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EMPIRICS OF THE MEDIAN VOTER:
DEMOCRACY, REDISTRIBUTION AND THE ROLE OF THE MIDDLE CLASS

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Empirics of the median voter:

democracy, redistribution and the role of the middle class

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Abstract

The present paper improves the empirical investigation on the effectiveness of the median voter theorem. Using high quality data, it is possible to directly observe net cash transfers for every individual and to investigate the effects of taxes and transfers on different classes. Results suggest to reject – or at least question – the hypothesis that the middle class plays a special role in the policy determination. Not only its gains from redistribution are negligible, but the link between income and redistribution is lower than for any other class of income. Moreover, the strength of the median voter seems to reduce over time. Finally, the amount of redistribution targeted to the middle class is lower in more asymmetric societies, a result in strong contrast to the median voter theorem.

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1 Introduction

The aim of the paper is to update and improve the analysis about the effectiveness of the middle class as a decisive fiscal policy maker. Even if political economy literature has very often relied on the median voter theorem as the mechanism through which the middle class could influence the direction of fiscal policies,[1] the empirical evidence on it is very far from being clearcut.

With respect to previous literature, the paper exploits a higher quality income dataset to investigate the size of redistribution relative to different classes of population and which economic and political aspects can influence it. Using two model specifications, referring to several measures of inequality and investigating the whole range of income classes, the paper can assess more accurately the role of the middle class in the process of political decision making.

The topic is relevant under two perspectives: first, testing the effectiveness of a median voter alike mechanism is interesting *per se*; second, it is relevant since this is a widely used tool to explain other political processes, and a rejection of its validity could foster a more deep investigation of the political mechanisms linking inequality and redistribution; third, some interest could be found in the political variables – if any – that influence its efficacy.

In spite of its relevance, this topic did not receive much attention, mainly due to the lack of suitable data. In order to link the role of the median voter to the redistribution process, the ideal dataset should include the amount of pre-tax income and redistribution for every individual in the population. Such data are available only for a small number of countries and are homogenized by the Luxembourg Income Study (LIS, 2009), that does not release the micro level dataset for confidentiality reasons. These data were exploited by Milanovic (2000) in an innovative paper that suffers, however, from some

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[1]Among others, Meltzer and Richard (1981); Bertola (1993); Perotti (1993); Alesina and Rodrik (1994); Persson and Tabellini (1994) are the most frequently quoted.

drawbacks that will be discussed in the next section. Previous empirical papers make use of outdated datasets on inequality, that – according to Deininger and Squire (1998) – contain "low quality" data. The outcome is that results of these papers are very sensitive to data used and it is difficult to compare the conclusions they reach.

The present paper firstly reviews the empirical literature, by analyzing in detail some influential paper on the topic (section 2), then it describes the several datasets merged together to implement the empirical investigation (section 3). Section 4 includes both a theoretical description of the models and the results obtained by the data, while section 5 concludes.

2 Review of empirical literature

The seminal paper by Downs (1957) applies the Hotelling competition model (Hotelling, 1929) to political economy, stating that – under some assumptions – the median voter of a distribution is the decisive agent in the democratic process. During the last fifty years, many theorists have questioned his results, developing a wide literature on the voting process and its effects on the political mechanisms. However, the median voter theorem remains the most widely used assumption whenever the political process is accounted for explaining an economic issue. In the field of inequality, redistribution and government expenditure, the seminal paper by Meltzer and Richard (1981) highlights that more unequal countries experience higher public expenditure because of the redistributive preferences of a poorer median voter. A decade later, a group of insightful papers by Bertola (1993); Perotti (1993); Alesina and Rodrik (1994); Persson and Tabellini (1994) focuses on the effects of income inequality to economic growth, keeping the assumption that higher inequality is associated to more redistribution through a median voter alike political mechanism.

Even if the median voter theorem is a kind of benchmark from the theoretical perspective, the empirical evidence referred to it is restricted to a small number of papers

that, in addition, are very far from finding a commonly agreed result. The main reason for this limited investigation resides in the lack of suitable data on individual preferences, income inequality and redistribution (Deininger and Squire, 1998). In order to review this branch of literature, I will refer to four well known papers (Persson and Tabellini, 1994; Alesina and Rodrik, 1994; Perotti, 1996; Milanovic, 2000) that summarize exhaustively all the characteristics, shortcomings, methodologies and results on this topic.

The common feature of these papers is the focus on the effectiveness of the middle class in deciding the level of redistribution. The mechanism investigated is simple: a more unequal income distribution is associated to a poorer median voter, who is able to set a higher amount of redistribution that – in turn – lowers incentives to investments and, ultimately, reduces economic growth. Even if dealing with the same issue, the papers differ among themselves either for the data sources, usually of "low quality" according to the definition of Deininger and Squire (1998), or for the methodologies implemented, and all of them find at least partially different results. Persson and Tabellini (1994) run two sets of regressions, one referred to an unbalanced panel of "historical data" including nine countries from 1830 to 1985, the other consisting of a cross-section of 56 countries in the postwar period. Due to the lack of suitable data, only the second model can account, even if indirectly, for the role of the middle class.[2] The model links economic growth to income inequality, national income, level of education and the presence of democratic institutions. Inequality is measured as the pretax income of the households in the third quintile of the population, based on data elaborated by Paukert (1973) for a period around 1965. The conclusion of the authors is that since "growth should be inversely related to inequality in a democracy, but not necessarily in a dictatorship", sign and significance of the variables related to democratic institutions confirm the effectiveness of the median voter theorem. However, there are two main

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[2]I will not consider the sensitivity analysis run on a very small sample, since also the authors admit that "the degrees of freedom are so few that the results are very tentative".

shortcomings in this model: on the one side, there is not a measure of redistribution and its role in the link between inequality and growth is not directly tested; on the other side, the model relies on "only" 49 observations that drop to 20 when splitting the sample between democratic and non-democratic countries.

Alesina and Rodrik (1994) test the same result as in Persson and Tabellini (1994) using a different inequality variable. The model is substantially the same, since economic growth is assumed to be negatively correlated to income inequality, controlling for national income, primary education and the level of democracy. Opposite to the previous case, inequality is measured by Gini indices referred to both income (from Jain (1975) and Fields (1989)) and land (from Taylor and Hudson (1972)) and include a larger cross section of 70 countries, both developed and developing. Results are in contrast to those obtained by Persson and Tabellini (1994). Indeed, even if the negative relationship between inequality and growth is confirmed, "the hypothesis that democracies and nondemocracies differ in the relationship between inequality and growth is rejected [...] rais[ing] some question about the generalizability of Persson and Tabellini's results on this front" (Alesina and Rodrik, 1994, p.483-484). One of the values of this paper is that it exploits a larger dataset, but – as a drawback – it does not directly focus on the middle class, since it considers only the Gini index as an inequality measure. Finally, analogously to Persson and Tabellini (1994), it does not include any measure of redistribution.

Two years later, Perotti (1996) analyzed more extensively the link between income inequality, democracy and growth. Using the same data sources as in Persson and Tabellini (1994), but a slightly different inequality measure,[3] he tests several models, finding results different from all the previous papers. The first model I report is analogous to those analyzed previously, but results are different. When linking inequality to growth, analogously to Persson and Tabellini (1994), the correlation is significantly negative only

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[3]The share of income belonging to the third *and fourth* quintile, instead of the only third quintile.

in democratic countries. However, analogously to Alesina and Rodrik (1994), political variables are not statistically significant. This apparently puzzling result is explained by the fact that, in this sample, democratic countries are also the richest ones and it is not possible to disentangle the two effects. The real novelty of his paper, however, is that it also splits the process in two stages, focusing on the one side on the effects of inequality on redistribution (proxied by the maximum marginal tax rate) and, on the other, on the link between redistribution and growth, in a cross section of 49 countries. Results are unexpected: income inequality is not significantly correlated to redistribution, and redistribution is *positively* correlated to growth. Under the perspective of the role of the middle class, however, the former result is insightful, since it goes in an opposite direction with respect to Persson and Tabellini (1994).

