**The Pink Tide and Inequality in Latin America**

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*Latin American countries experienced a significant reduction in income inequality at the turn of the 21st century. From the early 2000s to around 2012, the average Gini coefficient fell from 0.514 to 0.475. The period of falling inequality coincided with leftist presidential candidates achieving electoral victories across the region: by 2009, ten of the seventeen countries had a leftist president – the so-called Pink Tide. We investigate whether there was a "leftist premium" on the decline in inequality and, if there was one, through which mechanisms. Using a range of econometric models, inequality measurements, and samples, we find evidence that leftist governments lowered income inequality faster than non-leftist regimes, increasing the income share captured by the first seven deciles at the expense of the top ten percent. Our analysis suggests that this reduction was achieved by increasing minimum wages, social pensions, and taxes.*

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Income inequality fell in practically every Latin American country during the first decade of the 21st century, a time in which voters also elected an unusual number of left-of-center presidents – the so-called "Pink Tide" (Weyland et al., 2010; Levitsky and Roberts, 2011). Were these two developments related? Figure 1 suggests that, indeed, countries governed by leftist presidents experienced a more pronounced decline in inequality.[1] Simultaneously, most of these countries experienced an overlapping growth spurt as a consequence of the so-called commodities boom.[2] The decline in inequality, therefore, may have been a byproduct of economic growth and the concomitant larger fiscal space rather than the policies implemented by leftist governments.

[Figure 1 about here]

[1] Following Weyland et al. (2010), these include Argentina (Nestor Kirchner and Cristina Fernandez), Bolivia (Evo Morales), Brazil (Ignacio "Lula" da Silva and Dilma Rousseff), Chile (Ricardo Lagos and Michele Bachelet), Ecuador (Rafael Correa), El Salvador (Mauricio Funes and Salvador Sanchez), Nicaragua (Daniel Ortega), Paraguay (Fernando Lugo), Uruguay (Tabare Vazquez and Jose Mujica), and Venezuela (Hugo Chavez and Nicolas Maduro).

[2] The 2000s commodities boom or the commodities super cycle was the rise of many commodity prices (such as those of food, oil, metals, chemicals, fuels and the like) during the early 21st century (2000–2014).

Some of the existing literature lends support to the idea that leftist governments adopt policies that redistribute both wealth and income. Building on the experience of Western Europe, scholars contend that social-democratic parties are a powerful force for economic equality (Castles, 1985; Esping-Andersen, 1990; Korpi, 2018; Stephens, 1979). The evidence, however, is not unambiguous (e.g., Bradley et. al, 2003; Hicks & Hicks, 1999; Huber & Stephens, 2010, 2012; Mahler, 2010; Rueda, 2007a; Scheve & Stasavage, 2009).[3] Furthermore, heightened competition, changes in global finance, structural unemployment, and the decline in organized labor's power in recent decades may impede or discourage leftist governments from implementing broad redistributive policies (e.g., Rueda, 2007b; Thelen, 2014). In Latin America, smaller unions and larger informal sectors may further limit the power of progressive governments to redistributive incomes (Holland & Schneider, 2017; Schneider & Soskice, 2009; Segura-Ubiergo, 2007).

Given the commodities boom and the ambiguous empirical results in previous episodes of leftist government redistribution, there is no reason to assume a systematic connection between the "Pink Tide" and the observed reduction in inequality. After all, inequality also declined in countries governed by non-leftist presidents. That said, Figure 1 does suggest that countries governed by the Left experienced a sharper decline. The question is, then, was there a "leftist premium"? That is, did countries governed by the Left experience a decline in inequality over and above what would have been predicted by other factors such as high economic growth? If the answer is "yes," what policies were used by these governments to generate the leftist premium?

Using the most complete data on income inequality covering the period between 1992 and 2017, we study the contemporaneous impact of government ideology on economic inequality and on redistributive policies. For that end, we use a difference-in-differences (DD) design and various econometric strategies, including time-series models and event-study techniques. Conceptually, we examine changes in income inequality in countries before and after the Left came to office (treatment group), relative to such changes in other countries without a left-wing government during the sample period (control group).[4]

We find that there were no differing patterns in inequality trends prior to the left taking office. This result is in line with the findings by Lora and Olivera (2005), Kaufman (2009) and Murillo et al. (2010), for example. In turn, our results suggest that countries experienced a more pronounced decline in income inequality after the Left came to power, even when controlling for other factors such as terms of trade, trade volume, the skill composition of their workforce, lagged levels of inequality, and country and year fixed effects. On average, countries with a leftist president experienced a decline in their Gini index of six percent per year. If the Left would be on power for a sustained period

[3] For instance, Bradley et al. (2003) find that the cumulative power of the Left is a poor predictor of pre-tax inequality but has a positive and substantive effect on fiscal redistribution. Mahler (2010), instead, finds no effect of Left power on government inequality reduction.
[4] That is, we estimate the average treatment on the treated effect or ATT.

of time, the effect of the Left on inequality would accumulate. If it stayed in power for four years, the cumulative effect would equal to 5 percent and 7,8 percent if it stayed in power for eight years.[5] The redistribution induced by the Left favors the income shares of the bottom and middle deciles at the expense of the share of the top 10 percent. These results are robust to various model specifications, and they are not driven by pre-existing trends in inequality or the inclusion or exclusion of control variables or individual countries in our sample.

We also investigate three main mechanisms through which a change in policy could show a contemporaneous reduction in inequality: an expansion of direct transfers (more so if targeted to the poor), an increase in the minimum wage, and a progressive tax reform (Cord et al., 2014; Lopez-Calva & Lustig, 2010). For these outcomes, we only find statistically significant results when controlling for autoregressive effects between past and current levels of the outcome. Our finding indicates that leftist governments reduce inequality faster by expanding total tax revenue more than other governments. In general, increasing revenues in a progressive fiscal system—even if progressivity remains unchanged-- will result in a higher reduction in inequality through fiscal redistribution.[6] Our models also show that leftist governments collect more revenue from progressive taxes (i.e., taxes on profits and capital gains), implement more generous social pensions, and raise the minimum wage at a higher pace than non-leftist incumbents. By contrast, both Left and non-Left governments spend similar amounts on cash transfers targeted to the poor, both in the form of conditional (CCTs) and unconditional (UCTs) transfers.

The relationship between the Left and inequality in Latin America has been studied quantitatively by Birdsall et.al (2012), Cornia (2010), Huber & Stephens (2012) and Morgan & Kelly (2013). Our work complements and improves upon these studies in several ways. Morgan and Kelly (2013) find that the Left affects "gross" but not "net" income inequality; in turn, Huber and Stephens (2012) find that Left power improves income equality, but only when democracy is firmly established. These studies focus on the impact of the long-term strength of the partisan Left, measured as the legislative partisan balance accumulated over time (usually, over a 15-year period). Our work, in contrast, finds a positive effect of government ideology on disposable income inequality over and above democracy because all countries in our sample were democratic when the Left took power.[7]

Closer in spirit to our paper, Cornia (2010) and Birdsall et al. (2012) study the contemporaneous effect of government ideology on inequality. Although they find a

[5] We obtain the long-term effect of a Left victory using the so-called Koyck transformation. See fn. 24 for more details. To see the extended results, see Table 3 in Appendix 4.

[6] Data for a number of low- and middle-income countries in the Commitment to Equity Institute's Data Center of Fiscal Redistribution suggests that tax systems are progressive in Latin America. See Lustig (2020).

[7] Huber & Stephens (2012) study the 1970-2005 period, thus excluding from their analysis a substantial part of the "Pink Tide."

positive connection between different "types" of leftist governments (so-called "radical" and "moderate") and inequality decline, their work covers only a few years of the "Pink Tide" (as does Huber & Stephens 2012; see fn. 3) and does not explore the policy mechanisms by which governments equalize incomes.

Our main contributions are twofold. First, we provide a more comprehensive, empirically robust, and up-to-date analysis of the influence of leftist regimes on the evolution of income inequality in Latin America during the period of widespread decline. In particular, we examine a longer period than previous analyses and include all seventeen countries. Importantly, we use several indicators of inequality, test our hypothesis over different samples, and carefully check identification assumptions. Second, we provide new evidence on the policies that leftist administrations use to affect inequality, examining a wide range of potentially redistributive policies. In all, our findings contribute to an emerging literature on the relationship between inequality, redistribution, and government ideology outside the context of advanced nations.

## Inequality, Commodity Boom, and the Left

Latin America is among the most unequal regions in the world. Inequality became comparatively high after the first decade of the twentieth century, as the region missed the "Great Egalitarian Leveling" that followed post-war efforts in other countries (Williamson, 2015). Income inequality increased steadily in the 1980s and 1990s across the region, a period in which most countries also implemented market-oriented reforms, including trade and financial liberalization. By the turn of the 21st century, however, inequality began to recede, marking a watershed moment in the region. By 2013, inequality had declined in all 17 countries, in some quite significantly.[8]

The decline in inequality has been associated to a range of short- and long-term factors, including a decline in the skill premium and the expansion of cash transfers programs that favored the poor (Lopez-Calva & Lustig, 2010). Since this expansion coincided (in South America) with more favorable terms of trade – the so-called commodities boom –, the sharp decline in inequality may have been the byproduct of economic growth and the larger fiscal space that ensued. However, there are reasons to believe that better economic conditions were not the sole factor behind the rise in the generosity of transfers.

Table 1 splits countries on whether they were governed by the Left at some point between 1990 and 2017; it also reports the average annual GDP per capita growth rate and Gini index change during this period. Inequality declined in countries with above-the-average growth rates (Chile, Peru) and in those with more moderate (Brazil, Ecuador) or little growth (Mexico); it declined in both predominantly commodity exporters (Argentina, Bolivia, Brazil, Ecuador, and Peru) and commodity importers (El Salvador, Guatemala,

[8] For a review of regional trends, see Alvaredo & Gasparini (2015).

Nicaragua, Panama).[9] Thus, the commodity boom and the ensuing growth does not appear to be a necessary condition for countries to experience a decline in inequality. In fact, analyzing evidence for 153 developing countries between 1981 and 2010, Alvaredo & Gasparini (2015) conclude that "among both growing and contracting economies, inequality increased about as often as it fell. In the last decades economic growth has been distribution-neutral on average in the developing countries" (p. 748).

[Table 1 about here]

As seen in Table 1, inequality declined in countries governed by the Left and non-Left presidents. However, as seen in Figure 1, countries under leftist regimes experienced a faster decline in inequality. The likely candidate to explain the more rapid decline of income inequality by leftist countries is the policies implemented by the wave of leaders and parties generically dubbed "leftist" that came to power in Latin America during this period. Admittedly, these governments were hardly homogeneous. Some, like the governments of Lagos (2000-2006) and Bachelet (2006-2010, 2014-2018) in Chile, were seen as more moderate and market-friendly; others, like the Bolivian government of Evo Morales (2006-2019), were often portrayed as "populist" or radical.[10] Whether market-friendly or more radical, the leftist governments shared a common denominator: they all favored state-led redistribution and a more active role of the state in the economy (Levitsky & Roberts, 2011; Weyland et.al, 2010). To the extent that these governments were more likely to implement redistributive policies – including larger and pro-poor cash transfers, higher minimum wages, and progressive tax reform[11] – government partisanship should logically reduce levels of income inequality over and above other common factors. In what follows, we review the arguments and evidence linking redistributive policies and the "Pink Tide" governments.

## Redistribution and the Left

Consider, first, the political determinants of social spending. Until the turn of the century, regional scholars agreed that the relationship between government ideology and social spending was weak or nonexistent. Unlike their European counterparts, left-of-center parties were not more likely to increase social spending than other parties in governments (Huber et.al, 2008; Kaufman & Segura-Ubiergo, 2000). Analyzing data from 1970 to 2000, Huber et al. (2008) concluded that because the prevailing tax structure in the region was regressive, progressive governments were often wary of expanding spending (p. 431).

[9] For a comprehensive analysis of this change, see Lopez-Calva & Lustig (2010).
[10] There are several typologies classifying the "New Left" governments of Latin America (e.g., Arnson & Perales, 2007; Weyland, 2010; Levitsky and Roberts, 2011).
[11] Other policies, including an increase in education and health spending, also impact inequality but only in the medium or long run.

Beginning in the 2000s, however, governments of varying political orientations across the region introduced important changes to social policy (Brooks, 2015; de la O, 2015; Diaz-Cayeros et.al, 2016; Garay, 2016; Pribble, 2013). Of particular importance was the expansion of conditional cash transfers (CCTs), unconditional cash transfers (UCTs), and non-contributory pensions for the poor. Unlike general spending on education and health services, which affect inequality in the medium and long run, these transfers have an immediate effect on income inequality. These transfers benefit the poor disproportionally, ranking "among the most progressive in Latin America, and indeed in the developing world as a whole" (De Ferranti et.al, 2004; p.281). To give just one example, Soares et. al (2010) find that CCTs reduce the Gini for disposable incomes in Brazil and Mexico by 2.7 percentage points. Overwhelming evidence on the progressivity and pro-poorness of cash transfers in most countries for which these indicators exist can be found in the Commitment to Equity Institute's Data Center on Fiscal Redistribution.[12]

While there is substantial consensus that governments from across the ideological spectrum adopted cash transfer programs targeted to the poor, some scholars contend that leftist governments adopted more generous and progressive transfers (Garay, 2016; Huber & Stephens, 2012; Pribble, 2013). A recent study by Altman & Castiglioni (2020), in fact, provides quantitative evidence that experts on the region agree that left-of-center parties promote more "equitable" social policies. A majority of the evidence favoring this thesis, however, comes from qualitative case studies.[13] Below, we examine the effect of leftist governments on various forms of spending using quantitative models. In particular, we focus on conditional and unconditional cash transfers, and social pensions, as a share of gross domestic product (GDP), thus providing an important test on whether leftist governments implement more generous transfers to the poor.

