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Abstract

This study investigates how economic inequality shapes political participation and to what extent this relationship is moderated by political competition. In the case of Spain, the link between income inequality and turnout is negative, as expected, but rather weak, suggesting that local turnout rates do not depend exclusively on income inequality levels. We develop a theoretical model linking inequality, political competition and turnout. To test the validity of the theoretical model we derive a novel data set of inequality metrics for a sample of municipalities over the five local elections that took place between 2003 and 2019 and specify a spatial dynamic panel data model that allows us to account for serial dependence, unobserved spatial heterogeneity and spatial dependence. Our paper reveals two Spains: one in which high inequality and high levels of political competition yield relatively lower turnout rates, and one in which high levels of inequality and low levels of political competition yield relatively higher turnout rates. In addition, our findings suggest that this last result might be driven by a higher budgetary use of policies targeted to low income voters.

Keywords: Turnout, Income Inequality, Dynamic Spatial Panels, Spanish Municipalities

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1 Introduction

The relationship between economic inequality and political participation is a central tenet in the working of democracies. If the capacity of a citizen to provide input into the political system is stratified by income, there emerges a channel through which economic and political inequalities become self-reinforcing over time. This has been the central concern of a long tradition of research in political economy, providing considerable evidence of a negative relationship between inequality and the political engagement by low income citizens (Dahl, 1991; Przeworski, 2010; Schlozman *et al.*, 2012; Anduiza, 1999). This negative relationship is, however, primarily circumscribed to advanced industrial societies (Verba, 1995; Verba *et al.*, 2003). As a number of recent contributions have highlighted, poor citizens in developing democracies if anything participate more than their counterparts across advanced ones, thus raising a question about the conditions under which inequality shapes political participation positively or negatively (Kasara and Suryanarayan, 2014; Amat and Beramendi, 2020; Krishna, 2008).

In this paper we argue that a key, under-explored factor shaping the relationship between inequality and turnout lies in the spatial patterns of political competition. Building on Amat and Beramendi (2020), we argue that inequality matters for electoral participation primarily because it shapes elites's incentives to mobilize voters in different sectors of the income distribution via policy strategies. The fundamental choice comes down to one between targeted mobilization towards low income voters and public goods, whose access is typically enjoyed disproportionately by middle and upper income groups. Whether parties choose to pursue one strategy or the other depends on the levels of inequality and political competition, both variables that tend to be highly concentrated spatially. To the extend that this is the case, so are the policy choices by parties, thus shaping the relationship between inequality and electoral participation. By modeling this conditional, spatial relationship, we are able to account for the patterns observed within Spain, and offer a novel argument about the factors that condition the electoral implications of growing economic inequality. Our paper reveals two Spains: one in which high levels of inequality and low levels of political competition yield relatively higher turnout rates, and one in which high inequality and high levels of political competition yield relatively lower turnout rates.

Our analysis makes several contributions to the literature analyzing the link between political competition, income inequality and turnout. First, theoretically, we unpack the moderating role of the spatial patterns of political competition. This contributes an additional mechanism to a recent literature aimed at discovering the mechanisms governing the relationship between inequality and participation around the world (e.g. Kasara and Suryanarayan (2014)'s focus on the redistributive capacity of the state and the behavior of the rich or Amat and Beramendi (2020)'s attention to state capacity, mobilization strategies, and the behavior of the poor). Second, we apply the methodology presented in Hortas-Rico et al. (2014) to tax administrative records from Personal Income Tax (PIT) to derive a novel data set on local income inequality for those municipalities above 1,000 inhabitants. This novel inequality data set allows us to carry out the first municipality level analysis of the Spanish case, and exploit empirically an important case that bridges worlds across very different levels of development.

Third, methodologically, we specify a spatial dynamic panel data (SDPD) model that accounts for the spatial characteristics of the data on local election's turnout rates (i.e. serial dependence, spatial heterogeneity and spatial dependence) which is estimated by means of the Bias Corrected Quasi Maximum Likelihood (BCQML) estimator developed by Lee and Yu (2010). The benfits of this approach include (i) the removal of the unrealistic assumption of turnout rates to be independent over space and time and (ii) the ability to examine the scope and relevance of income inequality cross-jurisdiction spillovers on turnout rates. Uncertainty regarding model specification and the correct spatial weight matrix that captures spatial interactions among neighboring municipalities is addressed by means of Spatial Bayesian model selection techniques. In addition, to investigate the validity of the mechanisms proposed in our theoretical framework the baseline SDPD is extended in two directions. First, we investigate if the spending patterns produce the expected impacts on turnout rates conditional to the levels of income inequality and the degree of political competition. To that end we perform Monte Carlo simulations of a three-way interaction effect within the SDPD model, which is by itself a novel contribution in the field of spatial econometrics. Finally, we analyze if spatial interdependence in turnout rates arises due to the existence ideological clusters by means of spatial multi-regime model. This extended modeling framework allows us to test if the strength of interactions increases in spatial ideological clusters.

2 Theory: Inequality, Geography and Turnout

In this section we provide the necessary analytical tools to understand the logic governing the spatial concentration of patterns of political competition. We present our argument in two steps. First, we establish our premises about how politicians allocate resources across different mobilization tools given different institutional, political, and structural conditions; second we elaborate the implications that follow to understand the different spatial equilibria, focused on how the territorial unevenness of development, competition, and inequality shape local politicians' strategies.

2.1 Politicans' Budgetary Decisions as Mobilization Strategies

First, we develop a theoretical model to illustrate how political competition conditions the relationship between inequality and turnout across the geography. Our analysis of politicians' budgetary allocations follows Amat and Beramendi (2020). In their framework, three social groups of voters are divided according to wealth, with two rich elites $j = 1, 2$ that are assumed to compete among them and a group of poor individuals. Each elite group is represented by a political party. A portion δ belongs to the two elites combined. The remaining $(1 - \delta)$ are poor. The share of income of the elites is $\phi \in (0, 1]$. The remaining $(1 - \phi)$ share of wealth belongs to the poor. The middle class should be thought of as being part of the elite groups. As a result, the average income is given by:

$$\bar{w} = \frac{(1 - \delta)\, w_P}{(1 - \phi)} = \frac{\delta w_R}{\phi} \tag{1}$$

Elites seek to jointly maximize rents and electoral gains, and sets t_j (tax rate), g_j (general public good), b_j (targeted goods), and r_j (rents) accordingly. Voters seek to maximize their net income. Politicians and voters interact in different structural and institutional environments. The structural conditions differ in the level of inequality. The institutional conditions differ by both the level of state capacity and the intensity of political competition among parties (incumbent versus challenger). Capacity is a function of the state's ability to detect assets and implement policy. Competition is defined as the distance between the incumbent and the challenger. The key focus in the analysis concerns how these differences in context shape politicians's use of the budget as tool for electoral mobilization.

We introduce the notion of state capacity in two different ways. First, fiscal capacity, as the inverse of the capacity of wealthy individuals to hide their wealth from taxation, λ. Therefore, state's capacity increases as λ approaches zero[1 2]. Second, the state administrative capacity. We capture this capacity as the evenness with which the state can provide public goods to all citizens regardless of their background. In general, public goods are more effectively enjoyed by the middle and upper classes. As state capacity goes up, however, we should expect poor individuals are more likely to effectively enjoy access to these goods. We captured this as follows: poor individuals are able to enjoy a fraction $\gamma_P \in (0, 1)$, of the total amount of public goods provided to them.

We study the political process as a game with three stages. First, in stage 0, a representative individual from each elite j runs for office. Both candidates present their political offers in the form of policy-bundles to voters: a tax rate t_j, public goods g_j, local targeted goods for the poor b_j, and the rents that accrue to the elite each one represents r_j. In the paper, we refer to local targeted goods (b_j) as *pro-poor spending* and to public goods (g_j) as *pro-middle class spending.* Poor individuals act in the next two stages: they choose whether to participate in stage 1, and who to vote for in stage 2. We solve this game by backward induction.

In stage 2, each individual votes according to the utility maximization principle, so that each member of the elite votes for the candidate that represents them, and each poor individual decides to vote for the party which offers her a better deal. Thus, she votes for the Incumbent (I) if $U_P(t_I, b_I, g_I) \geq U_P(t_C, b_C, g_C)$, and for the challenger (C) otherwise. In stage 1, a poor individual will vote only if the utility she stands to achieve when either of the candidates wins is higher than her threshold utility, or $min\{U_P(t_I, b_I, g_I), U_P(t_C, b_C, g_C)\} \geq \bar{U}_p$.

Accordingly, *the optimization problem for the low income voters* can be defined as follows:

$$\begin{aligned} \underset{t,g,b}{\text{maximize}} \quad & (1-t)\, w_P + \gamma_P g + \ln(b) \\ \text{subject to} \quad & t\bar{w}(1-\lambda\phi) = b + g + r \end{aligned} \tag{2}$$

[1] λ is defined as a function of the share of income that belongs to the rich. Thus, for convenience we assume $\lambda = \theta(\phi) = \frac{\phi}{C}$

[2] Note that we assume that as concentration of income in hands of the few increases it becomes easier for elites to hide their income to the authorities in order to avoid paying taxes, quotes or to avoid certain regulations or administrative procedures.

Thus, in order to induce poor individuals to vote, a candidate's political offer must first guarantee that poor voters' utility exceeds their utility threshold too. The solution to this problem is given by (details provided in Appendix A.1):

$$\bar{U_P} = (1 - t^{max})\, w_p + \gamma_P t^{max} \bar{w}\, (1 - \lambda\phi) - 1 + \ln\left(\frac{1}{\gamma_p}\right) \tag{3}$$

This expression allows us to now formulate in full *the optimization problem of the elites.* The parameter μ measures the degree of elite bias in the candidate's calculation, i.e. how much weight is given to the candidate's own portion of the elite[3]. When $\mu = 1$, no weight is given to the utility of poor voters [4]. Most importantly, we also introduce the notion of elite competition with the parameter π, defined as the incumbent elite's probability of remaining in power. Each elites' candidate (j) [5] sets t_j, g_j, b_j and r_j facing two two constraints: (1) a standard budget constraint, out of which rents are derived, and (2) a political constraint to ensure that her political offer is high enough to prompt poor individuals to vote which is determined by the expected behavior of citizens below average income/wealth, as defined above. Thus, they face the following problem:

$$\begin{aligned} \underset{t_j, g_j, b_j,}{\text{maximize}} \quad & (1 - t_j)\, w_R + g_j + \mu\pi \ln(r_j) + (1 - \mu)\left[(1 - t_j)\, w_P + \gamma_P g_j + \ln(b_j)\right] \\ \text{subject to} \quad & t\bar{w} = b_j + g_j + r_j \\ \text{and} \quad & (1 - t_j)\, w_P + \gamma_P g_j + \ln(b_j) \geq \bar{U_P} \end{aligned} \tag{4}$$

Studying this problem yields important insights about the way in which inequality and competition shape elites' strategies.

Inequality: Our analysis predicts that inequality *decreases* the provision of public goods, when measured either as the proportion of poor individuals $(1 - \delta)$, or as the income share of high income citizens (ϕ). The relevant comparative statics here are (Appendix A.2 develops in detail all intermediate steps):

$$\frac{\partial g_j^*}{\partial (1 - \delta)} = -t^{max}\, (w_R - w_P) < 0 \tag{5}$$

[3]Accordingly, $\mu \in (0, 1]$, is defined as a function of state capacity and inequality such that $\mu = \phi C\lambda$, where $C \in (0, 1]$

[4]For convenience we assume a specific functional form: $\mu = \phi C\lambda = \phi^2$. Implicit to this form is the idea that the higher the concentration of income in the elite, the less they care on poor voter preferences

[5]j indexes both party elites: I for incumbent, and C for challenger. Furthermore, the candidate of elite j sets r_j to be distributed *only* to individuals who belong to elite j.

$$\frac{\partial g_j^*}{\partial \phi} = -\frac{t^{max}\delta w_R}{\phi^2} < 0 \tag{6}$$

Equations (5) and (6) imply that as the number of low-income voters or as the share of wealth that belongs to the rich increases, the incentives by incumbent political parties to provide general public goods to mobilize low-income voters should decline. As a result, with higher economic inequality political incumbents should have, on average, lower incentives to provide general public goods. Conversely, the model generates another interesting comparative static according to which when the fraction of low-income voters increases the incentives of elites to resort to targeted spending towards the poor are higher, as $\frac{\partial b_j^*}{\partial(1-\delta)} = \lambda\gamma_P t^{max} w_R > 0$.

Elite Competition. The second insight emerging from our model concerns the differential impact of political competition on different types of spending. We uncover two results. First, competition enhances the provision of public goods (g^*). Formally:

$$\frac{\partial g_j^*}{\partial \pi} = -\mu < 0 \tag{7}$$

By implication, it follows that lower competition on average should have a negative effect on the provision of general public goods. Interestingly, the model predicts that this will be the case specially when the degree of elite bias, which is captured by the μ parameter, is higher. Second, our analysis also yields an interesting insight on the link between competition and pro-poor spending. We uncover two results. The first one, captured in equation 8 (again, we develop all formal details in Appendix A.2), is that as the incumbent's probability of retaining power increases (i.e. as π increases and therefore political competition declines) the level of pro-poor spending increases. Interestingly, as implied in equation 9, this link grows stronger as the income share of the rich increases.

$$\frac{\partial ln(b_j^*)}{\partial \pi} = \frac{1}{\pi} + \frac{\lambda\phi t^{max}\bar{w}}{\pi^2\mu} > 0 \tag{8}$$

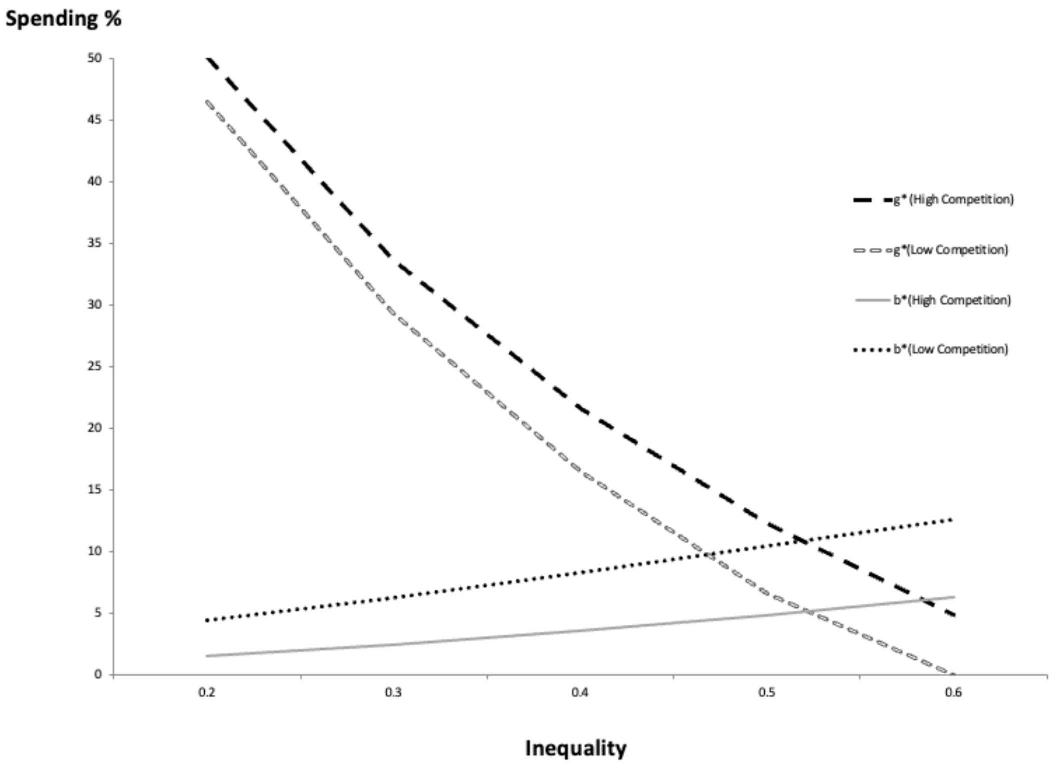
$$\frac{\partial}{\partial \phi}\left(\frac{\partial ln(b_j^*)}{\partial \pi}\right) = \frac{t^{max}\delta w_R}{C\pi^2\mu} > 0 \tag{9}$$

Crucially, these two comparative statics suggest that under conditions of very high economic inequality and low political competition, high inequality and pro-poor spending should reinforce each other in equilibrium.[6]

2.2 An Illustration of the Model and Theoretical Expectations

Figure (1) integrates our main analytical results obtained in the previous comparative statics. It simulates budget allocation choices between pro-poor (b) and pro-middle class spending (g) in a democracy with varying levels of economic inequality and political competition. The horizontal axis represents the level of inequality as proxied, concurrently, by the share of low income voters ($1-\delta$, ranging from 0.3 and 0.7) and the share of assets by the wealth (ϕ, ranging between 0.5 and 0.8); low (high) competition refers to democracies where the probability for the incumbent to be re-elected is 90% (50%). We assume a high capacity state ($\lambda = 0.2, t = 0.45$) and an increasing influence by the rich (μ) as inequality increases.

