Income Shocks, Economic Inequality, and Political Realignment: Voter Turnout and the Shift to a Multi-Party System in Costa Rica

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Abstract

This study uses Costa Rica as a case study to examine the impact of income shocks and inequality on two facets of the global transformation in electoral dynamics: declining voter turnout and the rise of multi-party systems. Since 1998, Costa Rica has experienced a significant drop in voter turnout, providing a unique lens to explore these socio-economic influences. By merging electoral registries with social security employer-employee records, this research offers novel insights from a developing democracy with a solid electoral tradition. The analysis finds a positive relationship between income and voter turnout, with inequality playing a pivotal role. High inequality mobilises voters at the income extremes, while lower inequality fosters greater participation from middle-income groups. Individuals facing downward income mobility are likelier to vote, indicating that economic hardship spurs electoral engagement. These results are robust to three identification strategies: random assignment of voters to polling stations inside the same polling centres, loss of income associated with unexpected mass layoffs, and changes of income related to changes in international prices of agricultural products. The study also investigates Costa Rica's transition from a two-party to a multi-party system after 2002. Income shocks have significantly altered electoral outcomes, particularly for the PLN, which has shifted from its traditional voter base in the middle of the income distribution to a more substantial reliance on the poorest and economic elites. Polling stations with more upwardly mobile voters now increasingly mirror the voting behaviour of the top 1%, underscoring the PLN's changing voter appeal.

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1 Introduction and literature review

1.1 Introduction

This project investigates the interaction of globalisation, income inequality, and electoral outcomes, focusing on how income inequality and various facets of globalisation—such as trade, foreign direct investment (FDI), and immigration—affect voter turnout. The research explicitly concerns democracies where political participation, especially electoral turnout, has declined. Figures 1 and 2 illustrate that this decline is a widespread phenomenon observed in most democracies worldwide, regardless of whether the elections are presidential, parliamentary, or both. [1] This trend is also evident when the analysis is limited to the oldest and most continuous democratic systems, as defined by Bormann and Golder (2022), as shown in Figures B.17 and B.18. This paper contributes to the literature on the effects of globalisation on political polarisation, a field that has predominantly focused on developed countries. In contrast, this study focuses on electoral turnout in a developing country, Costa Rica.[2]

Costa Rica is the oldest standing democracy in Latin America, since the re-establishment of an elected government in 1949 after the Civil War of 1948.[3] The country has had a bipolar party system since 1953 and a fully two-party system from 1983 through 2000. In the presidential elections 1998, voter turnout dropped 11 percentage points concerning the last election in 1994, and it has progressively dropped another 10 points ever since (see Figure B.19). Moreover, starting in 2002, Costa Rican democracy transitioned to a multiparty system. Hence, to understand this stark change, we are interested in studying the determinants of electoral outcomes (turnout, voting shares, campaign contributions, etc.) and how they relate to increasing income inequality and globalisation. It is essential to mention that other countries in Latin America, such as Mexico and Chile, and in different

[1] These graphs are produced using the Voter Turnout Dataset from International IDEA: `https://www.idea.int/data-tools/data/voter-turnout-database`. Some of these findings are condensed in the report by Solijonov (2016).

[2] Chapter two focuses on vote-shares and other electoral outcomes different from voter turnout.

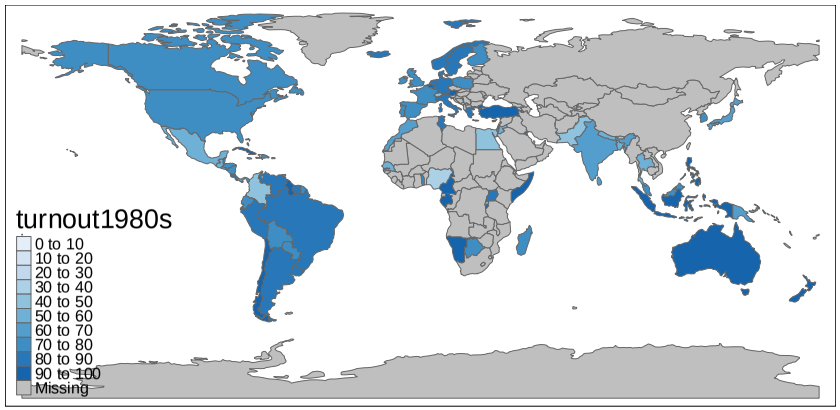
[3] According to World Economic Forum, Costa Rica is the oldest democracy in Latin America and the 21st in the world: `https://www.weforum.org/agenda/2019/08/countries-are-the-worlds-oldest-democracies`.

continents, such as France and the USA, have also witnessed a stark drop in voter turnout that has broken the electoral equilibrium of the past. Hence, the mechanisms at play in this analysis are likely present in different regions of the world.

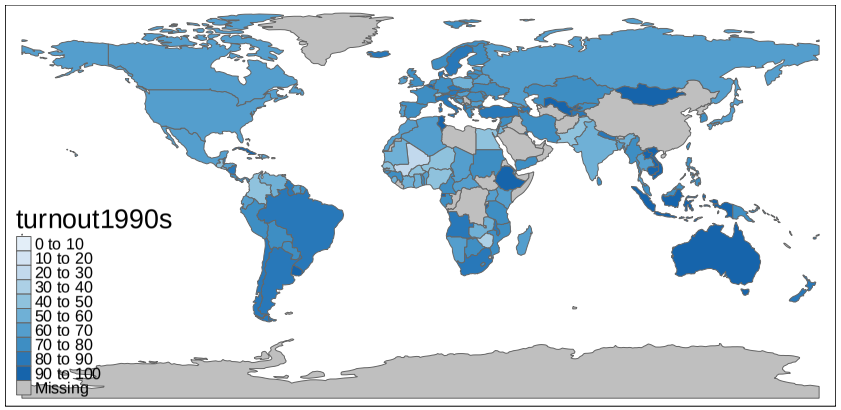
We address the research question: *How do rising income inequality and higher exposure to globalisation contribute to a decline in voter turnout since 2002?* This project aims to test whether two major shocks have contributed to significant changes in the political landscape. First, Costa Rica has signed several important Free Trade Agreements (FTAs) in the past two decades with the US, China, and the EU. Second, the country has experienced at least two immigration waves from Nicaragua during this period (1998 and 2018). Our hypothesis posits that globalisation is favoured by some (the *cosmopolitan*) and opposed by others (the *nativist*) Inglehart and Norris (2016). Thus, the empirical design tests whether there is a causal link between these shocks and the reconfiguration of the electoral system in Costa Rica.

This study uses uniquely detailed individual-level data to understand the mechanisms underlying changes in income distribution and individual income and globalisation shocks, particularly those related to exposure to immigration. Given the characteristics of our data, we focus on the universe of formal workers and the changes they have experienced over the last few decades. For instance, we examine changes in within-firm and between-firm income inequality. While previous studies have documented these changes in income distribution within firms, we are among the first to demonstrate how these changes influence voting behaviour. Consequently, we control and interact our inequality measures with levels of formality at the local level and account for competition from immigrants in both employment and residential contexts.

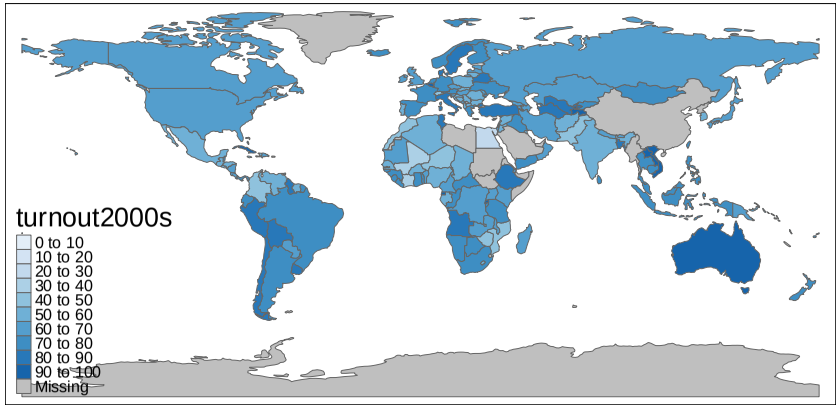
This project aims to make two main contributions. Firstly, expand the extensive literature on globalisation and electoral outcomes by exploring increasing economic inequality and political realignment in a developing country with a long democratic tradition instead of focusing on political polarisation in developed countries as is usually the case in the literature (Aksoy et al. (2020), Autor et al. (2020), Fetzer (2019), Giordani and Mariani (2022), and Grossman and Helpman (2021)). Secondly, this would be the first project to combine two sets of administrative data at the individual level to answer questions on



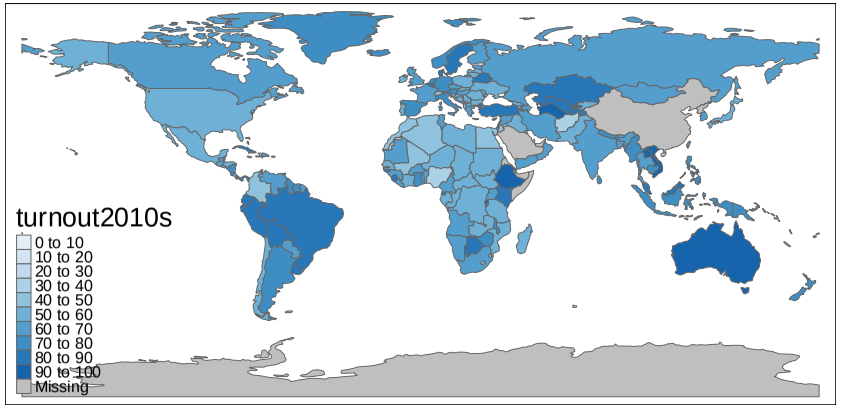
(a) 1980s



(b) 1990s



(c) 2000s



(d) 2010s

FIGURE 1: Global decrease in voter turnout.

Source: authors' computation using data from `www.idea.int/data-tools/data/voter-turnout-database`.

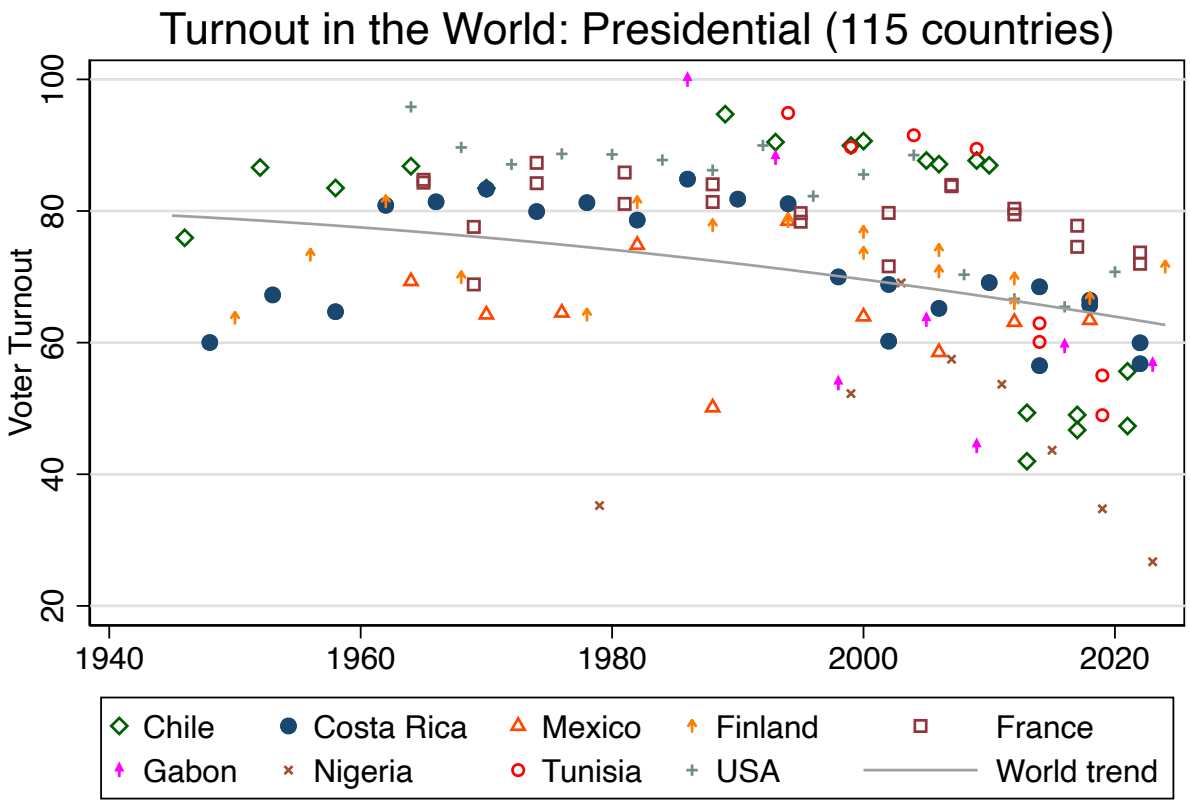


FIGURE 2: Voter turnout: selected countries and global trend.

the effect of globalisation and inequality on electoral outcomes in a developing country. There is a budding literature that has started to do so for developed countries, but it has never been done outside of Western Europe (see Sørensen and Geys (2024), Hirvonen et al. (2023), Szulkin (2022), Schafer et al. (2022) and Prarolo et al. (2023)).

This research combines uniquely detailed administrative data at both the local and individual levels to examine how various shocks, such as income and globalisation shocks –including increased contact with immigrant workers– affect political alignments in Costa Rica. We aim to contribute to discussing how globalisation and income shocks impact political preferences. To understand the transition from high voter turnout, which exceeded 80 per cent in 1994, to below 60 per cent in 2022, we begin by studying the effect of income and changes in income on turnout. We also explore the impact of absolute versus relative changes in income. In analysing changes in relative income, we aim to identify the most influential reference groups. We transition from the individual to the aggregate level by observing that most percentiles have lost income share, except the upper deciles. Simultaneously, most deciles are voting less now than at the beginning of the period (see Figure 25a). We then connect individual-level income changes to changes in inequality at the local level. Finally, we explore the causal effects of income changes using an instrumental variable (IV) strategy at the individual level.

This paper also focuses on the effects of income shocks on vote shares. Our analysis centres around three specific political parties that illustrate the transition from a two-party to a multi-party system in Costa Rica. The National Liberation Party (PLN) was the dominant actor during the two-party period. The Citizen's Action Party (PAC) was the first newcomer to have a genuine chance at winning a presidential election in 2002. The National Restoration Party (PRN) emerged as a significant new political force representing populist evangelical Christians, winning the first round of the national election in 2018. Additionally, we consider electoral volatility and votes for traditional parties as outcomes, alongside vote shares for specific political parties.

Our preliminary results indicate a strong positive correlation between income levels and voter turnout at individual and polling station levels. We observe that turnout increases with income in a non-monotonic manner. This income-turnout gradient has

shifted over time, decreasing turnout among lower- and higher-income deciles. Our findings highlight that county-level inequality significantly impacts voter behaviour, while province-level inequality does not. Moreover, we identify a U-shaped relationship between inequality and turnout, suggesting that higher inequality levels mobilise voters at the extremes of the income spectrum. In contrast, lower inequality levels see more engagement from the middle quintile. Additionally, individuals experiencing downward mobility within the income distribution are more likely to vote, indicating that economic setbacks drive electoral participation. These insights suggest absolute and relative income changes are crucial in shaping political engagement.

The second set of results addresses income shocks and electoral outcomes. The analysis reveals several key insights. Firstly, the transformation of political parties from the two-party period, particularly PLN, is evident in the changing direction of their income-vote-share gradients. PLN now faces two significant challenges: it lost a substantial portion of its historical base, captured by other parties such as PAC until 2018, and it faces intense competition from new political actors like PRN. If political parties were considered economic goods, PLN and PAC would be classified as normal goods, while PRN would be an inferior good. Surprisingly, despite exhibiting a negative gradient, polling stations with more climbers in the income distribution tend to vote more for PLN. One possible explanation for this anomaly is PLN's appeal to the economic elite, leading polling stations with more climbers to increasingly resemble the voting behaviour of the top 1 per cent.

