

Long-run Effects of Democracy on Income Inequality within Birth Cohorts: Evidence from Repeated Cross-Sections^{*}

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Abstract

This paper studies the link between democracy and income inequality by assessing the relationship between the quality of democratic institutions around people's birth year and income inequality. Using pseudo-panel data built from nine Latin American countries' household surveys (1995-2009, biannual) and various measures of democracy between 15 years before people's birth year and 20 years after it, I find that cohorts that experienced higher quality democratic institutions during their childhood exhibit less income inequality. This result is robust to several specifications that control for periods of wars and economic crisis, which often preceded political regime changes in the region during the 20th century. I also present suggestive evidence that education may be one mechanism explaining this result.

Keywords: Inequality, democracy, Latin America, pseudo-panel

JEL Classification: C23, D31, N36

^{*}This document has an online appendix hosted on: <https://sites.google.com/site/cfbalcazars/ongoing>

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Introduction

This paper studies the link between democracy and income inequality by assessing the relationship between the quality of democratic institutions (i.e., effective constraints on the executive and a system of political checks and balances) around people's birth year and income inequality. It is reasonable to think that democracies reduce income inequality by allowing citizens to vote for political parties that privilege redistributive platforms. Therefore, we may think that societies with a more egalitarian distribution of political power have lower income inequality. However, there are cases that challenge the previous conjecture: Asian countries, for example, display low income inequality and low-rating democratic institutions while Latin America, a region with higher-rating democratic institutions, displays extreme income inequality (Savoia et al., 2009, pp. 144-145).

The lack of a clear relationship between democracy and income inequality (from now on inequality) has two popular explanations. First, the political Kuznets curve. Chong (2004) argues that democratization may first produce an increase in inequality before it may produce an improvement in the distribution of income. He finds evidence for the political Kuznets curve using cross-country panel data. On the other hand, Palma (2011) does an extensive discussion on the previous regard using cross-country panel data as well, and states that countries with historically high levels of inequality do not exhibit a decline in inequality after democratization (e.g., Latin American countries). Nonetheless, Acemoglu and Robinson (2002) clarify that there are exceptions to the political Kuznets curve: the "autocratic disaster", the "East Asian Miracle" and Latin American countries.¹ Second, democracies that begin with high inequality may develop poor economic and political institutions that perpetuate the unequal distribution of income. Savoia et al. (2009) do a review on recent research regarding the link between democracy and inequality, and discuss recent empirical and theoretical studies that attribute high and persistent inequality to the presence of "bad" economic and political institutions, which are result of high initial inequality.

Most recent empirical studies assess the link between democracy and inequality using cross-country panel data sets, traditionally: the Deninger and Squire data base; WIDER's World Income Inequality data base, and the World Bank's World Development Indicators. Although findings using cross-country panel data differ on whether the effect of democracy on inequality is significant (refer to Li et al., 1998; Reuveny and Li, 2003; Chong, 2004; Timmons, 2010; and Nikoloski, 2010), cross-country panel data sets present considerable problems: i) some surveys report data on income and some on expenditure, making cross-country comparisons difficult, ii) the degree of

¹In an autocratic disaster inequality is high, but there is no democratization or redistribution because society is not well organized (e.g., Philippines). In an East Asian Miracle inequality is low, so the economy accumulates rapidly and converges to a high level of output (e.g., Taiwan and South Korea). In Latin America, inequality fluctuates as countries switch between less and more democratic regimes.

accuracy is still a problem; e.g., some surveys undertaken in the midst of sub-Saharan civil wars have “national” coverage, but polities were fragmented during those events, iii) it is not possible to account for within country heterogeneity; i.e., neither data set is able to provide crucial distributional information. (See Atkinson and Brandolini, 1999; Timmons, 2010; and Palma, 2011, for further discussion.) Furthermore, studies using cross-country panel data also present considerable endogeneity problems. The quality of democratic institutions may be a result of economic growth, educational attainment, initial inequality and other socioeconomic phenomena that may determine the distribution of political power. Moreover, proxies of democracy in these studies may present measurement error problems because democratic institutions can differ between groups within countries (Bardhan, 2005, ch. 1). Thus, studies using cross-country panel data may present omitted variables bias, simultaneity and measurement errors.

To address endogeneity studies using cross-country panel data usually resort to instrumental variables. Nonetheless, it is hard to argue that an instrument satisfies the exclusion restriction because almost any variable related to democracy relates to either a prior or subsequent redistribution of income, for example: many studies use characteristics of colonial settlements as instruments (see Nikoloski, 2009, annex 1), however these instruments are not valid given that colonial types had direct impact on initial inequality, which in turn influenced the development of economic and political institutions that perpetuate the level of inequality (Engermann and Sokoloff, 1997; 2000).

I assess the link between democracy and inequality using pseudo-panel data built from nine harmonized Latin American countries’ household surveys (1995-2009, biannual), conceiving cohort inequality as a function of various measures of democracy between 15 years before people’s birth year and 20 years after it.² This approach has some advantages over cross-country studies: i) I explore a relatively homogenous region with common early history, ii) surveys report the same sources of household income, making surveys comparable between countries and over time, iii) I do not rely upon country-level measures of income inequality but upon cohort inequality; therefore, I account for within country heterogeneity, iv) by including controls for the proxy of democracy for several time periods around people’s birth year, not only I consider differences in the quality of democratic institutions between groups within countries but also explore whether the quality of democratic institutions is important for people’s future economic conditions, before people’s birth year (i.e., democracy has a strong intergenerational effect), during the early childhood and/or school years—which are important for future individual development—, and/or when individuals are entering the labor markets, because democratic institutions may provide higher bargaining power to workers, v) I include a set of fixed-effects which eliminate unobserved country, survey, gender, and

²Democracy proxies consist of 4(or 5)-year averages using the Polity IV democracy index. I use gender, country and birth year in three-year spans as grouping variables (i.e., to construct cohorts).

birth-cohort specific factors: these allow to capture differences in economic and cultural factors across generations, gender differences in human capital and gender discrimination, long-run and short-run country-level economic changes, changes in survey lifting and short-term differences in the socioeconomic conditions of cohorts when they grow older. Therefore, I am able to attenuate endogeneity problems that derive from using democracy as regressor. Furthermore, I also evaluate my findings with several robustness checks.

A number of messages emerge from this paper. First, inequality is high and persistent. Although not new, this result is consistent with the fact that Latin America is a region with extreme, persistent, inequality (Lustig, et al., 2011, pp. 2). Second, cohorts that experienced higher quality democratic institutions during their childhood have less inequality. I find that one standard deviation increase in the proxies of democracy between people's birth year and ten years of age reduces inequality by nearly 1.7 percentage points. This result is comprehensible if we consider that democracy is important for determining how the governments distribute the benefits of public services among children (Moss, 2007), that early life conditions exert a strong influence on social and cognitive skills later in life (see Heckman, 2007), and that governments —particularly democratic governments— conducted substantial efforts to expand primary education during the 20th century (see Bethell, 1997; World Bank, 2003; and Schiefelbein, 2007), providing children with resources in key years of individual development. Third, cohorts that experienced higher quality democratic institutions during their childhood and possibly before their year of birth have higher average years of education. If more democratic regimes are more likely to spend more in public education (Ansell, 2008), those who are in school age and are younger benefit more from it, because inter-generational human capital accumulates with long time spans and because these investments are useful for kids attending school for developing social and cognitive skills that will be useful later in their lives (e.g., in their work years). Therefore, education may map democracy onto long-run changes in the distribution of human capital and then onto contemporary changes in income inequality, by allowing individuals to be more competitive in the labor markets as a result of their higher level of human capital.

Notably, results using inequality as a dependent variable survive statistical scrutiny and are robust to a number of specification checks. I run regressions for urban and rural sub-samples; results for both urban and rural areas hold in general despite these sub-samples may present potential sample size and measurement error problems. After including a set of sociodemographic characteristics as controls, results hold as well. Thus, differences in inequality are not (only) attributable to differences in the sociodemographic characteristics of individuals but to the quality of democratic institutions as well. I also perform additional regressions including controls for periods of war and economic crisis. My findings hold, suggesting that the variation in inequality is attributable to institutional changes on democracy and not (only) to historical phenomena that can motivate and

facilitate regime transitions, and that may also entail a redistribution of resources.

Results using educational attainment as a dependent variable present suggestive evidence that education may be one mechanism explaining the negative relationship between democracy and inequality. When I run regressions for the following sub-samples: urban areas, rural areas, women and men, the significant and positive effects of the proxies of democracy during childhood, and shortly before birth, hold for most specifications. However, when I restrict myself to rural areas, results do not hold. The previous (non) findings may not be reliable due to potential sample size and measurement error problems in the rural sub-sample. Furthermore, when I include additional controls: sociodemographic characteristics, periods of wars and economic crisis, the positive and significant effect of the quality of democratic institutions during cohorts' childhood and before it, over cohort educational attainment, holds.

In short, this paper provides suggestive evidence that cohorts that experienced higher quality democratic institutions during childhood exhibit less inequality, and that education may be one mechanism explaining this result. The rest of the document proceeds as follows: the first section presents a review of four mechanisms that link democracy and inequality, their limitations, and presents an alternative to study the link between democracy and inequality; section two describes the data; section three provides some descriptive statistics of the pseudo-panel; section four describes the econometric approach and addresses the methodological challenges; section five presents the main results and shows suggestive evidence that may education map democracy onto inequality; the last section concludes.

