Soaking the Rich and the Poor?
– An Empirical Investigation of Director's Law

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Abstract

The theoretical analysis of redistributive policies is a corner-stone of modern political-economy research. A plethora of theoretical models have been developed during the last three decades predicting different directions of income redistribution in response to changes in inequality. While theories based on standard median voter models conjecture that in modern democracies income is redistributed from rich to poor, many "pork barrel politics"-models come to the conclusion that income redistribution favors the middle-classes at the expense of the rich and the poor alike – a result famously dubbed "Director's Law". While there is a large empirical literature testing the implications of the median voter models, there is hardly any cross-country research that tries to test the empirical validity of "Director's Law". In this paper we set out to address this shortcoming. The aim is to provide a comprehensive, rigorous empirical test using panel data on 22 OECD countries over the time period of 1971–2005. Looking at the income share gains of different income deciles, we find strong evidence for "Director's Law": increases in income inequality result in redistribution from the richest and poorest 20 per cent of the income distribution towards the middle class.

KEYWORDS: redistribution, income inequality, median voter models, Director's law, panel data
JEL classification: D33, D72, H11, H53, I30

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1 Introduction

The theoretical analysis of income inequality and redistributive policies is a corner-stone of modern political-economy research. It cuts across many policy issues in international and comparative political economy. Inequality (and what to do about it) touches upon normative issues of social justice and societal cohesion, it drives political discussions and electoral competition, it may affect a public's acceptance of free trade policies and exposure to further international market integration. It is also argued to affect economic growth both directly and through the redistributive policies that may result from increasing inequality. Understanding the nexus between inequality and redistribution by the government is therefore a key factor when analyzing many of the questions political economists are concerned with.

Over the last three decades, a large amount of research trying to explain the relationship between redistribution and (income) inequality has emerged. The theoretical workhorse relating redistribution and inequality was proposed by Romer (1975), Roberts (1977) and Meltzer and Richard (1981), and relies on standard median voter models. The general conclusion is that redistribution increases with a rising mean to median income ratio, and so does redistributive government taxation. This basic set-up has been extended and modified in many directions. Some find that the direction of redistribution from rich to poor is not as obvious as one might think because insurance motives might trump redistributive aims (Moene and Wallerstein (2001, 2003)), or prospects of higher future income may make the median voter reluctant to endorse programs that could hurt him or her at some point (Alesina and La Ferrara (2005)).

Empirical tests of these hypotheses abound, but unfortunately there are no clear-cut results. Some authors find empirical evidence for a positive relationship between redistribution and inequality (Meltzer and Richard (1983), Alesina and Rodrik (1994), Persson and Tabellini (1994), Milanovic (2000)), others do not find evidence in support of the median voter model (Perotti (1996); Gouveia and Masia (1998); Kenworthy and McCall (2008)). These mixed results have led some to believe that there exists no robust empirical relationship at all. Others have pointed at the difficulty in identifying the 'correct' median voter because of the correlation between income and political participation (Benabou (2000); Harms and Zink (2003); Mahler (2006)).

However, there exists a second strand of models that predict quite a different pattern of redistribution. These so-called"pork barrel politics"-models differ in that they deviate from the direct-democracy assumption inherent in the median voter approach. Instead, they model redistributive policies as the outcome of electoral competition between political candidates/parties, thus approximating more closely the realities in representative democracies (Dixit and Londregan (1998); Dhami (2003); Carbonell-Nicolau (2009)). The general theoretical predictions lend support to "Director's Law" (Stigler (1970)) which stipulates that redistributive politics favor the middle class at the expense of both the rich and the poor .

To the best of our knowledge, the empirical literature has so far mostly neglected this distinct possibility or has not been able to properly test it, since such an investigation requires an in-depth analysis of gains and losses of different income deciles. Against this background, the aim of this paper is to conduct a comprehensive empirical test of "Director's Law" and income inequality. We use panel data provided by the Luxembourg Income Study (LIS) that covers 22 OECD countries over the time period of 1971–2005. Our analyses confirm the 'law's' message. Looking at the income share gains of different income deciles, we find that increases in income inequality result in redistribution from the richest and poorest 20 per cent of the income distribution towards the middle class. With respect to the impact of changes in income inequality, there is some tentative evidence that redistribution seems to be driven by the income disparity between the middle class and the top 10 per cent. By contrast, an increase in inequality between the middle-class and the poorest 10 per cent does not seem to have a significant impact on redistributive policies. The general results survive a large number of robustness tests and underline the pivotal role of the middle classes.

The remainder is structured as follows. Section 2 offers a brief and non-technical review of some of the models that arrive at a redistribution pattern predicted by "Director's Law". Subsequently, section 3 introduces the econometric framework used in the paper, discusses the results of the empirical analysis and provides some robustness checks. Finally, section 4 concludes.

2 “Pork-Barrel-Politics”-Models and “Director’s Law”

2.1 A Brief Review of the Literature

“Director’s Law” has been proposed by and named after the Chicago law professor Aaron Director and was later popularized by Stigler (1970). Stigler defines it to mean that “[p]ublic expenditures are made for the primary benefit of the middle classes, and financed with taxes which are borne in considerable part by the poor and rich” (p. 1). The basic explanation Stigler offers for this outcome is that redistribution is decided by voter coalitions. In the 20th century income became the basis for societal coalition formation and the middle income class turned out to be pivotal. Note, however, that at the end of his essay, Stigler backs off somewhat from these results by suggesting that the middle class is entering into a coalition with the poor today (p. 9).

The notion that redistribution may benefit mainly the middle class lay dormant after Stigler’s article, as theoretical modeling focused on the median voter approach. However, in the 1980s, formal theoretical research started analyzing the role of income redistribution in electoral politics. Redistribution was considered a tool used by political candidates or parties to win election (see Coughlin (1986); Cox and Mccubbins (1986); Lindbeck and Weibull (1987)). This approach allows consideration of a richer political environment with more than one policy dimension, while employing a probabilistic voting framework ensures existence of political (Nash-) equilibria even in a multidimensional issue space.

In their seminal contribution on redistribution within a probabilistic voting framework, Lindbeck and Weibull (1987) develop a model where two parties (representing the left and the right) compete for office. Unlike in the traditional median voter model, agents do not only care about private consumption, which is determined by taxation and income transfers, but also have ideological predispositions for or against a party or candidate. Given the assumption that parties can fully commit to their campaign promises, it emerges that party programs target those voter groups, which are most responsive to a marginal policy change. It is a general result of these type of models that a voter group becomes more important, the bigger it is and the greater its ideological density, i.e., the more voters may be swayed by a marginal change in program. Lindbeck and Weibull identify different equilibria depending on different distributional assumptions. If, however, low-income earners have a partisan bias in favor of the left party and high-income earners of the rightist one, “then in equilibrium both parties will favor middle-income earners at the expense of both low- and high-income earners, and to such an extent that the middle income earners will have the highest net income of all“ (p. 279). The intuition behind this finding is quite simple. From the perspective of a right-wing party, for instance, it is much cheaper to win over (in probabilistic terms) a middle class voter than a poor voter. The reason is that a much higher tax rate and transfer size is needed to convince the latter of voting for the right. This leaves the middle class in a pivotal position. The paper is content with analyzing redistributive patterns. The impact of changes in the distribution of income are not being analyzed.

