deeply political nature of distributional outcomes. Effective policy responses must therefore address the underlying power asymmetries and institutional configurations that shape how the gains from economic growth are shared.

This study has several limitations that point to promising directions for future research. First, the analysis is necessarily aggregate and cannot capture within-group heterogeneity or the experiences of specific sectors or occupations. Second, a deeper analysis of the consequences of the fiscal consolidations performed in Portugal in the context of the Great Recession and the *Troika* intervention would be particularly valuable. Third, the focus on Portugal, while providing analytical depth, raises questions about the generalisability of the findings to other national contexts. Comparative research across Southern European countries, which share similar institutional legacies and have undergone parallel reform trajectories, would be particularly valuable.

Overall, this paper provides evidence that the rise of top income inequality in Portugal reflects a series of political and institutional choices, namely concerning the organisation of labour markets, the strength of collective bargaining, the progressivity of taxation, and the scope of public provision, that can and should be reconsidered. Addressing inequality is not only a matter of social justice but also a prerequisite for sustainable, inclusive, and politically stable economic development.

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Appendix

Table A1 – Variables, proxies, units and sources for our variables

Variable (acronym)	Proxy (units)	Source
Top 1% (T1)	Top 1% income share, post-tax national income (%)	World Inequality Database
Top 5% (T5)	Top 5% income share, post-tax national income (%)	World Inequality Database
Top 10% (T10)	Top 10% income share, post-tax national income (%)	World Inequality Database
Top 0.1% (T01)	Top 0.1% income share, post-tax national income (%)	World Inequality Database
Bottom 50 % (B50)	Bottom 50% income share, post-tax national income (%)	World Inequality Database
P90/P50	Post-tax income ratio of the 90th percentile to the 50th percentile (%)	World Inequality Database
Union Density (UD)	Unionised workers (% of total)	OECD/AIAS ICTWSS and Barradas (2024a)
Top Marginal Tax (TMT)	Top marginal income tax rate (%).	OECD and Alvaredo (2009)
Economic Performance (EP)	GDP per capita growth (annual %)	Pordata
Government Consumption (GC)	General government final consumption expenditure (% of GDP)	World Bank
Labour Market Regulation (LMR)	Composite index measuring the strictness of labour market regulations	Fraser Institute
Financialization (F)	Gross value added of financial, insurance and real estate activities (% of total)	INE
Trade Openness (TO)	Exports and imports of goods and services (% of GDP)	World Bank

Table A2 – Correlation matrix

	Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1)	**Top 1%**	1.000												
(2)	**Top 5%**	0.946	1.000											
(3)	**Top 10%**	0.907	0.992	1.000										
(4)	**Top 0.1%**	0.848	0.642	0.577	1.000									
(5)	**Bottom 50 %**	-0.719	-0.818	-0.827	-0.367	1.000								
(6)	**P90/P50**	0.865	0.960	0.968	0.509	-0.937	1.000							
(7)	**Union Density**	-0.694	-0.604	-0.573	-0.752	0.191	-0.423	1.000						
(8)	**Top Marginal Tax**	-0.855	-0.887	-0.860	-0.577	0.642	-0.802	0.633	1.000					
(9)	**Economic Perform.**	0.115	0.022	-0.011	0.188	-0.108	0.037	0.122	-0.025	1.000				
(10)	**Gov. Consumption**	0.651	0.705	0.720	0.489	-0.295	0.572	-0.801	-0.714	-0.350	1.000			
(11)	**Labour Market Reg.**	0.345	0.276	0.284	0.509	0.162	0.099	-0.810	-0.215	-0.254	0.715	1.000		
(12)	**Financialization**	0.386	0.327	0.325	0.514	0.071	0.159	-0.902	-0.351	-0.311	0.750	0.899	1.000	
(13)	**Trade openness**	0.158	-0.010	-0.040	0.488	0.336	-0.184	-0.698	-0.001	0.050	0.284	0.778	0.775	1.000

Table A3 – The variance inflation factors

top-income inequality measures	Variable	R^2	Tolerance Value	Variance Inflation Factor
Top 1%	**Union Density**	0.973	0.027	12.110
	Top Marginal Tax	0.919	0.081	14.670
	Economic Performance	0.480	0.520	18.980
	Government Consumption	0.955	0.045	12.790
	Labour Market Regulation	0.943	0.057	13.750
	Financialization	0.960	0.040	13.130
	Trade Openness	0.973	0.027	12.110
Top 5%	**Union Density**	0.965	0.035	11.970
	Top Marginal Tax	0.923	0.077	12.680
	Economic Performance	0.480	0.520	17.050
	Government Consumption	0.954	0.046	11.070
	Labour Market Regulation	0.942	0.058	12.020
	Financialization	0.954	0.046	12.240
	Trade Openness	0.965	0.035	11.970
Top 10%	**Union Density**	0.962	0.038	11.740
	Top Marginal Tax	0.922	0.078	11.730
	Economic Performance	0.484	0.516	16.370
	Government Consumption	0.954	0.046	10.470
	Labour Market Regulation	0.942	0.058	11.340
	Financialization	0.951	0.049	11.850
	Trade Openness	0.962	0.038	11.740
Top 0.1%	**Union Density**	0.974	0.026	11.580
	Top Marginal Tax	0.912	0.088	13.210
	Economic Performance	0.482	0.518	18.280
	Government Consumption	0.957	0.043	12.000
	Labour Market Regulation	0.944	0.056	13.050
	Financialization	0.957	0.043	12.840
	Trade Openness	0.974	0.026	11.580
Bottom 50%	**Union Density**	0.963	0.037	11.210
	Top Marginal Tax	0.915	0.085	10.960
	Economic Performance	0.479	0.521	15.880
	Government Consumption	0.955	0,045	9.710

	Labour Market Regulation	0.940	0.060	10.910
	Financialization	0.950	0.050	11.420
	Trade Openness	0.963	0.037	11.210
P90/P50	**Union Density**	0.962	0.038	11.350
	Top Marginal Tax	0.918	0.082	11.260
	Economic Performance	0.479	0.521	15.880
	Government Consumption	0.954	0.046	10.000
	Labour Market Regulation	0.941	0.059	11.000
	Financialization	0.951	0.049	11.530
	Trade Openness	0.962	0.038	11.350