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Inequality and Elections in Italy, 1994–2018

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Abstract
The increase in income and wealth inequality in Italy is well documented, but less attention has been devoted to its association with social and political outcomes. This article investigates the association between inequality and several variables on socio-economic conditions with the evolution of Italian politics over the 1994–2018 period. Voting in Italy's regions for the centre-left and centre-right coalitions—with a focus on the Lega—is examined in seven rounds of general elections, before and after the 2008 crisis, which emerges as a key divide in these relationships. The centre-left vote is higher in the regions with an increase in mean wealth and employment rates and shows a reversal after 2008 in the support of part time employees. The centre-right vote is associated with impoverished middle classes and an increase in disparities of Southern regions. The associations shown by Lega voting are distinct from those of other centre-right forces. While political and cultural factors are important to understand political changes, our findings show that a more unequal and distressed society is clearly associated with changes in electoral behaviour.

Keywords Inequality · Economic conditions · Electoral politics · Two-party system · Italian regions

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1 Introduction

The article investigates the association between inequality and socio-economic conditions and electoral behaviour in Italian regions over the period 1994–2018. In economic terms, this period is marked by slow growth, recessions and a rise of income and wealth inequality (Franzini and Pianta 2015; Acciari et al. 2021). In political terms, the first part of the period was characterised by a bipolar electoral competition and alternation in government between centre-left and centre-right coalitions. After the 2008 crisis, with worsening economic conditions, mainstream parties have lost ground, new forces acquired large electoral support in 2013 and 2018, and different governing coalitions have emerged (Armingeon and Guthmann 2014; Ceccarini and Newell 2019; Chiaramonte and De Sio 2019).

We explore the interplay between economic factors and voting trends in seven rounds of general elections (1994, 1996, 2001, 2006, 2008, 2013, 2018). We use an original dataset that integrates economic and voting data in Italian regions, considering inequality in incomes and wealth, unemployment, precarisation, educational levels and other variables. The 1994–2018 period is also split into two sub-periods, before and after 2008, in order to analyse potential changes in voting preferences following the crisis. This research strategy allows us to take into account territorial socio-economic conditions and local political subcultures, which have long been identified as key factors in the political evolution in the country (Agnew 2007; Diamanti 2009). In this article we focus on the determinants of the long-term right-left cleavage, exploring the vote for the centre-right and centre-left coalitions; a specific investigation is carried out on voting for the Lega within the centre-right.

Our main results confirm the relevance of differences in the socio-economic conditions associated with voting for the centre-left and the centre-right; we show that higher average wealth is a driver for centre-left voting, reversing expectations of greater support by poorer income groups. Conversely, centre-right voting is mainly driven by the relevance of the impoverished middle classes.

The article is organised as follows. We first locate our theoretical contribution within the existing literature on the connection between economic conditions and changes in voting. We then move to summarise the Italian case and the political change we aim to investigate. Third, we present the relevant electoral and economic data, discussing key relationships between inequality and political variables. We then build a model to test the links between our variables and illustrate the empirical results. The concluding section discusses the implications of our findings.

2 Studies on Inequality and Voting Behaviour

Though focused on Italy, this article contributes to the growing literature on inequality and political developments in Western democracies, which has opened up novel interdisciplinary perspectives.

An important stream of economic research, started by Piketty (2013), investigated the long term evolution of inequality and its association with political developments. In an influential work, Piketty (2019, Chaps. 14–15) studied the association between

multidimensional inequality—as measured by income, wealth and education – and voting trends in France, Great Britain and the US from 1948 up to 2017, using post-electoral individual surveys. His argument is that a "class-based" party system was in place in the 1950s and the 1960s, when lower-education and lower-income electors tended to vote for left-wing parties, while upper and middle class electors tended to vote for centrist or right-wing parties. As class divisions began to blur in the 1970s and the 1980s, the left-wing vote then gradually became associated with higher education as well as with low income. A "multiple-élite" party system emerged in the 2000s-2010s, with high-education élites voting for the left, and high-income/high-wealth élites voting for the right. The concomitant massive increase in non-voting is related to the behaviour of lower-education and lower-income groups, who feel politically unrepresented. Additional studies using the World Inequality Database (Bauluz et al. 2021; Gethin et al. 2021) have extended this approach to other countries, including Italy, where the 'multi-élite' explanation appears to be weaker than in other cases, as neither income nor education factors have changed significantly since the 1970s in relation to the left-right orientation of voters.

A second stream of research has focused on the transformations in class voting. Oesch and Rennwald's (2018) study on 20 national elections finds that the left is broadly supported by workers in socio-cultural professions and by the working class; the right by managers, small business owners and the self-employed; the radical right competes with the centre-right for the votes of the latter, and challenges the left in its working-class stronghold. Old and new patterns of class voting therefore co-exist; old patterns are structured by the labour-capital conflict; new cleavages—opening up the political space for the radical right— are structured by cultural conflicts over immigration, multiculturalism and European integration. Investigating the relationship between inequality and the rise of radical right parties, focusing on 16 European countries, Han (2016) suggests that income inequality encourages poor people to vote for radical right parties, while it concurrently discourages rich people from doing so. Similarly, Burgoon et al. (2018) observe that 'positional deprivation' correlates with a higher propensity to vote for radical right parties and for parties that incorporate nationalist claims in their party manifestos.

Thirdly, interest in economic factors has increased since the economic crisis of 2008. Literature on economic voting has shown that the massive electoral punishment of the incumbents has been a function of the depth of the recession. In a comparative analysis of 42 elections in 28 OECD countries in the period just before, during, and after the recession, from 2007 to 2011, Bartels (2014) confirmed that citizens reward or punish incumbent governments based on economic growth in the one or two years preceding each election. Subsequent works have argued that both rising economic insecurity and the lack of responsiveness of established parties have fuelled the populist reaction of those left-behind following the Great Recession (Kriesi 2014). Both economic and political crises contributed to the growth of right-wing populist parties, especially so where the two types of crises occurred together, such as in Southern and Central-Eastern Europe (Kriesi and Pappas 2015). Based on a database of electoral outcomes for all relevant parties in 30 countries covering two national pre-crisis elections and post-crisis elections up to 2014, Hernández and Kriesi (2016) conclude that incumbents have been heavily punished, especially in

the hardest hit countries of Western Europe, with the main beneficiaries of the crisis having been parties of the populist radical right and of the radical left, as well as new parties. In their analysis of voting and trust-beliefs across 26 European countries before and after the Great Recession, Algan at al. (2017) show that the rising voting shares for anti-establishment parties follow increases in unemployment. Similarly, an analysis by Guiso et al. (2017) on 24 European countries finds that lower income, financial distress and higher economic insecurity from exposure to globalisation and competition of immigrants are drivers of lower trust in incumbents and of a populist vote. More in general, studies of political change have called for "bringing capitalism back in social movement analyses" (della Porta 2015) in order to understand the large protests that have developed since 2011 in a context of closed political opportunities.