In an extension of Lindbeck and Weibull (1987) , Dixit and Londregan (1998) propose a model in which voters and parties differ not only in their preferences for personal consumption but also in their aversion for general income inequality. Party programs are therefore proposals over taxation as well as redistribution to address both general inequality and pork barrel spending directed at certain voter groups. In addition, Dixit and Londregan consider the possibility that taxes are distortionary and thus have an impact on labor supply decisions. The authors arrive at the similar prediction that the middle class should be able to influence both parties' programs in their favor. The reasoning is akin to the previous model: most poor voters will strongly favor the redistributive platform of the left-wing party, while most rich voters are strongly attached to the rightist party's ideology. In addition, the middle class is also the most numerous group in most advanced countries and its ideological distribution makes it most responsive to marginal policy changes for both parties. As a result, transfer policies favor the middle class at the expense of the rich and the poor. With respect to the impact of changing income inequality, the model predicts that a rise in income disparity will lead to increased taxation and redistribution.

The theoretical prediction of a redistributive bias in favor of the middle class survives even if further assumptions are being relaxed. Dhami (2003) shows that “Director's Law” may still hold under asymmetric information, where voters do not know for sure the redistributive preferences of parties and full policy commitment by candidates is neither credible nor possible. In addition, party candidates and thus party platforms are derived endogenously through a Nash bargaining compromise between a moderate (i.e., more popular) faction and a highly ideological one. In a two-stage voting game, moderates try to win against ideologues by signaling they moderation and by proposing even more centrist polices. As a result, "the redistributive platforms implemented by the two parties [move] towards the middle. Middle income voters then find the implemented redistributive policy to be closer to their preferred outcome" (p. 2072). Dhami (2003) offers also some tentative comparative statics regarding the impact of income inequality on taxation and transfers. An increase in inequality may increase or decrease redistribution, depending on the on the location of the swing voters.

The distributional pattern of "Director's Law" is also preserved in a dynamic setting. Carbonell-Nicolau (2009) proposes a model where each candidate may reveal his or her intentions only gradually each round of the voting game. Thus candidates' preferences for taxation remain ambiguous, providing them with some flexibility over time. This allows them to react strategically to policy announcements of the other candidate. Carbonell-Nicolau (2009) finds that the model "possesses a subgame perfect equilibrium whose corresponding tax function is such that taxes are borne by less populous voter groups" (p. 9). Since the middle class constitutes the biggest group, both candidates/parties will tax the rich and poor more heavily. The intuition behind this prediction is that as the voting game continues, both try to remain as flexible as possible in the tax policies they announce. As time progresses, they commit to taxing the smaller groups of the rich and the poor first. The end result is that these two groups are more heavily taxed than the middle class, which is only taxed if a certain revenue goal cannot be met by taxing the poor and rich alone. In contrast to the previous models, the impact of changes in income disparity are not being considered here.

Note that not all models in this tradition arrive at a redistributive pattern in line with "Director's Law". Coughlin (1986) formulates a probabilistic framework where candidates choose a reputation for income redistribution and evaluate voter choices using a qualitative response model. In searching for different types of equilibria, he concludes that they "only rarely exhibit the redistribution pattern in Director's Law. Indeed, there are far more cases where income will be redistributed to low-income voters or high income voters or to groups of voters that do not make up any particular stratum of the income distribution than cases where income will be redistributed from the ends of the income distribution to the median income voters" (p. 62).

Unfortunately, none of the papers above offer any empirical tests of these predictions. In fact, "Director's Law" has not been thoroughly analyzed on real-world data. One notable exception are Xu and Zou (2000) who study changes in the income distribution in China using data for 29 provinces over 11 years. They find clear evidence that resources are spend towards the middle class at the expense of the rich and poor. To the best of our knowledge, however, there are no cross-national studies explicitly testing the empirical validity of "Director's Law".[1]

2.2 Formulation of Hypotheses

Reviewing the above models, we find that they are very clear-cut with respect to the distributional pattern they predict. It turns out that the middle class is the pivotal group and parties/candidates offer platforms in their favour. Referring to the analysis of "Director's Law" and income inequality offered by Dixit and Londregan (1998), we conjecture:

Hypothesis 1 *A rising income inequality increases redistribution towards the middle class at the expense of the rich and the poor.*

Note that we are also interested in examining whether it makes a difference, if inequality between the rich and the middle class increases or between the poor and the middle class. We therefore test the following prediction:

Hypothesis 2 *A rising income inequality between the middle class and the rich engenders a stronger redistributive response than a widening income gap between the middle class and the poor.*

[1] To be sure, their is another literature on the provision of public and private goods in, for example, education (Epple and Romano (1996a)) or health care (Epple and Romano (1996b); Cohen-Zada and Justman (2003)). These studies analyze individual preferences and often identify an "ends against the middle" conflict, that is, the interests of the middle class are opposed by a coalition of rich and poor. This finding is reminiscent of "Director's Law" and deals with redistribution not via direct transfers, but indirectly through public goods. Since the focus of our empirical analysis is on direct income transfers, we have neglected this strand of literature.

The rationale behind this hypothesis is that a rise in the income gap between the middle class and the rich will make the former relatively poorer, thus increasing their incentive for demanding higher transfers. Since the middle class is the group with the highest number of swing voters, party programs will reflect this preference for higher redistribution. On the other hand, an increasing income disparity between the middle and the lower end of the income ladder, will leave the former's relative position with respect to the rich unchanged. Therefore, their preferences should remain the same.

3 Empirical Analysis

In order to test the impact of income inequality on redistribution, we use an unbalanced panel of up to 22 OECD countries covering the time period 1971-2005.[2] The inequality measures and the indicators of government redistribution are taken from the Luxembourg Income Study. There are only few alternative sources for comprehensive inequality data sets such as UNU-Wider's world income inequality database (UNU-WIDER (2005)) or the University of Texas Inequality Project. However, the LIS guarantees the highest data quality. It does not collect microdata, but rather harmonizes the national household income micro-data sets, thereby ensuring the highest degree of internal consistency (for more detailed information about the unique contributions of LIS, see Atkinson (2004), Förster and Vleminckx (2004)).

The LIS publishes new country data approximately every 5 years. As a result, it is possible to generate seven 5-year averages beginning in 1971-1975 up to 2001-2005. We follow the approach of Carter (2006) and allocate the LIS data to the nearest/closest end of the five-year period.[3] The use of 5-year averages helps remove business cycle effects

[2] The countries are (available time periods in brackets): Australia (1981, 1985, 1989, 1994, 2001, 2003), Austria (1994, 2000), Belgium (1985, 1992, 1997), Canada (1975, 1981, 1987, 1991, 1994, 2000), Denmark (1987, 1992, 1995, 2000, 2004), Finland (1987, 1991, 1995, 2000, 2004), France (1979, 1984, 1989, 1994), Germany (1978, 1981, 1984, 1989, 1994, 2000), Greece (1995), Hungary (1991, 1994), Ireland (1987, 1990 (interpolated), 1995), Italy (1986, 1991, 1995), Luxembourg (1985, 1991, 1994, 2000, 2004), The Netherlands (1983, 1987, 1991, 1994, 1999), Norway (1979, 1986, 1991, 1995, 2000), Poland (1986, 1992, 1995, 1999), Slovak Republic (1992, 1996), Spain (1980, 1985 (interpolated), 1990, 1995), Sweden (1975, 1981, 1987, 1992, 1995, 2000), Switzerland (1982, 1985 (interpolated), 1992, 1995 (interpolated), 2000), UK (1974, 1979, 1986, 1991, 1995, 1999), USA (1974, 1979, 1986, 1991, 1994, 2000, 2004).