1. Do democracies breed more egalitarian societies?

Meltzer and Richard (1981), Alesina and Rodrik (1994), and Persson and Tabellini (1994) propose that utility-maximizing individuals redistribute based on rational choices; if the median income lies below the mean income, the median voter chooses redistribution and higher taxation for rich people. This model predicts that democracies have lower levels of inequality than non-democracies (Acemoglu and Robinson, 1998).

A second mechanism alleges that democracy lowers the costs of political participation of organized labor, allowing labor unions to obtain a privileged position in the policy process (Schumpeter, 1942; Rodrik, 1999). As a result, democracy encourages unionization, centralized wage bargaining, and minimum wages, which reduce wage dispersion (Katz and Autor, 1999; Rodrik, 1999).

Democracies should also guarantee broad access to property rights. With well-defined property rights and broad access to them, the poor have the possibility to gain access over improved or

produced assets by facilitating the development of efficient market-based economies and opening up markets and institutions, which also prevent the elite from erecting entry barriers and enjoying markets with monopoly power (Gerring et al., 2005; Acemoglu, 2008).

A fourth mechanism suggests that democracy rises competition among politicians for citizen support. This causes governments to invest more in public services, such as education (Saint-Paul and Verdier, 1993). Education, in turn, acts as a redistribution channel reducing the dispersion of human capital and increasing a generation's human capital relative to the previous generation.

Despite the literature inquires over other mechanisms that may map democracy onto inequality, I find the previous four the most relevant (see Thorbecke and Charumilind, 2002; and Savoia et al., 2009, for further discussion). Nonetheless, recent empirical findings reveal caveats in these mechanisms.

In a well regarded paper, Milanovic (2000), using micro-level data from the Luxembourg Income Studies, finds weak evidence for redistribution through the median voter channel. Indeed, he finds that the middle classes are not net beneficiaries from redistributive transfers.

Timmons (2010), using the University of Texas Inequality Project and the United Nations Industrial Development Organization (UTIP-UNIDO) data set, finds no evidence for the existence of the second channel. He shows that although democracies may pay higher average wages in manufacturing, democracy does not dampen wage dispersion between industries.

Amendola et al. (2013), using the WIDER Income Inequality data set, find evidence that democracy is not a sufficient condition to reduce income inequality in presence of strong property rights. They find that in presence of weak democratic institutions, strong property rights actually lead to an increase in the level of inequality.

Education presents an interesting alternative. The historical record offers many cases where the birth of democracies opened up new possibilities for the scaling up of public education (Sachs, 2012). Engerman et al., (2000), Baum and Lake (2001), Lindert (2004) and Glaeser et al. (2004), suggest that democracy increases the education output, mapping democracy onto long-run changes in the distribution of human capital and then onto contemporary changes in income inequality. However, if either the quality of education is low for the poor or the social payoff from education diminishes as a consequence of deeply ingrained patterns of social exclusion and discrimination, educational attainment may not reduce inequality (World Bank, 2003, pp. 187).

Why the median voter channel, the labor markets, the protection of property rights, and even education, may not reduce inequality? By looking at Engerman and Sokoloff (2000), You and Kagram (2004), Savoia et al. (2009), and Acemoglu and Dell (2010), I can provide a plausible

explanation: If democracies display high initial levels of inequality, it is difficult for the poor to hold the rich and powerful accountable; such state of affairs affects the social norms about the legitimacy of rules and institutions. In one hand, the wealthy minority may be inclined and able to establish a legal framework to ensure themselves a disproportionate share of political power, and use it to establish rules, laws, and government policies to give themselves broader access to economic opportunities. On the other hand, this situation might discourage citizens to press for redistributive changes that may not ultimately benefit them. Therefore, property rights, legal systems, and fiscal and economic institutions may perpetuate the unequal distribution of income. This explains why societies that began with high initial levels of inequality (e.g., Latin America) still display high levels of inequality, and shows the importance of exploring if democracy works as a commitment device that prevents ruling minorities from erecting barriers to the excluded.

1.1. An alternative to explore the link between democracy and inequality

An interesting alternative to assess the link between democracy and inequality consists of studying the effects of the quality of democratic institutions (e.g., effective constraints on the executive and a system of political checks and balances) across generations. On this regard, the immigration assimilation literature is suggestive: Reitz and Somerville (2004), Algan et al. (2010) and Constant et al. (2010), using micro-level data for Canada and European countries, show that the offspring of first-generation immigrants face better opportunities than their parents for economic success. Indeed, second-generation immigrants face institutional set-ups, particularly educational policies, that allow them to be more competitive in the local labor markets than their parents. Therefore, it is reasonable to think that institutional changes on democracy may have different effects across generations. Nonetheless, it may be that these changes are more relevant before people's birth if the benefits of democracy transmit between generations (e.g., human capital); maybe these changes are relevant during the early childhood years since early life conditions exert a strong influence on social and cognitive skills later in life (see Heckman, 2007); maybe these changes are important during the school years, considering that democracies are more likely to spend more in education (Ansell, 2008) and that during the school years individuals acquire cognitive, social, and emotional skills to navigate life (American Academy of Child and Adolescent, 2008); maybe these changes are important when individuals are entering the labor markets, because workers enjoy more bargaining power as a result of the political power of unions (Schumpeter, 1942; Rodrik, 1999) — nonetheless individuals may not count with the opportunity to enroll to the union, which limits the effects of democracy when individuals are entering the labor markets.

Having the previous ideas in mind, in the next sections I try to determine if cohorts that experienced higher quality democratic institutions around their year of birth exhibit less inequality.

2. Data

The data comes from several household surveys of nine Latin American countries: Argentina, Brazil, Bolivia, Colombia, Honduras, Peru, Panama, Paraguay and Uruguay, harmonized by the Research Department and Education Division of the Inter-American Development Bank. To maximize the number of countries and periods I use surveys between 1995 and 2009, biannual, and restrict myself to urban areas in Bolivia due to the lack of rural data for 1995 and 2009. Although Peru and Honduras 1995 surveys are not harmonizable, I do not exclude these countries from the analysis given that these represent important sources of variation and only unbalance the pseudo-panel. Table A1, in the appendix, reports data sources.

I restrict myself to individuals born between 1936 and 1977, so that the oldest individual is 73 years old in 2009 and the youngest one 18 years old in 1995. However, I drop individuals between 18 and 24 years in 1995 and between 21 and 24 years in 1997. Therefore, I consider the facts that by 2009 life expectancy in the region was about 74 years—to keep a representative sample of “old” individuals—and that a person’s educational attainment is likely to remain unchanged after age 25—to avoid truncation in the distribution of educational attainment. I do not consider individuals with less than 18 years in 1995 to avoid attrition problems.³

The source of income for every household member is monthly monetary household per-capita income, which is the sum of monthly household labor income (earnings from the main and secondary activity, tips (if apply), over-time payments, commissions and bonuses) and monthly monetary household non-labor income (incomes from interest, dividends, pensions, remittances, transfers from relatives and friends, disability incomes and other benefits), measured in terms of purchasing power parity, constant prices (US\$) of 2005, divided by the number of household members.

If a household does not report any source of income I drop it. I also drop monthly monetary household per-capita income outliers and observations with missing values.⁴ The previous procedures comprise less than 2% of the sample.

When repeated cross-sections are available it is important to use cohorts to obtain consistent estimators in a regression, because regressors are likely to be correlated with errors (Deaton, 1985). A pseudo-panel consists of cohorts (synthetic individuals) that we are able to follow over time. However, to obtain consistent estimators from a pseudo-panel, grouping variables—those that aggregate individuals into cohorts—must not present missing values for any individual in the sample, must

³A considerable limitation of excluding individuals born during the 80s is that Latin America experienced the third wave of democratization during this period (see Hagopian and Mainwaring, 2005, pp. 1-62), therefore I try to avoid truncation in the distribution of educational attainment and attrition at the cost of losing variation in the data.

⁴I detect outliers using the blocked adaptive computationally efficient outlier nominators algorithm (Billor et al., 2000), using the first percentile of the chi-squared distribution as a threshold to separate outliers from non-outliers.

not vary over time, and must be exogenous and relevant (see Verbeek, 2008). It is also important that the number of cohorts is large enough to avoid small sample size problems, that cohort-sizes are large enough to avoid measurement error problems, and that cohorts somehow minimize within cohort heterogeneity and maximize heterogeneity between cohorts (Verbeek and Nijman, 1993; McKenzie, 2000).

I use gender, country and birth year in three-year spans as grouping variables, which should be exogenous and relevant (Verbeek, 2008).⁵ I group individuals in three-year spans birth-cohorts to reduce within cohort heterogeneity and obtain high heterogeneity between cohorts; this also provides me a relatively large number of cohorts to mitigate sample size problems and cohorts that, due to their large sizes, should not present considerable measurement error problems. Thus, a cohort consists of an aggregate of individuals that have the same gender, reside in the same country at the time of the survey and that were born in the same birth-year interval. Table A2, in the appendix, shows the distribution of individuals and of cohorts.