In addressing this debate, we focus on the importance of an analysis at the regional level and on the consideration of a wide range of indicators on inequality and socio-economic conditions. Most studies have relied on individual survey data, which are usually based on limited samples and provide little information on inequality. Moving the analysis at the level of regions allows us to capture the relevance of the complex patterns of income and wealth inequality and of the structural economic and social conditions of regions.[1]

Moreover, by analysing the regional level, we address a territorial dimension that has long been studied by scholars of Italian politics. The four main areas (the North-West, the North-East, the Centre and the South) are characterised by significant voting stability, associated with the diversity of local economic models (Bagnasco 1976; Diamanti 2009). The mediating power of territorial subcultures on voting choices has proved to be persistent, and the regional dimension remains a key variable to understand electoral outcomes, including its changes in more recent years (Chiaramonte and De Sio 2014).

3 Italy's Politics from 1994 to 2018

After the *Mani Pulite* ('Clean hands') investigations had disclosed a deeply rooted system of corruption, contributing to a collapse of the party system that had characterised Italy until the beginning of the 1990s, (Della Porta 1992), in 1994 Italy entered the so-called 'second republic', which initially saw the presence of two opposing coalitions. The centre-left was based on the alliance between the Democrats of the Left (DS) and La Margherita (the Daisy party), who in 2007 merged into the Democratic Party (PD). The centre-right coalition included Forza Italia (FI, the party of media tycoon Silvio Berlusconi), Alleanza Nazionale (National Alliance, with a post-Fascist base) and Lega Nord. In the 2008 elections the two coalitions together gained more than 70% of the votes.

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[1] An analysis at a smaller territorial scale, such as that of local authorities, would offer a larger number of cases, but would be constrained by more limited information on patterns of inequality and on socio-economic structures. Studies at municipality level on economic conditions and voting include Ardeni (2020) and Levi and Patriarca (2020).

However, before the two-coalition system could fully consolidate, the effects of the 2008 economic crisis and the ensuing recession led to its demise. In the beginning of the 2010s, the economic crisis brought about a sudden decline of the mainstream parties that had established themselves in the previous two decades. As in other Southern European countries (Bosco and Verney 2012), the growing distrust towards traditional parties has been linked to a 'democracy without choices', which in Italy took the form of the government led by the economist Mario Monti in 2011–2013, supported by PD and FI. Already in 2013, the electors heavily penalised both parties, leaving space for the first electoral success at national level of the Movimento 5 Stelle (M5S), which obtained about 25% of the votes, while the centre-left and the centre-right coalitions obtained around 29% each. After negotiations between the PD and the M5S failed, centre-left led governments were formed in uneasy alliances with part of the centre-right parties. In the 2018 election, the PD received a low 18.8% and FI, with 14%, lost the leadership of the right-wing to the Lega (17.4%) which moved from being a 'regional' party rooted in Northern Italy to take on a leading national role with a nationalist, anti-immigrant political agenda. The M5S, however, achieved a large success, obtaining 32.7% of the votes. As, once again, negotiations between the PD and the M5S failed, the M5S and the Lega formed a government coalition (Albertazzi et al. 2018; Ceccarini and Newell 2019), which lasted about a year, followed by a government coalition between the M5S and the centre-left. In parallel, abstention in general elections constantly increased, especially after 2008, from 14% to 1994 to 27% in 2018.[2]

Political scientists have provided explanations for Italy's political turmoil that have generally focused on the evolution of political factors, including party transformations, emerging leaders, new forms of party competition, policy platforms and political communication (Bellucci et al. 2017). The electoral performance of the M5S in 2013 has been interpreted as the voters' reaction to austerity measures implemented by the Monti government, with a narrative pitting 'the people' against the elitist ruling class - the '*casta*' – associated with EU institutions (Mosca and Tronconi 2019). However, the M5S also addressed typical social movement issues such as environmental protection and the re-municipalisation of water provision, which had been the issue of a victorious 'referendum from below' held in 2011 (Della Porta et al. 2017). The electoral success of the M5S appeared therefore as a combination of political dissatisfaction and policy preferences (Passarelli and Tuorto 2018).

Few scholars have looked at the influence of social class on voting choices, underlining the role of the lower middle classes and the unemployed in the rise of the Five Star Movement, the progressive transformation of the Democratic Party into a party of public employees, retired people and wealthy voters, and the ability of the Lega to attract electors from both the self-employed and the working class (Maraffi et al. 2013; Maraffi 2018; De Sio 2018).

The persistent relevance of regional political subcultures took a new turn in 2018, with the Lega dominating Northern Italy and the M5S dominating the South. The

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[2] A study of non-voting in a large Northern Italian city has shown that abstention is higher among low income voters and that income inequality and turnout inequality may reinforce each other (Schafer et al. 2021). Cantoni and Pons (2020) find that interaction with candidates does not increase turnout.

drivers of their support, however, differ. Based on individual-level post-electoral data, Vassallo and Shin (2018) show that for Lega voters priorities are immigration, the criticism of Europe and the need for a strong leader. For the M5S voters, however, the priority is redistribution. The two parties' constituencies only converged on a similar anti-elitist attitude and mistrust for the political establishment.

Much less attention has so far been devoted to the association between growing inequality and worsening socio-economic conditions and electoral behaviour. Between 1994 and 2018 labour incomes (before taxes and transfers) decreased in real terms for all income groups, except for the richest 10%, who in 2018 had the same real incomes as in 1994. Losses in real incomes were smaller for the middle classes, and larger for low income Italians, reaching 25% for the poorest 10% of employees. The share of part-time workers among private sector employees rose from 14 to 25% of all workers. After the 2008 crisis the inequalities in household incomes and wealth increased and social distress became stronger. In this work, we suggest that impoverishment, precarisation and inequality are strongly correlated to voting behaviour.

Our previous study on inequality and elections in Italy's regions (Bloise et al. 2021) focused on voting for mainstream parties (the centre-right and centre-left parties considered together) as opposed to the 'protest' choice of abstaining, voting for the Lega and voting for the M5S. In particular, higher abstention was shown to be associated with greater overall income inequality, a more polarised income structure, a high presence of part-time jobs and a high unemployment rate. The rise of consensus for the Lega was linked to the downward pressure on the income of the middle classes, lower average levels of household wealth and precarisation of work. The consensus for the Five Star Movement increased with widening poverty, impoverished lower income groups and the rise of precarious employment. All of these factors contributed to a lower consensus for mainstream parties considered together, which remained strong only in regions where average household wealth was higher. These results suggested that in Italy each 'protest' choice – abstention, vote for the Lega and vote for the M5S – was driven by specific economic factors, relevant for different social groups in different regions, something very far from a general 'populist wave' (Bloise et al. 2021).