Figure 1: Inequality, Competition and Spending Strategies: Expectations in Equilibrium



Much like entrepreneurs in oligarchic markets competing, political parties' machines under

[6]At the same time, to the extent that economic inequality translates into a higher share of low income individuals, a rise in political competition (that is, a lower chance of securing victory) leads incumbent elites to doubling down at the margin on pro-poor spending. See Equation (32 in Appendix A.2)

democracy anticipate each other's reactions to alternative moves and decide accordingly. Interestingly, and consistent with the analytical results in the model, Figure (1) shows that pro-poor and pro-middle class spending follow different patterns under divergent conditions of inequality and competition:

1. Pro-poor spending emerges as the preferred strategy under conditions of low competition and high inequality. In other words, for local incumbents it is optimal to rely on pro-poor spending under high inequality when they enjoy a secure position (they are quasi-monopolists). The empirical implication of this relationship with respect to turnout is that, in equilibrium, we should observe greater turnout rates when local incumbents spend in pro-poor targeted goods in contexts of low competition and high economic inequality.

2. On the other hand, general public goods spending is at their maximum when political competition is high and economic inequality is low. The provision of general public good declines as party competition decreases, and specially so when there is more economic inequality. The focus on pro-middle class spending reduces pro-poor support, and reduces the incentives by citizens in the lower half of the income distribution to participate. As such, empirically we should find lower turnout rates when local incumbents spend in pro-middle-class general public goods in contexts of declining competition and growing economic inequality.

Crucially for our argument, these trade-offs are hardly neutral across time or space because of the uneven legacy of political and economic development. As development takes place, three things change. First, development makes contacting and mobilizing voters via brokers less efficient (Stokes *et al.*, 2013). Second, demands for large scale public goods (including large scale infrastructural developments, and (highly stratified) education systems tailored to the interests of urban middle classes and high income voters) and the state's ability to meet them rise (Lizzeri and Persico, 2004; Llavador and Oxoby, 2005; Lindert, 2004; Stigler, 1970). Third, development matters because it increases the cost of clientelism (Weitz, 2012). These dynamics are linked to strong spatial asymmetries. A long tradition of research in economic and political geography sees economic heterogeneity within nations as the long run legacy of patterns of industrialization, urbanization, and distribution (Krugman, 1991, Venables, 2001, Engerman and Sokolof, 1997, Engerman and Sokolof, 2000). These patterns are in turn linked to the internal organization of democracies, and map onto the design of political jurisdictions. More decentralized systems tend to emerge and persist in societies with more skewed economic geographies (Beramendi, 2012, Beramendi*et al.*, 2022). In turn, decentralization implies, by design, a spatial *specialization* in terms of political competition (Caramani, 2004). On the basis of the framework above and the comparative statics previously discussed, we can conceive two *spatially segregated* pattern.

First, strongholds should emerge in less economically developed areas, with relatively lower levels of urbanization, high levels of population dispersion. Our model suggests that in this context, given high levels of inequality, it is optimal for parties to seek electoral gains via targeted mobilization. In the context of a decentralized state, party organizations will select cadres on the basis of the performance of local officials in the delivery of local votes. This creates a logic of intra-party competition to maximize the amount of votes each locality can bring to the table, thereby boosting mobilization efforts. To the extent that any given party is successful in building such an organizational structure in any given region early on during the process of democratization, they will manage to secure control over a large number of offices and acquire a significant incumbency advantage for subsequent electoral contests. This in turn leads to the proliferation of spatial *monopolies*. Instead of challenging from within the parties that have acquired an advantage in particular region, competing parties place more effort in securing their own (relatively underdeveloped) areas of electoral dominance. Insofar as national party organizations do not intervene to try to alter these patterns, and in the absence of external shocks, these spatial monopolies will tend to be persistent over time. Within these areas, we would expect economic inequality to be associated with: (i) lower levels of political competition, (ii) higher effort on pro-poor spending and lower effort on pro-middle class spending, (iii) and, as a result, a positive link between between economic inequality and turnout.

Instead, relatively competitive political markets should predominate in wealthier regions with a history of earlier and more expansive industrialization and urbanization, with higher population density and varying levels of inequality. In these settings, political markets are characterized by competing parties with clearly differentiated platforms over the general public goods (more or less public funding for services, more or less progressivity, more or less regulation or privatization). National and regional party organizations coordinate offerings across areas and there is no spatial differentiation of strategies. Parties compete programmatically for the support of middle income groups and never manage to acquire persistent political control over specific units. As a result low income voters tend to be prioritized less, thus leading to a negative impact of poverty and inequality on turnout, and political markets tend to be more competitive. Within these areas, we would expect economic inequality to be associated with: (i) higher levels of political competition, (ii) lower effort on pro-poor spending and higher effort on pro-middle class spending, (iii) and, therefore, a negative link between between inequality and turnout.

3 Empirical strategy and Data

3.1 Data

To evaluate the empirical expectations presented above we focus on the case of Spain. Spain is a developed, decentralized democracy, with high levels of state capacity and, at the same time, territorially uneven patterns of political and economic development. It provides an ideal context where to explore the existence/combination of the two types of spatially defined political markets identified by the theory.

We study the relationship between inequality, competition, and turnout in the five local elections that took place between 2003 and 2019. Focusing on within-variation in Spain has several advantages. First, we are able to hold constant the degree of state capacity (λ), which we assume to be constant across all municipalities over a 1,000 inhabitants in Spain. Second, we also hold constant other sources of potential unobserved heterogeneity such as the electoral system (all local electoral councils are selected using the D'Hondt method and a closed list proportional representation, with a threshold of 5 % threshold, aimed at reducing the number of parties). Finally, the sources from which we gather data are homogeneous across all units under consideration.

Our empirical analysis is based on a sample of 2,541 Spanish municipalities. The sample includes almost all municipalities with populations above 1,000 inhabitants, which represent about the 30% of total municipalities and 80% of the whole population. This sample reflects the availability of data on local elections and the possibility to obtain precise estimates on the local income distribution from which to derive inequality metrics.

Dependent variable, Y

Our dependent variable is the political participation in local elections to elect members of the municipal council. In Spain, local elections are held every four years simultaneously in all the municipalities. Voters choose between various party lists, which being closed means that no preferences regarding the ranking of the names on these lists can be expressed. The electoral system is proportional and seats are allocated according to the *d'Hondt rule* and the mayor is then elected by a majority of the municiaplity council. The voter turnout is defined as the ratio between the total votes (including valid and null votes) and the total number of registered electors, and it is calculated for every local election included in this study (i.e. 2003, 2007, 2011, 2015, and 2019).

Explanatory variables, X

- *Income inequality:*

In Spain, as in many other countries, official statistics do not provide local data on income inequality. Thus, we resort to available micro data on Personal Income Tax (PIT) records from the Spanish Tax Administration Office and follow Hortas-Rico et al. (2014)'s re-weighting procedure to construct a data set on local income inequality measures for a representative sample of municipalities with more than 1,000 inhabitants. In particular, we draw on data from the 2003, 2007, 2011, 2015, and 2019 PIT samples, which include 0.94, 0.96, 2.04, 2.2 and 3.31 million records extracted from a population of 16.47, 17.84, 19.46, 19.35 and 21.03 million record of personal income tax returns, respectively. Then, we calculate the Gini index of taxable income as our (pretax) baseline income inequality measure, as it is the ubiquitous standard in the inequality literature.

- *Margin of Majority:*

The second key explanatory variable acting as a moderator of the effect of income inequality in turnout outcomes is the margin of majority. This variable is used as a proxy of the degree of political competition in local elections (i.e, a higher margin of majority reflects a lower degree of competition). We calculate the margin of majority as the vote share of the largest party in municipality i minus the 50% . In the econometric analysis we introduce this variable lagged in time to minimize potential reverse causality problems.

- *Additional control variables:*

According to previous empirical literature (see, e.g., Blais, 2006), an additional set of control variables has been added to the analysis. In particular, we include a first group of factors related to economic characteristics of the municipalities, such as (i) income, (ii) government spending, (iii) tax revenues and (iv) transfers, all expressed in per capita terms and thousands of euros. Second, we consider a group of potential determinants of electoral participation that captures differentials in the socio-demographic characteristics of the municipalities, including (v) the share of elderly population, (vi) the share of immigrants, (vii) the share of population with tertiary education and (viii) the population size. Finally, a set of variables that accounts for the effect of different political environments has been added: (ix) the ideology of the governing party and (x) the national and (xi) regional alignment.

Descriptive statistics, data sources and expected effects of the variables used in this analysis are presented in Table A1 in Appendix B.

3.2 Preliminary evidence

3.2.1 The link between inequality and turnout

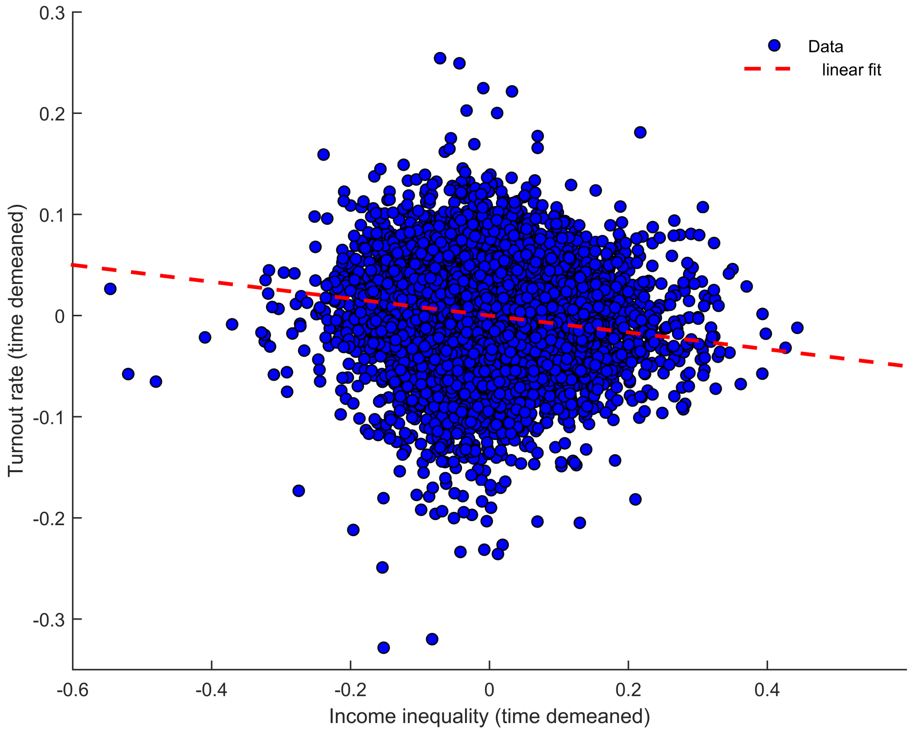
Spain is a middle income country that industrialized and democratized relatively late. It falls in between the two worlds of early and late development and therefore constitutes an ideal laboratory to analyze the relationship between inequality and turnout. Figure (2) presents a graphical illustration on the association between income inequality and voter turnout rates in Spanish municipalities during the period 2003-2019, where local elections have taken place in the years 2003, 2007, 2011, 2015, and 2019.[7]

The scatter plot suggests the existence of a negative relationship between income inequality and political participation during the period under consideration, consistent with the conventional wisdom about advanced industrial societies. Municipalities with higher income inequality tend to participate less in local elections, while those municipalities with lower inequality levels are characterized, on average, by a higher turnout rate. The observed link is statistically significant (t-value is -17.73), and the measure of income inequality alone explains around 3% of variation in local turnout rates across Spanish municipalities. The slope of the relationship is rather

[7]To that end, the original variables are demeaned with respect their temporal averages (i.e, $\tilde{y}_i = y_{it} - \bar{y}_i$ where $\bar{y}_i = \frac{1}{T}\sum_{t=1}^{T} y_{it}$)

weak (i.e., a 1% increase in the Gini coefficient reduces turnout by 0.083%), however, and there remains a large amount of unexplained variation. Figure (2) does indeed suggest that local turnout rates might not depend exclusively on income inequality levels or that the relationship between inequality and turnout is moderated by other factors.

Figure 2: The Link Between Income inequality and Turnout rates



3.2.2 Spatial patterns of income inequality, political competition and social spending

As suggested by the theoretical framework developed in Section (2), the relationship between income inequality and voter turnout might be moderated by the degree of political competition. To explore this issue, Table (1) summarizes municipal turnout rates for different levels of income inequality as the political competition increases (i.e, the margin of majority decreases). The upper part of Table (1) shows turnout rates when employing a two group classification based on the median of the Gini index and the median of the margin of majority. As shown in the first row, given a relatively high level of inequality, when we move from municipalities where political competition is high, toward municipalities where competition is low, the turnout rate decreases from 76.4% to 71.3%. A similar pattern is observed in the second row for municipalities where inequality is low (from 76% to 68.9%). Overall, this preliminary information suggests that for a given inequality level, lower levels of political competition encourage participation.