In addition to introducing more progressive transfers, governments during the 2000s also increased the coverage and level of minimum wages (Messina & Silva, 2017). The largest increases happened in countries governed by the Left, including Argentina, Bolivia, Brazil, Chile, Ecuador, Honduras (during the Zelaya administration, 2006-2009), and Nicaragua.[14] In Brazil, for instance, the minimum wage increased 55% over the course of Lula da Silva's presidencies (2003-2011).[15] In non-Left countries, either minimum wages rose little or none (e.g., Colombia, Mexico, and Paraguay). In the cases of Paraguay and, to some extent, Colombia, however, it must be noted that minimum wages were already high at the beginning of the commodities boom (Messina and Silva, pp. 160-161).

[12] See https://commitmentoequity.org/datacenter/.

[13] A few studies attempt to estimate the causal effect of partisanship on social policies by looking at "close" races at the local level, especially in Brazil. Based on the policies these local governments implement, we can conjecture its effect on inequality is either small (Johannessen, 2020) or ambiguous (Feierherd, 2020).

[14] Manuel Zelaya was president of Honduras between 2006 and 2009. Zelaya was elected for the Liberal Party of Honduras, a traditional party with a right-of-center platform. Soon after his election, he implemented a leftist agenda. Our results do not hinge on whether we classify him as leftist or non-leftist.

[15] According to data from CEPAL, described in more detail below.

The effect of minimum wage policy on inequality depends both on its level (i.e., whether the minimum wage is "binding") and its enforcement (i.e., its coverage), and whether the positive effect on incomes of poorer workers dominates the negative effect on any potential employment losses. Summarizing the most up-to-date evidence for Latin America, Messina & Silva (2017) conclude that "an increasing minimum wage, despite pervasive incomplete compliance and ever-present but small employment losses, still has a wage-equalizing effect" (p. 158).[16] In the following sections, we examine the relationship between government ideology and changes in the minimum wage levels for a large number of countries and years.

We finally consider tax policy as the last channel through which governments can achieve a rapid change in income inequality. If a tax system is progressive, raising taxes increases the fiscal system's progressivity. As shown in the detailed and comparative fiscal incidence results housed in the Commitment to Equity Institute's Data Center on Fiscal Redistribution,[17] tax systems in Latin America are progressive, though less so than in the developed world.[18]

Same as with cash transfers, the evidence on the political determinants of taxation in the region is somewhat mixed. During this period, government spending rose steadily across the region (CEPAL, 2018; Gonzalez et.al, 2017). The political science literature, however, suggests that governments face important obstacles in increasing revenue from direct taxes (e.g., Hunter et al. 2010, p. 161). Indeed, Latin American countries collect, on average, more revenue from consumption taxes and less from personal taxes than more developed nations (Lustig, 2017). In addition to this, two recent studies provide contradictory evidence on the effect of government partisanship. While Hart (2010) shows quantitative evidence that right-wing governments collect more revenue than other governments, Caro and Stein (2013) provide evidence that leftist governments produce more progressive tax systems, increasing both overall and income tax revenues.

## Hypotheses

In sum, the relationship between government ideology, inequality, and redistribution in Latin America warrants additional examination. Below, we test the following hypotheses:

**Hypothesis 1.** In countries governed by the Left, income inequality declines more than in other countries.

[16] This equalizing effect, however, depends in part on the economic environment: "[d]uring a period of slow growth and falling average wages (1995–2003), increases in the minimum wage were inequality-enhancing, as an increasing fraction of workers were not covered by the law (that is, their wages fell below the minimum wage)" (p. 178). Since the prevalence of leftist administrations coincided with booming economies, we postulate that a positive effect of Left partisanship on minimum wage levels was inequality reducing.

[17] https://commitmentoequity.org/datacenter/.

[18] Some authors argue that the tax system is regressive (Flores Macias, 2019), but the evidence from detailed fiscal incidence analysis on specific countries is overwhelming to the contrary.

**Hypothesis 2.** The Left in office increases spending on cash transfers more than non-leftist governments.

**Hypothesis 3.** The Left in office increases the level of the minimum wage more than non-leftist governments.

**Hypothesis 4.** Leftist governments increase revenue as a share of GDP more than non-Left governments.

**Hypothesis 5.** Leftist governments increase revenue from direct taxes as a share of GDP more than non-Left governments.

**Data and Descriptive Statistics**

To assess the influence of government ideology on inequality dynamics we construct an annual panel of 17 Latin American countries from 1992 to 2017. We combine different sources of information on government ideology, inequality, social policies, and macroeconomic indicators. As will be described below, we test our hypotheses under two main models: a difference-in-difference or "static" model and a "dynamic" model with lagged values of the dependent variables.

**Independent variables.** Our main independent variable is a dummy variable that reflects whether a country is classified as leftist or not. We code "treated" countries as those governed by leftist governments according to the classification produced by Weyland et al. (2010). The list of governments classified as leftist is shown in Table 1. We code the variable $Left_{i,t}$ equal to 1 if a Left government is elected in country $i$ in year $t$ and 0 otherwise. In the main analysis, once a Left government is replaced in office by a non-leftist party, we exclude the country from the analysis.

To control for the commodities boom we include two variables: the terms of trade and the volume of trade. For the terms of trade, we use the data from the ECLAC. Trade volume or openness is measured by the sum of imports and exports as a percentage of the GDP, using data from World Bank and OECD national accounts. Trade openness is a proxy for how much a given country in fact benefits from its terms of trade. Together, these two variables control for the potential increase in the relative demand of low skilled workers associated with the commodity boom. Commodity booms are usually accompanied by construction booms which raise the relative demand of low skilled workers. These variables also control for any effect the boom may have had over economic growth and the fiscal balance of the government. Finally, we control for the skill distribution of the economy, to account for the effect of education on the wage premium of more educated workers. We measure the skill distribution as the ratio of high- versus low-skilled people, where "high" skill are individuals with more than 13 years of

formal education and "low" are those with 0-8 years of formal education. These data come from Socio-Economic Database for Latin America and the Caribbean (SEDLAC, 2018; consulted October 1st, 2019).

**Dependent variables.** Our main outcome variable is the log of the Gini coefficient of per capita household (disposable) income, which we obtain from the Socio-Economic Database for Latin America and the Caribbean (SEDLAC, 2018; consulted October 1st, 2019). In the Appendix, we also use the Standardized World Income Inequality Database (SWIDD), which uses a Bayesian approach to standardize observations collected from several sources (see A1 for a description of the sources). We also study changes in the logged income shares of different income groups, again using data from SEDLAC: the income ratio between the 90 and 10 percentiles; the sum of the income shares of the deciles 4, 5, 6 and 7; the income shares of the poorer 10 and 20 percent; and the income share of the richest 10 percent.[19] These data cover a time span between 1992 and 2017.[20]

Additionally, we study the effect of government partisanship on several distributive policies: the real minimum wage, extracted from the LAC Equity Lab; the total spending on conditional and unconditional cash transfers, and on social (i.e., non-contributory) pensions, as percentage of the GDP. These data come from the World Bank's Atlas of Social Protection Indicators of Resilience and Equity (ASPIRE). The data on conditional cash transfers is collected by the Social Protection and Jobs (SPJ) Global Practice who uses administrative and household survey data on social assistance, social insurance, and labor market programs in 125 countries. Finally, we also examine tax revenue data by country as percentage of the GDP from the OECD. We look at total tax revenue and the revenue coming from taxes on income, rents, profits and capital gains. Total tax revenue includes all compulsory, unrequited payments to the general government coming from income, profits, and capital gains; payroll and social security contributions; property taxes; taxes on goods and services; and other taxes. We transform all these variables using the natural logarithm.

Columns 1 through 3 in Table 2 present the mean for the dependent variables for the full sample separately for "treated" and "control" countries. In columns 4 through 6, we report variable means for the pre-treatment period – i.e., before the election of Hugo Chavez in Venezuela in 1999. Even though countries in the two groups exhibit significant differences in all economic indicators over the full sample period (columns 1 to 3), during the pre-treatment period, we do not observe statistically meaningful differences in most variables, except for the real minimum wage. In other words, even though countries showed heterogeneous economic performance over the period under analysis, countries were more or less similar to each other before the start of the *Tide* in terms of the level of inequality, the distribution of income by shares, the share of total tax revenues to GDP, and so forth.

[19] All the distributional measures are calculated using the per capita income.
[20] In the Appendix 7, we present the coverage for each variable.

[Table 2 about here]

The statistically significant difference in real minimum wages between "treated" and "control" countries during the pre-treatment period does not necessarily pose a threat to our identification strategy, which we discuss in the next section. Our analysis only requires "treated" and "control" countries to experience similar *changes* in their levels of inequality before the establishment of a leftist government. However, the significant difference in real minimum wage levels highlights the necessity of adopting a credible research design to control for pre-existing differences between countries.

**Research Design**

Our empirical strategy employs a difference-in-differences (DD) design to study the effect of a leftist government on income inequality and several distributive policies. Our general regression model takes the following form:

$$Outcome_{i,t} = \beta_0 + \beta_1 Left_{i,t} + \beta_2 \boldsymbol{X}_{i,t} + Country_i + Year_t + \varepsilon_{i,t} \qquad (1)$$

where $Outcome_{i,t}$ is a measure of inequality or a policy variable depending on the hypothesis to be tested (e.g., the log of the Gini coefficient or the level of the minimum wage) in country $i$ and year $t$. $Left_{i,t}$ is an indicator variable that equals 1 if a leftist president was elected in country $i$ at time $t$ and 0 otherwise. In our main analysis, once a leftist president is replaced by a non-leftist president, we drop the country from our sample.[21] $\boldsymbol{X}_{i,t}$ is a vector of time-varying country-level socioeconomic factors. $Country_i$ are the country-level fixed effects that capture the time-invariant differences between treatment and control groups. $Year_t$ are the year-fixed effects that control for time-specific shocks. Finally, $\varepsilon_{i,t}$ is the idiosyncratic error term. Thus, $\beta_1$ measures the average causal effect of the election of a left-wing government on the outcome variable in year $t$. In all our specifications, standard errors are clustered at the country level to take care of serial correlation.

We control for three time-varying variables that may impact levels of inequality and also affect the direction of elections. One suggested explanation for the reduction of inequality during the 2000s is the expansion of secondary and tertiary education in the 1990s, which increased the relative supply of more educated workers and a decline in the wage premium. We take this into account by controlling for the ratio of high- to low-skilled workers. Another explanation is that higher terms of trade for commodity exporters increased the relative demand of low skilled workers, again, reducing the skill premium on wages. Hence, we control for both the relevance of the commodity boom and openness

[21] This reduces potential bias that may arise from having units going back and forth from "treatment" and "control" groups. See Goodman-Bacon (2018). In the Table 5, we show results for a different estimand: the effect of having been "ever" governed by a left-wing president (during the 1990-2017 period). In this specification, we do not drop countries after the Left loses office; instead, the remaining country observations are coded as "treated."

to trade. As a robustness check, we also control for the rate of GDP per capita growth in some of our models.

**Parallel trends assumption**

The key assumption of the DD strategy is the existence of parallel trends (in the absence of treatment) between treatment and control countries. Even though this assumption cannot be tested directly, we can test whether pre-trends in inequality differ for "treated" and "untreated" countries. Our DD strategy is likely to produce biased and inconsistent estimates if pre-treatment levels of inequality determine both the probability of a leftist party being elected and the concurrent level of inequality. Under the parallel trend assumption, this should not happen. To validate the assumption that the trends of the treatment and control groups would be parallel absent the elected leftist government, we employ a strategy akin to an event-study regression:

$$Outcome_{i,t} = \sum_{\in t(\leq -3,-2,0,1,2,3+)} \beta_1 Left_{i,t} + \beta_2 \boldsymbol{X}_{i,t} + Country_i + Year_t + \varepsilon_{i,t} \quad (2)$$

where $Left_{i,t}$ is a set of indicator variables that equal 1 if $t$ years have passed since the Left was elected in country $i$, where $t$ is between -3 and 3+, with 3+ indicates 3 years or more. The year before the leftist government is elected is omitted and used as the comparison group. If the coefficients associated to three years or more before the treatment ($\beta_{1,\leq -3}$) and two years before the treatment ($\beta_{1,-2}$) are not significantly different from zero, the parallel trends assumption is likely to hold. Figure 2 shows the estimates for the log of the Gini coefficient, our main dependent variable. Before the Left takes office, the coefficients are not statistically significant, and they are very close to zero. Once the Left is in power, however, inequality drops rapidly and significantly in these left-governed countries, lending initial support to our main hypothesis.