I compute cohort-level covariates as weighted averages (using survey weights) to ensure cohort-representativeness. Income inequality estimates consist of Gini indices at the cohort level using survey weights, which have the advantage to capture the variability of income around the median, where a large segment of the low income population falls (figure A1, in the appendix).⁶

2.1. Measuring democracy

According to Marshal et al. (2010), democracy encompasses three essential interdependent elements: i) the presence of institutions and procedures through which citizens can express effective preferences about alternative policies and leaders, ii) the existence of institutionalized constraints on the exercise of power by the executive, iii) the guarantee of civil liberties to all citizens in their daily lives and in acts of political participation. Although democracy encircles other aspects such as the rule of law, systems of checks and balances, freedom of the press, and so on, these are means to, or specific manifestations of, the previous three elements. The Polity IV project provides indicators that measure these three elements and cover a longer time period than similar measures of democracy (1800-2011),⁷ what satisfies my needs.

⁵Although I can use zone of residence (urban or rural) as well to group individuals, this variable is endogenous. Individuals may decide to move from rural to urban areas looking for better life opportunities or to escape violence (e.g., forced displacement in Colombia). According to Cerrutti and Bertonecello (2003), during the last decades there has been a remarkable migration process from rural to urban areas in Latin America that is very likely to continue.

⁶The Gini measures the *inequality* among values of a frequency distribution. A Gini of zero expresses perfect equality, while a Gini of one expresses maximal inequality among values. Following Fofack and Zeufack (1999), the Gini is the logic choice given the shape of the empirical distribution of my measure of household per-capita income.

⁷See http://www.democracybarometer.org/links_en.html for a list of democracy indexes.

The Polity IV democracy index consists of an additive eleven-point scale (0-10) from codings on the competitiveness of political participation, the openness and competitiveness of executive recruitment and constraints on the chief executive.⁸ In cases of political instability the indicator displays extreme values: -66 in cases of foreign interruption; -77 in cases of interregnum, and -88 in cases of transition (see Marshal et al., 2010, pp. 17-19). Figure A1 and table A3, in the appendix, present the democracy index and the periods of political instability by country.

To obtain proxies for democracy for each cohort I first compute the average value of the democracy index for each country between 15 and 11 years before each birth year (i.e., for each year between 1936-1977), between 10 and 6 years before each birth year, ..., between 16 and 20 years after each birth year—I do not consider periods of political instability because these are coded with extreme values.⁹ Then, I compute an average for each variable and cohort; that is, for each variable (i.e., each time span), I sum the values of the three birth years that compose each cohort and divide this value by three. To include periods of political instability I first compute the percentage of years of political instability between 15 and 11 years before each birth year, between 10 and 6 years before each birth year, ..., and between 16 and 20 years after each birth year. Then, for each variable, I sum the values of the three birth years that compose each cohort and divide this value by three, obtaining a value for each variable and cohort.

It is important to note that although I impute different political cycles to individuals, different measures of democracy are not near to correlate perfectly and measures of political instability show little correlation (see table A5 in the appendix). Thus, I am able to use more than one measure of the democracy and political instability indicators in a single regression, although, this commands to perform several robustness checks to discard multicollinearity problems.¹⁰

Using the Polity IV democracy index imposes a limitation: at the country-level the index may not exhibit enough variation to run a regression using it as an independent variable, because democratic institutions are rigid. Therefore, it is important that I include all countries of interest in all regressions in order to have enough variation between cohorts to make useful inferences.

⁸The *competitiveness of political participation* refers to the extent to which alternative preferences for policy and leadership can be pursued in the political arena. The *openness and competitiveness of executive recruitment* implies that everyone has an opportunity, in principle, to attain a position in the executive through a regularized process. The *constraints on the chief executive* refers to the extent of institutionalized constraints on the decision-making powers of chief executives, whether individuals or collectivities.

⁹Thus, if for example in a five year interval two of these years were periods of political instability, the average value of the democracy index is an average of three values.

¹⁰Multicollinearity implies that coefficients estimates might change erratically in response to small changes in the model if two or more predictor variables are highly correlated. Thereby, if coefficients estimates are somewhat robust to a number of specifications it is possible to discard multicollinearity.

3. Descriptive Statistics

Table 1 shows some descriptive statistics of the pseudo-panel: the first row for each variable shows its average value by cohort; standard deviations are in parentheses and below the averages; average inter-survey variations lie below the standard deviations, in parentheses and italics.¹¹ Variation between cohorts and between periods in household composition stands out. In one hand, household size and presence of children in the household is higher for younger birth-cohorts, which come as no surprise since these individuals are in age of establishing a family. On the other hand, inter-period variation suggests household creation and dissolution: either kids become adults (and leave the household) or adults form their own households.

Regarding labor markets, the older the birth-cohort and the older it gets, the lower the probability for individuals belonging to the cohort of being working. In one hand, retirement decisions and problems for middle-age workers to find new jobs because employers might prefer workers with longer horizons, can keep them out of the labor markets. On the other hand, younger individuals also have higher average years of education, making them more competitive in the labor markets than older individuals (not considering the role of experience in the labor markets).

Interestingly, older birth-cohorts have higher income per-capita, and income per-capita in turn presents a slight inverted U-shape with the life cycle (which is usual). However, household creation and dissolution also seem to explain why middle-age cohorts become wealthier than younger cohorts.¹² The previous is an important phenomenon to exploit intergenerational variation in monthly monetary household income and, therefore, intergenerational variation in income inequality.

Despite the previous results, inequality is not systematically lower for younger or older individuals, and although decreases a little bit more for older birth-cohorts between 1997 and 2009, we can argue that it is high and persistent.

¹¹Table 1 excludes 1995 to consider Honduras and Peru. However, if I include 1995 and do not consider Honduras and Peru results are practically the same (see the online appendix).

¹²Imagine a three member family whose youngest member is 24 years old in 1997 and his parents are middle age. The youngest individual is not working because he is finishing his bachelor degree, but his parents are working; so, we divide the earnings of two people by three. By 2009 the youngest individual is now 36, he obtained his degree, is working, and it is very likely that he is not residing with his parents anymore. Therefore, we divide by two his parents' earnings. On the other hand, the youngest individual household income per-capita depends on his current household composition and aggregate income. Thus, former middle age individuals display higher household income per-capita in 2009 (assuming that the real value of their earnings remains unchanged), but this is not necessarily the case for the younger individual.

Table 1: Descriptive statistics (1997-2009)

	Birth cohort													
	1936-38	39-41	42-44	45-47	48-50	51-53	54-56	57-59	60-62	63-65	66-68	69-71	72-74	75-77
Gender (% of male)	45.95 (50.04) (0.06)	41.35 (49.44) (-0.42)	47.17 (50.12) (0)	46.11 (50.05) (-0.25)	49.31 (50.2) (-0.5)	47.73 (50.15) (-0.24)	47.97 (50.16) (0.02)	46.63 (50.09) (-0.03)	49.10 (50.19) (0.18)	46.86 (50.1) (0.14)	48.61 (50.18) (-0.13)	47.31 (50.13) (-0.12)	46.65 (50.09) (-0.22)	50.44 (50.23) (-0.91)
Zone (% of urban)	78.48 (10.74) (1.77)	79.85 (9.84) (1.56)	77.82 (12.47) (1.38)	81.57 (9.06) (1.37)	81.36 (9.36) (1.14)	81.78 (9.17) (1.23)	81.90 (8.85) (1.1)	82.62 (7.95) (1.21)	82.31 (8.17) (1.18)	81.56 (8.41) (1.18)	81.86 (8.18) (1.26)	80.47 (8.92) (1.2)	81.29 (8.83) (1.34)	82.22 (8.07) (1.12)
Household size	3.99 (1.4) (-0.15)	4.02 (1.21) (-0.18)	4.10 (1.23) (-0.19)	4.19 (1.26) (-0.19)	4.32 (1.25) (-0.19)	4.44 (1.2) (-0.19)	4.52 (1.22) (-0.17)	4.65 (1.13) (-0.16)	4.65 (1.12) (-0.11)	4.64 (1.05) (-0.08)	4.66 (1.03) (-0.06)	4.65 (1) (-0.06)	4.59 (1.06) (-0.08)	4.65 (1.12) (-0.13)
Presence of kids (15 ≥ years) in the household (%)	37.83 (16.75) (-2.55)	37.97 (14.87) (-3.29)	39.37 (14.83) (-3.79)	41.14 (15.02) (-4.21)	45.61 (15.46) (-5.27)	51.43 (16.58) (-6.07)	58.22 (16.7) (-6.5)	66.23 (15.87) (-6.25)	72.91 (12.99) (-4.88)	77.32 (9.48) (-3.28)	79.09 (7.48) (-1.06)	78.50 (8.24) (0.56)	74.38 (8.99) (1.81)	69.15 (10.11) (1.52)
Household head (%)	63.09 (24.18) (0.6)	60.19 (25.23) (0.79)	60.86 (25.32) (0.98)	59.65 (26.08) (0.73)	59.79 (27.45) (0.69)	56.31 (27.86) (0.83)	55.14 (28.7) (1.04)	51.59 (28.54) (1.07)	51.32 (28.34) (1.54)	46.82 (27.89) (1.65)	44.21 (27.77) (2.01)	38.61 (25.34) (2.77)	33.61 (23.29) (3.53)	28.13 (19.38) (3.94)
Employment (% of employed)	38.19 (19.6) (-4.14)	41.84 (19.46) (-4.3)	51.49 (21.26) (-4.01)	58.26 (20.56) (-3.15)	64.17 (18.19) (-2.54)	68.63 (16.51) (-1.6)	71.58 (15.83) (-1.16)	73.85 (15.17) (-0.61)	75.86 (14.18) (-0.07)	76.12 (15.15) (0.25)	76.09 (14.75) (0.69)	74.96 (14.76) (0.92)	72.97 (15.24) (1.31)	70.77 (14.38) (1.75)

