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## VOTING SYSTEMS AND INCOME REDISTRIBUTION – A REVIEW OF THE CAUSAL LINKS

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### ABSTRACT

**T**he political economy literature identified a convincing association between voting systems and the redistribution of income. Majoritarian systems tend to be associated with significantly lower social spending as a percentage of GDP than proportional systems. Some authors suggest a causal relationship between the two variables. Voting systems, it is claimed, create different incentives for candidates and voters, which results in structurally different policy choices regarding redistribution. However, the causal mechanism between them has not been unambiguously established. There are several models that offer explanations for how exactly the voting system affects the level of redistribution. All models start from the median voter theorem and identify the behavioral changes generated by the voting rules. The fundamental difference is that majoritarian elections are won with a majority of districts, while in proportional systems a majority of the entire voting population is pursued. This translates into geographically targeted public spending on goods and services towards the decisive districts in the former and social transfers directed at the decisive voters in the latter. Thus, in the long run, majoritarian systems will redistribute less than proportional systems, other things being equal.

**Keywords:** Voting Systems, Income Redistribution, Social Spending, Causal Mechanism.

## 1. INTRODUCTION

The political economy literature identified a convincing association between voting systems and the redistribution of income (Milesi-Ferreti et al., 2002; Persson & Tabellini, 2003; Iversen & Soskice, 2006; Blume et al., 2009). Majoritarian systems tend to be associated with significantly lower social spending as a percentage of GDP than proportional systems. Some authors go as far as proposing a causal relationship between the two variables. Voting systems, it is claimed, create different incentives for candidates and voters, which results in structurally different policy choices regarding redistribution. This relationship represents a particular case of the tradition of institutionalism, whereby the “rules of the game” systematically influence public policy more than would seem justified by looking at voter preferences. In this case, the rule that establishes how individual preferences become group decisions influences the actual decisions that get to be taken. Whether a country has a majoritarian or a proportional system of choosing their representatives affects the level of social expenditure, *ceteris paribus*.

There has been significant empirical work on this subject. For example, Persson and Tabellini (2003) set out to test whether voting rules (and other institutional features such as presidentialism) have an impact on social expenditure (among others). They use econometric techniques such as Ordinary Least Squares (OLS), Two-Stage OLS with Instrumental Variables and Propensity Score Matching on a cross-sectional sample of 65 countries and panel data, and confirm a strong relationship between majoritarian (proportional) systems and less (more) social spending as a fraction of GDP. Depending on the technique used, the difference is between 2% and 4% of GDP, statistically significant under some specifications.

Iversen and Soskice (2006) also provide empirical proof of this relationship, on a panel of 14 countries included in the Luxembourg Income Study, with data from the 1960s to the late 1990s. Their results also confirm that voting rules, among others, influence redistribution, with majoritarian systems strongly associated with less social spending.

Thus, the relationship between voting systems and redistribution seems to have been proven empirically to a satisfying extent. However, the causal mechanism between them has not been unambiguously established. There are several models that propose explanations for how exactly the voting system changes the behavior of voters and politicians and, as a consequence, affect the level of redistribution. Some of the most important will be explored in this paper with the aim of shedding more light on the most plausible causal links behind this relationship.

Robust causal relationships between country-level variables are notoriously difficult to establish, due to conditional independence issues, the low sample size and the overall complexity of such entities (Acemoglu, 2005). Thus, enough depth in analyzing the plausible causal mechanism can complement the empirical strategy in consolidating the validity of the relationship.

All explanatory models start from the median voter theorem (Downs, 1957). Voters are sorted in ascending order from left to right along an income axis. The left side wants more redistribution, while the right wants lower taxes. In the middle, the median voter swings between the two sides and can tilt the balance towards one of them.

The rational agent prefers redistribution as long as the utility is higher than the cost of taxation. Given this relatively straightforward setting, the great degree of variation between countries becomes even more puzzling. The models presented below try to identify the formal explanations for the differences in collective

behavior stemming from the distribution of incomes and electoral participation, but also from institutional differences and the partisan balance they generate. The Meltzer-Richard model concludes that the distribution of incomes and especially the difference between the mean and the median is the source of variation between countries in terms of public spending. A greater difference, given the fact that the median is always below the mean, will trigger a greater pressure for redistribution.

