

INEQUALITY AND PARTICIPATIVE DEMOCRACY: A SELF-REINFORCING MECHANISM

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During the last three decades, a notable increase in economic inequality is observed, accompanied by a decline in people's engagement in politics and electoral participation. This is an unsatisfactory phenomenon as it undermines the legitimacy of democratic representation. This negative association is produced by a complex salient mechanism. This study aims at investigating this issue. Using data from a panel of 28 OECD and European countries, this paper identifies a two-way causal relationship between inequality and political participation. The results show that greater income inequality alienates and discourages people from engaging with common affairs, thus leading to lower political participation. Yet, lower electoral participation leads towards a less equitable distribution of income. Hence, this study reveals a self-reinforcing mechanism where the unequal distribution of income leads to political exclusion, which in turn leads to more inequality.

JEL Codes: D31, D70, E60

Keywords: income inequality, political participation, redistribution

“So long as the people do not care to exercise their freedom, those who wish to tyrannize will do so; for tyrants are active and ardent, and will devote themselves in the name of any number of gods, religious and otherwise, to put shackles upon sleeping men.”

Voltaire

1. INTRODUCTION

The shape of the income distribution has changed markedly since 1980, with substantial gains in real income at the top outpacing much more modest gains among middle income earners. The economic models of Romer (1975), Roberts (1977) and Meltzer and Richard (1981) suggest that rising economic inequality leads those at the lower rungs of the income ladder to demand greater redistribution. Hence, it would be expected that governments, responding to the increased

Note: We are grateful to the editor and two anonymous referees for constructive comments and suggestions. We also thank the seminar participants at the University of Aberdeen and the University of Dundee for valuable comments on an earlier version of the paper. All remaining errors are ours.

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political pressure, would increase social transfers and welfare provisions with the aim to achieve a more egalitarian distribution of income. However, their prediction that inequality should induce higher welfare spending and higher redistribution is not supported by empirical evidence (Perotti, 1993; 1996; Ramcharan, 2010). Indeed, it has been well documented that economic inequality is increasing dramatically among citizens in many advanced countries (Piketty, 2014), while welfare generosity has been steadily declining.

One strand of the literature explains why increasing economic inequality is not accompanied by policies of greater redistribution (Bénabou, 2000; Moene and Wallerstein, 2001; Barth and Moene, 2012). This literature assumes that public opinion plays a key role in the formulation of welfare policies. Thus, opinions of the public are found to be homogeneous and to follow a similar path over time. Furthermore, policy preferences of those at the lower and upper part of the income distribution are found to be highly correlated (Soroka and Wlezien, 2008; Ura and Ellis, 2008). Building on this, Kelly and Enns (2010) show that economic inequality is self-reinforcing because both the rich and poor become more conservative as inequality is rising. They argue that people in the top of the income distribution prefer lower redistribution, but with increasing inequality poor people also become discontented and less willing to pay higher taxes to finance a more generous welfare state. The homogeneity assumption in people's response among different rungs of the income ladder and the conservative shift in preferences as economic inequality widens can help explain why inequality has been steadily rising since the 1980s. Furthermore as Barth et al. (2015) suggest, it is not only public sentiment that shifts to more conservatism in response to rising inequality, but also party politics on welfare issues have moved to the right, strengthening the impact of inequality. Both their theoretical model and empirical findings highlight that left-wing political parties shift their political manifestos to the right and to less generous welfare spending.

A parallel to the above strand of the literature highlights that unequal democratic representation and a class bias in the political agenda favors the preferences of the individuals in the highest rungs of income distribution (Gilens, 2005; 2011; Bartels, 2008). Bartels (2008) proposes that economic inequality becomes self-reinforcing as "increasing economic inequality may produce increasing inequality in political responsiveness, which in turn produces public policies that are increasingly detrimental to the interests of poor citizens, which in turn produces even greater inequality, and so on." (p. 286). Gaventa (1980) and Lukes ([1974] 2005) argue persuasively that inequality induces frustration with the political process and thence apathy for those at the lower rungs of the income distribution. Hence, if economic inequality affects who votes, then election outcomes may produce a biased sample of preferences towards those who vote, namely the higher rungs of the income distribution. "Democracy, thus constituted, does not even attain its ostensible object, that of giving the powers of government in all cases to the numerical majority. It does something very different: it gives them to a majority of the majority; who may be, and often are, but a minority of the whole" (Mill, 1861; p.124),

This highlights that economic inequality is related to political participation and therefore to the democratic legitimacy. This is an outcome of the fact that the increasingly unequal distribution of income and wealth is hindering the

democratic system since economic inequality produces political inequality which, in turn, increases further the unequal distribution of income. Interestingly since 1980, the period of time where economic inequality has been steadily increasing, political participation has been declining, as reflected in the electoral participation. Franklin (2004) has observed that between the 1970s and the late 1990s participation rates have declined by an average of 4.4 percent for a number of democratic states. Furthermore, recent evidence from the Comparative Political Data Set suggests a more significant reduction of voters' turnout in parliamentary elections of roughly 13.5 percent from 1990 to 2011¹.

In light of the declining electoral participation and growing evidence on the inequities in the democratic system, this paper investigates the mechanism of the self-reinforcing nature of economic inequality. Specifically, the paper explores whether there is an interrelationship between economic and political exclusion in a unified framework. Using data from 28 OECD and EU-member countries over the period 1990-2011, the statistical analysis suggests that although wider political participation reduces economic inequality, economic inequality leads to political inactivity which, in turn, breeds further economic inequality. The findings offer an alternative explanation to that of Kelly and Enns (2010) and Barth et al. (2015) by highlighting a mechanism through which economic inequality is self-reinforcing, as it propels political exclusion of the lower rungs of the income distribution.