(Continued on next page)

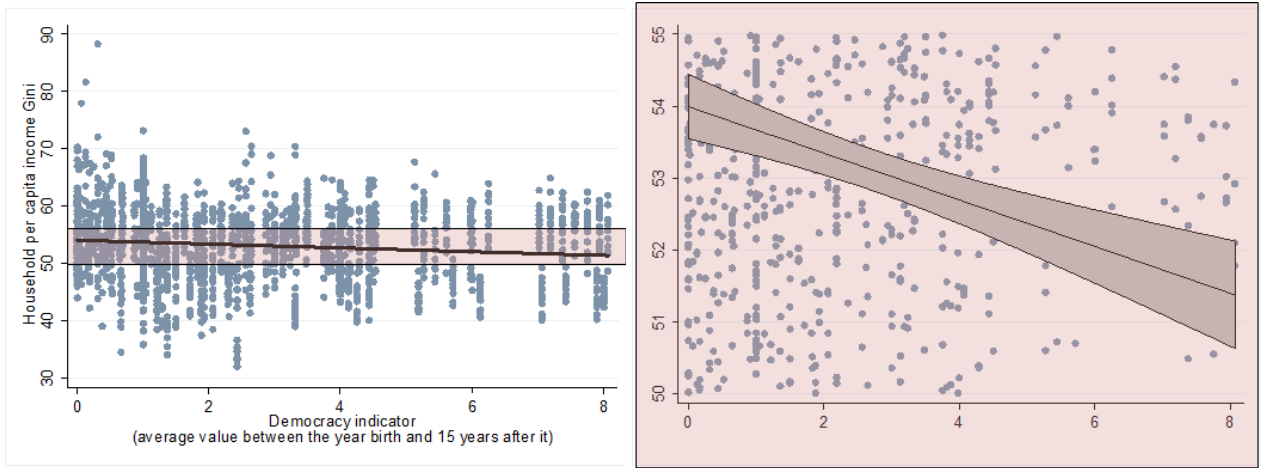
	Birth cohort													
	1936-38	39-41	42-44	45-47	48-50	51-53	54-56	57-59	60-62	63-65	66-68	69-71	72-74	75-77
Average years of education	4.84 (1.47) <i>(0.19)</i>	5.06 (1.42) <i>(0.18)</i>	5.46 (1.35) <i>(0.15)</i>	6.05 (1.42) <i>(0.17)</i>	6.49 (1.38) <i>(0.16)</i>	6.87 (1.28) <i>(0.15)</i>	7.30 (1.18) <i>(0.12)</i>	7.62 (1.19) <i>(0.12)</i>	7.88 (1.09) <i>(0.14)</i>	7.99 (1.05) <i>(0.14)</i>	8.26 (1.12) <i>(0.2)</i>	8.42 (1.09) <i>(0.12)</i>	8.80 (1.18) <i>(0.14)</i>	9.14 (1.07) <i>(0.07)</i>
Average household income per capita	334.35 (159.93) <i>(12.56)</i>	332.33 (146.94) <i>(13.22)</i>	349.09 (151.05) <i>(14.53)</i>	378.26 (150.42) <i>(19.5)</i>	352.79 (153.9) <i>(20.18)</i>	351.31 (137.89) <i>(18.32)</i>	334.34 (129.75) <i>(17.19)</i>	314.95 (124.36) <i>(19.8)</i>	300.39 (108.94) <i>(14.58)</i>	279.82 (105) <i>(10.07)</i>	279.39 (96.07) <i>(6.44)</i>	273.45 (88.3) <i>(7.2)</i>	279.30 (94.51) <i>(9)</i>	269.51 (89.59) <i>(16.31)</i>
Income inequality (Gini, 0-100 scale)	53.94 (7.56) <i>(-1.7)</i>	53.99 (6.32) <i>(-1.55)</i>	55.60 (6.37) <i>(-1.47)</i>	55.79 (6.42) <i>(-1.04)</i>	54.27 (4.6) <i>(-0.85)</i>	54.95 (4.95) <i>(-0.94)</i>	54.67 (5.1) <i>(-0.89)</i>	54.55 (4.07) <i>(-0.74)</i>	54.21 (4.37) <i>(-0.99)</i>	53.97 (4.41) <i>(-0.93)</i>	54.76 (4.43) <i>(-1.04)</i>	55.10 (4.38) <i>(-0.39)</i>	53.98 (3.77) <i>(-0.2)</i>	52.89 (4.22) <i>(0.17)</i>

Note: Standard deviations in parentheses. Average inter-survey variation in parentheses and italics. Average inter-survey variation corresponds to the difference between the average value of the variable in 2009 and 1997, divided by the number of periods (7 in this case).

Source: Author's calculations based on data from Latin American household surveys, 1997-2009, biannual.

In the next section I will go beyond region level averages to analyze whether cohorts that experienced higher quality democratic institutions around their year of birth exhibit less income inequality. It is reasonable to think, for example, that individuals born in more stable political environments, with broader civil liberties and political power in Latin America, enjoyed a more appropriate environment for individual development than those who did not, damping inequality within their birth cohort. Indeed, a preliminar look at the relationship between cohort inequality and democracy shows that individuals that experienced higher quality democratic institutions during their childhood and early adolescence exhibit less inequality (figure 1).

Figure 1: Democracy vs. Income Inequality (Gini)



Note: The right graph zooms in the shaded area in the left graph. The dark grey band in the right graph corresponds to a 95% confidence band.

Source: Author's calculations based on data from Latin American household surveys, 1995-2009, biannual and Polity IV Project.

4. Approach

Given the panel settings of my data (panel of successive cross-sections), the estimation relies on the following model:

$$Y_{c,g,p,e}w_{c,g,p,e} = [\alpha + \bar{\mathbf{D}}_{c,p}\beta + \bar{\mathbf{I}}_{c,p}\theta + \rho_c + \eta_g + \phi_p + \varphi_e + \psi_{p,e} + \bar{\mathbf{E}}_{c,g,p,e}]w_{c,g,p,e}, \quad (1)$$

where $Y_{c,g,p,e}$ denotes the Gini index of birth-cohort c , of gender g , of country p and survey e . $\bar{\mathbf{D}}$ is a vector of institutional characteristics on democracy around people's birth year: average value of the democracy indicator between 15 and 11 years before birth year, between 10 and 6 years before birth year, ..., between 16 and 20 years after birth year. $\bar{\mathbf{I}}$ is a vector that accounts for episodes of political

instability around people’s birth year: average percentage of years of political instability between 15 and 11 years before birth year, between 10 and 6 years before birth year, ..., and between 16 and 20 years after birth year. Using this set of variables I consider that institutional changes on democracy must be conceptualized over a long period of time (Gerring et al., 2005) and explore various time periods around people’s birth year in which democracy may affect the future economic conditions of individuals. However, I believe that the quality of democratic institutions is important during childhood for future economic conditions, since these are key years in which individuals acquire the cognitive, social, and emotional skills that the labor markets are likely to value and that in general are useful to navigate life.

ρ , η , ϕ , φ and ψ denote fixed effects by birth-cohort, gender, country, survey, and an interaction between survey and country fixed effects respectively. First, birth-cohort fixed effects allow to capture possible trends in democracy and other economic and cultural factors, such as: the level of access to technologies of information (e.g., tv, cable, internet), the level of access to different goods and services, etc., which may characterize differences between birth-cohorts. Second, gender fixed effects allow to consider the fact that women and men face different socioeconomic conditions; women, for example, enjoy less work opportunities and lower salaries than men as cause (among other reasons) of differences in human capital and/or gender discrimination (see Ñopo, 2012, ch. 4). Third, country fixed effects, survey fixed effects, and their interaction allow to control for long-run and short-run country-level economic changes, such as: GDP growth, social public spending, inflation, etc., and changes in survey lifting —which should capture as well short-term differences in the socioeconomic conditions of cohorts when they grow older. $\bar{\epsilon}$ denotes the composite error.

To estimate (1) the within estimator provides a reasonable estimate for δ (see Verbeek, 2008).¹³ Nonetheless, this approach does not provide estimates for β and θ because $\bar{\mathbf{D}}$ and $\bar{\mathbf{I}}$ are not time-varying. But, if grouping variables are exogenous and relevant (i.e., not correlated with the error term but properly correlated with observables), and cohort sizes are large enough, I can estimate (1) using OLS (see Moffitt, 1983; Verbeek and Vella, 2005).¹⁴ Nonetheless, Moffitt’s approach requires $\bar{\mathbf{D}}$ and $\bar{\mathbf{I}}$ to be exogenous, and these are not —remember that democratization might arise as an endogenous result from many socioeconomic phenomena. However, the set of fixed effects should attenuate endogeneity by eliminating not only unobserved country, survey, gender, zone and birth-cohort specific factors but also variables for which only cross-sectional information is available. Furthermore, I correct for underlying heteroscedasticity due to variation between periods

¹³In a simple pseudo-panel model: $Y_{c,e} = \alpha + \bar{x}_{c,e}\delta + \bar{\epsilon}_{c,e}$, the within estimator is $\hat{\delta} = (\sum_{c=1}^C \sum_{e=1}^E (\bar{x}_{c,e} - \bar{x}_c)(\bar{x}_{c,e} - \bar{x}_c)')^{-1} \sum_{c=1}^C \sum_{e=1}^E (\bar{x}_{c,e} - \bar{x}_c)(\bar{y}_{c,e} - \bar{y}_c)$, where \bar{x}_c denotes the time average of the observed cohort means for cohort c .