Iversen and Soskice (2006) on the other hand consider that the long term partisan balance is key in understanding this phenomenon. Governments where the left dominates redistribute more, on average, than the ones where the right has more influence. Moreover, some countries seem to have long term tendencies towards one of the sides of the political spectrum. This is explained by the differences stemming from the voting system, proportional systems being associated with higher social spending than majoritarian ones. The electoral formula changes the coalition dynamics, the election results and the prevalence of certain policies. Proportional systems produce multi-party systems where the center joins the left to tax the right and share the benefit. In majoritarian systems, that typically result in two-party configurations, the median voter is more apprehensive of being taxed and excluded from receiving benefits, given the relatively universal progressivity of tax systems.

Persson and Tabellini (2003) focus their explanation on the composition of public spending and the concentration/dispersion caused by the voting system. The median voter is lured by candidates in different ways, depending on the voting system. In majoritarian systems with single-member districts, the candidate will seek a majority of districts, which means it will geographically select the decisive ones, offering them local public goods. In proportional systems with multi-member districts, geographical targeting becomes impossible. The candidate needs a majority of voters, the swing voter becomes the target and the most effective way to reach a social category is through transfers. Thus, in the long run, public spending in proportional and majoritarian systems will differ, with the former allocating a larger share to social policies than the latter.

Milesi-Ferretti et al. present a two-stage model of elections whereby the fundamental difference lies with the district magnitude. Candidates have to choose between social and geographical loyalty and voters attempt to delegate representatives who will defend their interest by allocating more from the common purse to their group at the expense of others. Decisive voters in majoritarian systems with single-member districts will prefer to elect the candidate promising more public good to their district. On the other hand, in the proportional system with a nation-wide electoral district, decisive voters will choose higher transfer to their proportionally represented social group. This difference results in lower (higher) redistribution of income in majoritarian (proportional) systems.

This paper proceeds as follows. After the introduction, the most relevant models explaining the causal links between voting systems and redistribution will be presented in greater detail. First, the seminal Meltzer-Richard model of public spending will be explored, then the more adapted models of Iversen and Soskice, Persson and Tabellini and Milesi-Ferretti et al. will also be discussed. In the end, some conclusions and limitations will be suggested.

## 2. THE MELTZER-RICHARD MODEL

One of the best known explanations of redistribution in the political economy literature, the Meltzer-Richard model, has had an enduring influence in this field, despite not being necessarily confirmed empirically (Meltzer & Richard, 1981).

The model assumes an economy with exogenous prices, wages and taxes, with the government spending only on income redistribution, the amount being equal to the total tax collected. Individuals choose between consumption ( $c$ ) and leisure ( $l$ ) and the difference in their incomes are given by the differences in productivity. Taxes are proportional to incomes while transfers are in fixed sums.

Thus, the individual income  $i$  before taxes and transfers is given by:

$$v(p) = pn(p)$$

Where,  $p$  is the productivity and  $n$  the time allocated to work.

The individual income after tax and transfers, equal to consumption, is given by:

$$c(p) = (1 - t)np + r$$

Where  $t$  is the exogenous tax rate and  $r$  is the tax-financed redistribution.

At individual level,  $r$  and  $t$  are given, which means that the optimization problem becomes choosing  $n$  for maximizing utility. The result from this condition of maximization is that the rational choice for the time allocated to labor depends only on transfers and taxation:

$$n[r, p(1 - t)]$$

As higher transfers mean greater consumption for any individual, regardless of how much time is allocated to work, the point of contention becomes the tax rate. The latter reduces consumption more for the ones who allocated more time to work than for the ones who chose less work. In other words, the conflict between the levels of tax and transfers determines how much redistribution is chosen by the whole society. Calculating these parameters depends on the way in which elections take place. In majoritarian elections with a one-dimensional space and single-peaked preferences, the utility maximizing median voter is decisive. Higher taxation means lower incomes, compensated to a varying extent by transfers. Thus, as incomes grow along the income distribution, the preferred tax rate goes down. As productivity is equal to income, the ones with higher productivity have more to lose from tax than to gain from transfers. The opposite holds for the ones with lower productivity. If the median voter has an income higher than the mean, gaining from transfers will become impossible and the choice will be for a tax rate of zero. Conversely, if the decisive voter's income is lower than the mean, the choice will be for the adequate level of taxation that compensates through transfers the difference to the mean. Therefore, according to the model, any change in the income distribution that increases the difference between the median voter and the mean will translate into higher taxes and income redistribution.