2. THE RELATIONSHIP OF ECONOMIC EQUALITY AND POLITICAL PARTICIPATION

A detailed review of the political theory regarding the effects of economic inequality and political participation is beyond the scope of this study. However, a brief literature review is presented below to highlight the relevant issues. From a theoretical perspective there are three competing theories on the relationship between economic inequality and political engagement and electoral participation.

Conflict theory assumes that in democracy all individuals have the same political skills and power to influence the political agenda. The political outcomes are the product of the majority (Meltzer and Richard, 1981) and therefore people's preferences over the extent of redistribution depend on their individual financial circumstances. The poor want to redistribute wealth while the rich do not. Thus the extent of redistribution depends on the median voter's preference, which is the decisive voter. Conflict theory suggests that higher economic inequality leads to greater electoral participation because the conflict between the preferences of the rich and the poor will increase.

Meltzer and Richard (1981) propose that with more democracy there is a shift in policy to reforms that favor the less well-off, increase redistribution and reduce inequality. The extension of political power to poorer segments of society can be perceived as a credible commitment to future redistribution favoring the less well-off (Acemoglu and Robinson, 2000). This might be viewed as a strategic decision by the political elites to defuse social unrest.

¹ Authors' calculations based on the Comparative Political Data Set III (1990-2011).

Nevertheless, the relationship between democracy, redistribution and inequality is a complex one (Acemoglu et al., 2015). Thus, different theoretical models are developed to capture the mechanisms through which the broadening of political power is related to inequality (Acemoglu and Robinson, 2006, 2008 ; Acemoglu, Robinson and Santos, 2013; Acemoglu, Robinson and Torvik, 2013).

Relative power theory argues that it is rational for the poor to abstain from voting, since they already know they have a very low probability of influencing the political process (Goodin and Dryzek, 1980; Lukes, [1974] 2005). The political landscape is mainly shaped by the interests of the wealthier rungs of the society (Solt, 2008). Hence, the poor lose interest in politics and refrain from participating. As a result there is a negative association between inequality and voter turnout.

Overall, the literature (Schattschneider, 1960; Goodin and Drysek 1980; Dahl, 2006; Solt, 2008) suggests that economic inequality reduces electoral participation. Goodin and Drysek (1980) point out that political power is highly determined by economic power thus the relatively poor are alienated from political participation. Nevertheless, recent studies (Brady, 2004; Oliver, 2001) argue that higher social inequality should be expected to increase political participation, because inequality entrenches the policy preferences of the poor and rich and therefore both groups become more militant than when inequality is moderate. Political theory suggests several mechanisms through which inequality poses an obstacle to political participation.

Furthermore, Alesina and La Ferrara (2002) suggest that inequality tends to affect public's trust. Trust in others is an implication of economic equality. When resources are distributed unequally, people at the different rungs of the economic ladder perceive that they do not share the same fate and therefore, trust between people of different backgrounds is severely curtailed. Hence, people who are distrustful of others tend to be less likely to participate in a wide range of activities including civic participation and political engagement (Boeckmann and Tyler, 2002; Uslaner and Brown, 2005). Furthermore, Marsden (1987), McPherson et al. (2001) point out that in fragmented societies individuals tend to associate with those who are similar to them. Hence, income inequality tends to work against political discourse since it makes it difficult for groups of individuals from different rungs of social strata to come into contact (Leighley, 1990; Huckfeldt et al., 2004). Finally, as inequality is associated with social exclusion, socially excluded groups are less likely to be mobilized than others.

In addition, resource theory that suggests that the level of political engagement and electoral participation depends on the resources, money and political skills, people have (Verba et al., 1995). Hence, *a priori*, changes in inequality would not necessarily have an impact on turnout. An increase in economic inequality may lead to an increase or decrease of turnout, depending on the income changes in absolute terms. Specifically, if all income groups are getting richer in absolute terms, then electoral participation will increase due to more resources, even if the poorest are getting poorer in relative terms, so inequality increases.

Contrary to the conflicting predictions of the above theories there appears to be some consensus in the empirical literature which highlights that economic inequality have an adverse effect on electoral participation. Political participation increases with income, so higher-income individuals are more likely to participate

in the electoral process (Rosenstone and Hansen, 1993). Furthermore, the political weight may not necessarily be a function of absolute income, but rather of voter's rank in the income distribution (Bénabou, 2000). Thus, Goodin and Drysek (1980) point out that political power is highly determined by economic power, and thus the relatively poor are alienated from political participation. They further show that across countries, the Gini coefficient is inversely related to voter turnout. This finding is further supported by a number of studies where inequality is found to be associated with declining electoral participation within a country, or across regions or advanced industrialized countries (Merrifield, 1993; Mahler, 2002; Boix, 2003; Dahl, 2006; Lister, 2007). More recently, Solt (2008) uses individual level survey data for several Western countries to conclude that individuals living in more unequal societies are less likely to vote and, importantly, he shows that aggregate inequality affects the electoral participation of the poor far more than that of the rich.

However, an important implication of the above is that declining electoral participation should be expected to feedback to the level of inequality. One should consider that a key characteristic of a democracy is that the government should respond to the preferences of the citizens who are considered as political equals (Dahl, 1971). However, all citizens are not considered as political equals by policy-makers. It is by now well established (Wolfinger and Rosenstone, 1980; Verba *et al.* 1995) that there is a disparity in political participation based on the position of the individual or group in the economic strata and that inequality in political activity is associated with inequalities in the responsiveness of the political establishment. It appears that the political process evolves in ways that on the one hand favors those at the higher rungs of the income distribution and, on the other, disfavor the interests of those with more modest means. Low-income citizens receive considerably worse representation of their preferences (Bartels, 2008; Flavin, 2012; Gilens, 2012; Rigby and Wright, 2013; Gilens and Page, 2014). First, lobbying activities by corporations and business and professional organizations outperform public interest groups and trade unions, the membership of which has sharply declined over the past several decades. Second, notwithstanding that wealthier and well-educated individuals are more likely to have more well-formulated and well-informed preferences compared to the poor and the less-educated; the poor are also less likely to turn out to vote or to participate in the political process. Hence, disparities in political capital and action downgrade the value of the social groups at the lower rungs of income distribution for the political establishment.

