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## **ON COMPULSORY VOTING AND INCOME INEQUALITY IN A CROSS-SECTION OF COUNTRIES**

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## **Abstract<sup>1</sup>**

This paper explores the link between compulsory voting and income distribution using a cross-section of countries around the world. Our empirical cross-country analysis for 91 countries during the period 1960-2000 shows that compulsory voting, when enforced strictly, improves income distribution, as measured by the Gini coefficient and the bottom income quintiles of the population. Our findings are robust to changes and additions to our benchmark specification. Since poorer countries suffer from relatively greater income inequality, it might make sense to promote such voting schemes in developing regions such as Latin America. This proposal assumes that bureaucratic costs related with design and implementation are not excessive.

**JEL Classification Numbers:** D31, O17, KOO

**Keywords:** Democracy, Income Distribution, Gini, Governance, Poverty, Development.

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## 1. Introduction

One crucial, but largely overlooked, feature of many democracies around the world relates to the issue of compulsory voting. While democracies allow free will and free choice to societies, compulsory voting undermines such free will and free choice by not allowing voters to choose not to vote. This apparent contradiction stems from the idea that voter turnout should be increased so that societies will become better represented; compulsory voting rules are the mechanism for achieving this objective. According to conventional wisdom, since the poor are less likely to go to the polls, elected leaders do not cater to their needs, which ends up skewing the distribution of income against them. This is particularly true in developing countries. While it is true that mandatory voting redefines the ownership of the electoral process, questions the fundamental issue of free choice, and puts additional responsibility for the voting process on the government rather than on the voter, the potential benefits of compulsory voting rules remain sufficiently attractive for policymakers to regularly reassess the convenience of adopting such voting schemes.

This analysis is remarkable given the long-held belief that democratic structures lead to elections that serve as an outlet for a democratic struggle in which citizens vote for parties that appeal to the deprived. For instance, Lipset (1959) argues that extending the franchise in the last hundred years has increased political competition in societies by moving the political process to the left, with the potential of reducing income inequality. Similarly, Lenski (1983) argues that democracy redistributes power in favor of the disadvantaged, who are the majority in society. He also posits that this increased political equality leads to greater social equality as well, as the typical electoral demand has been for a more egalitarian distribution of goods. Furthermore, Bollen and Jackman (1985) argue that democracy can reduce the potentially negative impact of authoritarian regimes on inequality. For example, if an autocratic regime includes representatives of the land-owning class, chances are that land-reform programs aimed at reducing wealth inequality will not be pursued. In recent years, Bourguignon and Verdier (2000), Acemoglu and Robinson (2000), Chong (2003), and others, have shown that extending democracy to the masses may first produce an increase in income inequality before it produces an improvement in income distribution. An inverse U-shape relationship between democracy and inequality may thus exist.

With partial democratization, on the other hand, there is little redistribution and consequently an increase in inequality. However, as social pressure grows or as more individuals

are educated, the franchise is extended and the elite sees its political power diluted by the now larger voting group who vote for further redistribution, which yields a reduction in inequality. Similarly, if the regime includes capitalists, it is likely that labor strikes for better wages will be more easily repressed. Thus, according to this idea, democratization is linked with a decrease in income and worsening wealth inequality. Similarly, Meltzer and Richards (1981) argue that elections are the means to aggregate preferences and decide the equilibrium tax rate, and hence determine redistribution policy. If voters demand higher re-distributive taxes, democratization is a means of achieving lower inequality.

The crucial issue is that, regardless of the theoretical validity of this notion, in practice democracies may not necessarily improve income distribution in the short run, or at all. Even if democracies do succeed in reducing inequality, they may not do so to the extent that policymakers expect or desire. In fact, the ultimate objective of fair representation is for governments to provide their constituencies with their wants and needs, and this should be reflected in the welfare of the corresponding groups. Nonetheless, those who would benefit the most by voting tend not to vote, as their transaction costs tend to be extremely high. Furthermore, the marginal impact of a single voter's choices, especially in non-urban areas, is rightly or wrongly perceived as inconsequential. This biases individuals' cost-benefit calculation against voting, as individuals do not adequately assess the positive externalities of voting outcomes, which are typically not internalized in the utility functions of the voter.<sup>2</sup> In this context, compulsory voting mechanisms have been encouraged to make voting turnout more representative of the democratic process.<sup>3</sup>

Surprisingly, to the best of our knowledge, the relationship between compulsory voting and income inequality has not been explored in the empirical literature despite the fact that it is by no means obvious that mandatory voting laws, regulations, and enforcement yield an improvement in the distribution of income. The contribution of this paper is to provide empirical evidence that may help establish the relationship between compulsory voting and income inequality. As explained above, from an empirical perspective there are no available studies that

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<sup>2</sup> There is some research on compulsory voting in *small elections*, such as department meetings and the like, where the positive externality of voting for each vote is high. The results nonetheless tend to be ambiguous. In some cases voluntary voting Pareto-dominates compulsory voting, while in others the opposite happens, and for some researchers multiple equilibria exist (Borgers, 2004).