The remainder of this paper is structured as follows: Section 1 provides an extensive literature review, a brief theoretical framework, and a historical background in addition to this introduction. Section 2 introduces the data sources employed, while Section 3 outlines the methods used in the analysis. The rest of the document is divided into two primary parts, each presenting specific results. Section 4 focuses on income shocks and their impact on electoral turnout, while Section 5 concentrates on income shocks and vote shares. Finally, in Section 6, the paper concludes its findings and insights.

1.2 Literature review

1.2.1 Effects of economic and social shocks on voting:

This project closely relates to the literature on the effects of economic and social shocks on voting. Panunzi et al. (2020) examine the relationship between economic shocks and populism. The authors argue that economic shocks, such as recessions or financial crises, can increase support for populist political parties and leaders, who often blame these shocks on specific groups, such as immigrants or elites. They propose a model of disappointed expectations (induce a preference for risk), where an individual who suffers an unexpected and large income loss is forced to consume below his reference point (in this sense he is disappointed). This makes him risk-loving and as a result, he leans towards populist candidates who are perceived as riskier. Furthermore, it is the intrinsic preference for risk of low-income and disappointed voters that induces policy divergence and gives rise to the "unwieldy" coalition supporting the populist candidate.

Bonomi et al. (2021) explore the role of identity and beliefs in political conflict. The authors argue that individuals' identities and beliefs, particularly those related to ethnicity, religion, and culture, can shape their political views and the conflicts they engage in. They develop a model of endogenous identities (associated with systematic belief distortions). Hence, to explain why cultural divisions have increased or why the redistributive conflict has not risen despite growing income inequality, they propose that when voters abandon their class identity and redefine themselves in terms of their moral or religious values, the latter become more important to explain their beliefs in several domains. In both papers, we observe the idea that economic shocks create new cleavages in society, and these could be driven by trade and technological change. Hence, both channels are relevant to this project.

Fetzer (2019) argues that economic factors, such as the government's austerity policies and the impact of the financial crisis, may have played a role in the decision of some voters to support Brexit. Exploiting high-frequency annual election data, he shows that a significant expansion in electoral support for UKIP in places with weak socioeconomic fundamentals precipitated the EU referendum. In addition, using data from government

estimates on the expected intensity of specific welfare cuts across districts, he also shows that support for UKIP started to grow in areas with significant exposure to precise benefit cuts after these became effective. Similarly, Dal Bo' et al. (2022) study the political success of Sweden's populist radical right party. The authors argue that the party, which has traditionally been a marginal player in Swedish politics, has been able to tap into public discontent with the political establishment and rising inequality to gain support.

Dal Bo' et al. (2022) provides the first comprehensive account of political selection into a major populist radical-right party: the Sweden Democrats. In a descriptive paper, using simple graphs and (reduced-form) shift-share regressions, the authors document that rising local vote shares for the party coincide with rising local disposable-income gaps between labour-market outsiders and insiders driven by a sequence of national austerity reforms. Their empirical analysis is entirely based on individual-level data (except for vote shares, at the level of the electoral precinct, and municipality). Hence, this is a steppingstone paper for the type of work this project pursues. Overall, these papers provide insight into the factors that can drive support for populism and political conflict. Economic shocks and austerity, identity and beliefs, and discontent with the political establishment are all identified as potential drivers of populism and political conflict.

1.2.2 Distributional effects of trade:

This work is also related to the extensive literature on the distributional effects of trade. Antràs et al. (2017), investigates the relationship between globalization and welfare in the presence of inequality, finding that trade raises aggregate income but also increases income inequality. Closer to the subject of this project is the work of Alfaro-Urena et al. (2019a), and in particular, Alfaro-Urena et al. (2019b). The authors study the effects of multinational corporations (MNCs) on workers in Costa Rica. Using similar data to the one presented in this project, the authors combine microdata on all formal worker-firm and firm-firm relationships in Costa Rica with an instrumental variable approach that exploits shocks to the size of MNCs in the country. They find that as MNCs bring jobs that pay a premium, they improve outside options by altering both the level and composition of labour demand. MNCs can also enhance the performance of domestic employers

through input-output linkages. Shocks to firm performance may then pass through to wages.

1.2.3 Theoretical work in sociology and social psychology:

This project also benefits greatly from past theoretical work in sociology and social psychology regarding social identity, intergroup behaviour, social dominance, and more recently, populism. These works on other social sciences have contributed to a growing literature in economics as it will be discussed in the next subsection. Tajfel (1974) seminal work, discusses the concept of social identity and how it influences intergroup behaviour. The author proposes that individuals need to form and maintain a positive social identity, which is achieved through identifying with certain groups and differentiating those groups from others. This process of group identification and differentiation leads to intergroup behaviour, such as discrimination and prejudice. This theory has been influential in understanding the psychological basis for intergroup conflict.

Sidanius and Pratto (1999) presents a theory of social hierarchy and oppression that is based on the concept of social dominance. The authors argue that social hierarchy and oppression are maintained using intergroup dynamics, such as the exploitation of disadvantaged groups by dominant groups. The theory of social dominance has been influential in understanding the factors that contribute to the maintenance of social hierarchy. More recently, Norris and Inglehart (2019) discusses the rise of populism in the United States and Europe and the factors that have contributed to this trend. The authors argue that this rise can be traced to a combination of economic and cultural factors, including the decline of traditional industries, the increasing diversity of societies, and the increasing global interconnectedness of the world. Hence, they propose a cultural division between the social values of the so-called "nativists" (conservative) and those of more "cosmopolitan" (progressive) individuals.

1.2.4 Trade (and inequality) affect political attitudes:

As mentioned in the previous subsection, there is a growing literature in economics that focuses on the effects of trade and inequality on political attitudes. Aksoy et al. (2020) examine the relationship between globalization, government popularity, and the skill divide. The authors find that there is a negative relationship between globalization and government popularity, particularly in countries with a high skill divide. Additionally, not only the economic outcomes but also the political attitudes of skilled and unskilled workers respond differently to trade shocks. Grossman and Helpman (2021) argue that identity politics can have a significant influence on trade policy, as individuals may prioritize their identity over economic considerations when making decisions about trade. Furthermore, adverse economic shocks strengthen identification with a particular social group and a material interest in stronger trade protection. Voters' preferences over trade policy reflect not only their own material self-interests but also concerns for members of those groups in society with whom they identify.

Autor et al. (2020) examines whether the exposure of local labour markets to increased foreign competition from China has contributed to rising political polarization in the United States since 2000. The authors find that rising trade exposure is associated with increased political polarization, as individuals may be more likely to support candidates who align with their views on trade. Hence, they find a causal effect of import competition on voting for anti-globalization parties in the US. For Giordani and Mariani (2022), the lack of redistribution and a long-run process of human capital accumulation might explain the mounting hostility to free trade. This (endogenous) process, by eroding the political support for redistribution, may increase the demand for protectionism, if trade openness deepens inequality. They show how the recent resurgence of protectionism in Western democracies may be explained, at least partially, by the inability to redistribute the gains from trade towards the losers from globalization (those exposed to import competition).

Finally, in a case closer to the one presented in this paper, Van Patten and Méndez (2022) examines the relationship between firm networks and attitudes toward openness.

Focusing on a referendum on an FTA in Costa Rica, the authors find that individuals with stronger connections to firms that are more integrated into global networks are more likely to support trade agreements, while those with weaker connections are less likely to support such agreements. They identify this effect by measuring the level of exposure at the firm level of changes in tariffs if the FTA was not approved. This paper uses similar data sources to the ones discussed in this project while focusing on one single election. Concretely, they use a similar version of the employee-employer data and aggregate election results at the precinct level. However, they do not use individual-level turnout data.

1.2.5 Migration and electoral outcomes:

There is also a vast literature on migration and electoral outcomes. In the context of this project, immigration exposure is a common label for individuals who are more exposed to prospective competition from immigrants. Dustmann et al. (2019) investigate the relationship between refugee migration and electoral outcomes. The authors find that the presence of refugees is associated with a decline in electoral support for incumbent parties. Moreover, an exogenous increase in refugee allocation is associated with higher turnout and higher vote shares for anti-immigration parties in all but most urban municipalities in Denmark. Tabellini (2020) studies in a unified framework the political and economic effect of immigration across US cities between 1910 and 1930, a period when the massive inflow of European immigrants was abruptly interrupted by two major shocks, World War I, and the Immigration Acts (1921 and 1924).

Tabellini (2020) jointly investigates the political and economic effects of immigration and studies the causes of anti-immigrant sentiments. The first possible cause is economic in nature and argues that political discontent emerges from the negative effect of immigration on natives' employment and wages. The second hypothesis is that native backlash has cultural roots. This paper finds that opposition to immigration was unlikely to have economic roots. Instead, it provides evidence that natives' political discontent was increasing in the cultural differences between immigrants and natives. Hence, this conclusion echoes that of Alesina and Ferrara (2005), where diversity can be economically beneficial, but may be politically hard to manage. Recent work on stereotypes by Bor-

dalo et al. (2016) also provides insights on this matter. Beyond the economic dimension, people who are more than average exposed to immigration may also be more persuaded than others of a platform based on stereotypes about immigration threats.

1.2.6 Related literature in political science:

Finally, there is important literature in political science related to the broad topics discussed in this project. Hausermann and Kriesi (2015) explores the relationship between individual-level preferences and party choice in European politics. The authors argue that individual-level preferences are shaped by both economic and cultural factors and that these preferences are often organized into two broad categories: left-right positions on economic issues, and liberal-conservative positions on cultural issues. For the authors, there is a shift from an economic to a cultural basis of stratification, worldwide. The political actors who mobilize globalization losers mainly do so in identity-based and not in economic terms.

Rovny et al. (2021) discusses the concept of "cleavage" in political science, which refers to the divide between different groups in society along lines such as class, religion, or ethnicity. The authors argue that cleavages play a significant role in shaping political behaviour and party competition, and they explore the various ways in which cleavages can emerge and change over time. They find that conventional parties on the left and right have become much less socially structured. In addition, parties on the socio-cultural transnational divide—GAL (green, alternative, libertarian) and TAN (traditionalist, authoritarian, nationalist) — have sharply divergent social bases.

Hobolt and De Vries (2015) examines the role of "issue entrepreneurship" in multiparty systems. Issue entrepreneurship refers to the process by which parties or politicians seek to create or exploit new issues to gain electoral advantage. The authors argue that issue entrepreneurship is more common in multiparty systems, where there is more competition among parties and a greater need to differentiate themselves from one another. Two findings are important in the context of this project: first, political parties are more likely to become issue entrepreneurs when they are losers on the dominant dimension of contestation; and second, parties will choose which issue to promote based on their internal

cohesion and proximity to the mean voter on that same issue.

De Vries (2018) discusses the concept of the "cosmopolitan-parochial divide" in political behaviour and party competition. The cosmopolitan-parochial divide refers to the distinction between parties and voters who are more open and cosmopolitan in their attitudes, and those who are more parochial and inward-looking. The author argues that this divide has become increasingly important in recent years and that it has significant implications for party competition and electoral behaviour. Moreover, the cosmopolitan–parochial divide has become largely independent of the economic left–right dimension and influences people's voting decisions independently of their left–right views.

1.2.7 Income and turnout using individual-level data:

A new and growing body of literature utilises administrative data to study individual-level electoral turnout. While this approach is innovative, as there are few places globally where such data is accessible, most of these studies focus on developed countries, predominantly in Europe, particularly the Nordic Countries. Examples include the works of Sørensen and Geys (2024), Hirvonen et al. (2023), and Szulkin (2022). In addition, Schafer et al. (2022) and Prarolo et al. (2023) concentrate on a single Italian municipality or city. Most of these papers are still unpublished. Specifically, Sørensen and Geys (2024) examine the causal effect of income on voter turnout using Norwegian administrative data on lottery winnings. By leveraging the random nature of lottery wins, the study isolates the effect of income changes on turnout. The results indicate that positive income shocks do not significantly affect voter turnout, challenging the notion that increasing affluence leads to higher electoral participation. This finding underscores the complexity of the relationship between income and turnout, suggesting that other factors, such as innate traits and social influences, might drive income and turnout.

Hirvonen et al. (2023) investigate the impact of get-out-the-vote (GOTV) text message reminders on voter turnout in Finland. The study employs a large-scale randomised controlled trial (RCT) targeting young adults aged 18 to 29 to evaluate the effectiveness of non-partisan text message reminders sent before the 2022 Finnish county elections. The authors find that these reminders significantly increase turnout among low-propensity

voters, thereby reducing social inequalities in voting. Interestingly, the study also observes substantial spillover effects, with untreated household members of treated individuals also showing increased voter turnout. This suggests that GOTV interventions can have broader impacts beyond the directly treated individuals, potentially altering the overall composition of the electorate.

Schafer et al. (2022) investigate the impact of income changes on voter turnout in Bologna, Italy, using unique administrative data that match individual tax records with voter rolls. The study explores how levels of income and turnout were affected disproportionately among relatively poor citizens following the Great Recession. It documents that within-individual changes in income lead to changes in electoral participation. These effects are modest on average due to diminishing returns but can be significant among the poor. Furthermore, it shows that the income skew in participation has increased over the period of study, indicating that disparities between rich and poor eligible voters have widened, with the median of the active electorate becoming relatively richer. They employ a difference-in-differences (DD) framework to estimate how changes in income affect turnout, mitigating biases from survey misreporting and nonresponse. They also explore the role of political and economic contexts, finding that individual-level resources play a greater role in participation when the political party system is in flux and that the effects of income are larger in second-order elections than in national parliamentary elections.

Prarolo et al. (2023) explore the effects of income shocks and ethnic diversity on electoral turnout using individual-level administrative data from a large Italian municipality. Their findings indicate that positive income shocks increase turnout among the poor, while negative income and diversity shocks reduce turnout. These effects are more pronounced among lower-income individuals. The entry of a populist party further modifies these dynamics, increasing turnout among the poor experiencing income losses and decreasing turnout among the wealthy. Szulkin (2022), in his PhD thesis, explores different dimensions of economic inequality and their impact on political participation and representation. He examines how relative income affects turnout using Swedish register data. Szulkin finds that higher individual and peer incomes increase turnout. However, when individuals become relatively poorer compared to their peers, the effect on turnout de-

pends on the reasons behind the change. The positive impact of peer income is attributed to social network spillovers rather than direct mobilisation against income inequality.

1.2.8 Cleavages and socio-economic inequalities:

Finally, our research is greatly influenced by and intersects with the existing literature on the politics of social inequality and electoral behaviour, specifically as explored in the works of Gethin et al. (2021) and Cagé and Piketty (2023). Gethin et al. (2021) provide a comprehensive international and historical analysis of political cleavages and social inequalities, examining data from fifty democracies over several decades. Their work highlights the complex relationship between socioeconomic factors and voting patterns, revealing how inequality and political alignments shift across different contexts and times. This aligns with the focus of our research on understanding the intricate dynamics between income distribution and electoral turnout, especially in diverse socioeconomic landscapes. Our work is particularly related to the chapter on Latin America (Barrera et al., 2021b).

Cagé and Piketty (2023) historical exploration of political conflicts and social inequalities in France from 1789 to 2022 offers valuable insights into how socio-spatial disparities and historical electoral behaviour shape current political outcomes. Their meticulous compilation of electoral and socioeconomic data over two centuries provides a robust framework for examining long-term trends and transformations in political participation and social stratification. Our chapter, which utilises contemporary administrative data to analyse individual-level electoral turnout and its correlation with income changes, complements their historical perspective by providing a modern-day application of their theoretical findings. Both works emphasise the importance of detailed, data-driven analysis to uncover how economic and social inequalities influence political behaviour. Hence, we aim to understand better how contemporary economic shifts impact voter behaviour and the broader implications for democratic processes and social equity.

