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FINANCIALISATION, INDEBTED WORKERS AND LABOUR DISCIPLINE: EMPIRICAL EVIDENCE ON REDUCED STRIKE ACTIVITY IN THE EUROPEAN UNION COUNTRIES¹

Ricardo Barradas²

ABSTRACT

Workers are being denoted by higher resignation and conformism and lesser claimant behaviour due to their lesser engagement in strikes, which indeliberately accepts the significant deterioration of labour conditions, a loss of labour rights and an increase in labour exploitation all over the world in the last five decades. Our argument to explain this puzzling paradox of worsening labour conditions yet less strike activity emphasises that as a result of their more financially fragile position, indebted workers evidence a more self-disciplined attitude and risk-averse behaviour in their workplaces, especially in more liberalised and deregulated labour markets, in order to retain their jobs (and income) and honour their financial obligations, which then constrains their claims for higher wages and better labour conditions through engagement in strikes. This study assesses the influence of worker indebtedness on strike activity by performing a panel data econometric analysis from 1995 to 2022 that is focused on the European Union countries. Our results confirm that worker indebtedness negatively impacts strike activity in the European Union countries. Our results also show that this negative impact is stronger in the European Union countries with the highest levels of worker indebtedness. Our results corroborate that the growth in worker indebtedness is even one of the main drivers behind the decline of strike activity in the European Union countries since the mid-1990s.

KEYWORDS

Financialisation, Labour Discipline, Strike Activity, European Union, Panel Data, Fixed Effects Two-Stage Least Squares

JEL CLASSIFICATION

C23, J21 and J52 and J81

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1. INTRODUCTION

Industrial action through labour conflict, labour unrest, protests, picketing, lockouts, stoppages and/or strikes has historically been one of the fundamental means available to workers and their organisations to solve labour disputes and promote their economic and social interests, namely through higher wages and better labour conditions (Chan, 2023; Gouzoulis, 2023). Nonetheless, in the last five decades, workers have been denoted by higher resignation and conformism and lesser claimant behaviour due to their lesser engagement in strikes (Godard, 2011; Kelly, 2015), which unintentionally allows the significant deterioration of labour conditions, a loss of labour rights and an increase in labour exploitation all over the world (Korpi and Shalev, 1979; Gouzoulis, 2023; Barradas, 2024a; Feres *et al.*, 2024).

This paradox of worsening labour conditions yet less strike activity, typically known as ‘labour quiescence’ (Shalev, 1992), is somewhat puzzling in the field of labour relations. Our argument asserts that indebted workers, due to their more financially fragile position, evidence a more self-disciplined attitude and risk-averse behaviour in their workplaces, especially in more liberalised and deregulated labour markets, that hampers their requests for higher wages and better labour conditions by engagement in strikes in order to retain their jobs (and income) and honour their financial obligations (Godard, 2011; Kelly, 2015; Wood, 2017; Gouzoulis, 2023; Barradas, 2024a).

This study analysed the effect of workers’ indebtedness on strike activity by performing a panel data econometric analysis from 1995 to 2022 that was focused on the European Union (EU) countries. This paper extends the existing literature on this matter by offering at least five novelties. First, this paper identifies the determinants of strike activity in the EU countries, paying particular attention to the expected negative effect caused by worker indebtedness, for which the empirical evidence is limited (Gouzoulis, 2023; Barradas, 2024a). Second, this paper is centred on the EU countries, for which empirical evidence is lacking. The EU countries are an interesting case study because worker indebtedness has denoted a strong increase and strike activity has significantly decreased since the mid-1990s, particularly up to the Great Recession (Figure 1 and Figure 2). This seems to suggest that these two stylised facts could be strongly interrelated. By combining a strong process of liberalisation, deregulation, and privatisation of the financial system – which fueled the rise in worker indebtedness – with notable flexibilisation and deregulation of labour relations – which constrained workers’ claims – the EU countries provide an interesting case study of how financialisation can reduce workers’ willingness to engage in strikes. Third, a panel data econometric analysis was conducted in the study, which provides several advantages vis-à-vis a cross-sectional econometric analysis and/or time series econometric analysis due to the possibility of collecting more observations and larger samples with higher heterogeneity and less collinearity, thereby favouring more

consistent and efficient estimates (Brooks, 2009). Note that the only two existing empirical works about the relationship between worker indebtedness and strike activity performed time series econometric analysis (Gouzoulis, 2023; Barradas, 2024a) by offering a limited capacity of generalisation to other countries or regions because each one has its own idiosyncrasies. Fourth, this study incorporated a higher sample variability, namely by including different EU countries along with periods of a general increasing trend or periods of a general decreasing trend of worker indebtedness (Figure 1). As argued by Wooldridge (2019), the use of samples with higher variability also implies obtaining more consistent and efficient estimates. Fifth, this paper aims to identify not only the determinants of strike activity but also the respective drivers (McCloskey and Ziliak, 1996; Ziliak and McCloskey, 2004).

Our estimates confirm that worker indebtedness negatively influences strike activity in the EU countries. Our results also show that this negative influence is stronger in the EU countries with the highest levels of worker indebtedness. Our estimates also corroborate that the rise in worker indebtedness has even been one of the main drivers behind the decline in strike activity in the EU countries since the mid-1990s.

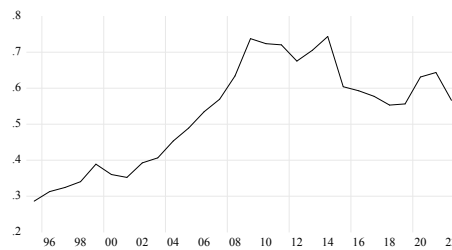
The remainder of this paper is organised as follows. In Section 2, we analyse the dynamics of worker indebtedness and strike activity in EU countries since the mid-1990s, driven by financialisation and the flexibilisation and deregulation of labour relations. Section 3 reviews the theoretical and empirical literature on strike activity in the era of financialisation and outlines the regression model along with the hypotheses. The dataset and the econometric method are described in Section 4. Section 5 displays the results and the discussion. Finally, Section 6 provides conclusions.