In this article we complement that previous research by addressing voting for the centre-left and centre-right coalitions and exploring their association with inequality and socio-economic factors. The two coalitions alternated in government over the 1994–2018 period; we add a specific focus on the Lega, which has held at times ambivalent positions within the centre-right.[3] We carry out separate investigations for the years before and after 2008, in order to identify specific changes in voting preferences potentially correlated to worsening economic conditions. The focus on the centre-left and centre-right coalitions allows us to trace the persistence of traditional divides rooted in different ideologies, social bases and regional political cultures, some shared positions in their austerity policies notwithstanding (Pianta 2012). The

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[3] The Lega has been part of centre-right coalitions, although with an often unpredictable role; in 1995 the withdrawal of support of the Lega caused the end of the centre-right coalition supporting the first Berlusconi government. Overall, the Lega held government responsibility for a total of nine years over the 1994–2018 period: 1994–1995; 2001–2005; 2008–2011, all with Silvio Berlusconi as prime minister.

separate consideration of voting for the Lega allows us to identify similarities with centre-right voting and changes introduced after 2008 by the extreme-right political trajectory of the Lega.

4 Data and Descriptive Statistics

We analyse the association between vote share and socio-economic variables in Italy's regions over the period 1994–2018, using the database developed at the Scuola Normale Superiore (SNS) described in the Appendix, integrating data on election outcomes, incomes, wealth, and socio-economic characteristics. Our SNS electoral database provides a systematisation of official voting data recorded by the Italian Ministry of Interior for seven rounds of national elections (1994, 1996, 2001, 2006, 2008, 2013, 2018). We consider the following political variables: the share of voters for the centre-left coalition, including the Democratic Party (in 2008, 2013, and 2018) and its predecessors (the Democratic Party of the Left in 1994 and 1996, and Democrats of the Left in 2001 and 2006), and its left-wing and centrist governing partners; the share of voters for the centre-right coalition, including Silvio Berlusconi's Forza Italia (running as Popolo delle Libertà in 2008 and 2013), its allies on the right (such as Fratelli d'Italia and its predecessors) and on the centrist side (such as UDC and its predecessors), and the Lega (formerly Lega Nord); the vote for the Lega alone.

With regard to socio-economic characteristics, yearly gross earnings of workers are taken from the Italian National Social Security Institute (INPS) administrative archives, providing data on about 1/15 of Italian employees working in the private sector (Longitudinal Sample INPS – Losai). Data on household net wealth, inequality of equivalised disposable income, the employment rate and the share of tertiary graduate residents are calculated using the Bank of Italy's Survey on Household and Wealth (SHIW) microdata, based on a representative sample of Italian households.[4]

Data are investigated over the whole sample and for two separate periods: 1994–2007 and 2008–2018. While a major turning point comes with the 2013 elections, we carefully considered the periodisation, finding that in 2008 significant novelties can be identified. Considering the national vote, for the Centre-Left the 1994–2006 period is marked by a steady growth, ending with the highest vote share ever obtained, 47% in 2006. In 2008 there was already a significant fall to 37%, opening a phase of steady decline in 2013 and 2018. Votes for the Lega fell from 1994 to 2006, and 2008

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[4] INPS data are used to calculate mean gross earnings and P90/P50 and P50/P10 ratios. P90 is the level of income above which we find the richest 10% of employees; P50 is the median; P10 is the level of income below which we find the poorest 10%. The Bank of Italy survey is carried out every two years; we use a cubic spline interpolation to impute values for the years in which the survey is not conducted. Net wealth is calculated by summing up all real and financial assets minus liabilities of household members. Disposable income includes labour and capital revenue flows, net of taxes, and all public transfers; income has been equivalised using the OECD equivalence scale which assigns a value of 1.0 to the first household member aged 14 years and over, a value of 0.7 to each additional household member aged 14 years and over, and a value of 0.5 to each child who is under 14 years old.

Table 1 Descriptive statistics

	Full Sample		1994–2007		2008–2018	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Vote share						
Centre-Left	0.38	0.11	0.42	0.10	0.31	0.09
Centre-Right	0.44	0.10	0.48	0.09	0.39	0.09
Centre-Right without Lega	0.38	0.11	0.44	0.07	0.31	0.12
Lega	0.08	0.08	0.07	0.07	0.09	0.09
Observations (Observations for Lega)	119 (88)		68 (44)		51 (44)	
Socioeconomic variables:						
P90/P50 on gross earnings	2.01	0.17	1.96	0.14	2.06	0.19
P50/P10 on gross earnings	5.98	1.04	5.65	0.94	6.42	1.00
Gini on disposable household income	0.29	0.04	0.30	0.03	0.29	0.04
Gini on household wealth	0.56	0.05	0.56	0.05	0.56	0.05
Log mean household wealth	12.39	0.33	12.35	0.33	12.44	0.33
Log mean gross earnings	9.93	0.13	9.95	0.11	9.90	0.14
Share of part-time workers	0.16	0.09	0.10	0.05	0.25	0.06
Share of tertiary graduates	0.08	0.03	0.06	0.02	0.10	0.03
Employment rate	0.58	0.10	0.55	0.09	0.61	0.10
Observations	119		68		51	

Sources: LoSai, SHIW, and SNS.

Note: 17 regional units are considered in the database, for the seven political elections in the period 1994–2018: Abruzzo-Molise, Basilicata-Calabria, Campania, Emilia-Romagna, Friuli Venezia Giulia, Lazio, Liguria, Lombardia, Marche, Piemonte, Puglia, Sardegna, Sicilia, Toscana, Trentino Alto Adige, Umbria, Veneto. In order to obtain units with a larger number of individuals, Abruzzo and Molise on the one hand, and Basilicata and Calabria on the other hand, have been merged, while Valle d'Aosta has been excluded due to lack of data. See Appendix A for details.

marked the first significant increase in electoral consensus, further strengthened in 2018.

Table 1 presents the mean and the standard deviation of the variables included in our analysis. In the second period, the vote shares of the two main political coalitions, centre-right (C-R) and centre-left (C-L), considerably decreased (data are averages of the votes obtained in the regions in all the elections held). With regard to economic variables, over the two periods mean earnings of employees fall slightly and the dispersion of their distribution broadens with increases in the P90/P50 and P50/P10 ratios, while mean household wealth increases; there is also a major rise in the share of part-time workers.

A few key relationships that emerge from these variables are highlighted in the following figures, where units of observations are Italy's regions in each of the election years, split into the two periods we consider, before and after the 2008 crisis.

In Fig. 1 the vote share for the centre-left is shown to be associated with mean household wealth; wealth is greater in regions with larger metropolitan areas and in Northern and Central Italy, where centre-left voting tends to be higher. Moving from the first to the second period there is a downward shift in the distribution, resulting from the loss of votes of the centre-left.