In conclusion, the voter with the median income sets the level of redistribution in majority elections. Voters with incomes lower than the median prefer higher taxes and transfers, while the ones with incomes higher than the median prefer lower taxes and transfers. When the mean income gets closer to the median, the

demand for redistribution goes up. The Meltzer-Richard model brings a new perspective to redistribution, seen as a choice of rational agents with given productivity who have to optimize between work and leisure. Based on the assumptions, towards the ends of the income distribution the choice is different and the one tilting the balance is the median voter. The latter's position relative to the mean determines the absolute level of redistribution, which implies that greater inequality will lead to greater demand for taxes and transfers.

The model has its limitations, given the assumptions. Some of them are standard for the Downsian analysis, while others are a bit more restrictive. A significant example from the second category is the fact that in the model the composition of public spending is reduced to income redistribution, when in reality, this also includes public goods and other expenses. Because of this reasons, the results of the models are not entirely confirmed by empirical research. However, the model remains relevant for explaining redistribution in terms of rational choice and helps in developing other, more elaborate models.

### 3. THE IVERSEN AND SOSKICE MODEL

The Meltzer-Richard model points to the expected rational behavior of the median voter in majority elections, thus explaining the level of tax and transfers in society. On the other hand, elections are not only majoritarian. The extent to which the situation differs in proportional elections also needs to be analyzed, in order to understand the causal mechanism in detail (Iversen & Soskice, 2006)

The model considers three classes of citizens  $j$ , equally distributed in three groups based on their incomes: low ( $L$ ), middle ( $M$ ) and high ( $H$ ).

The utility function is given by the following expression, where  $y$  represents income,  $T$  is taxation, and  $B$  is the benefit received through income redistribution. The difference between tax and benefits is denoted  $p$ , this being equivalent to the net benefit of the group.

$$V_j(p_j) = y_j - T_j + B_j = y_j + p_j$$

The Government will have a limit  $R_j < y_j$  until it can tax members of each group and thus the amount available for redistribution will be  $R = R_M + R_H$  equal to the tax collected, so as to have a balanced budget.

An important assumption is the progressivity of the tax system: income can only be redistributed from higher to lower income members.

$$p_L \geq p_M \geq p_H$$

The net benefit is higher as the income is lower. This results in the rational behavior of group  $L$  to prefer taxing  $M$  and  $H$  and enjoy the benefit, of  $M$  to tax  $H$  and share the benefit with  $L$ , and of  $H$  to avoid taxation altogether. This also generates the coalition strategy: (i)  $M$  can join  $L$  and impose taxes to  $H$ , and then share the benefits or (ii)  $M$  can join  $H$  and avoid taxation, giving up on benefits. From the different choices of the middle income group results the difference in redistribution between democracies. However, this behavior depends on institutional factors, especially the voting system.

In proportional systems,  $L$ ,  $M$  and  $H$  are representative parties for their respective groups and their goal is to maximize ( $p$ ) for their group. As a consequence of the groups being equal size, no party will be able to form the Government alone, which means that a negotiation will have to be carried out regarding  $p$ . Negotiations

between  $L$  and  $M$ , given the progressivity assumption, would mean for each group a net payoff  $p$  of  $0.5R$ ,  $0.5R - R_M$ , and  $-R_S$ , respectively.

The situation is completely different in majority systems, mainly because of the two-party system is generates (Lijphart, 1999). Majority systems tend to be associated with the long term dominance of just two parties, as exemplified by the US, UK or Canada. As a consequence, instead of having the three parties represent their income groups, in majority systems, only two parties will be considered, one center-left  $LM$  and one center-right  $MH$ . The two sides will have to establish a common policy offer – decide the value of  $p$  that will become the bloc's platform. In this process, the conventional Downsian tendency of trying to lure  $M$ , brings the political offering from the extremes towards the center in the pre-election stage. The formalized coalition from proportional systems allows parties to be more representative for the interests of their voters, while the implicit coalition in majority systems moderates the political platform before the elections, but not necessarily afterwards. In the Iversen and Soskice model,  $M$  will have to choose between  $L$  and  $H$ , based on the probability  $\lambda$ , uniformly distributed, that the allied group will deviate towards the extremes after the elections. Hence, the voter chooses strategically – not necessarily the favorite platform but the one with the highest chance of obstructing the least favorite. The party with most votes wins everything.