[3] To make this clearer, we allocate the LIS data for Australia in 1981 (1989) to the year 1980 (1990) and

and enables us to examine medium- to long-term relationships. Given our research focus this constitutes an advantage, since we doubt that annual changes of income inequality automatically influence the extent of redistribution. First, there is bound to be a lag in recognition, i.e., before households/voters actually notice that their *relative* income position has changed. Second, elections do not take place annually, so there might not be an immediate outlet for voters to express possible changes in their preferences for government policies.[4] Finally, choosing 5-year averages has the additional advantage of increasing the comparability to the existing empirical literature on the determinants of income inequality, since many studies also follow these lines (e.g., most recently by Carter (2006); Voitchovsky (2005)).

3.1 Variables and Definitions

Using spending variables such as the size of public social expenditures to measure redistribution would be highly inappropriate. It would make it virtually impossible to discern which income groups benefit most. In addition, we would miss the redistributive impact of taxation[5]. Therefore, we consider indicators that directly measure gains in income through redistributional measures.[6] Thus, we calculate the gains/losses in the overall (household) income share when comparing disposable and factor income, that is we compare the income before and after redistribution took place. In particular, we examine the share gains of the poorest decile (**SG Bottom-10**), of the two poorest deciles (**SG Bottom-20**), of the middle class ranging from the 2^{nd} to the 8^{th} (**SG Middle-80/20**)[7]

then calculate the 5-year averages from 1971-1975 up to 2001-2005.

[4] Of courses, there are other, more direct ways to influence public policy, such as lobbying and exerting interest group pressure. However, even if this is successful, it usually requires a considerable amount of time in a democracy to enact change.

[5] The majority of existing empirical studies that investigate median-voter models have gone the first route (e.g. Moene and Wallerstein (2003); Schwabish, Smeeding, and Osberg (2004)), but there are also some that have used the latter concept (e.g. Milanovic (2000); Iversen and Soskice (2006)).

[6] Calculating the household income variables, we follow the LIS standard, i.e., we use the square root equivalence scale in order to adjust to household sizes. Furthermore, we top- and bottom coded the income data according to the LIS standard.

[7] We tested also ranges for the middle class such as percentiles 20 to 50. However, our empirical results with respect to the direction of redistribution suggest that the the broader definition adopted here is more appropriate.

and of the richest decile (**SG Top-10**) and the two richest deciles (**SG Top-20**) of the income distribution. These indicators are direct measures of redistribution and also capture the impact of tax breaks and allowances, as well as other forms of tax exempts that are not captured by spending variables. By distinguishing between various parts of the income distribution, it is possible to get a precise understanding of net winners and losers of redistribution and thus to investigate the validity of "Director's law". Detailed definitions and sources for all dependent and independent variables are provided in Table 1 of the appendix. In addition, Table 2 provides the summary statistics, while Tables 3 and 4 show the pairwise correlation results.

Turning to our independent variables, we are mainly interested in the effects of inequality on redistribution, using several inequality measures from the LIS database. We calculate them using factor income, which, according to the LIS definition, includes cash wages and salaries gross of employee taxes and social contributions, cash property income as well as earnings from farm- and non-farm self-employment. As an overall indicator of the distribution of income, we use the **Gini** coefficient. However, the Gini coefficient is too coarse to test our second hypothesis, since it cannot distinguish properly between the dynamics that might take place at the bottom or the top of the income ladder. Hence, we also investigate the inequality between the richest 10 per cent and the middle class, and between the poorest 10 per cent and the middle class. We calculate the ratios of factor income between the 90th and the 50th percentile (**P90/50**) and between the 50th and the 10th percentile (**P50/10**). Finally, since median voter models suggest that inequality with respect to the median income earner is pivotal, we use the LIS data set to calculate the median to mean ratio (**Median Mean Ratio**), which has rarely been tested before. This indicator is an alternative measure of income disparity and it decreases if the median income shrinks relative to the average income. It goes up, on the other hand, if the the distance between the median and the average income gets smaller.

The control variables are chosen solely based on theoretical considerations and stay the same in all specifications. Of course, we extensively test whether our results are sensitive to our choice of these variables. As economic controls, we employ the real **GDP Growth**, the (standardized) unemployment rate (**Unemployment**) and, to take the impact of population aging into account, we use the ratio of people aged 65 and older to the total population (**Pop>65**).

In addition, we also introduce three political control variables that could, according to the literature, affect policy decisions on redistribution. First, there is a sizeable literature identifying the the role of government ideology on redistribution (Hibbs (1977), Persson and Svensson (1989)). One link between partisan politics and redistribution results from the fact that the partisan theory of political competition assumes right-wing parties to represent higher-income voters and left-wing parties to represent lower-income voters. As a consequence, leftist governments are more engaged in redistribution towards the poor than rightist governments.[8] Hence, we employ a variable indicating the left's strength by measuring the share of cabinet seats held by left-wing parties (**Left Government**). Second, the literature assumes that a political outcome is influenced by the electoral system (for a very influential theoretical model see Austen-Smith (2000)). Under majoritarian (as opposed to proportional) regimes, the competition between parties focuses on some key marginal districts resulting in fewer public goods, less rents for politicians, more district targeted redistribution and a larger government. By contrast, under proportional representation politicians need to win the support of the broad majority, so that proportional regimes tend to have larger governments and a larger share of spending going to broad-based welfare programs on public goods or welfare policy (Persson and Tabellini (1999), Persson, Roland, and Tabellini (2000)).[9] As a consequence, to account for the potential impact of the electoral system (i.e., its degree of proportionality), we use a least squares index which has been proposed by Gallagher (1991) and has also become known as the Gallagher index.[10] The idea behind this index is quite simple: it measures an electoral

[8]A great number of studies have tested these hypotheses (see for example Cusack (1997), Hicks and Swank (1992)). In general, they have found support for the claim that the cabinet share of left-wing parties is positively associated with more redistribution. The effect of union power, in contrast, has been empirically less convincing (Bradley, Huber, Moller, Nielsen, and Stephens (2003)).

[9]Empirical evidence strongly supports this hypothesis (see among others Persson and Tabellini (2007) Persson and Tabellini (2004)). Similarly, Feld, Fischer, and Kirchgässner (forthcoming) find empirical evidence for Switzerland that institutions of direct democracy are more efficient in the sense that they spend less for redistribution while simultaneously performing as well as representative democracies in reducing inequality. Moreover, Verardi (2005) demonstrates that inequality decreases with the increasing degree of proportionality of a system.