Table 1: Turnout rates conditional to inequality and political competition

		Two-Groups Classification	
		Margin of Majority	
		High	Low
Income	High	0.764	0.713
Inequality	Low	0.760	0.689

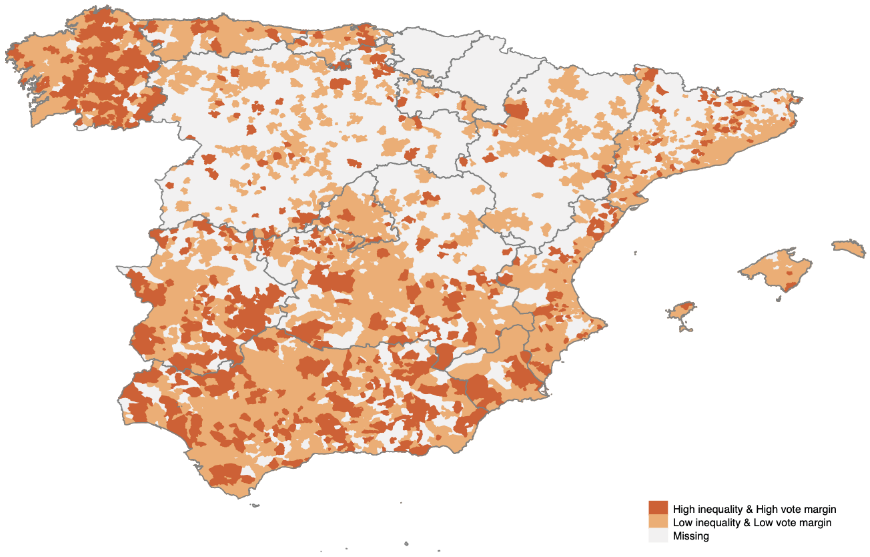
To complement the information provided in Table (1), we further explore the geographical link between the average turnout rates, income inequality and the margins of majority in the five local elections under consideration. Figure (3) maps the turnout rates according to income inequality and vote margins. Among the municipalities belonging to the high-inequality and high-margin group, we find that 40% are located in the regions of Andalucia and Galicia which are the traditional fishing grounds of votes of the left-wing and right-wing parties, respectively. If we add the regions of Extremadura and the Valencian Community, these figures increase to the 60%. Thus, 60% of the municipalities displaying a pattern of high inequality and high margin of majority are geographically concentrated in four regions (out of the existing 17 regions), where historically, the electorate has always supported these traditional parties and where clientelistic relationships between parties and voters are likely to be at place.[8] In fact, existing regional data on quality of government for these regions suggest they are among the most corrupt governments in Spain.[9]

As explained in Section (2), it is easier for elites to resort to target public goods (i.e, pro-poor social spending) when inequality is high and when political competition is low. Thus, the spatial patterns observed in Figure (3) should show an overlap with that of per capita pro-poor social spending. We investigate this issue graphically in Figure (4). As observed, municipalities belonging to the regions of Andalucia and Galicia also exhibit the highest per capita pro-poor

[8]Since the beginning of the Spanish democratic regime, there have been regional elections in Andalucia in the years 1982, 1986, 1990, 1994, 1996, 2000, 2004, 2008, 2012, 2015, and 2018. The left-wing Socialist party has won every election but the last one. On the other hand, in Galicia, the right-wing Popular Party obtained consecutive victories in all the electoral contests occurred in 1981, 1985, 1989, 1993, 1997, 2001, 2005, 2009, 2012 and 2016.

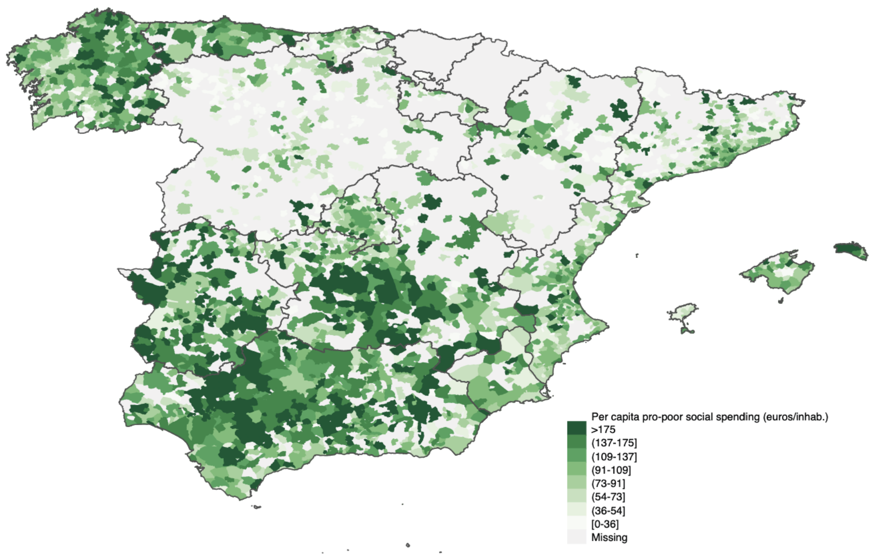
[9]Further information on the distribution of corruption across Spanish regions is reported in Appendix B, Table A2. These data are taken from the Quality of Government Institute website.

Figure 3: Inequality and Margins of Majority in Spain, 2003-2019



social spending, which is in line with the political-economy equilibrium shown in Figure (1).

Figure 4: Map of per capita pro-poor social spending in Spain, 2003-2019



3.2.3 Spatial dependence in turnout rates

Political turnout rates data are spatial data. Figure (5) displays the Moran's Scatterplot and provides a first insight on the role of space shaping political participation in Spanish local elections during 2003-2019. The X-axis reports the turnout y, while y-axis reports its spatial lag

Wy, where y is the vector of gathering all municipalities in the sample and W is a spatial weight matrix describing the spatial arrangement in the sample.[10] The estimated Moran's I index takes a value of 0.466 and it is statistically significant at the 1% level, showing the existence of a strong positive spatial dependence across the sample municipalities.[11]

As a further check, Figure (5) also displays the estimated spatially conditioned stochastic kernel and the contour map of (relative) turnout rates following the methodology outlined by Magrini (2007). The results indicate that the probability mass aligns parallel to the axis representing the original distribution. Accordingly, spatial effects play a significant role in explaining the observed variability in turnout rates. Moreover, Figure (5) displays a multi-peaked distribution, implying that different spatial clusters (or regimes) may exist for different levels of political participation.[12]

Taken together, these preliminary findings suggest that (i) the link between income inequality and turnout rates might be dependent on the level of political competition. In addition, the spatial patterns observed in this preliminary analysis suggest that (ii) the hypothesis that in contexts of high-inequality, turnout rates increase because political parties resort to clientelism as a mobilization strategy, could be valid to explain the Spanish local experience. The rest of the paper aims to test these predictions.

3.3 Econometric Approach

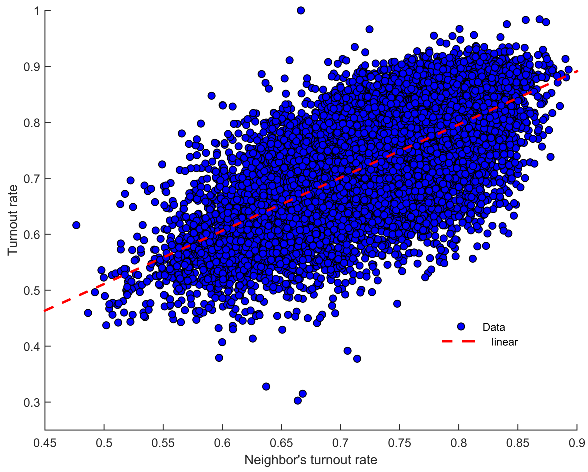
To date, only a handful of studies have considered spatial dependence when analyzing the determinants of turnout rates (few exceptions are Cho and Rudolph, 2008, Cutts and Webber, 2010 ; Lacombe *et al.*, 2016). However, preliminary evidence shown in Section 3.2.3 suggests that research on local turnout rates may suffer major problems if it ignores the spatial characteristics of the data. From an econometric standpoint, the effects of leaving these interactions out of the model specification are potentially significant and could result in estimates that are biased, inconsistent and/or inefficient (Elhorst, 2014).

[10] As a first approach, we assume a 10-nearest neighbor W matrix.

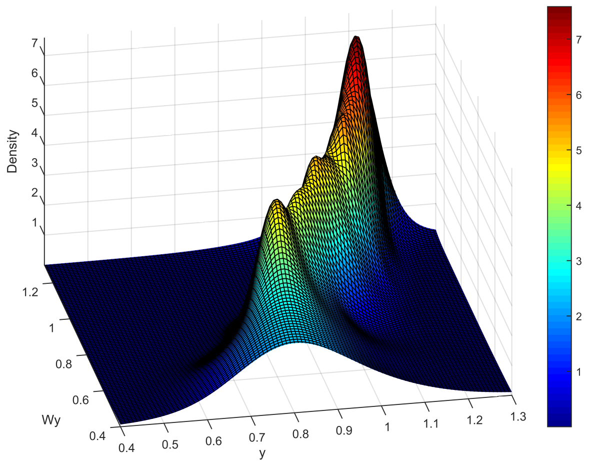
[11] The Moran's I index measures the degree of spatial auto-correlation in the data and its null hypothesis states that the data is randomly distributed over the spatial domain.

[12] The estimation of the stochastic kernel relies in Gaussian kernel smoothing functions developed by Magrini (2007) and it is performed by employing the L-stage Direct Plug-In estimator with an adaptive bandwidth that scales pilot estimates of the joint distribution by $\alpha = 0.5$.

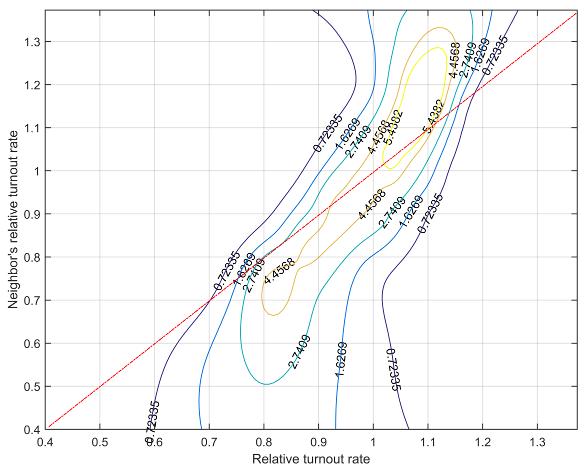
Figure 5: Spatial Effects in the Turnout Rates of Spanish Local Elections



(a) Moran's Scatterplot



(b) Spatially conditioned stochastic kernel



(c) Contour map

In view of this, to model the spatio-temporal evolution of turnout rates in the local elections of Spain, we begin our analysis with the following Dynamic Spatial Lag Model (DSLM) including municipal fixed effects:

$$Y_t = \mu + \rho W Y_t + \tau Y_{t-1} + \eta W Y_{t-1} + X_t \beta + \epsilon_t \tag{10}$$

where Y_t reresents the N-dimensional vector of observations representing the turnout rate for each municipality in the sample ($i = 1, \ldots, N$) at a particular point in time ($t = 1, \ldots, T$). The exogenous aggregate socioeconomic variables are included in a $N \times K$ matrix X_t, along with the corresponding response parameters β included in a $K \times 1$ vector. τ, the response parameter of the lagged dependent variable Y_{t-1} and $\epsilon_t = (\epsilon_{1t}, \ldots, \epsilon_{Nt})^{'}$ is a $N \times 1$ vector of i.i.d. disturbance terms. $\mu = (\mu_1, \ldots, \mu_N)^{'}$ is a vector of municipal fixed effects which controls for all municipal-specific time invariant variables whose omission could bias the estimates. W is a $N \times N$ matrix that describes the structure of spatial dependence between the municipalities in the sample. WY_t and WY_{t-1} capture contemporaneous and lagged endogenous interaction effects among the dependent variable and ρ and η are the spatial auto-regressive and the space-time coefficients associated to WY_t and WY_{t-1}, respectively.

As noted in LeSage and Pace (2009), in a model with an endogenous spatial interaction term, as it is the case of our DSLM, a change in a particular covariate in municipality i impacts the municipality itself (*direct effect*) and can potentially affect the remaining municipalities (*indirect effect*). The direct effect summarizes the average impact in the turnout rate of a given municipality arising from a one unit change in that municipality's covariate. The indirect effect captures the averaged overall impact of changing a covariate in all other municipalities on the turnout rate of a specific municipality or, alternatively, the impact of a change in a covariate in a particular municipality on the turnout rates of the other municipalities. The *total effect* is the sum of both the direct and indirect impacts.

As in Debarsy *et al.* (2020), to carry out inference with our dynamic spatial panel data model of Equation (10), we resort to the matrix of partial derivatives of Y_t with respect the *k-th* explanatory variable of X_t in municipality 1 up to municipality N at a particular point in time

t is given by:

$$\frac{\partial Y_t}{\partial X_t^k} = [I - \rho W]^{-1} \left[\beta^{(k)}\right] \tag{11}$$

Direct short run effects are captured by diagonal terms in Equations (11) while the *indirect short run effects* correspond to off-diagonal terms. The *long run effects*, are given by:

$$\frac{\partial Y_t}{\partial X_t^k} = [(1 - \tau)\, I_n - (\rho + \eta)\, W]^{-1} \left[\beta^{(k)} W\right] \tag{12}$$

The estimation of the dynamic spatial panel data model of Equation (10) involves defining a spatial weights matrix W. We consider a set of row-standardized W geographical distance-based matrices between the sample municipalities. By using these geographical distance matrices, we ensure that W remains exogenous, as suggested by Anselin and Bera (1998) and we avoid the identification issues pointed out by Manski (1993). Furthermore, we explore the potential for alternative spatial processes to explain the observed spatial interdependence in turnout rates (for a taxonomy see Elhorst (2014)). In order to choose between different potential specifications of the turnout rates and the spatial weight matrix W, we follow LeSage (2014) and Rios and Ginamoena (2018) and apply a Spatial Bayesian model comparison approach to derive model probabilities. We find that the DSLM in Equation (10) is the preferred spatial model specification and, conditional to the DSLM model specifications, the spatial weight matrix displaying the highest probability is the 10 nearest neighbor matrix (see Table A3 in Appendix C for further details). Thus, for the reminder of the paper we base our inference in the DSLM specification with the 10 nearest neighbor matrix.

4 Results

4.1 Baseline Results

According to the model selection performed in the previous section the DSLM is the best specification to model turnout rates and the accurate description of the evolution of turnout rates in Spanish local elections require to consider endogenous cross-municipal interactions. However, to motivate the methodological approach of this study, Table (2) below also presents the estimation results of different dynamic but non-spatial panel data models.

Table 2: Main Results

	Model I [Non Spatial] (1)	Model II [Non Spatial] (2)	Model III [Spatial] (3)	Model IV [Spatial] (4)
Inequality(t)	-0.029***	-0.030***	-0.013**	-0.013***
	(-5.26)	(-5.38)	(-2.55)	(-2.65)
Margin of majority(t-1)	-0.009*	-0.100***	-0.008*	-0.061***
	(-1.89)	(-5.87)	(-1.86)	(-3.97)
Margin(t-1)*Inequality(t)		0.194***		0.113***
		(5.60)		(3.60)
Turnout (t-1)	0.027***	0.026***	0.289***	0.290***
	(27.95)	(28.85)	(31.12)	(31.20)
Neighbors' Turnout (t)			0.675***	0.682***
			(69.19)	(70.97)
Neighbors' Turnout (t-1)			-0.182***	-0.185***
			(-12.28)	(-12.50)
Controls	Yes	Yes	Yes	Yes
Municipal fixed effects	Yes	Yes	Yes	Yes
Great Recession dummy	Yes	Yes	Yes	Yes
R-squared	0.845	0.846	0.9893	0.893

Notes: The dependent variable is in all cases the political turnout rate in local elections (2003, 2007, 2011, 2015, and 2019). * Significant at 10% level. ** Significant at 5% level. *** Significant at 1% level. t-statistics provided within parenthesis. Columns (1) and (2) report the OLS estimates of the non-spatial model. Columns (3) and (4) report the dynamic spatial lag model results. The spatial weight matrix employed in the spatial models (columns (3) and (4)) is the 10 nearest neighbors' spatial weight matrix. Estimator: BCQML of Lee and Yu (2010). Control variables include income, taxes, spending, transfers, old population, education, migration, (log of) total population, ideology, regional and national alignment and a dummy for the Great Recession. The estimation results for the full set of controls are provided in Appendix D, Table A4.