¹⁴Girma (2000) and Collado (1997) provide other methods to estimate pseudo-panel models. However, I do not consider these because do not offer any gain in terms of consistency, and estimators are less efficient than those from Moffitt’s approach. (See Verbeek and Vella, 2005, for further discussion.)

in cohort sizes using Weighted Least Squares (where the weight $w_{c,g,p,e}$ is $\sqrt{N_{c,g,p,e}}$ and N denotes the cohort size) and robust errors to strengthen the specification.

5. Results

Table 2 shows the estimates of democracy on inequality for several specifications of the pseudo-panel model. As a first exercise I estimate equation (1) using each interval of the indicators of democracy and political instability separately (columns 1-7 of table 2). Results show that the indicators of democracy between the year of birth and 5 years after it and between 6 and 10 years after the birth year are significant and negatively related to inequality.

Column 8 shows the results of estimating my main regression (i.e., controlling for all time intervals around people's birth year for both democracy and political instability indicators). This column provides similar results to those I present above: the indicators of democracy between the year of birth and 5 years after it and between 6 and 10 years after the birth year are significant and are negatively related to inequality. These results suggest that one standard deviation in the average value of the democracy indicator between the year of birth and 5 years after it (that is 2.5) reduces inequality by 1.0 percentage points approximately (that is, 2.5×-0.39). Furthermore, one standard deviation in the average value of the democracy indicator between 6 and 10 years after the birth year (that is 2.7) reduces inequality by around 0.7 percentage points. Thus, I can conjecture that one standard deviation in the average value of the democracy indicator during childhood reduces inequality by nearly 1.7 percentage points.

The previous results suggest that the quality of democratic institutions during childhood exerts influence on economic conditions later in life. It is reasonable to think that the quality of democratic institutions is important for individuals during their childhood years considering that democracy is important for determining how the governments distribute the benefits of public services among children (Moss, 2007), and that the socioeconomic conditions kids enjoy can exert a strong influence on social and cognitive skills later in life (Heckman, 2007) —which in turn may play a role in the level of socioeconomic opportunities individuals can access during their adulthood.

It is less likely that individuals that experienced higher quality democratic institutions when they were about to enter the labor markets (e.g., late teens), but that did not experienced an adequate political environment during their childhood, show less inequality. Given that democracies are more likely to demand workers with high levels of human capital than non-democracies (Przeworski, 2008), it is important that individuals count with the social and cognitive skills that a more democratic political environment during childhood may provide. Thus, it is reasonable to find that

the value of the democracy indicators during the late teens is not significant.

Table 2: Estimates of the pseudo-panel Model, Income Inequality

Estimated effect of democracy on inequality: $Y_{c,g,p,e}w_{c,g,p,e} = [\alpha + \bar{D}_{c,p}\beta + \bar{I}_{c,p}\theta + \rho_c + \eta_g + \phi_p + \varphi_e + \psi_{p,e} + \bar{\epsilon}_{c,g,p,e}]w_{c,g,p,e}$								
	Dependent variable: Income inequality (Gini, 0-100 scale)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Average value of the democracy indicator								
Between 15 and 11 years before birth	0.087 (0.076)							-0.115 (0.100)
Between 10 and 6 years before birth		-0.037 (0.082)						-0.147 (0.090)
Between 5 and 1 years before birth			-0.094 (0.069)					0.139 (0.136)
Between birth and 5 years after it				-0.258*** (0.069)				-0.386*** (0.135)
Between 6 and 10 years after birth					-0.224*** (0.052)			-0.258** (0.106)
Between 11 and 15 years after birth						-0.008 (0.086)		0.078 (0.088)
Between 16 and 20 years after birth							0.123 (0.103)	-0.071 (0.148)
Constant	50.272*** (1.255)	50.295*** (1.202)	50.384*** (1.282)	50.668*** (1.329)	51.087*** (0.948)	50.172*** (1.195)	50.549*** (1.246)	52.075*** (0.887)
Political instability	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R2	0.766	0.766	0.767	0.778	0.778	0.768	0.773	0.797
Clusters	126	126	126	126	126	126	126	126
Observations	1890	1890	1890	1890	1890	1890	1890	1890

Note: Robust standard errors clustered by country and birth-cohort in parentheses. * Significant at ten percent; ** significant at five percent; *** significant at one percent. Each specification includes the following fixed effects: birth-cohort (ρ), gender (η), country (φ), survey (ϕ), and an interaction between survey and country fixed effects (ψ). \bar{I} includes the average percentage of years of political instability between 15 and 11 years before birth year, between 10 and 6 years before birth year, ..., and/or between 16 and 20 years after birth year depending on the indicator(s) of democracy included in the regression.

Source: Author's calculations based on data from Latin American household surveys, 1995-2009, biannual and Polity IV Project.

All in all, it is important to note that the effect of democracy on inequality is not negligible if we consider that inequality is a persistent phenomenon in the region —thereby we cannot expect sharp falls as a consequence of socioeconomic phenomena. Furthermore, it is reasonable to find that the magnitudes of the significant coefficients of the democracy indicator are “small”. Indeed, if we consider that high inequality affects the social norms about the legitimacy of rules and institutions, discouraging citizens to press for redistributions that may not benefit them, and that high initial inequality stimulated the development of political and economic and political insinuations that perpetuate the unequal distribution of income (Engerman and Sokoloff, 2000), then the historically high level of inequality in the region dampens the effect of democracy on inequality.

5.1. Robustness

In this section I verify if my results survive statistical scrutiny and are robust to a number of specification checks. I briefly describe results from regressions for urban and rural sub-samples, and regressions that include a vector of sociodemographic characteristics and that control for periods of economic instability and wars. These additional checks are available in the online appendix.

In a first check I compute the same specifications of table 2 but for urban and rural areas separately. Nonetheless, to mitigate possible sample size problems in the specifications for rural areas I use as well Bolivia's rural surveys between 1997 and 2007 (although results do not vary much if I do not include these). For urban areas the main results hold: the democracy indicators between the year of birth and 5 years after it and between 6 and 10 years after the birth year are significant and negatively related to inequality. For rural areas, although the democracy indicator between 6 and 10 years after the birth year is significant, it is not possible to conclude that the democracy indicator between the year of birth and 5 years after it is significant as well. Nonetheless, it is important to consider that the previous specifications have potential sample size and measurement error problems, particularly in rural areas, because the number and size of cohorts is much smaller.

In a second check I include a vector of sociodemographic characteristics to consider that the differences in sociodemographic characteristics between cohorts may explain the differences in inequality between cohorts (e.g., cohorts with higher level of employment may exhibit less income inequality because a lower share of individuals hold the total labor income of the cohort). Thus, I add a vector of sociodemographic characteristics ($\bar{\mathbf{X}}$) to my main regression, includes: average household size, percentage of urban inhabitants, percentage of individuals living with children (15 years or less), percentage of household heads and rate of employment. It is important to note that since grouping variables are exogenous and relevant, these act as instruments for $\bar{\mathbf{X}}$ (see Moffitt, 1983). Results show once more that the indicators of democracy between the year of birth and 5 years after it and between 6 and 10 years after the birth year are significant and are negatively related to inequality. Furthermore, coefficients are statistically equal to those in table 2, column 8.

It is also important to check that the main results hold after controlling for factors that can precede regime changes, such as wars and economics crisis.¹⁵ Thus, I add a vector of controls ($\bar{\mathbf{H}}$)

¹⁵For example, in Brazil, after the end of World War II, Getúlio Vargas regime became unsustainable because during the period of the war the threat of a German attack did not materialized, and he was swiftly overthrown in a military coup that "restated" democracy. In the Argentinean *Revolución Libertadora* (1955), the peronist regime was deposed for a military dictatorship in a coup d'état by military forces. On the other hand, the 30s economic depression weakened the legitimacy of emerging democratic institutions, which led to social and political unrest between liberal movements and oligarchs and eventually to a military dictatorship in most countries backed up by the right-wing (which sought to protect the *status quo*). Furthermore, the 80s economic crisis brought important economic problems for dictatorships to deal with: high unemployment, inflation, and growth stagnation, which had deligitimizing over dictatorships. Even-

that accounts for these factors. I construct \bar{H} , using the data from Correlates of War (see Sarkees and Wayman, 2010), as follows: first I compute the percentage of years of intra-state wars, inter-state wars and economic crisis respectively, for each country, either between 20 and 16 years before each birth year (i.e., for each year between 1936-1977), or between 15 and 11 years before each birth year, or between 20 and 11 years before each birth year, or for other similar time spans, since I only include one variable (i.e., time span) per regression. Then, for the variable, I sum the values of the three birth years that compose each cohort and divide this value by three, obtaining a value for each cohort. Table A4, in the appendix, presents the periods of wars and economic crisis that took place in the countries of interest.