[Figure 2 about here]

To bolster confidence in our empirical strategy, we perform an additional test. We drop all observations with a leftist government, and then assign a "placebo" treatment to those countries eventually governed by leftist presidents, but four years before they take the office. If the parallel trend assumption holds, differences in outcomes between the treatment and control groups should be small and statistically insignificant. This is in fact what we find for our main outcome variables (see Table A2 in Appendix for the full results).

These results are consistent with research on elections in Latin America. While Debs & Helmke (2010) suggest there may be an inverted-U shape relationship between inequality and voting, with inequality pushing poor voters to the Left at medium levels of inequality, other studies have failed to find a link between levels of inequality and support for leftist candidates when examining the rise of the "Pink Tide." Kaufman (2009) reviews survey

evidence, controlled-case comparisons, and electoral returns, and concludes that "[t]here is no systematic relation between income inequality and Left voting" (p. 364). Similarly, Murillo et al. (2010) claim that "retrospective evaluations of right-leaning presidents of the 1990s and their poor performance in handling the economy (…) explain the increase in Left vote share in the 2000s" (p. 90). In most cases, leftist parties only consolidated their support among the poor *after* taking office.[22] Therefore, our assumption that government ideology was orthogonal to past trends in inequality for the period we analyze has broad empirical support.

**Estimation**

We estimate Equation 1 using standard OLS regression. This equation models the data generating process linearly and in a "static" fashion – i.e., it assumes past treatments do not affect current versions of the outcomes (Imai & Kim, 2019). Even though the parallel trends assumption seems to hold, it is not unthinkable that past levels of inequality affect both the future political orientation of the government and ensuing levels of inequality. If that is the case, trends in non-treated units are not a good counterfactual for trends in countries governed by the Left: the coefficient for the treatment effect would reflect the compound effect of the Left as well as the effect from autoregressive dynamics. Hence, this assumption may be too strong in our context.

We address this concern by employing an additional "dynamic" linear model that controls for autoregressive effects. This model includes one lag of the outcome variable to account for the fact that past outcomes may affect both current levels of the outcome and the treatment. We include only one lag because we cannot reject the null hypothesis of no serial correlation in the corresponding AR2 test.[23] Our model takes the following form:

$$Outcome_{i,t} = \beta_0 + \beta_1 Left_{i,t} + \beta_2 \boldsymbol{X}_{i,t} + \rho\, Outcome_{i,t-1} + Year_t + \varepsilon_{i,t} \qquad (3)$$

The underlying assumption behind this model is that, conditional on the lags of the outcome variable, time-varying covariates, and year-fixed effects, countries with a leftist president are not on a different trend. We estimate this model using the generalized System method of moments (GMM) estimator proposed by Arellano & Bover (1995) and Blundell & Bond (1998), which augments the difference GMM estimator proposed by Arellano & Bond (1991).

**The effect of Left on income inequality**

In this section, we evaluate the relationship between the ideology of the government in office and inequality using both the static and dynamic panel models presented above.

[22] See, for instance, Hunter & Power (2007) and Zucco Jr (2013) on Brazil, and Madrid (2007) on Bolivia.

[23] The perform the AR2 test because, by definition, the first-differenced residuals in the system GMM estimation presents serial correlation.

We first present results on the relationship between Left incumbency and income inequality using the "static" version of our model (Eq. 1). Table 3 presents the conditional relationship between government ideology and different measures of inequality. For the log of the per capita income Gini index, the coefficient for Left incumbency is negative and statistically significant at the 1% level. This coefficient implies that the Gini is 6 percent lower in years when the Left is in office. Moving to the other inequality measures, leftist presidents also increase the income share of the deciles in the bottom and middle of the income distribution. On average, the income share of the bottom 20% is roughly 13 percent higher relative to what happens to the same group under a non-Left government (p-value<0.05). The middle-income deciles also benefit with the Left: the income share of the deciles 4 to 7 is roughly 6 percent higher (p-value<0.01). Conversely, the income share of the top 10% drops 6.5 percent and the income ratio between the centiles 90 and 10 by 16.8 percent (p-value<0.01). Overall, our findings suggest that the Left premium comes from an increasing income share of the first seven deciles at the expense of the top 10% percent.

[Table 3 about here]

We obtain similar results once we account for potential autoregressive effects as shown in equation (3) (Panel B, Table 3). In countries governed by a leftist government, the Gini index declines and the income shares for the first 7 deciles increase, again at the expense of the top 10%. In addition to the yearly or short-run effects reported in the table, with the dynamic model we can calculate the aggregate long-run effect of a Left government maintaining power over time. The suggested effect on the log of the Gini coefficient after one year of the Left in power is 2.3 percent. If the Left stayed in power for four years, the cumulative effect would be 5 percent, and for eight years, the effect would be 7.8 percent.[24] The total long-run effect (i.e., if the Left would stay in office for a prolonged period of time) of a change from a non-Left to a Left regime on the log of the Gini coefficient would be equal to a decline of 14.3 percent.[25] Similarly, the total long-run effect of Left would cause a fall of 14.5 percent in the income share of the top 10% while the bottom 20% would accumulate an 18.3 percent additional share of the national income. The income shares of the middle deciles (4, 5, 6, and 7), in turn, would increase by 11 percent (Table A3 in Appendix).

[24] These effects are obtained by forward iteration using the model presented in Equation 3. These long-run effects are reported in Table A3. For more detail about how to compute the long run effects see the A9.

[25] In our case, we add one lag of the independent variable. Hence, we can obtain the total long-run effect of the Left government on the inequality performance:

$$\frac{\beta_{left}}{1-\rho}$$

Where $\beta_{left}$ is the estimated coefficient in the dynamic model for the Left dummy and $\rho$ is the autoregressive coefficient corresponding to the lagged dependent variable.

**The effect of Left on direct transfers, minimum wages, and taxation**

Our results suggest that income inequality declines more rapidly when the Left controls the presidency. In this section, we explore the policies through which a leftist government might influence inequality performance in a country during its time in office. In particular, we examine the impact of the Left on several direct transfers, minimum wages, and tax policy.

Table 4 present results exploring the relationship between government ideology and several redistributive policies. While the coefficient for $Left_{i,t}$ fails to achieve statistical significance at conventional levels for any of the policy outcomes in the static model, we find a significant effect of Left incumbency on tax revenues, the minimums wages, and social pensions using our dynamic model. The Left produces a yearly average increase of 2,5 percent on tax revenues over GDP relative to a non-leftist government.[26] If the Left stayed in power for one, four and eight years, the cumulative effect on the log of the total tax revenues as percentage of the GDP would be 4.85, 11.6 and 19.6 percent, respectively. In the long run, this translates into a cumulative impact of 80 percent (see Table A3 in Appendix).

From Lambert's fundamental equation on the redistributive effect of fiscal systems, we know that when taxes are increased in a progressive fiscal system, the system becomes more equalizing.[27] From the fiscal incidence studies reported in the CEQ Institute Data Center on Fiscal Redistribution and analyzed in Lustig (2020), we know that all countries in Latin America have progressive fiscal systems: that is, the combination of taxes and transfers reduce inequality.[28]

We also find statistically significant effects of Left incumbency on other redistributive policies, but only for the dynamic model. The Left implements more generous social pensions, which increase on average by 12.4 percent compared to countries not governed by the Left. After one year of the Left in office, the log of the social pensions as percentage of the GDP would be 26,8 percent higher, and after four and eight years, social pensions would increase by 47.6 and 58.8 percent, respectively.[29] The level of the minimum wage also increases under the Left, in line with descriptive data presented previously, as well as the qualitative assessments from Cook & Bazler (2013). The effect of the left on the log of the real minimum wage would be 9.5 percent one year after, 21.5 percent four years after, and 34.1 percent in eight years after. Reassuringly, the sign of

[26] The size of the coefficients is similar to those presented in Caro and Stein (2013), who use an older version of the same tax data from CIAT-IDB.

[27] Lambert (1992) shows that the system-wide progressivity equals a weighted sum of the progressivity of taxes and transfers.

[28] See the results in https://commitmentoequity.org/datacenter/.

[29] The dynamic model also suggests that leftist governments spend more on wages and salaries in the public sector (as a share of GDP) and on social expenditures (as a share of GDP). However, there is no evidence that expanding employment or raising wages in the public sector should be inequality-reducing. Regarding social expenditures, it is only spending on cash transfers that affects inequality contemporaneously and we test the nexus between spending on cash transfers and the Left separately.

the estimates for the static models are all in line with the estimates from the autoregressive models (see Table 3 in Appendix).

In contrast, we find no evidence of a correlation between leftist governments and the expansion of cash transfers, both conditional and unconditional. CCTs were introduced or greatly expanded during these years; this expansion took place under leftist (e.g., in Argentina, Bolivia, and Brazil) and non-leftist presidents (e.g., in Colombia and Mexico). While this is in line with studies showing that both right- and leftist presidents were equally likely to implement CCTs (Brooks, 2015; Diaz-Cayeros et.al, 2016), our findings cast some shadow on analyses suggesting these tranfers were more generous or progressive under the Left (e.g., Garay, 2016; Pribble, 2013).

[Table 4 about here]

Of course, we cannot test all the potential policy channels through which the Left in office may induce a contemporaneous reduction inequality. Although we examine a range of policies that the literature suggests have an immediate effect on inequality, we cannot tell which of the policies that the Left is more likely to implement is causing the "leftist premium" in inequality reduction that we identified in the previous section. For that, we would need to perform some form of mediation analysis, for instance, which requires stronger assumptions than those we are willing to accept. Similarly, there may be other policies ignored so far by the policy literature affecting inequality, or policies that affect inequality contemporaneously could interact in complex ways. That said, our analysis suggests both that inequality declines more under the Left and that the Left implements a range of policies that are likely to impact inequality in the same equalizing direction.

**Robustness tests**

Even if the parallel trend assumption holds, other factors could compromise our results. Below we assess the robustness of our results to varying samples, measurement choices, and inclusion or exclusion of control variables. Figure 3 plots the coefficient estimates for our leftist government indicator for several alternative specifications.

We start by analyzing the consistency of our results when we reclassify countries whose ideological denomination is not clear cut. First, we evaluate whether our results change when we code the presidencies of Fernando Henrique Cardoso (1994-2002) in Brazil and Manuel Zelaya (2006-2009) in Honduras as leftist. While Cardoso's *Partido da Social Democracia Brasileira* (PSDB) is often classified as center-right in the political science literature, Cardoso himself has a long history as a leftist public intellectual as one of the fathers of Dependency Theory. Zelaya, in turn, was elected under the banner of a traditional party, the *Partido Liberal*, but soon after taking office he aligned himself and his policies with the "Pink Tide" movement. Secondly, we vary the sample by separately excluding several countries. We exclude Guatemala because we have no data for the 1990s and Honduras because it excludes non-labor incomes in the 1990s. We also run the analysis without observations from Brazil because up to 2003 it excluded the rural North

from its household surveys. Until 1997, Bolivia measured inequality only in urban areas, so we also run a regression without Bolivia. We exclude Venezuela because it only has data up to 2006. Finally, we run our regression without Argentina because it measures inequality only in urban areas (little over sixty percent of the population). In all these cases, our results remain largely the same. Finally, we re-run our models including as a control variable real GDP per capita.[30] Crucially, our results remain largely unaffected by these coding, sampling, and modeling choices.

A related concern is whether the effect of Left incumbency on inequality depends on governments having a large fiscal space related to the commodities boom. To test this claim, we interact the Left dummy with the terms of trade variable. This analysis suggests that Left governments are associated with declining inequality over all the potential values of terms trade for which there is common support in the data. While Left governments seem more redistributive under more favorable terms of trade, the moderating of trade is not very large. The coefficient for Left is negative, statistically significant at 5%, and the point estimates remain very similar to the baseline estimation (red solid line) across a wide range of terms of trade levels.

[Figure 3 about here]

Finally, we explore the consistency of our main findings by changing how we code our treatment variable. In the main analysis, we dropped observations from "treated" countries after the Left is replaced by a non-leftist president. The rationale for this is to avoid any contamination from "treated" countries to the "control" group, potentially inducing endogeneity – e.g., if the performance of leftist governments affects posterior decisions by a non-Left government. Indeed, social policies are often hard to deactivate by succeeding administrations, for instance, because "powerful groups surrounding social programs… make the welfare state less dependent on the political parties, social movements, and labor organizations that expanded social programs in the first place" (Pierson, 1996, p. 147). Yet, governments have some capacity to change the policies established by previous administration; so, it might be interesting to assess what happens when we allow "treated" observations to return to the control group. To explore these possibilities, we recode our main variable in two ways: we code all observations as treated after a country elects a left-wing government, regardless of what happens later; and we code observations according to which government is in office that year. Table 5 presents the results of the estimates for the three definitions and, in all cases, our findings remain strikingly similar. Inequality declines, the total tax revenues increase, and the income shares of the first seven deciles also increase with a simultaneous decrease in the income share of the top 10%.[31]

[30] We use the GDP index rather than levels in our regressions.
[31] The effect of the Left on total tax revenues becomes statistically significant for the static model under these alternative treatment definitions.