1.3 Theoretical framework: Relative Power and Conflict Theory

The theories of relative power and conflict provide two divergent perspectives on the relationship between economic inequality and electoral turnout. Relative power theory posits that increasing inequality leads to a concentration of political power among the wealthy, diminishing lower-income individuals' political engagement. In contrast, conflict theory suggests that higher inequality stimulates political participation across all income groups by intensifying the stakes of political contests. Relative power theory, as articulated by Goodin and Dryzek (1980), asserts that greater economic inequality results in a disproportionate concentration of political power among the affluent, which marginalises lower-income individuals and diminishes their incentive to participate in politics. Solt (2008) supports this view by demonstrating that higher income inequality is associated with lower political participation, particularly among those with lower incomes. This theory posits that as wealth concentrates, the interests of the affluent dominate the political agenda, leading poorer citizens to perceive political participation as futile. Consequently, they disengage from the political process, further entrenching the power imbalance.

Conflict theory offers a contrasting perspective, drawing on the work of Meltzer and Richard (1981). This theory argues that higher income inequality intensifies political conflicts, mobilising greater political engagement across all income groups. According to this view, increasing inequality heightens the demands for redistributive policies from lower-income groups while prompting the affluent to engage politically to protect their interests. This dynamic creates a more conflictive political environment that stimulates higher voter turnout. Polacko (2020) highlights that increased income inequality can lead to more polarised political preferences, thereby increasing political mobilisation and participation. Lupu and Pontusson (2011) argue that the structure rather than the level of inequality matters. They find that middle-income voters are more likely to support redistributive policies when the income gap between the middle and the poor is smaller relative to the gap between the middle and the rich. This aligns with conflict theory, suggesting that the structure of inequality, rather than its level, influences political behaviour.

Oliver (2001) discusses how civic participation is influenced by social conflict within

suburban areas. The book suggests that political fragmentation and social segregation in metropolitan regions limit the role of local government in addressing class and racial conflicts, which affects local civic engagement. This aligns with conflict theory, highlighting how social cleavages and economic disparities drive political mobilisation at the local level. The theories presented in this section provide a critical framework for understanding how economic inequality influences electoral turnout. This chapter examines the individual-level changes in income and their impact on political participation, particularly along diverse points in the income distribution. The relative power theory helps explain the disengagement of lower-income individuals in highly unequal societies. In contrast, conflict theory provides insights into how economic disparities can mobilise political participation across different income groups. By integrating these theoretical perspectives, this chapter aims to explain the dynamics between income inequality and electoral turnout, thus contributing to understanding political behaviour in contemporary democracies.

1.4 Historical background

The modern political history of Costa Rica starts in the aftermath of the 1948 Civil War, triggered by the annulation of the election results of February 1948.[4] A group of rebels led by José Figueres Ferrer formed the National Liberation Army and successfully toppled the government of Teodoro Picado (1944-1948) (Molina Jiménez, 2001). Among the social and political achievements of this period were the establishment of the Supreme Electoral Court of Costa Rica (Tribunal Supremo de Elecciones, TSE), the abolishment of the army, the end of racial segregation, and women's suffrage. The outcomes of the war also included exile for the losers and the ban of communist parties to take part in elections (revoked in 1974). This conflict was the last violent political episode in the history of Costa Rica, and it established a defining moment in the political, social, economic, and cultural development of the country.

The two sides of the Civil War were at the origin of the dichotomous political en-

[4]For a longer discussion of the historical background and political cleavages in Costa Rica, see Barrera et al. (2021a) and Gethin et al. (2021)

vironment that dominated Costa Rican politics for the next five decades. The winning side, led by Figueres Ferrer, established the National Liberation Party (Partido Liberación Nacional, PLN), of centre-left social democratic orientation, which would become the dominant political party. The losing side, led by Rafael Ángel Calderón Guardia, reconstituted into a number of political parties and coalitions of centre-right Christian democratic orientation that won the presidential elections three times before establishing the Social Christian Unity Party (Partido Unidad Social Cristiana, PUSC) in 1983. The successful transfer of control to the centre-right in 1958 marked the beginning of a tradition of alternation of power that crystallized in the following decades (Solís Avendaño, 2006).

While we can only strictly define a two-party system from 1983 onwards, the alliances on the right constituted after the Civil War and the weakness of socialist parties contributed to the predominance of a bipolar party system since 1948 (Sánchez Campos, 2003). Interestingly, no political party has won the elections more than twice in a row, not even in the most dominant years of the PLN during the 1970s and 1980s. Hence, some have interpreted the political history of Costa Rica as an affair of a dominant party versus everyone else (Alfaro Redondo, 2019). However, the institutional model already started to deteriorate in the late 1970s, with the combination of economic factors (i.e., high levels of public debt, inflation, capital flight, etc.) and political violence in Central America. After the political pact between Calderón Fournier from the PUSC and his successor from PLN Figueres Olsen in 1995, which intended to continue the process of adjustment and reform of the State that started in the 1980s, social discontent mounted, breaking the basis that had supported the PLN in the construction of the Welfare State (1950-1978) (Alfaro Redondo and Alpízar Rodríguez, 2020).

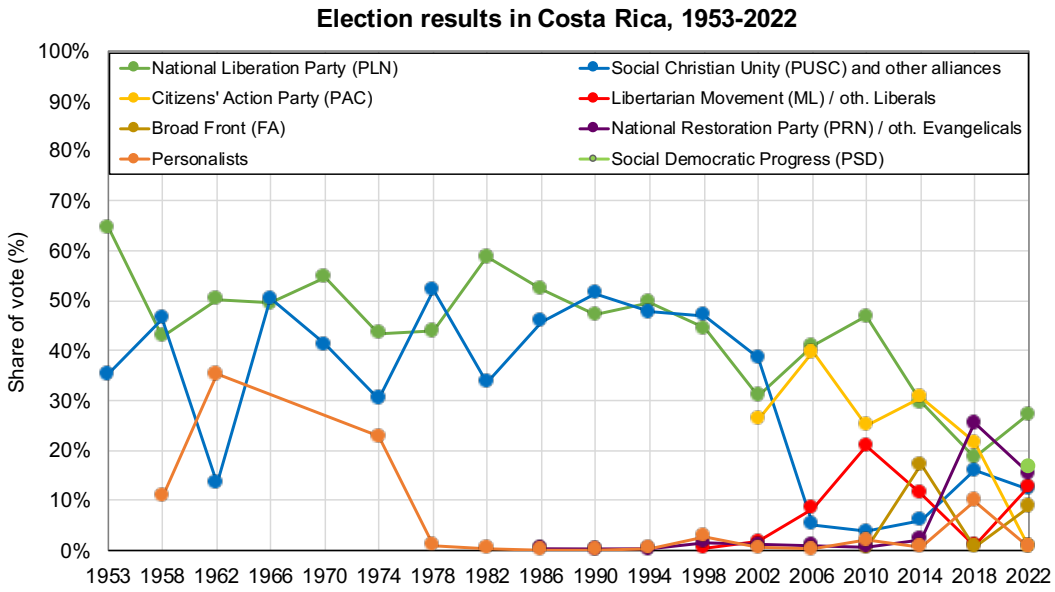
The erosion process of the 1990s thus revealed growing dissatisfaction with the political system as a whole, which translated first into an increase in electoral abstention in 1998, and then with the emergence of the Citizens' Action Party (Partido Acción Ciudadana, PAC) in 2002 in a process initially identified by some as partisan dealignment (Sánchez Campos, 2003). As traditional parties converged towards the centre in the 1980s and 1990s, the once centre-left PLN suffered the most (Raventós-Vorst et al., 2005). In this context, PAC took the social democratic baton and attracted many intellectuals and

prominent figures from the PLN and other parties. After two PLN governments, PAC won the election for the first time in history, as the PLN collapsed in the second round in 2014 (Alfaro Redondo et al., 2015). Finally, the PLN finished third for the first time in 2018, when the PAC defeated the evangelical Christian National Restoration Party (Partido Restauración Nacional, PRN), founded in 2005.

While support for non-established parties increased, and a candidate from a previously fringe party made it to the second-round vote in 2018, established parties have survived, and the party system has not collapsed, prompting some authors to favour the concept of realignment instead (Perelló and Navia, 2021). Thus, after the appearance of the PAC in 2002, the last two decades have also seen the emergence of other parties that have played an important role in at least one election. Right-wing Libertarian Movement Party (Movimiento Libertario, ML), finished third in 2006 and 2010, with 8.5 and 21 percent of the vote, respectively. Left-wing Broad Front Party (Frente Amplio, FA), finished third in 2014 with 17 per cent of the vote. Finally, the aforementioned right-wing evangelical Christian PRN finished first in the first round in 2018 with 25 per cent of the vote, only to lose to PAC in the second round. This paper contributes to explaining the fragmentation of the Costa Rican electorate in the last two decades (see Figures 3 and B.19 for a summary of election results).

2 Data sources

This project exploits the combination of administrative data sources, surveys, and censuses. The most innovative of these datasets are social security records and the possibility of matching them with electoral registries. The country has a unique identification number for every citizen and legal resident. Hence, it is possible to match these two data sets. The electoral registry tells us if one person voted in one election or not, and the social security records offer a myriad of socio-economic variables. We have not yet been able to obtain the individual-level match, but it remains our goal. Therefore, we concentrate on aggregate results at the local level for the moment. We distinguish salient trends and plan to use individual-level data to further explore mechanisms. In doing so, this would



Source: authors' computations using official election results.
Note: the figure shows the share of votes received by selected groups of Costa Rican political parties in presidential elections between 1953 and 2022. Provisional results for 2022.

FIGURE 3: Electoral results: from two-party to multi-party system

be the first project, to the best of our knowledge, to combine two sets of administrative data to study electoral outcomes.

2.1 Administrative electoral

2.1.1 Electoral registries (micro): 1994 – 2022.

Electoral registries are the lists of eligible voters in each election. Since registration is automatic in Costa Rica, most adults over the age of 18 are systematically included in the registry. There are a few possible exceptions, for example, those who have not renewed their national identity card (*cédula de identidad*) in over 10 years. While there are probably several individuals that fall into this category, it is generally considered that this is a small number, because the national identity card is necessary for most bureaucratic and admirative procedures in the country and its renewal is free of charge. Hence, it is unlikely that someone living in the country would not be included in the electoral registry. It is a more plausible possibility for those who have migrated abroad but are not part of the adult population resident in the country. Thus, electoral registries are reliable censuses of the adult population in Costa Rica.

There are two main features of the electoral registries that are of paramount importance for this project. Firstly, the registries assign a polling station to everyone. In Costa Rica, polling stations are rooms within polling centres. For example, if the polling centre is a school, a polling station would be a classroom within the school. Thus, polling stations are the smallest level at which we can aggregate electoral results such as vote shares. In addition, since everyone is assigned to a polling station close to their residence, these centres are good proxies for individual addresses. Secondly, the electoral registries considered in this project, include individual-level turnout for each election. In other words, they record whether an individual showed up at the polling station on the day of the election. This unique variable would allow us to study the individual-level determinants of turnout.

2.2 Administrative labor market

2.2.1 Social security (micro): 2001 – 2021.

This is probably the most fascinating data source in this project. This data is not available to the public, but it is possible to request it from the Social Security Authority of Costa Rica. With the support of *WID.World*, we purchased every month of data for every year from 2001 through 2021. This data has income information for all workers of the formal sector, as well as, important socio-economic variables: income, occupation, working hours, public/private sector, industry, geographical localization of the firm, wage/independent worker, sex, age, national/foreign and region. This information is certainly at the centre of the study presented in this paper. Its richness also motivates follow-up research projects, such as the application presented in the Fifth Section of this document: local-level inequality and electoral outcomes.

2.3 Surveys and censuses

2.3.1 National Household surveys (ENAHO): 2000 – 2022.

Costa Rica has had consistent annual Household Surveys since 1976. However, for the scope of this project, those from 1990 and especially from 2000 are the most relevant ones. The databases of these surveys are available to the public. It is important to mention that in the period considered in this paper (2000-2020), the baseline household survey changed in Costa Rica. Hence, here we use the Multi-Purpose Household Survey (*Encuesta de Hogares de Propósitos Múltiples*, EHPM) from 2000 through 2009, and the National Household Survey (*Encuesta Nacional de Hogares*, ENAHO) from 2010-2020. Although both surveys have similar objectives, they have different forms and specificities. Therefore, cleaning them in order to obtain equivalent results throughout the sample, requires an additional effort.

Descriptive Statistics: formal workers in Costa Rica, 2001, 2011 and 2021.

		2001	2011	2021
% age	23 or -	13.6	11.3	6.6
	24 to 34	29.9	32.6	29.5
	35 to 44	24.5	22.6	25.9
	45 or +	32.0	33.5	37.9
% educational level	No university degree	96.9	87.3	80.2
	University degree	3.1	12.7	19.8
% skill level	unknown	76.8	34.6	25.9
	unskilled	5.9	17.5	19.2
	semi-skilled	7.0	22.1	24.7
	skilled	10.3	25.8	30.1
Sex	% Female	31.4	36.2	40.1
Employment	Mean monthly full time wage (100 = 2021)	149,742	429,318	677,803
	Total number of formal workers	900,154	1,422,187	1,777,287
	% contracts public sector	26.9	23.6	21.1
	% foreigners	6.7	9.1	13.7
Voting	Total number of voters a/	2,279,851	2,822,491	3,541,911
	% voters in Social Security a/	38.3	44.8	48.3
	% formal workers in electoral registry a/	97.5	96.8	94.4
	Number of polling stations a/	6,681	6,617	6,847
	% turnout a/	68.8	69.1	56.8

a/ Presidential election years: 2002, 2010 and 2022.
Source: authors' computation using data from the Social Security Administration (CCSS) and the Electoral Authority (TSE).

FIGURE 4: Descriptive Statistics: Costa Rica, 2001, 2011 and 2021

3 Methodology

3.1 Aggregate analysis

Most of the aggregate results presented in the next section have the following form. These are descriptive regressions where Y_{it} represent aggregate electoral outcomes (*turnout, volatility, and vote-shares*) in district i during election t; $INEQ_{it}$ symbolizes different measures of income inequality (*Gini coefficient, Top 10, and Bottom 50*); γ_i refers to locality (district) fixed effects, and δ_t represents election (year) fixed effects. Additionally, X_{it} is a vector of district-level controls, such as the social development index (SDI), and log-average-income. Finally, u_{it} are the residuals of the model.

$$Y_{it} = \gamma_i + \delta_t + \beta INEQ_{it} + \theta X_{it} + u_{it} \tag{1}$$

3.2 Mechanisms

3.2.1 Trade and FDI

We also aim to study the political and economic effects of increased exposure to trade and FDI in Costa Rica in the last two decades. The major events of this period were the signature of FTAs with the main economic partners of the country: the US (CAFTA, 2006), China (2011), and the EU (2012). While we have yet to show a clear shock in the trade data, we document that FDI is indeed very important in the Costa Rican labour market (see Figure 5). Nonetheless, exposure to trade has been an important topic in the political arena of the country. In 2007, before the confirmation of CAFTA by the Costa Rican Congress, a referendum was organized to give the people the chance to vote yes or no to the FTA. It was ultimately approved by 51.56 % of voters. Nonetheless, this shows how salient was the topic in the political debate at the time.