Milanovic (2000) faced a quite puzzling framework: using data on similar countries and with comparable sample size, Persson and Tabellini (1994), Alesina and Rodrik (1994) and Perotti (1996) had found opposite results. The novelty of Milanovic (2000) consists in exploiting the Luxembourg Income Study dataset, that provides the researchers with individual *micro*-data comparable both across countries and over time. This represents an improvement under three perspectives: first, the sample size increased up to 79 observations; second, it was possible for the first time to exploit the panel dimension of the dataset, taking into account the time invariant unobserved heterogeneity; third, it was possible to directly create redistribution measures based on individual data. Opposite to previous literature, therefore, Milanovic (2000) directly tested how the amount of redistribution targeted to the middle class depends on the share of income it earns. Results are in line with those found by Perotti (1996): not only the middle class is always a net looser in the process of redistribution (namely, taxes levied on the third quintile of the distribution are always higher than the transfers to it), but there are no significant relationships between its market income and the level of redistribution targeted to it. Opposite, such relationship is effective for poorest classes of

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population: the amount of net redistribution to the poorest half and the poorest quintile are negatively and strongly significantly correlated to their market income. Moreover, the level of democracy leaves unaffected all the conclusions of the paper.

Despite its innovation, the paper by Milanovic (2000) suffers from some inaccuracy. First, the amount of redistribution targeted to the middle class is miscalculated, being the true values lower;[4] second, it includes also a bunch of observations for which LIS does not provide ex-ante income values. It is not possible to assess whether and how this inclusion drives the results, however – being the actual sample size larger – in the present paper I am able to exclude these observations, obtaining more precise results.[5] Finally, as stated in next section, this paper exploits a more rigorous definition of democracy.

What I intend to do in this paper is merging together the values of the four "representative" works summarized above and extend them in order to shed some further light on the still unsolved question on the role of the middle class in determining the level of redistribution.

3   Data description

The political-economic relationship investigated by the paper involves several dimensions and there are no datasets including all the relevant variables. The present section is devoted to describe and analyze data sources and variables included in the empirical investigation. The sample size is limited by the availability of data on inequality and redistribution, whose analysis represents however a major innovation of the paper since it exploits the Luxembourg Income Study dataset and overcomes many of the shortcomings pointed out in the previous section. The resulting dataset is an unbalanced panel made

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[4]Table F in the appendix of his paper contains figures algebraically inconsistent with their definition. The author confirmed that the values in the table are misreported and that – in order to get the true figures – they must be scaled down by a factor of 2.5. This miscalculation, however, does not affect any of the other results in his paper.

[5]LIS website `http://www.lisproject.org/techdoc/netdatasets.htm` provides the list of observations, splitting the sample in two groups: those for which market income (variable V1 of LIS dataset) is reported, and those for which only net income (variable V1NET) can be retrieved.

up of 24 countries[6] observed over 40 years, from 1967 to 2006. Table 1 lists the data sources and the variables used in the empirical analysis and their descriptive statistics.

First of all, economic variables come from the very well known Penn World Table provided by the Center for International Comparisons at University of Pennsylvania.[7] The dataset includes long time series on *Per capita* GDP and GDP *growth* rates both across countries and over time, getting rid of all the comparability issues since they are all computed in US$ PPP, taking 2005 as a base year.[8] Second, variable *Unemployment rate* is taken from the LABORSTA office dataset at International Labour Organization.[9] Among the several possible sources, the more homogeneous is the set of labor force surveys, considering general unemployment among individuals aged 15 years and over since 1969.[10]

Third, political variables are taken from the Database of Political Institutions, edited by the World Bank Development Research Group (Beck et al., 2001). Variables *Government center* and *Government left* are two dummies taking value 1 if a country is ruled by a government with a centrist (left) orientation. Analogous dummy for right governments is dropped due to perfect collinearity. *Proportional representation* is a dummy indicating whether candidates are elected according to the number of votes obtained by their parties (value 1), opposite to a plurality system. *Political fragmentation* is the probability that two randomly picked deputies belong to different parties, while *Presidential system* takes value 1 for countries where the system is presidential, opposite to

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[6]Countries included in the analysis are: Australia, Belgium, Brazil, Canada, Czech Republic, Denmark, Finland, France, Germany, Guatemala, Ireland, Israel, Luxembourg, Netherlands, Norway, Poland, Romania, Slovak Republic, South Korea, Sweden, Switzerland, Taiwan, United Kingdom, United States.

[7]Available at http://pwt.econ.upenn.edu/index.html

[8]As a robustness check, all the results are qualitatively unchanged if the Penn World Table data are replaced by analogous series provided by OECD statistic office (http://stats.oecd.org/Index.aspx). Results are not even shown in appendix, but I can provide them on request.

[9]http://laborsta.ilo.org/

[10]Apart from one case (Czechoslovakia in 1992, whose data come from official records) the following codes can be used to retrieve data from the LABORSTA dataset: Code Source: BA (Labour force survey); Code Subject: 3A (Unemployment); Code Worker Coverage: 31 (Total unemployment); Code Sex 3R (Rates, total); Code Table: 3A (Unemployment, general level).

parliamentary.

Fourth, variables about democracy originate from Polity IV project (Marshall and Jaggers, 2009), that classifies all countries on a scale from 0 to 10 (variable *Democracy index*), according to the criteria listed in Marshall and Jaggers (2009, p.12). From this variable, I generated a dummy (*Democracy dummy*) taking value 1 if *Democracy* is higher than 7, in order to split the sample. However, since the majority of observations takes value 10, the results are robust to different breakpoints. Moreover, results are robust also with respect to the tenure of the system. Considering the persistence of democracy (*Democracy persistence*, taking value 1 if the country is classified as democratic in the last ten years) in the previous decade instead of the contemporaneous level does not affect the results.

Finally, the most innovative and complex data source regards the inequality and redistribution variables. Luxembourg Income Study (LIS, 2009) releases 164 *micro-level* datasets about 36 countries over a time span of 40 years, from 1967 to 2006. Unfortunately, only for a subgroup of these, that is 104 observations, it is possible to compute both gross and net income at individual level.[11]

The main merit of the LIS dataset is that it allows to compute both *ex-ante* and *ex-post* income at individual level.[12] This enables to directly observe the amount of cash redistribution implemented toward every single individual in the income distribution and to aggregate them freely. By exploiting this feature, I computed two different kinds of measures. One is the widely used Gini index of inequality, that aggregates the whole sample in a single index. Opposite to the previous literature, I was able to investigate the difference between market income (or *ex-ante*) Gini index and disposable income

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[11]The detailed list of datasets can be found at `http://www.lisproject.org/techdoc/datasets.htm`. 52 of 164 datasets do not include information on gross income, while 8 observations are dropped because of some problem on the variables generation.

[12]To be precise, the datasets correctly include household incomes. In order to account for individuals, I standardize the variable by dividing household income for the square root of the components. This is a frequent standardization methodology, since households are supposed to experience "scale economies" increasing with the household membership.