Column (1) of Table (2) shows the results obtained when model given by Equation (10) is estimated by the Least Square Dummy Variable (LSDV) estimator assuming $\rho = 0$ and $\eta = 0$. As it can be observed, the estimated parameter of income inequality is negative and statistically significant at the 1% level, pointing to a negative association between income inequality and turnout rates among Spanish municipalities. Furthermore, we find that the coefficient of the lagged margin of majority is negative and weakly significant, indicating that the existence of electoral competition exerts a positive effect on turnout rates across the sample of municipalities.

In Column (2) the model is extended by including an interaction term between income inequality and the lagged margin of majority. As observed, the estimated coefficient (0.194) is positive and statistically significant at the 1% level, suggesting that the effect of income inequality on political participation is moderated by the degree of electoral competition. Nevertheless, these results should be treated with caution since, as mentioned in Section 3.2.3, there are important reasons to believe that spatial interactions play an important role in explaining the patterns of local turnout rates in Spain and, therefore, their omission could generate biased, inconsistent and/or inefficient estimates.

In view of this, the DSLM described in the previous section is estimated by means of the BCQML estimator developed by Lee and Yu (2010).[13] In Column (3) the model is estimated without the interaction term whereas Column (4) reports the interaction effect between income inequality and the lagged margin of majority. At this point, it is important to discuss some estimation features of these spatial models. First, as shown in Columns (3) and (4), the estimated parameters of Y_{t-1}, WY_t and WY_{t-1} are statistically significant, confirming the suitability of our dynamic spatial panel data modeling approach for studying the evolution of turnout rates and that electoral participation in one municipality exerts an impact on neighboring municipalities. Second, as discussed in Yu *et al.* (2012), inference based on spatial dynamic models is only valid if the model is stable, i.e. $\tau + \rho + \lambda < 1$. We perform a (two-sided) Wald-test to test the (null) hypothesis of $\tau + \rho + \lambda = 1$ and the results indicate that in the both cases the model is stable: for the model in Column (3) $\tau + \rho + \lambda = 0.782$ with a p-value of 0.00 and for the model in Column (4) $\tau + \rho + \lambda = 0.786$ with p-value 0.00. The space-time coefficients reveal the existence of simultaneous positive spillovers in turnout rates as a 1% increase in the turnout of neighboring municipalities (WY_t) increases turnout in i by 0.682%. In addition, we find some degree of time persistence as a 1% increase in the last elections raises turnout in the next elections by 0.29%.

As explained in Section 3.3, the correct interpretation of the parameter estimates in the DSLM presented in Column (4) requires to take into account the direct, indirect and total effects associated with changes in the regressors. These effects are provided in Table (3). As observed, simultaneous *short run direct effects* shown in Column (1) of Table (5) are slightly different from the estimates of the response parameters shown in Column (4) of Table (2). These differences are due to the spatial feedback effects that arise as a result of impacts passing through other municipalities and back to the municipality itself, which on average for this specific context are around the 9% of the direct effect.[14] Short run indirect effects are significant for 10 out of the 15 regressors and amplify significantly direct effects accounting for the 65% of the total effect. The interpretation of this result is that if all municipalities $j = 1, \ldots, N$ other than i experience a change in X^k, this will have a greater effect in i that if only i experiments a change in X^k, which can be explained by the fact that individual municipalities are usually very small in size relative

[13] The QML estimator is biased when both the number of spatial units and the points in time in the sample go to infinity. Nonetheless, according to Lee and Yu (2010) it is possible to introduce a bias correction procedure that will yield consistent parameter estimates if the model is stable, i.e. whenever $\tau + \rho + \eta$ is significantly smaller than one.

[14] Spatial feedback effects for any regressor k can be calculated as $\frac{DE_k - \beta_k}{\beta_k}$.

to the whole system of interacting units.

Table 3: Spatial Effects Decomposition.

	Short term effects			Long term effects		
Variables	Direct Effects (1)	Indirect Effects (2)	Total Effects (3)	Direct Effects (4)	Indirect Effects (5)	Total Effects (6)
Inequality(t)	-0.014***	-0.027***	-0.041***	-0.020***	-0.041***	-0.061***
	(-2.64)	(-2.61)	(-2.62)	(-2.63)	(-2.58)	(-2.61)
Margin of majority(t-1)	-0.067***	-0.128***	-0.195***	-0.094***	-0.196***	-0.290***
	(-3.95)	(-3.87)	(-3.91)	(-3.96)	(-3.74)	(-3.85)
Margin(t-1)*Inequality(t)	0.124***	0.238***	0.361***	0.175***	0.364***	0.539***
	(3.56)	(3.50)	(3.53)	(3.55)	(3.41)	(3.49)
Space-time dynamics	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Municipal fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Great Recession dummy	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The dependent variable is in all cases the turnout rate in local elections. * significant at 10% level, ** significant at 5% level, *** significant at 1% level. t-statistics provided within parenthesis. Space-time dynamics refer to the inclusion of turnout (t-1) and neighbors' turnout (t and t-1). Inferences regarding the statistical significance of these effects are based on the variation of 1,000 simulated parameter combinations drawn from the variance-covariance matrix implied by the BC-QML estimation of Model IV in Table (2), including the interaction term between income inequality and the margin of majority. The results are obtained using the 10 nearest neighbors' spatial weights matrix. Control variables include income, taxes, spending, transfers, old population, education, migration, (log of) total population, ideology, regional and national alignment and a dummy for the Great Recession. The spatial effect decomposition for the full set of controls is provided in Appendix D, Table A5.

Columns (4) to (6) of Table (3) display *long run effects.* As can be seen, the main variables of interest generate the expected results and show similar effects in both the short and long term. Moreover, the discrepancies between the short- and long-run effects are consistent with the spatial economic theory and imply that, apart from the first period where interaction effects are mainly pure spatial feedback effects, spatio-temporal feedbacks passing from one municipality to another seem to be relevant in explaining variations in the turnout rate. Furthermore, simultaneous effects account for 67% of the total long-run effect, suggesting that the diffusion of shocks to turnout takes time to unravel.

If we now turn our attention the main aim of the paper, we find a negative and statistically significant association between income inequality and turnout rates. This result is in line with the preliminary empirical evidence provided in section 3.2.3. In particular, our estimates show that the total effect of lowering the Gini coefficient by 1% is associated with an increase in the turnout rate of 0.041% in the *short run.* Thus, the bias of the non-spatial model estimate in this context is about 27%, which implies that the omission of contextual effects in local elections underestimates the impact of income inequality.

The direct and indirect effects can be interpreted as follows. On the one hand, an increase in income inequality in a given municipality reduces its turnout rates. On the other hand, this increase also reduces the turnout rates in neighboring municipalities, implying that turnout rates in a specific municipality also depend on the degree of income inequality registered by the remaining municipalities. In fact, the indirect effect accounts for 67.5% of the overall *long-run* impact caused by changes in the Gini index, thus corroborating the empirical relevance of spatial spillovers in this context.

We now focus on how the level of electoral competition acts as a moderator of the impact of inequality on electoral participation. The total effect of the interaction term $Ineq_t \times Margin_{t-1}$ is positive and significant at the 1% level, suggesting that the negative effect of income inequality on participation is moderated by the level of electoral competition (see Columns (3) and (6) in Table (3)). Therefore, the negative impact of inequality on turnout becomes less negative (and even positive) as political competition decreases and we move from the levels of political competition characterizing highly competitive political markets to those of political monopolies or *regional strongholds*. The comparison of the total *short run* effects of the DSLM with the coefficient of the non-spatial model reveals that non-spatial model would underestimate by 69% the strength of this interaction. To draw more accurate inferences on how the effect of income inequality is shaped by the margin of majority, we use Monte Carlo techniques to simulate its mean impact and its variability (see Appendix E for further details).

Figures (6) and (7) display the results of the effect of income inequality on turnout rates conditional to the margin of majority, and the results of the effect of the margin of majority on turnout conditional to income inequality, respectively. As observed in Figure (6), the effect of income inequality on turnout is negative in municipalities where the majority of margin is below the 10% of the votes. Taking into account the empirical distribution of the margin of majority across municipalities and across time, this result implies that for the 74% of the Spanish municipalities an increase in income inequality had negative effects for political participation outcomes during the study period.[15] Therefore, only above the top 26% threshold of the distribution of majority margins in our sample of municipalities and local elections, the estimated impact of an increase in income inequality appears to exert a positive effect on turnout (i.e, within the traditional strongholds). On the other hand, Figure (7) shows that the negative effect of the margin of majority on turnout rates holds for most of the observed income inequality range in our sample of

[15] Figures A1 and A2 in Appendix B provide a non-parametric estimate of the distribution of the margin of majority and the local income inequality measured by the Gini index.

municipalities. Indeed, the effect of a higher margin of majority in $t-1$ just increases turnout in the top 15% of the most unequal municipalities. Taken together these results confirm the insights and hypothesis provided by our theoretical model.

Figure 6: The Link Between Income Inequality and Turnout rates

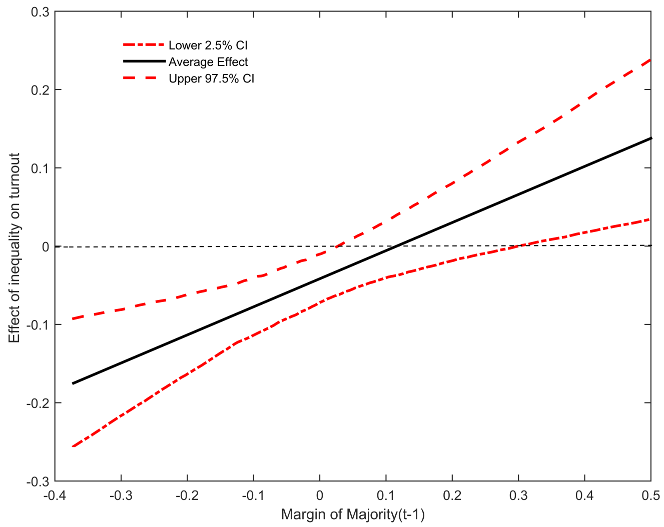
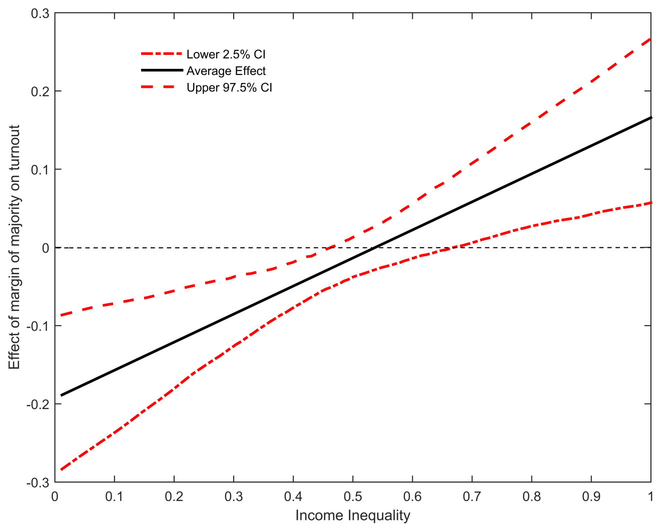


Figure 7: The Link Between Margin of Majority and Turnout rates



4.2 Zooming in the mechanism: the moderating role of social spending

As explained in Section (2), the levels of political participation and the provision of local public goods under the status quo are interlinked. Recall that from our model, we expect that (i) in contexts of high inequality, the resort to clientelism as a mobilization strategy should increase the turnout levels; and (ii) the resort to clientelistic strategies should also translate into a larger provision of targeted goods and lower levels of other public goods at the local level. Elites will resort to clientelism when they have the capacity to hide part of their income from taxes, the share of low income citizens is high (and therefore, inequality is high) and, as a result, they are responsive to bribes. In this scenario, low income voters respond to elite's clientlistic strategies leading to higher levels of turnout.

To explore the issue of how targeted goods and the resort to clientelism increases political participation, we now investigate if the effect of increasing per capita social spending in pro-poor public goods and pro-middle class public goods generate the expected effects. According to our model, an increase in the provision of targeted goods, which we associate with pro-poor public spending, should have a positive effect in turnout rates when income inequality is high and when political competition is low. On the other hand, an increase in the provision of more general public goods, which we proxy by pro-middle class public spending, should decrease inequality when income inequality is low and political competition is high.

Thus, to accommodate this three-way interaction model, we extend our baseline framework to account for a three-way interaction effect among inequality (*Ineq*), the lagged margin of majority (*Margin*) and social expenditures (*Exp*), such that we now estimate the following DSLM specification:

$$\begin{aligned} Y_t =& \mu + \tau Y_{t-1} + \rho W Y_t + \lambda W Y_{t-1} + \gamma_1 Ineq_t + \gamma_2 Margin_{t-1} + \gamma_3 Exp_t + \\ & + \gamma_4 Ineq_t \times Margin_{t-1} + \gamma_5 Ineq_t \times Exp_t + \gamma_6 Margin_{t-1} \times Exp_t + \\ & + \gamma_7 Ineq_t \times Margin_{t-1} \times Exp_t + X_t \beta + \epsilon_t \end{aligned} \tag{13}$$

The direct, indirect and total effects implied by this model when we consider targeted public goods are presented in Table (4), whereas the estimated contour plot of the average total short run effect of pro-poor social spending on turnout, conditional to the level of inequality and the margin of majority is depicted in Figure (8) for each pair of values of inequality and margins in a grid of $1,000 \times 1,000$ points.

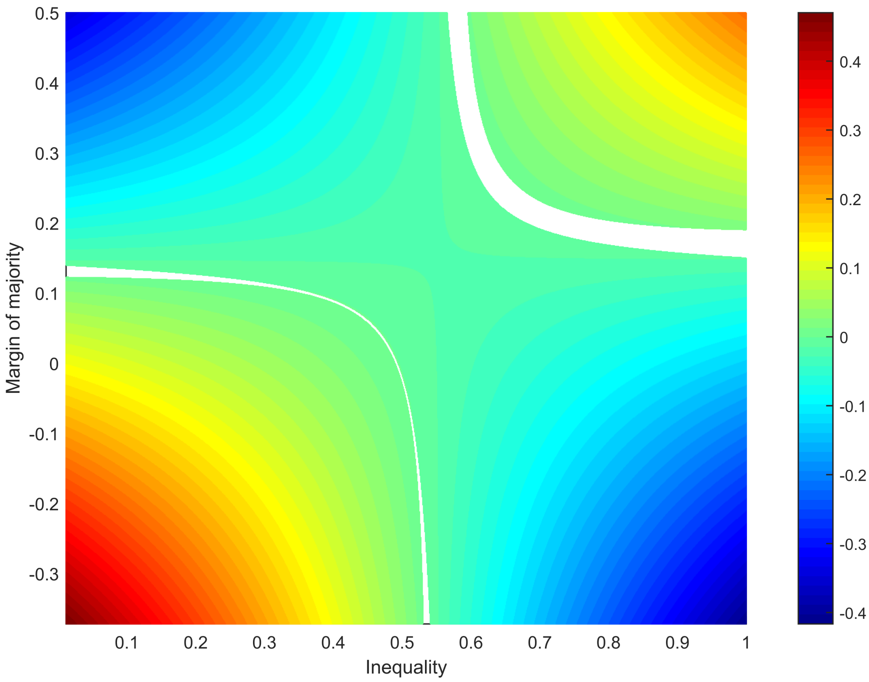
Table 4: Evidence on transmission channel (I): pro-poor social spending