<sup>3</sup> In fact, compulsory voting is not a new concept. Some of the first countries to introduce mandatory voting laws were Switzerland in 1904 and Argentina in 1914.

focus on this question. Furthermore, there are extremely few studies that use compulsory voting data on formal empirical analysis. A seminal study is Crain and Leonard (1993) who focus on the effects of compulsory laws on the size of government expenditures, concluding that the end effect is an increase in expenditures. O'Toole and Strobl (1995) further explore the findings by Crain and Leonard (1993) and find that the effect is on the *composition* of expenditures, more than on the *level* of expenditures. Since compulsory voting laws aim at producing an increase in expenditures on social and welfare programs, this research may be viewed as a further extension of this unique literature.<sup>4</sup>

The paper is organized as follows. Section 2 briefly reviews recent alternative theories that explain a link between compulsory voting and welfare. Section 3 presents the methodology and the data. This section provides some basic empirical regularities of the data. Section 4 presents formal empirical evidence and introduces two types of robustness tests on the basic findings. Finally, Section 5 concludes.

## **2. The Case for Compulsory Voting**

As explained above, the case for compulsory voting is not so much based on the belief that voter participation per se should be increased, but on the idea that increased voter turnout will result in a better representation of the desires of the society. In the absence of compulsory voting, those individuals who may benefit the most by voting somewhat paradoxically tend not to vote. This may be in part because related transaction costs tend to be extremely high for this group, as individuals do not adequately assess the positive externalities of voting outcomes. Lack of information or misinformation may be a source of problems as well. In fact, there is ample evidence that the sample of individuals who vote voluntarily is not representative of the entire population of eligible voters. When a compulsory voting rule brings in those voters who would not vote voluntarily, this changes the demographic composition of the effective electorate. Extensive data on income, age, education, race, and so on suggest that these characteristics differ between voters and the remaining eligible population (Crain and Leonard, 1993). In fact, it has been argued that eligible non-voters tend to be poorer, less educated, younger, and disproportionately composed of minority group members when compared to voluntary voters. Particularly in developing countries, chances are that non-voters are net recipients of government

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<sup>4</sup> Yeret (1995) and Crain (1995) further expand the research of Crain and Leonard (1993).

services. Compulsory rules may thus increase the share of high-demanders for public services among the active electorate, since the characteristics of voluntary non-voters suggest they are net gainers of government expenditure; bringing these non-voters into the active electorate would shift the position of the median voter.

The idea that there is a voter bias is not new. Evidence on class bias in turnout shows that the median voter's income is above the mean. If the non-voting population corresponds to the lower class, compulsory voting would generate stronger support for fiscal redistribution programs. Compulsory voting laws would increase turnout, but, in addition, would compel lower income people to vote. This segment of the population is believed to prefer redistribution policies.

Political participation, however, is positively related to socioeconomic characteristics. In fact, early on researchers found a positive relationship between voting and socioeconomic status (Gosnell, 1927). Unequal political participation is then not randomly distributed, generating a systematic bias toward wealthy citizens in terms of representation and influence in political decisions. Several studies with country- and region-specific data support this fact. The class bias turnout was 37 percent between the least and most educated people in Switzerland's 1991 referendum (Linder, 1994). For six Central American countries this bias was 12 percent (Seligson et al., 1995). This same result holds for seven European countries, where a difference of 10 percentage points between the lowest and highest of five education levels is typical (Powell, 1986).

Likewise, some partial evidence sustains the connection between turnout and representation. As differentials in turnout based on socioeconomic characteristics diminish, support for leftist parties increases (Pacek and Radcliff, 1995; Nagel, 1998). It has been shown that higher turnout benefits leftist parties, while lower turnout appears to favor parties of the right (McAllister, 1986). Furthermore, income is consistently, positively correlated with the probability of voting, while education has proven to be positively and significantly related to voter turnout in virtually every study of voter participation (Muller, 1989).<sup>5</sup> Also, it has been argued that compulsory voting countries and non-compulsory voting countries have the same

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<sup>5</sup> However, Barr (1987) argues that in the United Kingdom middle-class children receive a disproportionate share of educational resources. The finance of university education is given as an example. Based on this case, O'Toole and Strobl (1995) claim that it is difficult to accept the validity of the median voter model as an explanation of

mean voter turnout, but differ in the prevalence of democratic institutions; the compulsory-voting group has a greater democratic presence than the voluntary voting group. A sample of countries with a greater prevalence of democratic institutions exhibits greater sensitivity to voter preferences than a sample of basically autocratic countries. That is, insofar as government consumption consists of public goods and redistributive transfers, democracies are more sensitive to the general needs of the populace than autocratic regimes, where greater shares of increasing gross domestic product may be transferred to the private wealth of the ruling elite (Yeret, 1995).