2. FINANCIALISATION, WORKER INDEBTEDNESS AND STRIKE ACTIVITY IN THE EUROPEAN UNION COUNTRIES

The EU countries, like the majority of countries all over the world, has been employing a strong process of liberalisation, deregulation and privatisation of the financial system as an excuse to restrain financial repression, to support financial development, to sustain liquidity towards the real sectors and to boost economic growth (Barradas, 2020, 2022a; Gouzoulis *et al.*, 2024). As a consequence, the EU financial system has displayed strong growth and a general increasing dominance over the real economic and everyday life of workers (Van der Zwan, 2014), a phenomenon that is typically invoked as financialisation, which is visible through the higher and stronger involvement of workers, including those with low income and low wealth, in the realm of the financial system (Van der Zwan, 2014; Gonçalves and Barradas, 2021).

The vast majority of the EU countries have developed ‘bank-based’ financial systems, where banks play a dominant role, serving as the main agents of financialisation, particularly concerning the general workers, credit provision and debt levels (Barradas, 2019). As a result, worker indebtedness has evidenced a steep increase in the EU countries since the mid-1990s to unprecedented and unsustainable levels (Figure 1), even reaching historical maximum levels, particularly up to the Great Recession (Barradas and Tomás, 2023; Romão and Barradas, 2024). European integration, particularly the monetary union, reinforced this pattern by providing access to large amounts of external financing at low interest rates, due to the elimination of the exchange rate risk premium and improved access to EU financial markets. National banks could diversify their funding sources by borrowing from the euro interbank market, the bond market, or the European Central Bank (Gouzoulis *et al.*, 2024), which led to a greater availability of credit, a deterioration in creditworthiness standards and a reduction in collateral requirements, even for low-income and low-wealth workers (Stockhammer, 2009 and Hein, 2012).

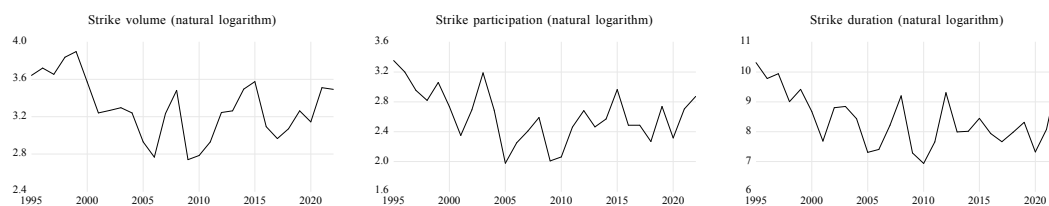
Figure 1 – Worker indebtedness in the EU countries (% of GDP, unweighted averages)



Source: International Monetary Fund (IMF)

Similarly, strike activity in EU countries has registered a relative reduction, particularly up to the Great Recession, which corresponds to the period when worker indebtedness exhibited the highest growth (Figure 1 and Figure 2). This seems to confirm our argument about the existence of a negative relationship between worker indebtedness and strike activity due to its disciplinary effects, particularly in more liberalised and deregulated labour markets, as observed in EU countries.

Figure 2 – Strike activity in the EU countries (unweighted averages)



Source: International Labour Organisation (ILO) and European Trade Union Institute (ETUI)

Indeed, the flexibilization and deregulation of labour relations have been at the heart of European integration, particularly through the adoption of wage restraint policies based on internal devaluation in most EU countries to maintain external competitiveness and a sustainable growth pattern, especially in less export-oriented countries such as those in the southern ones (Barradas, 2024a), due to the lack of alternative policies. The monetary union prevents the use of commercial, industrial, monetary and exchange rate policies, and imposes strong control over government balances, as well as the use of budgetary and fiscal policies, implying that wage restraint policies are the only viable solution.

The flexibilisation and deregulation of labour relations was even more pronounced in the countries that sought international financial assistance in the last decade, particularly in the southern ones, as international organizations (the International Monetary Fund, the European Commission, and the European Central Bank) imposed the implementation of aggressive supply-side-oriented economic adjustment programmes and severe austerity measures strongly supported by internal devaluation (Barradas and Tomás, 2023; Gouzoulis *et al.*, 2024).

3. THEORETICAL AND EMPIRICAL LITERATURE ON STRIKE ACTIVITY IN THE ERA OF FINANCIALISATION

Our argument ascertains that indebted workers are in a more financially fragile position, which then reveals a more self-disciplined attitude and risk-averse behaviour in the workplace, especially in more liberalised and deregulated labour markets, that inhibits demands for higher wages and better labour conditions by lessening worker involvement in strikes. This is the so-called ‘labour quiescence’ (Shalev, 1992). This results from at least four different channels, namely the fear of losing their jobs (and income) and the risk of default (Langley, 2007; Stockhammer, 2009; Lazzarato, 2012; Sweet, 2018); the need to preserve their jobs and maintain a steady flow of income until they repay their existing debts, thereby avoiding a potential default (Gouzoulis, 2023); self-protection from the social stigma that may arise in cases of personal default, as this is typically associated with personal failure and reflects a perceived incompetence in managing one’s finances (Wood, 2017); and the avoidance of short-term income loss, even in instances where trade unions provide some strike pay, due to the time lag between the strike day and the receipt of reimbursement, as well as the high risk of being permanently replaced or dismissed in the medium to long term (Stelzner, 2017; Gourevitch, 2018; Grady and Simms, 2019; Gouzoulis, 2023).

As a consequence, indebted workers, by reducing their strike activity, have not effectively contested and have inadvertently accepted the significant deterioration of labour

relations, the loss of certain labour rights, and the increase in labour exploitation that has been observed worldwide over the last five decades (Feres *et al.*, 2024). This seems to suggest that worker indebtedness cannot be dissociated from the drop in the labour income share and stagnant (or falling) wages (Barradas, 2019; Alcobia and Barradas, 2023); the rise of top management compensation vis-à-vis the working class and blue-collar workers and the widening of personal income inequalities (Barradas and Lakhani, 2024; Barradas, 2024b); the proliferation of atypical work and the prevalence of nonstandard labour contracts (Chan, 2023; Gouzoulis *et al.*, 2023a; Feres *et al.*, 2024); the increase in job insecurity, instability, insufficient social protection, precariousness, higher flexibility, scarcer incentives and lower-paid jobs (Tridico and Pariboni, 2018); the surge of emotional abuse and/or other threats in the workplace (Buttigieg *et al.*, 2011); the deterioration in work–life balance and the intensification of work pressure (Ayudhya *et al.*, 2019); and the spread of informal work and non-contract workers (Chan, 2023).