(*ex-post*) Gini index (see table 2). In turn, this represents an improvement under two perspectives: first of all, opposite to the papers by Alesina and Rodrik (1994), it is an inequality index genuinely independent from the level of (at least, contemporaneous) redistribution; second, it is possible to directly measure redistribution as the relative change of the Gini indices: the gap between *ex-ante* and *ex-post* inequality can be directly and exclusively imputed to fiscal redistribution.[13]

Even if Gini index is a widely used inequality measure, two shortcomings suggest to look for other measures in order to investigate the effectiveness of the middle class in the redistribution process. First, it is not possible to account for re-ranking and to investigate the effects of redistribution at individual level; second, it is not possible to focus on specific classes of individuals. In order to overcome these two issues, I computed a second set of variables: *ex-ante* and *ex-post* income of every individual, aggregated by deciles. On the one side, these variables are very effective in determining how different classes are differently affected by redistribution, since they can also account for re-ranking. On the other side, they are not suitable at all to describe the general level of inequality and redistribution. Indeed, this procedure generates 30 variables for every observation, that is *ex-ante* and *ex-post* share of total income belonging to every decile and the difference between these two variables, that is a very precise measure of redistribution.[14] In addition, I also computed some decile ratio, in order to capture some polarization aspect of the income distribution. These variables quantify the relative distance – in terms of *ex-ante* income – between some classes of population, namely the rich tail (tenth decile), the middle class (fifth and sixth decile) and the poor tail (first

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[13]Notice that – according to many insightful theoretical and empirical papers (among others, Bassett et al. (1999); Moene and Wallerstein (2001)) – I do *not* consider compulsory social contribution and related public transfers as redistribution. Indeed, they must be defined as deferred consumption and do not represent redistribution as a transfer from "rich" to "poor".

[14]Such a detailed analysis at deciles level was firstly implemented by Milanovic (2000). However, the present analysis improves his work under two perspectives: first, the sample size is more than doubled, including not only a longer time span, but also a wider number of countries. Second, opposite to Milanovic (2000), it does *not* include those datasets for which gross income cannot be computed, making inequality and redistribution measures much more precise.

quintile).

4 Empirical analysis

The present section is devoted to describe the empirical strategy adopted to test the effectiveness of the median voter in redistributive policy setting, given the availability of data analyzed in the previous section. In general, what the following models test is the connection between some inequality index and the relative redistribution measure.

With respect to econometric methodology, the issue is subtle. The panel nature of the sample would suggest to implement a "time invariant unobserved heterogeneity" model – following Milanovic (2000) – that allows to deal with unobservable institutional and political characteristics of every single country. On the other side, the relative small number of observations and the very unbalanced path of the sample could raise some doubts on the results. The alternative model is an OLS, implemented by all the literature prior to Milanovic (2000). This model disregards at all the panel dimension of the sample by treating the observations as if they originate from different countries. Since there are no decisive elements to discriminate between the two strategies, in the following I report results from both the methodologies: differences are negligible, suggesting that results are robust to different models and overcoming the choice between them.

A second issue regards the missing values. By adding the set of controls described above, the number of observations reduces to 79 countries. In order to test whether results are somehow driven by observations dropped due to some missing value, I run analogous regressions considering only inequality and redistribution measures from the complete sample of LIS data. Also in this case, there are no significant differences in the relationship between the two relevant dimensions.

4.1 Empirical strategy

The models tested in the paper can be generically summarized by the following:

$$R_{it} = \alpha + \beta I_{it} + \gamma C_{it} + \delta T_i + u_i + \epsilon_{it} \tag{1}$$

$$R_{it} = \alpha + \beta I_{it} + \gamma C_{it} + \delta T_i + \epsilon_{it} \tag{2}$$

where R is a measure of redistribution, I is an inequality index, C is a set of economic and political controls, T are seven time dummies, considering periods after 1973.[15] The former equation includes also a time invariant heterogeneity term (u_i), while the latter is the pooled-OLS formulation. In the following I consider several specifications of the general model above, each one focusing on a different aspect of the problem. The first relates overall inequality and overall redistribution, disregarding the middle class. Opposite to Persson and Tabellini (1994) and Alesina and Rodrik (1994), the present model includes a measure for redistribution, that is the relative change of Gini index after the fiscal transfers,[16] and it can directly investigate the nexus between inequality and redistribution:

$$\Delta\%Gini_{it} = \alpha + \beta Gini_{ex-ante,it} + \gamma C_{it} + \delta T_i + u_i + \epsilon_{it} \tag{4}$$

$$\Delta\%Gini_{it} = \alpha + \beta Gini_{ex-ante,it} + \gamma C_{it} + \delta T_i + \epsilon_{it} \tag{5}$$

The expected sign for β is positive, as suggested by virtually all literature.

The second set of models aims at testing the role of the median voter in the redistributive process. Analogously to Persson and Tabellini (1994), the dependent variable

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[15]Because of the small number of observations, many yearly dummies would have a too low variability, or even be constant. The sign of these dummies would not be driven by the genuine "time effect", but by some unobserved feature of the countries that happened to be observed in that specific year. By aggregating time dummies in seven periods (1973-1977 to 2003-2007) it is possible to consider the time effects without generating such meaningless variables.

[16]The exact definition is

$$\Delta\%Gini = \frac{Gini_{ex-post} - Gini_{ex-ante}}{Gini_{ex-ante}} \tag{3}$$

is the amount of net transfers received by the middle class; opposite to it, the regressor is the amount of market income earned by the middle class, as introduced by Milanovic (2000). According to the median voter theorem, the expected sign is negative, suggesting that a poorer median voter should receive a higher amount of transfers – or pay a lower amount of taxes. In addition to the middle class, I tested the same relationship also for other classes of income: according to Milanovic (2000), I focus on the poorest half of the population and on the poorest quintile, in order to compare the redistributive propensity of policy makers to classes different from the median voter. For the same comparative reasons, I run the same regressions also for every decile in the population. The models can be all summarized as:

$$FiscalGain_{d,it} = \alpha + \beta Income_{d,it} + \gamma C_{it} + \delta T_i + u_i + \epsilon_{it} \qquad (6)$$

$$FiscalGain_{d,it} = \alpha + \beta Income_{d,it} + \gamma C_{it} + \delta T_i + \epsilon_{it} \qquad (7)$$

where d is referred to several classes of population: every decile from 1 to 10, the first quintile (called "very poor" from now on), the fist half of the population ("poor") and the third quintile ("middle class", or "median voter").

The third class of models aims at testing asymmetry of political power as a consequence of asymmetry of income distribution. The link between the two asymmetries is treated by several papers, either as an assumption (see for instance Bourguignon and Verdier (2000) or as a result of a political-economic process Scervini (2009)). From an empirical perspective, the strategy to shed some light on this issue consists in adding a decile ratio as regressor: the distance between the top decile and the middle class, or the very poor individuals, is a good proxy for the asymmetry of income distribution. The expected sign of its coefficient depends on the theoretical model we believe in. Under the median voter theorem perspective, the distance between the rich tail of the distribution and the median voter should increase the redistribution toward the median voter,

since she is more willing to expropriate a very rich minority. On the other side, if we assume that political power is biased toward rich classes, the power of the median voter is reduced, and the redistribution she get is unaffected by her relative position, or even negative. Analogous relationships can be assumed for poor and very poor classes. The only modification with respect to the previous model is highlighted in the following:

$$FiscalGain_{d,it} = \alpha + \beta Income_{d,it} + \zeta Ratio_{90/d,it} + \gamma C_{it} + \delta T_i + u_i + \epsilon_{it} \qquad (8)$$

$$FiscalGain_{d,it} = \alpha + \beta Income_{d,it} + \zeta Ratio_{90/d,it} + \gamma C_{it} + \delta T_i + \epsilon_{it} \qquad (9)$$

where an asymmetry term is added in the regressions and d is either the middle or the poorest quintile of the population.