		Short term effects			Long term effects		
Variables	Coefficient	Direct Effects	Indirect Effects	Total Effects	Direct Effects	Indirect Effects	Total Effects
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Inequality (t)	-0.005	-0.005	-0.009	-0.014	-0.007	-0.014	-0.021
	(-0.77)	(-0.69)	(-0.68)	(-0.69)	(-0.69)	(-0.68)	(-0.68)
Margin of majority (t-1)	-0.009	-0.012	-0.022	-0.034	-0.017	-0.033	-0.049
	(-0.42)	(-0.50)	(-0.50)	(-0.50)	(-0.50)	(-0.49)	(-0.49)
Pro-poor Spending (t)	0.030**	0.032**	0.060**	0.093**	0.046**	0.092**	0.137**
	(2.11)	(2.10)	(2.08)	(2.09)	(2.09)	(2.05)	(2.07)
Inequality(t) * Margin (t-1)	0.029	0.034	0.063	0.096	0.048	0.095	0.143
	(0.63)	(0.73)	(0.72)	(0.72)	(0.72)	(0.71)	(0.72)
Inequality (t)	-0.057*	-0.063*	-0.117*	-0.179*	-0.089*	-0.117*	-0.266*
*Pro-poor spending (t)	(-1.92)	(-1.93)	(-1.91)	(-1.92)	(-1.93)	(-1.89)	(-1.91)
Margin(t-1)	-0.345***	-0.363***	-0.675***	-1.038***	-0.514***	-1.027***	-1.541***
*Pro-poor spending (t)	(-3.12)	(-3.08)	(-3.05)	(-3.06)	(-3.07)	(-2.93)	(-3.00)
Inequality (t) * Margin (t-1)	0.575**	0.603**	1.122**	1.725**	0.855**	1.705**	2.560**
* Pro-poor spending (t)	(2.51)	(2.49)	(2.47)	(2.48)	(2.49)	(2.41)	(2.45)
Space-time dynamics	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipal fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Great Recession dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The dependent variable is in all cases the turnout rate in local elections. Pro-poor spending is defined as (per capita) municipal expenditures in social protection and inclusion policies. * Significant at 10% level. ** Significant at 5% level. *** Significant at 1% level. t-statistics provided within parenthesis. Space-time dynamics refer to the inclusion of turnout (t-1) and neighbors' turnout (t and t-1). Inferences regarding the statistical significance of these effects are based on the variation of 1,000 simulated parameter combinations drawn from the variance-covariance matrix implied by the BCQML estimation. The results are obtained using the 10 nearest neighbors' spatial weights matrix. Control variables include income, taxes, spending, transfers, old population, education, migration, (log of) total population, ideology, regional and national alignment and a dummy for the Great Recession. The estimation results and the spatial effect decomposition for the full set of controls are provided in Appendix D, Table A6.

As observed in Table (4), both the parameter γ_7 and the total effects of the three way interaction term are positive and statistically significant at the 5% level. This result suggests that increasing pro-poor public spending has a positive effect on electoral participation when income inequality is high and when the margin of majority is high. Nevertheless, a detailed inspection of Figure (8), which reports both the surface of average total impacts on turnout and the surface of their corresponding p-values due to increasing spending (in white if p-value above 0.05), reveals a more complex pattern. As expected, for very unequal distributions of income and high margins, the effect in turnout of increasing pro-poor spending is very high. Indeed, when moving along the diagonal from the bottom-left quadrant (with low margins of majority and low inequality) to the upper-right one, the impacts are generally positive and significant. However, the reported the p-values of the total effects show some discontinuities (white areas) and for some distributions of income and margins of majority around the median values increasing pro-poor public spending does not foster participation anymore. It is also worth mentioning that in many municipalities characterized by high inequality and low margin of majority, or by low inequality but high margin of majority, increasing pro-poor spending tends to reduce electoral participation.

Figure 8: The link between pro-poor social spending and voter turnout



Notes: regions where the average total effects of pro-poor social spending have p-values above the 5% threshold are depicted in white.

On the other hand, the results for the model where we consider pro-middle class social spending are shown in Table (5) with the corresponding contour plots in Figure (9). Table (5) shows that the total effects of the three way interaction term of pro-middle class spending are negative and weakly significant. This result indicates that increasing pro-middle class spending decreases turnout when inequality is high and when the margin of majority is high. This result is largely in agreement with the previous finding on the effects of pro-poor social spending. In fact, as shown in Figure (9), in competitive political markets with egalitarian distributions of income what we observe is that pro-middle class spending raises participation strongly.

Overall, these results suggest that pro-poor social spending increases turnout rates when

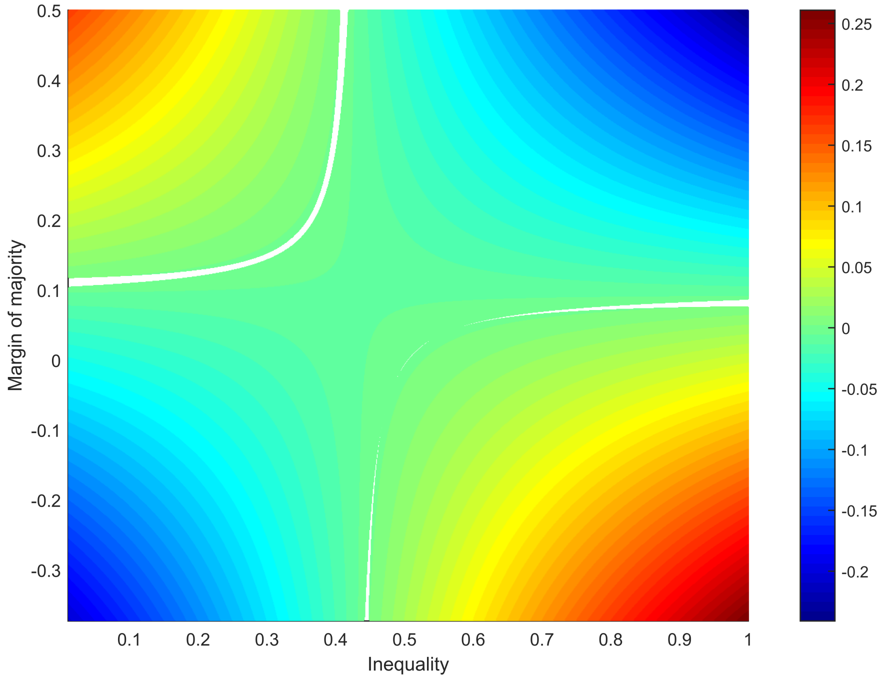
Table 5: Evidence on transmission channel (II): pro-middle class social spending

		Short term effects			Long term effects		
Variables	Coefficient	Direct Effects	Indirect Effects	Total Effects	Direct Effects	Indirect Effects	Total Effects
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Inequality (t)	-0.013	-0.014*	-0.027*	-0.041*	-0.020*	-0.041*	-0.061*
	(-1.60)	(-1.67)	(-1.67)	(-1.67)	(-1.67)	(-1.64)	(-1.65)
Margin of majority (t-1)	-0.117***	-0.125***	-0.237***	-0.362***	-0.177***	-0.362***	-0.539***
	(-4.18)	(-4.02)	(-3.97)	(-4.00)	(-4.01)	(-3.79)	(-3.91)
Pro-middle class Spending (t)	-0.001	-0.001	-0.004	-0.006	-0.003	-0.006	-0.009
	(-0.13)	(-0.20)	(-0.20)	(-0.20)	(-0.20)	(-0.21)	(-0.21)
Inequality (t) * Margin (t-1)	0.216***	0.231***	0.439***	0.670***	0.327***	0.670***	0.998***
	(3.68)	(3.64)	(3.62)	(3.63)	(3.63)	(3.48)	(3.56)
Inequality (t)	-0.001	0.000	0.000	0.000	0.000	0.000	0.000
* Pro-middle class spending(t)	(-0.06)	(0.00)	(-0.01)	(-0.01)	(0.00)	(0.00)	(0.00)
Margin(t-1)	0.183**	0.189**	0.359**	0.548**	0.268**	0.549**	0.817**
* Pro-middle class spending(t)	(2.24)	(2.11)	(2.10)	(2.11)	(2.11)	(2.07)	(2.10)
Inequality (t) * Margin (t-1)	-0.339*	-0.351*	-0.667*	-1.018*	-0.497*	-1.019	-1.516*
* Pro-middle class spending(t)	(-1.88)	(-1.81)	(-1.81)	(-1.81)	(-1.81)	(-1.79)	(-1.81)
Space-time dynamics	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipal fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Great Recession dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The dependent variable is in all cases the turnout rate in local elections. Pro-middle class spending is defined as (per capita) municipal expenditures in education, health, culture, and sports. * Significant at 10% level. ** Significant at 5% level. *** Significant at 1% level. t-statistics provided within parenthesis. Space-time dynamics refer to the inclusion of turnout (t-1) and neighbors' turnout (t and t-1). Inferences regarding the statistical significance of these effects are based on the variation of 1,000 simulated parameter combinations drawn from the variance-covariance matrix implied by the BCQML estimation. The results are obtained using the 10 nearest neighbors' spatial weights matrix. Control variables include income, taxes, spending, transfers, old population, education, migration, (log of) total population, ideology, regional and national alignment and a dummy for the Great Recession. The estimation results and the spatial effect decomposition for the full set of controls are provided in Appendix D, Table A6.

income inequality and margins of majority are high whereas pro-middle class social spending in these local contexts reduces electoral participation. Thus, the different political-economy equilibria implied by the theoretical model are confirmed in the data.

Figure 9: The link between spending pro-middle class and turnout



Notes: regions where the total effects of pro-middle class spending have p-values above the 5% threshold are depicted in white.

4.3 Ideological clustering and Spatial Regime Heterogeneity

As discussed in Section (2.2), a plausible mechanism that could explain both the observed spatial dependence in turnout rates and the positive estimated spillover in electoral participation is the *ideological clustering* of government parties in space. Ideological clustering in space may produce various types of competition patterns, both between and within parties. If as hypothesized, the underlying process behind spatial dependence in participation is that of ideological clustering, we should observe in the data that the spillover effects generated by participation in neighboring municipalities are related to the degree of ideological clustering in a given area.

In municipalities belonging to areas where there is a dominant party and where the level of ideological clustering is high, the logic of intra-party competition should cause a strong positive spillover effect because local leaders would compete with each other in an attempt to scale through the hierarchy of the party, trying to capture votes and mobilize voters. This contagion effect should be higher than the one observed in areas where the level of political competition between parties is intermediate and where the incentives to compete within-parties are lower. However, local leaders located in areas where there is no dominant party and where the spatial dispersion of the vote is very high, will also have powerful incentives to mobilize their electorate. In this case, the nature of the competition will be between-parties.

The above discussion suggests that the positive turnout spillover estimated in Table (2) may hide a non-linear political mechanism caused by ideological clustering, such that in spatial monopolies and competitive political markets an increase in participation in neighboring municipalities j should reinforce participation in i, whereas in political markets with intermediate levels of competition such spillover effects should be of lower magnitude.

The notion of spatial political regimes, in our context, points to the existence of multiple context-specific reaction functions to neighboring turnout rates which, in turn, implies that parameters of the regression model might not be constant across municipalities and might display structural instability across space. To verify the hypothesis of multiple spatial spillover effects caused by degree of local ideological clustering with a *U-shapped pattern*, we resort to the following *Dynamic Spatial Lag Multi-Regime Model* (DSLMRM) specification:

$$Y_t = \mu + \sum_{r=1}^{R} D_t^{(r)} \rho_c W Y_t + \tau Y_{t-1} + \lambda W Y_{t-1} + X_t \beta + \epsilon_t \tag{14}$$

In this model $r = 1, .., R$ is the number of spatial regimes, $D_t^{(r)}$ is a time-varying dummy identifying the spatial regime membership of any region i at a particular point in time t and ρ_r denotes the spatial lag parameter for municipalities in a particular regime r. The model is estimated by means of the Bias-Corrected Maximum Likelihood (BCML) estimator for spatial multi-regimes panels following Rios and Ginamoena (2018).

Given that there is not a unique way to define and form spatial regimes in our context, we rely on different exogenous determination procedures, which use pre-specified criteria to define the spatial regimes r. In particular, we employ two different strategies to determine whether a municipality belongs to a given regime $r = 1, 2, 3$, taking into account that the best spatial weights matrix W to describe the data in this context is a 10-nearest neighbor connectivity matrix.

The first approach classifies the municipalities into the distinct regimes depending on their number of neighbors with the same ideology. Thus, if in the neighborhood of a municipality i (consisting of the 10 closest municipalities), there are at least 8 municipalities sharing the same ideology, that municipality i belongs to *Regime 1* (i.e, $D_{it} = 1$). Therefore, Regime 1 represents those municipalities that belong to a dense *ideological spatial cluster* or a spatial monopoly. If there are between 3 and 7 neighbors sharing the same ideology then that municipality belongs to *Regime 2* ($D_{it} = 2$), and if the number is between 0 and 2 that municipality belongs to *Regime 3* ($D_{it} = 3$). In this context, *Regime 3* is formed by municipalities surrounded by a very *diverse set of ideological neighbors.* Alternatively, these regimes have been defined using 7 or more neighbors with the same ideology as cutt-offs to define membership to *Regime 1*, and a maximum of 4 neighbors to define *Regime 3*.

The second approach categorizes the spatial regimes using the distribution of estimated local Moran's I statistics of ideology, which measures the existence of clusters in the spatial arrangement of government ideologies around an individual location i. [16] A positive value of the Local Moran's I implies that the location under study has similarly high or low values within its neighbours and, thus, the locations are *spatial clusters*[17], whereas a negative Local Moran's I value indicates that the location i is a *spatial outlier* (i.e. a value that is obviously different from the values of its surrounding locations). We resort to the distribution of Local Moran's I to define our spatial regimes. Specifically, if a municipality i has an I_{it} in the $[75, 100]$ p-th percentile of the distribution of local I's, it belongs to *Regime 1*; if $I_{it} \in (25, 75)$ it belongs to *Regime 2* whereas if $I_{it} \in [0, 25]$, then, it belongs to *Regime 3*. Alternatively, the following thresholds have also been used: i belongs to *Regime 1* if $I_{it} \in [66, 100]$, to *Regime 2* if $I_{it} \in (33 - 66)$ and to *Regime 3* if $I_i \in [0, 33]$.

The results are reported in Table (6). As observed, the various specifications considered tend to produce the same qualitative results. Turnout rates of municipalities belonging to a spatial

[16]In particular, we compute the local Moran's I developed by Anselin (1995) for each municipality i at each period t as follows:

$$I_{it} = \frac{z_{it} - \bar{z}}{\sigma^2} \sum_{j=1, j \neq i,}^{n=10} w_{ij} \left(z_{jt} - \bar{z}\right) \tag{15}$$

where z_{it} is the ideology of the government in i at t, $\bar{z}$, is the average value of z with the sample number of $n = 10$, σ^2 is the variance of the ideology variable, z_{jt} is the value of the ideology at all the other locations (where $j \neq i$) and w_{ij} is the weight implied by the 10-nearest neighbors spatial weight matrix.

[17]Spatial clusters include high-high clusters (high values in a high value neighborhood, which correspond to right-wing party clusters) and low-low clusters (low values in a low value neighborhood, which correspond to left-wing party clusters).