[10]We decided against using a simple dummy variable, which merely distinguishes between majoritarian and proportional systems because such a measure would be way too crude and would miss considerable differences that exist within each of the two categories. The Gallagher index is defined in Table 1.

system's **Disproportionality**, which is conceptualized as the difference between vote and seat shares of each party, weighted by the size of the deviations. Finally, we introduce **Voter Turnout** into our empirical specifications, since it has been argued that higher turnout is associated with more redistribution (for a very recent empirical test of that proposition, see Mahler (2006)).

3.2 Specification and Estimation

For each of our dependent variables we run panel regressions ($T = 7$ and $N = 22$),[11] using fixed effects estimation to account for unit heterogeneity. We deal with the problem of panel heteroskedasticity by employing White-Huber robust standard errors. Moreover, we test all specifications for the inclusion of time dummies. We decide on a case-by-case basis whether to introduce them into a regression equation, depending on the significance of a standard Wald test. In addition, we check all specifications for autocorrelation, using the Wooldridge test (Wooldridge (2002)). In cases where the Wooldridge test clearly rejects the null of no first-order autocorrelation, standard errors are specified to be robust not only to heteroskedasticity but also to autocorrelation, using the Bartlett kernel (Newey and West (1987)). Cross-sectional dependence could be another potential problem. Thus, in the robustness test section below, we also report our estimation results for standard errors that are robust to general forms of cross-sectional (spatial) dependence.

The generic set-up of our empirical analysis is a fixed-effects estimation

$$y_{i,t} = \beta_0 + \beta_1 \mathbf{z}_{i,t-1} + \beta_2 \mathbf{x}_{i,t} + \beta_3 \mathbf{w}_{i,t} + \mu_i + \eta_t + u_{i,t}$$

where the subscripts $i = 1, ..., N$ and $t = 1, ..., T$ denote country and year, $\mathbf{z}$ denotes the inequality variable(s), $\mathbf{x}$ and $\mathbf{w}$ are vectors of economic and political variables respectively, while μ_i and η_t stand for the inclusion of country and time dummies (if necessary) and $u_{i,t}$ is the disturbance term.

Note that reverse causality could pose a severe problem in the empirical analysis. Income inequality may affect the amount of redistribution, but at the same time redistribution has an immediate effect on income. Hence, there is the danger of capturing the influence of redistribution on inequality instead of the other way around. As it is hard

[11] Note that a number of missings for different variables and different country-years effectively reduces the actual number of useable observations.

to think of suitable exogenous instruments, we try to solve this problem in the following way. We use Gini coefficients and percentile ratios that are calculated using factor income as defined in the previous sub-section. This is income *before* taxes have been raised and *before* redistribution by the state has taken place. Thus, social spending and taxation should have no direct impact on this type of income (see Milanovic (2000) and Schwabish, Smeeding, and Osberg (2004) for a similar argument). An indirect link, however, cannot be ruled out this way, since individual labour supply decisions are likely to be affected by the welfare state. According to standard theories, a higher degree of generosity of redistributional programs induces households at the lower end of the income strata to reduce labour supply, thus lowering their factor income relative to higher income groups. To address this issue, we lag our inequality indicators by one period. Finally, in case of a still remaining endogeneity problem, we employ a two-step system GMM estimation (Blundell and Bond (1998)) in the robustness section.

3.3 Results

Table 5 presents the fixed effects estimation results for different income groups ranging from poor to rich. The pattern presented in the table is exactly what we would expect from "Director's Law". We find significant relationships that differ depending on which part of the income ladder we are looking at. When we only consider the share gain of the poorest 10 per cent of income earners, we find a strong negative impact of inequality as measured by the Gini coefficient, which is quite significant. A similar picture emerges, if we look at bottom 20 per cent: the Gini coefficient and P90/50 are both negative and significant. This picture changes when focusing on the share gains of the middle class (SG Middle-80/20). In this case, the Gini coefficient is strongly positive and significantly different from zero. Moreover, both P90/50 and P50/10 are also positive, although only the former is significant. This suggests that as the income gap widens between the middle and the top, redistribution towards the middle classes strongly increases. Interestingly, these results can be observed for a broad definition of the middle class that ranges from the 2^{nd} to the 8^{th} decile. Comparing the results of several regressions for different ranges of middle class definitions, we find that the main recipients of these increases in redistribution are indeed those in the 2^{nd} to 8^{th} decile-bracket. It is therefore clearly warranted to define such a broad spectrum of the income distribution to belong to the 'middle class'.

Looking at the share gains of the highest two income deciles, the coefficients for Gini and P90/50 turn negative again, but still being at conventional significance levels. These results suggest that increasing income inequality raises redistribution towards the (broadly defined) middle class at the cost of both high and low income earners.

Insert Table 5 here.

All these findings are strongly confirmed if we re-run the regressions without lagging the inequality variables. Table 6 presents these results in the upper panel. For economy of space, the table only shows the coefficients and standard errors for the inequality variables. The estimation strategy as well as economic and political control variables remain the same as before. We once again find that parameter signs switch from negative to positive and back, as we move along the distribution of income from the lower to the higher end.

Insert Table 6 here.

We also test whether the median income earner plays the pivotal role ascribed to her by the traditional median voter models. Table 6 exhibits our corresponding results in the second panel. Interestingly, the coefficients are in all specifications far from being significant. This suggests that the difference between median and mean income does not affect the degree of redistribution to any income group.

3.4 Robustness Checks

To check the robustness of our results, we run a battery of regressions using various alternative estimators and standard error calculations. First, to test the robustness of our findings against another estimator, we also run all regressions using a feasible generalized least-squares method that includes country dummies. Errors are assumed to follow a first-order autoregressive process and the Prais-Winsten method is used to estimate the autocorrelation coefficient. Second, we want to make sure that our results are not driven by the bandwidth we selected for the Bartlett-kernel. Thus, we calculate standard errors using the automatic covariance selection procedure introduced by Newey and West (1994) making our standard errors robust to both heteroskedasticity and serial correlation.

Third, we repeat the analysis using standard errors that are robust to heteroskedasticity, serial correlation and general forms of spatial dependence. Our set of countries is a non-random sample of industrialized democracies, which could be subject to common influences affecting our variables of interest. Hence, we estimate standard errors employing a nonparametric covariance matrix estimation procedure as proposed by Driscoll and Kraay (1998). Fourth, we opt for additionally explicating the most important estimation results in detail for a sample that excludes the US using our standard fixed effects estimator. The reason is that the US is a country with a comparably high inequality and a relatively small welfare state. We want to make sure that this does not bias our results. Finally, we report our findings for the regressions on the whole country sample, but without the unemployment rate as a control variable. The case for leaving unemployment out of the specification could be made on the grounds of it being endogenous to redistribution. In other words, the generosity of welfare benefits may affect labour supply decisions and the labour market in general. Higher spending could lead to lower employment and higher unemployment, which would also bias our estimates for the inequality variables.

Insert Table 7 here.