In Fig. 2, votes for the centre-left are related to the share of part-time private sector employees, and a major change emerges. In the first period, when part-time workers
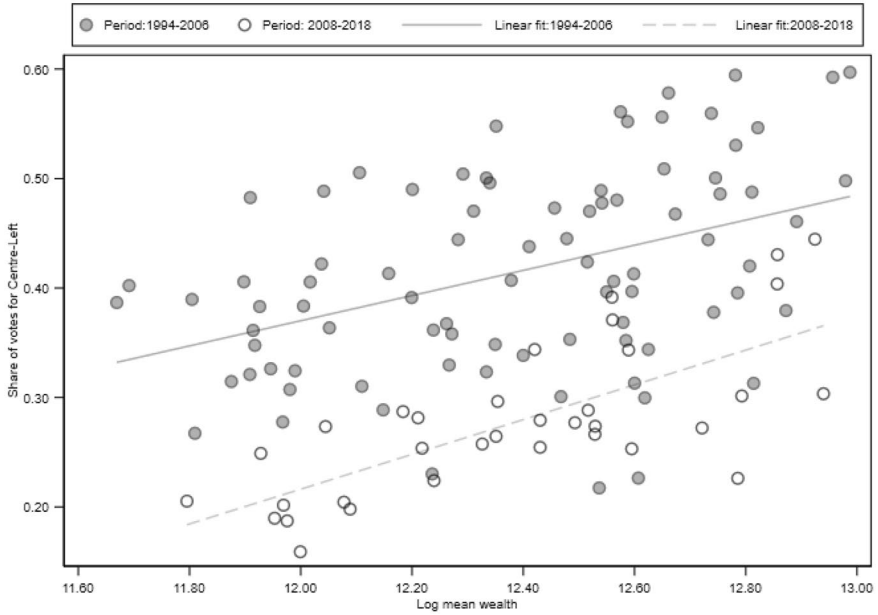
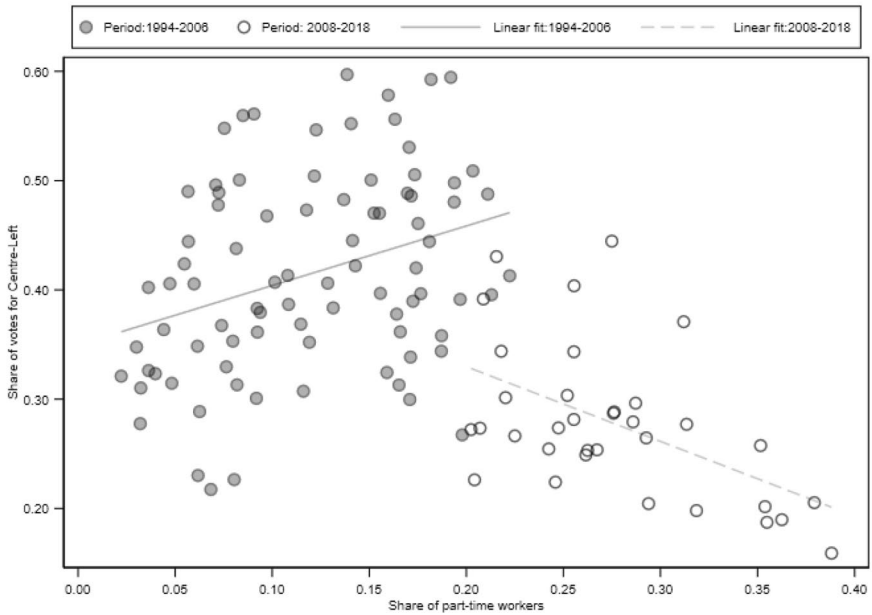**Fig. 1** Centre-left vote and mean household wealth

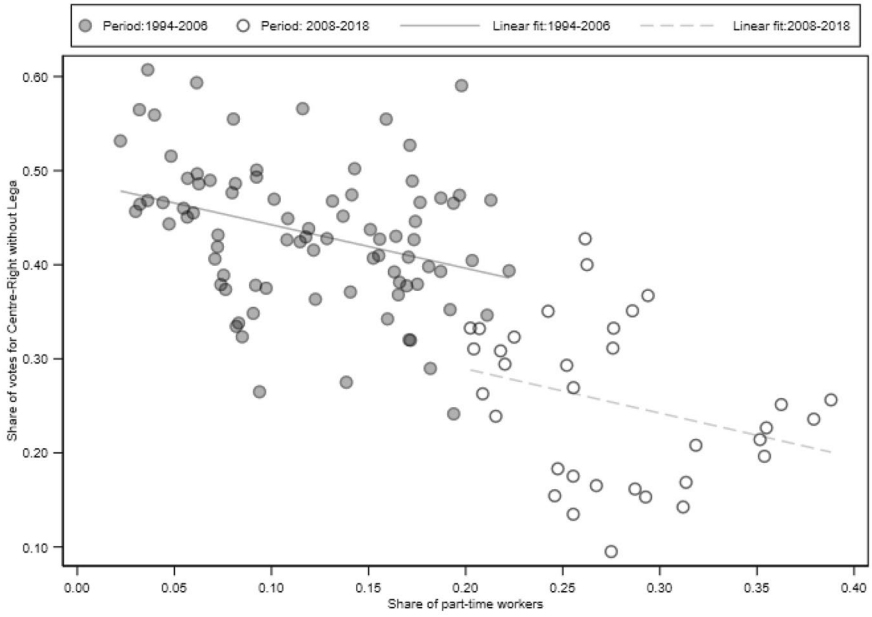**Fig. 2** Centre-left vote and share of part-time employees

Fig. 3 Centre-right without the Lega vote and share of part-time employees
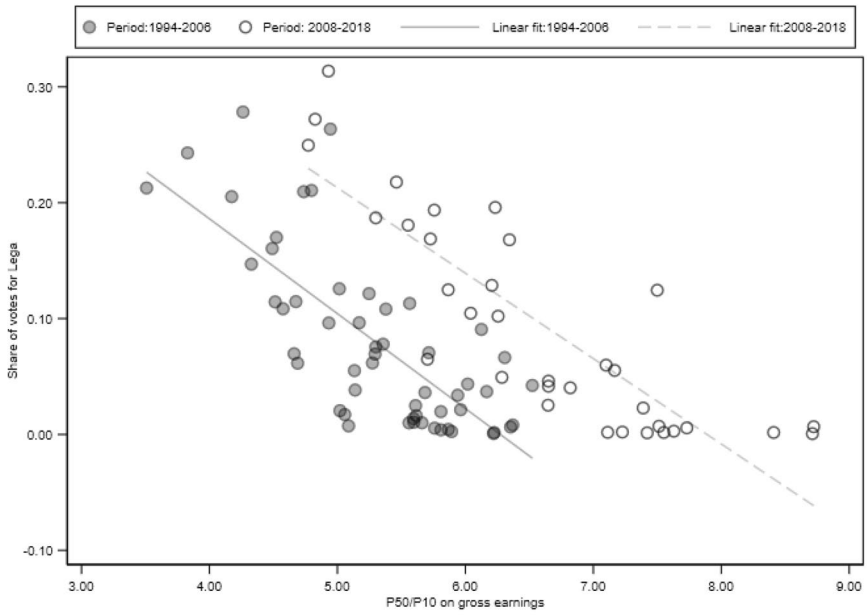

Fig. 4 Lega vote and P50/P10 ratio

were below 20% in all regions, a positive association emerges, with the centre-left obtaining a larger consensus where non-standard work was more widespread, a heritage of the role of the Left as a supporter of workers' rights. In the second period, when part time workers are above 15% in all regions, the relation turns negative. The precarisation of employment – resulting also from policy changes introduced by centre-left governments – appears to be associated with the collapse of centre-left voting after 2008.