Table 6: Spatial Regime Heterogeneity

	Number of neighbors with the same ideology		Moran's I local correlation index	
Variables	(1)	(2)	(3)	(4)
Inequality (t)	-0.012**	-0.016***	-0.012***	-0.012***
	(-2.41)	(-3.03)	(-2.25)	(-2.24)
Margin of majority (t-1)	-0.067***	-0.068***	-0.063***	-0.057***
	(-4.26)	(-4.18)	(-4.03)	(-3.50)
Inequality (t) * Margin (t-1)	0.100***	0.103***	0.094***	0.069***
	(3.13)	(3.07)	(2.95)	(2.05)
Neighbors' turnout (t) in Regime 1 (ρ_1)	0.716***	0.459***	0.737***	0.465***
	(30.99)	(33.36)	(43.12)	(22.10)
Neighbors' turnout (t) in Regime 2 (ρ_2)	0.650***	0.133***	0.644***	0.367***
	(53.74)	(9.68)	(47.10)	(16.31)
Neighbors' turnout (t) in Regime 3 (ρ_3)	0.698***	0.532***	0.646***	0.398**
	(36.31)	(157.69)	(33.90)	(17.85)
ρ_1 - ρ_2	0.065***	0.326***	0.093***	0.098***
t-value of difference	(2.53)	(11.99)	(4.34)	(2.61)
ρ_1 - ρ_3	0.017	-0.073***	0.92***	0.067*
t-value of difference	(0.57)	(-5.02)	(3.59)	(1.80)
ρ_2 - ρ_3	-0.048***	-0.399***	-0.001	-0.031
t-value of difference	(-2.10)	(-27.54)	(0.06)	(-0.78)
Space-time dynamics	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Municipal fixed effects	Yes	Yes	Yes	Yes
Great Recession dummy	Yes	Yes	Yes	Yes

Notes: The dependent variable is in all cases the turnout rate in local elections. * Significant at 10% level. ** Significant at 5% level. *** Significant at 1% level. t-statistics provided within parenthesis. Space-time dynamics refer to the inclusion of turnout (t-1) and neighbors' turnout (t and t-1). Control variables include income, taxes, spending, transfers, old population, education, migration, (log of) total population, ideology, regional and national alignment and a dummy for the Great Recession. The results are obtained using the 10 nearest neighbors' spatial weights matrix. In Columns (1) and (2) the regimes are defined according to the number of neighbors (up to ten) with the same ideology. In particular, in Column (1), Regime 1 = [8-10], Regime 2 = [3-7] and Regime 3 = [0-2]; whereas in Column (2), Regime 1 = [6-10], Regime 2 = [5] and Regime 3 = [0-4]. In Columns (3) and (4) the regimes are defined according to the distribution of the Moran's local spatial correlation coefficient of ideology. In particular, in Column (3), Regime 1 contains municipalities exhibiting the upper 75th to 100th percentiles of the local Moran's I coefficient estimates (i.e, Regime 1 = [75-100]); Regime 2 municipalities contain municipalities local Moran's I estimates within the 25th to 75th percentiles of the distribution (i.e, Regime 2 = [25-75]); Regime 3 is populated by municipalities in the lower quartile (i.e, Regime 3= [0-25]). Finally in Column (4) we report the results obtained using the following partitions of the distribution: Regime 1 = [66-100], Regime 2 = [33-66] and Regime 3 = [0-33]. Estimator: BCML spatial multi-regime.

political monopoly area (*Regime 1*) are highly responsive to electoral participation in neighboring municipalities. Indeed, in the various specifications presented in Table (6) we observe a stronger positive spillover (ρ_1) than in the other regimes. The magnitude of this spillover is statistically different from that observed in municipalities that belong to *Regime 2*. In fact, the estimated spillover effect for municipalities in *Regime 2*, ρ_2, is lower than the spillover effect in *Regime 1* in all cases and for some cases it is also below the spillover effect in *Regime 3*. While the regime design based on the Moran's I does not favor this interpretation, when we use the number of neighbors with the same ideology, we find that the spillover effect of *Regime 3* (ρ_3) is significantly higher (weakly) than the spillover effect of *Regime 2*, thus confirming the hypothesized *U-shaped* spillover pattern as a function of ideological clustering. Taken together, these results suggest that the logic of intra-party competition among local leaders might be responsible for a large amount of the spatial interdependence observed in voters' turnout data. However, between-party competition and mobilization strategies in areas of large dispersion could also explain, to a lower extent, this spatial interdependence.

5 Conclusions

The relationship between economic inequality and political participation is a central tenet in the working of democracies. Previous empirical literature provides evidence of a negative relationship between inequality and the political engagement by low income citizens in advanced economies, whereas this relationship becomes positive when analyzing developing democracies. This paper contributes to this strand of the political economy literature by analyzing how economic inequality shapes political participation in electoral contests and to what extent this relationship is moderated by political competition. To that aim, we develop a novel theoretical framework extending the work of Amat and Beramendi (2020) where we model how the interdependence between the distributions of income, the electoral offers and budget allocations, and the degree of political competition among elites, may produce a multiplicity of spatial political markets with distinct features and electoral behaviors.

In some political markets high turnout rates may be the consequence of self-reinforcing positive feedbacks between the power of political elites and income inequality. In other contexts, lower turnout rates might be the outcome of a strong political competition and the strategic differentiation of platforms over public goods of general character, which could de-mobilize the poor. Specifically, our model predicts that in equilibrium there exists a conditional effect of inequality on turnout rates in local elections that is positive in strongholds/spatial monopolies (where there are low levels of political competition) and negative in competitive political markets with high levels of political competition.

In the case of Spain, the link between inequality and turnout is negative, as expected, but rather weak, suggesting that local turnout rates do not depend exclusively on income inequality levels. To investigate whether this relationship depends on spatial competition patterns, we derive a novel data set of income inequality metrics for a sample of 2,541 municipalities over the four local elections that took place between 2003 and 2015. In a second step, we specify a spatial dynamic panel data model that allows us to account for serial dependence, unobserved spatial heterogeneity and the spatial interdependence observed in the data. We find that the conditional effect of political competition is statistically significant and robust to various model specifications.

A second implication of our model is that the link between inequality and turnout being moderated by political competition ultimately reflects optimal policy strategies of elites on the provision of public goods, such that in contexts of high-inequality and low competition the resort to targeted public goods helps elites to remain in power whereas in regions with low-inequality and competitive political markets, the provision of general public goods is optimal. Thus, we extend our baseline spatial panel data model by means of a three-way interaction term to investigate if higher pro-poor policy efforts increase electoral turnout when income inequality is high and political competition is low. We find that this empirical relationship is mostly in line with the hypothesized theoretical prediction.

Finally, we investigate if the nature of spatial interdependence in turnout rates might arise as a byproduct of intra-party competition in strongholds and between-party competition in competitive political markets. If this is the case, we should observe stronger spillover effects in turnout rates from j to i in clusters of municipalities where there is a dominant party or in competitive markets, at least relative to environments characterized by medium degrees of competition. We estimate a three-regime dynamic spatial panel data model where we allow spillover heterogeneity and we find that spillover effects are stronger in *ideological clusters*, thus confirming the strength of intra-party competition.

Taken together the results of our paper reveal two Spains: one in which high inequality and high levels of political competition yield relatively lower turnout rates, and one in which high levels of inequality and low levels of political competition yield relatively higher turnout rates. In addition, our findings suggest that this last result might be driven by a higher budgetary use of policies targeted to low income voters.

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ONLINE APPENDIX

A. THEORETICAL MODEL

A.1. The optimization problem for the low income voters:

The optimization problem for the low income voters is defined as follows:

$$\begin{aligned} \underset{t,g,b}{\text{maximize}} \quad & (1-t)\, w_P + \gamma_P g + \ln(b) \\ \text{subject to} \quad & t\bar{w}\,(1-\lambda\phi) = b + g + r. \end{aligned} \tag{16}$$

Thus, in order to induce poor individuals to vote, a candidate's political offer must first guarantee that poor voters' utility exceeds their utility threshold too. The solution to this problem is given by:

We employ the Lagrange method to find $\bar{U_P}$:

$$\mathcal{L} = (1-t)\, w_p + \gamma_P g + \ln(b) + \psi\,(t\bar{w}\,(1-\lambda\phi) - b - g - r) \tag{17}$$

where $\mathcal{L}$ is the lagrangian function and ψ denotes the lagrange multiplier. In this context, the First Order Conditions are given by:

$$\begin{aligned} \frac{\partial \mathcal{L}}{\partial t} &= -\, w_P + \psi\bar{w}\,(1-\lambda\phi) = 0 \\ \frac{\partial \mathcal{L}}{\partial g} &= \gamma_P - \psi = 0 \\ \frac{\partial \mathcal{L}}{\partial b} &= \frac{1}{b} - \psi = 0 \\ \frac{\partial \mathcal{L}}{\partial \psi} &= t\bar{w}\,(1-\lambda\phi) - b - g - r = 0 \end{aligned} \tag{18}$$

From these First Order Conditions we obtain expressions for b, r, t and g. We begin by noting that, since t enters the utility function linearly and r does not enter it at all: $r^* = 0$ and $t^* = t^{max} \leq 1$.

Next, solving $\frac{\partial \mathcal{L}}{\partial g}$ and $\frac{\partial \mathcal{L}}{\partial b}$ in terms of ψ, and setting them equal to each other, we obtain:

$$b^* = \frac{1}{\gamma_P} \tag{19}$$

Finally, we substitute b^*, r^* and t^* into the first order condition with respect to ψ and obtain the following expression for g^*:

$$g^* = t^{max}\bar{w}\left(1-\lambda\phi\right) - \frac{1}{\gamma_P} \tag{20}$$

Therefore, the level of utility elites must guarantee to poor voters in order to induce them to vote, which we find by substituting b^*, r^*, t^* and g^* into the utility function, is:

$$\bar{U_P} = \left(1-t^{max}\right)w_p + \gamma_P t^{max}\bar{w}\left(1-\lambda\phi\right) - 1 + \ln\left(\frac{1}{\gamma_p}\right) \tag{21}$$

A.2. The Optimization Problem for Elites

The optimization problem for elites is defined as follows:

$$\begin{aligned}
&\underset{t_j, g_j, b_j,}{\text{maximize}} \quad && \left(1-t_j\right)w_R + g_j + \mu\pi\ln\left(r_j\right) + \left(1-\mu\right)\Big[\left(1-t_j\right)w_P + \gamma_P g_j + \ln\left(b_j\right)\Big] \\
&\text{subject to} && t\bar{w} = b_j + g_j + r_j \\
&\text{and} && \left(1-t_j\right)w_P + \gamma_P g_j + \ln\left(b_j\right) \geq \bar{U_P}
\end{aligned} \tag{22}$$

We employ the Lagrange method and, assuming that the second constraint binds, substitute $g = t\bar{w} - b_j - r_j$ into the maximand.

$$\begin{aligned}
\mathcal{L} = &\left(1-t_j\right)w_R + \left[t\bar{w} - b_j - r_j\right] + \mu\pi\ln\left(r_j\right) \\
&+ \left(1-\mu\right)\Big[\left(1-t_j\right)w_P + \gamma_P\left(t\bar{w} - b_j - r_j\right) + \ln\left(b_j\right)\Big] \\
&+ \psi\Big[\left(1-t_j\right)w_P + \gamma_P\left(t\bar{w} - b_j - r_j\right) + \ln\left(b_j\right) - \bar{U_P}\Big]
\end{aligned} \tag{23}$$

First Order Conditions:

$$\begin{aligned}
\frac{\partial\mathcal{L}}{\partial b_j} &= -1 - \left(1-\mu\right)\gamma_P + \frac{\left(1-\mu\right)}{b_j} - \psi\gamma_P + \frac{\psi}{b_j} = 0 \\
\frac{\partial\mathcal{L}}{\partial r_j} &= -1 + \frac{\mu\pi}{r_j} - \left(1-\mu\right)\gamma_P - \psi\gamma_P = 0
\end{aligned} \tag{24}$$

We now obtain expressions for b_j, r_j, t_j and g_j. We begin by noting that, since t_j enters the utility function linearly, it follows that: $t_j^* = t^{max} \leq 1$. Next, solving $\frac{\partial\mathcal{L}}{\partial b_j}$ and $\frac{\partial\mathcal{L}}{\partial r_j}$ in terms of

ψ, and setting them equal to each other, we can solve the problem. We can obtain the following expressions:

$$b_j^* = \exp\left\{\ln\left(\frac{1}{\gamma_P}\right) - \lambda\phi\gamma_P t\bar{w}\right\} \tag{25}$$

$$g_j^* = t^{max}\bar{w} - \mu\pi \tag{26}$$

The Role of Inequality:

To obtain an expression for the derivative of g_j^* with respect to $(1-\delta)$, we substitute $\bar{w} = \frac{\delta w_R}{\phi}$ and $\phi = \frac{\delta w_R}{(1-\delta)w_P + \delta w_R}$, into Equation (26).

Therefore,

$$\frac{\partial g_j^*}{\partial(1-\delta)} = -t^{max}\left(w_R - w_P\right) < 0 \tag{27}$$

$$\frac{\partial g_j^*}{\partial\phi} = -\frac{t^{max}\delta w_R}{\phi^2} < 0 \tag{28}$$

The Role of Competition:

Establishing the link between competition and the provision of public goods (g^*) is straightforward:

$$\frac{\partial g_j^*}{\partial\pi} = -\mu < 0 \tag{29}$$

At the same time, we are also interested in exploring the joint effect of party competition and pro-poor spending on electoral participation. Exploring this result is a bit more elaborate. Recall that, according to the comparative static of pro-poor spending in relation to the competition parameter:

$$\frac{\partial\ln\left(b_j^*\right)}{\partial\pi} = \frac{1}{\pi} + \frac{\lambda\phi t^{max}\bar{w}}{\pi^2\mu} > 0 \tag{30}$$

Now, to obtain an expression for $\frac{\partial}{\partial(1-\delta)}\left(\frac{\partial \ln\left(b_j^*\right)}{\partial \pi}\right)$, we substitute $\bar{w} = \frac{\delta w_R}{\phi}$ and $\delta = 1-(1-\delta)$ into it, so that we can finally re-write $\frac{\partial \ln\left(b_j^*\right)}{\partial \pi}$ as:

$$\frac{\partial \ln\left(b_j^*\right)}{\partial \pi} = \frac{1}{\pi} + \frac{\lambda t^{max}[1-(1-\delta)]w_R}{\pi^2 \mu} > 0 \tag{31}$$

Then, differentiating with respect to $(1-\delta)$ we obtain:

$$\frac{\partial}{\partial\left(1-\delta\right)}\left(\frac{\partial \ln\left(b_j^*\right)}{\partial \pi}\right) = -\frac{\lambda t^{max} w_R}{\pi^2 \mu} < 0 \tag{32}$$

B. DATA

This Appendix section provides additional details on the data employed to produce the results of the main manuscript.

Figure A1: Distribution of local income inequality, 2003-2019.

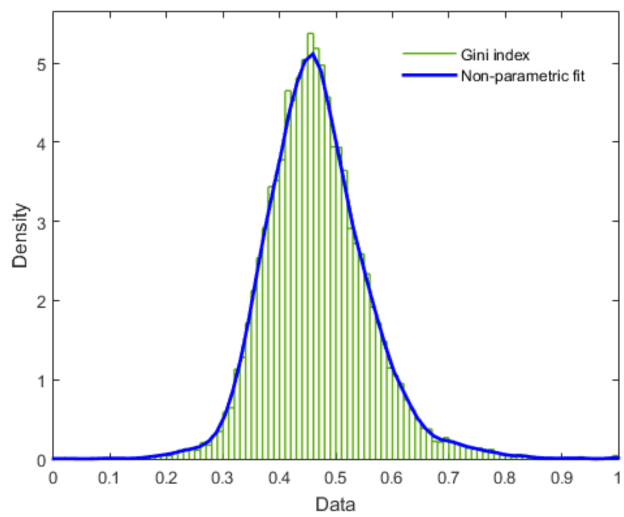

Figure A2: Distribution of the margin of majority, 2003-2019.