Results hold in general after introducing \bar{H} in my main regression as a control: individuals that experienced higher quality democratic institutions during childhood exhibit less inequality. Therefore, I can state that my robustness tests show consistent results with those that I obtain in my main regression.

All in all, the previous results provide a number of important messages. First, my specification does not seem to have multicollinearity problems because the values of the coefficients do not vary erratically across specifications. Second, if I control for periods of political instability (which are controls in all regressions), wars and economic crisis, the negative and significant effect of democracy on inequality holds; thereby, changes in inequality are attributable to institutional changes on democracy. Third (and most importantly), I find suggestive evidence that suggests that cohorts that experienced higher quality democratic institutions during their childhood exhibit less inequality.

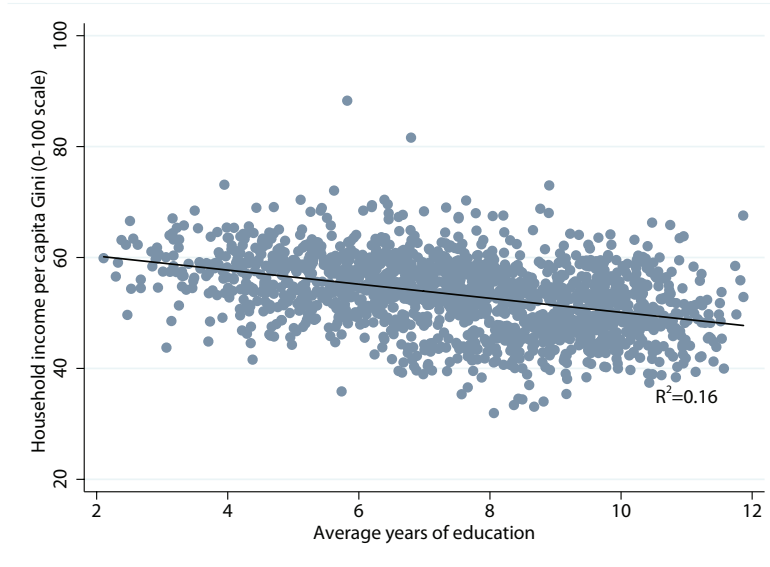
5.2. The role of education

A mechanism that may explain the negative relationship between democracy and inequality is education. We may think that more democratic regimes may invest more in public education (Ansell, 2008). If governments spend more in public education, those who are in school age and are younger benefit more from it, because inter-generational human capital accumulates with long time spans and also because investments in education are useful for kids attending school for developing social and cognitive skills that will be useful later in their lives (e.g., in their work years). This conjecture may imply that we may not only expect that individuals that experienced higher quality democratic institutions during their childhood have higher educational attainment, but also that individuals that “experienced” higher quality democratic institutions before their birth year exhibit higher educational attainment due to inter-generational transmission of human capital. In

tually the crisis led non-democratic regimes to an end and to the birth of representative democracies during the 80s. (See Bethell, 1997; Scheina, 2003.)

any case, an increase in human capital may allow poor individuals to become more competitive in the labor markets and the work force to add more value to goods and services; and both may lead to a more egalitarian distribution of resources (see Saint-Paul and Verdier, 1993). Then, education may map democracy on inequality if democracy affects the level of educational attainment, given that cohorts' *average years of education* (the most common proxy for educational attainment) and cohorts' inequality show a negative relationship (figure 2).

Figure 2: Average Years of Education vs. Household Income per-capita Gini



Source: Author's calculations based on data from Latin American household surveys, 1995-2009, biannual.

Before testing the link between democracy and educational attainment, it is important to consider that the number of years of education should exhibit serial correlation, because the number of years of education of a person in a given year is necessarily related to the number of years of education in the previous year —although I restrict myself to individuals with 24 years or more to avoid truncation in the distribution of educational attainment, individuals might still attain more education with time (e.g., graduate studies). Therefore, it is important to control for serial correlation introducing a lag of the dependent variable as a regressor.¹⁶ Thus, the pseudo-panel model for educational attainment is

$$\begin{aligned} \bar{Y}_{c,g,p,e} w_{c,g,p,e} = & [\alpha + \bar{Y}_{c,g,p,e-1} \tau + \bar{\mathbf{D}}_{c,p} \beta + \bar{\mathbf{I}}_{c,p} \\ & + \theta + \rho_c + \eta_g + \phi_p + \varphi_e + \psi_{p,e} + \bar{\mathbf{E}}_{c,g,p,e}] w_{c,g,p,e}, \end{aligned} \quad (2)$$

¹⁶Verbeek and Vella (2005) show that if grouping variables are exogenous and relevant and cohorts sizes are large enough, it is possible to obtain an appropriate measure of $\bar{Y}_{c,g,p,e-1}$, equivalent to the lagged value of $\bar{Y}_{c,g,p,e}$.

where $\bar{Y}_{c,g,p,e-1}$ is the lag of $\bar{Y}_{c,g,p,e}$.

5.2.1. Results

Table 3 shows the estimates of democracy on educational attainment for several specifications of the pseudo-panel model. In a first exercise I estimate equation (2) using each interval of the indicators of democracy and political instability separately (columns 1-7 of table 2). Results show that the indicators of democracy between 5 and 1 years before the birth year, between the birth year and 5 years after it and between 6 and 10 years after the birth year relate positively to educational attainment and are significant. In column 8, which presents the results of my main regression, my findings are in line with the previous ones. Furthermore, the democracy indicator between 15 and 11 year before the year of birth is significant. The previous results may give credence to the idea that democracy not only benefits individuals during their childhood but also has an inter-generational component (i.e., older cohorts may benefit as well from democracy, build human capital, and be able to transmit it to the younger generations).

Regarding results in column 8, one standard deviation in the average value of the democracy indicator between 15 and 11 years before the birth year (that is 2.4) increases educational attainment by 0.08 years (that is, 2.4×0.04); one standard deviation in the average value of the democracy indicator between 5 and 1 years before the birth year (that is 2.7) increases educational attainment by 0.05 years; one standard deviation in the average value of the democracy indicator between the birth year and 5 years after it (that is 2.8) increases educational attainment by 0.09 years; and one standard deviation in the average value of the democracy indicator between 6 and 10 years after the birth year (that is 2.9) increases educational attainment by 0.11 years. Therefore, one standard deviation in the previous coefficients increases average educational attainment by 4.5 percentage points approximately (that is, $[0.08+0.05+0.09+0.11+7.5] \div 7.5 - 1$).

It is possible to understand the previous findings if we consider that early life conditions exert a strong influence on social and cognitive skills later in life, and that governments —particularly democratic governments— conducted substantial efforts to expand primary education during the 20th century (see Bethell, 1997; World Bank, 2003; and Schiefelbein, 2007). Along this line, democracies may provide broader political power and a more stable political environment to exercise civil liberties, which allow parents with low income to keep their children in school and children to exercise their entitlement to have education. In turn, children may benefit from more adequate learning environments and possibly higher public spending in education by governments during key years of their individual development. As a result, they may become more educated and, therefore, more competitive and more productive —adding more value to goods and services dur-

ing their work years. Under the previous conjectures, democracy increases human capital, which in turn may reduce income dispersion by providing employment opportunities for the poor and boosting economic growth (which may also generate other benefits: increases in public spending, creates demand for labor, etc.).

Table 3: Estimates of the pseudo-panel Model, Educational Attainment

Estimated effect of democracy on education: $\bar{Y}_{c,g,p,e}w_{c,g,p,e} = [\alpha + \bar{Y}_{c,g,p,e-1}\tau + \bar{D}_{c,p}\beta + \bar{I}_{c,p}\theta + \rho_c + \eta_g + \phi_p + \varphi_e + \psi_{p,e} + \bar{\epsilon}_{c,g,p,e}]w_{c,g,p,e}$								
	Dependent variable: Average years of education							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Average value of the democracy indicator between								
Between 15 and 11 years before birth	0.004 (0.005)							0.035*** (0.008)
Between 10 and 6 years before birth		0.009 (0.006)						0.011 (0.011)
Between 5 and 1 years before birth			0.016*** (0.005)					0.019* (0.010)
Between birth and 5 years after it				0.019*** (0.006)				0.033*** (0.011)
Between 6 and 10 years after birth					0.015*** (0.005)			0.039*** (0.010)
Between 11 and 15 years after birth						-0.007 (0.006)		-0.000 (0.008)
Between 16 and 20 years after birth							-0.021** (0.008)	0.013 (0.009)
Constant	0.913*** (0.261)	0.924*** (0.255)	0.926*** (0.272)	1.026*** (0.280)	0.959*** (0.264)	0.950*** (0.265)	1.129*** (0.296)	0.736*** (0.277)
Political instability	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R2	0.972	0.973	0.973	0.973	0.973	0.972	0.973	0.974
Clusters	126	126	126	126	126	126	126	126
Observations	1638	1638	1638	1638	1638	1638	1638	1638

Note: Robust standard errors clustered by country and birth-cohort in parentheses. * Significant at ten percent; ** significant at five percent; *** significant at one percent. Each specification includes the following fixed effects: birth-cohort (ρ), gender (η), country (φ), survey (ϕ), and an interaction between survey and country fixed effects (ψ). \bar{I} includes the average percentage of years of political instability between 15 and 11 years before birth year, between 10 and 6 years before birth year, ..., and/or between 16 and 20 years after birth year depending on the indicator(s) of democracy included in the regression.