Another view is that the existence of compulsory voting reduces the potential for fiscal spillovers between voters and non-voters and consequently reduces pressure groups' incentives to expend resources on lobbying (Craig and Leonard, 1993). The claim is that there is a negative relationship between the existence of compulsory voting and the scale of government expenditures.<sup>6</sup> Public policy is driven by the demands of competing pressure groups and government favors are bestowed upon small, well-organized coalitions at the expense of dispersed unorganized tax-payers. According to this argument, transfers to special interests in per capita terms are large in relation to the per capita costs, which are spread across a broadly dispersed group of taxpayers (O'Toole and Strobl, 1995). The large gains to interest groups relative to the small costs of taxpayers implies that policies produced are not in the collective interest of the majority as aggregate costs exceed benefits per capita. This asymmetry means that interest groups have more incentive to organize and spend lobbying resources advocating policies than taxpayers have to organize against these policies. Unorganized individual voters have little incentive to become informed or participate in the political process given the costs of voting relative to the small expected benefit. As more voters are coerced into the process, voting by the cost-bearing group will rise more than proportionately, simply because it is larger in size than the benefit-receiving group. Thus, the interest group framework suggests that compulsory voting will reduce government activity and expenditures (Crain and Leonard, 1993).

In general, a basic framework that links compulsory voting to income inequality may be based on the median voter theorem applied to a political-economic equilibrium, along the lines

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government expenditure depends upon the existence of a positive relationship between countries with compulsory voting and countries with relatively higher levels of expenditures.

of Meltzer and Richards (1981) and Persson and Tabellini (1994, 2000). In addition to the standard economic equilibrium based on rationality and utility maximization, these models also arrive at a collective political equilibrium aggregating the heterogeneous preferences of each agent through mechanisms such as democratic elections. Specifically, each agent is endowed with a personal characteristic, such as productivity, hence income. Their preference among fiscal programs varies in the following way. The program includes lump sum transfers and a tax rate—proportional to income—in order to achieve a balanced government budget. Since the tax-transfer program has a bearing on the individual’s budget constraint, the higher the endowment, the lower the preferred tax rate. Each individual maximizes her personal utility function, deciding between labor and leisure, and computing her optimal consumption level. The mechanism that aggregates the preferences of all individuals and defines the optimal fiscal policy is the election. In its simpler version, the median voter theorem connects government to political participation. In order to establish the equilibrium fiscal policy, the key relationship is between the mean income of the population and the income of the decisive voter. When the median voter’s income is below the mean, the aggregation of preferences will command a transfer program that redistributes income, and hence a higher tax rate to finance it, given the government budget constraint. The opposite is also possible. A consequence of the above is that fiscal programs should to some extent translate into better income distribution. Thus, in the context of the likely voting bias in voluntary schemes described above, compulsory voting mechanisms will have a bearing on income distribution.

### **3. Data and Methodology**

While universal franchise was adopted in many democracies by the end of the nineteenth century, voter turnout has been typically low. Worse, it has secularly declined. This is particularly true in recent decades. During the last two decades, average turnout in Latin America was 71.2 percent in legislative elections and just 65.5 percent in presidential elections (Payne et. al, 2002). Even regions with the highest voting turnouts yield remarkably low participation rates. This is the case in Central and Eastern Europe, with 73 percent, and industrial

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<sup>6</sup> O’Toole and Strobl (1995) argue that this is not entirely convincing. Although one might expect a reduction in government expenditures on items of particular benefit to voluntary voters, it may be reasonable to expect increased government expenditures on items of particular benefit to voluntary non-voters.

countries, with 71 percent (IDEA, 1997).<sup>7</sup> The impact of compulsory voting on voting turnout is noticeable. IDEA (1997) finds that voter turnout increases by six to seven percentage points in the 24 countries with mandatory voting countries included in their sample. This increase is even higher in Latin America. Furthermore, in a similar study, Fornos (1996) finds that voting turnout increases between 11 and 24 points. Within countries there is also compelling evidence of increased turnout. Perhaps the classic example is Australia, where voting turnout in legislative elections dramatically increased from about 64 percent to around 94 percent after mandatory voting laws were enacted in 1924 (Montinola and Jackman, 2002).<sup>8</sup> In fact, compulsory voting has proved a far more effective instrument for achieving higher voter turnout than other available mechanisms, including simple registration rules, weekend voting, relatively infrequent elections, centralized electoral electronic voting, postal voting, and even mobile polling stations (Hill, 2002). Although mandatory voting laws have a strong impact on turnout, regardless of the level of enforcement (Liphart, 1997), some evidence suggests that the level of enforcement generates an even higher turnout. In Australia and Uruguay, countries with strong enforcement, the percentage of registered voters that participated in legislative elections is close to 90 percent and 94 percent, respectively.<sup>9</sup> On the other hand, in Italy and Peru, countries with weak or no enforcement, the number falls to 83 percent and 73 percent, respectively.<sup>10</sup>

Recent empirical literature offers several specifications that focus on the determinants of income inequality.<sup>11</sup> This study uses data from 1960 to 2000 and takes averages for the period, similar to cross-country work by Knack and Keefer (1995), Chong, (2003), and others. The specification includes the essential control variables from known empirical work. The two basic control variables are initial gross domestic product per capita (per Bourguignon and Morrisson, 1998; Li, Squire, and Zou, 1998; Chong, 2003), and education as reflected by the average years of schooling (Li, Squire and Zou, 1998; Bourguignon and Morrisson, 1998; Chong, 2003).<sup>12</sup>

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<sup>7</sup> At around 50 percent, Africa and South Asia are the regions with the lowest voting participation rates (IDEA 1997).