In effect, the higher the inequality, the less the voting turnout is. This causes a reduction of the ability of those at the lower segments of the income distribution to promote their economic interests. This, in turn, further increases inequality. Hence, "rising economic inequality will solidify longstanding disparities in political voice and influence, and perhaps exacerbate such disparities" (Task Force on Inequality and American Democracy, APSA Task Force, 2004, p. 662).

A number of studies have investigated how electoral participation affects government policies related to welfare and redistribution. This literature reveals that average electoral turnout is positively related to government redistribution in developed democracies (Hill, Leighley, and Hinton-Andersson, 1995; Iversen, 2005; Kenworthy and Pontusson, 2005; Mahler, 2008; Brady, 2009; Lupu and

Pontusson, 2011), and it is associated with a more equal distribution of income (Mueller and Stratmann, 2003). Importantly, studies highlight that it is not only average turnout that matters, but also who votes. Thus, although overall larger electoral participation reduces inequality and increases redistribution, there is a marked income bias in voter turnout. A greater income bias in turnout, i.e. greater electoral participation of the higher income compared to the lower income groups, is negatively related to transfer redistribution (Mahler et al. 2015) and positively related to income inequality (Avery, 2015).

3. DATA

To explore the relationship between electoral participation and inequality, country-level data with information on the political and institutional arrangements, the economic policies pursued and the level of inequality is required. The Comparative Political Data Set III (CPDS III) 1990-2011 is a collection of political and institutional data (Armingeon et al., 2013). This data set consists of annual data for a group of 35 OECD and/or EU-member countries for the period 1990-2011. CPDS III contains information on the political system and institutions, the level of electoral participation in the parliamentary elections, and fiscal and social policies adopted in each country. The key variable of interest is electoral participation defined as the voter turnout in the parliamentary election (lower house), as a percentages of the electorate.

Data on income inequality are obtained from OECD², where four alternative measures are selected. These are the Gini coefficient, the P90/P10 ratio, the P50/P10 ratio and the Palma ratio³. The Gini coefficient measures the extent to which the distribution of income among individuals or households within an economy deviates from a perfectly equal distribution, based on the comparison of cumulative proportions of the population against cumulative proportions of income they receive. It ranges between 0 in the case of perfect equality and 100 in the case of perfect inequality.

The Gini coefficient is perhaps the most widely used measure of inequality. It describes overall inequality within a particular society and can be readily used to make comparisons across different societies. However, it does not provide any information about the origin of inequality; whether it is due to the upper, middle or bottom part of the distribution. Hence, two societies with very similar Gini coefficients can still have very different income distributions. Hence, inequality measures based on income ratios are also used, which may be more insightful about the origin of inequality. In contrast to the Gini coefficient, income ratios do not describe the whole income distribution, but capture two points of that distribution. The P90/P10 ratio is the ratio of the upper bound value of the ninth decile (the 10 percent of people with highest income) to that of the upper bound value of the first

² Source: <https://stats.oecd.org/Index.aspx?DataSetCode=IDD>

³ This study utilizes inequality indicators but it draws no conclusions regarding the social welfare function. Hence, the measures of inequality used in this study do not satisfy the Pigou-Dalton condition of social welfare function. This states that all other things being equal a transfer of utility from the rich to the poor is desired, as long as it does not bring the rich to a poorer situation than the poor.

TABLE 1
DESCRIPTIVE STATISTICS

	Mean (SD)	Definition
Gini	29.427 (4.228)	The Gini coefficient is based on the comparison of cumulative proportions of the population against cumulative proportions of income they receive, and it ranges between 0 in the case of perfect equality and 100 in the case of perfect inequality
P90/P10	3.744 (0.778)	The P90/P10 ratio is the ratio of the upper bound value of the ninth decile (i.e. the 10% of people with highest income) to that of the upper bound value of the first decile
P50/P10	1.991 (0.241)	The P50/P10 ratio is the ratio of the median income to that of the upper bound value of the first decile
Palma ratio	1.090 (0.223)	The Palma ratio is the share of all income received by the 10% people with highest disposable income divided by the share of all income received by the 40% people with the lowest disposable income
Electoral participation	69.904 (13.101)	Voter turnout in the latest parliamentary election

decile, and the P50/10 is defined respectively. Both selected income ratios refer to the bottom of the income ladder, the poorest 10 percent. Finally, the Palma ratio is the share of all income received by the 10 percent people with highest disposable income divided by the share of all income received by the 40 percent people with the lowest disposable income. It focuses on the middle 50 percent that tends to capture around 50 percent of Gross Net Income (Palma, 2011). Descriptive statistics of the four inequality measures are provided in Table 1. The variables of interest are not available for all 35 countries in CPDS III, and so the sample includes 28 countries⁴.

Figures 1–4 provide plots of the country average of each measure of income inequality used in this paper. All four figures reveal that the Scandinavian countries have the most egalitarian distribution of income, in contrast to the USA, Japan and the UK with the highest level of income inequality. Income inequality is also high for Greece, Spain and Portugal, countries most severely hit by the repercussions of the austerity policies after the 2008 Great Recession.