Moving now to the key factors associated with votes for the centre-right, we first consider (see Fig. 3) the electoral support for the centre-right without the Lega and its link with the share of part-time workers. A clear negative relationship emerges over both periods, with a shift to the bottom and to the right in the second period, when part-timers greatly increase and consensus falls. The centre-right without the Lega has lower votes where precarisation is greater. We also considered the share of university graduates, finding a clear negative association with centre-right votes.

Finally, the vote for the Lega is examined in Fig. 4 with its association with the P50/P10 ratio. Consensus is higher in regions where the median gross earnings of employees are closer to the earnings of the poorest 10% (mainly part-time workers with low incomes), suggesting the presence of an impoverished middle class; moving from the first to the second period, we find a shift upward and to the right, reflecting the growing consensus for the Lega.

5 The Empirical Strategy

As a next step, we go more in depth in the analysis of the association between vote share and the socio-economic variables described in Sect. 3 by estimating the following equation:

$$y_{rt} = \alpha_r + \beta S_{rt-1} + \tau Z_{rt-1} + \rho T + \epsilon_{rt}, \tag{1}$$

where the outcome variable y_{rt} is the share of voters - who voted for the centre-left, the centre-right, and the two components of the latter - observed in region r and year of election t.

On the right-hand side of Eq. (1), we include all socio-economic variables as the average between the year before that of election and the year of election, given that all elections took place in the first five months of the year. Specifically, S_{rt-1} is the vector of economic variables listed in Table 1[5]; such variables include the P90/P50 and P50/P10 ratios on gross earnings to capture inequality among employees; the Gini coefficient on disposable income as a measurement of overall income inequality; the Gini coefficient on net wealth to capture differences in assets; the log mean net wealth; the log mean of gross earnings; the share of employees with a part-time contract used as a proxy of precarious jobs; the employment rate. Then, Z_{rt-1} controls for the share of the population with a tertiary degree, α_r are the regional fixed

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[5] Note that all variables in the right-hand side of Eq. 1 have been standardized to obtain comparable coefficients.

effects to control for structural characteristics of regions which do not vary over time, and T is the period dummy which takes the value of 1 for elections occurring after 2007. Equation (1) is first estimated on the full sample and is then estimated separately on the two periods: 1994–2007 and 2008–2018. Results of ordinary least squares estimations are shown in Table 2 and discussed in the next section.

One limitation of using least squares to estimate Eq. (1) is the potentially high degree of collinearity among regressors included in the vector S_{rt-1}.[6] Table 3 shows the correlation matrix among the regressors for the full sample and the two period subgroups. In our empirical context, this is a relevant issue, especially when we divide the data into the two period subgroups. Moreover, most inequality-related regressors have little variation over time and are likely to be correlated to regional time-invariant characteristics. When the degree of multicollinearity is high and the number of observations is low compared with the number of regressors, there is a possibility of obtaining imprecisely estimated coefficients (i.e., with very high standard errors) which are often not statistically different from zero.

A possible way to deal with multicollinearity issues and reduce the variance of estimates is to adopt regularisation methods such as LASSO (Least absolute shrinkage and selection operator), which has recently been used in applied studies on electoral outcomes (Levi and Patriarca 2020) or, as an alternative, the 'elastic net' estimator. In order to select relevant regressors and mitigate the variance of the model, LASSO and 'elastic net' methods add some penalisation parameters to the OLS estimator which shrink the coefficients of explanatory variables and set those of non-relevant regressors to zero (Hastie et al. 2009). We re-estimate the association between the vote shares and socio-economic factors using the 'elastic net' estimator, which is more appropriate than LASSO when we are dealing with a large number of highly correlated variables in small samples (Zou and Hastie 2005). The main features of the 'elastic net' estimator are described in Appendix A. Results are shown in Table 4 and discussed in the next section. The combination of these two methods strengthens the robustness of our results.[7]

6 Results

The regression results for the centre-left and centre-right are shown in Table 2, using fixed effects regressions, and in Table 4, using the 'elastic net' method.[8]

Voting for the centre-left. In Table 2, considering the whole sample 1994–2018, the share of votes for the centre-left is positively associated with increases in regions' mean wealth and employment rate, and negatively correlated to a rise in the share of

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[6] Table 3 shows a correlation higher than 0.8 between the employment rate and the log mean wealth in the period 1994–2007 and between employment rate and log mean gross earnings in the period 2008–2018.

[7] A well-known problem in regularisation methods is the lack of a measurement of dispersion of the estimated coefficients. This limitation cannot be easily overcome with standard methods since the theoretical distribution of the estimator is unknown.

[8] In the work for this article, we also tested our model using the share of electors instead of the share of actual voters for our political variables and results do not change significantly; the share of electors is the dependent variable used by Bloise et al. (2021).

Table 2 Regressions of the vote shares of the centre-left and centre-right. (Fixed effects estimates on the full sample 1994–2018 and on the periods 1994–2007 and 2008–2018)

	Centre Left			Centre Right		
	Full Sample	1994–2007	2008–2018	Full Sample	1994–2007	2008–2018
P90/P50 on gross earnings	-0.019	0.031	0.055***	-0.028**	-0.018	0.029
	[0.015]	[0.023]	[0.018]	[0.012]	[0.021]	[0.041]
P50/P10 on gross earnings	-0.014	0.005	-0.033***	-0.029***	-0.041*	-0.036***
	[0.011]	[0.019]	[0.003]	[0.010]	[0.021]	[0.009]
Gini on disposable income	-0.014	-0.002	-0.005	-0.002	0.00	-0.011
	[0.008]	[0.012]	[0.005]	[0.007]	[0.011]	[0.009]
Gini on wealth	-0.005	-0.02	0.011***	-0.006	0.008	-0.012**
	[0.014]	[0.012]	[0.002]	[0.005]	[0.010]	[0.005]
Log mean wealth	0.044***	0.018	-0.001	-0.002	-0.024*	-0.016
	[0.012]	[0.013]	[0.009]	[0.008]	[0.013]	[0.014]
Log mean gross earnings	-0.052	0.036	0.009	-0.036**	0.005	0.07
	[0.031]	[0.023]	[0.026]	[0.016]	[0.045]	[0.052]
Share of part-time workers	-0.035*	0.109***	-0.118***	-0.072***	-0.032	-0.118***
	[0.018]	[0.022]	[0.015]	[0.010]	[0.029]	[0.026]
Share of tertiary graduates	0.012	0.005	-0.003	-0.007	-0.013	0.01
	[0.014]	[0.014]	[0.007]	[0.009]	[0.013]	[0.013]
Employment rate	0.054**	-0.044	0.023**	0.001	-0.001	-0.001
	[0.019]	[0.025]	[0.009]	[0.013]	[0.023]	[0.011]
Regional fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Period fixed effects	Yes	No	No	Yes	No	No
Observations	119	68	51	119	68	51
R-squared (within)	0.417	0.678	0.958	0.626	0.561	0.907