The theoretical and empirical literature has already evidenced that worker indebtedness has been definitively contributing to the decline in the labour income share (Wood, 2017; Kohler *et al.*, 2019; Gouzoulis, 2021, 2022; Gouzoulis *et al.*, 2023b), the fall of organised labour and the decrease in the unionisation rate (Gouzoulis, 2024), the rise in atypical work and the proliferation of non-standard labour contracts (Gouzoulis *et al.*, 2023a), and the reduction in strike activity (Gouzoulis, 2023; Barradas, 2024a).

In order to assess the determinants of strike activity in EU countries, we apply a regression model by including worker indebtedness and other control variables. Control variables were chosen to avoid the problem of omitted relevant variables and to obtain more consistent and efficient estimates (Brooks, 2009) by taking into account the traditional explanations identified in the literature for the decline in strike activity in the last five decades, namely the deceleration of economic activity (Kaufman, 1982; Tracy, 1986; McConnell, 1990; Goerke and Madsen, 2004), the disinflationary process (Gouzoulis, 2023), deindustrialisation and the reduction in industrial work (Bell, 1973; Troy, 1990), the retrenchment of the welfare states and the decrease in public servants and public work (Piazza, 2005; Gouzoulis, 2023; Romão and Barradas, 2024), globalisation and the increase in trade openness (Piazza, 2005; Brandl and Traxler, 2010; Tuman, 2019) and the decrease in unionisation rates and the deterioration in general workers' bargaining power (Kaufman, 1982, 1983; Gouzoulis, 2023).

Strike activity should be positively affected by macroeconomic performance because of its procyclical behaviour (Kaufman, 1982; Tracy, 1986; McConnell, 1990; Harrison and Stewart, 1994; Goerke and Madsen, 2004). During economic expansions, the unemployment rate tends to decline, which induces workers to engage in strikes to demand higher wages to maintain their purchasing power due to the increase in inflationary pressures.

The inflation rate should also exert a positive influence on strike activity, primarily because a rising inflation rate encourages workers to engage in strikes to demand higher wages in order to not lose their purchasing power (Gouzoulis, 2023).

Strike activity should also positively depend on industrial work and public work, particularly due to the fact that workers in the manufacturing industries and workers in the public sector tend to be more strike prone vis-à-vis workers in the nonmanufacturing industries and workers in the private sector and those that are unemployed, respectively (Bell, 1973; Troy, 1990; Gouzoulis, 2023).

It was expected that the degree of globalisation would negatively impact strike activity because multinational, transnational and the so-called ‘nomadic’ corporations threaten to offshore and/or relocate production to low-wage countries, which discourages workers from participating in strikes in order to preserve their jobs (and income) despite a deterioration in their labour conditions (Piazza, 2005; Brandl and Traxler, 2010; Hein, 2012; Tuman, 2019).

Finally, the unionisation rate should also exert a positive effect on strike activity due to a higher capacity for workers’ organisation and workers’ mobilisation and the increase in workers’ bargaining power (Kaufman, 1982, 1983; Gouzoulis, 2023) because the right to call a strike is primarily reserved for trade unions in several EU countries.

Our regression model follows a macroeconomic approach that implicitly takes the assumption of the existence of a representative worker in the EU countries whose behaviour does not change across time and space. This macroeconomic approach introduces at least two important shortcomings in our empirical work (Correia and Barradas, 2021; Barradas, 2023). First, we cannot address whether the determinants of strike activity in the EU countries vary according to the workers’ own characteristics. Second, we cannot address whether the determinants of strike activity in the EU countries vary according to the corporations, sectors, industries, regions and/or countries in which workers’ jobs are located. Nevertheless, this macroeconomic approach entails at least four distinct advantages that potentially compensate for the two shortcomings (Correia and Barradas, 2021; Barradas, 2023; Gouzoulis, 2023), namely the possibility of addressing the determinants of strike activity in the EU countries as a whole by looking beyond the idiosyncrasies of each worker in each corporation, sector, industry, region or country; the analysis of the determinants of strike activity in the EU countries covering the longest period possible, which paves the ground for microeconomic approaches at the worker level, corporate level, sector level, industry level, regional level and country level; the assessment of the determinants of strike activity in the EU countries by taking into account that the majority of them will implicitly have the predicted microeconomic influences; and the examination of the determinants of strike activity in the EU countries by relying on some economic and social transformations (e.g., deindustrialisation, the retrenchment

of the welfare states and/or the globalisation) that cannot be taken into account by performing microeconomic approaches.

4. DATASET AND ECONOMETRIC METHOD

Our dataset was composed of annual data for all EU countries from 1995 to 2022, which constituted a panel dataset with a total of 26 cross-sectional units (countries) observed over 28 years³. This represents the period and periodicity for which all data were available.

Our dataset was structured in an unbalanced panel because not all variables were available for all countries in all years of our sample, especially the ones related to strike activity. As argued by Dribbusch and Vandaele (2016), there are considerable gaps in the data related to strike activity in the EU because there are countries that do not collect such data at all or at least not on a regular basis and there are countries that only release such data with an extensive delay. Our unbalanced panel was composed of 441 observations, with 287 missing. Table A1 in the Appendix displays the structure and composition of our unbalanced panel.

Table 1 synthetises the definitions, units and sources for all variables and Table A2 in the Appendix provides the descriptive statistics for each variable.

Table 1 – Variables, proxies, units and sources for all variables⁴

Variable	Proxy and Unit	Source
Strike Volume	Strikes per year (natural logarithm)	ILO and ETUI
Strike Participation	Workers involved in strikes per year (natural logarithm)	ILO and ETUI
Strike Duration	Working days not worked due to strikes (natural logarithm)	ILO and ETUI
Worker Indebtedness	Household debt, loans and debt securities (% of GDP)	IMF
Macroeconomic Performance	GDP growth (annual %)	World Bank
Inflation Rate	Inflation, GDP deflator (annual %)	World Bank
Industrial Work	Employment in industry (% of total)	World Bank
Public Work	Compensation of employees (% of total public expenses)	World Bank
Degree of Globalisation	Trade (% of GDP)	World Bank
Unionisation Rate	Trade union density (%)	OECD/AIAS ICTWSS and Barradas (2019)

Table A3 in the Appendix includes the recent Karavias and Tzavalis (2014) panel unit root test for each variable⁵. Results confirmed that we had a mixture of variables that are

³ Croatia was not included in our panel data set due to the unavailability of data, particularly with regard to strike activity. Croatia is one of a small group of countries in the EU that does not maintain a national statistical account of strikes (Dribbusch and Vandaele, 2016).