<sup>8</sup> Conversely, general election turnout in Venezuela dropped from 90 percent to 60 percent after the repeal of compulsory voting laws (Liphart, 1997).

<sup>9</sup> For Australia, the reference is to nine elections of the House of Representatives after the law was adopted (Montinola and Jackman, 2002), and for Uruguay to four legislative elections between 1984 and 1999. The percentage in Uruguay in the same period for presidential elections is 95 percent (Payne et al, 2002).

<sup>10</sup> Italy's figure is taken from national elections in 1996, as reported at [www.fabian-society.org.uk](http://www.fabian-society.org.uk). Peru's percentage for represents the average of five legislative elections between 1980 and 2000 (Payne et al., 2002).

<sup>11</sup> See, among others, Acemoglu and Robinson (2000) and Bourguignon and Verdier (2000).

<sup>12</sup> There is no difference in the results when using the mean for the whole period instead of the initial level of education.

Additionally, there is a proxy for democracy (Chong 2003, Li, Squire and Zou, 1998, Acemoglu and Robinson, 2000) and a dummy variable for countries with compulsory voting schemes. Thus, the benchmark specification is:

$$Gini_i = \alpha + \beta_1 GDP_i + \beta_2 Education_i + \beta_3 Democracy_i + \beta_4 Compulsory Voting_i + u_i \quad (1)$$

where the subscript  $i$  corresponds to each country.<sup>13</sup> The expected signs of the coefficient of the variable of interest,  $\beta_4$ , is negative as the neediest segments of the population become better represented and governments shift relatively more resources to them. This follows along the lines of the theoretical expositions above. Similarly, consistent with existing empirical work, the expected sign of  $\beta_1$  is ambiguous for the coefficient is typically very close to zero (Chong, 2003). Also, the expected sign of  $\beta_2$  as education is negative since theory and evidence point to its role on welfare improvement (Bourguignon and Morrisson, 1998). Finally, the expected sign for  $\beta_3$  is positive when introduced linearly (Acemoglu and Robinson, 2000; Chong and Calderón, 2000).<sup>14</sup>

The sample of voting characteristics by country comes from the corresponding constitutions of each country as well as from IDEA (1997). As shown in Table 1, mandatory voting regulations are in place in 33 countries. Remarkably, the concept of compulsory voting has different layers depending on the degree of enforcement of the law, as noted by O’Toole and Strobl (1995). In fact, countries are distinguished by the level of enforcement of voting laws. First, countries are classified by whether enforcement of the compulsory voting law actually occurs and thus, whether sanctions are strongly linked to voting. Typical sanctions associated with law compliance may range from a request to submit a simple formal explanation for not voting, to monetary fines, to infringements of civil rights, disenfranchisement, and even imprisonment. Second, countries are grouped by whether there is weak enforcement of compulsory voting laws. Weak enforcement may occur as a result of limited budgets, for example, which may not allow governments to assign enforcement a high priority. Thus, weak enforcement may range from the imposition of fines that for all practical purposes are non-binding, to waivers of fines and other fees. Out of the 33 countries with compulsory voting

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<sup>13</sup> The authors also tested income quintiles as dependent variables; the findings are reported in the robustness section. Results do not change.

<sup>14</sup> Recent research shows that when introduced in quadratic fashion, the linear term becomes positive and the squared term becomes negative (Acemoglu and Robinson, 2000; Chong, 2003). As expected, when a squared democracy or civil liberties term is included, the coefficient of the compulsory voting variable remains statistically significant and of the expected negative sign.

shown in Table 1, six countries report no enforcement of compulsory voting laws, and seven countries report strict enforcement laws. The rest have weak law enforcement. Depending on the particular variable considered, a value of one is assigned when there is a compulsory law requirement, and a value of zero is assigned otherwise.

The inequality data come from Chong (2003). These data were updated to 2000 using comparable household surveys available from the World Bank (Deininger and Squire, 1997) and, like the other variables used in this paper, used averages for the period 1960-2000 by country. As argued by several researchers, the inequality data used here, while not perfect, have several advantages. First, the observations are based on household surveys. Second, population and income coverage are comprehensive. Additionally, criteria from different sources are homogenized to avoid problems of definition (Chong, 2003); while the data include 103 countries, the study obviously could not use them all due to restrictions according to our variable of interest. Table 2 shows some summary statistics for the Gini coefficient and quintile distribution by region for the period under consideration. The higher the Gini index, the more unequal the distribution of income. This variable ranges from zero to 100.

As is well known, the data show that Latin America is the region displaying the most unequal distribution of income, with a Gini coefficient of 49. On the other hand, industrial countries have the most equal distribution of income, with a Gini coefficient of 32.8. With respect to the other explanatory variables considered in Table 2, industrial countries have the best indicators of civil liberties with 0.83, while Eastern Europe has the lowest average index for the period with 0.25 (Freedom House, 2004). This variable ranges from zero to one, where the higher the number the more civil liberties in the country.<sup>15</sup> Finally, using average years of secondary education (Barro and Lee, 1996) shows that, unsurprisingly, industrial countries hold the highest educational average, while the lowest educational attainment corresponds to Africa.