Notes: Standard errors (clustered at the regional level) in brackets.

part-time employees. Specifically, an increase of mean wealth by one standard deviation is associated with an increase of 4.4% points in the share of votes for the centre-left. Centre-left support is greater in richer and economically more active regions and is lower where poorer part-time workers expand. The latter association however shows a remarkable change of the sign of coefficients when we consider separately the first and second periods. As already noted in Fig. 2 above, in the first period regions with greater precarisation voted more for the centre-left, while the opposite happened in the second period; all the above coefficients are statistically significant. Focusing on the post-2008 period, we find that vote for the centre-left is associated – as already pointed out - with higher increases in employment rates and lower precarisation; electoral consensus is higher where we find growing wealth inequalities, where the rich grow more distant from median employee income and where median income moves closer to the earnings of the poor.

Table 4, with results obtained from the 'elastic net' estimates, confirms this evidence. Looking at the full sample, the vote share for the centre-left is positively associated with regions' mean wealth, and to the employment rate, while it is negatively correlated to the share of part-time workers and mean earnings. In addition, lower negative coefficients are found between the vote shares for the centre-left and all measurements of income distance and inequality in disposable income and wealth; this reflects the high voting for the centre-left in Central Italian regions, where overall inequality tends to be lower. When we compare the two subperiods, we find a confirmation of previous results on the shift from a positive to a negative association between the vote share for centre-left and the share of part-time workers (as well as for the share of graduates), while the correlation with wealth inequality changes from a negative to a positive one.

Summing up the evidence, consensus for the centre-left in Italy's regions appears to be associated with two main factors. First, there are its social roots among workers, shown by the links with growing employment rates and lower inequality in disposable incomes. Second, there are the increasing links to greater economic privilege – shown by the regions' rise in average wealth and, in the post-2008 period, by the relevance of higher wealth inequalities, higher earning distance between the rich and the median and the reversal of support from poor part-time workers.

Voting for the centre-right. In Table 2, for the whole sample, the vote share for the centre-right is associated with falling P50/P10 ratios, reflecting median incomes moving closer to the earnings of the poorest, with declining mean earnings and a lower distance between the rich and the median, as well as to lower shares of part-time workers. Specifically, a decrease in the P50/P10 ratio by one standard deviation is associated with an increase of 2.9% points in the share of votes for the centre-right; this relationship is significant in both subperiods of the investigation. Results from Table 4 confirm these findings, with all the above variables showing the highest coefficients.

In short, the centre-right appears to draw its support on the one hand from the impoverished middle-income groups – relevant mainly in Northern and Central regions – and, on the other hand, from Southern regions characterised by declining employment rates; increases in part-time workers are always negatively associated with centre-right support.

Table 3 Correlation matrix on the full sample 1994–2018 and on the periods 1994–2007 and 2008–2018

Full Period

	P90/P50 on gross earnings	P50/P10 on gross earnings	Gini on disposable income	Gini on wealth	Log mean wealth	Log mean gross earnings	Share of part-time workers	Share of tertiary graduates	Employment rate
P90/P50 on gross earnings	1.00								
P50/P10 on gross earnings	0.59	1.00							
Gini on disposable income	0.15	0.05	1.00						
Gini on wealth	0.52	0.30	0.50	1.00					
Log mean wealth	-0.44	-0.31	0.03	-0.44	1.00				
Log mean gross earnings	-0.33	-0.65	0.10	-0.23	0.47	1.00			
Share of part-time workers	0.46	0.41	-0.09	0.00	0.07	-0.33	1.00		
Share of tertiary graduates	0.25	0.21	-0.09	-0.05	0.35	0.17	0.66	1.00	
Employment rate	-0.48	-0.44	-0.16	-0.61	0.78	0.59	0.19	0.47	1.00

Period 1994–2007

	P90/P50 on gross earnings	P50/P10 on gross earnings	Gini on disposable income	Gini on wealth	Log mean wealth	Log mean gross earnings	Share of part-time workers	Share of tertiary graduates	Employment rate
P90/P50 on gross earnings	1.00								
P50/P10 on gross earnings	0.65	1.00							
Gini on disposable income	0.18	0.22	1.00						
Gini on wealth	0.54	0.53	0.54	1.00					
Log mean wealth	-0.53	-0.55	0.00	-0.46	1.00				
Log mean gross earnings	-0.06	-0.61	0.10	-0.17	0.44	1.00			
Share of part-time workers	-0.01	-0.13	-0.12	-0.35	0.41	-0.05	1.00		
Share of tertiary graduates	0.12	-0.17	-0.07	-0.06	0.35	0.31	0.55	1.00	
Employment rate	-0.50	-0.69	-0.23	-0.67	0.82	0.50	0.50	0.39	1.00

Period 2008–2018

	P90/P50 on gross earnings	P50/P10 on gross earnings	Gini on disposable income	Gini on wealth	Log mean wealth	Log mean gross earnings	Share of part-time workers	Share of tertiary graduates	Employment rate
P90/P50 on gross earnings	1.00								
P50/P10 on gross earnings	0.45	1.00							
Gini on disposable income	0.18	-0.12	1.00						
Gini on wealth	0.56	0.12	0.41	1.00					
Log mean wealth	-0.48	-0.24	0.05	-0.43	1.00				
Log mean gross earnings	-0.44	-0.66	0.09	-0.29	0.60	1.00			
Share of part-time workers	0.68	0.34	-0.09	0.33	-0.47	-0.46	1.00		
Share of tertiary graduates	0.06	-0.06	-0.14	-0.05	0.42	0.48	0.14	1.00	
Employment rate	-0.65	-0.56	-0.09	-0.58	0.74	0.83	-0.45	0.47	1.00

Table 4 'Elastic net' regressions of the vote shares of the centre-left and centre-right. (Estimates on the full sample 1994–2018 and on the periods 1994–2007 and 2008–2018)

	Centre Left			Centre Right		
	Full Sample	1994–2007	2008–2018	Full Sample	1994–2007	2008–2018
P90/P50 on gross earnings	-0.009	0.002	0.000	-0.024	-0.009	0.008
P50/P10 on gross earnings	-0.009	0.011	-0.027	-0.026	-0.027	-0.035
Gini on disposable income	-0.012	-0.007	-0.012	-0.002	0.004	0.000
Gini on wealth	-0.010	-0.015	0.005	-0.007	0.007	-0.007
Log mean wealth	0.037	0.014	0.026	0.001	-0.016	-0.033
Log mean gross earnings	-0.024	-0.010	-0.005	-0.015	0.014	0.000
Share of part-time workers	-0.021	0.038	-0.070	-0.059	-0.023	-0.115
Share of tertiary graduates	0.003	0.014	-0.009	-0.011	-0.012	0.000
Employment rate	0.028	0.008	0.021	-0.003	-0.009	-0.005
Regional dummies	Yes	Yes	Yes	Yes	Yes	Yes
Period dummy	Yes	No	No	Yes	No	No
Observations	119	68	51	119	68	51

Notes: coefficients equal to 0.000 are set to zero by the 'elastic net' method.