To save space, Table 7 contains again only the coefficients and standard errors for Gini, P90/50 and P50/10. These are estimated using the same set of controls as in the previous regressions. As before, the Gini coefficient and the percentile ratios are in two separate specifications. A first look at Table 7 reveals that all our findings survive the use of different standard errors and estimators, although the size of the coefficients varies somewhat.[12] SG Middle-80/20 increase with rising inequality measured by Gini and P90/50, while the bottom and top 20 per cent of the income distribution a net losers. In addition, P50/10 becomes significant for some dependent variables. But it does not remain significant across all specifications, which is why we do not consider these as stable results[13]. Dropping the variable 'Unemployment' or all observations for the US from the sample does not change the results substantively.

[12]Different coefficient sizes for Newey-West and Driscoll-Kraay result from the fact that the test for the inclusion of time dummies mandated sometimes their inclusion for one but not the other of these two.

[13]It has been found before that the Driscoll-Kraay standard errors are somewhat optimistic. Of course, it has to be noted that they rely on large T asymptotics, while in our panel $T < N$.

As mentioned in the beginning of the paper, endogeneity could still pose a problem in our empirical analysis. One way to control for this is to use an instrumental variable estimator combined with fixed effects or first-differences. However, there are no reasonable external IV available. Thus, identification will be based on internal instruments using the inequality variables (Gini, P90/50, P50/10), the GDP growth and the unemployment rates as instruments. We include them into a two-step system GMM approach proposed by Blundell and Bond (1998) to see whether our result still hold up. The consistency of the GMM estimators is based on large N. However, recent Monte Carlo simulations show that given predetermined explanatory variables, the system GMM estimator has a lower bias and higher efficiency than the first differenced GMM or the fixed effects estimator (Soto (2006)). As the small N makes it not possible to use the full set of instrumental variables since the number of instruments must not exceed the number of countries, we include only the lagged variables in the levels equation and the first differenced variable in the differenced equation. Please note that we checked the robustness of our results by additionally using the second and / or third lag of the variables as instruments. This increases the number of instruments, however, but it does not change the results substantially. Based on small panel size, Soto (2006) shows that using not all potentially available instruments does not decrease the reliability of the system GMM estimator. In order to prevent a downward bias of our results, in all of our system GMM estimations we use the finite-sample correction to the reported standard errors as proposed by Windmeijer (2005).

Insert Table 8 here.

The estimates in table 8 confirm our substantive conclusions, coefficient signs are the same as above and remain highly significant, with the only exception being the specification involving SG Bottom-20 as dependent variable.

Finally, we also check whether changing the institutional control variables would make a difference. We introduce **Federalism**, which indicates whether a country has a federalist structure. In addition, we also substitute our electoral system indicator **Disproportionality**, which is a continuous variable, with a dummy variable named **Plurality**. It indicates whether a country has a majoritarian system or not. We again use our standard fixed effects estimator.

Insert Table 9 here.

The results in Table 9 show that including these alternative institutional variables does not change any of our substantive findings. Even though the institutional variables are sluggish and could thus pose a problem for a fixed effects estimation, we arrive at the same significant results. Notably, Federalism and Plurality both have a negative and significant impact on redistribution towards the top and bottom 2 deciles of the income scale. However, for the middle class the relationship is strongly positive. In other words, in more federalist systems with majoritarian electoral systems rising inequality leads to more redistribution for the middle class, but less redistribution to the lowest and highest 20 per cent of income earners. Since the impact of institutions on redistribution is not our main concern, we do not intend to dwell in depth on these results. However the interactions between institutions, inequality and their impact on redistribution clearly demand further research.

Please note that we also test whether changing the income base for our inequality measures from factor to market income[14] would change our findings. Our substantive results, however, prove to be robust to this adjustment of definition. Although not shown here, all our substantively interesting coefficients remain significant and of a similar magnitude. Finally, we also test the inclusion of further control variables. But neither an openness indicator to capture possible effects of increased international integration nor the creation of a Maastricht dummy to isolate the effect the Maastricht convergence process are significant or change our results. In sum, the robustness tests strongly increase our confidence in these results.

3.5 Interpretation of the Results

We are now in a position to relate our empirical findings to the hypotheses. We indeed see strong evidence for "Director's Law" in our data. It emerges that redistribution is directed at the middle class, which in our analysis comprises all incomes between the second and eight decile. When overall inequality as measured by the Gini coefficient rises, redistribution towards this broad middle significantly increases. This happens at the

[14]Market income includes the same income categories as factor income, but in addition also contains public and private pensions.

expense of the lowest and the highest 20 percent of the income distribution. Their gain in income shares decreases as inequality goes up. This pattern of negative coefficients at the fringes and positive ones for the middle of the income distribution is extremely robust and survives all of our robustness tests. It thus offers strong empirical support for our first hypothesis

The confirming evidence for hypothesis 2 is a bit less robust. The coefficients seem to suggest however, that the disparity between the highest income earners and the middle classes is a more important driver of redistribution than the gap between the middle and the poor. While the coefficient for P90/50 is not always significant, is has the predicted sign, and the coefficients for P50/10 turn out to be almost always insignificant at conventional levels.

4 Conclusions

"Director's Law" predicts that redistribution benefits the middle class at the expense of both the poor and the rich. This intuitive prediction by Aaron Director has been borne out in a number of political-economy models that analyze redistribution in the context of a two-party electoral contest. These so-called "pork-barrel-politics" models offer a theoretical alternative to traditional median voter models. However, while there exists a huge empirical literature testing the predictions that median voter models make about income inequality and redistribution, "pork-barrel-politics" models' results and their relation to income inequality have hardly been confronted with the data. We find this to be very surprising, given the prominent role that "Director's Law" has played in the theoretical literature on redistribution and electoral politics.

The aim of this paper has been to fill this void. Analyzing panel data of 22 OECD countries over the time period of 1971–2004, we find very strong evidence that redistribution does indeed favor the middle of the income distribution. According to our estimations, this middle is rather wide, ranging from the second to the eight decile. An increase in income inequality clearly increases redistribution towards the middle class at the expense of both the the poor and the rich. In addition, our results suggest that not only general inequality as measured by the Gini coefficient, but the difference in (factor) income between the middle classes and the top income decile (co-)determine the level of redistribution. This seems to constitute the politically relevant disparity in the income distribution. Our conclusions hold even after using different alternative estimators and running a great number of robustness tests.

These findings may help explain the poor empirical performance of median voter models in the tradition of Meltzer and Richard (1981), Romer (1975) and Roberts (1977). While they correctly conjecture that income is redistributed away from the rich, they seem to be mistaken in their prediction that all voters below the median income benefit equally. Although we conducted a lot of testing, even more empirical robustness checks could be imagined. An expansion of the sample to democratic countries from Asia and Latin America would be desirable. However, the availability of more frequent, high quality income data taken over longer time periods would be even more desirable. The relatively small number of useable observations is a severe limitation in this area of study.

Regardless of the details of our results or possible extensions that could be envisioned, the main finding of our empirical analysis is unambiguous in our view: rising inequality leads to a higher redistribution towards the middle class. This happens at the expense of those at the lower and higher end of the income distribution. "Director's Law" is an empirically robust phenomenon and therefore warrants further research.