Endogeneity in the variable of interest may be of potential concern. Perhaps countries with high inequality try to solve this problem by instituting compulsory voting laws and not the other way around. To deal with this problem, all the compulsory voting laws in the countries considered in the sample precede the period in which the inequality data were collected along the lines of work by Knack and Keefer (1995) and others. The corresponding constitutions of the

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<sup>15</sup> When using political rights and institutionalized democracy variables, the authors also use the same zero-to-one scale where the higher the number the better the political rights and the stronger the democracy, respectively.

countries provide confirmation of the year in which the corresponding compulsory voting law was enacted. The enactment year is shown in Table 1. While the dependent variable covers the period 1960-2000, most compulsory voting laws were enacted decades before 1960.<sup>16</sup> While this approach may not be perfect, it is likely the best possible method, given the data restrictions of this research; credible instruments for use in an instrumental variables approach are extremely difficult to come by.<sup>17</sup> Finally, potentially omitted variables are tackled in the robustness section below, along the lines of previous work on the determinants of income inequality (Chong and Calderón, 2000; Chong, 2003).

#### **4. Evidence**

Table 3 presents the main results when using the benchmark specification described above. Cross-country robust ordinary least squares regressions are run for the period between 1960 and 2000. In order to isolate idiosyncratic effects from the two regions where compulsory voting is somewhat concentrated, dummy variables for Latin America and industrial countries are also included, although they are not reported.<sup>18</sup> The control variables, such as the initial gross domestic product, the average years of education and the proxy for democratic values yield the expected sign. However, average years of education is the only variable that yields a negative coefficient that is statistically significant for all the specifications considered.<sup>19</sup>

With regards to the variable of interest, compulsory voting appears to have no effect on income inequality, as shown in Regression 1 of Table 3. The coefficient of the compulsory voting variable is unexpectedly positive, but it is statistically insignificant at conventional levels. When a dummy variable captures the level of enforcement of compulsory voting laws, the result is still statistically insignificant, although the sign of the coefficient shifts from positive to negative. This is shown in Regression 2. Finally, when using a dummy variable that captures only strong enforcement of compulsory voting schemes, the sign of the corresponding coefficient is negative and statistically significant at conventional levels. This is shown in Regression 3.

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<sup>16</sup> When this is not the case, a dummy variable is included. A dummy variable was also included when it was not possible to obtain the year of enactment. Results are not affected.

<sup>17</sup> Still, along the lines of La Porta et al. (1998) using law origin variables as instruments does not alter the results. These findings are available upon request.

<sup>18</sup> The results for these dummies are as expected. In all the regressions, both coefficients are significant, with a positive sign for Latin America, and a negative one for the OECD.

This finding implies that countries with strictly enforced compulsory voting laws have, on average, a Gini coefficient 3.7 points lower than countries without such laws. The model explains 44 percent of cross-country inequality.<sup>20</sup> Regressions 4 to 6 test the same three first specifications as before but use an index of political rights instead of civil liberties. The results are similar. In short, mandatory voting laws that “on paper” require individuals to vote, but bear little or no consequence, fail to have a bearing on the distribution of income. This is unsurprising, as the lack of impact may occur either because the increased number of voters, if any, may not be representative of the voting population, or simply because additional voters do not go to the polls in significant amounts. On the other hand, compulsory voting laws that carry a penalty for noncompliance are, indeed, associated with an improvement in the distribution of income, possibly as voter representation increases.

Table 4 repeats the same exercise as above for the case of strongly enforced compulsory voting laws but uses income quintiles instead of Gini coefficients as the dependent variable.<sup>21</sup> While the statistical significance of the variable of interest is not as clear as in the results that use the Gini index, as expected, strong compulsory voting laws do increase the income share of the bottom quintiles, as the corresponding sign of the three bottom quintiles is positive and statistically significant for the first and third quintiles. Furthermore, the sign of the corresponding coefficients for the top quintiles is, as expected, negative. However, they are not statistically significant. In order to further verify the robustness of these results, the authors expand the benchmark specification by following previous work by Bourguignon and Morrisson (1998) and Chong (2003). They include other relatively common variables used as determinants of income inequality, including the value added of agriculture, the value added of manufacturing, the number of physicians, investment as a percentage of gross domestic product, and others. The results for compulsory voting with strict enforcement are quite robust. In fact, strongly enforced compulsory voting is statistically significant, with the expected sign in all the regressions. This is shown in Table 5.

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<sup>19</sup> Also tested are other democracy variables such as institutionalized democracy from Polity V (Jagers and Gurr, 1995), instead of civil liberties and political rights. The results are identical.

<sup>20</sup> The study also addresses the role of institutions, arguing that strong enforcement of compulsory voting laws requires strongly efficient government institutions. Using data from Kaufmann et al. (2002), however, the authors do not find robust evidence that this is the case. Using duration (in years) of compulsory voting laws yields weak evidence that the longer the compulsory voting law, the better the distribution of income.

<sup>21</sup> Regressions using top/bottom quintile ratios as the dependent variable yield similar results. Also, regressions using weak compulsory voting laws yield no statistical significance.