⁴ Data for the variables of strike activity for Bulgaria, Luxembourg and Slovenia were collected from the database provided by the ETUI due to their unavailability on the ILO database. As the variables of strike activity were measured by applying the natural logarithms, we had previously added a constant of one in all of the natural logarithms because for some countries in some years there was no occurrence of any strikes. Given the absence of a database with data available on public servants, we used the compensation of employees as a percentage of the total public expenses to measure public work (Kollmeyer and Peters, 2019).

⁵ This panel unit root test was carried out in the Stata software by relying on the 'xtbunitroot' command developed by Chen *et al.* (2022).

stationary in levels and variables that are stationary in the first differences. Strike volume, strike participation, strike duration, worker indebtedness, macroeconomic performance, inflation rate, industrial work and unionisation rate are stationary in levels, whilst public work and the degree of globalisation are stationary only in the first differences.

Our econometric method encompassed the implementation of the fixed effects two-stage least squares (FE2SLS) estimator, which allows to produce reliable estimates in terms of consistency and efficiency and to take into account the heterogeneity across the EU countries and to overcome the potential problems of endogeneity (Greene, 2017; Wooldridge, 2019), namely the possible existence of simultaneity (and/or reverse causation) between our variables, the hypothetical existence of measurement errors in the proxies chosen for our variables and the potential omission of other important determinants of strike activity in the EU countries.

The suitability of our estimates and the validity of our instrumental variables were assessed by applying the Sargan test, which validates the overidentifying restrictions in a certain statistical model (Sargan, 1958, 1975). We used the first lag and the second lag of each variable as our set of instrumental variables. The choice of a relatively small set of instrumental variables allows more efficient estimates to be obtained (Ravenna and Walsh, 2006) and increases the power of the Sargan test (Mavroeidis, 2009).

As the FE2SLS requires that all variables should be stationary in levels, we used the first differences of the variables pertaining to the public work and the degree of globalisation because they were stationary only in the first differences. The remaining variables were used directly in levels because they were stationary in levels. We included time dummies to account for the specific features of each year in the evolution of strike activity in the EU countries and to minimise the possible existence of structural breaks.

As robustness and heterogeneous analyses, we performed a jackknife analysis that re-estimated our model by excluding one country at a time (Quenouille, 1949, 1956; Tukey, 1958), and we also re-estimated our model with a focus on only the EU countries with the highest levels of worker indebtedness. This allowed us to assess the robustness of our estimates to resampling, to take advantage of the cross-sectional dimension of our panel dataset and to confirm whether the negative impact of worker indebtedness on strike activity is stronger for more indebted workers.

Finally, we assessed the economic effects of our statistically significant estimates to better identify the drivers of strike activity in the EU countries from 1995 to 2022 (McCloskey and Ziliak, 1996; Ziliak and McCloskey, 2004).

5. RESULTS AND DISCUSSION

Our estimates are presented and discussed throughout this Section⁶. Table 2 exhibits the estimates of strike activity for the EU countries. These estimates were produced by relying on three different models in a context in which each one used a different variable to capture the multidimensional nature of strike activity, namely strike volume, strike participation and strike duration. All of these estimates are reliable, and our instrumental variables are strongly accepted because we cannot reject the null hypothesis of the Sargan test that the overidentifying restrictions are valid (Sargan, 1958 and 1975). Given the high values for R-squared and adjusted R-squared, our estimates also describe expressively well the evolution of strike activity in the EU countries since the mid-1990s. Our estimates are quite robust primarily because they did not radically change in terms of statistical significance and signs of the coefficients when we used different variables as proxies to assess strike activity in the EU countries. In what follows, we interpret our estimates for each independent variable in more detail.

Table 2 – Estimates of strike activity for the EU countries

Variable	Strike Volume	Strike Participation	Strike Duration
Constant	1.584 (2.121) [0.747]	2.471 (2.551) [0.969]	7.888* (4.572) [1.725]
Worker Indebtedness_t	-1.961* (1.125) [-1.743]	-2.360* (1.395) [-1.692]	-4.260* (2.507) [-1.699]
Macroeconomic Performance_t	-15.662** (6.986) [-2.242]	-14.386* (8.816) [-1.632]	-42.216*** (15.574) [-2.711]
Inflation Rate_t	8.386 (6.460) [1.298]	5.090 (7.653) [0.665]	23.797* (13.757) [1.730]
Industrial Work_t	18.356*** (5.933) [3.094]	18.321*** (7.157) [2.560]	28.818** (12.993) [2.218]
ΔPublic Work_t	-2.807 (7.960) [-0.353]	3.294 (9.164) [0.359]	7.071 (17.099) [0.414]
ΔDegree of Globalisation_t	7.071* (3.667) [1.928]	8.711* (4.494) [1.939]	6.048 (8.238) [0.734]
Unionisation Rate_t	-4.722* (2.608) [-1.810]	-8.792*** (3.131) [-2.808]	-10.723* (5.620) [-1.908]
Observations	309	309	309
Years	25	25	25
Countries	26	26	26
Time effects	Yes	Yes	Yes
Sargan test (<i>p</i>-value)	0.101	0.206	0.848
R-squared	0.866	0.767	0.827
Adjusted R-Squared	0.836	0.715	0.788

Note: Standard errors in (), t-statistics in [], Δ is the operator of the first differences, *** indicates statistically significance at 1% level, ** indicates statistically significance at 5% level and * indicates statistically significance at 10% level. Coefficients, standard errors and t-statistics for the time dummies are not reported

We report strong evidence that worker indebtedness exerts a negative impact on strike volume, strike participation and strike duration in the EU countries. The negative impacts of

⁶ Our estimates were produced in the EViews software and in the Stata software by relying on the 'xtivreg' and 'xtivreg2' commands.

worker indebtedness on strike volume and strike participation do not change if we use household debt (all instruments) as a percentage of the gross domestic product instead of household debt (loans and debt securities) as a percentage of the gross domestic product (Table A4 in the appendix). This confirms our argument that due to a highly fragile financial position, indebted workers display a more self-disciplined attitude and risk-averse behaviour in the workplace in order to retain their jobs (and income) and honour their financial obligations, which then restricts their demand for higher wages and better labour conditions through their involvement in strikes (Godard, 2011; Kelly, 2015; Gouzoulis, 2023; Barradas, 2024a). Our results are in line with those reported by Gouzoulis (2023) for the specific cases of Japan, Korea, Sweden, the United Kingdom and the United States and reported by Barradas (2024a) for Portugal.