FDI: We explore the creation of FDI-jobs as the first mechanism that explains changes in the income distribution and therefore in the insider-outsider status of individuals. Based on the findings by Alfaro-Urena et al. (2019b), we know that Costa Rica has experienced a direct MNC wage premium of 9 per cent, which is consistent with MNCs paying

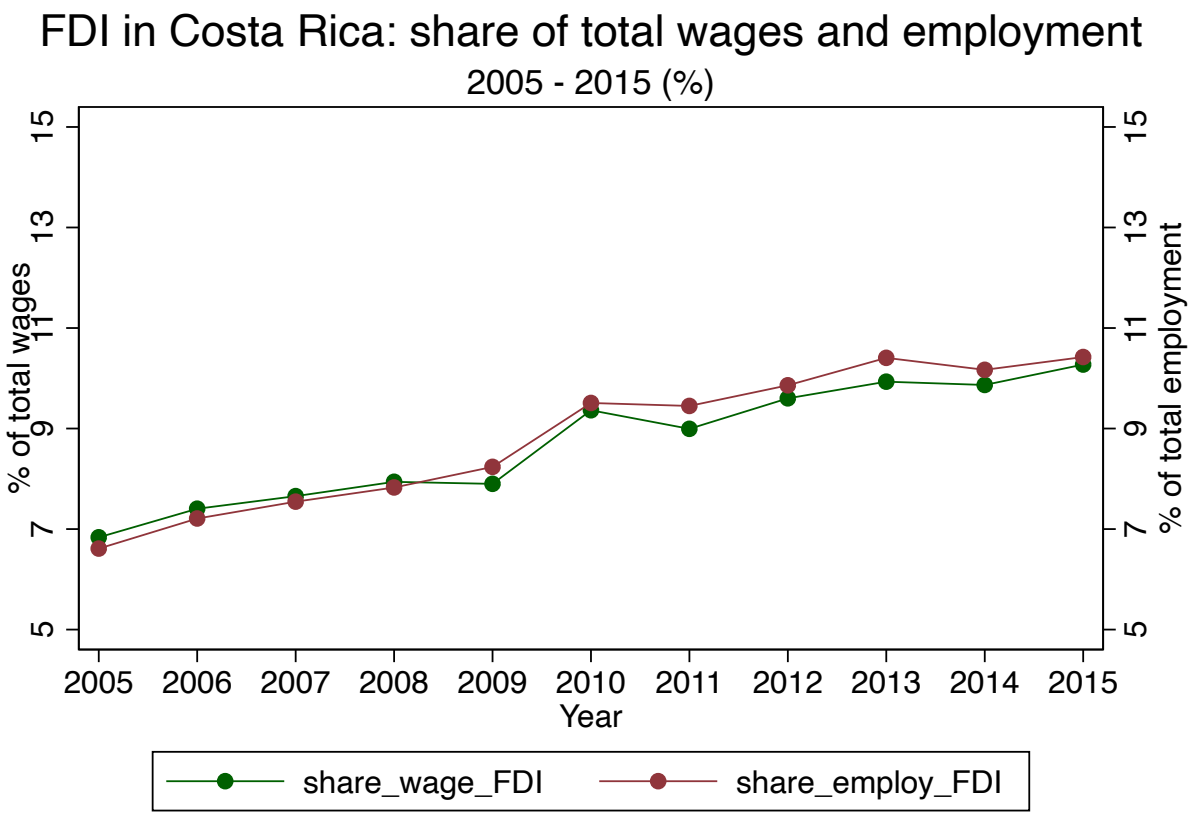


FIGURE 5: Share of workers in MNCs

above-market wages rather than compensating workers for *disamenities*. This premium is larger for workers with a college education (12 per cent) than for those without one (8 per cent). In addition, the growth rate of annual earnings of a worker experiencing a one standard deviation increase in either the labour market or the firm-level exposure to MNCs is one percentage point higher than that of an identical worker with no change in either MNC exposure. Hence, according to the literature, MNCs explain positive changes in income for at least part of the population. In addition, MNCs help insure people against local income shocks, and MNCs' wages do not depend on local politics.

$$\begin{aligned} turnout_{it} = \beta_w \Delta w_{it} + \beta_{LME} \Delta LME_{s(i),t} + \beta_{FLE} \Delta FLE_{j(i),t} + \theta X'_{ij,t-1} \\ + \alpha_{j(i)} + \gamma_{ind(s(i))\times t} + \mu_{reg(s(i))\times t} + \rho_{ind(s(i))\times reg(s(i))} + u_{it} \end{aligned} \tag{2}$$

We are interested in exogenous changes to MNC exposure as a possible mechanism that affects income distribution. Of course, these exogenous changes are difficult to find naturally. Hence, we propose an instrumental variable strategy à la Alfaro-Urena et al. (2019b), where changes in exposure to MNCs explain changes in the income distribution, but do not directly explain changes in voting. Here, we present a specification that combines changes in income, as well as labour market and firm-level exposure to MNCs (see, the equation above). Where the outcome $turnout_{it}$ represents vote/no-vote of worker i in election t; $\Delta LME_{s(i),t}$ / $\Delta FLE_{j(i),t}$ are labor market and firm-level exposure; $X'_{ij,t-1}$ is a vector of worker and firm characteristics; $\alpha_{j(i)}$ are firm $j(i)$ fixed effects; $\gamma_{ind(s(i))\times t}$ are controls for potential shocks to industry x region market of i; $\mu_{reg(s(i))\times t}$ are controls potential shocks to region of the same market; And $\rho_{ind(s(i))\times res(s(i))}$ are controls for differences in levels between markets.

$$\Delta \mathcal{M}_{st} \equiv \frac{{M^{CR}}_{s,t} - {M^{CR}}_{s,t-1}}{{M^{CR}}_{s,t-1}} \times 100 \tag{3}$$

We define as $\Delta \mathcal{M}_{st}$ as the percentage increase between years $(t-1)$ and t in the number of MNC workers in labour market s in CR, where ${M^{CR}}_{s,t}$ is the number of MNC workers in market s in year t. Now, $LME_{s(i),t}$ is a sum across all labour markets s' in CR,

in which market s' is weighted by its "closeness" to the market s of the worker. Moreover, $\pi_{s(i)s',t_0}$ the "closeness" measure – is the number of workers who start year t in market $s(i)$ and end t in s', divided by the total number of workers who start t in market $s(i)$.

$$LME_{s(i),t} \equiv \sum_{s'} \pi_{s(i)s',t_0} \psi_{s'} \nu_{s',t-1} \Delta \mathcal{M}_{st} \tag{4}$$

Finally, we propose to use the worldwide size of MNCs with subsidiaries in Costa Rica, as an IV to account for the creation of FDI jobs in the country. This idea comes from Alfaro-Urena et al. (2019b) who use Orbis and Compustat to account for the changes in the workforce of MNCs present in CR. Here, two variables are key to the construction of IVs: the main industry code of the MNC and its worldwide number of workers. This allows us to create instruments for (labour-market exposure) $\Delta LME_{s(i),t}$ and (firm-level exposure) $\Delta FLE_{j(i),t}$ using ΔO_{st} as the IV analogue of ΔM_{st}. The formula for ΔO_{st} is:

$$\Delta O_{st} \equiv \frac{{M^{Out}}_{s,t} - {M^{Out}}_{s,t-1}}{{M^{Out}}_{s,t-1}} \times 100 \tag{5}$$

where ${M^{Out}}_{s,t}$ is the year-t number of workers *outside* of CR across all MNCs whose subsidiaries operate in the two-digit *industry* $\times$ *region* market s in Costa Rica. Importantly, the exclusion restriction for the IV of $\Delta \text{LME}_{s(i),t}$ is that changes between $(t-1)$ and t in the employment outside of CR of MNCs whose subsidiary is in labour market s in CR are not correlated with contemporaneous shocks to the productivity of workers in s in CR.

Trade: we identify the demand-driven component of American/European/Chinese exports by instrumenting for growth in exports from Costa Rica using the contemporaneous composition and growth of American/European/Chinese exports in six other Central American countries (using the *UN Comtrade Database*). Hence, we isolate the component of growth in Costa Rican trade with the US/EU/China that is driven by export-supply growth in the US/EU/China, rather than Costa Rican product-demand shocks, following the identification strategy in Autor et al. (2014), Acemoglu et al. (2016) and Autor et al. (2020). We exploit the fact that during our sample period, much of the growth in trade stems from the signature of FTAs, which is a demand shock from the perspective of

Costa Rican producers.

In the analysis of local and presidential elections, as well as campaign donors, we estimate equations of the form:

$$\Delta Y_{cdj\tau} = \gamma + \beta_1 \Delta TP^{cu}_{j\tau} + X'_{cdjt}\beta_2 + e_{cdj\tau} \tag{6}$$

Where dependent variable $\Delta Y_{cdj\tau}$ is the change in an outcome for the period τ (2002 to 2022 in our baseline specifications) that corresponds to county/district cell cd in CZ j. To our trade-exposure measure $\Delta TP^{cu}_{j\tau}$, we pair an expanded vector of regional controls X'_{cdjt}, which includes Census-division dummies and initial Commuting Zone (CZ) economic and political conditions.

3.2.2 Migration

We aim to study the political and economic effects of Nicaraguan immigration in Costa Rica between 1998 and 2020, a period with two major shocks: (1) Mitch hurricane hit important parts of Central America in 1998, and (2) the Political Riots of 2018, which began in April 2018 when demonstrators in several cities of Nicaragua began protests against social security reforms that increased taxes and decreased benefits. In line with these events, we find evidence in the literature that xenophobic sentiment against Nicaraguans peaked in 2005-2006 (Vargas Selva et al., 2013). In 2005, congress approved a new migration law that viewed immigration as a national security issue, promoted more control of immigration flows, and a crackdown on illegal immigration, while welcoming foreign investors and retirees. This happened during a PUSC government (centre-right) and many sectors criticized it as a violation of human rights. Eventually, a more inclusive migration reform was passed in 2009.

The immigration wave of 2018 saw an increase in asylum seekers and persons with higher educational backgrounds. However, this is not necessarily reflected in the estimates from household surveys, since household surveys do not account for refugees. Instead, it is likely that those in the survey are immigrants who have settled. So, it is necessary to contrast these estimates with those from population censuses. Figure 6 shows that

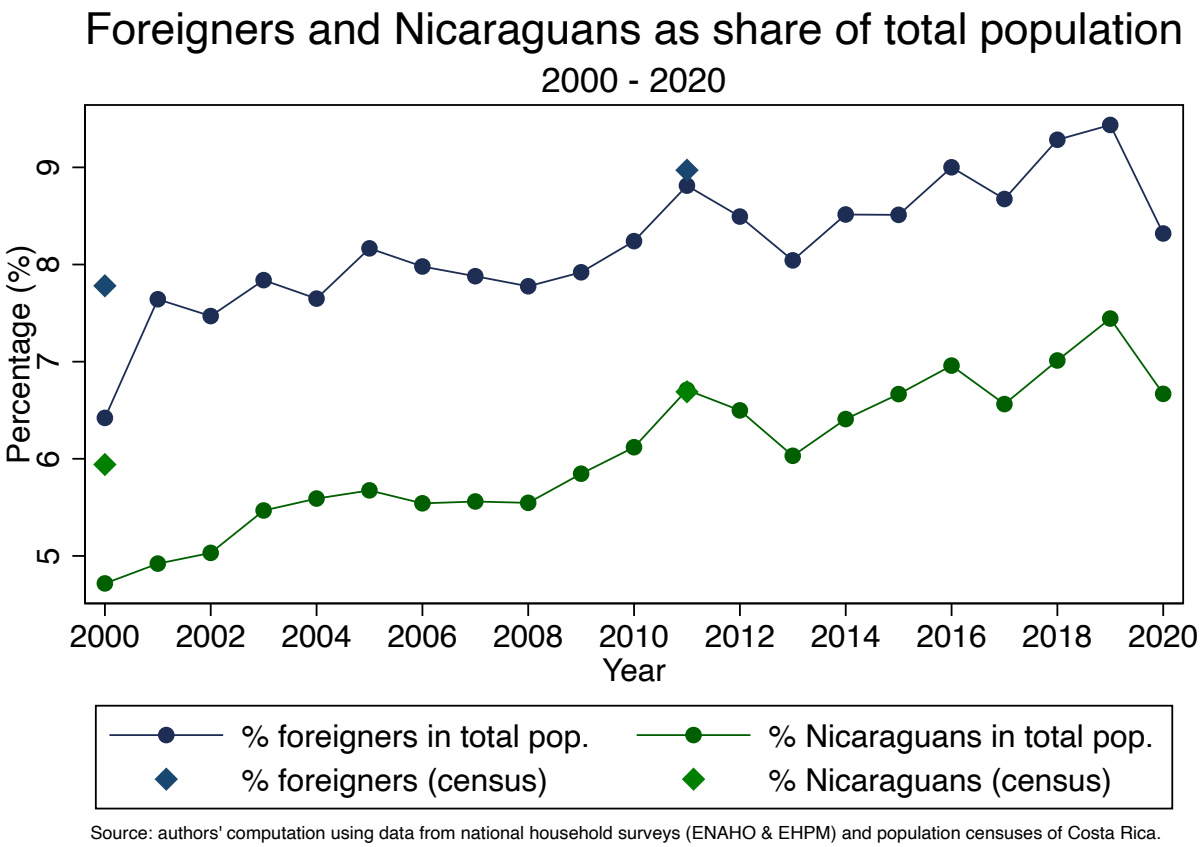


FIGURE 6: Share of foreigners in censuses and household surveys

household surveys indeed underestimate the number of foreign-born and Nicaraguans in 2000, soon after the first shock, but not in 2011. Historical evidence suggests that migration shocks come mainly from push factors in Nicaragua, as opposed to pulling factors in Costa Rica. Of course, there are reasons to believe that the choice of where migrants settle is not exogenous. Therefore, the next sections present a full discussion of this issue and possible alternatives.

To study the political and economic effects of immigration, we focus on the period covered by social security data (2001-2020) and use the 1984 census to build our instrument. Hence, following Tabellini (2020), we propose the following specification:

$$y_{ct} = \gamma_c + \ \delta_t + \beta \ Imm_{ct} + u_{ct} \tag{7}$$

Where, y_{ct} is the outcome for county c in election t, and Imm_{ct} is the fraction of immigrant workers over the total number of workers in the county. γ_c and δ_t are county and year fixed effects, implying that β is estimated from changes in the fraction of immigrants within the same county over time, compared to other counties each year.

We propose a "leave-out" version of the shift-share instrument à la Card (2001). The instrument predicts the number of immigrants received by Costa Rican counties over time by interacting with 1984 settlements of different nationality groups with subsequent migration flows from each sending country, excluding individuals that eventually settled in each county.

$$Z_{ct} = \ \frac{1}{P_{ct}} \sum_j \alpha_{jc} O_{jt}^{-M} \tag{8}$$

Where P_{ct} is the predicted county population; α_{jc} is the share of individuals of nationality group j living in county c in 1984; and O_{jt}^{-M} is the number of immigrants from country j that entered Costa Rica between t and $t-1$, net of those that eventually settled in county c.