The authors also apply the robustness methodology by Levine and Renelt (1992) and introduce all possible ordering combinations of three different variables out of seven variables suggested by the literature as explanatory variables of income inequality to the benchmark specification when using strong compulsory voting (Regression 3, Table 3). The pool of variables includes the four additional ones used in Table 5 plus the following: (i) private credit, (ii) black market premium and (iii) openness (World Bank, 2004). The total number of combinations corresponds to an additional 35 different regressions. Findings are presented in Table 6. Overall, the coefficient of the compulsory voting with strong level of enforcement is, again, quite robust. However, a variable that weakens the effect of compulsory voting is the number of physicians, even though the correlation between these two variables is low (0.15).<sup>22</sup> The effect can vary from 2.2 points of the Gini coefficient to 8.5. The former corresponds approximately to one standard deviation of the Gini coefficient in Eastern Europe, while the latter is close to one standard deviation in Africa.

The authors also follow a method developed by Sala-i-Martin (1997) to further test for robustness. This researcher argues that the method by Levine and Renelt (1992) above is too strict; when one single regression in which either the sign of the coefficient of the variable of interest changes or the statistical significance of such a coefficient varies, the relationship ceases to be robust. Sala-i-Martin (1997) develops a robustness test by looking at the entire distribution of the estimator of the variable of interest by focusing on the fraction of the density function lying on either side of zero.<sup>23</sup> Given that zero divides the area under the density in two, he denotes the larger of the two areas,  $cdf(0)$ , regardless of whether it is above or below zero. Under the assumption that the distribution of the coefficient of interest is non-normal, the  $cdf(0)$  uses the benchmark specification of Regression 3 in Table 3. As before, the idea is to choose up to three variables at a time and perform regressions using all the possible combinations based on the pool of ancillary variables. The basic specification is tested for all possible combinations of ancillary variables and the coefficient estimates, their variance, the (integrated) likelihood, and the individual  $cdf(0)$  for each regression are computed. The aggregate  $cdf(0)$  of the coefficient of interest is computed as the weighted average of all individual  $cdf(0)$ s. The variable of interest is

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<sup>22</sup> Out of the 35 regressions, ten are fragile specifications where the compulsory voting variable is not statistically insignificant. In all of these ten regressions the number of physicians is included. However, the coefficient always preserves the negative sign.

said to be strongly correlated (i.e., is robust) if the weighted  $cdf(0)$ , is greater than or equal to 0.95. Results for the three compulsory voting variables used in this paper are shown in Table 7. The first row of each corresponding variable reports the aggregate  $cdf(0)$  under the assumption of non-normality. The second row presents the standard deviation computed as the squared root of the weighted variance estimate for all the regressions. In general, these results are similar to the previous findings. That is, strongly enforced compulsory voting is robust to changes and additions in specification but, unsurprisingly, weakly enforced compulsory voting is not.

## 5. Conclusions

This analysis suggests that the effect of compulsory voting on income distribution is strong if the law is strictly enforced. In short, enforceable compulsory voting laws compel the bottom income quintiles of the population to vote. In this scenario, the median voter would be the population that prefers higher transfers and redistribution programs. If the law is enforced, the effect is an improved distribution of income.

From a policy perspective, the findings in this paper give credence to the idea that compulsory voting rules are sensible schemes that may be applied in developing countries, where the distribution of wealth and income is dramatically skewed against the poor. In fact, this may be particularly relevant in Latin America, a region in which many countries have weak compulsory voting schemes but only one, Uruguay, has a strict mandatory voting rule. Perhaps not coincidentally, this country is the one that has the most equal distribution of income in the region.<sup>24</sup>

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<sup>23</sup> If 95 percent of the density function for the estimates of the coefficient of interest lies to the right of zero, one could say that this variable is more likely to be correlated with the dependent variable.

<sup>24</sup> The dilemma of policymakers is understandable; the poor are the ones that vote the least (IDEA, 1997) thus, they are potentially the ones that would be penalized the most.

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**Table 1. Compulsory Voting around the World**

| Country                    | Level of Enforcement | Year Introduced              |
|----------------------------|----------------------|------------------------------|
| Argentina                  | Weak                 | 1912                         |
| Australia                  | Strict               | 1924                         |
| Austria (Tyrol)            | Weak                 | N/A                          |
| Austria (Vorarlberg)       | Weak                 | N/A                          |
| Belgium                    | Strict               | 1919 (men)                   |
| Bolivia                    | N/A                  | 1952                         |
| Brazil                     | Weak                 | N/A                          |
| Chile                      | Weak                 | 1925                         |
| Costa Rica                 | No                   | N/A                          |
| Cyprus                     | Strict               | 1960                         |
| Dominican Republic         | No                   | N/A                          |
| Ecuador                    | Weak                 | 1936                         |
| Egypt                      | N/A                  | 1956                         |
| Fiji                       | Strict               | N/A                          |
| France (Senate only)       | N/A                  | 1950's or 60's               |
| Gabon                      | N/A                  | N/A                          |
| Greece                     | Weak                 | N/A                          |
| Guatemala                  | No                   | N/A                          |
| Honduras                   | No                   | N/A                          |
| Italy                      | Weak/No              | N/A                          |
| Liechtenstein              | Weak                 | N/A                          |
| Luxembourg                 | Strict               | N/A                          |
| Mexico                     | Weak                 | N/A                          |
| Nauru                      | Strict               | 1965                         |
| Netherlands                | No                   | 1917 to 1967                 |
| Paraguay                   | N/A                  | N/A                          |
| Peru                       | Weak                 | 1933                         |
| Philippines                | No                   | 1972-1986 under martial law. |
| Singapore                  | Strict               | N/A                          |
| Switzerland (Schaffhausen) | Strict               | 1904                         |
| Thailand                   | No                   | N/A                          |
| Turkey                     | Weak                 | N/A                          |
| Uruguay                    | Strict               | 1934                         |
| Venezuela                  | N/A                  | Eliminated in 1993           |