Source: Author's calculations based on data from Latin American household surveys, 1995-2009, biannual and Polity IV Project.

We must consider that the magnitudes of the significant coefficients are small as a result of high initial inequality. During the first half of the 20th century high inequality exacerbated the collective-action problems associated with the establishment and funding of universal public schools. Furthermore, where the elite enjoyed disproportionate political power, the elite was able to procure schooling services for their own children and resist subsidize services for others. Governments did not provide adequate access to education to most people until the second half of the 20th century. However the differences in the quality of education between the wealthy and the rest of the population prevailed. (See World Bank, 2003, pp. 177-188.) Therefore, it is reasonable to think that high initial inequality dampens the effect of democratic institutions on educational attainment by

affecting the long-run provision of public goods such as education, which may in turn dampen the intergenerational accumulation of human capital particularly among the poor.

5.2.2. Robustness

In this section I verify that my results survive statistical scrutiny and are robust to a number of specification checks. I briefly describe results from regressions for male and female sub-samples, and for urban and rural sub-samples. I also perform regressions that include a vector of sociodemographic characteristics and controls for periods of economic instability and wars. These additional checks are available in the online appendix.

In a first check I compute specifications in table 3 but for female and male sub-samples. In general, the main results regarding the positive relationship between democracy and educational attainment hold for the male and female sub-samples. However, for women, when I include the full set of democracy and political instability indicators, the average values of the democracy indicators between 5 and 1 years before the birth year and between the birth year and 5 years after it are no longer significant.

In a second check I compute the specifications for urban and rural areas separately. For urban areas the main results seem to hold. To analyze rural areas I include Bolivia's rural surveys between 1997 and 2007 in order to mitigate sample size problems (although results are similar if I do not include them). However, results suggest that the effect of democracy on educational attainment is ambiguous. Nonetheless, it is important to consider that the number and size of cohorts for rural areas is much smaller than for urban ones. Thus, estimates for the rural sub-sample may suffer from considerable sample size and measurement error problems in comparison to estimates for the urban sub-sample, and thereby are less reliable.

In a final set of checks, I include a vector of sociodemographic characteristics to consider that the differences in sociodemographic characteristics between cohorts may explain the differences in educational attainment between cohorts; furthermore, I also add a vector of controls that accounts for periods of inter-state wars, intra-state wars and economic crisis with the objective of checking that the main results hold after controlling for factors that precede regime changes —similarly to the previous robustness checks.

Results from the previous specification checks show that the main results hold for most specifications: the indicators of democracy between 15 and 11 years before the birth year, between 5 and 1 years before the birth year, between the birth year and 5 years after it, and between 6 and 10 years after the birth year relate positively to educational attainment and are significant. This gives further

credence to the idea that democracy not only benefits children attending school, but also provides benefits that transmit intergenerationally (e.g., such as the level of human capital).

Although the previous results are somewhat less robust, given that results are consistent for the different specifications, these do not rule out the effect of democracy on education. Thus, the previous findings give credence to the idea that education may map democracy onto long-run changes in the distribution of human capital, and then onto contemporary changes in income inequality.

Conclusions

Despite many research documents assess the link between democracy and inequality, empirical research is still not conclusive on whether and how democracy and inequality relate. This relationship is a complex and multidimensional process that involves many socioeconomic phenomena. And although many studies assess the empirical relationship between democracy and inequality, these usually resort to cross-country panel data sets which impose several measurement error and endogeneity problems that are hard to solve.

This paper tries to overcome many of the previous difficulties using pseudo-panel data built from several household surveys of nine Latin American countries; exploiting panel data techniques to control for endogeneity due to unobserved factors, and proposing a renewed approach which seeks to determine if cohorts that experienced higher quality democratic institutions during childhood exhibit less inequality.

My findings suggest not only that cohorts that experienced higher quality democratic institutions during childhood exhibit less inequality, but also that education may act as a redistributive mechanism that maps long-run changes in the distribution of educational attainment on inequality. My interpretation of these results is: It is reasonable to think that democracies invest more in public education, which in turn benefits particularly individuals in school age and younger generations, not only because inter-generational human capital accumulates with long time spans but also because investments in school education can exert a strong influence on social and cognitive skills of individuals later in life. Furthermore, it is possible to argue that with broader political power and a more stable political environment to exercise civil liberties, parents with low income can keep their children in school and children can benefit from adequate learning environments to become more competitive and productive during their work years, which may lead to a more egalitarian distribution of income.

It is important to note that there is still further research to conduct regarding the effect of the quality of democratic institutions during childhood on inequality. This paper, for example, does

not consider cohorts born in the third wave of democratization that experienced the region (that is, during the 80s). In the future we will count with additional surveys that will permit us to consider these cohorts, allowing us to draw more precise conclusions on the role of the quality of democratic institutions during childhood on inequality. Furthermore, we will be able to study the differences between cohorts that experienced long periods of democracy and those that experienced a different institutional set up (e.g., intermittent periods of democracy, as in Argentina). There is also plenty of room to carry on micro-level studies on this regard, for example: considering the growing availability of longitudinal studies, in the future we will be able to test the effects of the quality of democratic institutions during childhood on inequality within a country—which is beyond the possibilities of this study— by analyzing individuals and not aggregates of them (which I consider a step forward in research regarding the link between democracy and inequality). All in all, I believe further research will be important to validate the findings that I present in this paper, that for now present suggestive evidence of the negative relationship between democracy and the positive relationship between democracy and educational attainment.

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Table A1: Data Sources

Country	Name of survey	Year	Coverage	Country	Name of survey	Year	Coverage
Argentina	Encuesta Permanente de Hogares	1995	Urban	Panama	Encuesta de Hogares	1995	National
		1997	Urban			1997	National
		1999	Urban			1999	National
		2001	Urban			2001	National
		2003	Urban			2003	National
	Encuesta Permanente de Hogares-Continua	2005	Urban			2005	National
		2007	Urban			2007	National
		2009	Urban	2009	National		
Bolivia	Encuesta Integrada de Hogares	1995	Urban	Paraguay	Encuesta de Hogares (Mano de Obra)	1995	National
	Encuesta Nacional de Empleo	1997	National		Encuesta Integrada de Hogares	1997	National
	Encuesta Continua de Hogares	1999	National		Encuesta Permanente de Hogares	1999	National
		2003	National		Encuesta Integrada de Hogares	2001	National
		2001	National		Encuesta Permanente de Hogares	2003	National
		2005	National			2005	National
		2007	National			2007	National
Encuesta de Empleo	2009	Urban		2009	National		
Brazil	Pesquisa Nacional por Amostra de Domicilios	1995	National	Peru	Encuesta Nacional de Hogares	1997	National
		1997	National			1999	National
		1999	National			2001	National
		2001	National			2003	National
		2003	National			2005	National
		2005	National			2007	National
		2007	National			2009	National
		2009	National				

(Continued on next page)

Country	Name of survey	Year	Coverage	Country	Name of survey	Year	Coverage	
Colombia	Encuesta Nacional de Hogares-Fuerza de Trabajo	1995	National	Uruguay	Encuesta Continua de Hogares	1995	Urban	
		1997	National			1997	Urban	
		1999	National			1999	Urban	
	Encuesta Continua de Hogares	2001	National			2001	Urban	
		2003	National			2003	Urban	
		2005	National			2005	Urban	
		Gran Encuesta Integrada de Hogares	2007			National	2007	Urban
			2009			National	2009	Urban
Honduras	Encuesta Permanente de Hogares de Propósitos Múltiples	1997	National					
		1999	National					
		2001	National					
		2003	National					
		2005	National					
		2007	National					
		2009	National					

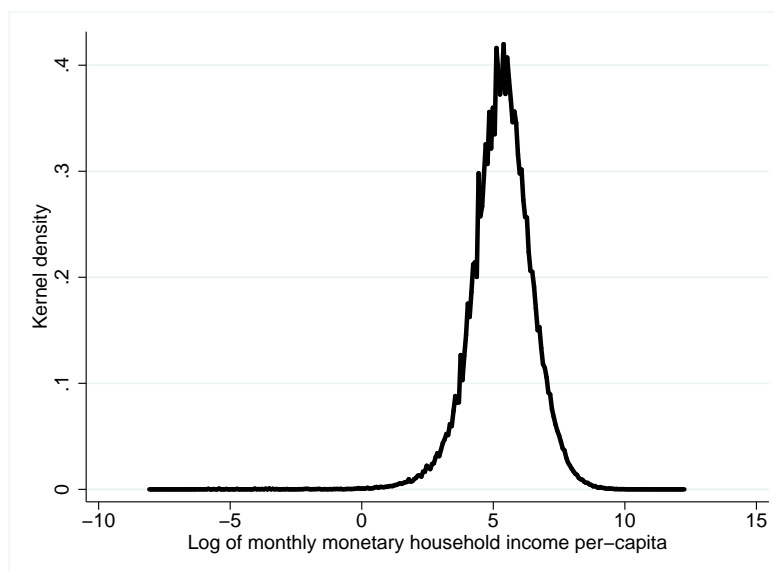
Source: Research Department and Education Division of the Inter-American Development Bank.