Appendix

Table 1: Description of Variables

Variable	Source	Description
		Dependent Variables
SG Bottom-10	LIS Database	Share gain of the poorest decile: Disposable income (DPI) - factor income (FI)
SG Bottom-20	LIS Database	Share gain of the two poorest deciles: DPI - FI
SG Middle-80/20	LIS Database	Share gain of 8^{th} - 2^{nd} decile: DPI - FI
SG Top-20	LIS Database	Share gain of the two richest deciles: DPI - FI
SG Top-10	LIS Database	Share gain of the richest decile: DPI - FI
		Variables Measuring Income Inequality
Gini	LIS Database	Gini coefficient, calculated using factor income
P90/50	LIS Database	Ratio of 90^{th} to 50^{th} factor income percentile
P50/10	LIS Database	Ratio of 50^{th} to 10^{th} factor income percentile
Median Mean Ratio	LIS Database	Median to mean ratio, calculated using factor income
		Economic Variables
GDP Growth	OECD Economic Outlook	Real GDP growth rate, %
Unemployment Rate	OECD Economic Outlook	Standardized unemployment rate, %
Pop>65	World Development Ind.	Persons aged 65 and above, % total population
		Political Variables
Voter Turnout	Armingeon et al. 2006	Voter turnout in recent general election, %
Left Government	Armingeon et al. 2006	Cabinet share of social-democratic and other left parties in percentage of total cabinet posts
Disproportionality	Armingeon et al. 2006	Gallagher Index of disproportionality of the electoral system: $disprop = \sqrt{\frac{1}{2}\sum_{i=1}^{m}(v_i - s_i)^2}$, $0 \leq \text{disprop} \leq 100$ with the number of parties $i = 1, ..., m$ v_i – percent of votes obtained by party i, s_i – percent of seats obtained by party i
Federalism	Armingeon et al. 2006	Degree of federalism: 0 = no, 1 = weak, 2 = strong
Plurality	Worldbank, DPI Database	Electoral system: 0 = proportional, 1 = majortitarian

Table 2: Summary Statistics

Variable	Obs.	Mean	Std. dev.	Min.	Max.
Gini	118	0.4415281	0.0545838	0.28085	0.58434
P90/50	118	2.282015	0.3629186	1.852257	3.916719
P50/10	118	60.05547	34.3246	1.797563	101.4063
SG Bottom-10	118	3.054301	0.9286713	0.4900002	5.074
SG Bottom-20	118	3.857437	1.172061	0.5200005	6.217
SG Middle-80/20	118	0.661373	7.805863	-80.49999	7.889998
SG Top-20	118	-4.51881	7.841842	-11.1708	76.40599
SG Top-10	118	-1.789471	7.532094	-6.673801	77.786
Median Mean Ratio	114	0.8813064	0.0748706	0.630316	1.010866
GDP Growth	208	2.804977	2.198278	-7.28	9.684
Unemployment Rate	208	6.188983	3.631709	0.17709	18.90696
Pop>65	209	0.1306261	0.0256452	0.0389657	0.1901632
Voter Turnout	232	75.8466	13.82312	40.76	96.79
Left Government	185	36.30197	33.10822	0	100
Disproportionality	212	5.884423	4.740701	0.5185118	21.84986
Federalism	116	0.5965517	0.8554613	0	2
Plurality	218	0.5357798	0.4969071	0	1

Table 3: Correlation Matrix, Part 1

	Gini	P90/50	P50/10	SG Bottom-10	SG Bottom-20	SG Middle-80/20	SG Top-20	SG Top-10
Gini	1							
P90/50	0.8062	1						
P50/10	0.475	0.1145	1					
SG Bottom-10	-0.0951	-0.4959	0.4591	1				
SG Bottom-20	0.0166	-0.4333	0.5527	0.9872	1			
SG Middle-80/20	0.3195	0.2408	0.1983	-0.1175	-0.0443	1		
SG Top-20	-0.3205	-0.1749	-0.28	-0.0306	-0.1054	-0.9888	1	
SG Top-10	-0.2552	-0.1673	-0.1896	0.0567	-0.0066	-0.9943	0.9908	1
Median Mean Ratio	-0.5866	-0.9249	0.1445	0.6842	0.6591	-0.1503	0.0514	0.0859
GDP Growth	-0.1968	-0.1772	-0.0542	0.1192	0.0795	-0.1778	0.129	0.0878
Unemployment	0.5609	0.4782	0.4409	-0.2368	-0.1556	0.183	-0.1661	-0.1334
Pop>65	0.0141	-0.3121	0.2698	0.4455	0.4979	0.1284	-0.3729	-0.1741
Voter Turnout	-0.2088	-0.3809	0.4108	0.6073	0.6093	-0.0557	-0.0262	0.0171
Left Government	-0.1661	-0.2247	-0.0162	0.2476	0.2374	-0.1879	0.1636	0.1737
Disproportionality	0.1792	0.3125	-0.0506	-0.38	-0.3812	0.0078	0.0364	0.0216
Federalism	-0.1843	-0.0041	-0.3981	-0.5049	-0.5319	0.0599	-0.0116	-0.0711
Plurality	-0.0239	0.1739	-0.2789	-0.5316	-0.5399	-0.1075	0.3715	0.1942

Table 4: Correlation Matrix, Part 2

	Median Mean Ratio	GDP Growth	Unemployment	Pop. > 65	Voter Turnout	Left Government	Disproportionality	Federalism	Plurality
Median Mean Ratio	1								
GDP Growth	0.1551	1							
Unemployment	-0.3664	0.1441	1						
Pop. > 65	0.4143	-0.1119	0.0363	1					
Voter Turnout	0.5128	-0.106	-0.1199	0.1302	1				
Left Government	0.2119	-0.0728	-0.0706	0.2456	0.2382	1			
Disproportionality	-0.3587	0.066	0.2416	-0.1611	-0.218	-0.1495	1		
Federalism	-0.2426	-0.0203	-0.1276	-0.088	-0.4057	-0.2283	-0.0227	1	
Plurality	-0.3538	-0.0882	-0.0077	-0.1937	-0.3239	-0.1039	0.5929	0.4865	1