We also confirm a negative relationship between macroeconomic performance and strike volume, strike participation and strike duration in the EU countries. The negative relationships between macroeconomic performance and strike volume and strike duration do not change if we use the annual percentage growth rate of the real gross domestic product per capita instead of the annual percentage growth rate of the real gross domestic product (Table A4 in the Appendix). As found by Barradas (2024a), this counterintuitive result does not confirm that strike activity reveals a procyclical behaviour (Kaufman, 1982; Tracy, 1986; McConnell, 1990; Harrison and Stewart, 1994; Goerke and Madsen, 2004). Instead, our estimates show that strike activity exhibits a countercyclical behaviour in the EU countries, which could be related to the countercyclical behaviour of wages and their sluggish nature (Willis and Wroblewski, 2007). Barradas (2024a) also highlighted that the countercyclical behaviour of strike activity derives from the high costs faced by employers in firing and hiring workers and the existence of a risk-sharing compromise between employers and workers in the EU countries, particularly in the context of an intensification of the degree of globalisation, which implies that employers preserve wages and jobs during economic recessions and workers do not participate in strikes to request higher wages and better labour conditions during economic expansions.

We also find that the inflation rate exerts a positive effect on strike activity in the EU countries, especially in the case of strike duration. This result confirms that high inflation pressures incite workers to engage in longer lasting strikes to make a claim for higher wages to avoid loss of their purchasing power (Gouzoulis, 2023). Gouzoulis (2023) reported a positive relationship between the inflation rate and strike activity in Japan, Sweden, the United Kingdom and the United States. Nonetheless, the inflation rate lost its statistical significance for strike duration when we used the annual percentage growth rate of the consumer price index instead of the annual percentage growth rate of the gross domestic product deflator (Table A4 in the Appendix).

Another finding relates to industrial work, namely that it has a positive influence on strike volume, strike participation and strike duration in the EU countries. This result was expected and is similar to Gouzoulis' (2023) finding for Japan and Korea and Barradas' (2024a) finding for Portugal, thereby corroborating the theoretical claims that industrial workers have a more strike-prone stance vis-à-vis non-industrial workers and unemployed workers (Bell, 1973; Troy, 1990).

Public work has no effect on strike volume, strike participation or strike duration in the EU countries given the lack of statistical significance of its coefficients in all three models. This result is not too surprising since public work has remained relatively stable in the EU countries in the last few decades.

The degree of globalisation is a positive determinant of strike activity in the EU countries, especially with regard to strike volume and strike participation. The degree of globalisation remains a positive determinant of strike volume if we use imports as a percentage of the gross domestic product (i.e., the import penetration rate) and a positive determinant of strike participation if we use net outflows related to foreign direct investment as a percentage of gross domestic product, respectively, instead of the trade as a percentage of the gross domestic product (Table A4 in the Appendix). This unexpected result fails to confirm the theoretical belief that workers prefer to preserve their jobs (and incomes) instead of engaging in strikes to request higher wages and better labour conditions because they fear that their corporations will offshore and/or relocate to low-wage countries (Piazza, 2005; Brandl and Traxler, 2010; Hein, 2012; Tuman, 2019). Abouharb and Fordham (2020) suggested that there are at least three different reasons that could explain the positive impact of the degree of globalisation on strike activity in the EU countries. The first reason is concerned with the existence of several EU countries that are export-oriented. These countries tend to experience more strike activity due to an increasing demand for labour that strengthens the general workers' bargaining power. The second reason is also related to the existence of several EU countries that are relatively export-oriented and that have a greater union density, which favours more strikes due to market pressures that strengthen the ability of labour to mobilise. The third reason is linked with the uncertainty related to exposure to international markets that alters the bargaining power of labour and capital, which leads to miscalculations by both sides (capitalists and workers) and could boost the number of strikes. A positive relationship between the degree of globalisation and strike volume was also reported by Barradas (2024a) for Portugal.

Unionisation rate tends to have a negative effect on strike volume, strike participation and strike duration in the EU countries. This result is not in accordance with the theoretical predictions that higher unionisation rates are directly related to a higher capacity for workers' organisation and workers' mobilisation around the realisation of new strikes (Kaufman, 1982, 1983; Gouzoulis, 2023). This unexpected negative influence of unionisation rate on strike

activity could be attributable to the threat effect exerted by stronger unions around the mobilisation of workers to the realisation of new strikes that could be enough to win several disputes with employers even without the materialisation of those strikes (Gouzoulis, 2023). Gouzoulis (2023) found a similar result for Japan, Norway and the United States.

The application of the jackknife analysis (Quenouille, 1949, 1956; Tukey, 1958) confirms the robustness of all of our estimates because all variables do not change expressively in terms of statistical significance and signs of the coefficients in comparison to the estimates for strike volume, strike participation and strike duration for the EU countries (Table 6)⁷.

Table 3 demonstrates the estimates of strike activity for the EU countries with the highest levels of worker indebtedness (Cyprus, Denmark, Germany, Ireland, the Netherlands, Portugal, Spain and Sweden). The average of worker indebtedness in these countries is higher than the average of approximately 51.6 per cent for the EU countries (Table A2 in the Appendix).