[Table 5 about here]

## Concluding remarks

The *Pink Tide* explains why inequality fell faster in some Latin American countries than others during the first decade of this century. While the equalizing effect of the Left in more advanced economies is well documented in the literature, our results are novel in two ways. First, previous attempts to estimate the effect of government partisanship on inequality focus on the long-term electoral power of the Left. By contrast, we focus on contemporaneous effects of government ideology on inequality. Our study suggests that government policy –increased taxation, higher minimum wages and more generous direct transfers for the old – can have a contemporaneous positive impact on income equality. Second, there is an overwhelming consensus among regional experts that fiscal systems in the region are largely regressive (e.g., Holland 2018; Huber et al 2006; Huber et al 2008; Ross-Schneider y Soskice 2009; Magaloni et al 2016). Instead, we show that leftist administrations reduced inequality while simultaneously expanding both tax collection and public spending. In fact, this expansion was probably progressive, not regressive.

Was this redistribution sustainable? In the past, short-term improvements in the terms of trade fueled the implementation of redistributive fiscal policies that proved unsustainable in the long run (Dornbusch & Edwards, 1991). Similar "time-consistency" concerns may affect the legacy of the *Pink Tide*. Argentina is a case in point: the Kirchner couple expanded taxation drastically, raised the minimum wage, and expanded direct transfers. But, when commodity prices fell and external conditions worsened, the country faced several economic crises and rising poverty levels as a result of recurrent fiscal deficits. Other economies faced similar crises triggered by unsustainable fiscal deficits, including Brazil, Ecuador, and most notably Venezuela. In fact, inequality trends after 2012 reveal that in some countries it started to rise again while in the others, the declining trend is much smaller or nonexistent (Lustig, 2020).

In spite of the pervasive decline in inequality, several countries in Latin America continue to be among the most unequal in the world even if they were governed by the Left for prolonged period of time: for example, Brazil and Chile. Furthermore, our analysis is based entirely on inequality trends measured with data from household surveys. We know that these surveys do not capture top incomes well. There is some evidence that when surveys are corrected for upper tail issues, the top income shares do not follow the pattern observed with household surveys. WID.World reports trends corrected for upper tail issues. Based on the results presented in this database, while the corrected Gini coefficient continued to show a decline for the period 2000-2012, the share of the top 10% and 1% grew at an average of 0.01% and 0.65%.[32] This suggests that the Left does not seem to have an impact on the concentration of income at the very top. However, further research

[32] See https://wid.world/es/series/.

is needed including assessing whether the results are robust to alternative correction methods beyond the one utilized by WID.World.

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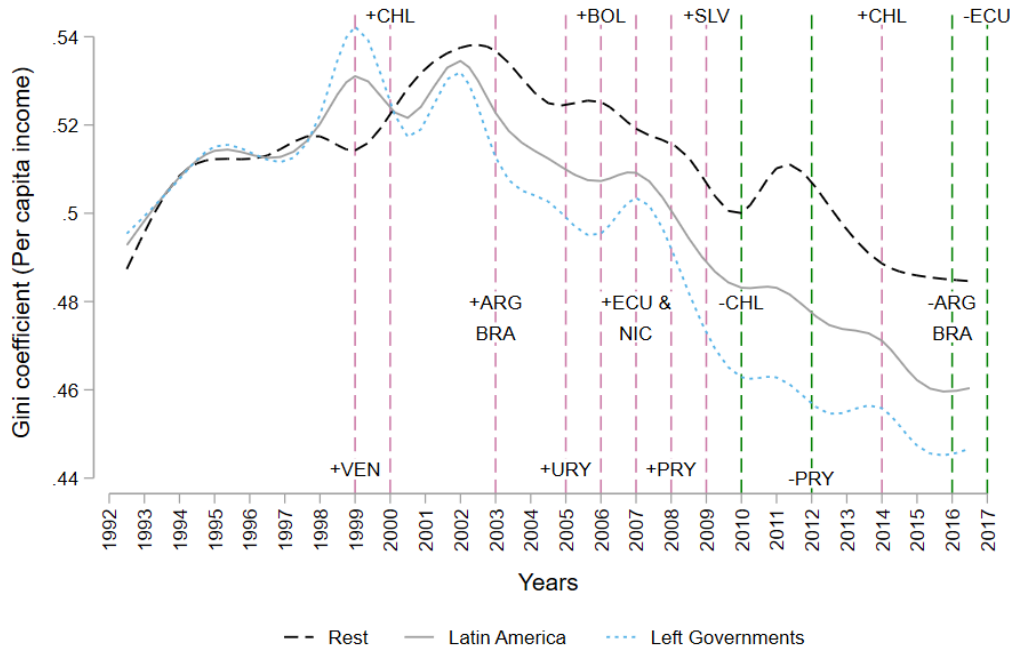
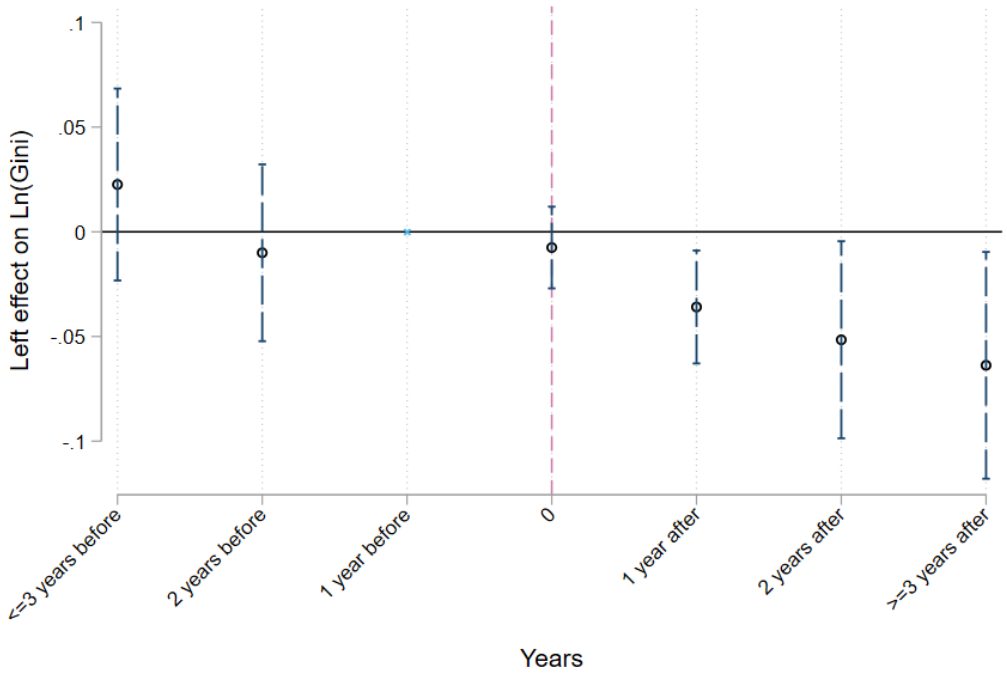
**Figure 1. Inequality and government ideology in Latin America.**




Source: SEDLAC (2018; consulted October 1st, 2019). Left includes Argentina, Bolivia, Brazil, Chile, Ecuador, El Salvador, Nicaragua, Paraguay, Uruguay and Venezuela; "+" indicates the first year with a leftist president and "–" indicates the first year with a non-leftist president. Classification of presidents as "leftist" is based on Weyland et al. (2010).

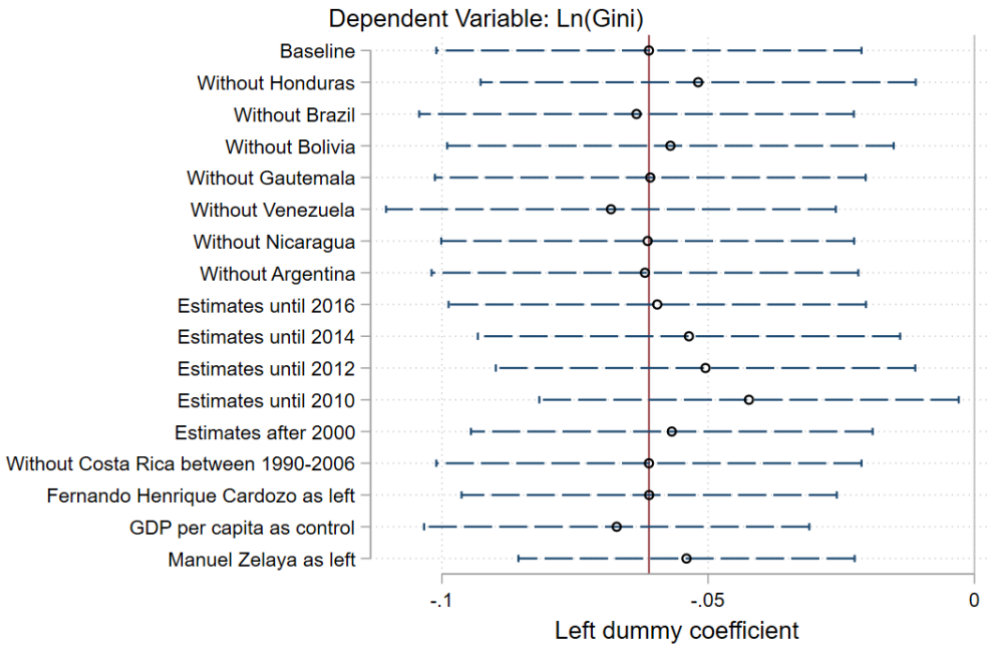
**Figure 2. Trends in inequality before and after the Left takes office[33]**




*Notes*: Each coefficient corresponds to the change in the natural logarithm of the Gini coefficient relative to the change one year before the leftist government begins. The red dashed line represents the year where the Left government begins. The regression controls for the level of the terms of trade, the ratio between total trade and the GDP, and the ratio between high skilled and low-skilled workers.

[33] In the Figure A2 in the appendix, we show the parallel trend test results for all the dependent variables.

**Figure 3. Stability in the point estimates of the difference in difference estimator**




*Notes*: The black circle represents the point estimate of the Left dummy coefficient for each one of the sub-samples specified in the y-axis. The horizontal blue dashed line shows the 95 percent confidence interval for the Left dummy coefficient. The vertical red solid line shows the value of the estimate in our preferred specification. The GDP per capita growth comes from the World Bank and it is the index of the GDP per capita based on constant local currency. We use as control variables the terms of trades, trade openness, and the ratio of high skilled to low-skilled workers.

**Table 1. Classification of Countries by Political Regime and Commodity Exporters/Importers**

| Country | Commodity Boom | Left | President | Average annual percent change | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Gini full sample | Gini during left government | Gini during non-left government | GDP per capita full sample | GDP per capita during left government | GDP per capita during non-left government |
| Argentina | 2003-2012 | 2003-2015 | Nestor Kirchner<br>Cristina Fernandez | -0.3% | -1.7% | 1.5% | 1.4% | 2.8% | -0.4% |
| Bolivia | 2002-2012 | 2006-2019 | Evo Morales | -1.3% | -2.1% | 0.1% | 2.2% | 3.0% | 0.9% |
| Brazil | 2004-2011 | 2003-2016 | Lula da Silva<br>Dilma Rousseff | -0.5% | -0.9% | -0.3% | 1.3% | 1.9% | 1.1% |
| Chile | 2003-2011 | 2000-2009<br>2014-2017 | Ricardo Lagos<br>Michelle Bachelet | -0.8% | -0.9% | 0.2% | 3.2% | 2.6% | 4.2% |
| Ecuador | 2004-2013 | 2007-2016 | Rafael Correa | -1.1% | -1.7% | -0.7% | 1.4% | 1.7% | 1.1% |
| El Salvador | Importer | 2009-2018 | Mauricio Funes<br>Salvador Sanchez | -1.5% | -1.7% | -1.0% | 1.4% | 1.8% | 1.4% |
| Nicaragua | Importer | 2007- | Daniel Ortega | -0.9% | 0.8% | -1.1% | 2.4% | 3.3% | 2.3% |
| Paraguay | 2007-2014 | 2008-2011 | Fernando Lugo | -0.7% | 0.7% | -0.8% | 1.3% | 2.6% | -0.1% |
| Uruguay | 2008-2014 | 2005-2017 | Jose Mujica<br>Tabare Vazquez | -0.2% | -1.0% | 0.8% | 2.5% | 3.8% | 0.8% |
| Venezuela | 2001-2012 | 1999- | Hugo Chavez<br>Nicolas Maduro | 0.3% | -1.0% | 1.9% | 0.1% | 1.7% | -0.6% |
| Colombia | 2004-2011 | Non-left | | -0.6% | | -0.6% | 2.9% | | 2.9% |
| Costa Rica | Importer | Non-left | | 0.3% | | 0.3% | 2.5% | | 2.5% |
| Guatemala | Importer | Non-left | | -0.8% | | -0.8% | 1.1% | | 1.1% |
| Honduras | Importer | Non-left | | -0.1% | | -0.1% | 1.4% | | 1.4% |
| Mexico | Neutral | Non-left | | -0.3% | | -0.3% | 0.9% | | 0.9% |
| Panama | Importer | Non-left | | -0.4% | | -0.4% | 3.9% | | 3.9% |
| Peru | 2001-2012 | Non-left | | -1.0% | | -1.0% | 3.3% | | 3.3% |

Source: SEDLAC (2018; consulted October 1st, 2019) and The World Bank (2020e).