Table 5: FE Estimation – Share Gains (SG)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	8)	(9)	(10)
	SG	SG	SG	SG	SG	SG	SG	SG	SG	SG
	Bottom-10	Bottom-10	Bottom-20	Bottom-20	Middle-80/20	Middle80/20	Top-20	Top-20	Top-10	Top-10
Gini (t-1)	-3.655***		-6.842***		16.70***		-12.34***		-12.04***	
	(1.407)		(2.029)		(5.298)		(3.982)		(3.173)	
P90/50 (t-1)		-0.406		-0.527*		2.095*		-1.568*		-1.767**
		(0.252)		(0.277)		(1.115)		(0.946)		(0.758)
P50/10 (t-1)		-0.00247		-0.00275		0.00492		-0.00217		-0.00381
		(0.00191)		(0.00208)		(0.00716)		(0.00604)		(0.00570)
GDP Growth (t)	0.0324	0.0323	0.0120	0.0294	-0.445***	-0.409***	0.416***	0.379***	0.318***	0.307***
	(0.0392)	(0.0438)	(0.0557)	(0.0458)	(0.121)	(0.144)	(0.101)	(0.117)	(0.0823)	(0.0927)
Unemployment (t)	-0.0105	-0.00910	0.0253	0.00857	0.167*	0.176**	-0.174***	-0.184***	-0.0696	-0.0698
	(0.0257)	(0.0263)	(0.0235)	(0.0261)	(0.0834)	(0.0823)	(0.0595)	(0.0642)	(0.0521)	(0.0550)
Pop>65 (t)	-5.542	-8.063	-4.742	-2.339	27.14	40.75**	-27.47**	-38.41***	-2.086	-8.834
	(7.184)	(7.276)	(9.617)	(8.194)	(19.33)	(18.84)	(12.82)	(13.59)	(11.48)	(11.87)
Voter Turnout (t)	-0.0186	-0.0236	0.00206	-0.0243	-0.0103	7.04e-06	0.0293	0.0243	0.0205	0.0142
	(0.0200)	(0.0207)	(0.0218)	(0.0227)	(0.0491)	(0.0460)	(0.0322)	(0.0321)	(0.0353)	(0.0365)
Left Government (t)	0.000417	0.000282	-0.000234	5.43e-05	0.000173	-0.000670	-0.000354	0.000615	-0.00355	-0.00309
	(0.00139)	(0.00149)	(0.00118)	(0.00164)	(0.00473)	(0.00520)	(0.00376)	(0.00457)	(0.00298)	(0.00380)
Disproportionality (t)	0.0227	0.0214	0.0271	0.0107	0.00563	0.0114	-0.0185	-0.0221	-0.0549	-0.0635
	(0.0286)	(0.0288)	(0.0297)	(0.0300)	(0.0741)	(0.0763)	(0.0529)	(0.0547)	(0.0486)	(0.0499)
Observations	73	73	73	73	77	73	73	73	77	77
No. of Countries	18	18	18	18	22	18	18	18	22	22
R^2	0.237	0.212	0.294	0.139	0.654	0.605	0.706	0.669	0.598	0.550
WT AR(1) (p-value)	0.278	0.195	0.0199	0.113	0.116	0.0415	0.0559	0.0246	0.212	0.105
Wald test TD (p-value)	0.196	0.358	0.0295	0.140	0.202	0.179	0.225	0.151	0.194	0.211

Fixed effects estimation coefficients with Huber-White robust or heteroskedasticity and autocorrelation consistent standard errors in parentheses (depending on the Wooldridge test). *** significant at 1%; ** significant at 5%; * significant at 10%

Table 6: No Lags, Median-to-Mean-Ratio

	(1) SG Bottom-10	(2) SG Bottom-20	(3) SG Middle-80/20	(4) SG Top-20	(5) SG Top 10
No Lags					
Gini (t)	-3.655**	-4.352**	16.70***	-12.34***	-12.04***
	(1.585)	(1.696)	(5.298)	(3.982)	(3.173)
P90/50 (t)	-0.406	-0.527	2.095*	-1.568*	-1.767**
	(0.299)	(0.320)	(1.247)	(0.946)	(0.758)
P50/10 (t)	-0.00247	-0.00275	0.00492	-0.00217	-0.00381
	(0.00246)	(0.00270)	(0.00929)	(0.00604)	(0.00570)
Fixed Effects					
Median/Mean (t-1)	1.122	1.432	-6.064	-4.285	-0.787
	(1.352)	(1.466)	(4.593)	(4.054)	(4.197)

Fixed effects estimation coefficients with White-Huber robust or heteroskedasticity and autocorrelation consistent standard errors in parentheses (depending on the Wooldridge test). Time dummies are included, if indicated by a Wald test.
*** significant at 1%; ** significant at 5%; * significant at 10%.

Table 7: Alternative Estimators for the Expenditure and Share Gain Specifications

	(1) SG Bottom-10	(2) SG Bottom-20	(3) SG Middle-80/20	(4) SG Top-20	(5) SG Top-10
Driscoll-Kray SE					
Gini (t-1)	-5.526***	-6.842***	13.57***	-6.731*	-8.716***
	(1.598)	(1.696)	(4.375)	(3.239)	(2.141)
P90/50 (t-1)	-0.502**	-0.711**	0.639*	0.0721	-0.747***
	(0.236)	(0.252)	(0.339)	(0.234)	(0.237)
P50/10 (t-1)	-0.00410**	-0.00458**	0.00531	-0.000731	-0.00361
	(0.00161)	(0.00185)	(0.00451)	(0.00276)	(0.00298)
Newey West SE					
Gini (t-1)	-5.526***	-6.842***	13.57***	-6.731	-8.716***
	(1.814)	(2.051)	(5.093)	(4.221)	(3.217)
P90/50 (t-1)	-0.502**	-0.711**	0.639	0.0721	-0.747
	(0.256)	(0.304)	(1.006)	(0.923)	(0.734)
P50/10 (t-1)	-0.00410**	-0.00458***	0.00531	-0.000731	-0.00361
	(0.00163)	(0.00175)	(0.00680)	(0.00598)	(0.00438)
Prais-Winsten					
Gini (t-1)	-4.000**	-4.621***	19.12***	-14.44***	-13.65***
	(1.509)	(1.635)	(4.943)	(4.007)	(3.009)
P90/50 (t-1)	-0.420	-0.528	2.242*	-1.784*	-1.957**
	(0.296)	(0.320)	(1.235)	(1.016)	(0.743)
P50/10 (t-1)	-0.00241	-0.00274	0.00442	-0.00155	-0.00309
	(0.00250)	(0.00270)	(0.00935)	(0.00738)	(0.00581)
FE, Dropping Unemployment					
Gini (t-1)	-3.813**	-4.252**	19.22***	-14.97***	-13.09***
	(1.608)	(1.707)	(5.058)	(4.111)	(3.271)
P90/50 (t-1)	-0.428	-0.507	2.513**	-2.006**	-1.932**
	(0.308)	(0.322)	(1.159)	(0.981)	(0.784)
P50/10 (t-1)	-0.00264	-0.00259	0.00818	-0.00559	-0.00510
	(0.00241)	(0.00257)	(0.00715)	(0.00619)	(0.00593)
FE excluding USA					
Gini (t-1)	-3.789**	-4.545***	18.58***	-14.03***	-13.21***
	(1.711)	(1.685)	(5.178)	(4.113)	(3.084)
P90/50 (t-1)	-0.487	-0.635*	2.573*	-1.938*	-2.041**
	(0.351)	(0.331)	(1.284)	(1.048)	(0.780)
P50/10 (t-1)	-0.00328	-0.00359	0.0103	-0.00675	-0.00671
	(0.00281)	(0.00240)	(0.00958)	(0.00744)	(0.00591)

Results for economic and political control variables are not shown, set up is the same as before. Coefficients for Driscoll-Kraay and Newey-West are fixed effects estimations. *** significant at 1%; ** significant at 5%; * significant at 10%