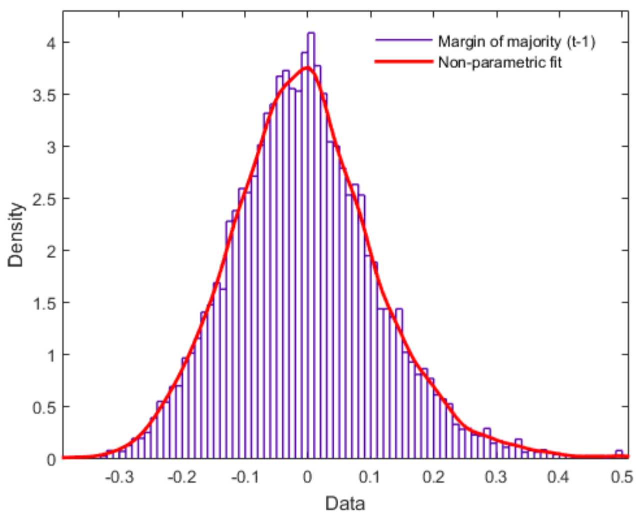

Table A1. Data Summary.

Variable	Mean	Standard deviation	Source	Expected Effect	Definition
Turnout rate	0.731	0.095	SMI		Ratio of votes (valid and null) with respect to the total census of registered electors
Income inequality	0.467	0.090	STAO & own calculations	?	Gini index
Margin of majority	-0.006	0.116	SMI	-	Share of votes received by the winner - 50%
Spending per capita	0.723	0.311	SMF	+	Per capita current spending (in thousands euros). Corresponds to operating expenses as defined by Sections I to IV of the economic classification of local budgets
Pro-poor social spending	0.159	0.341	SMF	+	Per capita pro-poor social spending (in thousands euros). Corresponds to social protection and inclusion expenditures as defined by Function III (2003, 2007) or II (2011, 2015 and 2019) of the functional classification of local budgets
Pro-middle class spending	0.276	0.501	SMF	+	Per capita pro-middle class spending (in thousands euros). Corresponds to local expenditure in education, health, culture, and sports as defined by Function IV (2003, 2007) or III (2011, 2015 and 2019) of the functional classification of local budgets
Income per capita	15,370	5,361	STAO	?	Per capita income (in thousands euros)
Tax revenues per capita	0.524	0.401	SMPF	?	Per capita total local revenues from local taxes and fees (in thousands euros)
Transfers per capita	0.430	0.228	SMPF	?	Per capita total local revenues from current and capital transfers (in thousands euros)
Old population	0.205	0.129	INE	?	Share of population with age above 65 years old (in %).
Education	0.558	0.124	INE	?/+	Share of population with secondary and/or tertiary education (in %)
Migration	0.078	0.084	INE	-	Share of immigrants in the resident population (in %)
Ln Population	8.520	1.220	INE	?	Natural logarithm of municipal population (in thousands inhabitants)
Ideology	5.627	1.946	SMI & Deusto Polls	-	Index that ranges between 0 (left) to 10 (right)
Regional alignment	0.416	0.493	SMI	?	Dummy variable, 1 if regional and local governments are aligned, 0 otherwise
National alignment	0.403	0.490	SMI	?	Dummy variable, 1 if national and local governments are aligned, 0 otherwise
Great Recession dummy	0.20	0.40		?	Dummy variable, 1 in the year 2011, 0 otherwise.

Notes: SMPF denotes the Spanish Ministry of Public Finance, STAO, Spanish Tax Administration Office, SMI the Spanish Ministry of Internal Affairs, INE the National Statistics Institute.

Table A2. Regional corruption index

Region	Years		
	2017	2013	2010
Galicia	36	48	69
Principado de Asturias	45	62	63
Cantabria	48	65	59
Pais Vasco	56	57	67
Navarra	55	60	56
La Rioja	45	57	63
Aragn	47	54	62
Comunidad de Madrid	37	64	67
Castilla y Len	40	62	55
Castilla-La Mancha	40	51	61
Extremadura	45	51	62
Catalua	40	51	58
Comunidad Valenciana	37	51	56
Illes Balears	36	58	60
Andalucia	36	54	57
Regin de Murcia	40	59	54
Canarias (ES)	35	53	63
Country Average	42	56	61

The Corruption index is a pillar of the European Quality of Government Index (EQI), which has recently been constructed with the aim to provide scholars and policy makers with a comparable and homogeneous measure of governance at the regional level that can be used to make comparisons within and across countries. The EQI is based on survey data about the perceptions and experiences of European citizens on the quality, impartiality and level of corruption in education, public health care and law enforcement.

C. SPATIAL BAYESIAN MODEL SELECTION

This Appendix section provides details on the procedure employed to verify that our baseline spatial specifications is the most likely one given the data.

The baseline *Dynamic Spatial Lag Model* in Equation (10) can be compared to other commonly used dynamic spatial panel data model specifications in the spatial econometrics literature, including the *Dynamic Spatial Lag of X Model*, the *Dynamic Spatial Durbin Model*, the *Dynamic Spatial Error Model* and the *Dynamic Spatial Durbin Error Model*, which are presented in Equations (33), (34), (35) and (36), respectively:

$$Y_t = \mu + \tau Y_{t-1} + \eta W Y_{t-1} + X_t \beta + W X \theta + \epsilon_t \tag{33}$$

$$Y_t = \mu + \tau Y_{t-1} + \rho W Y_t + \eta W Y_{t-1} + X_t \beta + W X \theta + \epsilon_t \tag{34}$$

$$\begin{aligned} Y_t &= \mu + \tau Y_{t-1} + \eta W Y_{t-1} + X_t \beta + \upsilon_t \\ \upsilon_t &= \lambda W \upsilon_t + \epsilon_t \end{aligned} \tag{35}$$

$$Y_t = \mu + \tau Y_{t-1} + \eta W Y_{t-1} + X_t \beta + W X_t \theta + \upsilon_t$$
$$\upsilon_t = \lambda W \upsilon_t + \epsilon_t \tag{36}$$

The estimation of the above equations involves defining a spatial weights matrix, a critical issue in spatial econometric modeling. The following spatial weights matrices have been considered. First, a spatial weights matrix based on the concept of geographical contiguity, according to which $w_{ij} = 1$ if regions i and j are physically adjacent and 0 otherwise. The definition of neighboring regions used here is based on physical contiguity. Given that we do not have the full set of municipalities in our sample, to ensure that every region has at least one neighbor, we employ the Delaunay triangulation by constructing Voronoi polygons from the centroids of the sample municipalities using the Matlab function xy2cont.m developed by LeSage and Pace (2009, p. 118). Second, we define several matrices based on the k-nearest neighbors ($k = 5, \ldots, 10$) computed from the great circle distance between the centroids of the municipalities.

In order to choose between different potential specifications of the turnout rates and the spatial weight matrix W, a Bayesian model comparison approach is applied following LeSage (2014) and Rios and Ginamoena (2018). This method establishes the Bayesian posterior model probabilities (PMP) of the various alternative specifications given a specific spatial weight matrix.

We calculate posterior model z probabilities $p(M_z|D)$ using Equation (37):

$$p(M_z|D) = \frac{p(D|M_z)\, p(M_z)}{p(D)} \tag{37}$$

where $z = 1, \ldots, Z$ is the specific model under consideration, $p(M_z)$ is the prior model probability and the term $p(D|M_z)$ is the marginal likelihood given by $p(D|M_z) = \int p(D|\Theta^z, M_z)\, p(\Theta^z|M_z)\, d\Theta^z$ where Θ is the vector of parameters of the model.

To ensure that all models M_z are equally likely prioir to the analysis, an identical prior probability $\pi(M_z) = 1/Z$ is assigned to each model under examination. In order to prevent situations drawing conclusions that heavily rely on subjective prior knowledge, we employ diffuse prior distributions. In doing so, we find that the *dynamic spatial lag model* is the preferred spatial model specification. Furthermore, looking at marginal likelihoods, we find that the spatial weight matrix with the highest likelihood is the 10 nearest neighbor matrix (see Table A3).

Table A3. Spatial Bayesian Model Selection.

	Panel A: log marginal likelihoods						
	Spatial Weight Matrix						
Model specification	Contiguity	$W_k = 5$	$W_k = 6$	$W_k = 7$	$W_k = 8$	$W_k = 9$	$W_k = 10$
Dynamic Spatial Lag of X Model	9659.5	9631.2	9642.8	9662.8	9667.8	9676.2	9693.0
Dynamic Spatial Lag Model	10418.6	10472.0	10545.2	10582.3	10610.1	10636.1	10669.1
Dynamic Spatial Durbin Model	10402.7	10447.4	10515.6	10554.7	10579.6	10605.3	10638.3
Dynamic Spatial Error Model	10394.1	10445.2	10521.6	10562.6	10595.5	10625.7	10661.3
Dynamic Spatial Durbin Error Model	10383.7	10434.8	10511.1	10552.1	10584.9	10615.1	10650.7
	Panel B: posterior model probabilities						
	Spatial Weight Matrix						
Model specification	Contiguity	$W_k = 5$	$W_k = 6$	$W_k = 7$	$W_k = 8$	$W_k = 9$	$W_k = 10$
Dynamic Spatial Lag of X Model	0.00	0.00	0.00	0.00	0.000	0.000	0.000
Dynamic Spatial Lag Model	1.00	1.00	1.00	1.00	1.000	1.000	1.000
Dynamic Spatial Durbin Model	0.00	0.00	0.00	0.00	0.000	0.000	0.000
Dynamic Spatial Error Model	0.00	0.00	0.00	0.00	0.000	0.000	0.000
Dynamic Spatial Durbin Error Model	0.00	0.00	0.00	0.00	0.000	0.000	0.000

Notes:
The dependent variable is in all cases the turnout rate of the various sample municipalities for the period 2003-2019. Panel A reports the log-marginal likelihood of the different pairs of spatial model specifications and spatial weight matrices. Panel B reports the Bayesian estimation of the posterior model probabilities for the different spatial dynamic models. All the estimations include municipal fixed effects. Inferences drawn on the log marginal likelihood function value are based on the same uniform prior for ρ (for the DSLM/DSDM) and λ (DSEM/DSDEM). This prior takes the form $p(\rho) = p(\lambda) = 1/Q$ where $Q = (1/\omega_{min}, 1/\omega_{max})$ on which ρ and λ are defined, where $\omega_{max} = 1$ (i.e, the maximum eigenvalue) as W is row normalized.

D. DETAILED ESTIMATION RESULTS

This Appendix section provides the estimation results corresponding to Tables 2 to 5 in the manuscript including the full set of control variables.

Table A4. Main Results

	Model I [Non Spatial] (1)	Model II [Non Spatial] (2)	Model III [Spatial] (3)	Model IV [Spatial] (4)
Inequality(t)	-0.029***	-0.030***	-0.013**	-0.013***
	(-5.26)	(-5.38)	(-2.55)	(-2.65)
Margin of majority(t-1)	-0.009*	-0.100***	-0.008*	-0.061***
	(-1.89)	(-5.87)	(-1.86)	(-3.97)
Margin(t-1)*Inequality(t)		0.194***		0.113***
		(5.60)		(3.60)
Income per capita (t)	0.001***	0.001***	0.0001*	0.001*
	(3.84)	(4.05)	(1.69)	(1.80)
Taxes per capita (t)	-0.013***	-0.012***	-0.007* **	-0.007***
	(-6.04)	(-5.68)	(-3.62)	(-3.45)
Spending per capita (t)	0.014***	0.012***	0.011***	0.011***
	(3.93)	(3.48)	(3.62)	(3.35)
Transfers per capita (t)	-0.006**	-0.006**	0.002	-0.002
	(-2.35)	(-2.33)	(-0.82)	(-0.76)
Old population (t)	0.008**	0.008**	0.004	0.004
	(2.23)	(2.27)	(1.15)	(1.19)
Education (t)	-0.034***	0.034***	-0.004	-0.004
	(-6.57)	(-6.58)	(-0.81)	(-0.80)
Migration (t)	-0.159***	-0.160***	-0.062***	-0.061***
	(-9.35)	(-9.39)	(-3.98)	(-3.95)
Log Population (t)	-0.133***	-0.132***	-0.058***	-0.057***
	(-31.97)	(-32.34)	(-14.91)	(-14.60)
Ideology (t)	-0.001***	-0.001***	-0.000	-0.000
	(-5.71)	(-5.68)	(-1.23)	(-1.23)
Regional Alignment (t)	-0.005***	-0.005***	-0.002***	-0.002***
	(-6.21)	(-6.06)	(-3.07)	(-2.98)
National Alignment (t)	-0.003***	-0.003***	-0.002**	-0.002***
	(-3.34)	(3.52)	(-2.51)	(-2.60)
Great Recession dummy	0.121***	0.121***	0.010***	0.010***
	(13.79)	(14.16)	(11.49)	(11.22)
Turnout (t-1)	0.027***	0.026***	0.289***	0.290***
	(27.95)	(28.85)	(31.12)	(31.20)
Neighbors' Turnout (t)			0.675***	0.682***
			(69.19)	(70.97)
Neighbors' Turnout (t-1)			-0.182***	-0.185***
			(-12.28)	(-12.50)
R-squared	0.845	0.846	0.9893	0.893

Notes: The dependent variable is in all cases the political turnout rate in local elections (2003,2007,2011,2015,and 2019). * Significant at 10% level. ** Significant at 5% level. *** Significant at 1% level. t-statistics provided within parenthesis. Columns (1) and (2) report the OLS estimates of the non-spatial model. The spatial weight matrix employed in the spatial models (columns (3) and (4)) is the 10 nearest neighbors' spatial weight matrix. Estimator: BC-QML of Lee and Yu (2010)

Table A5. Spatial Effects Decomposition.

Variables	Short term effects Direct Effects (1)	Indirect Effects (2)	Total Effects (3)	Long term effects Direct Effects (4)	Indirect Effects (5)	Total Effects (6)
Inequality(t)	-0.014***	-0.027***	-0.041***	-0.020***	-0.041***	-0.061***
	(-2.64)	(-2.61)	(-2.62)	(-2.63)	(-2.58)	(-2.61)
Margin of majority(t-1)	-0.067***	-0.128***	-0.195***	-0.094***	-0.196***	-0.290***
	(-3.95)	(-3.87)	(-3.91)	(-3.96)	(-3.74)	(-3.85)
Margin(t-1)*Inequality(t)	0.124***	0.238***	0.361***	0.175***	0.364***	0.539***
	(3.56)	(3.50)	(3.53)	(3.55)	(3.41)	(3.49)
Income per capita (t)	0.000*	0.001*	0.001*	0.001*	0.001*	0.002*
	(1.86)	(1.85)	(1.86)	(1.86)	(1.85)	(1.86)
Taxes per capita (t)	-0.007***	-0.014***	-0.021***	-0.010***	-0.021***	-0.031***
	(-3.55)	(-3.50)	(-3.53)	(-3.54)	(-3.38)	(-3.46)
Spending per capita (t)	0.011	0.022	0.033	0.016	0.033	0.049
	(3.19)	(3.15)	(3.17)	(3.20)	(3.08)	(3.14)
Transfers per capita (t)	-0.002	-0.004	-0.006	-0.003	-0.006	-0.008
	(-0.84)	(-0.84)	(-0.84)	(-0.84)	(-0.84)	(-0.84)
Share of Old population (t)	0.004	0.008	0.013	0.006	0.013	0.019
	(1.22)	(1.22)	(1.22)	(1.22)	(1.21)	(1.21)
Education (t)	-0.004	-0.009	-0.013	-0.006	-0.013	-0.019
	(-0.85)	(-0.85)	(-0.85)	(-0.85)	(-0.85)	(-0.85)
Migration (t)	-0.065***	-0.125***	-0.191***	-0.093***	-0.193***	-0.285***
	(-3.88)	(-3.87)	(-3.89)	(-3.85)	(-3.59)	(-3.71)
Log Population (t)	-0.061***	-0.117***	-0.178***	-0.086***	-0.179***	-0.265***
	(-15.19)	(-13.57)	(-14.64)	(-15.86)	(-11.58)	(-14.38)
Ideology (t)	0.000	0.000	-0.001	0.000	-0.001	-0.001
	(-1.25)	(-1.25)	(-1.25)	(-1.525)	(-1.24)	(-1.24)
Regional Alignment (t)	-0.002**	-0.004**	-0.007**	-0.003**	-0.007**	-0.010**
	(-2.98)	(-2.94)	(-2.96)	(-2.98)	(-2.91)	(-2.95)
National Alignment (t)	-0.002**	-0.004**	-0.007**	-0.003**	-0.007**	-0.010**
	(-2.52)	(-2.52)	(-2.52)	(-2.52)	(-2.47)	(-2.50)
Great Recession dummy	0.011***	0.021***	0.032***	0.01***	0.032***	0.047***
	(10.60)	(11-02)	(11.13)	(10.28)	(7.57)	(8.64)

Dependent variable: The dependent variable is in all cases the turnout rate in local elections. * significant at 10% level, ** significant at 5% level, *** significant at 1% level. t-statistics provided within parenthesis. Inferences regarding the statistical significance of these effects are based on the variation of 1,000 simulated parameter combinations drawn from the variance-covariance matrix implied by the BC-QML estimation of Model IV in Table (2), including the interaction term between income inequality and the margin of majority. The results are obtained using the 10 nearest neighbors' spatial weights matrix.