Notes: Commodity boom: counted from first year in which terms of trade rose until they peaked, since 2000; Left: counted since the year where the government begins to the ending year, if the government ends after the first half of the year. For instance, Fernando Lugo begins in August of 2008 and their government ended in June of 2012. Hence, the left dummy variable is equal to 1 between 2008 and 2011; classification of countries as "leftist" is based on Weyland et al. (2010). The year intervals used to calculate the growth rates are: Argentina: 1992-2017; Bolivia: 1997-2017; Brazil: 1993-2016; Chile: 1992-2015; Colombia: 2001-2016; Costa Rica: 1992-2017; Ecuador: 1995-2016; El Salvador: 2000-2016; Guatemala: 2000-2014; Honduras: 1992-2016; Mexico: 1992-2016; Nicaragua: 1993-2014; Panama: 1995-2016; Paraguay: 1995-2017; Peru: 1997-2016; Uruguay: 1992-2016; Venezuela: 1992-2006. In all cases, we calculate the average annual percent change as the geometric growth rates between the years mentioned before.

**Table 2. Descriptive Statistics for Outcome Variables**

| *Variable* | *Full sample* | | | *Pre first treatment*[3] | | |
|---|---|---|---|---|---|---|
| | Left Mean[1] | Non-Left Mean | Difference | Left Mean[3] | Non-Left Mean [3] | Difference |
| *Gini coefficient*[4] | 0.512 | 0.491 | -0.0211*** | 0.508 | 0.510 | 0.002 |
| | [0.003] | [0.004] | [0.0054] | [0.009] | [0.012] | [0.0146] |
| *Income share of the bottom 20%* [4] | 3.588 | 4.049 | 0.4615*** | 3.622 | 3.875 | 0.253 |
| | [0.062] | [0.078] | [0.0997] | [0.155] | [0.188] | [0.2438] |
| *Income share of the middle deciles 4, 5, 6 & 7* [4] | 25.722 | 26.860 | 1.1372*** | 26.011 | 25.736 | -0.275 |
| | [0.168] | [0.218] | [0.2749] | [0.439] | [0.620] | [0.7597] |
| *Income share of the top 10%* [4] | 39.537 | 37.618 | -1.9195*** | 39.195 | 39.375 | 0.179 |
| | [0.292] | [0.391] | [0.4881] | [0.799] | [1.085] | [1.3480] |
| *Extreme income ratio 90/10* | 11.676 | 10.666 | -1.0098** | 11.463 | 11.135 | -0.328 |
| | [0.279] | [0.392] | [0.4812] | [0.656] | [0.704] | [0.9614] |
| *Total tax revenues as % of GDP* | 16.187 | 19.259 | 3.0717*** | 14.516 | 15.538 | 1.022 |
| | [0.264] | [0.415] | [0.4919] | [0.460] | [0.673] | [0.8155] |
| *Total tax revenues on rents, income, profits and capital gains as % of GDP* | 4.103 | 4.121 | 0.018 | 3.113 | 2.929 | -0.184 |
| | [0.100] | [0.129] | [0.1632] | [0.126] | [0.256] | [0.2858] |
| *Real minimum Wage* | 111.921 | 125.396 | 13.4750*** | 93.888 | 94.179 | 0.290 |
| | [2.161] | [3.153] | [3.8225] | [3.002] | [2.129] | [3.6774] |
| *Spending in Conditional cash transfers as % GDP* | 0.237 | 0.305 | 0.0686** | N/A | N/A | N/A |
| | [0.015] | [0.026] | [0.0301] | | | |
| *Spending in Unconditional cash transfers as % GDP* | 0.188 | 0.128 | -0.0595** | N/A | N/A | N/A |
| | [0.025] | [0.015] | [0.0290] | | | |
| *Spending in Social pensions as % GDP* | 0.148 | 0.502 | 0.3539*** | N/A | N/A | N/A |
| | [0.022] | [0.034] | [0.0406] | | | |

Significance levels: * < 10% ** < 5% *** < 1%.

Robust standard errors in brackets.

1 Left is defined as all countries eventually governed by the left

2 Non-Left are those countries that never were governed by the Left between 1992 and 2017

3 We calculate the mean for the period 1992-1998 for countries eventually governed by the Left and for those countries who never were governed by the Left. Venezuela in 1999 is the first country with a leftist government.

4 The Gini coefficient and all the income shares were calculated using per capita income.

**Table 3. The effect of the Left on inequality**

| Dependent Variable | *Panel (a): Static Model* | | | | | *Panel (b): Dynamic Model (System GMM)* | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Ln(Gini) | Ln(Share of income top 10%) | Ln( Share of income 4,5,6 & 7 decile) | Ln(Share bottom 20%) | Ln(Share 90 centile/ Share 10 centile) | Ln(Gini) | Ln(Share of income top 10%) | Ln(Share of income 4,5,6 & 7 decile) | Ln(Share bottom 20%) | Ln(Share 90 centile / Share 10 centile) |
| Left[1] | -0.061*** | -0.065*** | 0.059*** | 0.132** | -0.168** | -0.012** | -0.017*** | 0.015*** | 0.021** | -0.031** |
| | [0.019] | [0.022] | [0.019] | [0.059] | [0.075] | [0.005] | [0.006] | [0.006] | [0.009] | [0.012] |
| Ln(ToT)[2] | -0.045 | -0.041 | 0.032 | 0.085 | -0.104 | 0.005* | 0.010*** | -0.009*** | 0.005 | -0.005 |
| | [0.030] | [0.030] | [0.029] | [0.079] | [0.097] | [0.003] | [0.004] | [0.003] | [0.014] | [0.018] |
| Ln(Trade/GDP)[3] | -0.041 | -0.071 | 0.064 | 0.019 | -0.040 | -0.003 | -0.006 | 0.006 | -0.001 | 0.004 |
| | [0.049] | [0.058] | [0.049] | [0.138] | [0.175] | [0.004] | [0.006] | [0.005] | [0.012] | [0.017] |
| Ln(High skilled/Low skilled)[4] | -0.048 | -0.074 | 0.098** | 0.193* | -0.271** | -0.005 | -0.010* | 0.009* | 0.011 | -0.011 |
| | [0.038] | [0.050] | [0.042] | [0.107] | [0.123] | [0.003] | [0.005] | [0.005] | [0.008] | [0.011] |
| Lagged dependent variable | | | | | | 0.916*** | 0.886*** | 0.869*** | 0.883*** | 0.873*** |
| | | | | | | [0.024] | [0.027] | [0.030] | [0.026] | [0.032] |
| Observations | 268 | 264 | 264 | 264 | 264 | 210 | 208 | 208 | 208 | 208 |
| R-squared | 0.843 | 0.845 | 0.835 | 0.800 | 0.785 | | | | | |
| Country FE | YES | YES | YES | YES | YES | NO | NO | NO | NO | NO |
| Period FE | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| R2 Adjusted | 0.811 | 0.813 | 0.801 | 0.759 | 0.740 | | | | | |
| Arellano-Bond test for AR(1) in first differences | | | | | | 0.00137 | 0.00116 | 0.00185 | 0.0136 | 0.0141 |
| Arellano-Bond test for AR(2) in first differences | | | | | | 0.570 | 0.711 | 0.536 | 0.500 | 0.237 |

Clustered standard errors at country level in brackets.

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

Note 1: Left is equal to missing after left-governed countries go back to being governed by a non-left government.

Note 2: Ln(ToT) is the logarithm of Terms of trade for each country.

Note 3: Ln(Trade/GDP) is the logarithm of the ratio between all trade and GDP for each country.

Note 4: Ln(High skilled/Low skilled) is the logarithm of the ratio between high- and low-skilled workers.

**Table 4. The Effects of Left on Transfers, Social Pensions, Minimum Wages, and Taxes**

| | *Panel (a): Static Model* | | | | | | *Panel (b): Dynamic Model* | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dependent Variable | Ln(CCT/ GDP) | Ln(UCT/ GDP) | Ln(Social Pensions | Ln(Minimum Wage) | Ln(Total Revenues / GDP) | Ln(Taxes on rents capital gains income and Profits/GDP) | Ln(CCT/ GDP) | Ln(UCT/ GDP) | Ln(Social Pensions | Ln(Minimum Wage) | Ln(Total Revenues / GDP) | Ln(Taxes on rents capital gains income and Profits/GDP) |
| Left[1] | -0.883 | 0.859 | 0.124 | 0.134 | 0.091 | 0.036 | -0.029 | -0.428 | 0.152* | 0.049** | 0.025*** | 0.030 |
| | [0.617] | [0.675] | [0.393] | [0.112] | [0.053] | [0.108] | [0.065] | [0.307] | [0.089] | [0.023] | [0.009] | [0.021] |
| Ln(ToT)[2] | 2.338** | -1.011 | -3.102** | 0.050 | 0.071 | 0.174 | 0.344 | 0.563 | -0.788** | 0.032 | 0.038** | 0.087*** |
| | [0.847] | [3.021] | [1.049] | [0.151] | [0.043] | [0.123] | [0.398] | [1.491] | [0.310] | [0.027] | [0.017] | [0.019] |
| Ln(Trade/GDP)[3] | 0.440 | -2.052* | -0.419 | 0.088 | 0.119 | 0.453** | -0.219*** | 0.353 | -0.095 | -0.020** | 0.001 | -0.022*** |
| | [0.963] | [1.109] | [0.751] | [0.192] | [0.081] | [0.190] | [0.054] | [0.254] | [0.116] | [0.008] | [0.007] | [0.008] |
| Ln(High skilled/Low skilled)[4] | 0.059 | 1.560 | -2.183 | 0.261 | 0.025 | -0.056 | -0.003 | 0.431*** | 0.305** | 0.002 | -0.006 | 0.001 |
| | [0.890] | [2.579] | [1.469] | [0.218] | [0.106] | [0.193] | [0.062] | [0.166] | [0.142] | [0.015] | [0.005] | [0.012] |
| Lagged dependent variable | | | | | | | 0.753*** | 0.596*** | 0.765*** | 0.934*** | 0.969*** | 0.902*** |
| | | | | | | | [0.043] | [0.130] | [0.066] | [0.042] | [0.016] | [0.045] |
| Observations | 141 | 105 | 121 | 271 | 275 | 275 | 131 | 95 | 110 | 265 | 269 | 269 |
| R-squared | 0.815 | 0.572 | 0.837 | 0.703 | 0.917 | 0.827 | | | | | | |
| Country FE | YES | YES | YES | YES | YES | YES | NO | NO | NO | NO | NO | NO |
| Period FE | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| Arellano-Bond test for AR(1) in first differences | | | | | | | 0.129 | 0.0899 | 0.194 | 0.0942 | 0.0280 | 0.0400 |
| Arellano-Bond test for AR(2) in first differences | | | | | | | 0.723 | 0.895 | 0.277 | 0.863 | 0.630 | 0.316 |

Clustered standard errors at country level in brackets.

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

Note 1: Left is equal to missing after left-governed countries go back to being governed by a non-left government.

Note 2: Ln(ToT) is the logarithm of Terms of trade for each country.

Note 3: Ln(Trade/GDP) is the logarithm of the ratio between all trade and GDP for each country.

Note 4: Ln(High skilled/Low skilled) is the logarithm of the ratio between high skilled and low skilled workers.

**Table 5. Robustness Checks: Left definition**

| Dependent Variable | | Ln(Gini) | Ln(Share of income top 10%) | Ln( Share of income 4,5,6 & 7 decile) | Ln(Share bottom 20%) | Ln(Share 90 cent/Share 10 cent) | Ln(CCT/GDP) | Ln(UCT/GDP) | Ln(Social Pensions | Ln(Minimum Wage) | Ln(Total Revenues / GDP) | Ln(Taxes on rents capital gains income and Profits/GDP) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Static** | Left baseline 1[1] | -0.0611*** | -0.0654*** | 0.0586*** | 0.132** | -0.168** | -0.883 | 0.859 | 0.124 | 0.134 | 0.0908 | 0.0364 |
| | | (0.0188) | (0.0220) | (0.0188) | (0.0586) | (0.0750) | (0.617) | (0.675) | (0.393) | (0.112) | (0.0526) | (0.108) |
| | Left alternative 1[2] | -0.0582*** | -0.0618** | 0.0553*** | 0.124** | -0.157** | -0.885 | 0.870 | 0.132 | 0.0972 | 0.0927* | 0.0408 |
| | | (0.0189) | (0.0218) | (0.0189) | (0.0562) | (0.0720) | (0.620) | (0.727) | (0.393) | (0.117) | (0.0493) | (0.103) |
| | Left alternative 2[3] | -0.0522*** | -0.0571*** | 0.0504*** | 0.117** | -0.150** | -0.687 | 0.595 | 0.0839 | 0.138 | 0.0800* | 0.0369 |
| | | (0.0149) | (0.0175) | (0.0144) | (0.0527) | (0.0669) | (0.528) | (0.587) | (0.347) | (0.0922) | (0.0458) | (0.0906) |
| **Dynamic (System GMM)** | Left baseline 1[1] | -0.0120** | -0.0165*** | 0.0145*** | 0.0215** | -0.0311** | -0.0290 | -0.428 | 0.152* | 0.0490** | 0.0246*** | 0.0297 |
| | | (0.00503) | (0.00633) | (0.00561) | (0.00917) | (0.0124) | (0.0650) | (0.307) | (0.0892) | (0.0228) | (0.00850) | (0.0212) |
| | Left alternative 1[2] | -0.0110** | -0.0143** | 0.0129** | 0.0224** | -0.0329*** | -0.0182 | -0.386 | 0.147* | 0.0380* | 0.0222*** | 0.0237 |
| | | (0.00472) | (0.00625) | (0.00552) | (0.00887) | (0.0124) | (0.0662) | (0.280) | (0.0886) | (0.0212) | (0.00752) | (0.0200) |
| | Left alternative 2[3] | -0.0126*** | -0.0177*** | 0.0149*** | 0.0209** | -0.0294** | -0.0507 | -0.438 | 0.142* | 0.0484** | 0.0242*** | 0.0355* |
| | | (0.00485) | (0.00608) | (0.00514) | (0.00880) | (0.0115) | (0.0715) | (0.318) | (0.0859) | (0.0217) | (0.00795) | (0.0209) |

All regressions include the controls of our specification in equation (1). The static model includes country and year fixed effects. The dynamic model includes year fixed effects. Clustered standard errors at country level in brackets.