There is no enforcement in countries where mandatory laws are not complemented with sanctions. Weak enforcement corresponds to countries where, for example, limited budgets do not allow governments to assign enforcement a high priority. Strict enforcement countries enforce the law with a high priority. Sanctions vary from a simple explanation for not voting to fines, possible imprisonment, and infringements of civil rights or disenfranchisement.

**Table 2. Summary Statistics**

| Variable                             | Mean   | Minimum | Maximum |
|--------------------------------------|--------|---------|---------|
| Gini                                 | 37.7   | 22.4    | 59.3    |
| Income Share for Bottom 20%          | 0.07   | 0.0     | 0.1     |
| Income Share for Bottom 80%          | 0.5    | 0.3     | 0.7     |
| GDP 1960                             | 2728.1 | 435.5   | 9774.0  |
| Average GDP                          | 4762.3 | 716.6   | 15202.4 |
| Civil Liberties                      | 0.5    | 0.1     | 0.9     |
| Political Rights                     | 0.6    | 0.1     | 1.1     |
| Average Years of Secondary Schooling | 1.0    | 0.2     | 3.9     |

*Sources:* Deininger and Squire (1998) and Chong (2003) for Gini coefficient and income shares, World Bank (2004) for gross domestic product, Freedom House (2004) for civil liberties and political rights, and Barro and Lee (2001) for years of schooling

**Table 3. Compulsory Voting and Income Distribution**

| Dependent Variable: GINI coefficient | (1)                 | (2)                 | (3)                 | (4)                 | (5)                 | (6)                 |
|--------------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| Initial GDP per capita (1960)        | 0.000<br>(0.64)     | 0.000<br>(0.66)     | 0.000<br>(0.65)     | 0.000<br>(0.64)     | 0.000<br>(0.48)     | 0.000<br>(0.46)     |
| Average years of secondary schooling | -3.040<br>(2.16)**  | -3.030<br>(2.17)**  | -3.020<br>(2.15)**  | -2.796<br>(1.99)*   | -2.799<br>(1.98)*   | -2.756<br>(1.96)*   |
| Civil Liberties                      | 9.710<br>(1.35)     | 10.300<br>(1.44)    | 10.808<br>(1.50)    |                     |                     |                     |
| Political rights                     |                     |                     |                     | 5.190<br>(0.99)     | 5.430<br>(1.01)     | 5.866<br>(1.08)     |
| Compulsory voting                    | 1.150<br>(0.88)     |                     |                     | 1.490<br>(1.19)     |                     |                     |
| Strong and Weak Voting Enforcement   |                     | -0.595<br>(0.41)    |                     |                     | -0.134<br>(0.09)    |                     |
| Strong Voting Enforcement            |                     |                     | -3.710<br>(2.25)**  |                     |                     | -3.367<br>(1.98)**  |
| Constant                             | 0.409<br>(14.55)*** | 0.409<br>(14.49)*** | 0.408<br>(14.48)*** | 0.432<br>(18.01)*** | 0.424<br>(18.04)*** | 0.424<br>(18.17)*** |
| Number of observations               | 91                  | 91                  | 91                  | 91                  | 91                  | 91                  |
| R-Squared                            | 0.45                | 0.45                | 0.44                | 0.44                | 0.43                | 0.44                |

Latin America and OECD dummies are included in all regressions but they are not reported. The coefficient for the Latin America dummy is positive and statistically significant at one percent, the coefficient for OECD is negative and statistically significant at one percent. \* Significant at 10 percent level. \*\* Significant at 5 percent level. \*\*\* Significant at 1 percent level.