The developments in the centre-right coalition, however, combine two different processes: the decline in the consensus of traditional conservative parties – Forza Italia and Fratelli d'Italia – on the one hand, and, on the other hand, the rapid growth in electoral support, up to 2018, of the Lega, with its 'anti-élite' agenda. We investigated separately the results for the Lega, shown in Table 5; its support is higher in regions with falling P50/P10 ratios, with a declining distance between the rich and median earnings, with growing shares of part-time workers, and declining average wealth. The estimated coefficient of impoverished middle income groups is coherent with the results of the centre-right as a whole (and is significant in both subperiods); however, differently from other centre-right forces (see Fig. 3), the Lega obtains greater votes where precarisation grows faster. As we have shown in our previous investigation (Bloise et al. 2021), the Lega and M5S were the parties able to capture the protest vote of the rapidly growing group of part time workers. Conversely, the other forces of the centre-right reflect the traditional strength of conservative parties in Southern regions, where incomes and university education are lower.

Summarising our findings, we find strong differences between the socio-economic factors behind electoral support for the centre-left, the centre-right and the Lega in particular. First, the centre-left has moved away from poorer workers and closer to wealthier voters. After the 2008 crisis the coalition lost the support it had from poorer part-time employees and from tertiary graduate residents – reversing the previous positive association – and strengthened instead its links to indicators of economic privilege such as growing average wealth, greater wealth inequality, larger distance between the rich and the median earnings of employees.

Second, the centre-right coalition combines two different factors: a general support in regions where the relative impoverishment of middle income groups is stronger, and the ability of the Lega alone to obtain consensus where part time work expands. Since 2008 the Lega has run elections in most regions, overcoming its previously

Table 5 **Regressions of the vote shares of the Lega**. (Fixed effects estimates on the full sample 1994–2018 and on the periods 1994–2007 and 2008–2018)

	Lega		
	Full Sample	1994–2007	2008–2018
P90/P50 on gross earnings	-0.038***	-0.008	0.003
	[0.010]	[0.020]	[0.141]
P50/P10 on gross earnings	-0.042***	-0.104***	-0.033*
	[0.014]	[0.027]	[0.017]
Gini on disposable income	0.008	0.005	-0.004
	[0.007]	[0.011]	[0.013]
Gini on wealth	-0.001	0.018	-0.016
	[0.011]	[0.014]	[0.011]
Log mean wealth	-0.030**	-0.033	0.000
	[0.010]	[0.028]	[0.020]
Log mean gross earnings	0.037	-0.102**	0.188
	[0.027]	[0.046]	[0.127]
Share of part-time workers	0.050**	-0.003	0.056
	[0.019]	[0.044]	[0.050]
Share of tertiary graduates	-0.003	0.018	0.017
	[0.011]	[0.016]	[0.032]
Employment rate	-0.028	-0.072*	-0.016
	[0.016]	[0.032]	[0.034]
Regional fixed effects	Yes	Yes	Yes
Period fixed effects	Yes	No	No
Observations	88	38	44
R-squared (within)	0.590	0.705	0.814

Notes: Standard errors (clustered at the regional level) in brackets.

limited regional appeal, and has transformed itself in ways that could appeal to the discontent of precarious workers with mainstream parties.

7 Conclusion

This article explores the associations between inequality, socio-economic factors and voting for the centre-left, the centre-right and the Lega in particular from the start of Italy's 'Second Republic' in 1994 to 2018. Major changes have been identified between the first (1994–2007) period and the post-2008 years, characterised by a prolonged recession, economic distress and political turmoil. Our results shed new light on specific aspects of the relationship between inequality and voting and provide an original perspective on the Italian case. Four main results emerge from our work, identifying key factors associated with the evolution of voting in Italy's regions.

Inequality matters. First, we show that inequality in income and wealth and structural economic conditions in Italy's regions are significantly associated with electoral outcomes. This is in line with results from other countries (Han 2016; Algan et al. 2017; Piketty 2019). Several political factors – ideology, cultures, leadership, social

mobilisations, policy agendas – clearly play a key role in election outcomes, but the association with inequality and economic distress is also relevant.

The long recession changed voting patterns. Second, we show that the 2008 crisis and the prolonged recession that followed were key drivers of Italy's political re-alignment, with the dramatic decline of the centre-left and of the more established centre-right parties, and the rise of anti-élite voting for the Lega and the Five Star Movement. The rejection of the centre-left and centre-right coalitions, which have taken turns in governing the country in the last 25 years, is also rooted in their policies, which have often converged in protecting the 'economics of privilege' (Pianta 2012). In the case of the Five Star Movement, our previous work (Bloise et al. 2021) showed that the key drivers of voting are income poverty and the share of part-time workers. Major shifts in the socio-economic base of parties are documented for the centre-left and the Lega in particular. Post-2008, the centre-left has shown closer associations with indicators of economic privilege, such as wealth levels and degree of inequality, losing consensus in regions where part-time, low-paid precarious work has become more widespread. While before 2008 the Lega had a socio-economic profile similar to that of the centre-right coalition, including the relevance of the support from impoverished middle classes, in the last decade the consensus for the Lega has expanded in regions where there is a concentration of part-time workers and university educated residents and where economic privilege is lower. As happened in several countries besides Italy, the Great Recession indeed contributed to the crisis of the social democratic party family in Europe, with specific developments in Southern Europe (Bremer 2018).

Social and regional characteristics have persistent associations. Third, our results are complementary to those on the role of class and other cleavages (Oesch and Rennwald 2018) in affecting the social base of political parties, and on the regional dimension of Italian electoral behaviour (Ceccarini and Newell 2019; Chiaramonte and De Sio 2019). We find the persistence of some long-term factors behind voting, rooted in social and regional divides, alongside the changes pointed out above. In particular, voting for the centre-left maintains some of its social roots among workers, as indicated by a strong association with higher employment rates, lower levels of labour earnings and lower inequality in disposable incomes. At the same time, centre-left voting is associated with growing average wealth and measurements of economic privilege, typical of the left's regional base in regions with large metropolitan areas and in Central Italy. Voting for the centre-right shows its class base through its consistently high consensus in regions where there is higher impoverishment of the middle classes (the P50/P10 ratio). Voting for the Lega reveals the persistence of its roots in some Northern regions through the association with higher average incomes and high inequalities.