4.2 Results

This section is devoted to present and comment the results of regressions. In the following I refer to models described in the previous sections, while all the tables are included in appendix A. The relationship between overall inequality and overall redistribution is positive and significant in *almost* all formulations (tables 3 and 9). Using the complete sample, without controls, OLS models perform poorly, with a very low R-squared, and with an even non-significant coefficient for the democracy sub-sample. Results obtained by the FE models are confirmed by regressions including controls and evidence the positive relationship predicted by the literature. However, this relationship does not give any intuition either on the shape of the distribution and the position of the median voter and on the recipients of fiscal redistribution. What we can infer from it is only that more unequal countries (according to the definition of Gini) implement a relatively higher reduction of inequality through cash redistribution. With respect to controls, the only two coefficients that remain somehow significant in the FE model are the dummy for the proportional representation and unemployment rate. According to the literature,

proportional rule gives an incentive to creation and proliferation of political parties that can influence the bargaining power of ethnic/local/minorities interests. The role of unemployment rate is more straightforward, since unemployed can be entitled to receive some cash support from the government, that is captured by a substantial reduction of the Gini index. Finally, there are no significant time trends, being all the period dummies non significant.

Tables 4 to 12 show regressions linking market income to redistribution for three classes of individuals: middle class, poorest half and poorest quintile of population. At a first glance, regressions relative to the middle class (tables 4 and 10) seem to support the median voter theorem, since coefficients of interest are always negative and significant. The only comparable result in the literature is Milanovic (2000), that gets to opposite conclusions: in that paper coefficients are higher in absolute value, but the model is not significant, leading the author to conclude that "the middle classes' gain or loss in redistribution is independent of the initial "factor" distribution. This is explained by the fact that middle classes receive little in the form of non-pension cash transfers such as unemployment benefits, social assistance and even family allowances. Thus, the median voter hypothesis fails when we focus on the truly redistributive transfers only." (Milanovic, 2000, p. 394). Results from the improved dataset I use in this paper lead to opposite results: even if the effect is weaker, the amount of market income is significant in explaining the level of cash redistribution to the middle class, both with OLS and FE models, both with and without controls. Moreover, time trends show a clear and steady reduction in the level of redistribution to the median voter. Opposite to the conclusions by Persson and Tabellini (1994), the dummy *democracy* is never significant and there is no difference between the whole sample and the group of democratic countries. On the one side, the pure effect of income on redistribution supports the existence of a "median voter theorem" effect, since poorer middle classes receive more cash transfers. However, democracy effects are never significant – while, according to the theory, there should

be some effect, since the median voter theorem should apply only in democracies –, the time trend is significant – suggesting a kind of declining power of the middle class – and the net transfers to the middle class is negative in 16 cases over 104, meaning that the median voter is a net looser from redistribution process in almost 15% of the cases. Moreover, the average gain of the middle class is .59% of total income and 3.86% of their market income. The same figures for the poorest half of the population are 6.49% and 32.21%.

In order to investigate if and how middle class is different with respect to other classes, I focus on the poorest tail of the population (tables 5 to 12). Results are much more similar to those by Milanovic (2000): coefficient are negatively significant[17] both for the poorest half of the population and for the poorest quintile, with coefficients higher (in absolute values) than those relative to the middle class. Opposite to the middle class, however, there are no time trends and the importance of unemployment rate is intuitively increasing for poorer classes, since unemployed are very likely to belong to low (pre-transfers) income groups and to receive some cash redistribution. Comparing results from the three different classes of population, we find that the relationship between income and redistribution is much stronger for poorest classes of income than for the median voter. Moreover, while the "strength" of the middle class reduced over time, poorest classes did not experience a similar trend. None of the regressions show significant changes between democratic and non democratic countries, and *democracy* dummy is never significant. Therefore, the arguments that could lead us to support the effectiveness of the median voter theorem apply also for classes of income different from the middle one.

Figure 1 shows the coefficients (in absolute value) of the regressions linking market income of every single decile of population to the associated amount of redistribution.

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[17]The only exception is the "fixed effect" model with controls for the poorest half. In the case, however, neither the F test is significant, meaning that the whole model should be considered as meaningless. Since all other specifications are significant and coherent with both previous results and literature, I ascribe the non significance of that model to the reasons why I implement also OLS regressions.
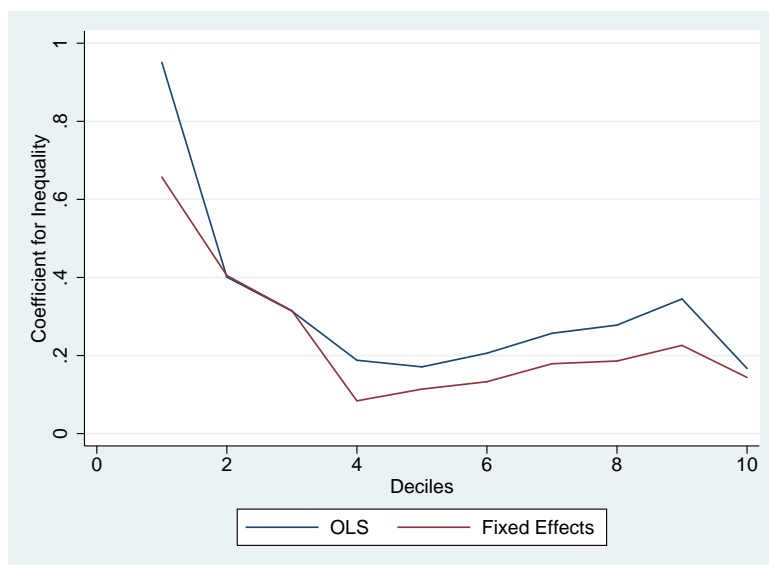
Figure 1: Effects of market income on redistribution by decile. For every unit of market income loss, redistribution increases by y units. Of course, every decile can be on average either net recipient or net payer, but lower income is always associated to more favorable tax schemes.

What emerges is that the effects of income on redistribution are kind of u-shaped, being very strong for the poorest individuals and increasing from the fifth to the ninth decile. The most unexpected result is that the weaker effect is exactly in correspondence of the middle class, between fourth and sixth deciles. This result is really puzzling in the perspective of the median voter theories: the class that benefits the less from a reduction of income is the middle one. Opposite, expected results are for the two tails of the distribution. Poorest ones receive an amount of transfers much higher than the others, richest decile an amount significantly lower than closest ones. The puzzling result is that middle class coefficients are very similar, or even lower, than those associated to the top decile.

The last class of models I test in the paper refers to the level of income asymmetry, in order to shed some light on the possible reason why the effectiveness of the median voter is not confirmed by empirical estimates. Income polarization can foster two phenomena: on the one side, it amplifies the distance between the preferences of the top class with

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respect to other individuals; on the other side, it could cause a more asymmetric polit-ical power, as theoretically modeled by many scholars, among which Bénabou (2000); Bourguignon and Verdier (2000); Acemoglu and Robinson (2006); Scervini (2009) and in contrast to the median voter theorem.[18] If these two hypotheses are true, we should expect that if rich tails of distribution are very far – in terms of income – with respect to the middle or poorest classes and this can increase their *de facto* political power, then more polarized societies should experience a lower level of redistribution toward poorer classes. Results are shown in tables 7 to 14. Models are identical to the previous ones, apart from a term that captures the ratio between the share of income of the top decile to the share of income of the middle class and the poorest quintile.

Results are – again – in strong contrast to the predictions of the median voter theo-rem. Indeed, the effect of the distance between rich and middle classes on redistribution targeted to the latter is *negative*, meaning that – fixed the share of income – the further the median voter from the richest individuals, the lower redistribution she gets. This result is very difficult to be explained in a classical median voter theorem, but much easier to reconcile under the perspective of asymmetry of political power: whatever the reason, richest individuals hold more power relative to other classes and therefore they can set a tax scheme more targeted on their own interests. The wider is the distance between them and the middle class, the more different are their preferences, the less redistribution the middle class receives.