In Figure 5, the country average of each of the four measures of inequality is plotted against the country average of electoral participation covering the elections during the period 1990-2011, along with a fitted line and the 95 percent confidence interval. Regardless to which measure of inequality is used, the raw data suggest a negative relationship between the two variables.

⁴Data are available for the following 28 countries: Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, UK and USA.

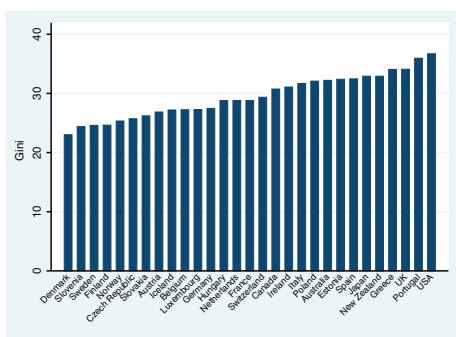


Figure 1. Gini coefficient.

Notes: Country averages of Gini coefficient for the period 1990-2011, based on authors' calculations. [Colour figure can be viewed at wileyonlinelibrary.com]

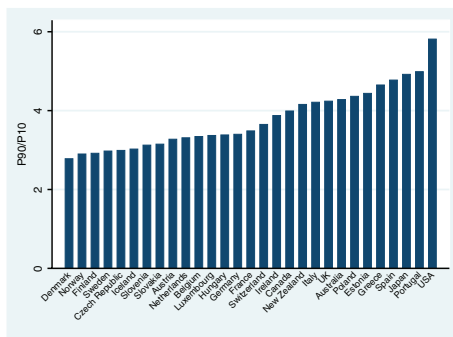


Figure 2. P90/P10 ratio.

Notes: Country averages of P90/P10 ratio for the period 1990-2011, based on authors' calculations. [Colour figure can be viewed at wileyonlinelibrary.com]

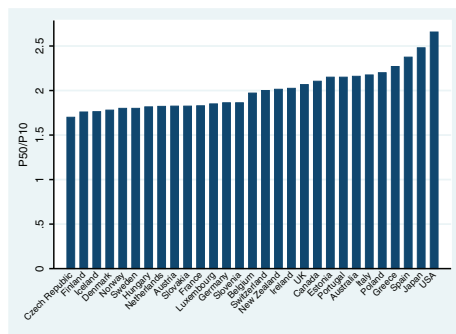


Figure 3. P50/P10 ratio.

Notes: Country averages of P50/P10 ratio for the period 1990-2011, based on authors' calculations. [Colour figure can be viewed at wileyonlinelibrary.com]

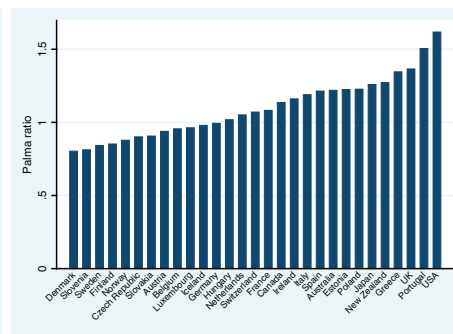


Figure 4. Palma ratio.

Notes: Country averages of Palma ratio for the period 1990-2011, based on authors' calculations. [Colour figure can be viewed at wileyonlinelibrary.com]

4. EMPIRICAL STRATEGY

The aim of the study is to identify the mechanisms driving the negative correlation between income inequality and political participation, as depicted in Figure 5. The *a priori* expectation is that individuals' participation in parliamentary elections affects political outcomes, and consequently, directly or indirectly, it influences policies that are related to the distribution of income within the society. In addition, existing levels of income inequality affect people's decision to vote. Therefore, there is a two-way relationship between income inequality and political participation. However, one idiosyncratic feature of this relationship is that the realization of electoral participation is assessed at a specific point in time, namely during the elections, while income inequality manifests itself over a period of time after the elections take place, implying an unspecified and staggered lagged effect. Similarly, the effects of inequality on the next rounds of political participation as reflected on the electoral outcome may also

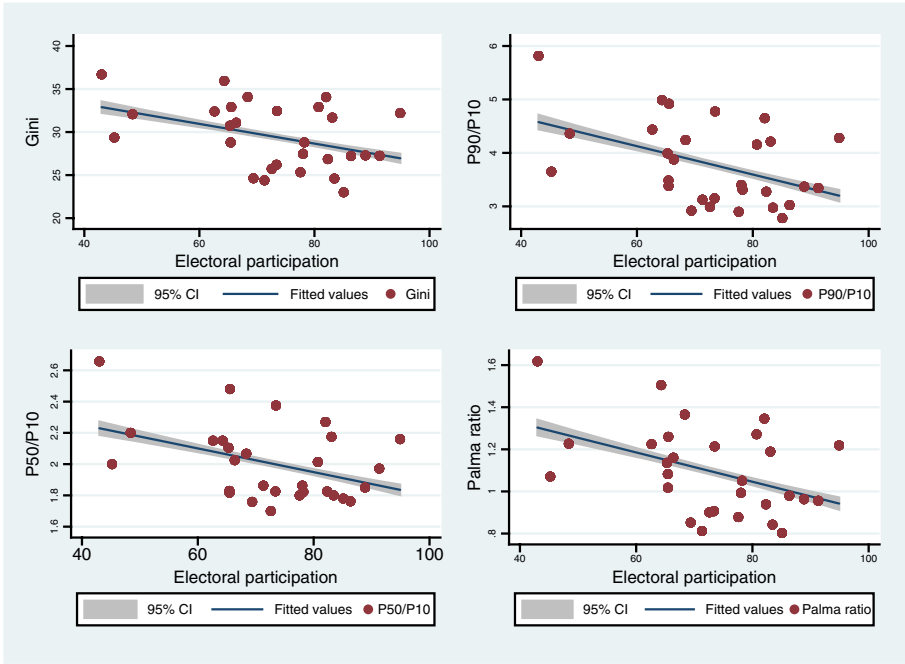


Figure 5. Inequality and electoral participation.