Table 3 – Estimates of strike activity for the EU countries with the highest levels of worker indebtedness

Variable	Strike Volume	Strike Participation	Strike Duration
Constant	9.113*** (1.744) [5.224] -2.644***	10.412*** (3.564) [2.922] -1.778	18.688*** (4.702) [3.975] -6.192***
Worker Indebtedness_t	(0.832) [-3.179] -14.944**	(1.759) [-1.011] -29.897*	(2.323) [-2.666] -23.810
Macroeconomic Performance_t	(7.534) [-1.984] -22.257	(16.009) [-1.867] 30.663	(23.717) [-1.004] -29.941
Inflation Rate_t	(15.122) [-1.472] 1.113	(28.840) [1.063] -6.024	(42.970) [-0.697] 11.308
Industrial Work_t	(5.779) [0.193] 1.361	(11.802) [-0.510] -0.697	(15.830) [0.714] 21.480
ΔPublic Work_t	(6.593) [0.206] 5.504*	(12.117) [-0.057] 0.884	(16.726) [1.284] 9.178
ΔDegree of Globalisation_t	(3.204) [1.718] -5.602***	(6.911) [0.128] -11.004***	(9.177) [1.000] -11.493**
Unionisation Rate_t	(2.109) [-2.656]	(4.190) [-2.626]	(5.559) [-2.067]
Observations	164	164	164
Year	25	25	25
Countries	8	8	8
Time effects	Yes	Yes	Yes
Sargan test (<i>p-value</i>)	0.246	0.278	0.571
R-squared	0.917	0.652	0.630
Adjusted R-Squared	0.891	0.546	0.517

Note: Standard errors in (), t-statistics in [], Δ is the operator of the first differences, *** indicates statistically significance at 1% level, ** indicates statistically significance at 5% level and * indicates statistically significance at 10% level. Coefficients, standard errors and t-statistics for the time dummies are not reported

Overall, the results for these countries (Table 3) did not dramatically change in comparison to the results for the EU countries (Table 2). Macroeconomic performance and the unionisation rate continue to be statistically significant by exerting a negative impact on strike activity. The degree of globalisation also remains statistically significant as a positive

⁷ Estimates of the jackknife analysis are available upon request.

determinant of strike activity, and public work persists as a statistically insignificant variable to explain the behaviour of strike activity. The most important finding pertains to the variable of worker indebtedness, which remains statistically significant by negatively impacting strike activity and, especially, strike volume and strike duration. However, the negative effects of worker indebtedness on strike activity in the EU countries with the highest levels of worker indebtedness are greater than the negative effects of worker indebtedness on strike activity in the EU countries. This seems to suggest that the negative impact of worker indebtedness on strike activity is stronger for more indebted workers.

Table 4 comprises the economic effects of strike activity in the EU countries and Table 5 encompasses the economic effects of strike activity in the EU countries with the highest levels of worker indebtedness.

Table 4 – Economic effects of strike activity for the EU countries

Strike Activity	Variable	Estimated Coefficient	Actual Cumulative Change	Economic Effect
Strike Volume	Worker Indebtedness _t	-1.961	0.029	-0.057
	Macroeconomic Performance _t	-15.662	0.029	-0.454
	Industrial Work _t	18.356	-0.009	-0.165
	ΔDegree of Globalisation _t	7.071	0.021	0.148
	Unionisation Rate _t	-4.722	-0.025	0.118
Strike Participation	Worker Indebtedness _t	-2.360	0.029	-0.068
	Macroeconomic Performance _t	-14.386	0.029	-0.417
	Industrial Work _t	18.321	-0.009	-0.165
	ΔDegree of Globalisation _t	8.711	0.021	0.183
	Unionisation Rate _t	-8.792	-0.025	0.220
Strike Duration	Worker Indebtedness _t	-4.260	0.029	-0.124
	Macroeconomic Performance _t	-42.216	0.029	-1.224
	Inflation Rate _t	23.797	0.035	0.833
	Industrial Work _t	28.818	-0.009	-0.259
	Unionisation Rate _t	-10.723	-0.025	0.268

Note: The actual cumulative change corresponds to the average of the annual growth rates of the corresponding variable from 1995 to 2022 and the economic effect is the multiplication of the estimated coefficient by the actual cumulative change

Table 5 – Economic effects of strike activity for the EU countries with the highest levels of worker indebtedness

Strike Activity	Variable	Estimated Coefficient	Actual Cumulative Change	Economic Effect
Strike Volume	Worker Indebtedness _t	-2.644	0.012	-0.032
	Macroeconomic Performance _t	-14.944	0.024	-0.359
	ΔDegree of Globalisation _t	5.504	0.018	0.099
	Unionisation Rate _t	-5.602	-0.025	0.140
Strike Participation	Macroeconomic Performance _t	-29.897	0.024	-0.718
	Unionisation Rate _t	-11.004	-0.025	0.275
Strike Duration	Worker Indebtedness _t	-6.192	0.012	-0.074
	Unionisation Rate _t	-11.493	-0.025	0.287

Note: The actual cumulative change corresponds to the average of the annual growth rates of the corresponding variable from 1995 to 2022 and the economic effect is the multiplication of the estimated coefficient by the actual cumulative change

With regard to strike volume, we conclude that the main drivers behind the fall in the number of strikes realised per year in the EU countries from 1995 to 2022 were the acceleration of economic activity, the reduction in industrial work and the rise in worker indebtedness. During that time, the acceleration in economic activity of around 2.9 per cent on average per

year, the reduction in industrial work of around 0.9 per cent on average per year and the rise in worker indebtedness of around 2.9 per cent on average per year favoured a decline in strike volume in the EU countries of about 45.4 per cent, 16.5 per cent and 5.7 per cent on average per year, respectively. The acceleration of macroeconomic performance and the rise of worker indebtedness also represented the main drivers behind the decline of strike volume in the EU countries with the highest levels of worker indebtedness.

In relation to strike participation, we observe that the main causes behind the decrease in the number of workers involved in strikes per year in the EU countries from 1995 to 2022 were the acceleration of economic activity, the reduction in industrial work and the rise in worker indebtedness. During that time, strike participation in the EU countries would have effectively been higher by around 41.7 per cent, 16.5 per cent and 6.8 per cent on average per year if there had not been an acceleration of economic activity, a reduction in industrial work and a rise in worker indebtedness, respectively. The acceleration of macroeconomic performance also represented the main cause behind the drop in strike volume in the EU countries with the highest levels of worker indebtedness.