Table 8: System GMM Estimation – Soctrans Ratio and Share Gains (SG)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	SG	SG	SG	SG	SG	SG	SG	SG	SG	SG
	Bottom	Bottom	Bottom	Bottom	Middle	Middle	Top	Top	Top	Top
	10	10	20	20	80/20	80/20	20	20	10	10
Gini (t-1)	-6.813*		-5.759		35.27***		-32.14**		-26.17**	
	(3.731)		(4.243)		(12.51)		(12.73)		(10.88)	
P90/50 (t-1)		-1.346*		-1.339		6.340***		-4.632**		-3.938**
		(0.808)		(1.107)		(2.020)		(1.929)		(1.563)
P50/10 (t-1)		0.000657		0.00235		-0.00492		0.00121		0.000782
		(0.00552)		(0.00748)		(0.0115)		(0.0118)		(0.00766)
GDP Growth (t)	0.0993**	0.0939	0.0742	0.0878	-0.521***	-0.452***	0.391**	0.367*	0.384**	0.314**
	(0.0459)	(0.0708)	(0.0496)	(0.0859)	(0.201)	(0.172)	(0.197)	(0.198)	(0.192)	(0.155)
Unemp (t)	0.0205	0.0298	0.0263	0.0637	0.110	-0.0731	-0.0777	0.0724	-0.0163	0.0945
	(0.0300)	(0.0517)	(0.0313)	(0.0464)	(0.165)	(0.193)	(0.183)	(0.231)	(0.185)	(0.153)
Pop>65 (t)	11.84**	9.697	15.05**	15.29**	-1.439	9.247	-14.36	-15.86	8.055	0.307
	(5.550)	(5.992)	(6.267)	(6.726)	(11.85)	(17.42)	(13.93)	(21.72)	(11.47)	(14.24)
Vot. Turn. (t)	0.0195***	0.0158***	0.0260***	0.0202***	-0.00134	0.0333	-0.0325**	-0.0553*	-0.00470	-0.0227
	(0.00639)	(0.00403)	(0.00814)	(0.00579)	(0.0162)	(0.0258)	(0.0157)	(0.0287)	(0.0136)	(0.0205)
Left Gov. (t)	-0.000110	0.000478	0.000121	-0.000431	-0.00384	-0.00624	0.00435	0.00544	-0.00304	-0.000502
	(0.00135)	(0.00141)	(0.00165)	(0.00217)	(0.00471)	(0.00431)	(0.00498)	(0.00659)	(0.00320)	(0.00328)
Disproport. (t)	-0.0343	-0.0302	-0.0352	-0.0433	-0.00889	0.0327	0.0217	-0.0516	-0.00409	-0.0362
	(0.0250)	(0.0426)	(0.0272)	(0.0376)	(0.0736)	(0.0645)	(0.0893)	(0.0818)	(0.0790)	(0.0517)
Obs.	77	77	77	77	77	77	77	77	77	77
No. of N	22	22	22	22	22	22	22	22	22	22
No. of instr.	15	18	15	18	15	18	15	18	15	18
AR(1)	0.0246	0.0285	0.0274	0.0262	0.0866	0.161	0.0990	0.154	0.0798	0.0917
AR(2)	0.459	0.383	0.281	0.409	0.815	0.611	0.887	0.750	0.911	0.780
Hansen	0.650	0.420	0.625	0.340	0.673	0.815	0.709	0.617	0.453	0.703

All System GMM specifications contain a time trend which is not shown. In all regressions, the real GDP growth rate, the unemployment rate and the Gini coefficients (the percentile ratios) are assumed to be endogenous and included as up to 1-period lagged variables in the GMM specification. All other independent variables are assumed to be exogenous. *** significant at 1%; ** significant at 5%; * significant at 10%

Table 9: FE Estimation – Alternative Institutional Variables

	(1) SG Bottom 10	(2) SG Bottom 10	(3) SG Bottom 20	(4) SG Bottom 20	(5) SG Middle 80/20	(6) SG Middle 80/20	(7) SG Top 20	(8) SG Top 20	(9) SG Top 10	(10) SG Top 10
Gini (t-1)	-5.441***		-6.391***		20.76***		-15.29***		-14.59***	
	(1.761)		(1.832)		(6.035)		(5.052)		(3.784)	
P90/50 (t-1)		-0.696**		-0.851**		2.915*		-2.203*		-2.284**
		(0.317)		(0.344)		(1.512)		(1.268)		(0.959)
P50/10 (t-1)		-0.00398**		-0.00416**		0.00103		0.00160		-0.000667
		(0.00193)		(0.00208)		(0.00941)		(0.00730)		(0.00598)
GDP Growth (t)	-0.0484	-0.0671	-0.0527	-0.0760	-0.417**	-0.284	0.420***	0.304*	0.315***	0.234*
	(0.0516)	(0.0513)	(0.0563)	(0.0562)	(0.173)	(0.181)	(0.148)	(0.151)	(0.112)	(0.118)
Unemp (t)	0.00449	0.00956	0.0215	0.0262	0.143	0.188*	-0.146*	-0.188**	-0.0511	-0.0773
	(0.0178)	(0.0206)	(0.0179)	(0.0214)	(0.103)	(0.103)	(0.0864)	(0.0868)	(0.0666)	(0.0669)
Pop>65 (t)	10.57	9.631	16.30*	15.30*	16.29	33.11	-29.32**	-43.66***	-3.487	-13.32
	(7.568)	(7.780)	(8.640)	(8.850)	(16.37)	(20.88)	(13.11)	(15.72)	(10.30)	(11.51)
Federalism (t)	-0.551***	-0.577***	-0.676***	-0.703***	0.651**	0.809**	-0.0735	-0.182	-0.539**	-0.611**
	(0.131)	(0.133)	(0.127)	(0.135)	(0.317)	(0.361)	(0.266)	(0.308)	(0.208)	(0.237)
Plurality (t)	-3.412***	-3.660***	-3.708***	-3.981***	3.317***	3.367**	-0.119	0.0293	-0.942	-1.046
	(0.448)	(0.467)	(0.458)	(0.493)	(1.013)	(1.496)	(0.837)	(1.187)	(0.637)	(0.879)
Obs.	60	60	60	60	61	61	61	61	61	61
No. of N	15	15	15	15	16	16	16	16	16	16
R^2	0.513	0.504	0.506	0.489	0.680	0.621	0.723	0.682	0.616	0.562
WT AR(1)	0.151	0.0466	0.0608	0.00884	0.289	0.121	0.294	0.144	0.238	0.166
Wald TD	0.00521	0.0182	0.00158	0.0136	0.252	0.173	0.290	0.189	0.155	0.135

Fixed effects estimation coefficients with White-Huber robust or heteroskedasticity and autocorrelation consistent standard errors in parentheses (depending on the Wooldridge test). WT AR(1): Wooldridge test of the null hypothesis of no-first-order autocorrelation; Wald test TD: Wald test for the inclusion of time dummies, if p-value<0.1 time dummies are included (coefficients for time dummies are not shown).

*** significant at 1%; ** significant at 5%; * significant at 10%.

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