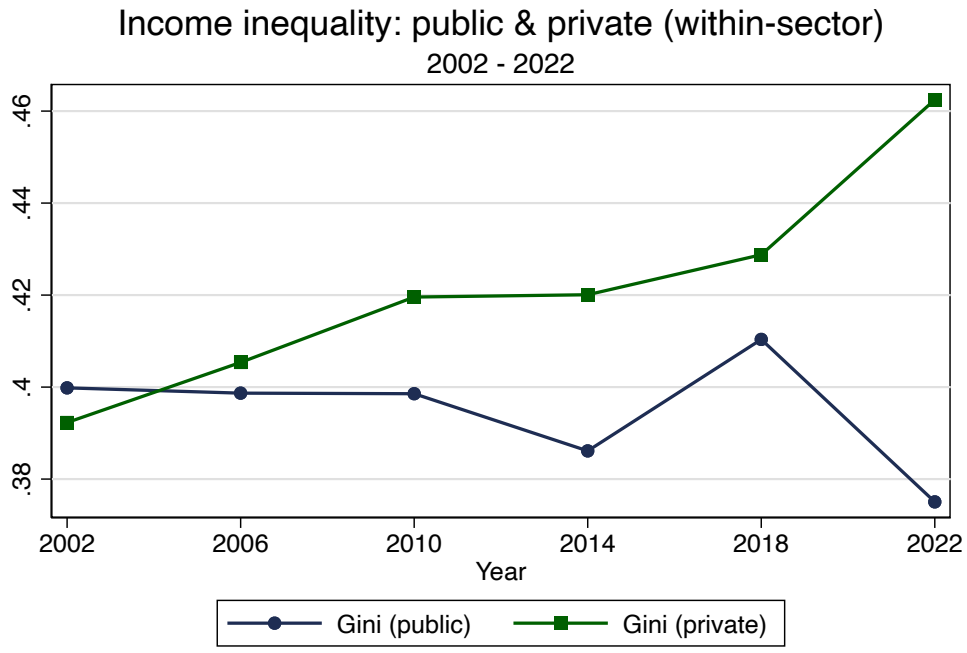
4 Section A results: income shocks and electoral outcomes

4.1 Income levels and turnout

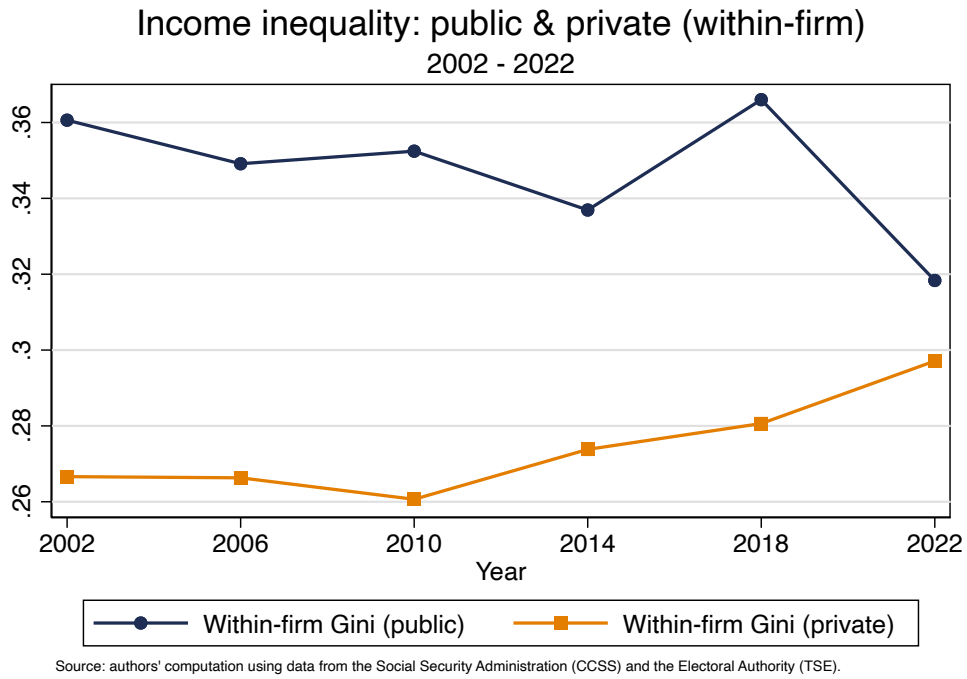
In this subsection, we present individual-level results. Hence, we start by describing the data and showing simple but strong correlations between changes in income and turnout. We aim to subsequently identify these strong correlations following the methodology described in the previous sections. Therefore, as stated before, our individual data consist of the exhaustive electoral registries of Costa Rica for six presidential elections (2002, 2006, 2010, 2014, 2018 and 2022), merged with the universe of social security records for the same years.[5] In other words, we combine all adults eligible to vote with the universe of formal workers in the country (See Tables B.25 and B.26 for descriptive statistics). While we cannot capture informality in our social security records, these two datasets allow us to study the political behaviour of formal workers and how it has changed with changing socio-economic and demographic characteristics.

While the section on aggregate results relies on the idea that inequality has increased in the country, whether we measure it at the national level (Figure 8a) or as the average of local level inequality measures (Figure 8b), this section aims to study changes in income at the individual level. These individual changes, when aggregated, explain, at least partially, variations in the income distribution. Hence, this section looks at the effect of income levels and absolute and relative changes in income distribution on turnout. Figure 7 motivates this enquiry by showing that income inequality has increased among private sector workers. The result is less clear for public sector workers, but this finding is already a good indication of where to look. Consequently, we are interested in studying new jobs in MNCs and other possible mechanisms that explain changes in income distribution. Nonetheless, in this chapter, we focus on identifying the relationship between changes in income and electoral results.

[5] We have also successfully consolidated the electoral registries from five local elections (2002, 2006, 2010, 2016, and 2020) with social security records. However, as of the drafting of this chapter, the full potential of this integrated dataset remains to be explored.

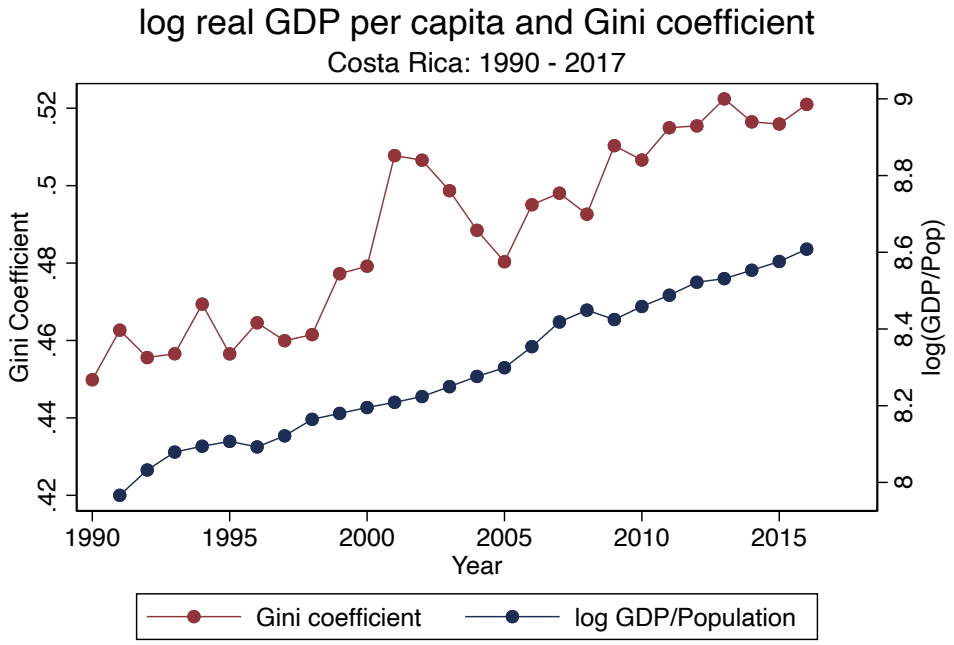


(a) Within public-private sector.



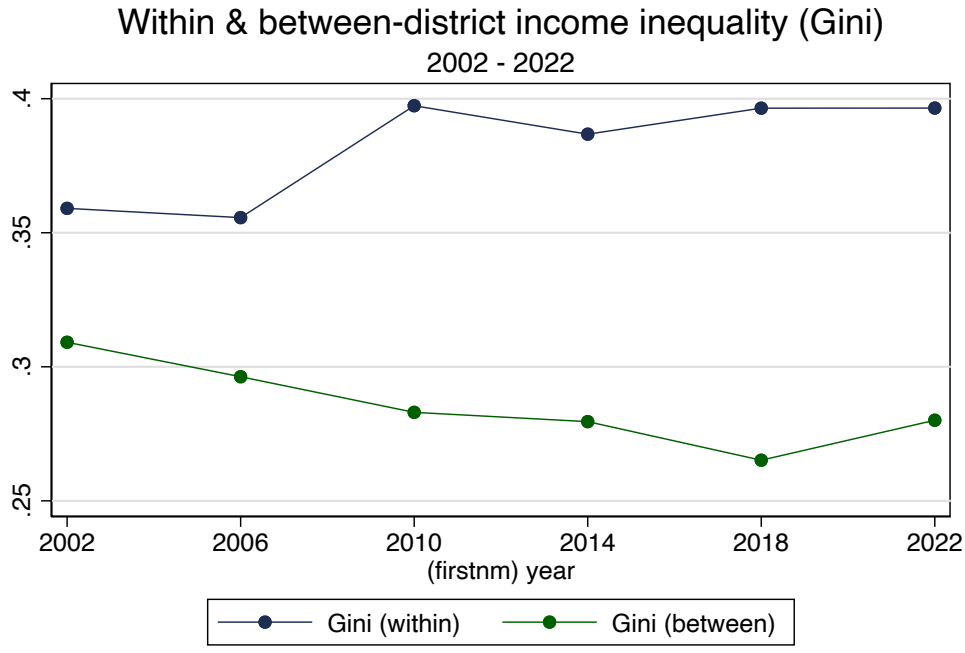
(b) Within public-private firms.

FIGURE 7: Public and private sector changes in inequality.



Notes: own computation on official data from Programa Estado Nacion (PEN) and Central Bank (BCCR).

(a) Income inequality at the national level.



Source: authors' computation using data from the Social Security Administration (CCSS) and the Electoral Authority (TSE).

(b) Income inequality at the local level.

Fig. 8: Changes in income inequality at the national and local level.

As in other sections of this paper, our results initially focus on wage-earners. This

group is the most numerous among formal workers, and social security records are better at registering their income than other groups. Income reported in social security records is not bounded at either the lower or upper limit. Nonetheless, some workers, such as the self-employed, tend to bunch around the minimum contribution for their coverage category. This is not the case for wage earners, who tend to declare their real wages. In addition, declared income is used to estimate pensions at the end of the work life of individuals. Hence, this incentivises employees to ask employers to declare their actual income. In addition to the income-related reasons to focus on wage-earners, we observe a strikingly similar electoral behaviour of this group relative to the population median. Figure 11 shows that the turnout rate of "formal wage-earners" is very similar to that of "all voters". On the other hand, the turnout rate of "all voters" in social security is above the median, and that of voters "not in social security" is below the median.

$$turnout_{it} = \gamma_i + \delta_t + \beta_1 logwage_{it} + \beta_2 turnout_{i(t-1)} + \theta X_{it} + u_{it} \tag{9}$$

$$turnout_{kt} = \gamma_k + \delta_t + \beta_1 \Delta logavwage_{kt} + \beta_2 turnout_{k(t-1)} + \theta logavwage_{kt} + u_{kt} \tag{10}$$

Following the specification in Equation 9, our first results show that income positively correlates to turnout, Figure 9. We build upon this simple but salient result throughout this subsection. Here, γ_i and δ_t are, respectively, individual and time-fixed effects, and X_{it} is a vector or individual level controls. Furthermore, Figure 10 shows a strong correlation between changes in the wage of individuals and changes in their propensity to vote. In panel 10a, we observe this at the individual level, where the outcome variable is a binary (0/1) value that indicates whether an individual went to vote or did not vote on the day of the election. As implied before, these values come from administrative data and cover the universe of voters in each election. In Column 4, when we include election year and individual fixed effects and controls, we observe that the correlation is positive, which means that positive changes in income imply an increasing propensity to vote and vice versa. This result is reinforced by Panel 10b, which shows similar results when we aggregate individuals at the polling station level.

Effects of income on turnout in presidential elections, 2002-2018 (individual level)

	(1) OLS	(2) FE	(3) FE controls	(4) FE controls	(5) FE controls
logwage	0.068***	0.019***	0.061***	0.003***	0.038***
	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
L.turnout			0.225***		0.232***
			(0.001)		(0.001)
Observations	4,452,700	4,452,700	3,340,227	3,030,195	2,452,222
r2_o	0.022	0.022	0.171	0.016	0.175
Individual level controls				YES	YES
Turnout presidential (t-1)			YES		YES
Year FE		YES	YES	YES	YES
Individual FE		YES		YES	

Standard errors in parentheses * p<0.1 ** p<0.05 *** p<0.01
Controls: public sector, age, skilled and unskilled.

Table 9: Income and turnout at the individual level.

Effects of changes in income on turnout in presidential elections, 2002-2018 (individual level)

	(1) OLS	(2) FE	(3) FE controls	(4) FE controls	(5) FE controls
D.logwage	0.017***	-0.004***	0.008***	0.001**	0.004***
	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
L.turnout			0.251***		0.246***
			(0.001)		(0.001)
Observations	2,498,467	2,498,467	2,498,467	1,799,021	1,799,021
r2_o	0.001	0.001	0.171	0.009	0.179
Individual level controls				YES	YES
Turnout presidential (t-1)			YES		YES
Year FE		YES	YES	YES	YES
Individual FE		YES		YES	

Standard errors in parentheses * p<0.1 ** p<0.05 *** p<0.01
Controls: public sector, age, skilled and unskilled.

(a) Individual level.

Effects of changes in income on turnout in presidential elections, 2002-2018 (polling station level)

	(1) OLS	(2) FE	(3) FE controls	(4) FE controls	(5) FE controls
D.logaveragewage	0.159***	0.154***	0.174***	0.225***	0.243***
	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)
L.share_turnout			0.489***		0.452***
			(0.026)		(0.023)
Observations	31,919	31,919	31,919	31,919	31,919
r2_o	0.061	0.061	0.105	0.196	0.246
log average wage				YES	YES
Turnout presidential (t-1)			YES		YES
Year FE		YES	YES	YES	YES
Polling station FE		YES	YES	YES	YES

Standard errors in parentheses * p<0.1 ** p<0.05 *** p<0.01

(b) Polling station level.

Table 10: Effects of changes in income on turnout in presidential elections.

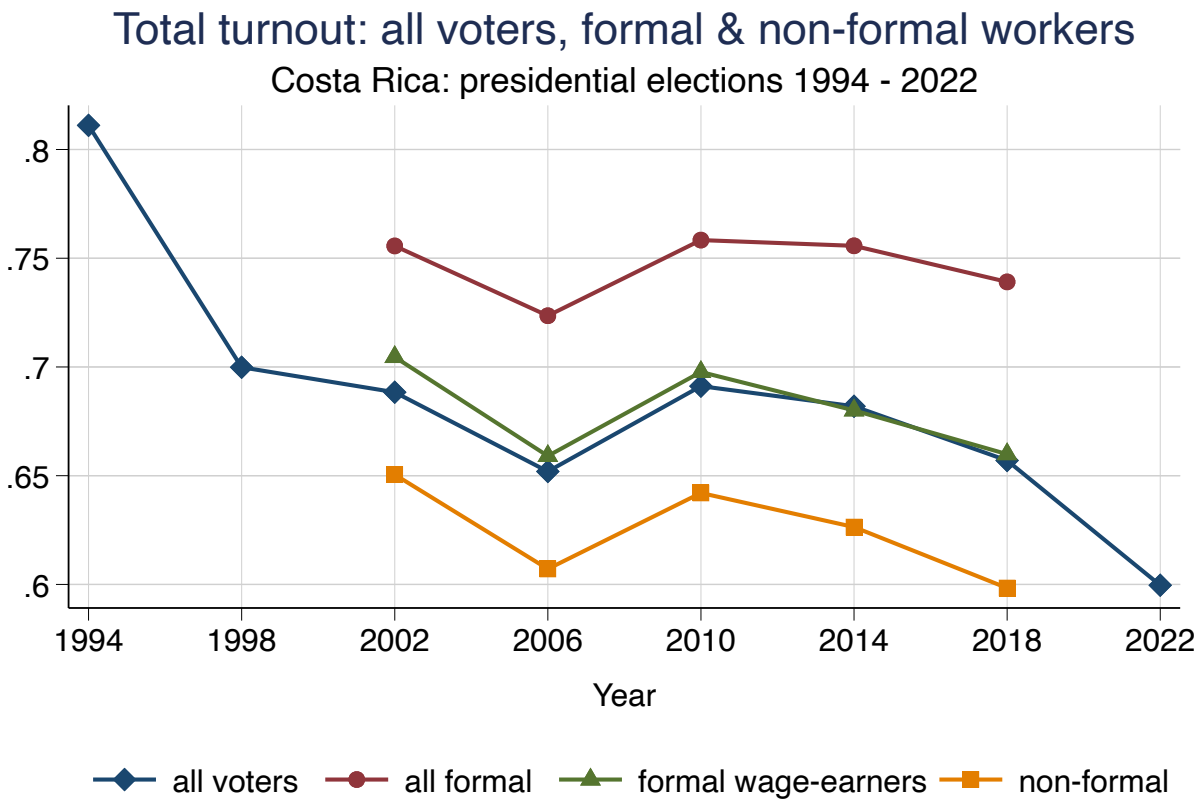


Fig. 11: Average turnout by worker/voter type.