Notes: Country mean income inequality plotted with country mean electoral participation for the period 1990-2011, observation points with fitted line and 95% confidence interval, based on authors' calculations. [Colour figure can be viewed at wileyonlinelibrary.com]

take an unspecified and staggered fashion to manifest itself. This becomes far more complex when this relationship is examined in a cross country framework. Hence, this simultaneous nature of the evolution of the electoral participation – income inequality interrelationship cannot be modeled within the conventional simultaneous equations statistical context.

To circumvent this difficulty this paper specifies two independent equations: one describing the effect of electoral participation on inequality for the years following an election and one examining the effect of past inequality on political participation at the time of the elections. Therefore, the inequality equation can be described as

$$(1) \quad I_{it} = \alpha + \beta P_{ie} + X_{it}\gamma + v_{it}$$

where I refers to inequality for country i in period t , P is the level of electoral participation in the latest parliamentary elections that took place in period e , where $t > e$, and X is a vector of other covariates that captures labor market institutional arrangements, overall economic conditions and redistributive policies. The inequality equation is estimated for the years after a parliamentary election, without considering the year of the election⁵. The term, v , is the error term that consists of two

⁵ The year of the election is not considered since the income inequality measure may be calculated before or after the election, and thus it is more difficult to discuss about causality in the election years.

components, an unobserved country specific and time-invariant component, θ_i , and a random error component, ε_{it} .

The electoral participation equation is described by

$$(2) \quad P_{ie} = \delta + \kappa I_{ie-1} + \mathbf{Y}_{ie-1} \zeta + z_{ie}$$

where \mathbf{Y} is a vector of other covariates including electoral rules, and economic conditions prior to the year of the election. Similar to v in equation (1), the error term, z , contains an unobserved time-invariant country-specific component, ϕ_i and a random error component, ω_{ie} . The explanatory variables in the electoral participation are measured the year before the election took place and the equation is estimated only for the years where a parliamentary election took place. The simultaneous relationships between electoral participation and economic inequality are empirically investigated using four alternative estimation procedures.

A candidate estimator for equations (1) and (2) is a fixed-effects estimator that has the intuitive appeal of controlling for unobserved country-specific characteristics, especially when there is a concern that the between-group variation is contaminated with unobserved heterogeneity. However, one main limitation is that fixed-effects estimation assumes that the country effect is fixed over time, an assumption that is unlikely to be satisfied over the period of 22 years covered in the data. Furthermore, if most of the true variation in the variables of interest, economic inequality and electoral participation, is cross-sectional, the fixed-effects estimator removes the true variation, leaving mainly variations in possible measurement errors (Griliches and Hausman, 1986). Therefore, a potential limitation of fixed-effects regression is that it cannot capture the effects of variables that have little within-group variation. Further, the fixed-effects approach uses only the within-group variation. Hence, any time-invariant observable characteristics also differenced out, so that their coefficients cannot be identified, with the effects of invariant factors simply combined into a single fixed-effect. A further shortcoming of the fixed-effects estimator is that it cannot remove the resulting biases from omitted relevant time-varying factors, simultaneous responses to idiosyncratic shocks, or measurement errors.

An alternative estimator that addresses some of the potential limitations of fixed-effects is the instrumental variables approach. This method relies on the identification of valid instruments. The exclusion restriction conditions for valid instruments require instrumental variables to be correlated with the causal (suspected to be endogenous) variable and uncorrelated with any other determinant of the dependent variable. However, it is often difficult to find convincing instruments that satisfy these two requirements. In addition, the regression outcome can be severely biased if the chosen instruments are weakly correlated with the endogenous variable. A further issue is that the instrumental variables method assumes monotonicity that implies that the direction of the effect of the instrument on the endogenous variable is the same for everyone in the sample. Therefore, while the instrument may have no effect on a sub-group of the sample, “non-takers” and “always-takers,” all those who are affected, “compliers”, are affected in the same way. An implication of this assumption is that the estimated effect is the average treatment for those whose treatment status changed by the instruments (the

compliers), which is called the “local average treatment effect”. Hence the instrumental variable regression may not be informative about treatment effects on the never-takers or always-takers.

In view of the above, a third estimator this paper employs is the Mundlak (1978) methodology. Greene (2008) argues that Mundlak formulation retains the random effects specification but it also appropriately deals with the problem of any correlation between the unobserved effects and the regressors. In effect, the Mundlak specification provides a fixed-effect estimator (Greene, 2008, pp. 209–10; Hsiao, 1989, p. 45). In addition, Egger and Pfaffermayr (2002) demonstrate using Monte Carlo simulations that the Mundlak model provides an approximation of the temporary and permanent effects, when inference a dynamic model is not feasible. Using Mundlak’s decomposition one can assume that a subset of the country characteristics, electoral participation and inequality in equations (1) and (2) respectively, are correlated with a part of the country random effect. This correlation operates through the mean value of the time-varying set of variables over the sample lifetime. The Mundlak methodology retains the econometrically “correct” fixed-effect structure through the inclusion of the mean values of the regressors that are fixed for each country over time. This circumvents the problem of correlations between unobserved state-specific effects and the regressors. Indeed, the Mundlak methodology offers an economically interpretable fixed-effect, since changes in this “fixed-effect” correspond to changes in average of the variables of interest. In view of the above, the equations to be estimated are:

$$(3) \quad I_{it} = \alpha + \beta P_{ie} + \bar{\beta} \bar{P}_i + X_{it} \gamma + \bar{X}_i \bar{\gamma} + \theta_i + \varepsilon_{it}$$

and

$$(4) \quad P_{ie} = \delta + \kappa I_{ie-1} + \bar{\kappa} \bar{I}_i + Y_{ie-1} \zeta + \bar{Y}_i \bar{\zeta} + \phi_i + \omega_{ie}$$

where \bar{P} , \bar{I} , \bar{X} and \bar{Y} are the country averages over the sample period. The estimated coefficients of the level variables represent the within-groups effects, whilst the between-groups effects are identified by the coefficients of the mean variables.