Concerning strike duration, we confirm that the main triggers behind the drop in the number of working days not worked due to strikes per year in the EU countries from 1995 to 2022 were the acceleration of economic activity, the reduction in industrial work and the rise in worker indebtedness. In fact, strike duration in the EU countries would have been higher by about 122.4 per cent, 25.9 per cent and 12.4 per cent on average per year if there had not been an acceleration of economic activity, a reduction in industrial work and a rise in worker indebtedness, respectively. The growth of worker indebtedness also represented the main trigger behind the decrease in strike duration in the EU countries with the highest levels of worker indebtedness.

6. CONCLUSION

This study contributes to the literature, being the first to perform a panel data econometric analysis, which has the potential to produce more consistent and efficient estimates due to its larger, more heterogeneous samples and greater variability. We focused on EU countries, for which empirical evidence has been lacking. The EU countries represent an interesting case study of how financialisation can reduce workers' willingness to engage in strikes by combining a strong process of liberalisation, deregulation, and privatisation of the financial system – which fueled the rise in worker indebtedness – with notable flexibilisation and deregulation of labour relations – which constrained workers' claims.

Our estimates support our argument by evidencing that worker indebtedness negatively influences strike volume, strike participation and strike duration in EU countries. Our estimates also show that this negative influence is stronger in the EU countries with the highest levels of worker indebtedness. Our estimates confirm that the growth of worker indebtedness has even been one of the main drivers behind the decline of strike activity in the EU countries since the mid-1990s. The acceleration of economic activity and the reduction of industrial work have also exacerbated the generally decreasing trend in strike volume, strike participation and strike duration in the EU countries since the mid-1990s.

Our estimates suggest that the deleverage process that has been ongoing since the Great Recession in EU countries (Figure 1) should continue in the coming years to ensure that workers regain their claimant behaviour of engaging in more strikes to promote their economic and social interests, namely a higher level of wages and better labour conditions. Against this backdrop, public policies should continue to promote the progressive reduction of worker indebtedness, which should involve restraining the increase in both housing and financial asset prices and the fall in wages because they have represented the main determinants of worker indebtedness in EU countries since the mid-1990s (Barradas and Tomás, 2023). This should be done, for instance, through an increase in public housing, the introduction of rental controls, an increase in taxes on capital gains and financial transactions and the re-regulation and de-flexibilisation of labour relations (Alcobia and Barradas, 2024).

Further research on this topic should focus on an analysis of the direct and/or indirect consequences related to the decline of strike activity in the EU countries mainly at the level of social welfare and the potential effects on social tensions, political instability, the emergence of populisms and the general quality of democracies.

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8. APPENDIX

Table A1 – The structure and composition of our unbalanced panel

Country	Period	Observations	Missing
Austria	1995-2002, 2005-2010 and 2015-2017	17	11
Belgium	1995-2000	6	22
Bulgaria	2010-2020	11	17
Cyprus	1995-2018 and 2022	25	3
Czechia	1995-1996 and 2009-2012	6	22
Denmark	1995-2021	27	1
Estonia	1995-2001, 2003, 2005-2009, 2011 and 2013-2018	20	8
Finland	1995-2008, 2011-2020 and 2022	25	3
France	1995-2004	10	18
Germany	2009-2022	14	14
Greece	1995-1998	4	24
Hungary	1995-2007, 2012, 2016-2019 and 2022	19	9
Ireland	2002-2018 and 2022	18	10
Italy	1995-2008	14	14
Latvia	2005-2013 and 2015-2021	16	12
Lithuania	2000-2008, 2012 and 2015-2019	15	13
Luxembourg	2000-2004	5	23
Malta	1995-1998, 2000-2009 and 2011-2012	16	12
Netherlands	1995-2022	28	0
Poland	1995-2013, 2015, 2018 and 2020-2022	24	4
Portugal	1995-2022	28	0
Romania	2001-2008	8	20
Slovakia	1995, 1997-2010, 2013-2015 and 2017-2022	24	4
Slovenia	2000-2007	8	20
Spain	1995-2022	28	0
Sweden	1995-2013 and 2017-2022	25	3

Table A2 – The descriptive statistics for each variable

Variable	Mean	Median	Maximum	Minimum	Standard Deviation	Skewness	Kurtosis
Strike Volume	3.295	2.944	9.455	0.000	2.289	0.193	1.937
Strike Participation	2.622	2.526	8.602	0.000	2.056	0.451	2.407
Strike Duration	8.433	9.863	15.414	0.000	4.514	-0.800	2.423
Worker Indebtedness	0.516	0.445	1.379	0.010	0.335	0.581	2.459
Macroeconomic Performance	0.029	0.029	0.245	-0.146	0.035	-0.049	9.815
Inflation Rate	0.035	0.022	0.380	-0.097	0.046	2.333	18.333
Industrial Work	0.271	0.272	0.423	0.139	0.058	0.098	2.402
Public Work	0.194	0.190	0.456	0.062	0.091	0.673	2.685
Degree of Globalisation	1.098	1.012	3.227	0.371	0.507	1.323	5.177
Unionisation Rate	0.338	0.251	0.848	0.045	0.225	0.722	2.114

Table A3 – *P-values* of the Karavias and Tzavalis (2014) panel unit root test for each variable

Variable	Levels	First Differences
Strike Volume	0.000 (2007 and 2009)	n.a.
Strike Participation	0.000 (2019 and 2020)	n.a.
Strike Duration	0.000 (2020 and 2021)	n.a.
Worker Indebtedness	0.000 (2020 and 2021)	n.a.
Macroeconomic Performance	0.000 (1996 and 2021)	n.a.
Inflation Rate	0.000 (1996 and 1997)	n.a.
Industrial Work	0.000 (2000 and 2001)	n.a.
Public Work	1.000 (2001 and 2002)	0.000 (2019 and 2020)
Degree of Globalisation	1.000 (2009 and 2021)	0.000 (1996 and 2020)
Unionisation Rate	0.000 (2000 and 2001)	n.a.