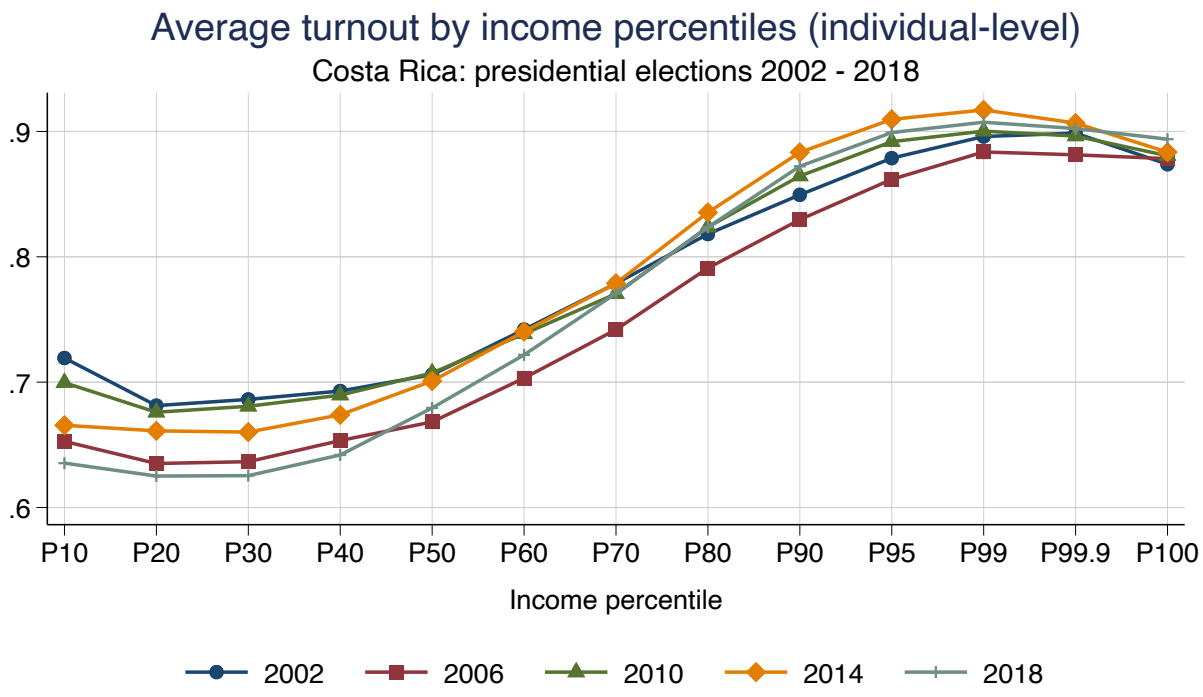
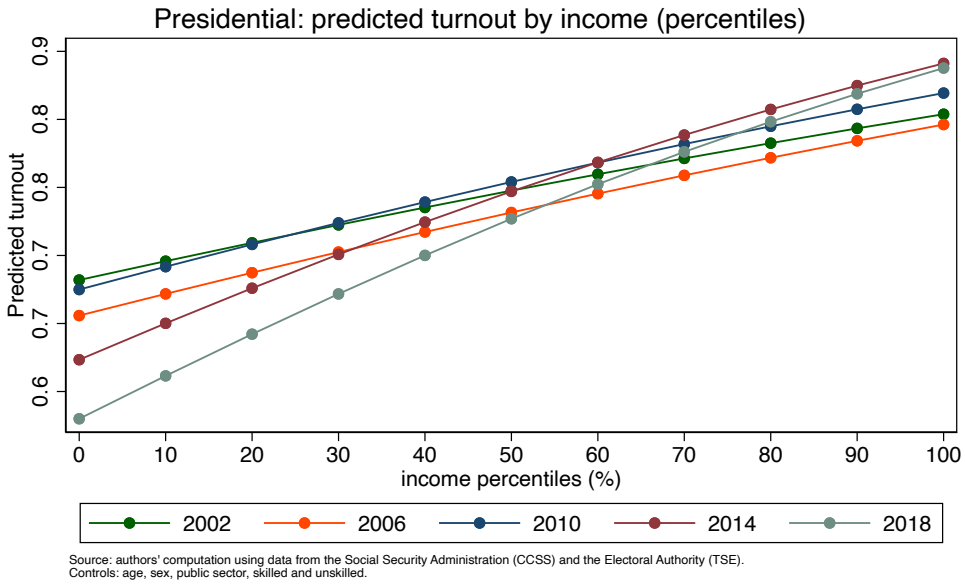
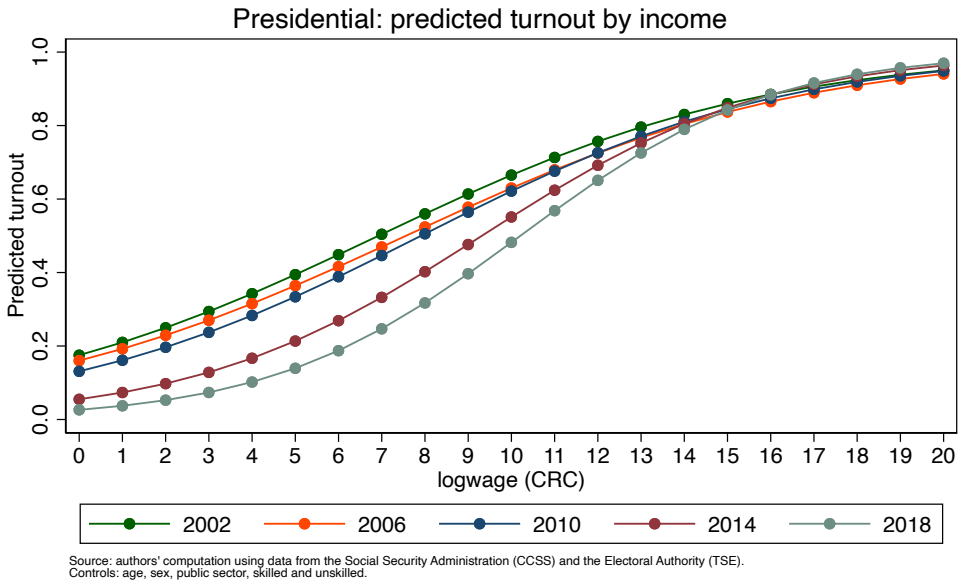


Fig. 12: Average turnout by income percentiles.

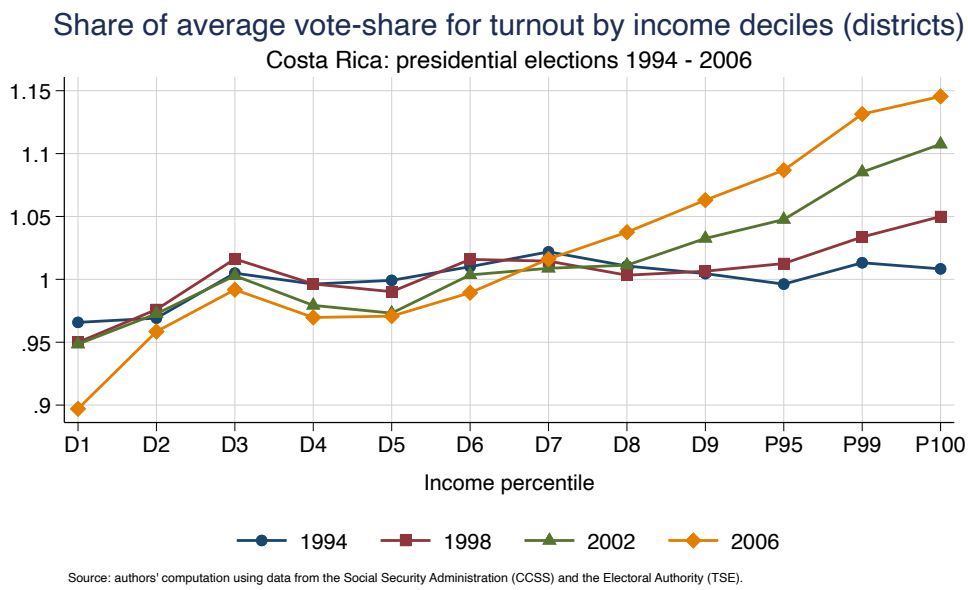


(a) Predicted turnout by income percentiles.

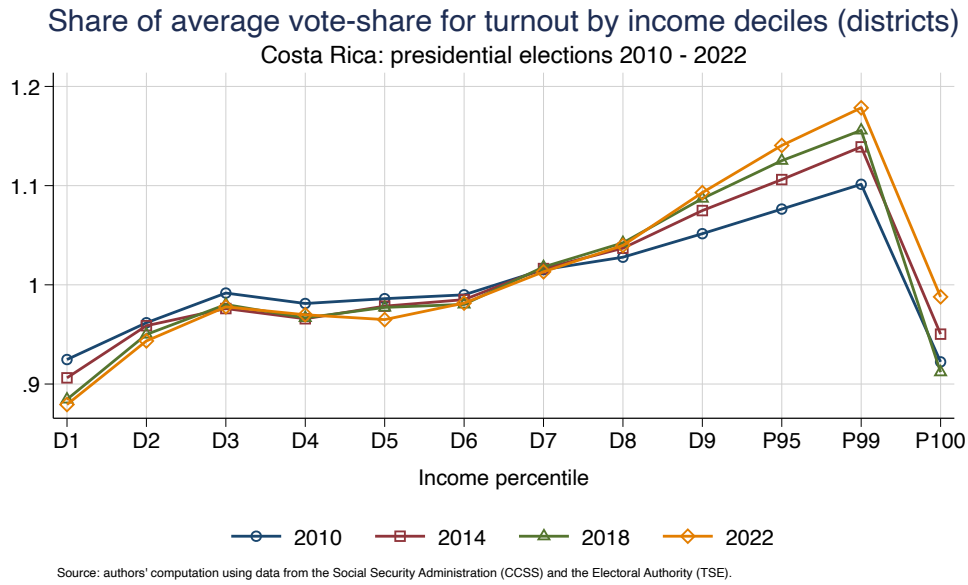


(b) Predicted turnout by log income (national currency).

Fig. 13: Predicted turnout by income levels.



(a) 1994-2006.



(b) 2010-2022.

Fig. 14: Share of average voter turnout (decile district level / national level).

Another salient result in this section points towards a general behaviour change in voters of all income levels. Figure 12 shows the average turnout by income percentiles, also known as the income-turnout gradient, and conveys two main messages: first, turnout

increases with income in a non-monotonic way[6]; second, the gradient is pivoting over time, which means that lower deciles vote increasingly less, and upper deciles vote increasingly more. These results are confirmed by the margins plots in Figure 13, which explores predicted turnout at different income levels. Whether we consider income percentiles or log income in national currency, most individuals are increasingly less likely to vote in each new election. In Figure 13a, we observe that while the bottom half of the income distribution votes less in each election, the upper part of the distribution seems to be voting more. In Figure 13b, most income levels vote less, except for the extreme values on the right. This result contributes to identifying which income groups are voting less. Although the upper percentiles might be voting more, most of the population is voting less, which explains the general trend of decreasing turnout at the aggregate level. This finding also speaks to the literature that finds that voters are increasingly skewed towards the upper part of the income distribution Bonica et al. (2013).

We cannot illustrate the transition of the income-turnout gradient before 2002 because administrative data on individual income before 2001 is not currently available. However, we can estimate the gradients for each election by using electoral results at the district level from 1994 and 1998, combined with average income at the same level from 2002. Figure 14a indicates that the gradient was much flatter in 1994 when national voter turnout exceeded 80 per cent. With each subsequent election year, the gradient becomes steeper, showing that higher-income percentiles vote proportionally more while lower-income percentiles vote proportionally less. Employing the same technique, Figure 14b presents similar results for the years 2010 to 2022, as those depicted in Figure 12. Notably, a similar phenomenon is observed at the individual and district levels: the top 1 per cent votes proportionally less than the upper part of the distribution.

4.2 Random assignment to polling stations

This subsection leverages a unique aspect of the data for causal identification: within a polling centre, such as a school, individual voters are assigned to different polling stations

[6]See Appendix B.1 for binned scatterplots with and without controls

based on alphabetical ordering. While socioeconomic characteristics are not exogenous to neighbourhoods, as individuals choose their places of residence, the assignment to polling stations within a polling centre is effectively random. This randomness arises because it is implausible to argue that specific letters of the alphabet are correlated with higher levels of income or other socioeconomic characteristics. Consequently, we utilise this feature to identify the effect of changes at the polling station level. To isolate changes in average income at the polling station level, we employ the specification outlined in Equation 11.

$$\begin{aligned} \text{share turnout}_{PSt} = \gamma_{PC} + \delta_t + \beta_1 \text{log average wage}_{PSt} + \\ \beta_2 \text{share turnout}_{PS(t-1)} + \theta X_{PSt} + u_{PSt} \end{aligned} \tag{11}$$

In this analysis, we estimate regression models analogous to those presented in Table 9 at the polling station level. The key characteristic of these fixed effects models is the incorporation of polling centre-level fixed effects. This approach allows us to estimate deviations at the polling station level from the overall trend at the polling centre, as represented by γ_{PC} in Equation 11. We use these specifications to test the robustness of our previous findings reported in Tables 9 and 10. Table 15 corroborates our earlier results: log-average wage at the polling station level is positively associated with higher turnout shares across all specifications. This relationship is statistically significant, except for Column 5, where the inclusion of the lag of turnout and polling station-level controls appears to absorb all the explanatory power. In conclusion, our analysis confirms that higher income levels are associated with higher voter turnout when exploiting the random assignment feature in our data.

Effects of changes in income on voter turnout in presidential elections, 2002-2018 (polling station level)

	(1) OLS	(2) FE	(3) FE lag	(4) FE controls	(5) FE lag controls
log_PS_ave_wage	0.033***	0.017***	0.035***	0.006***	0.002
	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
L.share_turnout			0.308***		0.180***
			(0.016)		(0.014)
Observations	32,393	32,360	25,173	32,360	25,173
r2_a	0.088	0.698	0.234	0.718	0.388
Polling station-level controls				YES	YES
Clustered SE		YES	YES	YES	YES
Turnout presidential (t-1)			YES		YES
Year FE		YES	YES	YES	YES
Polling centre FE		YES		YES	

Standard errors in parentheses * p<0.1 ** p<0.05 *** p<0.01
Clustered standard errors at polling centre.
Controls: public sector, skilled and unskilled.

Table 15: Income and turnout at the polling station level with polling centre fixed effects (*random assignment to polling stations*).

This analysis represents the first exercise to exploit the unique characteristics of Costa Rican data. While the availability of individual-level income and turnout data may not initially seem to provide significant innovation beyond the previous specifications in Tables 9 and 10, it nonetheless offers valuable insights that could be further leveraged, mainly when dealing with variables available only in aggregate form. For instance, inequalities at the polling station level will correlate with those at the polling district level. Still, they should not affect turnout other than through the effect of polling district inequality. While this thesis does not apply this specific approach when examining the direct impact of local-level inequality on turnout (see Section 4.6), it provides essential lessons for understanding the broader relationship between income and electoral participation. By aggregating individuals at the polling station level, we gain insights into the voting behaviour of both formal and non-workers and the average income in each locality. The formal income in a locality may impact the voting behaviour of all voters, including

non-formal workers, through spillover effects. In this regard, the random assignment of voters to polling stations, alongside the correlation between polling stations and districts, yields additional information that complements individual-level specifications. There is potential for further exploitation of this data characteristic using other variables that are available only in aggregate form.

4.3 IV: international prices of agricultural products

The agricultural sector plays a crucial role in Costa Rica's economy. Hence, we identify the effects of wage changes within this sector as a first approach to causality in our study of income and turnout. To investigate this phenomenon, we employ international prices of agricultural products as an exogenous instrument. Since economic conditions in the country do not affect international prices, we consider that his instrument does not violate the exclusion restriction.

The percentage of agricultural workers experienced notable fluctuations, peaking at 12.5 per cent in 2006 and declining to 8.4 per cent in 2018. Subsequently, a further decline was observed, reaching as low as 6 per cent in 2022. To identify agricultural workers in our data, we harness the industry classification system of more than 300 UN ISIC codes and associate each worker with a specific subsector of agriculture based on the corresponding product.

Nine subsectors emerge as major contributors, collectively accounting for over 80 per cent of all employment in the agricultural sector. These subsectors include bananas, cereals (such as maize and rice), coffee, eggs, meat, milk, palm oil, pineapples, and sugar cane. Not only do these products dominate agricultural production in terms of harvested area and units/tons, but they also serve as the primary agricultural exports for the country.

For the remaining workers in the agricultural sector, an index of prices for the entire agricultural industry was employed. This comprehensive index encompassed various agricultural products beyond the nine significant subsectors. By doing so, we ensure that our instrument identifies all agricultural workers and thus explains wage-change effects across the entire sector. At the time of writing this draft, we are working on expanding

this identification strategy to more sectors.