**Table 4. Compulsory Voting and Income Shares**

| Dependent Variable: Income Shares       | 1st. quintile      | 2nd quintile        | 3rd quintile        | 4th quintile        | 5th quintile        |
|---|--------------------|---------------------|---------------------|---------------------|---------------------|
| Initial GDP per capita (1960)           | 0.000<br>(0.02)    | 0.000<br>(0.41)     | 0.000<br>(0.37)     | 0.000<br>(0.22)     | 0.000<br>(0.34)     |
| Average years of secondary schooling    | 0.001<br>(0.42)    | 0.006<br>(1.31)     | 0.011<br>(2.02)*    | 0.005<br>(0.74)     | -0.023<br>(1.62)    |
| Civil Liberties                         | -0.045<br>(1.95)*  | -0.025<br>(1.01)    | -0.039<br>(1.18)    | 0.047<br>(1.23)     | 0.061<br>(0.71)     |
| Strong Enforcement of Compulsory Voting | 0.011<br>(1.67)*   | 0.010<br>(1.00)     | 0.030<br>(2.60)**   | -0.005<br>(0.21)    | -0.045<br>(1.52)    |
| Constant                                | 0.079<br>(9.60)*** | 0.107<br>(11.56)*** | 0.151<br>(11.69)*** | 0.186<br>(11.57)*** | 0.099<br>(30.87)*** |
| Number of observations                  | 68                 | 68                  | 68                  | 68                  | 68                  |
| R-Squared                               | 0.35               | 0.36                | 0.39                | 0.14                | 0.38                |

Latin America and OECD dummies are included in all regressions but they are not reported. The coefficient for the Latin America dummy is positive and statistically significant at one percent, the coefficient for OECD is negative and statistically significant at one percent. \* Significant at 10 percent level. \*\* Significant at 5 percent level. \*\*\* Significant at 1 percent level.

**Table 5. Compulsory Voting and Inequality: Alternative Specifications**

| Dependent Variable: GINI coefficient    | (1)                 | (2)                 | (3)                 | (4)                  |
|---|---------------------|---------------------|---------------------|----------------------|
| Initial GDP per capita (1960)           | -0.001<br>(2.31)**  | -0.001<br>(2.31)**  | -0.001<br>(1.22)    | -0.001<br>(1.26)     |
| Average years of secondary schooling    | -2.130<br>(1.58)    | -2.130<br>(1.57)    | -1.390<br>(1.31)    | -1.380<br>(1.28)     |
| Civil Liberties                         | 17.020<br>(2.79)*** | 17.020<br>(2.77)*** | 7.320<br>(1.38)     | 7.290<br>(1.36)      |
| Strong enforcement of Compulsory Voting | -5.110<br>(3.14)*** | -5.110<br>(3.13)*** | -2.590<br>(1.74)*   | -2.580<br>(1.72)*    |
| Agriculture value added (as % of total) | -7.709<br>(0.99)    | -7.612<br>(0.96)    | -19.207<br>(2.58)** | -19.472<br>(2.47)**  |
| Manufacture value added (as % of total) |                     | 0.504<br>(0.05)     | 2.370<br>(0.25)     | 2.421<br>(0.25)      |
| Number of physicians (per inhabitant)   |                     |                     | -6.863<br>(4.58)*** | -6.823<br>(-4.52)*** |
| Investment (% of GDP)                   |                     |                     |                     | -1.039<br>(0.08)     |
| Constant                                | 0.411<br>(12.50)*** | 0.410<br>(10.32)*** | 0.490<br>(13.87)*** | 0.492<br>(10.76)***  |
| Number of observations                  | 90                  | 90                  | 90                  | 90                   |
| R-Squared                               | 0.52                | 0.52                | 0.62                | 0.62                 |

Latin America and OECD dummies are included in all regressions but they are not reported. The coefficient for the Latin America dummy is positive and statistically significant at one percent, the coefficient for OECD is negative and statistically significant at one percent. \* Significant at 10 percent level. \*\* Significant at 5 percent level. \*\*\* Significant at 1 percent level.

**Table 6. Levine-Renelt Robustness Tests**

|  |         | Coefficient | t-statistic | R-Squared | Additional variables                                   |
|--|---------|-------------|-------------|-----------|--|
| Compulsory Voting - Strong Enforcement | Maximum | -8.47       | (5.19)***   | 0.50      | Agriculture, openness, private credit                  |
|  | Base    | -3.71       | (2.25)**    | 0.45      |  |
|  | Minimum | -2.21       | (1.86)*     | 0.53      | Number of physicians, investment, black market premium |

Each coefficient reported in this table comes from the estimation of our benchmark specification (Regression 3, Table 3) but only the variable of interest is reported. The Levine and Renelt (1992) test for robustness is used. \* Significant at 10 percent level. \*\* Significant at 5 percent level. \*\*\* Significant at 1 percent level.

**Table 7. Sala-i-Martin Robustness Tests**

|                    | <i>Strong<br/>Enforcement</i> | <i>Weak<br/>Enforcement</i> | <i>Strong and Weak<br/>Enforcement</i> |
|--------------------|-------------------------------|-----------------------------|--|
| Weighted $cdf(0)$  | 0.96                          | 0.64                        | 0.69                                   |
| Standard Deviation | 0.245                         | 0.352                       | 0.399                                  |

Following Sala-i-Martin (1997) the first row shows the cumulative distribution function (0) and the second row presents the standard deviation of the variable of interest. A variable whose weighted  $cdf(0)$  is larger than 0.95 is significantly correlated with the dependent variable (i.e. robust) at a 5 percent significance level. The  $cdf$  is computed assuming non-normality of the parameters estimated. Results are similar when normality is assumed. The benchmark regression employed is that of Regression 3 in Table 3.