The difference between the two voting systems, according to the model is that, in the long run, majoritarian systems elections are won more often by the political right, thus redistribution is lower, on average. The model considers for an equal probability  $\lambda$  for  $L$  and  $H$  to deviate, that  $M$  would be safer by joining  $H$ . The least favorable scenario is that  $M$  and  $H$  both pay taxes but benefits are only kept for  $L$ , in the case of a deviation towards the left. An opposite deviation will mean for  $M$  to also be excluded from benefits, but at least avoiding taxation together with  $H$ . The suspicion regarding the post-electoral behavior and the equal probability for deviation towards the extremes means that in majoritarian systems, the decisive voter will choose the option that minimizes its losses in the least favorite case, and this option is to join the right.

In proportional systems the number of parties is not reduced so drastically and this allows for a more accurate representation of political platforms. Thus, the post-vote deviation for each party will no longer be a risk, as each party promotes the interest of its citizens regarding  $p$ . That is why  $M$  will prefer a coalition with  $L$  securing an equal share of  $R$  – the sum collected by taxing  $H$ . In case of a coalition with  $H$ , a higher share from the total will have to go to  $L$ , because of the progressivity assumption, but the burden would have to be shared with  $H$ . More precisely, the benefit for  $M$  in a coalition with  $L$  is  $0.5 (R_H - R_M)$  while in a coalition with  $H$  it would be  $0.3 (R_H - R_M)$ .

To sum up, the decisive group (middle) will choose a right coalition in majoritarian systems because the risk of deviation to the left has worse consequences. In contrast,  $M$  will prefer a left coalition in proportional systems, because the net payoff is higher, given the progressivity assumption. Because of these reasons, it is expected for majoritarian systems to have lower social spending than proportional ones.

#### 4. THE PERSSON AND TABELLINI MODEL

Persson and Tabellini present a theoretical model that explains both the size of public budgets and their composition (Persson & Tabellini, 2003). The model starts from three groups  $i = 1,2,3$  equal in size, with identical preferences for public policy. The utility function is thus given by:

$$w_i = c_i + H(g) = 1 - t + b_i + H(g)$$

Where  $c_i$  represents the consumption of group  $i$ ,  $t$  is the tax rate,  $b_i$  is the transfer to group  $i$  and  $g$  stands for the public goods described by  $H$ , a concave and strictly increasing function. Thus, the utility of group  $i$  depends on consumption, taxes, transfers and public goods.

As a consequence, public policies are defined by taxes, public goods, transfers but also by the level of rents  $r$  kept by representatives, all different from zero.

The confrontation is between voters regarding transfers ( $b_i$ ), between voters and the elected regarding the size of  $r$  and between representatives over the distribution of  $r$ .

Similar with other models in this tradition, some individuals will have more rigid preferences than others, which will influence the calculation behind the voting decision. The decisive voter will be the one evaluating the policy platform only. Any voter to the right of the decisive voter on an axis between  $A$  and  $B$  will choose  $B$ , while any voter to the left will choose  $A$ . The middle group, the one with the highest density, will have a less intense ideology and the greatest number of decisive voters. Naturally, this group will become the target for both parties as it offers the greatest potential for additional gain.

The difference regarding the rule that establishes the winner in proportional and majoritarian systems, respectively, becomes relevant here. In the former, the winner needs a majority of voters, while in the latter, a majority of districts is sufficient. Hence, politicians compete for votes, but the number and type of votes they need to win depends to a large extent on the voting system. Candidates formulate electoral platforms and voters choose the one closest to their interest, while also taking into account their ideological inclinations. In proportional systems, the decisive voter becomes the target of all parties and the recipient of public spending. In their case, the ideological rigidity is not significant, which makes the voting decision depend more on the expected utility derived from the policy platforms. That is why these voters, assuming they are uniformly distributed geographically, get a greater share of public resources through quasi-universal transfers that reach large categories of citizens.