The available longitudinal data allows the decomposition of the estimated effects to country permanent differences in the explanatory variables and country transitory changes. The permanent–transitory decomposition using the Mundlak methodology is appealing especially if the impact of electoral participation (inequality) on inequality (electoral participation) is not contemporaneous and may take a long time to manifest itself. The transitory and permanent effects can be identified by using the variable transformation, suggested by van Praag, Frijters and Ferrer-i-Carbonell (2003) and Ferrer-i-Carbonell (2005), which transforms equations (3) and (4) to:

$$(5) \quad I_{it} = \alpha + \beta (P_{ie} - \bar{P}_i) + (\beta + \bar{\beta}) \bar{P}_i + (X_{it} - \bar{X}_i) \gamma + \bar{X}_i (\gamma + \bar{\gamma}) + \theta_i + \varepsilon_{it}$$

and

$$(6) \quad P_{ie} = \delta + \kappa (I_{ie-1} - \bar{I}_i) + (\kappa + \bar{\kappa}) \bar{I}_i + (Y_{ie-1} - \bar{Y}_i) \zeta + \bar{Y}_i (\zeta + \bar{\zeta}) + \phi_i + \omega_{ie}$$

The coefficients β , γ , κ and ζ reflect the transitory effects and the coefficients $(\beta + \bar{\beta})$, $(\gamma + \bar{\gamma})$, $(\kappa + \bar{\kappa})$ and $(\zeta + \bar{\zeta})$ the corresponding permanent effects. Equations (5) and (6) are estimated by random effects.

One potential issue with the Mundlak methodology is that there may still be concerns of endogeneity bias in the estimates if some independent variables, in our case electoral participation in equation (5) and inequality in equation (6), may correlate with the country-level random effects. Hausman and Taylor (1981) show that in cases where there are both time-variant and time-invariant variables of interest, consistent estimation of the coefficients of interest is possible, if not all of the time-varying coefficients are correlated with the unobserved heterogeneity. The basic idea is to use the group means of the time-varying variables that are uncorrelated with the unobserved heterogeneity as instruments for the time-invariant variables to obtain consistent estimates of their coefficients, while consistent estimates of the time-varying variable coefficients can be obtained using standard fixed-effects estimation. This requires that there are at least as many uncorrelated, exogenous, time-varying variables as correlated time-invariant variables and also that there is suitable correlation between these. Therefore, in order to deal with the potential bias, the Hausman-Taylor approach is used on a specification very similar to the Mundlak specification to test whether the results are robust to this type of endogeneity.

5. RESULTS AND DISCUSSION

5.1. *The Effect of Electoral Participation on Inequality*

The effect of electoral participation on income inequality is investigated empirically using the four identification strategies proposed above, a fixed-effects regression, an instrumental variable with fixed-effects estimator, a random effects Mundlak approach with a transitory-permanent decomposition, and a Hausman-Taylor estimator using the same transitory-permanent framework. The regression specification used for the electoral participation includes controls for union membership, union density, employment protection strictness, unemployment rate, GDP and population growth. Governments can affect the distribution of income through taxation and transfers. Thus, tax revenue of social security funds (as a percentage of GDP), social benefits other than social transfers in kind (as a percentage of GDP), and total tax revenues (as a percentage of GDP) are included⁶ to explain the distribution of income in a country, as measured by the inequality measure. Similar explanatory variables are used routinely as control variables in the literature (e.g. Mueller and Stratmann, 2003). The results are summarized in Table 2.

The estimates from the fixed-effects regression and the instrumental variables with fixed-effects regression are presented in the first two columns. Columns (III)

⁶ The full set of estimates is available upon request from the authors.

and (IV) refer to the random effects with Mundlak terms, where there are two coefficients reported, one on the transitory effect of electoral participation and one on the permanent effect, β and $\beta + \beta$ using the notation above. The last two columns, (V) and (VI), present the results from the Hausman-Taylor estimator that address the issue of potential endogeneity bias. Table 2 is divided into four panels, one for each income inequality measure. Therefore, the dependent variable in panel (i) is the Gini coefficient, whereas the P90/P10 ratio is in panel (ii), the P50/P10 ratio in panel (iii), and the Palma ratio in panel (iv).

The results from the fixed-effect regression suggest that electoral participation has a negative effect on all four measures of economic inequality considered. A wider participation in parliamentary elections is found to reduce inequality, a result that is consistent with the limited empirical evidence on the effect of political participation on economic welfare (Mueller and Stratmann, 2003). Specifically, the estimates suggest that an increase in electoral participation by one standard deviation leads to a reduction in all four measures of inequality of around twenty percent of a standard deviation.

To address some of the limitations of the fixed-effects estimates, the equations are re-estimated using an instrumental variables regression. For the first three measures of income inequality, the instruments used for political participation are an index of electoral fractionalization of the party-system, and a variable that indicates whether it is a parliamentary, semi-presidential, presidential or hybrid system. The instruments used for the Palma ratio equation are an index of electoral fractionalization of the party-system, a variable for consensus democracy based on Lijphart's first dimension "Parties-executives", and an indicator regarding the proportionality of the electoral system.