Effects income on turnout in presidential elections, 2002-2018 (individual level)
Agricultural Sector

	(1) OLS	(2) FE	(3) FE controls	(4) FE controls	(5) FE controls
logwage	0.033***	0.023***	0.049***	-0.001	0.027***
	(0.009)	(0.003)	(0.004)	(0.002)	(0.004)
L.turnout			0.280***		0.268***
			(0.011)		(0.011)
Observations	440,758	440,758	181,893	308,115	142,759
r2_o	0.003	0.003	0.176	0.017	0.179
Individual level controls				YES	YES
Turnout presidential (t-1)			YES		YES
Year FE		YES	YES	YES	YES
Individual FE		YES		YES	

Standard errors in parentheses * p<0.1 ** p<0.05 *** p<0.01
Controls: age, skilled and unskilled.

Table 16: Income and turnout at the individual level: agricultural sector only.

Figure 16 shows equivalent results to Figure 9 but focuses exclusively on agricultural workers. While the number of observations evidently drops, the strong positive relationship between income changes and turnout remains. Hence, we have strong reasons to believe that agricultural workers behave similarly to the rest of the population. Therefore, we can focus on them as a first approach to developing our identification strategy.

Effects of changes in international prices on wages, 2002-2018 (individual level)
First stage (agricultural sector)

	(1) OLS	(2) OLS controls	(3) OLS	(4) OLS controls
diff_price_L3	0.007***	0.002***		
	(0.002)	(0.001)		
diff_log_price_L3			0.533***	0.167***
			(0.141)	(0.061)
Observations	283,623	232,601	283,623	232,601
r2_o	0.020	0.008	0.025	0.008
Individual level controls		YES		YES
Clustered SE	YES	YES	YES	YES
Year FE		YES		YES
Individual FE		YES		YES

Standard errors in parentheses * p<0.1 ** p<0.05 *** p<0.01
Clustered standard errors by year*product.

(a) IV: first stage.

Effects of changes in income on turnout in presidential elections, 2002-2018 (individual level)
Second stage (agricultural sector)

	(1) 2SLS clustered SE	(2) 2SLS clustered SE	(3) 2SLS FE robust SE	(4) 2SLS FE robust SE
D.logwage	0.082**	0.112***	0.246***	0.156***
	(0.040)	(0.036)	(0.051)	(0.048)
L.turnout		0.393***		-0.268***
		(0.007)		(0.004)
Observations	142,757	142,757	142,759	142,759
r2_a	0.018	0.163		
r2_o			0.003	0.060
KPLM	11.442	11.453		
CDWald	3390.011	3393.811		
KPWald	21.576	21.541		
Individual level controls	YES	YES	YES	YES
Turnout presidential (t-1)		YES		YES
Clustered SE	YES	YES		
Year FE			YES	YES
Individual FE			YES	YES

Standard errors in parentheses * p<0.1 ** p<0.05 *** p<0.01
Clustered standard errors by year*product.
Controls: age, skilled and unskilled.

(b) IV: second stage.

Table 17: Effects of changes in income on turnout in presidential elections (IV strategy).

$$\begin{aligned} \textbf{IV first stage: } \Delta logwage_{itz} &= \gamma_i + \delta_t + \beta_1 \Delta agriprices_{zt} + \theta X_{it} + u_{it} \\ \textbf{IV second stage: } turnout_{it} &= \gamma_i + \delta_t + \beta_1 \Delta logwage_{it} + \beta_2 turnout_{i(t-1)} + \theta X_{it} + u_{it} \end{aligned} \tag{12}$$

Following the specifications in Equation 12, Figure 17 shows the first and second stages of the 2SLS regression in Panel 17a and Panel 17b, respectively. The first stage shows a strong positive and statistically significant correlation between changes in international prices of agricultural products between electoral periods and changes in the wages of agricultural workers. Moreover, the second stage shows that the effect of changes in wages on turnout remains significant when using changes in international prices as instruments. Therefore, we conclude that while incomplete, this instrument represents the first attempt at the identification strategy that we want to pursue.

4.4 Measuring up: voter income comparisons and the dimensions of inequality that matter

4.4.1 Identifying the key inequalities

This section opens with a foundational inquiry: how do individuals compare their income against others, and which disparities are most relevant? The entire country may be a reference point for voters assessing income disparities in a compact nation like Costa Rica. However, a compelling case exists for focusing on more proximate geographical units, such as neighbourhoods or local communities (Clark and Senik (2010), Gimpelson and Treisman (2018), Karadja et al. (2017)). These perspectives necessitate empirical evaluation to determine their validity. To address these questions, the initial empirical test investigates the role of income inequality at various geographic levels. This experiment expands on previous simple-level regression analyses demonstrated in Figure 9 by incorporating inequality measures across a spectrum of sizes, from the province to the polling station.[7] Given that Costa Rica comprises only seven provinces but over 6,000 polling stations, neither of these extreme measures may be inherently informative. Neverthe-

[7] For a relative income version of the baseline results, see Tables B.2 and B.3 in the Appendix.

less, their inclusion serves as a robustness test, allowing for a comprehensive hypothesis evaluation.

$$turnout_{it} = \gamma_i + \delta_t + \beta_1 logwage_{it} + \beta_2 Gini_{kt} + \theta X_{it} + u_{it} \tag{13}$$

Effects of income on turnout in presidential elections, 2002-2018 (individual level)

	(1) FE province	(2) FE county	(3) FE district	(4) FE codigoe	(5) FE junta
logwage	0.002	0.003***	0.003***	0.003***	0.003***
	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
gini	0.579	0.236**	0.131***	0.075***	0.070***
	(0.562)	(0.099)	(0.033)	(0.019)	(0.007)
Observations	3,029,723	3,029,723	3,029,723	3,029,041	3,029,140
r2_o	0.027	0.022	0.021	0.019	0.019

Standard errors in parentheses * p<0.1 ** p<0.05 *** p<0.01
Clustered standard errors at the same level as Gini coefficients.
Controls: public sector, age, skilled and unskilled.
Individual and Year fixed effect.

Table 18: Income, inequality and turnout (fixed effects and controls).

The results, depicted in figure 18, integrate Gini coefficients estimated at these different levels into a fixed effects model with controls (for additional models, refer to Table B.4 in the Appendix). Equation 13 shows the general specification, where $Gini_{kt}$ stands for the Gini coefficient estimated at different levels of aggregation from the highest sub-national level, the province, to the smallest, the polling station (*junta*). Notably, while the signs, magnitudes, and significance of the log-wage coefficients remain consistent, the impact of the Gini coefficients varies. The Gini coefficients are consistently significant, except at the province level, and their magnitude diminishes as the geographical unit narrows. From these findings, at least two conclusions can be drawn. First, province-level inequality does not significantly influence voter turnout at the individual level in this analysis. Second, county-level inequality holds the most significance regarding the magnitude of its impact on voter behaviour. This suggests that smaller yet significant geographic di-

visions may provide more relevant contexts for understanding economic disparities and their effects on political participation.

	(1) OLS	(2) FE	(3) Year FE	(4) FE cntrls	(5) Year FE cntrls
logwage	0.053***	0.010***	0.053***	0.002	0.033***
	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)
Gini (province)	0.495**	0.730***	0.749***	0.504**	0.744***
	(0.216)	(0.212)	(0.144)	(0.240)	(0.163)
Gini (county)	-0.018	0.038	0.029	0.061	0.089
	(0.118)	(0.127)	(0.070)	(0.112)	(0.064)
Gini (district)	0.005	0.040	0.023	0.030	0.008
	(0.052)	(0.036)	(0.035)	(0.036)	(0.030)
Gini (polling district)	0.657***	-0.002	0.417***	-0.007	0.329***
	(0.027)	(0.034)	(0.026)	(0.032)	(0.029)
L. turnout			0.219***		0.226***
			(0.002)		(0.002)
Observations	4,450,662	4,450,662	3,338,385	3,029,041	2,451,135
r2_o	0.033	0.02	0.173	0.028	0.178
Individual level controls				YES	YES
Turnout presidential (t-1)			YES		YES
Year FE		YES	YES	YES	YES
Individual FE		YES		YES	

Standard errors in parentheses * p<0.1 ** p<0.05 *** p<0.01
Clustered standard errors at county-level.
Controls: public sector, age, skilled and unskilled.

Table 19: Income, inequality and turnout (individual-level).

To enhance the insights garnered from our initial examinations, we propose a direct "horse race" involving various levels of inequality within a singular regression framework. The results, encapsulated in Table 19 and derived from Equation 14, integrate multiple Gini coefficients across different levels of aggregation. This approach examines the implications of these coefficients on individual voter turnout. Our findings reveal notable

trends: province and polling district-level inequalities significantly influence individual-level turnout behaviour. This underscores the importance of broader national inequality and local disparities within one's immediate environment in shaping electoral participation. Although incorporating national-level inequality into this model presents challenges, province-level inequality may be an adequate proxy for country-wide disparities. Provinces are large enough to exhibit the size and diversity of small countries.

$$turnout_{it} = \gamma_i + \delta_t + \beta_1 logwage_{it} + \sum_{k=1}^{4} \beta_2 Gini_{kt} + \theta X_{it} + u_{it} \tag{14}$$

Theoretically, the polling district is considered the smallest pertinent unit, effectively mirroring the dynamics of a neighbourhood or a small community. Within these polling districts, polling stations are each one of the rooms or ballot boxes where voters cast their votes. Voters are assigned to these stations based on alphabetical ordering, which leads to the assumption that polling stations, while detailed, do not provide additional geographical insights beyond what is captured at the polling district level. Consequently, we have opted to omit polling station level Gini coefficients from the primary results in Table 19, with an alternative specification detailed in Table B.5 of the Appendix. In all specifications, county and district-level Gini coefficients are not statistically significant. It is also interesting to note that the coefficients of Gini estimated at the polling district level are negative but statistically weak and small in magnitude.

This analysis unequivocally indicates that medium-level inequality metrics at both country and district levels do not significantly contribute to explaining variations in individual voter turnout. This discovery is pivotal, highlighting the specific scales of inequality that are most relevant in understanding electoral behaviours. This result can also be attributed to the nature of administrative divisions in Costa Rica, where both county and district levels may not correspond to the tangible realities experienced by individuals. For instance, counties can vary significantly; some are too small to encapsulate a commuting zone, while others are large and diverse, complicating their relevance as meaningful units for our analysis. In conclusion, our results suggest that individuals benchmark their incomes against a national backdrop and within their local or neighbourhood contexts. This

dual perspective is crucial for comprehending how economic disparities influence voting patterns and political engagement.

4.4.2 Differential effects along the income distribution

While the preceding subsection examined how various levels of inequality influence voters' electoral behaviour, this subsection seeks to explore the differential effects of inequality based on individuals' positions within the income distribution. While inequality plays a role in explaining individual-level turnout, its impacts vary across different income tiers. To address this question, we analyse the interaction between inequality measures and income quintiles. It's important to recognise that although inequality measures are aggregated, an individual's position in the income distribution is unique and specific. Accordingly, we have calculated both these relative positions and inequality measures across multiple levels of aggregation, ranging from province to polling station. To illustrate these interactions visually, we present contour graphs in Figure 20, which predict voter turnout across different combinations of Gini coefficients and income quintiles.

$$\begin{aligned} turnout_{it} = \gamma_i + \delta_t + \beta_1 logwage_{it} + \beta_2[Gini_{kt} \times quintile_{ikt}] + \\ \beta_3 Gini_{kt} + \beta_4 quintile_{ikt} + \theta X_{it} + u_{it} \end{aligned} \tag{15}$$

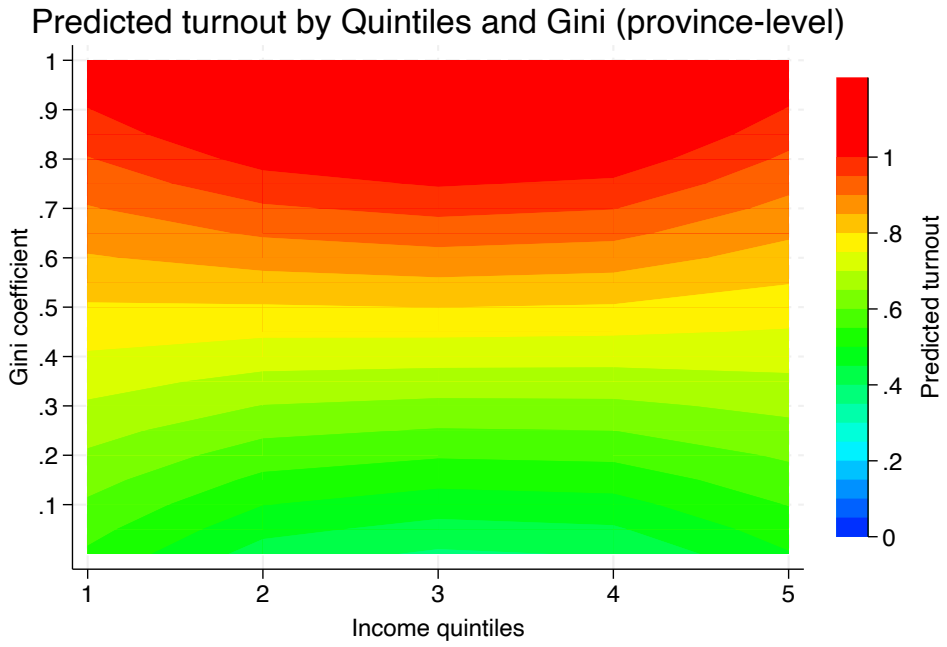
Equation 15 portrays the interaction between the Gini coefficient at different levels of aggregation and the specific quintiles that individuals take in the income distribution at the same geographical level. As in Equation 14, $Gini_{kt}$ represents inequality at different levels of aggregation from the province to the polling district, which is specific to the individual, but not unique (several individuals experience the same level of inequality). The innovation of this specification is the interaction with the income quintile of individual i at the k aggregate level and time t. The coefficient of interest is β_2, which appears in the contour graphs of Figure 20. To fully appreciate which coefficients are statistically significant, please refer to the regression tables B.6, B.7, and B.8, in the Appendix. For example, Table B.6, which is the base of Figure 20a, shows that most interaction coefficients are

significant. Nonetheless, the 1st and 5th quintiles exhibit stronger statistical significance and are more prominent in magnitude at the extreme of the income distribution. These findings explain the U-shape of the contour curves, where both the lowest and highest quintiles share high levels of inequality to attain the same predicted turnout.

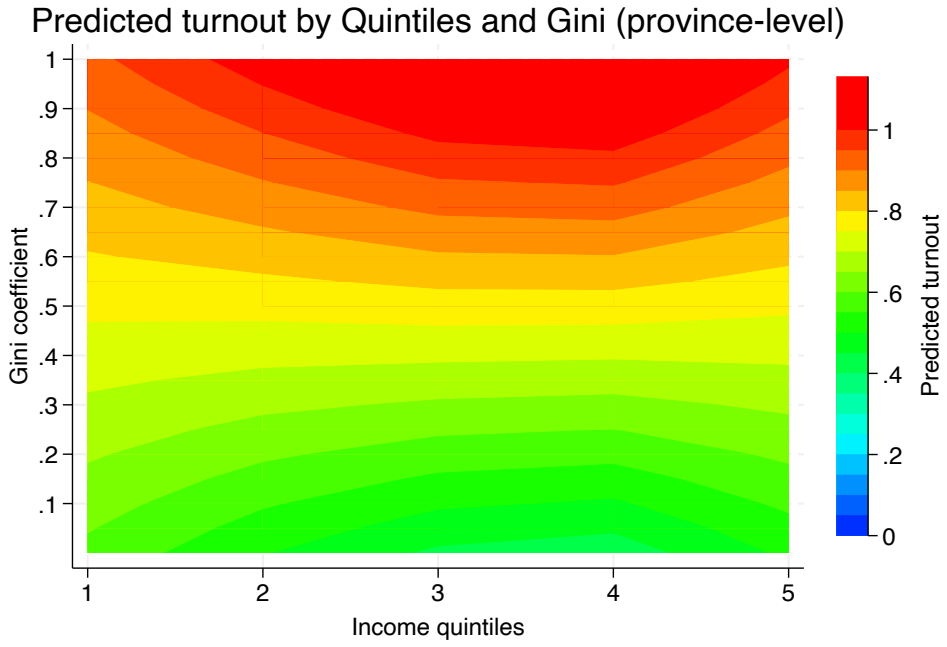
Our initial observation indicates that turnout tends to increase with the Gini coefficient, suggesting that higher levels of inequality correlate with greater voter participation at the individual level. However, our primary interest lies in how this effect varies across different income quintiles. We observe a U-shaped relationship in contexts of high inequality and an inverted U-shape at lower levels of inequality. Specifically, to achieve similar turnout levels as observed in the middle quintile (quintile 3, which serves as our reference), the lowest and highest quintiles (quintiles 1 and 5) require greater degrees of inequality when Gini coefficients exceed 0.5. Conversely, when Gini coefficients fall below 0.5, these quintiles need less inequality to match the turnout levels of quintile 3. This pattern suggests that while voters at the extremes of the income spectrum are more likely to vote under conditions of high inequality, those in the middle quintile are more active when inequality is lower. A potential implication of this finding is that increasing inequality might encourage greater electoral participation among the poorest and wealthiest while potentially discouraging those in the middle.