In majoritarian systems, a candidate no longer needs the majority of voters to win the mandate but the majority of districts. Within each district, getting the highest number of votes means winning the district, while any result lower than that brings no other benefit. Thus, considering three districts that correspond to the three social groups, there will again be two groups at the extremes and one in the center, undecided, that becomes key in the election game. Two districts won is equivalent to winning the elections, since the majoritarian system does not have a national level for redistributing votes. Competition will be focused on the decisive district, which, by definition is geographically delineated and becomes the target for public spending with local impact. That is why, in the long run, the composition of public spending gets to be dominated by geographically targeted public goods at the expense of transfers.

In conclusion, the decisive district is that one where competition is fierce in majoritarian systems and the one getting the largest share of public funds through locally restricted public goods. In proportional systems, the decisive voter becomes crucial for reaching a majority, and, since geographical targeting would not be effective, policies with wider impact (redistributive transfers) are preferred and get to dominate in the long run.

## 5. THE MILESI-FERRETTI ET AL. MODEL

Another explanation of the causal mechanism is based on the district magnitude of the electoral system (Milesi-Ferretti et al., 2002). The model considers three income groups *A*, *B* and *C*, each having between 25% and 50% of the population. The country is also divided in three regions, fundamental administrative units. The government only has two instruments for public spending: transfers, equivalent to direct redistribution of income, and the purchase of goods and services. Each of these two types of public spending requires a certain rule of eligibility. For transfers, a category of citizens is defined and every individual belonging to this category is entitled to benefit of the respective policy, irrespective of the geographical location. The situation is different for the purchase of goods and services: each region can become the recipient of additional spending on local goods such as roads, hospitals or public services.

The utility function for citizen *i* from group *j* in region *k* is given by:

$$U_{ijk} = (1 - t)^{\alpha_i \beta_i} s_j^{\alpha_i (1 - \beta_i)} g_k^{(1 - \alpha_i)}$$

Where *t* is the proportional tax rate, *s<sub>j</sub>* are the social transfers towards group *j* and *g<sub>k</sub>* represents government spending on public goods in region *k*. Individuals have complementary preferences between public goods and individual gain, and between primary income and transfers.

The political decision process needs to establish the levels for *t*, *s<sub>j</sub>* and *g<sub>k</sub>*, the parameters of public spending. The first phase of this process is the vote, which can take place in a majority system with each region being an electoral district, or through a proportional system with a single national district. An important mention is that all representatives of group *j* from different regions benefit from *s<sub>j</sub>*, while only *k* benefits from *g<sub>k</sub>*.

In the second stage of the political process, the government is formed. From the three representatives, one is chosen as coalition maker and tries to co-opt another for negotiations. Once formed, the government tries to maximize the joint utility of the two groups represented in the coalition.

In majority systems, supposing that one group is larger than each of the other two and given that a plurality within districts is sufficient for winning the mandate, all three representatives belong to one group. Suppose that *B* is the winner, so that the joint utility of the two groups is obtained by maximizing the utility based on different preferences for goods and services but similar in terms of transfers. The budget constraint considers transfers to the winning group only and the purchase of goods and services in the two regions of the coalition members.

The election of the group representative will suppose the emergence of a decisive voter, the median voter between the parameters  $\alpha$  and  $\beta$ , given by:

$$\alpha^{*M} = \frac{\alpha_m}{2 - \alpha_m}; \beta^{*M} = \beta_m$$

The outcome is that the decisive voter chooses the representative with the median value for the public goods parameter and with a below-median value for the transfers. The decisive voter knows that excluding the other coalition group from transfers is impossible and, as such, chooses the representative that prefers public goods to transfers and thus maximizes the share of public goods for her region at the expense of others.

In proportional systems, each group delegates one representative, given the condition that the size of the group is between 25% and 50% of the population. The public budget for a certain level of  $\alpha$  and  $\beta$  is equal to the one in the majority system, but the ratio of public goods to transfers is different:

$$\alpha^{*P} = \frac{\alpha_m(2 - \beta_m)}{1 + \alpha_m(1 - \beta_m)}; \beta^{*P} = \frac{\beta_m}{2 - \beta_m}$$

In this situation, the decisive voter chooses a representative with a higher preference for transfers than the median, and a lower preference for public goods than the median. Symmetrical to the explanation in the previous case, public goods are uniformly distributed by regions, but each representative wins more from a single type of transfer, the one to the represented group. Thus, the decisive voter will delegate the representatives with a preference for higher transfers than public goods.