The exogeneity of the instruments in an exactly identified model cannot be tested. Hence, the exclusion restrictions, required for identification, are assumed to be valid. However, when the model is overidentified, as in this case, it is possible to perform a test for the validity of the overidentifying restrictions using the Sargan-Hansen test. The Sargan-Hansen test assumes that there are enough valid instruments for the model to be identified and tests whether the remaining instruments are also valid. The Sargan-Hansen test of overidentifying restrictions, presented in Table 2, provides evidence on the validity of the overidentifying instruments. The joint null hypothesis is that the overidentifying instruments are uncorrelated with the error term. A rejection would cast doubt on their validity. The estimated effect of electoral participation on economic inequality retains its negative sign, although the effect is statistically significant only when the inequality is measured by the Gini coefficient or the Palma ratio⁷. This result may be an outcome of the inevitable efficiency loss associated with the instrumental variables estimator and the resulting larger standard errors. Hence, it is always useful to statistically assess whether the instrumental variables estimation is required. To test this under the null hypothesis that the specified endogenous regressors can be treated as exogenous, a Durbin-Wu-Hausman test of endogeneity of regressors is performed and presented in Table 2. The results for the equations using the Gini coefficient, the

⁷ The difference in the magnitude of the estimated effects between the instrumental variables and the fixed-effects regression may be attributed to the fact that the former estimator identifies local average treatment effects that correspond to the group of "compliers" only.

TABLE 2
THE EFFECT OF ELECTORAL PARTICIPATION ON INCOME INEQUALITY

	(I)	(II)	(III)	(IV)	(V)	(VI)
	FE Overall	IV-FE Overall	RE Mundlak Transitory	RE Mundlak Permanent	RE Hausman-Taylor Transitory	RE Hausman-Taylor Permanent
(i) Inequality measure: Gini coefficient						
Electoral participation	-0.052** (-2.37)	-0.119* (-1.82)	-0.043** (-2.06)	-0.037 (-0.66)	-0.042** (-2.01)	-0.019 (-0.24)
Overidentification test (X^2)		0.340			9.638	
Endogeneity test (X^2)		0.560				
N	190	187	186		186	
(ii) Inequality measure: P90/P10						
Electoral participation	-0.013*** (-2.84)	-0.008 (-0.67)	-0.013*** (-2.68)	-0.009 (-1.08)	-0.013*** (-2.83)	-0.018 (-1.54)
Overidentification test (X^2)		0.034			9.563	
Endogeneity test (X^2)		0.159				
N	158	155	154		154	
(iii) Inequality measure: P50/P10						
Electoral participation	-0.004** (-2.27)	-0.004 (-0.85)	-0.003 (-1.50)	-0.003 (-1.44)	-0.004** (-2.22)	-0.006* (-1.69)
Overidentification test (X^2)		0.017			9.772	
Endogeneity test (X^2)		0				
N	158	155	154		154	
(iv) Inequality measure: Palma ratio						
Electoral participation	-0.004*** (-2.68)	-0.007* (-1.88)	-0.004** (-2.42)	-0.003 (-1.02)	-0.004** (-2.41)	-0.006 (-1.53)
Overidentification test (X^2)		2.177			9.701	
Endogeneity test (X^2)		5.061**				
N	158	123	154		154	

Notes: (i) The table reports coefficients with *t* statistics in parentheses; (ii) the level of significance is denoted as follows: * *p* < 0.1, ** *p* < 0.05, *** *p* < 0.01; (iii) controls for union membership and union density, employment protection strictness, unemployment rate, GDP growth, population growth, revenue of social security funds (percentage of GDP), social benefits other than social transfers in kind (percentage of GDP), and total tax revenues (percentage of GDP) are also included.

P90/P10 ratio and the P50/P10 ratio do not provide any evidence that electoral participation is endogenous. It is only when economic inequality is measured by the Palma ratio that the electoral participation appears to be endogenous. Therefore, although the chosen exclusion restrictions appear to be valid instruments, there is very limited evidence that the instrumental variables approach is required. These findings may also be taken to reflect the complicated nature of the estimated relationship discussed above.

The estimates based on random effects with Mundlak transitory and permanent decomposition terms, presented in columns (III) and (IV), indicate that electoral participation has a transitory negative effect on income inequality, which is of similar magnitude to that estimated with fixed-effects regression. Yet no permanent effects turn out to be statistically significant. This may be taken to imply that since elections normally take place at frequent intervals, it is voters' participation at the most recent elections that have the most significant impact. For robustness purposes, the model is re-estimated using the Hausman-Taylor approach that controls for potential endogeneity bias in the estimated coefficients of interest. The results remain the same, with the evidence suggesting the existence of a transitory effect of voters' participation on income inequality. The over-identification test also reported in Table 2 provides support to the exogeneity hypothesis of the generated instruments by the Hausman-Taylor method. The results from the four alternative estimation strategies employed are remarkably robust and suggest that larger electoral participation may lead to more egalitarian distribution of income in the society.

5.2. *The Effect of Inequality on Electoral Participation*

The results regarding the effect of inequality on electoral participation are summarized in Table 3 which has the same structure as Table 2. The specification of the estimated regression equation is comparable to models commonly used in the literature (e.g. Mueller and Stratmann, 2003; Fumagalli and Narciso, 2012). Electoral rules and constitutions might affect voters' participation, thus controls for the parliamentary system, compulsory voting legislation⁸, federalism, and proportional representation are included. In addition, the population growth is also included since countries with growing population have a relatively higher incidence of younger voters who, as literature shows, are expected to have lower participation (Mueller and Stratmann, 2003). Furthermore, GDP growth and the unemployment rate are also included in the regressions to capture the level of economic activity for the year of the elections.