Party positions matter. Fourth, our results allow us to reflect on the ways in which party strategies are correlated to voters' behaviour. Especially on the centre-left, as research has pointed out, the decline of votes, especially of their traditional class-bases, is especially visible when political and policy differences are blurred (Oesch 2008; Jansen et al. 2013). In fact, the capacity of the centre-left to maintain the working-class vote, at least in part, is considered a relevant factor in facing the potential competition of the radical populist right. Our results show that precarious workers

moved away from the centre-left after the 2008 crisis - and the labour market reforms introduced by centre-left governments. The Italian experience is in contrast to the cases of European countries where a successful radical left has been able to keep the low-skilled electorate in the progressive front (Ramiro 2016).

In sum, Italy's electoral turmoil is the result of two decades of slow growth and recession, increasing inequality and worsening socio-economic conditions, factors warranting adequate attention in the explanations for political change. Our findings on Italian regions document the specificity of associations between inequality, socio-economic conditions and voting, and their evolution after the 2008 crisis. Different variables which are correlated to the decline in votes for the centre-left and centre-right coalitions have been pointed out, together with the novel factors associated with the rise in consensus for the Lega. While some studies have argued about the presence of a general 'populist' wave rooted in economic distress (Kriesi 2014; Guiso et al. 2017), we find the sources of support for the Lega to be specific to its socio-economic and regional base, and often different from those of the other forces of the centre-right coalition. In our previous study – which addressed non-voting, vote for the Lega and support for the Five Star Movement – the factors associated with each of these three anti-élite electoral choices were found to be different (Bloise et al. 2021).

Alongside political, ideological, and cultural factors, the association between a more polarised, impoverished and unequal society and electoral behaviour emerges as a crucial factor for understanding Italy's recent – and current - political upheavals.

8 Appendix A. The Electoral Database of the Scuola Normale Superiore

In order to identify in a systematic way voting trends in Italian regions, we constructed the SNS voting database described in Sect. 3 above. Here we provide the full details of the definition of the key variables we considered for each general election in the period under investigation: votes for the Centre-Left parties; votes for the Centre-Right parties; votes for the Centre-Right without the Lega; votes for the Lega. 'Centre-Left' and 'Centre-Right' coalitions include all parties belonging to a broad notion of 'political-ideological bloc' competing for government responsibilities; the forming of coalitions was driven by the nature of Italy's electoral system after 1993.

Our database also includes electoral data for 'non-voters' and for the Movimento 5 Stelle, which are not considered in this article. Parties which did not obtain seats in Parliament are excluded from the database in order to ensure comparability among coalitions associated to government majorities in Parliament.

The units of observation are the following regions: Abruzzo-Molise, Basilicata-Calabria, Campania, Emilia-Romagna, Friuli Venezia Giulia, Lazio, Liguria, Lombardia, Marche, Piemonte, Puglia, Sardegna, Sicilia, Toscana, Trentino Alto Adige, Umbria, Veneto. In order to reduce the variance that may come from very small regions, Abruzzo and Molise on the one hand, and Basilicata and Calabria on the other hand, have been merged, while Valle d'Aosta has been excluded due to lack of

data. In all, we have 17 regional observations for each of the seven political elections in the period 1994–2018.

8.1 Centre-Left

Votes for Centre-Left parties are the share of voters that voted for the following parties:

Democratic Party (in 2008, 2013, 2018) and its predecessors, namely Partito Democratico della Sinistra (in 1994 and 1996), Democratici di Sinistra (in 2001), and Uniti nell'Ulivo (in 2006; this included Democratici di Sinistra, La Margherita, and Movimento dei Repubblicani Europei). Radical Left parties, Green parties and Minor Centre-Left and Centrist parties are included when in alliance with the Centre-Left coalition and when they obtained seats in Parliament.

8.2 Centre-Right

Votes for Centre-Right parties are the share of voters that cast their vote for the following parties:

Forza Italia (in 1994, 1996, 2001, 2006, 2018) and Popolo della Libertà (the merger between Forza Italia and Alleanza Nazionale in 2008 and 2013); Alleanza Nazionale (in 1994, 1996, 2001, 2006); Lega Nord (in 1994, 1996, 2001, 2006, 2008); Lega (in 2013, 2018); Fiamma Tricolore (in 2001); Fratelli d'Italia (in 2013 and 2018). Minor Centre-Right and Extreme Right parties are included when in alliance with the Centre-Left coalition and when they obtained seats in Parliament.

Votes for Centre-Right without the Lega is a variable that considers the share of voters that cast their vote for the Centre-Right parties excluding the Lega.

Votes for the Lega are the share of electors that cast their vote for Lega Nord and Lega.

Further details of the SNS electoral database are provided in Bloise et al. (2021).

9 Appendix B. The 'Elastic Net' Estimator

The 'elastic net' estimator combines features of other regularisation methods, i.e., the least absolute shrinkage and selection operator (LASSO) and ridge regression, to deal with highly correlated variables (Zou and Hastie 2005). Elastic net can be estimated according to the following expression:

$$min\left\{\sum_{r=1}^{n}\left(y_{rt}-\beta X_{rt}\right)^2 + \lambda\left[\alpha\sum_{j=1}^{k}|\beta_j| + (1-\alpha)\sum_{j=1}^{k}\beta_j^2\right]\right\} \tag{A1}$$

where all previously described explanatory variables are now included in the k-dimensional vector X_{rt} in Eq. (1).

Elastic net adds to the OLS estimator two penalisation parameters λ and α which, if greater than zero, have the potential ability to shrink some of the K coefficients included in the vector X_{rt} towards zero and set the coefficients of irrelevant regressors exactly to zero in order to reduce multicollinearity and overfitting. On the contrary, when $\lambda = 0$ and $\alpha = 0$, elastic net collapses to the simple OLS case (i.e. the first term of Equation A1), such that the coefficients of all explanatory variables are estimated without any shrinkage. It is noteworthy that elastic net collapses to ridge regression, when $\lambda > 0$ and $\alpha = 0$, and to LASSO when $\alpha = 1$.

Elastic net can be exploited for variable selection when the number of observations is very small compared with the number of explanatory variables and outperforms LASSO when the collinearity between regressors is potentially high (Zou and Hastie 2005).

Before estimating the coefficients, elastic net needs to be calibrated in order to select an "optimal" $\lambda - \alpha$ pair which minimise the out-of-sample mean squared error (MSE) of the model. The calibration of elastic net and other regularisation methods is usually obtained through K-fold cross-validation. In our case we use 4-fold cross-validation. Specifically, we randomly divide our data into 4 equally-sized subgroups (folds) such that 3/4 of the observations are iteratively used to estimate the coefficients and the remaining fold is exploited to predict the outcome variable. The optimal $\lambda - \alpha$ combination is the one which minimise the cross-validation MSE defined as the mean MSE computed across the 4 folds which are not exploited to estimate the coefficients. Once the "optimal" $\lambda - \alpha$ pair is selected, the coefficients are estimated on the full sample.

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