A similar argument seems not to apply for the poorest individuals in the population. In this case, the distance between the two tails of the population is not significant in explaining the amount of redistribution the poorest individuals receive. Opposite to the previous case, this can be explained by referring to several models: first, Galor and Zeira (1993) and Saint-Paul and Verdier (1993) give some incentives to rich individuals

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[18]Models that refer to the middle class as a decisive agent in the political process predict that the richer are richest classes with respect to the middle class, the stronger are the incentives for it to "expropriate" the very rich individuals through a tax scheme very biases in their favor.

to redistribute in favor of the poorest in order to make the whole economy grow faster; second, Acemoglu and Robinson (2000) state that richest classes could implement some redistribution in order to avoid threatens of revolutions and social conflicts; third, there could be ethic reasons driving redistributive choices in favor of the very low income individuals. However, what is relevant for the paper is that – once again – the median voter seems not to play any special role in the redistribution setting.

5   Conclusions

The paper carries on the existing research that investigates the role of the median voter in the redistribution process. With respect to previous literature, it exploits a larger high quality dataset to test models including the proper variables (market and disposable income shares and Gini indices, detailed redistribution measures, deciles and quintiles ratios) and a set of political and economic controls.

Results are twofold: on the one side, the paper confirms the positive relation between inequality and redistribution. On the other side – focusing on the role of the median voter – there are several reasons that lead us to reject – or at least question – its role in the redistributive decision process. First, the amount of cash transfers she receives decreased steadily over time, while poorer classes did not experience a similar trend. Second, the level of democracy is not significant in explaining the amount of redistribution and there are no relevant differences if we consider only the subsample of democratic countries. Third, the quantitative effect of income on redistribution relative to the middle class is not only lower than that referred to the poorer individuals, but also to the richer ones. Indeed, the lowest coefficients are for middle deciles (fourth to sixth). Fourth, the further the middle class from the richest tail, the less redistribution it gets, opposite to the incentives to redistribution – or "expropriation" – that the middle class is expected to practise.

Summarizing, if one is ready to assume that a negative relation between inequality

and redistribution is a sufficient evidence in support of the median voter theorem, then the former is confirmed. However, if one analyzes more in detail the characteristics of the middle class and its difference with respect to the rest of the population, the role of the median voter is much more questionable. Even if some results could give evidence of an influent role of the middle class, many others go in the opposite direction, suggesting that mechanisms different from those envisaged by the median voter theorem are effective in explaining the amount of redistribution and its recipients.

Even if this paper represents an improvement with respect to the previous empirical literature, a lot of issues remain opened and would require further investigations. A very relevant one regards non-cash redistribution. It is possible that redistribution takes the form of in-kind public provision (see for instance Epple and Romano (1996)). In this case, the amount of redistribution is underestimated not only in the present paper, but by virtually all the cross country comparisons. Indeed, if it is possible to account for in-kind redistribution for single countries case studies, it is a very hard task to compare how different classes of income in different countries are affected by different in-kind redistributive schemes. A second issue refers to the low sample size. The quality of LIS data is much higher than any other dataset, but unfortunately only a relatively small number of countries participate to the project, and there is very little variability in their economic and political development level. Exploiting also this dimension could help to understand the effects of the political framework on the level of redistribution, possibly increasing the significance of political related variables.

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A Tables

Table 1: Summary statistics

Variable	Mean	Std. Dev.	Min.	Max.	N
Penn World Table					
Per capita GDP (PPP, US $, 2005)	23568.026	8948.653	5894.314	68390.357	104
GDP growth	2.344	2.828	-8.973	10.164	104
International Labour Organization (LABORSTA)					
Unemployment rate	6.437	3.410	1.36	19	88
Polity IV					
Democracy index	9.433	1.717	0	10	104
Democracy dummy	0.952	0.215	0	1	104
Democracy index (10 years lag)	8.721	3.000	0	10	104
Democracy persistence (10 years)	0.865	0.343	0	1	104
World Bank Database of Political Institution					
Proportional representation	0.734	0.444	0	1	94
Political fragmentation	0.670	0.158	0	0.884	96
Government right	0.442	0.499	0	1	104
Government left	0.356	0.481	0	1	104
Government center	0.058	0.234	0	1	104
Presidential system	0.177	0.384	0	1	96
Elaborations from Luxembourg Income Study					
Gini index (market income)	0.391	0.056	0.28	0.561	104
Gini index (disposable income)	0.304	0.052	0.203	0.541	104
Gini redistribution	0.219	0.098	0.019	0.441	104
Factor income, decile 1	0.009	0.01	0	0.039	104
Factor income, decile 2	0.03	0.012	0.002	0.061	104
Factor income, decile 3	0.046	0.011	0.009	0.074	104
Factor income, decile 4	0.061	0.01	0.025	0.081	104
Factor income, decile 5	0.077	0.009	0.036	0.094	104
Factor income, decile 6	0.091	0.01	0.045	0.109	104
Factor income, decile 7	0.109	0.011	0.054	0.126	104
Factor income, decile 8	0.13	0.014	0.062	0.152	104
Factor income, decile 9	0.161	0.015	0.08	0.202	104
Factor income, decile 10	0.286	0.07	0.194	0.692	104
Disposable income, decile 1	0.035	0.013	0.004	0.089	104
Disposable income, decile 2	0.045	0.011	0.016	0.071	104
Disposable income, decile 3	0.057	0.009	0.032	0.079	104

Disposable income, decile 4	0.069	0.009	0.038	0.085	104
Disposable income, decile 5	0.081	0.008	0.042	0.096	104
Disposable income, decile 6	0.092	0.009	0.049	0.111	104
Disposable income, decile 7	0.106	0.009	0.056	0.121	104
Disposable income, decile 8	0.123	0.011	0.061	0.146	104
Disposable income, decile 9	0.147	0.012	0.076	0.172	104
Disposable income, decile 10	0.243	0.06	0.163	0.599	104
Share gain, decile 1	0.026	0.016	0.001	0.089	104
Share gain, decile 2	0.015	0.009	0.001	0.036	104
Share gain, decile 3	0.011	0.006	0	0.031	104
Share gain, decile 4	0.008	0.004	0	0.019	104
Share gain, decile 5	0.005	0.003	-0.005	0.015	104
Share gain, decile 6	0.001	0.004	-0.008	0.011	104
Share gain, decile 7	-0.003	0.005	-0.015	0.007	104
Share gain, decile 8	-0.007	0.006	-0.022	0.006	104
Share gain, decile 9	-0.014	0.008	-0.032	0.005	104
Share gain, decile 10	-0.042	0.02	-0.098	-0.004	104
Factor inc., q3 (middle class)	0.168	0.019	0.081	0.199	104
Factor inc., d1-d5 (poorest half)	0.223	0.045	0.068	0.312	104
Factor inc., q1 (poorest quintile)	0.039	0.021	-0.003	0.094	104
Factor inc., d10/q3 ratio	1.792	0.899	0.991	8.584	104
Factor inc., d10/q1 ratio	9.960	7.874	2.414	55.923	104
Share gain, q3 (middle class)	0.006	0.006	-0.013	0.026	104
Share gain, d1-d5 (poorest half)	0.065	0.031	0.004	0.138	104
Share gain, q1 (poorest quintile)	0.041	0.024	0.002	0.108	104

Table 2: Gini indices

	Country	Year	Market income Gini index	Disposable income Gini index
1	Taiwan	1981	.2802144	.2747965
2	Taiwan	1986	.2877191	.2802188
3	Taiwan	1991	.297533	.2881675
4	Czech Republic	1992	.298589	.2203666
5	Slovak Republic	1992	.3025859	.2025105
6	Switzerland	2004	.3032357	.2834309