Table A2: Sample Size

Birth cohort (years)	Number of cohorts by year								Number of individuals	
	1995	1997	1999	2001	2003	2005	2007	2009	Unweighted	Weighted
1936-38	13	18	18	18	18	18	18	18	94244	31218954
1939-41	12	18	18	18	18	18	18	18	111656	37152574
1942-44	13	18	18	18	18	18	18	18	120244	40361728
1945-47	13	18	18	18	18	18	18	18	142512	47837181
1948-50	12	18	18	18	18	18	18	18	162667	55916674
1951-53	12	18	18	18	18	18	18	18	182919	62789916
1954-56	12	18	18	18	18	18	18	18	206572	71294990
1957-59	12	18	18	18	18	18	18	18	228840	78972699
1960-62	12	18	18	18	18	18	18	18	247802	85733849
1963-65	13	18	18	18	18	18	18	18	269200	93947731
1966-68	13	18	18	18	18	18	18	18	266407	93489847
1969-71	13	18	18	18	18	18	18	18	284583	98457627
1972-74		18	18	18	18	18	18	18	257892	89508760
1975-77			18	18	18	18	18	18	241356	84072034
Total	150	234	252	252	252	252	252	252	2816894	970754564

Source: Author's calculations based on data from Latin American household surveys, 1995-2009, biannual.

Figure A1: Estimated Kernel Distribution of Monthly Monetary Household Income per-capita

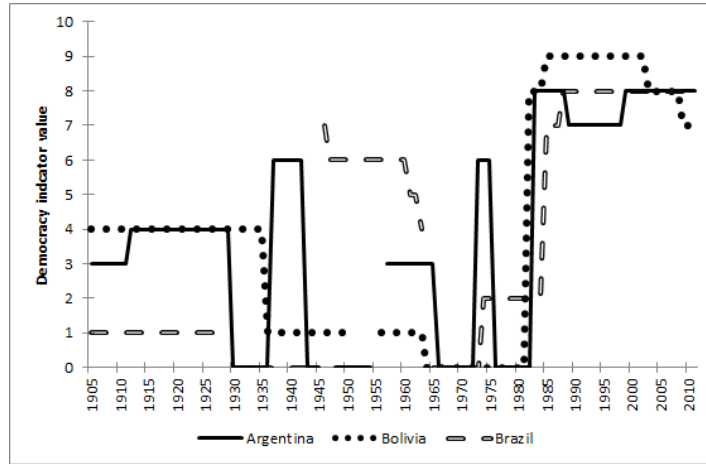


Bandwidth: 0.05

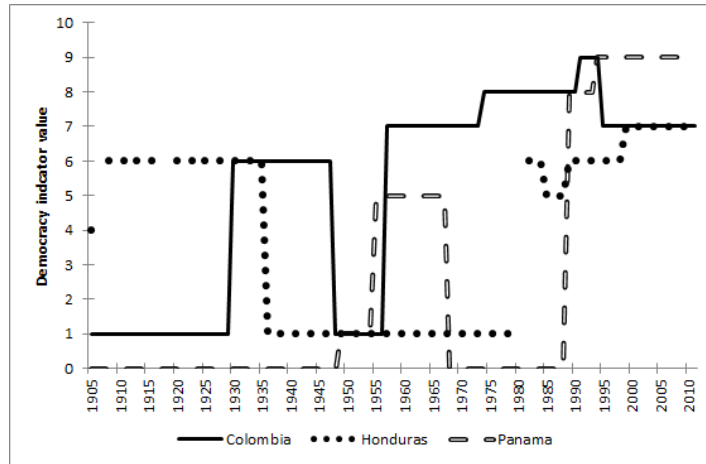
Source: Author's calculations based on data from Latin America household surveys, 1995-2009, biannual.

Figure A2: Democracy Index by Country (1905-2009)

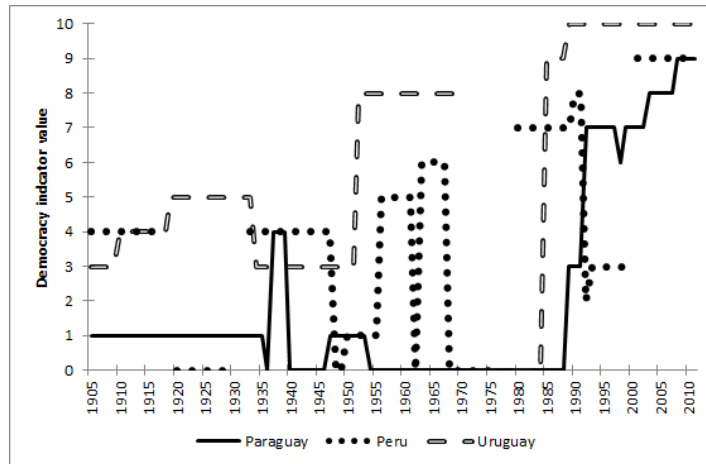
(a)



(b)



(c)



Source: Polity IV Project.

Table A3: Periods of Political Instability by Country (1905-2009)

Country	Years	Type of period of political instability
Argentina	1946-1947	Transition
	1955-1956	Transition
Bolivia	1952-1955	Transition
Brazil	1930-1933	Transition
	1945	Transition
	1964	Transition
Colombia	n.a.	n.a.
Honduras	1907	Interruption
	1912	Interruption
	1919	Interruption
	1924	Interruption
	1980-1981	Transition
Panama	n.a.	n.a.
Paraguay	n.a.	n.a.
Peru	1919	
	1930-1932	Transition
	1978-1979	Transition
Uruguay	2000	Transition
	1971-1972	Transition

Note: An interruption period is defined when a country is occupied by foreign powers during war, terminating the old polity. The foreign power then reestablishes a polity after foreign occupation ends (end of the interruption period). A transition period is defined by a “transition” during which new institutions are planned, legally constituted, and put into effect. Democratic and quasi-democratic polities are likely to be established, in a procedure involving constitutional conventions and referenda.

Source: Polity IV Project.

Table A4: Periods of Economic Crisis and Wars (1905-2009)

A. Periods of war		
Country	Years	Type of war
Argentina	1955	Intra-state
	1975-1977	Intra-state
	1982	Inter-state
Bolivia	1932-1935	Inter-state
Brazil	1912-1916	Intra-state
	1932	Intra-state
	1944-1945	Inter-state
Colombia	1948-1958	Intra-state
	1951-1953	Inter-state
	1989-2013	Intra-state
Honduras	1906	Inter-state
	1907	Inter-state
	1924	Intra-state
	1969	Inter-state
Panama	n.a.	n.a.
Paraguay	1911-1912	Intra-state
	1932-1935	Inter-state
	1947	Intra-state
Peru	1932	Intra-state
	1982-1992	Intra-state
	1995	Inter-state
Uruguay	n.a.	n.a.

B. Periods of economic instability	
Name of the crisis	Years
Economic recession	1928-1939
Latin American debt crisis	1982-1992
Latin American financial crisis	1998-1999
Global financial crisis	2008-2013

Note: Intra-state wars encompass wars that predominantly take place within the recognized territory of a state. Inter-state wars encompass wars that take place between or among the recognized states.

Source: Author’s compilations and Correlates of War.

Table A5: Correlations Between Selected Measures of the Democracy Indicator and the Political Instability Indicator

A. Democracy Indicator							
Value between	20 and 16 years before birth	15 and 11 years before birth	10 and 6 years before birth	5 and 1 years before birth	birth year and 5 years after it	6 and 10 years after birth	11 and 15 years after birth
15 and 11 years before birth	1.000						
10 and 6 years before birth	0.685*** (0.000)	1.000					
5 and 1 years before birth	0.316*** (0.000)	0.673*** (0.000)	1.000				
birth years and 5 years after it	0.138*** (0.000)	0.319*** (0.000)	0.659*** (0.000)	1.000			
6 and 10 years after birth	0.133*** (0.000)	0.141*** (0.000)	0.271*** (0.000)	0.616*** (0.000)	1.000		
11 and 15 years after birth	0.278*** (0.000)	0.171*** (0.000)	0.102*** (0.000)	0.236*** (0.000)	0.667*** (0.000)	1.000	
16 and 20 years after birth	0.345*** (0.000)	0.283*** (0.000)	0.123*** (0.000)	0.068*** (0.003)	0.295*** (0.000)	0.699*** (0.000)	1.000
B. Political Instability Indicator							
15 and 11 years before birth	1.000						
10 and 6 years before birth	0.116*** (0.000)	1.000					
5 and 1 years before birth	0.047** (0.040)	0.198*** (0.000)	1.000				
birth years and 5 years after it	-0.032 (0.161)	0.046** (0.045)	0.091*** (0.000)	1.000			
6 and 10 years after birth	-0.104*** (0.000)	-0.045* (0.050)	0.029 (0.209)	0.103*** (0.000)	1.000		
11 and 15 years after birth	-0.109*** (0.000)	-0.091*** (0.000)	-0.089*** (0.000)	-0.001 (0.968)	0.120*** (0.000)	1.000	
16 and 20 years after birth	0.002 (0.945)	-0.096*** (0.000)	-0.070*** (0.002)	-0.083*** (0.000)	0.039* (0.089)	0.145*** (0.000)	1.000

Correlations at the cohort level. P-values in parentheses. * Significant at ten percent; ** significant at five percent; *** significant at one percent.

Sources: Author's calculations based on data from the Polity IV Project.