Note: Estimated break dates are reported in ()

Table A4 – Robustness analyses for the estimates of strike activity for the EU countries

New Proxy	Household debt, all instruments (% of GDP)			GDP per capita growth (annual %)			Inflation, consumer prices (annual %)			Foreign direct investment, net outflows (% of GDP) ⁸			Imports (% of GDP)		
Variable	Strike Volume	Strike Participation	Strike Duration	Strike Volume	Strike Participation	Strike Duration	Strike Volume	Strike Participation	Strike Duration	Strike Volume	Strike Participation	Strike Duration	Strike Volume	Strike Participation	Strike Duration
Constant	2.194 (2.160) [1.016]	2.921 (2.611) [1.119]	7.464* (4.571) [1.633]	1.756 (2.243) [0.783]	2.555 (2.702) [0.946]	8.852* (4.868) [1.818]	1.477 (1.935) [0.763]	1.961 (2.473) [0.793]	6.818 (4.344) [1.569]	2.103 (1.891) [1.112]	2.554 (2.537) [1.007]	7.874* (4.588) [1.716]	2.654 (1.903) [1.395]	4.118 (2.376) [1.733]	8.529* (4.312) [1.978]
Worker Indebtedness _t	-2.328** (1.161) [2.005]	-2.692* (1.466) [1.836]	-3.528 (2.604) [1.355]	-1.604 (1.104) [1.453]	-2.064 (1.354) [1.524]	-3.448 (2.436) [1.415]	-1.394 (1.000) [1.393]	-2.162* (2.300) [1.636]	-2.924 (0.941) [1.271]	-1.104 (1.266) [1.173]	-1.551 (2.295) [1.225]	-3.603 (1.036) [1.512]	-1.567 (1.321) [1.570]	-1.819 (1.321) [1.570]	-3.693 (2.395) [1.542]
Macroeconomic Performance _t	-17.876** (7.170) [2.493]	-16.470* (9.313) [1.769]	-38.413** (16.008) [2.400]	-13.250* (6.959) [1.904]	-12.140 (8.600) [2.455]	-37.751** (15.375) [1.412]	-11.218* (6.415) [2.455]	-12.591 (8.609) [1.749]	-31.933** (14.710) [1.462]	-11.418* (6.487) [2.171]	-8.058 (9.039) [1.760]	-37.421** (16.184) [0.891]	-14.555** (6.448) [2.312]	-14.704* (8.423) [2.257]	-39.227*** (15.078) [1.746]
Inflation Rate _t	9.724 (6.612) [1.471]	5.527 (7.811) [0.708]	22.511 (13.920) [1.617]	6.919 (6.373) [1.086]	4.380 (7.586) [0.577]	20.541 (13.577) [1.513]	2.022 (5.119) [0.395]	-4.826 (6.761) [0.714]	-2.374 (11.859) [0.200]	6.722 (5.792) [1.160]	4.436 (7.558) [0.587]	23.408* (13.794) [1.697]	8.094 (6.163) [1.313]	3.931 (7.548) [0.521]	23.043* (13.784) [1.672]
Industrial Work _t	17.883*** (6.011) [2.975]	18.262** (7.258) [2.516]	28.140** (12.983) [2.167]	16.350*** (6.035) [2.709]	16.747*** (7.272) [2.303]	22.406* (13.215) [1.696]	16.519*** (5.434) [3.040]	19.105*** (6.985) [2.735]	27.286** (12.386) [2.875]	12.627*** (4.392) [2.024]	11.701** (5.782) [2.875]	24.514** (10.537) [2.327]	13.906*** (4.804) [2.895]	11.587* (5.940) [1.951]	25.033** (10.837) [2.310]
ΔPublic Work _t	-3.139 (8.327) [0.377]	2.426 (9.538) [0.254]	9.148 (17.599) [0.520]	-1.264 (7.923) [0.160]	3.634 (9.150) [0.397]	10.338 (17.054) [0.606]	-2.578 (7.400) [0.348]	2.226 (9.114) [0.244]	9.193 (16.641) [0.552]	-6.643 (7.519) [0.884]	-5.153 (9.159) [0.563]	1.371 (18.081) [0.076]	-5.500 (7.818) [0.704]	-0.584 (9.109) [0.064]	5.230 (17.664) [0.296]
ΔDegree of Globalisation _t	7.203* (3.795) [1.897]	9.476** (4.689) [2.021]	6.746 (8.544) [0.790]	7.233* (3.684) [1.963]	9.196** (4.545) [2.023]	6.016 (8.313) [0.724]	5.082* (3.110) [1.634]	9.135** (4.075) [2.242]	3.023 (7.243) [0.417]	0.295 (0.334) [0.882]	0.840* (0.442) [1.899]	8.524* (0.809) [0.585]	5.307 (4.994) [1.707]	6.801 (6.228) [0.852]	6.801 (11.384) [0.597]
Unionisation Rate _t	-5.051* (2.622) [1.926]	-8.946*** (3.162) [1.119]	-9.810* (5.570) [1.633]	-4.493* (2.634) [1.706]	-8.592*** (3.160) [1.837]	-10.441* (5.683) [1.564]	-3.677 (2.351) [1.564]	-7.628** (3.003) [2.541]	-7.215 (5.283) [1.366]	-3.199 (2.628) [1.217]	-5.596 (3.515) [1.592]	-8.628 (2.506) [1.356]	-4.989** (3.115) [1.990]	-8.901*** (5.675) [2.858]	-10.657* (5.675) [1.878]
Observations	309	309	309	309	309	309	309	309	309	309	309	309	309	309	309
Years	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Countries	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
Time effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sargan test (<i>p-value</i>)	0.120	0.251	0.771	0.078	0.199	0.895	0.053	0.270	0.911	0.007	0.074	0.660	0.034	0.069	0.797
R-squared	0.863	0.761	0.829	0.865	0.765	0.825	0.882	0.766	0.833	0.894	0.775	0.827	0.879	0.774	0.827
Adjusted R-Squared	0.833	0.708	0.791	0.835	0.712	0.786	0.856	0.714	0.795	0.870	0.725	0.789	0.852	0.724	0.789

Note: Standard errors in (), t-statistics in [], Δ is the operator of the first differences, *** indicates statistically significance at 1% level, ** indicates statistically significance at 5% level and * indicates statistically significance at 10% level. Coefficients, standard errors and t-statistics for the time dummies are not reported

⁸ We use the net outflows related to foreign direct investment as a percentage of gross domestic product in levels because it was found to be stationary in levels according to the Karavias and Tzavalis (2014) panel unit root test. The results of this panel unit root test for this specific variable are available upon request.