7	Switzerland	2002	.3048586	.2843707
8	Taiwan	1995	.3104849	.2951742
9	Switzerland	2000	.3145399	.2985663
10	Romania	1997	.3163138	.2856039
11	Sweden	1981	.3164674	.210961
12	Taiwan	1997	.321762	.3051956
13	Finland	1987	.3248392	.231584
14	Romania	1995	.3265365	.292782
15	Finland	1991	.3276254	.2351046
16	Sweden	1987	.3281296	.2501997
17	Germany	1981	.33002	.2578126
18	Taiwan	2000	.3307052	.3099753
19	Taiwan	2005	.3307052	.3099753
20	Germany	1983	.3322993	.2801017
21	Germany	1978	.33356	.2833126
22	United Kingdom	1974	.3347019	.2914466
23	United Kingdom	1969	.3433452	.290727
24	Sweden	1975	.3445911	.2412511
25	Norway	1991	.3455004	.254641
26	Netherlands	1999	.3459876	.2446935
27	Germany	1989	.3525565	.2756276
28	Czech Republic	1996	.3540561	.2716299
29	South Korea	2006	.3583019	.3394573
30	Switzerland	1992	.3611861	.3376184
31	Luxembourg	2004	.3612408	.2779375
32	Belgium	1992	.364892	.243935
33	Sweden	1992	.3650496	.2564691
34	Canada	1981	.3704749	.3084364
35	Norway	1995	.3710241	.2663617
36	Canada	1987	.3718522	.2990189
37	United Kingdom	1979	.3719184	.287153
38	Germany	1984	.3734117	.2966945
39	Poland	1999	.3749817	.2966512
40	Switzerland	1982	.3772148	.3415934
41	France	1979	.3799805	.3072973
42	Sweden	2005	.3815156	.2538075
43	France	1984	.3826207	.3067423
44	Germany	1994	.3827189	.2894659

45	Canada	1975	.3830479	.3216833
46	Finland	1995	.3833658	.2375677
47	Norway	2000	.3862797	.2799192
48	Denmark	2000	.386912	.2476427
49	Canada	1991	.3874985	.2962965
50	Netherlands	1991	.38792	.290958
51	Australia	1981	.3897179	.2994092
52	United States	1969	.3899572	.3755113
53	Sweden	1995	.3908388	.2473607
54	Denmark	2004	.3909282	.2509002
55	Denmark	1995	.3932686	.2424425
56	Belgium	1997	.3937816	.2671117
57	Germany	2000	.3939979	.2934439
58	Canada	1997	.394428	.3066284
59	United States	1974	.3952391	.3377851
60	Poland	2004	.395505	.3251183
61	Canada	1994	.3964971	.2991011
62	Denmark	1987	.3975315	.2881064
63	United States	1979	.3980841	.3209241
64	Netherlands	1994	.3985032	.2915244
65	Sweden	2000	.4020534	.2735219
66	Israel	1979	.4029598	.3240302
67	Australia	1985	.40868	.3108054
68	Finland	2000	.4098251	.2696294
69	United States	1986	.4114265	.3468581
70	Finland	2004	.4133443	.2836452
71	Canada	1971	.4137352	.3607078
72	Canada	2004	.4138205	.334448
73	Canada	2000	.4147592	.3324517
74	United States	1991	.4171903	.3520308
75	Israel	1986	.4185273	.3175077
76	Denmark	1992	.4206891	.2688564
77	Netherlands	1983	.4226322	.2859385
78	Norway	2004	.4236855	.3012407
79	Germany	1973	.4251351	.2898924
80	Sweden	1967	.4281965	.3626542
81	Canada	1998	.4297862	.3344262
82	Norway	1986	.4302624	.2578966

83	Israel	1992	.4303373	.3243227
84	Australia	1989	.4305961	.3225255
85	Netherlands	1987	.4319962	.2666001
86	United Kingdom	1986	.4461092	.3157844
87	United States	1996	.4498993	.383339
88	Norway	1979	.4515451	.2524512
89	United States	2000	.4558048	.3824978
90	United Kingdom	1991	.4586892	.3452112
91	Australia	2003	.4615107	.3386639
92	United States	2004	.4651361	.3921124
93	Australia	1995	.4670091	.3366306
94	Israel	1997	.4677444	.3567513
95	Australia	2001	.46898	.3400981
96	Israel	2005	.4707648	.3790137
97	United Kingdom	2004	.475647	.3681186
98	United Kingdom	1995	.4762268	.3489637
99	United Kingdom	1999	.4830163	.3727867
100	United Kingdom	1994	.4834134	.3583261
101	Israel	2001	.4842356	.3618868
102	Ireland	1987	.5169468	.3500381
103	Brazil	2006	.5452494	.5064859
104	Guatemala	2006	.5610095	.5414725

Table 3: Dep.var.: Δ% Gini index

	All countries		Democracies	
	FE	OLS	FE	OLS
	(1)	(2)	(3)	(4)
Gini index	0.585***	0.477***	0.601***	0.117
(market income)	(0.128)	(0.166)	(0.137)	(0.180)
Constant	-0.010	0.033	-0.006	0.189**
	(0.050)	(0.066)	(0.055)	(0.073)
R-squared	0.210	0.075	0.216	0.005
F-test	21.026***	8.248***	19.231***	0.420
N	104	104	90	90

* $p<0.1$, ** $p<0.05$, *** $p<0.01$

Table 4: Dep.var.: Fiscal Gain (Median voter)

| | All countries | | Democracies | |
| | FE | OLS | FE | OLS |
	(1)	(2)	(3)	(4)
Market income	-0.121***	-0.189***	-0.124***	-0.188***
(median voter)	(0.040)	(0.028)	(0.042)	(0.029)
Constant	0.026***	0.038***	0.027***	0.038***
	(0.007)	(0.005)	(0.007)	(0.005)
R-squared	0.105	0.305	0.109	0.327
F-test	9.289***	44.694***	8.545***	42.749***
N	104	104	90	90

* p<0.1, ** p<0.05, *** p<0.01

Table 5: Dep.var.: Fiscal Gain (Poor classes)

| | All countries | | Democracies | |
| | FE | OLS | FE | OLS |
	(1)	(2)	(3)	(4)
Market income	-0.318***	-0.349***	-0.327***	-0.261***
(poorest half)	(0.068)	(0.058)	(0.074)	(0.067)
Constant	0.136***	0.143***	0.140***	0.126***
	(0.015)	(0.013)	(0.016)	(0.015)
R-squared	0.216	0.261	0.216	0.148
F-test	21.799***	36.116***	19.292***	15.319***
N	104	104	90	90

* p<0.1, ** p<0.05, *** p<0.01

Table 6: Dep.var.: Fiscal Gain (very poor class)

| | All countries | | Democracies | |
| | FE | OLS | FE | OLS |
	(1)	(2)	(3)	(4)
Market income	-0.636***	-0.665***	-0.664***	-0.714***
(first quintile)	(0.105)	(0.093)	(0.116)	(0.132)
Constant	0.066***	0.067***	0.067***	0.069***
	(0.004)	(0.004)	(0.004)	(0.005)
R-squared	0.318	0.335	0.317	0.248
F-test	36.789***	51.426***	32.489***	29.078***
N	104	104	90	90

* p<0.1, ** p<0.05, *** p<0.01

Table 7: Dep.var.: Fiscal Gain (Median voter)

	All countries		Democracies	
	FE	OLS	FE	OLS
	(1)	(2)	(3)	(4)
Market income ratio	-0.300**	-0.306**	-0.311**	-0.403***
(d10/q3)	(0.136)	(0.133)	(0.145)	(0.135)
Market income	-0.284***	-0.319***	-0.294***	-0.359***
(median voter)	(0.084)	(0.063)	(0.090)	(0.064)
Constant	0.059***	0.065***	0.062***	0.074***
	(0.016)	(0.013)	(0.017)	(0.013)
R-squared	0.158	0.340	0.164	0.389
F-test	7.297***	25.959***	6.790***	27.729***
N	104	104	90	90