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

Note 1: Left is equal to missing after left-governed countries go back to being governed by a non-left government.

Note 2: Left is equal to 1 after the first year of a left government.

Note 3: Left is equal to 1 when a left government is in office and 0 when a non-left government is in office.

**Appendix for *The Pink Tide and Inequality in Latin America***

February 26, 2021

## A1. Alternative Data

Data on income inequality is often missing for some countries and years. We test the robustness of our results using the SWIID database. SWIID relies on the following data sources: OECD Income Distribution Database, the Socio-Economic Database for Latin America and the Caribbean generated by CEDLAS, and the World Bank, Eurostat, the World Bank's PovcalNet, the UN Economic Commission for Latin America and the Caribbean, national statistical offices around the world, and other sources. The Gini coefficients provided by SWIDD are imputed and its main objective is to reach the maximum comparability of inequality data across countries and years. We obtain strikingly similar results, showing that the Left lowers the Gini index.

**Table A1. The Effect of Left on Inequality Using SWIID data**

| Dependent Variable | *Ln(Gini disposable income)* | |
|---|---|---|
| Left[1] | -0.056*** | |
| | [0.018] | |
| Left alternative[2] | | -0.052** |
| | | [0.019] |
| Ln(ToT) | -0.039 | -0.035 |
| | [0.038] | [0.038] |
| Ln(Trade/GDP) | -0.038 | -0.046 |
| | [0.047] | [0.045] |
| Ln(High skilled/Low skilled) | -0.042 | -0.011 |
| | [0.039] | [0.040] |
| Observations | 275 | 287 |
| Country FE | YES | YES |
| Period FE | YES | YES |

Clustered standard errors in brackets

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

Note 1: Left is equal to missing after left-governed countries go back to being governed by a non-left government.

Note 2: Left is equal to 1 after the first year of a left government.

## A2. Placebo Check

Here we run a placebo test. To do so, we assign a placebo treatment four years before the Left came to office and drop country-observations with a leftist government from our sample. As expected, the placebo treatment does not have a statistically significant effect on inequality.

**Table A2. The Effect of the Placebo Treatment on Inequality and Policy**

| Dependent Variable | Ln(Gini) | Ln(Share of income top 10%) | Ln(Share of income 4,5,6 & 7 decile) | Ln(Share bottom 20%) | Ln(Share 90 cent/Share 10 cent) | Ln(CCT/GDP) | Ln(Social Pensions | Ln(Minimum Wage) | Ln(Total Revenues / GDP) | Ln(Taxes on rents capital gains income and Profits/GDP) |
|---|---|---|---|---|---|---|---|---|---|---|
| Left placebo[1] | -0.032 | -0.016 | 0.022 | 0.132 | -0.163 | 0.182 | 3.247 | 0.022 | 0.081 | 0.137 |
| | [0.023] | [0.023] | [0.023] | [0.078] | [0.097] | [0.840] | [1.939] | [0.059] | [0.054] | [0.148] |
| Ln(ToT)[2] | -0.070** | -0.074* | 0.071* | 0.152 | -0.174 | 3.237*** | -2.740* | 0.334** | 0.124* | 0.242 |
| | [0.032] | [0.037] | [0.037] | [0.091] | [0.127] | [0.428] | [1.271] | [0.143] | [0.064] | [0.213] |
| Ln(Trade/GDP)[3] | -0.050 | -0.076 | 0.063 | -0.038 | 0.021 | 1.392* | -0.542 | -0.156 | 0.080 | 0.345 |
| | [0.055] | [0.071] | [0.060] | [0.121] | [0.155] | [0.665] | [1.195] | [0.146] | [0.087] | [0.242] |
| Ln(High skilled/Low skilled)[4] | -0.064 | -0.046 | 0.068 | 0.275* | -0.346** | -1.842 | -2.913 | -0.076 | 0.101 | 0.166 |
| | [0.045] | [0.056] | [0.050] | [0.130] | [0.148] | [1.088] | [4.652] | [0.108] | [0.114] | [0.212] |
| Observations | 185 | 181 | 181 | 181 | 181 | 86 | 58 | 192 | 192 | 192 |
| R-squared | 0.798 | 0.794 | 0.796 | 0.813 | 0.804 | 0.838 | 0.843 | 0.712 | 0.916 | 0.859 |
| Country FE | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| Period FE | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| R2 Adjusted | 0.735 | 0.728 | 0.731 | 0.752 | 0.741 | 0.754 | 0.702 | 0.626 | 0.890 | 0.817 |

Clustered standard errors at country-level in brackets.

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

Note 1: The placebo treatment is assigned four periods before the Left takes office and we drop the effectively treated country-year observations.

Note 2: Ln(ToT) is the logarithm of Terms of trade for each country.

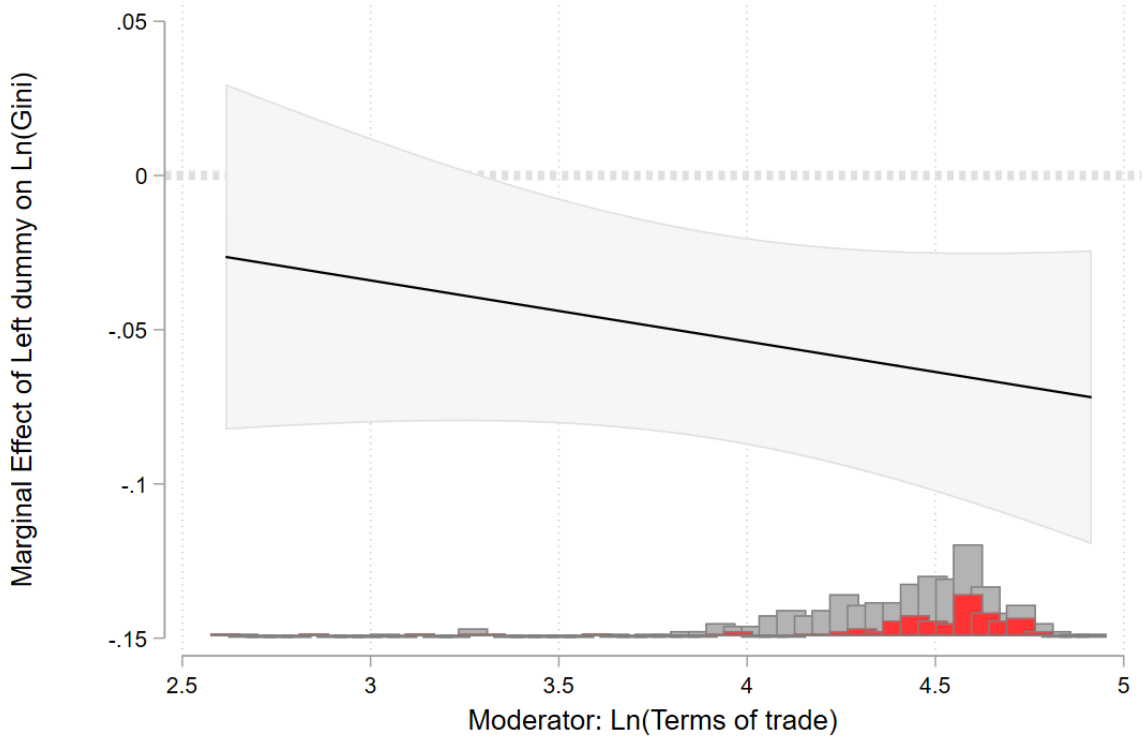
Note 3: Ln(Trade/GDP) is the logarithm of the ratio between all trade and GDP for each country.

Note 4: Ln(High skilled/Low skilled) is the logarithm of the ratio between high skilled and low skilled workers.

### A3. Terms of trade and conditional effect of left governments

Figure A1 shows the moderating effect of the Left across levels of the Terms of trade variable. The histogram in the figure shows the distribution of "treated" (red) and "untreated" (grey) observations across the terms of trade. For most of the range with sufficient data, the coefficient of Left is negative and significant.

**Figure A1. The Marginal Effect of Left on Inequality Over Terms of Trade**




Notes: The black solid line represents the linear marginal effect of Left incumbency on the log of the Gini index at each point of the moderator variable, Ln(Terms of trade). The red bars represent the distribution of Left governments and the grey bars the non-Left governments across the moderator variable.

### A4. Long-run Effects of Left

Table A3 shows results for the cumulative effect of being governed by the Left after one, four, and eight years.

**Table A3. Long-run Effects of Left on Inequality and Policy**

| Dependent Variable | Ln(Gini) | Ln(Share of income top 10%) | Ln(Income share middle deciles 4 to 7) | Ln(Share of income bottom 20%) | Ln(Income share centile 90/Income share centile 10) | Ln(CCT's) | Ln(UCT's) | Ln(Social Pensions) | Ln(Real minimum wage) | Ln(Total tax revenues as % of the GDP) | Ln(Total tax revenues on rents income profits and capital gains as % of the GDP) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Left effect one year after | -0.0229** | -0.0312*** | 0.0271*** | 0.0405** | -0.0582** | -0.0508 | -0.684 | 0.268* | 0.0948** | 0.0485*** | 0.0565 |
| | (0.00951) | (0.0118) | (0.0103) | (0.0172) | (0.0230) | (0.114) | (0.459) | (0.156) | (0.0430) | (0.0166) | (0.0399) |
| Left effect four years after | -0.050** | -0.066*** | 0.056*** | 0.085** | -0.120** | -0.089 | -0.980* | 0.477* | 0.215** | 0.116*** | 0.122 |
| | [0.020] | [0.024] | [0.020] | [0.036] | [0.047] | [0.200] | [0.594] | [0.273] | [0.091] | [0.038] | [0.085] |
| Left effect eight after | -0.078*** | -0.096*** | 0.079*** | 0.124** | -0.172*** | -0.108 | -1.050* | 0.588* | 0.341** | 0.196*** | 0.183 |
| | [0.030] | [0.034] | [0.028] | [0.051] | [0.067] | [0.243] | [0.616] | [0.339] | [0.136] | [0.063] | [0.125] |
| Left effect in the long-run | -0.142*** | -0.145*** | 0.110*** | 0.183** | -0.244** | -0.117 | -1.060* | 0.645* | 0.743* | 0.802** | 0.302 |
| | [0.053] | [0.054] | [0.0391] | [0.080] | [0.102] | [0.265] | [0.618] | [0.382] | [0.407] | [0.369] | [0.221] |

Clustered standard errors in parentheses

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

### A5. Extended results

In the following links we present the extended results of the estimations presented in Figure 2 – i.e., we present the results for all the subsamples in the figure for each one of our dependent variables using both models (static and dynamic).