Table A6. Evidence on transmission channel (I): pro-poor social spending

		Short term effects			Long term effects		
Variables	Coefficient	Direct Effects	Indirect Effects	Total Effects	Direct Effects	Indirect Effects	Total Effects
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Inequality (t)	-0.005	-0.005	-0.009	-0.014	-0.007	-0.014	-0.021
	(-0.77)	(-0.69)	(-0.68)	(-0.69)	(-0.69)	(-0.68)	(-0.68)
Margin of majority (t-1)	-0.009	-0.012	-0.022	-0.034	-0.017	-0.033	-0.049
	(-0.42)	(-0.50)	(-0.50)	(-0.50)	(-0.50)	(-0.49)	(-0.49)
Pro-poor Spending (t)	0.030**	0.032**	0.060**	0.093**	0.046**	0.092**	0.137**
	(2.11)	(2.10)	(2.08)	(2.09)	(2.09)	(2.05)	(2.07)
Inequality(t) * Margin (t-1)	0.029	0.034	0.063	0.096	0.048	0.095	0.143
	(0.63)	(0.73)	(0.72)	(0.72)	(0.72)	(0.71)	(0.72)
Inequality (t)	-0.057*	-0.063*	-0.117*	-0.179*	-0.089*	-0.117*	-0.266*
*Pro-poor spending (t)	(-1.92)	(-1.93)	(-1.91)	(-1.92)	(-1.93)	(-1.89)	(-1.91)
Margin(t-1)	-0.345***	-0.363***	-0.675***	-1.038***	-0.514***	-1.027***	-1.541***
*Pro-poor spending (t)	(-3.12)	(-3.08)	(-3.05)	(-3.06)	(-3.07)	(-2.93)	(-3.00)
Inequality (t) * Margin (t-1)	0.575**	0.603**	1.122**	1.725**	0.855**	1.705**	2.560**
* Pro-poor spending (t)	(2.51)	(2.49)	(2.47)	(2.48)	(2.49)	(2.41)	(2.45)
Income per capita (t)	0.000*	0.000*	0.001*	0.001*	0.001*	0.001*	0.002*
	(1.73)	(1.70)	(1.70)	(1.70)	(1.71)	(1.70)	(1.70)
Taxes per capita (t)	-0.007***	-0.007***	-0.014***	-0.021***	-0.010***	-0.021***	-0.031***
	(-3.46)	(-3.76)	(-3.73)	(-3.75)	(-3.76)	(-3.56)	(-3.67)
Spending per capita (t)	0.011***	0.012***	0.022***	0.033***	0.017***	0.033	0.050***
	(3.36)	(3.52)	(3.45)	(3.48)	(3.51)	(3.35)	(3.43)
Transfers per capita (t)	-0-002	-0.002	-0.003	-0.005	-0.003	-0.005	-0.008
	(-0.74)	(-0.73)	(-0.73)	(-0.73)	(-0.73)	(-0.72)	(-0.73)
Old population (t)	0.004	0.004	0.007	0.011	0.006	0.011	0.017
	(1.22)	(1.25)	(1.25)	(1.25)	(1.25)	(1.24)	(1.25)
Education (t)	-0.003	-0.003	-0.006	-0.009	-0.005	-0.009	-0.013
	(-0.62)	(-0.61)	(-0.61)	(-0.61)	(-0.61)	(-0.59)	(-0.60)
Migration (t)	-0.062***	-0.067***	-0.125***	-0.193***	-0.096***	-0.191***	-0.286***
	(-4.03)	(-4.10)	(-4.07)	(-4.10)	(-4.08)	(-3.86)	(-3.98)
Log Population (t)	-0.057***	-0.061***	-0.114***	-0.175***	-0.087***	-0.173***	-0.259***
	(-14.60)	(-15.06)	(-13.54)	(-14.62)	(-15.64)	(-10.64)	(-13.22)
Ideology (t)	0.000	0.000	0.000	-0.001	0.000	-0.001	-0.001
	(-1.27)	(-1.17)	(-1.17)	(-1.17)	(-1.17)	(-1.15)	(-1.16)
Regional Alignment (t)	-0.002***	-0.002***	-0.004***	-0.006***	-0.003***	-0.006***	-0.010***
	(-2.98)	(-2.79)	(-2.78)	(-2.79)	(-2.79)	(-2.73)	(-2.77)
National Alignment (t)	-0.002***	-0.002***	-0.004***	-0.007***	-0.003***	-0.007***	-0.010***
	(-2.58)	(-2.66)	(-2.64)	(-2.65)	(-2.65)	(-2.60)	(-2.63)
Great Recession dummy	0.010***	0.011***	0.021***	0.032***	0.016***	0.031***	0.047***
	(11.43)	(11.54)	(11.70)	(11.98)	(11.12)	(7.82)	(9.10)
Turnout (t-1)	0.290***						
	(31.24)						
Neighbors' turnout (t)	0.674***						
	(69.09)						
Neighbors' turnout (t-1)	-0.185***						
	(-12.46)						

The dependent variable is in all cases the turnout rate in local elections. Pro-poor spending is defined as (per capita) municipal expenditures in social protection. * Significant at 10% level. ** Significant at 5% level. *** Significant at 1% level. t-statistics provided within parenthesis. Inferences regarding the statistical significance of these effects are based on the variation of 1,000 simulated parameter combinations drawn from the variance-covariance matrix implied by the BC-QML estimation. The results are obtained using the 10 nearest neighbors' spatial weights matrix.

Table A7. Evidence on transmission channel (II): pro-middle class social spending

		Short term effects			Long term effects		
Variables	Coefficient	Direct Effects	Indirect Effects	Total Effects	Direct Effects	Indirect Effects	Total Effects
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Inequality (t)	-0.013	-0.014*	-0.027*	-0.041*	-0.020*	-0.041*	-0.061*
	(-1.60)	(-1.67)	(-1.67)	(-1.67)	(-1.67)	(-1.64)	(-1.65)
Margin of majority (t-1)	-0.117***	-0.125***	-0.237***	-0.362***	-0.177***	-0.362***	-0.539***
	(-4.18)	(-4.02)	(-3.97)	(-4.00)	(-4.01)	(-3.79)	(-3.91)
Pro-middle class Spending (t)	-0.001	-0.001	-0.004	-0.006	-0.003	-0.006	-0.009
	(-0.13)	(-0.20)	(-0.20)	(-0.20)	(-0.20)	(-0.21)	(-0.21)
Inequality (t) * Margin (t-1)	0.216***	0.231***	0.439***	0.670***	0.327***	0.670***	0.998***
	(3.68)	(3.64)	(3.62)	(3.63)	(3.63)	(3.48)	(3.56)
Inequality (t)	-0.001	0.000	0.000	0.000	0.000	0.000	0.000
* Pro-middle class spending(t)	(-0.06)	(0.00)	(-0.01)	(-0.01)	(0.00)	(0.00)	(0.00)
Margin(t-1)	0.183**	0.189**	0.359**	0.548**	0.268**	0.549**	0.817**
* Pro-middle class spending(t)	(2.24)	(2.11)	(2.10)	(2.11)	(2.11)	(2.07)	(2.10)
Inequality (t) * Margin (t-1)	-0.339*	-0.351*	-0.667*	-1.018*	-0.497*	-1.019	-1.516*
* Pro-middle class spending(t)	(-1.88)	(-1.81)	(-1.81)	(-1.81)	(-1.81)	(-1.79)	(-1.81)
Income per capita (t)	0.000*	0.000*	0.001*	0.001*	0.001*	0.001*	0.002*
	(1.87)	(1.81)	(1.79)	(1.80)	(1.81)	(1.79)	(1.80)
Taxes per capita (t)	-0.006***	-0.007***	-0.013***	-0.021***	-0.010***	-0.021***	-0.031***
	(-3.37)	(-3.41)	(-3.38)	(-3.40)	(-3.41)	(-3.29)	(-3.36)
Spending per capita (t)	0.011***	0.011***	0.022***	0.033***	0.016***	0.033***	0.049***
	(3.31)	(3.37)	(3.32)	(3.35)	(3.37)	(3.16)	(3.25)
Transfers per capita (t)	-0-002	-0.002	-0.003	-0.005	-0.002	-0.005	-0.007
	(-0.73)	(-0.68)	(-0.68)	(-0.68)	(-0.68)	(-0.67)	(-0.68)
Old population (t)	0.004	0.004	0.008	0.012	0.006	0.012	0.018
	(1.15)	(1.25)	(1.25)	(1.25)	(1.25)	(1.24)	(1.25)
Education (t)	-0.005	-0.005	-0.010	-0.015	-0.007	-0.015	-0.023
	(-1.01)	(-1.01)	(-1.01)	(-1.01)	(-1.01)	(-1.01)	(-1.01)
Migration (t)	-0.062***	-0.067***	-0.127***	-0.194***	-0.095***	-0.195***	-0.290***
	(-3.98)	(-4.03)	(-3.99)	(-4.01)	(-4.02)	(-3.72)	(-3.86)
Log Population (t)	-0.057***	-0.061***	-0.116***	-0.177***	-0.086***	-0.176***	-0.263***
	(-14.71)	(-14.55)	(-13.41)	(-14.23)	(-15.13)	(-11.40)	(-14.00)
Ideology (t)	0.000	0.000	0.000	-0.001	0.000	-0.001*	-0.001
	(-1.23)	(-1.28)	(-1.28)	(-1.28)	(-1.28)	(-1.27)	(-1.28)
Regional Alignment (t)	-0.002***	-0.002***	-0.004***	-0.006***	-0.003***	-0.006***	-0.009***
	(-2.97)	(-2.86)	(-32.85)	(-2.86)	(-2.86)	(-2.75)	(-2.81)
National Alignment (t)	-0.002**	-0.002**	-0.004**	-0.007**	-0.003**	-0.007**	-0.010**
	(-2.62)	(-2.63)	(-2.63)	(-2.63)	(-2.61)	(-2.58)	(-2.61)
Great Recession dummy	0.010***	0.011***	0.021***	0.032***	0.015***	0.032***	0.047***
	(11.30)	(11.30)	(11.35)	(11.59)	(11.22)	(8.00)	(9.30)
Turnout (t-1)	0.290***						
	(31.19)						
Neighbors' turnout (t)	0.679***						
	(70.20)						
Neighbors' turnout (t-1)	-0.186***						
	(-12.50)						

Dependent variable: The dependent variable is in all cases the turnout rate in local elections. Pro-middle class spending is defined as (per capita) municipal expenditures in education, health, culture and sports.* Significant at 10% level. ** Significant at 5% level. *** Significant at 1% level. t-statistics provided within parenthesis. Inferences regarding the statistical significance of these effects are based on the variation of 1,000 simulated parameter combinations drawn from the variance-covariance matrix implied by the BC-QML estimation. The results are obtained using the 10 nearest neighbors' spatial weights matrix.

E. SIMULATING INTERACTION EFFECTS IN SPATIAL MODELS

This Appendix section provides further information on the procedure employed to simulate interaction effects in spatial models.

Let $\tilde{\theta}$, $\tilde{\psi}$ and $\tilde{\zeta}$ denote the corresponding average short run total effects on turnout caused by an increase in $Ineq_t$, $Margin_{t-1}$, and $Ineq_t \times Margin_{t-1}$ using Equation (11). Then, the expected effect of inequality, conditional on $Margin_{t-1}$, can be obtained as: [18]

$$\frac{\partial Turnout_t}{\partial Ineq_t} = \tilde{\theta} + \tilde{\zeta} Margin_{t-1} \tag{38}$$

which given $\tilde{\theta}$ and $\tilde{\zeta}$ can be easily calculated using the ranges over which the $Margin_{t-1}$ is defined in our sample. To conduct inference on the effect of inequality conditional to the margin of majority, we also need to know if the estimated response given by Equation (38) is statistically distinguishable from zero. For that, we need an estimate of the variance and the covariance of the total effects of the relevant terms implied by our model. Thus, to simulate the distribution of the total short run effect of inequality conditional on $Margin_{t-1}$ we perform a Monte Carlo analysis of the distribution of the total effects by computing their covariances. Using the laws of the variance, the variability of the inequality effect conditional to the margin of majority is given by:

$$\begin{aligned} Var\left(\frac{\partial Turnout_t}{\partial Inequality_t}\right) =& Var\left(\tilde{\theta}\right) + 2 \times Margin_{t-1} \times \Sigma_{Ineq_t, Margin_{t-1}} + \\ &+ Var\left(\tilde{\zeta}\right) \times \left[Margin_{t-1}\right]^2 \end{aligned} \tag{39}$$

where $Var\left(\theta_0\right)$ is the variance of the total effect of income inequality on turnout, $Var\left(\zeta\right)$ is the variance of the total effect of the interaction term and $\Sigma^{(s)}_{Ineq,Margin}$ denotes the covariance of the two effects. To derive the distribution of the total effects of inequality and the interaction between inequality and the margin of majority, $\tilde{\theta}$ and $\tilde{\zeta}$, we first simulate the total effect $\left(\frac{\partial Y_t}{\partial X_t}\right)$ implied by Equation (11) by drawing $D = 1,000$ times from the variance-covariance matrix $Varcov\left(\eta\right)$ as follows: $\left[\eta^d\right]' = P'\upsilon + \left[\hat{\eta}\right]'$ where $\hat{\eta}$ denotes the parameter estimates of Equation (10), P denotes the upper-triangular Cholesky decomposition of the variance-covariance matrix and υ is

[18] We use the tilde notation to make clear the distinction with respect the estimates of the parameters in Equation (10), given that to simulate the inequality impact conditional on $Margin_{t-1}$ we use the total effects implied by the Monte Carlo simulation of the partial derivative of the DSLM in Equation (11) and not the parameter estimates.

a vector containing random values drawn from a normal distribution with mean zero and standard deviation one. This generates a matrix of size $K \times d$ containing the total effects. Then, we calculate the average variance-covariance matrix of the average total effects $\Sigma_{TE} = Varcov\left(\frac{\partial E_t}{\partial X_t}\right)$ implied by Equation (11) over all the Monte Carlo draws $d = 1, \ldots, 1,000$.