* $p<0.1$, ** $p<0.05$, *** $p<0.01$

Table 8: Dep.var.: Fiscal Gain (very poor class)

	All countries		Democracies	
	FE	OLS	FE	OLS
	(1)	(2)	(3)	(4)
Market income ratio	0.003	0.005	0.003	0.005
(d10/q1)	(0.004)	(0.006)	(0.004)	(0.006)
Market income	-0.638***	-0.672***	-0.666***	-0.732***
(very poor class)	(0.105)	(0.093)	(0.117)	(0.134)
Constant	0.066***	0.067***	0.067***	0.069***
	(0.004)	(0.004)	(0.004)	(0.005)
R-squared	0.322	0.340	0.322	0.255
F-test	18.563***	25.960***	16.388***	14.880***
N	104	104	90	90

* $p<0.1$, ** $p<0.05$, *** $p<0.01$

Table 9: Dep.var.: $\Delta\%$ Gini index

| | All countries | | Democracies | |
| | FE | OLS | FE | OLS |
	(1)	(2)	(3)	(4)
Gini index	0.790***	0.599***	0.833***	0.878***
(market income)	(0.157)	(0.155)	(0.160)	(0.198)
Per capita GDP	-0.000	0.000***	-0.000	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
GDP growth	-0.001	0.003	-0.002	0.000
	(0.002)	(0.004)	(0.002)	(0.004)
Unemployment rate	0.004*	0.007***	0.004	0.008***
	(0.002)	(0.003)	(0.003)	(0.003)
Democracy dummy	0.018	0.050		
	(0.029)	(0.052)		
Government center	0.017	0.076**	0.014	0.103***
	(0.023)	(0.033)	(0.023)	(0.038)
Government left	0.005	0.031*	0.003	0.045**
	(0.009)	(0.017)	(0.010)	(0.019)
Proportional	0.129**	0.051*	(dropped)	0.040
representation	(0.062)	(0.028)		(0.030)
Political	-0.116	0.085	-0.069	0.223*
fragmentation	(0.093)	(0.087)	(0.114)	(0.117)
Presidential	-0.028	-0.090***	-0.046	-0.095***
system	(0.023)	(0.021)	(0.029)	(0.025)
1978-1982	0.016	-0.051	0.013	-0.065
	(0.032)	(0.071)	(0.032)	(0.071)
1983-1987	-0.002	-0.084	0.001	-0.100
	(0.033)	(0.072)	(0.033)	(0.072)
1988-1992	-0.003	-0.094	-0.004	-0.139*
	(0.035)	(0.073)	(0.036)	(0.074)
1993-1997	0.005	-0.106	0.015	-0.146*
	(0.038)	(0.071)	(0.040)	(0.075)
1998-2002	0.022	-0.137*	0.029	-0.198**
	(0.043)	(0.072)	(0.045)	(0.076)
2003-2007	0.012	-0.171**	0.023	-0.219***
	(0.048)	(0.073)	(0.051)	(0.077)
Constant	-0.062	-0.193*	0.052	-0.387**
	(0.089)	(0.097)	(0.119)	(0.151)
R-squared	0.559	0.632	0.592	0.551
F-test	3.651***	7.082***	4.242***	4.577***
N	83	83	72	72

* p<0.1, ** p<0.05, *** p<0.01

Table 10: Dep.var.: Fiscal Gain (Median voter)

| | All countries | | Democracies | |
| | FE | OLS | FE | OLS |
	(1)	(2)	(3)	(4)
Market income	-0.117***	-0.155***	-0.119***	-0.132***
(median voter)	(0.030)	(0.034)	(0.031)	(0.034)
Per capita GDP	0.000	0.000**	0.000	0.000*
	(0.000)	(0.000)	(0.000)	(0.000)
GDP growth	-0.000	-0.000	-0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Unemployment rate	-0.000	0.000	-0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Democracy dummy	-0.001	-0.003		
	(0.003)	(0.004)		
Government center	0.002	0.003	0.002	0.006**
	(0.002)	(0.002)	(0.002)	(0.003)
Government left	0.000	0.000	0.000	0.001
	(0.001)	(0.001)	(0.001)	(0.001)
Proportional	-0.011*	-0.002	(dropped)	0.001
representation	(0.006)	(0.002)		(0.002)
Political	0.011	0.017**	0.015	0.014*
fragmentation	(0.009)	(0.007)	(0.011)	(0.008)
Presidential	0.000	0.003**	-0.000	0.007***
system	(0.002)	(0.002)	(0.003)	(0.002)
1978-1982	-0.019***	-0.015***	-0.019***	-0.017***
	(0.003)	(0.005)	(0.003)	(0.005)
1983-1987	-0.018***	-0.017***	-0.018***	-0.017***
	(0.003)	(0.005)	(0.003)	(0.005)
1988-1992	-0.018***	-0.018***	-0.018***	-0.018***
	(0.003)	(0.005)	(0.003)	(0.005)
1993-1997	-0.018***	-0.019***	-0.017***	-0.019***
	(0.004)	(0.005)	(0.004)	(0.005)
1998-2002	-0.019***	-0.020***	-0.019***	-0.019***
	(0.004)	(0.005)	(0.004)	(0.005)
2003-2007	-0.022***	-0.023***	-0.021***	-0.024***
	(0.004)	(0.005)	(0.005)	(0.005)
Constant	0.040***	0.037***	0.030***	0.031***
	(0.007)	(0.009)	(0.010)	(0.010)
R-squared	0.624	0.537	0.635	0.589
F-test	4.764***	4.791***	5.092***	5.350***
N	83	83	72	72

* $p<0.1$, ** $p<0.05$, *** $p<0.01$

Table 11: Dep.var.: Fiscal Gain (Poor classes)

| | All countries | | Democracies | |
| | FE | OLS | FE | OLS |
	(1)	(2)	(3)	(4)
Market income	-0.106	-0.264***	-0.105	-0.273***
(poorest half)	(0.098)	(0.055)	(0.104)	(0.063)
Per capita GDP	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
GDP growth	-0.001	-0.000	-0.001	-0.002
	(0.001)	(0.001)	(0.001)	(0.001)
Unemployment rate	0.003**	0.003***	0.003**	0.003***
	(0.001)	(0.001)	(0.001)	(0.001)
Democracy dummy	-0.001	0.032**		
	(0.015)	(0.016)		
Government center	0.007	-0.003	0.006	-0.006
	(0.012)	(0.010)	(0.012)	(0.012)
Government left	-0.002	-0.002	-0.001	-0.002
	(0.005)	(0.005)	(0.005)	(0.006)
Proportional	0.024	-0.002	(dropped)	-0.002
representation	(0.032)	(0.008)		(0.010)
Political	-0.040	-0.012	-0.042	-0.013
fragmentation	(0.046)	(0.026)	(0.059)	(0.036)
Presidential	-0.003	-0.030***	-0.006	-0.031***
system	(0.011)	(0.006)	(0.015)	(0.008)
1978-1982	-0.012	-0.022	-0.013	-0.022
	(0.016)	(0.022)	(0.017)	(0.022)
1983-1987	-0.014	-0.021	-0.014	-0.019
	(0.016)	(0.022)	(0.017)	(0.023)
1988-1992	-0.024	-0.027	-0.024	-0.031
	(0.018)	(0.022)	(0.018)	(0.023)
1993-1997	-0.015	-0.018	-0.014	-0.013
	(0.019)	(0.022)	(0.021)	(0.023)
1998-2002	-0.015	-0.023	-0.015	-0.022
	(0.022)	(0.022)	(0.024)	(0.023)
2003-2007	-0.020	-0.028	-0.018	-0.024
	(0.024)	(0.022)	(0.027)	(0.023)
Constant	0.087**	0.104***	0.112**	0.143***
	(0.034)	(0.031)	(0.050)	(0.035)
R-squared	0.265	0.624	0.277	0.490
F-test	1.037	6.839***	1.120	3.592***
N	83	83	72	72