The fixed-effects results, column (I) in Table 3, suggest that individuals participate less in the electoral process when there is higher income inequality. Regardless of which measure of income inequality is considered, an increase in income inequality by one standard deviation results in a reduction in political participation by around 4 units, one third of a standard deviation.

The results are confirmed by the instrumental variables estimates, column (II) in Table 3. Voter turnout is lower in countries with more unequal distribution of

⁸ Source: <https://www.idea.int/uid/fieldview.cfm?field=300>

TABLE 3
THE EFFECT OF INCOME INEQUALITY ON ELECTORAL PARTICIPATION

	(I)	(II)	(III)	(IV)	(V)	(VI)
	FE	IV-FE	RE Mundlak	RE Hausman-Taylor	RE Hausman-Taylor	RE Hausman-Taylor
	Overall	Overall	Transitory	Permanent	Transitory	Permanent
(i) Electoral Participation						
Gini(t-1)	-1.065*** (-2.72)	-1.524*** (-2.61)	-1.025*** (-2.79)	-1.315** (-2.58)	-1.030*** (-2.60)	-1.22 (-1.12)
Overidentification test (X^2)						
Endogeneity test (X^2)		1.77			2.809	
N	84	79	84		84	
(ii) Electoral Participation						
P90/P10(t-1)	-5.073*** (-3.52)	-6.246*** (-3.11)	-4.963*** (-3.59)	-7.605*** (-3.36)	-4.923*** (-3.30)	-3.743 (-0.80)
Overidentification test (X^2)		0.226			2.701	
Endogeneity test (X^2)		0.64				
N	68	63	68		68	
(iii) Electoral Participation						
P50/P10(t-1)	-12.68*** (-3.18)	-17.53*** (-3.01)	-12.72*** (-3.32)	-25.04*** (-3.44)	-12.43*** (-2.93)	-7.351 (-0.38)
Overidentification test (X^2)		0.138			2.587	
Endogeneity test (X^2)		0.7102				
N	68	63	68		68	
(iv) Electoral Participation						
Palma ratio(t-1)	-17.668*** (-3.74)	-20.337** (-2.83)	-17.430*** (-3.92)	-25.745*** (-2.93)	-17.287*** (-3.58)	-17.857 (-1.10)
Overidentification test (X^2)		2.295			2.235	
Endogeneity test (X^2)		0.225				
N	68	63	68		68	

Notes: (i) The table reports coefficients with t statistics in parentheses; (ii) the level of significance is denoted as follows: * p < 0.1, ** p < 0.05, *** p < 0.01; (iii) controls for parliamentary system, compulsory voting legislation, federalism, proportional representation, unemployment rate (at t-1), GDP growth (at t-1), and population growth (at t-1) are also included.

income. The instruments used for the Gini coefficient are the social benefits other than social transfers in kind (as a percentage of GDP), the percentage of women in parliaments, and total tax revenues (as a percentage of GDP). For the other three measures of income inequality the chosen instruments are the total tax revenues (as a percentage of GDP) and the annual deficit (as a percentage of GDP). The Sargan-Hansen overidentification test supports the exclusion restriction conditions of the instruments and supports the assumption that they are uncorrelated with the error term. The endogeneity tests performed do not suggest that any of the four measures of income inequality is endogenous in the estimated electoral participation equation. This, in turn, suggests that the use of instrumental variables is not statistically supported.

The transitory and permanent effects of inequality on electoral participation are explored with the use of random effects regression with Mundlak terms, columns (III) and (IV). The estimates reveal that income inequality has a negative transitory effect on electoral participation of similar magnitude to that estimated by fixed-effects. In addition, there also appears to be a negative permanent inequality effect.

As a robustness check, the model using the Hausman-Taylor approach is estimated (last two columns). Although income inequality does not appear to exhibit any permanent effect on the electoral participation, the negative transitory effect is statistically significant. In addition, the over-identification test supports the exogeneity hypothesis of the identifying restrictions.

Therefore, the empirical evidence offered in this paper suggests that when there is higher income inequality, there is lower electoral participation (Table 3). Lower electoral participation is found to increase income inequality (Table 2). The above results from both the estimated equations taken together reveal that there is a vicious cycle where unequal distribution of income leads to more inequality through reducing the electoral participation of the poorer groups in a society. As the estimates suggest, an increase in income inequality by a standard deviation will trigger a reduction to electoral participation by one third of a standard deviation which itself will lead to a further increase in income inequality of around 10 percent of a standard deviation. This highlights John Stuart Mill's argument (Mill, 1861) that unless there is a proportional representation of all people, the government will serve the interests of a privileged minority.

6. CONCLUSION

Over the last three decades there has been a notable increase in economic inequality accompanied by a decline in political participation in many advanced countries. A number of studies in the economics and politics literature explore this negative association between inequality and political participation. This paper explores whether there is mechanism of self-reinforcing economic inequality through the political inactivity and exclusion of people from the democratic processes, as proposed by Bartels (2008). The evidence suggests that although wider participation in parliamentary elections reduces economic inequality, a more disperse distribution of income has an adverse effect on electoral participation.

The empirical results, therefore, imply that there is an interrelationship where economic inequality leads to lower political participation, which subsequently leads to greater inequality. This study contributes to the recent literature on the self-reinforcing nature of economic inequality (Kelly and Enns, 2010; Barth et al., 2015) by highlighting a mechanism linking income inequality and electoral participation, that of political exclusion. Democratic processes are fundamental for the existence of egalitarian societies. However, unless there is wide participation in the political process from all the segments of the society and all rungs of the socio-economic ladder, inequitable distribution of income will perpetuate.

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