In other words, politicians have to choose between two types of public spending: transfers and public goods, the first category can target a social group, while the second can be allocated to a region. Accordingly, the representative needs to choose between the social and the regional loyalty. The common purse either finances transfers to a wide social group, or local-use goods like schools, roads or services.

The explanatory key here is the district magnitude – the number of mandates allocated to each electoral unit. Its role in the causal mechanism is relevant in all models, but becomes most visible in this one. The single-member district is one of the key features of the majoritarian system, where candidates with the highest number of votes get the mandate. In proportional systems, each candidate (or party) wins a number of mandates proportional to the share of the vote received at national level. In the case of single member districts, a plurality of votes is equivalent to winning the mandate and any result lower than that is irrelevant, as it brings no additional benefit to the candidate or the party. Thus, some districts are left outside the real political competition, as elections are considered already won by one party or the other, given the strong ideological inclination towards one of the sides of the political spectrum. Only the districts with a higher share of undecided voters are electorally significant, thus becoming the target for campaigns that promise public spending directed exclusively at the region.

The competition is much more diffuse in proportional systems, where district magnitude is higher, sometimes equal to the total number of mandates. Political platforms focused on the median voters will have to be designed to include wider segments of the population. The most effective policies to achieve this goal are social transfers.

The causal mechanism from the Milesi-Ferreti et al. model starts from this realization. In majority systems, districts will choose only one representative and given the identical social distribution assumed for all districts, all representatives will be from the same group. They will have equal preferences for transfers but different in terms of public goods. The decisive voter will prefer the representative that will try to take from the common purse and bring more to its district than to others, and the only way to do that will be through public goods. Assuming that regional social transfers are impossible, the representative will always choose more public goods and this will be seen in the composition of public spending. In proportional systems, each social group has a representative, and they will have identical preferences in terms of public goods, but different in terms of transfers, which they would like to keep for their own social group. In this case, the decisive voter will prefer the candidate with the greater commitment for obtaining transfers to the social group, as the regional public good is less relevant. The result is reflected by the configuration of public

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spending, where transfers are higher than expenditure on goods and services. Thus, the difference in electoral rules, especially in terms of the district magnitude, is associated with a social representation of interest in proportional systems and a geographical representation in majoritarian systems. This represents the source of the different share of redistribution between countries.

## 6. CONCLUSIONS

The rational choice models presented attempt to explain the causal mechanism between voting systems and income redistribution. In different ways, they present the role of the rule that transforms votes into mandates and the incentives and coalition behavior that determine voters and representatives to opt for different types of public spending.

Undoubtedly, these models have their drawbacks. The Downsian analysis tradition does not allow for a more elaborate description of the electoral process, as the choice dimension is singular. Because of this limitation, the wide variety of voting systems is reduced to two extreme cases. There are numerous details such as registration procedures, mixed systems, turnout rates and all influence the electoral process to varying degrees (Larcinese, 2007; Mahler, 2008). Similarly, the delegation of representatives and their loyalty towards voters depends from one context to the other, and the rational and perfectly informed choice solely on criteria of utility maximization is far from being a realistic assumption. However, the models used here provide valuable insights regarding the causal mechanism of interest. Given the fact that they are also empirically confirmed, they have significant explanatory value.

To sum up, the causal mechanism between the dependent variable (redistribution through social spending) and the independent variable (the voting system) is convincing. In the logic of political economy models based on the median voter theorem and the rational choice between taxes and transfers, the difference between the two types of electoral systems plays an important role. In majority systems, elections are won by obtaining a majority of districts, which means public goods will be geographically targeted to decisive districts that can help win the majority. In proportional systems, candidates pursue a majority of the entire voting population, which means that the decisive voter becomes the target and the only way to reach a wide category of voters is through social transfers. Thus, in the long run, majoritarian systems will redistribute less than proportional systems, other things being equal.

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