* $p<0.1$, ** $p<0.05$, *** $p<0.01$

Table 12: Dep.var.: Fiscal Gain (very poor class)

	All countries		Democracies	
	FE	OLS	FE	OLS
	(1)	(2)	(3)	(4)
Market income	-0.571***	-0.581***	-0.568***	-0.666***
(first quintile)	(0.176)	(0.115)	(0.186)	(0.137)
Per capita GDP	0.000*	-0.000	0.000*	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
GDP growth	-0.001	-0.000	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)
Unemployment rate	0.002***	0.002**	0.003***	0.002**
	(0.001)	(0.001)	(0.001)	(0.001)
Democracy dummy	-0.004	0.020		
	(0.010)	(0.013)		
Government center	0.008	-0.007	0.008	-0.011
	(0.008)	(0.008)	(0.009)	(0.010)
Government left	0.001	-0.004	0.001	-0.003
	(0.003)	(0.004)	(0.004)	(0.005)
Proportional	0.022	0.002	(dropped)	-0.003
representation	(0.022)	(0.007)		(0.008)
Political	-0.055*	-0.031	-0.059	-0.013
fragmentation	(0.032)	(0.021)	(0.040)	(0.029)
Presidential	-0.001	-0.022***	-0.001	-0.025***
system	(0.008)	(0.005)	(0.010)	(0.006)
1978-1982	0.010	0.004	0.010	0.005
	(0.011)	(0.018)	(0.011)	(0.018)
1983-1987	0.003	0.005	0.002	0.005
	(0.011)	(0.018)	(0.012)	(0.018)
1988-1992	-0.006	0.005	-0.007	-0.000
	(0.012)	(0.018)	(0.013)	(0.019)
1993-1997	-0.006	0.014	-0.008	0.013
	(0.013)	(0.018)	(0.015)	(0.019)
1998-2002	-0.011	0.013	-0.014	0.009
	(0.015)	(0.018)	(0.017)	(0.019)
2003-2007	-0.017	0.011	-0.019	0.011
	(0.017)	(0.018)	(0.019)	(0.019)
Constant	0.032	0.055**	0.038	0.067**
	(0.022)	(0.024)	(0.034)	(0.027)
R-squared	0.421	0.583	0.435	0.525
F-test	2.092***	5.773***	2.253***	4.130***
N	83	83	72	72

* p<0.1, ** p<0.05, *** p<0.01

Table 13: Dep.var.: Fiscal Gain (Median voter)

	All countries		Democracies	
	FE	OLS	FE	OLS
	(1)	(2)	(3)	(4)
Market income ratio	-0.195	-0.509***	-0.214	-0.456***
(d10/q3)	(0.140)	(0.137)	(0.156)	(0.141)
Market income	-0.229**	-0.391***	-0.243**	-0.352***
(median voter)	(0.085)	(0.071)	(0.095)	(0.075)
Per capita GDP	0.000	0.000***	-0.000	0.000**
	(0.000)	(0.000)	(0.000)	(0.000)
GDP growth	-0.000	-0.000	-0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Unemployment rate	-0.000	0.000	-0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Democracy dummy	-0.001	-0.002		
	(0.003)	(0.003)		
Government center	0.001	0.002	0.001	0.004
	(0.002)	(0.002)	(0.002)	(0.003)
Government left	0.000	0.001	-0.000	0.001
	(0.001)	(0.001)	(0.001)	(0.001)
Proportional	-0.006	-0.001	(dropped)	0.001
representation	(0.007)	(0.002)		(0.002)
Political	0.005	0.015**	0.007	0.009
fragmentation	(0.009)	(0.006)	(0.012)	(0.008)
Presidential	0.000	0.002	-0.000	0.005***
system	(0.002)	(0.002)	(0.003)	(0.002)
1978-1982	-0.018***	-0.014***	-0.018***	-0.015***
	(0.003)	(0.005)	(0.003)	(0.005)
1983-1987	-0.018***	-0.018***	-0.017***	-0.018***
	(0.003)	(0.005)	(0.003)	(0.005)
1988-1992	-0.017***	-0.019***	-0.017***	-0.018***
	(0.003)	(0.005)	(0.004)	(0.005)
1993-1997	-0.016***	-0.019***	-0.015***	-0.019***
	(0.004)	(0.005)	(0.004)	(0.005)
1998-2002	-0.017***	-0.021***	-0.016***	-0.019***
	(0.004)	(0.005)	(0.005)	(0.005)
2003-2007	-0.019***	-0.024***	-0.018***	-0.024***
	(0.005)	(0.005)	(0.005)	(0.005)
Constant	0.066***	0.085***	0.065**	0.078***
	(0.020)	(0.015)	(0.028)	(0.017)
R-squared	0.639	0.618	0.651	0.655
F-test	4.689***	6.194***	4.982***	6.521***
N	83	83	72	72

* $p<0.1$, ** $p<0.05$, *** $p<0.01$

Table 14: Dep.var.: Fiscal Gain (very poor class)

	All countries		Democracies	
	FE	OLS	FE	OLS
	(1)	(2)	(3)	(4)
Market income ratio	0.001	0.007	0.001	0.008
(d10/q1)	(0.004)	(0.005)	(0.005)	(0.006)
Market income	-0.575***	-0.602***	-0.572***	-0.713***
(very poor class)	(0.180)	(0.116)	(0.189)	(0.139)
Per capita GDP	0.000*	-0.000	0.000*	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
GDP growth	-0.001	-0.000	-0.001	-0.002
	(0.001)	(0.001)	(0.001)	(0.001)
Unemployment rate	0.002**	0.002**	0.003***	0.002**
	(0.001)	(0.001)	(0.001)	(0.001)
Democracy dummy	-0.004	0.020		
	(0.010)	(0.013)		
Government center	0.008	-0.008	0.008	-0.012
	(0.008)	(0.008)	(0.009)	(0.009)
Government left	0.001	-0.004	0.001	-0.002
	(0.003)	(0.004)	(0.004)	(0.005)
Proportional	0.023	0.003	(dropped)	-0.003
representation	(0.023)	(0.007)		(0.008)
Political	-0.056*	-0.032	-0.060	-0.012
fragmentation	(0.033)	(0.021)	(0.041)	(0.029)
Presidential	-0.001	-0.022***	-0.001	-0.026***
system	(0.008)	(0.005)	(0.010)	(0.006)
1978-1982	0.010	0.007	0.011	0.010
	(0.011)	(0.018)	(0.012)	(0.018)
1983-1987	0.003	0.006	0.002	0.006
	(0.011)	(0.018)	(0.012)	(0.018)
1988-1992	-0.005	0.006	-0.007	0.000
	(0.012)	(0.018)	(0.013)	(0.019)
1993-1997	-0.005	0.015	-0.008	0.013
	(0.014)	(0.018)	(0.015)	(0.019)
1998-2002	-0.011	0.014	-0.014	0.009
	(0.016)	(0.018)	(0.018)	(0.019)
2003-2007	-0.016	0.012	-0.018	0.011
	(0.018)	(0.018)	(0.020)	(0.019)
Constant	0.033	0.055**	0.040	0.066**
	(0.023)	(0.023)	(0.037)	(0.027)
R-squared	0.422	0.593	0.435	0.543
F-test	1.929**	5.569***	2.055**	4.087***
N	83	83	72	72

* p<0.1, ** p<0.05, *** p<0.01