Links:

**Table A4. Extended results for the static model**

**STATIC EXTENDED RESULTS**

**Table A5. Extended results for the dynamic model**

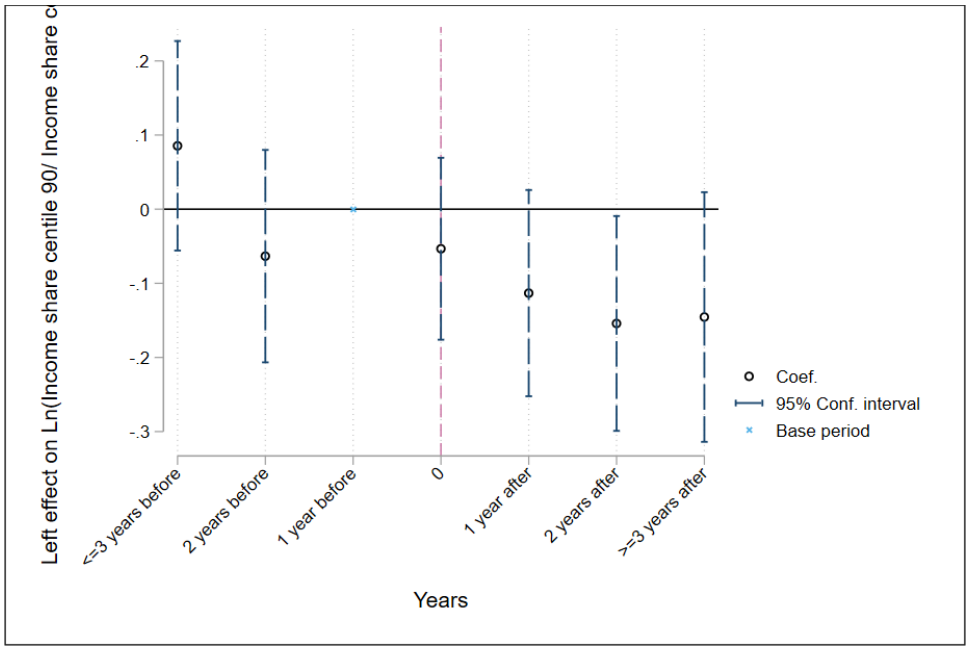
**DYNAMIC EXTENDED RESULTS**

### A6. Parallel Trend Tests

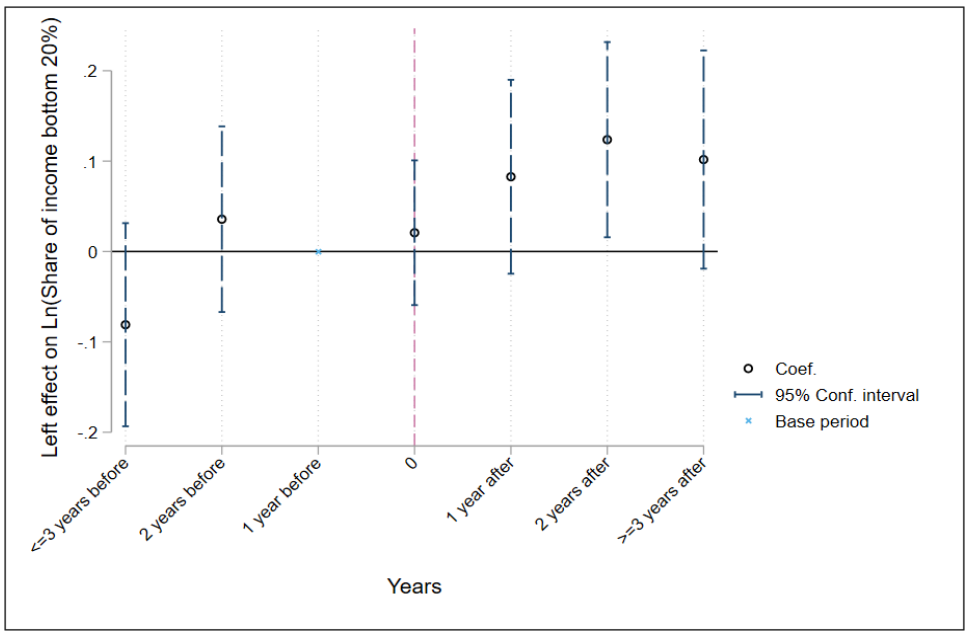
Below we show plots for the parallel trend regression tests for all our dependent variables. In all cases, each coefficient corresponds to the change in the natural logarithm of the dependent variable to the change one year before the leftist government begins, relative to the base period. The red dashed line represents the year where the Left government begins. The regression controls for the level of the terms of trade, the ratio between total trade and the GDP, and the ratio between high skilled and low-skilled workers.

**Figure A2. Parallel trend assumption: Results for all variables**

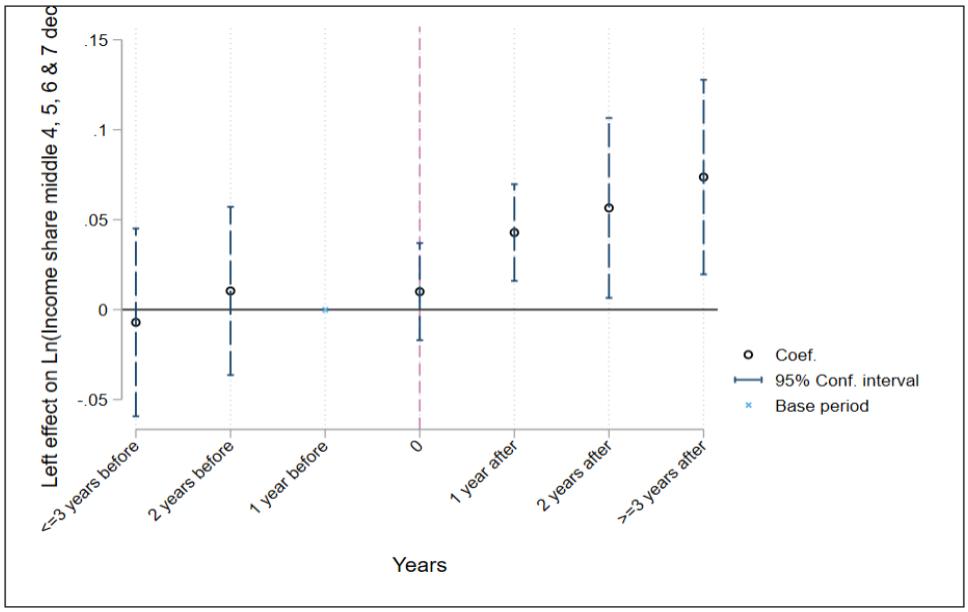
*Panel 1. Income share centile 90 over income share centile 10*



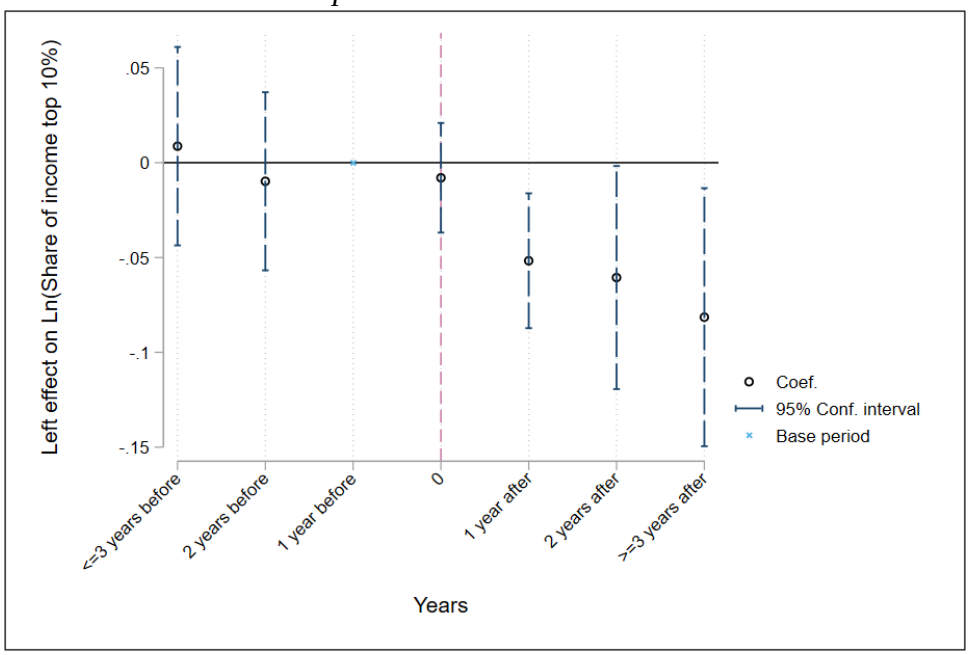

*Panel 2. Income share bottom 20%*



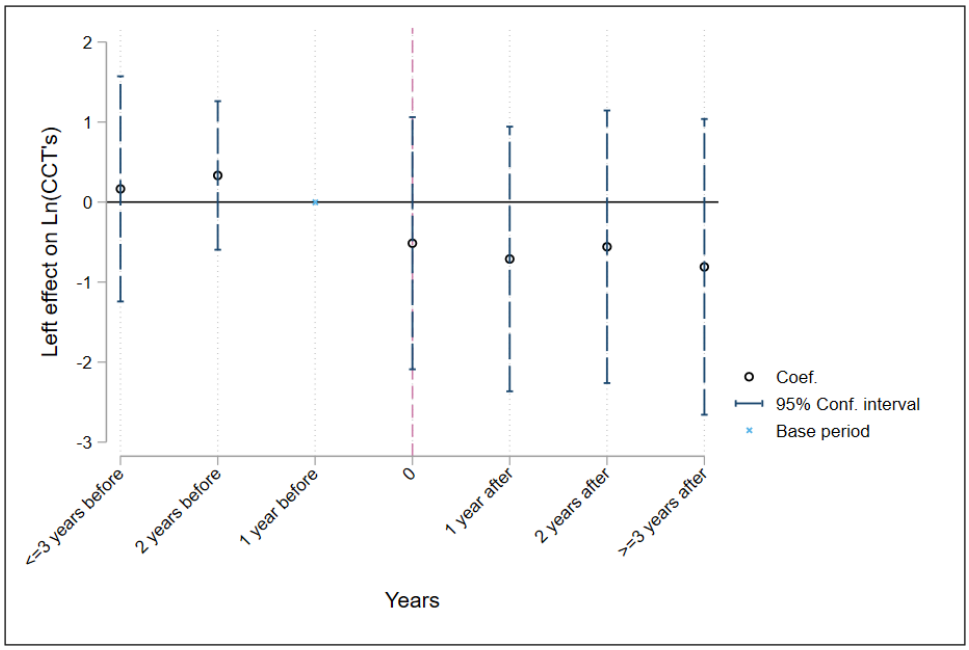
*Panel 3. Income share middle deciles (4, 5, 6 & 7)*



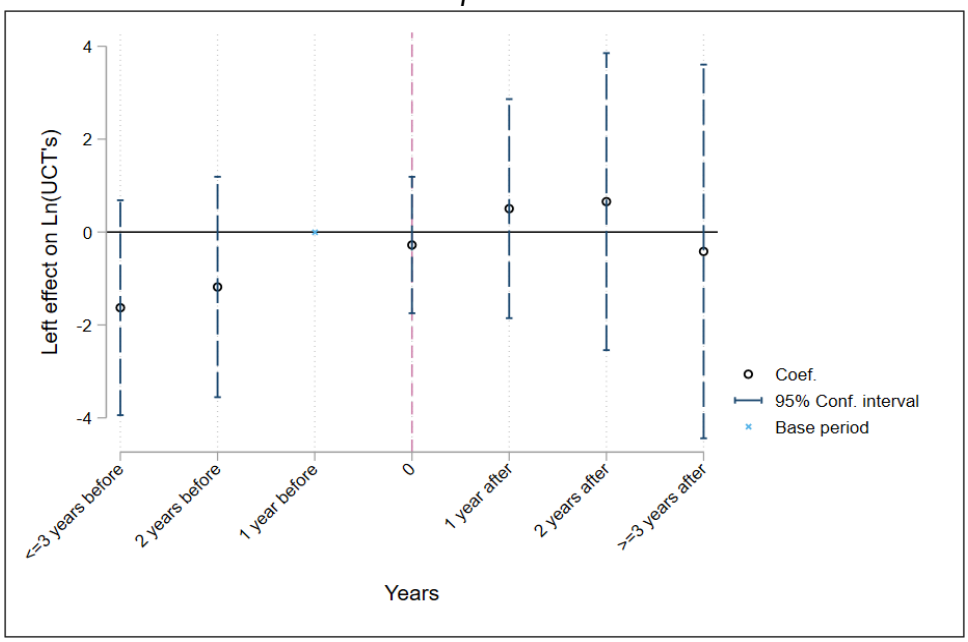

*Panel 4. Income share top 10%*



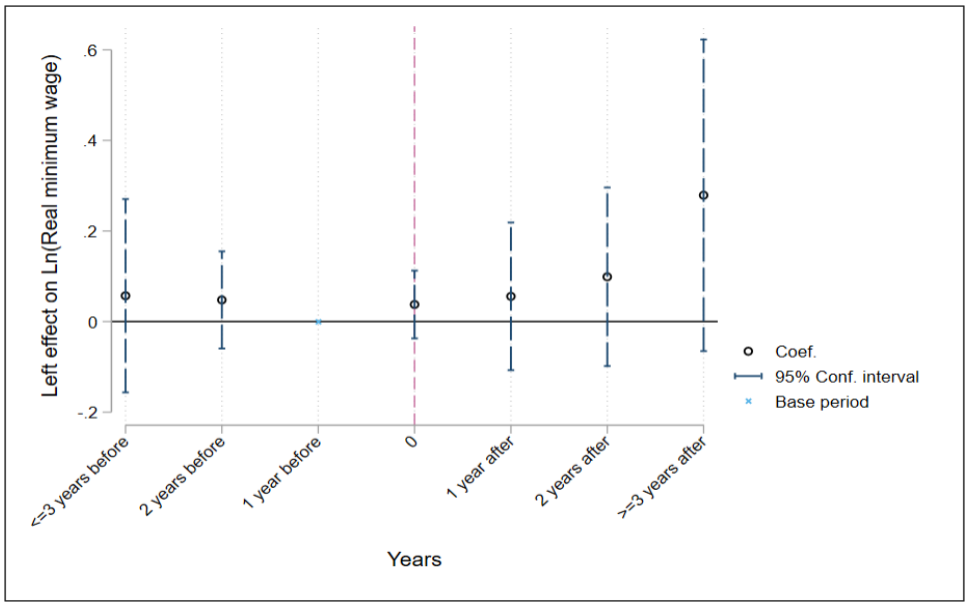
*Panel 5. Conditional Cash Transfers*



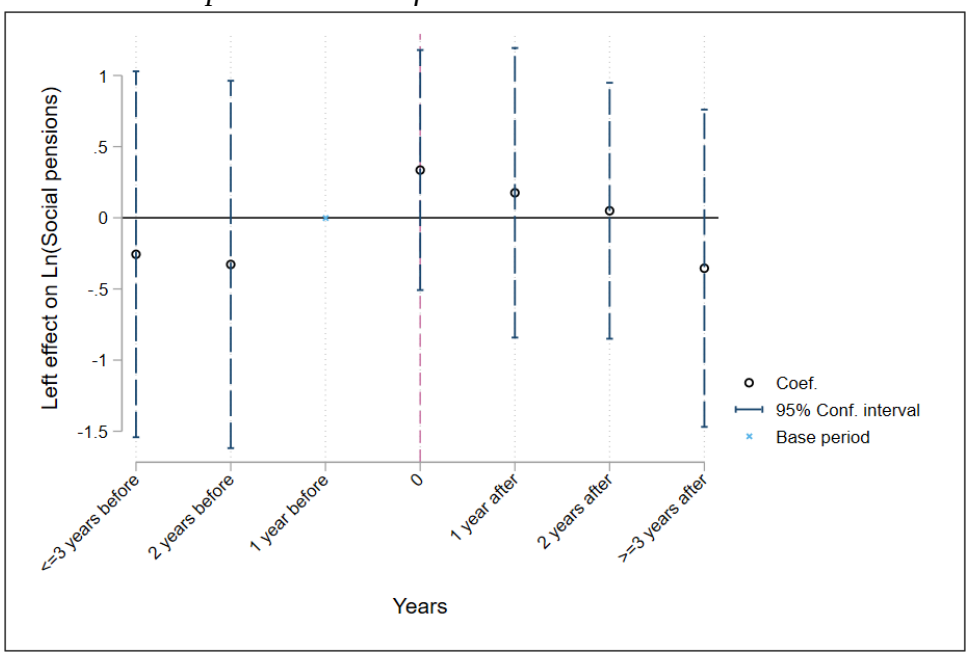

*Panel 6. Unconditional Cash Transfers*



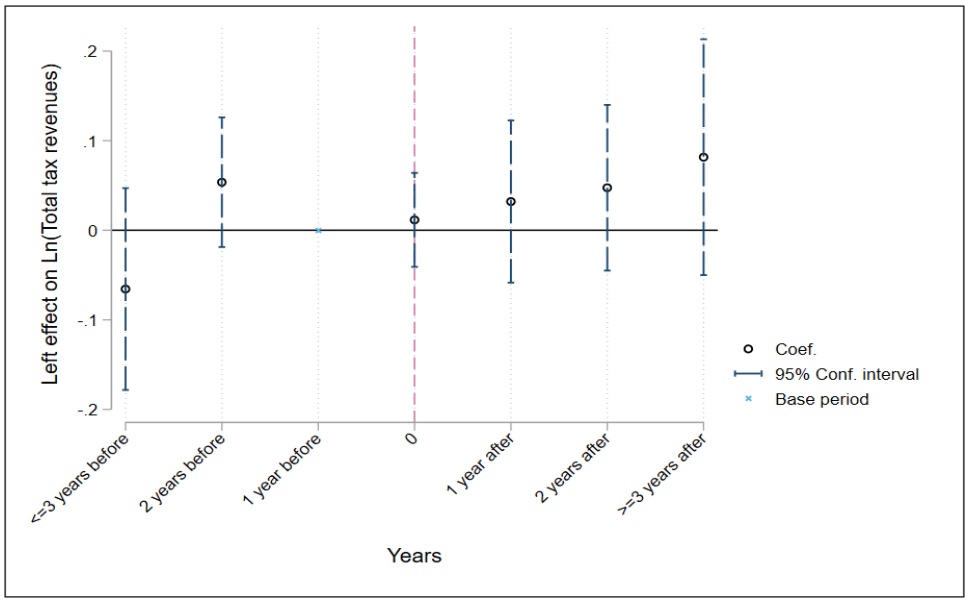
*Panel 7. Real Minimum Wage*



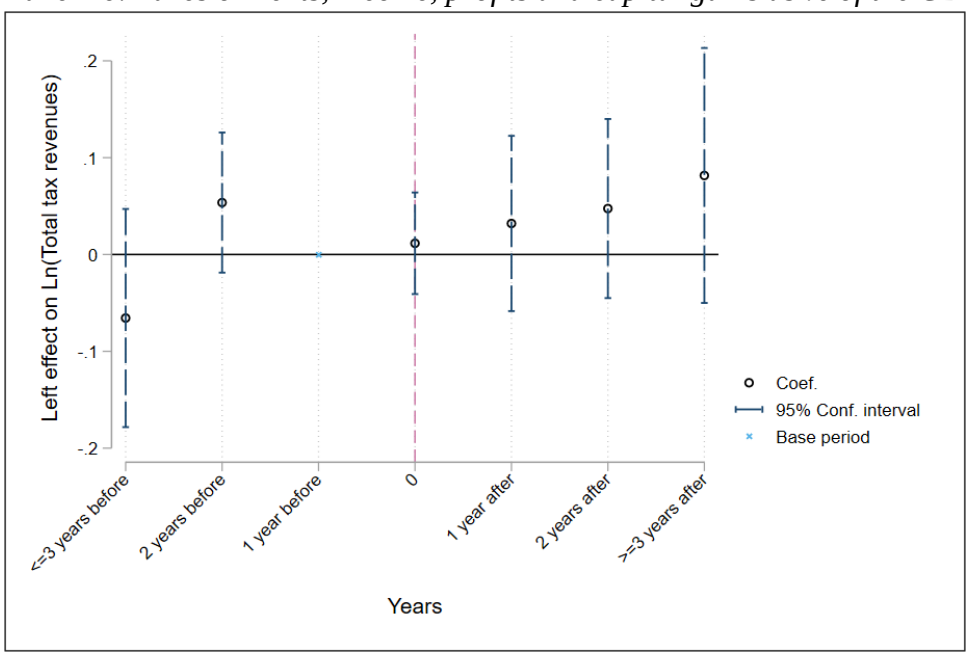

*Panel 8. Social pensions as % of the GDP.*



*Panel 9. Total tax revenues as % of the GDP*




*Panel 10. Taxes on rents, income, profits and capital gains as % of the GDP.*




### A7. Data Availability

In the table attached, we present the data availability for each dependent variable used in our paper.

**Table A6. Data availability**

Please find the table in this link **HERE**

### A8. Serial Correlation Test

As discussed in the paper, there are reasons to believe that there is serial correlation in our variables. In Table A7, we present the serial correlation test for the residuals of the

static model for all the variables we use as outcome variables. As expected, we found one or higher order of serial correlation in all our variables. In the static model, we account for this issue by using clustered standard errors. However, serial correlation may also introduce bias in our point estimates. To account for this possibility, we estimate dynamic panel data models (using the difference and system generalized method-of-moments estimator) where we explicitly account for the potential serial correlation in the dependent variable.

**Table A7. Serial correlation test for the residuals of the static model**

| P-value of the Ljung-Box serial correlation test on the static models for one to six lags | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lags | Ln(Gini) | Ln(Real minimum wage) | Ln(Income share centile 90/ Income share centile 10) | Ln(Income share middle 4, 5, 6 & 7 deciles) | Ln(Share of income bottom 20%) | Ln(Share of income top 10%) | Ln(CCT's) | Ln(UCT's) | Ln(Social pensions) | Ln(Total tax revenues) | Ln(Taxes on income, rents, profits and capital gains) |
| 1 | 3.2E-14 | 7.3E-22 | 2.382E-14 | 1.7E-11 | 3.8E-14 | 1.8E-11 | 5.7E-06 | 0.00036 | 0.04443 | 5.4E-14 | 4.752E-09 |
| 2 | 1.7E-06 | 3.9E-15 | 1.996E-07 | 4.6E-05 | 2.2E-07 | 0.0001 | 0.42 | 0.73 | 0.75 | 7.2E-06 | 0.001 |
| 3 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.33 | 0.17 | 0.22 | 0.01 | 0.04 |
| 4 | 0.05 | 0.00 | 0.04 | 0.08 | 0.04 | 0.12 | 0.26 | 0.09 | 0.00 | 0.10 | 0.06 |
| 5 | 0.62 | 0.51 | 0.35 | 0.55 | 0.32 | 0.79 | 0.26 | 0.01 | 0.31 | 0.42 | 0.01 |
| 6 | 0.69 | 0.79 | 0.86 | 0.94 | 0.96 | 0.74 | 0.18 | 0.14 | 0.93 | 0.57 | 0.64 |

Notes: We test if the autocorrelation at each lag order is zero, but we allow for nonzero autocorrelations at lower lag orders. We run the test with the residuals of the static model.

### A9. Computation of long-run effects

Our baseline dynamic model (excluding year fixed effects, w.l.o.g) is:

$$Y_{i,t} = \beta_0 + \beta_1 L_{i,t} + \rho Y_{t-1} + \epsilon_{i,t} \ (1)$$

Henceforth, we will assume a transition to a left government in the period $t$. As a result, $L_{i,j} = 1 \ \forall j > t$, hence $L_{i,t} = L_{i,t+s} = 1 \ \forall s \geq 0$.

Now, one year after $t$, equation (1) would transform into:

$$Y_{i,t+1} = \beta_0 + \beta_1 L_{i,t+1} + \rho Y_t + \epsilon_{i,t+1} \ (2)$$

Replacing equation (1) into equation (2):

$$Y_{i,t+1} = \beta_0 + \beta_1 L_{i,t+1} + \rho (\beta_0 + \beta_1 L_{i,t} + \rho Y_{t-1} + \epsilon_{i,t}) + \epsilon_{i,t+1} \ (3)$$

Reordering equation (3) we get:

$$Y_{i,t+1} = \beta_0(1+\rho) + \beta_1 L_{i,t+1} + \beta_1\rho L_{i,t} + \rho^2 Y_{t-1} + \rho\epsilon_{i,t} + \epsilon_{i,t+1} \ (4)$$

Given the transition since period $t$, $L_{i,t+1} = L_{i,t} = 1$ we can rewrite equation (4):

$$Y_{i,t+1} = \beta_0(1+\rho) + \beta_1 (1+\rho) L_{i,t} + \rho^2 Y_{t-1} + \rho\epsilon_{i,t} + \epsilon_{i,t+1}$$

Now if we repeat the process to $Y_{t+2}$, it is easy to derive the following expression:

$$Y_{i,t+2} = \beta_0(1+\rho+\rho^2) + \beta_1 (1+\rho+\rho^2) L_{i,t} + \rho^3 Y_{t-1} + \rho^2\epsilon_{i,t} + \rho\epsilon_{i,t+1} + \epsilon_{i,t+2}$$

The coefficient $\beta_1 (1+\rho+\rho^2)$ represents the cumulative effect of being governed by the Left 2 years after the beginning of the government.

This example can be generalized for any time horizon. If we want to estimate the cumulative effect $T$ periods after the left beginning we could compute the following equation:

$$Y_{i,t+T} = \beta_0 \sum_{j=0}^{T} \rho^j + \beta_1 \sum_{j=0}^{T} \rho^j \ L_{i,t} + \rho^{T+1} Y_{t-1} + \sum_{j=0}^{T} \rho^{T-j} \epsilon_{i,t+j} \ (5)$$

It is easy to derive tur formula in the footnote 24 to calculate "long-run" effects from equation (5). As $j \to \infty$ the summation $\sum_{j=0}^{T} \rho^j$ converges to $\frac{1}{1-\rho}$, given that it is a geometric summation. Also, given a finite value of $Y_{i,t-1}$ and, if the stability condition is satisfied $\rho$ within the unit circle ($|\rho| < 1$), the term

$\rho^{T+1}Y_{i,t-1} \to 0$. Similarly, $\sum_{j=0}^{T} \rho^{T-j}\, \epsilon_{i,t+j} = \rho^{T}\, \epsilon_t\, (1 + \rho^{-1}L^{-1} + (\rho^{-1}L^{-1})^2 + \cdots + (\rho^{-1}L^{-1})^T)$, and when $T \to \infty$, $(1 + \rho^{-1}L^{-1} + (\rho^{-1}L^{-1})^2 + \cdots + (\rho^{-1}L^{-1})^T) = \left(\frac{1}{1-\rho^{-1}L^{-1}}\right)$, and $\rho^T \to 0$. As a result, the equation (5) when $j \to \infty$ converges to:

$$Y_{i,t+\infty} = \frac{\beta_0}{1-\rho} + \frac{\beta_1}{1-\rho}\, L_{i,t} \quad (6)$$

Now we can see that $\frac{\beta_1}{1-\rho}$ is the limiting value of an infinite iteration of the equation 1, and it represents the cumulative effect of the change from non-left to left.

### A10. Additional Descriptive Statistics

Table A8 includes country-levels statistics disaggregated at the year level for the average Gini and GDP per capita indexes.

**Table A8. Additional descriptive statistics**

Please find the table in this link **HERE**