The focus of Figure 20 is on Gini coefficients and income quintiles estimated at the province level, where we assume province-level inequality acts as a proxy for national inequality. This assumption provides a broader gradient of observed turnout levels. However, for completeness, analogous graphs representing different levels of aggregation are included in the Appendix (see figures, B.9, B.10, B.11, and B.12). Despite the geographical scale reduction, all models display the aforementioned U-shaped pattern at high levels of inequality and the inverted U-shape at lower levels. Moreover, these predictive models are underpinned by various regression model specifications, as detailed in the Appendix (see tables B.6, B.7, and B.8). Across different specifications, a consistent theme is the negative interaction between the Gini coefficient and the first two income quintiles. The interaction terms highlight that the adverse effects of increasing inequality are most pronounced for those in the lower wage quintiles, particularly at broader geographic scales.

This impact lessens in magnitude and significance as the focus shifts towards higher wage quintiles or smaller geographic units. These findings suggest that policy interventions to reduce inequality could benefit lower-income groups substantially, especially when implemented at larger regional or national levels.



(a) FE & NO controls.



(b) FE & controls.

Fig. 20: Interaction income quintiles and Gini (province-level).

4.4.3 Movements along the income distribution

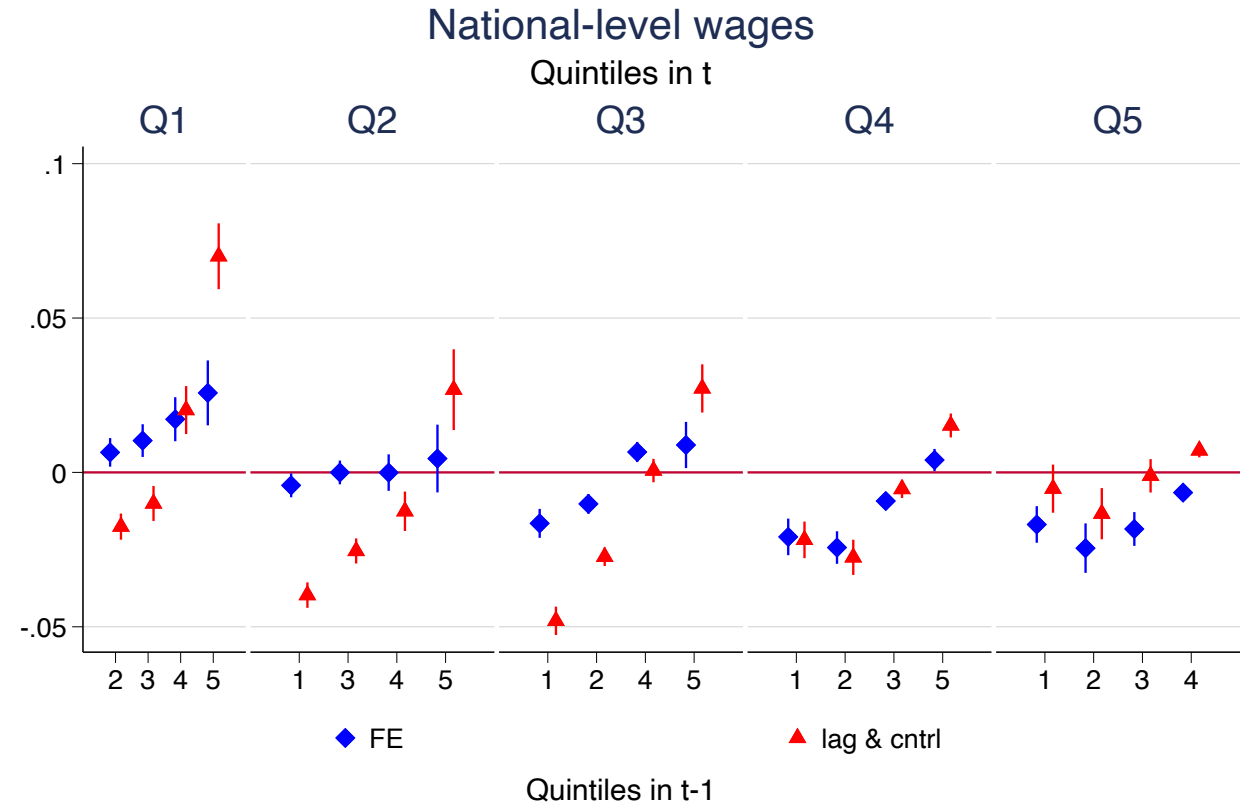
Building upon the analysis in the previous subsection, this section examines how changes in voters' positions within the income distribution influence their electoral behaviour. Specifically, we focus on relative income to explore how voter turnout at the individual level is affected when individuals transition between income quintiles. Figure 21 illustrates the impact of moving from one income quintile in period $t-1$ to another in period t on voter turnout. Our observations indicate that improving one's relative position within the income distribution negatively influences individual-level turnout. Conversely, a decline in one's economic standing—worsening their position in the distribution—appears to increase the likelihood of participating in elections. This pattern is particularly pronounced for individuals who, in period t, fall into the first quintile, having moved down from higher quintiles (2 through 5) in period $t-1$. While this effect is less evident in the second quintile, it becomes more noticeable for those in the third and fourth quintiles.

$$\begin{aligned} turnout_{it} = \gamma_i + \delta_t + \beta_1 \text{Q(m)Q(n)}_{it} + \beta_2 turnout_{k(t-1)} + \theta X_{it} + u_{it} \\ \text{quintiles in t: } m = 1, ..., 5 \\ \text{quintiles in t-1: } n = 1, ..., 5 \\ m \neq n \end{aligned} \tag{16}$$

Equation 16 shows the specification upon which the results in Figure 21 are based. The coefficient of interest is β_1, specific for each movement among quintiles. We exclude the cases where individuals stay in the same quintile as in the previous period ($m = n$) as reference. To ensure the robustness of these findings, we replicated the analysis across various geographic scales, like the methods employed in the preceding subsection. Figures B.13 and B.14 in the Appendix display comparable results at the county, district, polling district, and polling station levels. Regardless of the geographic context, the general trend persists, and downward mobility within the income distribution is associated with increased voter turnout. Notably, this effect is most significant among those who experience the most substantial drop, specifically those descending to Quintile 1 from

higher quintiles between two consecutive periods. Those who move from Quintile 5 to Quintile 1 exhibit the most marked increase in voting likelihood.

These findings suggest that individuals who face economic setbacks between elections are more inclined to vote in subsequent elections, potentially motivated by a desire to influence or express discontent with the prevailing economic policies. This behaviour may be seen as a form of protest or punishment directed at the incumbent, pointing to a significant link between personal economic experiences and electoral participation. Further exploration of this hypothesis, particularly how it relates to changes in vote shares, appears in the subsequent chapter, which delves deeper into the potential motivations behind these voting patterns.



Controls: logwage, age, public sector, skilled and unskilled.
Clustered standard errors at county-level.

Fig. 21: Changes in relative income and turnout (national-level wages).

4.5 From individual-level income changes to inequality

In this subsection, we revisit the premise that rising inequality within the country influences electoral turnout. This assertion is visually supported by Figure 22, which depicts the progression of income inequality as measured by the Gini coefficient. A comparative observation reveals a moderate increase in income inequality among the general population, as recorded in household surveys. However, a more significant escalation is noted among formal workers, according to the social security data. Given that this study primarily focuses on formal workers, this pronounced rising inequality trend underscores our research focus's relevance. It enhances our motivation to explore the connections between individual income dynamics and broader shifts in inequality. To this end, our investigation begins with an analysis of how both individual and aggregated voter turnout respond to changes in relative income levels. This exploration aims to discern the intricate ways in which economic disparities, particularly those affecting formal workers, might shape political participation patterns across the spectrum.

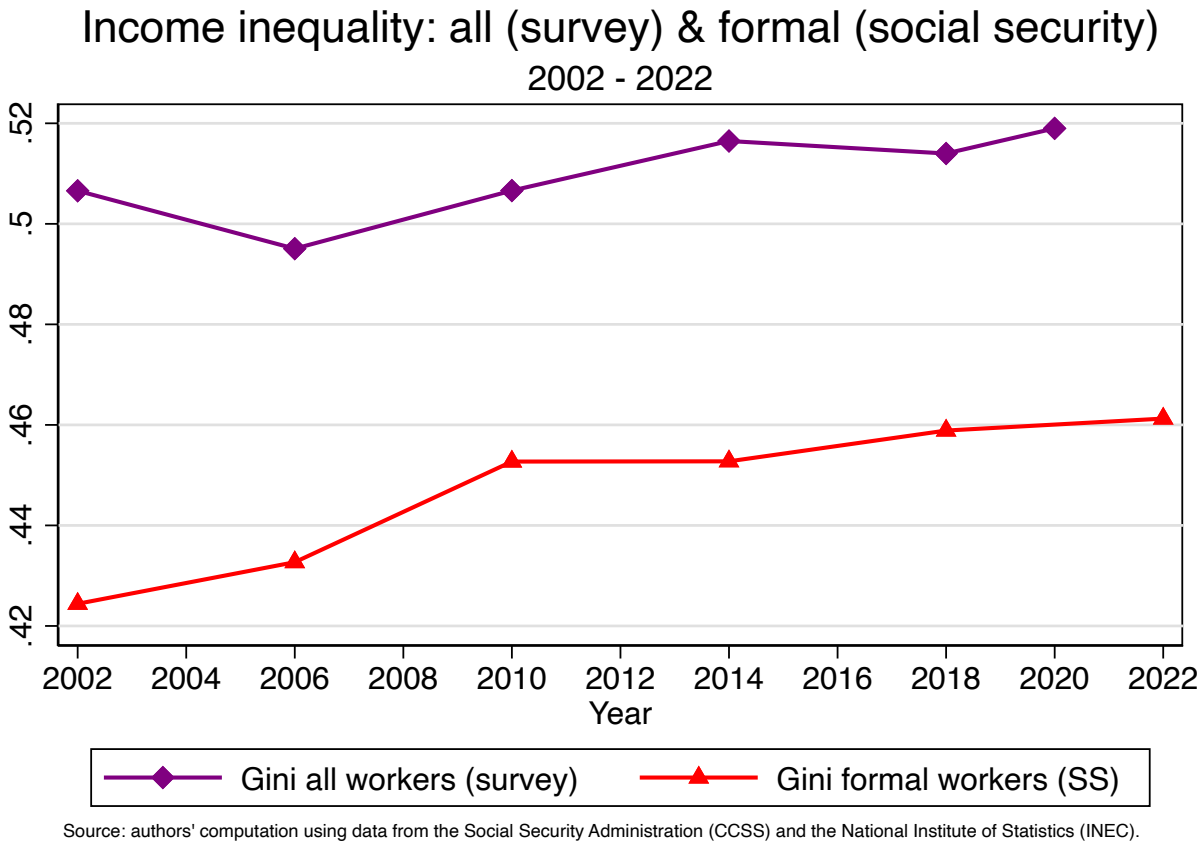


Fig. 22: Changes in relative income and turnout (national-level wages).

We continue our analysis with a series of fixed effect regressions -at the individual and polling station level- where we try to identify the effects of worsening or improving one's position in the income distribution. Of course, these changes are always relative to others. Hence, we call "climbers" those who improve their position from one election to another and "droppers" those who worsen their position from one period to the next. In addition, we study the effect of changes in three magnitudes: 10 percentiles, 20 percentiles and 30 percentiles. In other words, we are trying to understand what happens with the propensity to vote when individuals gain/lose 10, 20 or 30 percentiles in their position in the income distribution. In addition to the presidential, this part of the analysis also examines local elections. Equation 17 shows the specifications at the individual and polling station levels for positive and negative movements along the income distribution. The excluded cases contain all individuals whose movements within the income distribution

are less than 30, 20 or 10 percentiles, respectively.

$$\textbf{individual: } turnout_{it} = \gamma_i + \delta_t + \beta_1 climb30_{it} + \beta_2 drop30_{it} + \beta_3 turnout_{i(t-1)} + \theta X_{it} + u_{it}$$
$$\textbf{polling station: } turnout_{kt} = \gamma_k + \delta_t + \beta_1 shareclimb30_{kt} + \beta_2 sharedrop30_{kt} + \beta_3 turnout_{k(t-1)} + \theta logavewage_{kt} + u_{kt} \quad (17)$$

Table 23a shows at the individual level that "climbers" have a lower propensity to turn out to vote in all specifications. The case for "droppers" is not as clear. However, in two specifications, columns 4 and 6, the coefficient is positive and statistically significant. These results, together with the findings of the previous subsections and the results for local elections (see table B.29 in the Appendix), suggest that the coefficient for "droppers" might indeed be positive. On the other hand, at the polling station level, Table 23b shows that the "share of droppers" is negatively correlated, and the "share of climbers" is positively correlated with the share of turnout at the polling station level. The whole set of results for 10, 20 or 30 percentiles is in Tables B.27 and B.28, for presidential elections and Tables B.29 and B.30, for local elections, in the Appendix. While the polling station level results are much more intuitive, most of our results suggest that improvements in relative income depress electoral turnout.

Effect of movements in the income distribution on turnout in presidential elections, 2002-2018 (individual level) (30 percentiles)

	(1) OLS	(2) FE	(3) FE controls	(4) FE controls	(5) FE controls	(6) FE controls
climb_dist30	-0.028***	-0.018***	-0.019***	-0.019***	-0.014***	-0.023***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
drop_dist30	-0.066***	-0.015***	-0.037***	0.012***	-0.003	0.020***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)
Observations	2,497,775	2,497,775	2,497,775	2,497,775	1,798,799	1,798,799
r2_o	0.001	0.001	0.172	0.029	0.019	0.181
Individual level controls					YES	YES
log Income				YES	YES	YES
Turnout presidential (t-1)			YES			YES
Year FE		YES	YES	YES	YES	YES
Individual FE		YES		YES	YES	

Standard errors in parentheses * p<0.1 ** p<0.05 *** p<0.01
Controls: public sector, age, skilled and unskilled.

(a) Individual-level.

Effect of movements in the income distribution on turnout in presidential elections, 2002-2018 (polling station level) (30 percentiles)

	(1) OLS	(2) FE	(3) FE controls	(4) FE controls	(5) FE controls
share_climb30	8.655***	4.746***	4.656***	8.752***	9.788***
	(0.316)	(0.402)	(0.440)	(0.394)	(0.437)
share_drop30	-20.839***	-24.167***	-24.696***	-15.070***	-15.392***
	(0.340)	(0.400)	(0.418)	(0.427)	(0.450)
Observations	32751	32750	31966	32720	31939
r2_o	0.103	0.096	0.118	0.150	0.160
log Income				YES	YES
Turnout presidential (t-1)			YES		YES
Year FE		YES	YES	YES	YES
Polling station FE		YES	YES	YES	YES

Standard errors in parentheses * p<0.1 ** p<0.05 *** p<0.01

(b) Polling station-level.

Table 23: "Droppers", "climbers" & turnout.

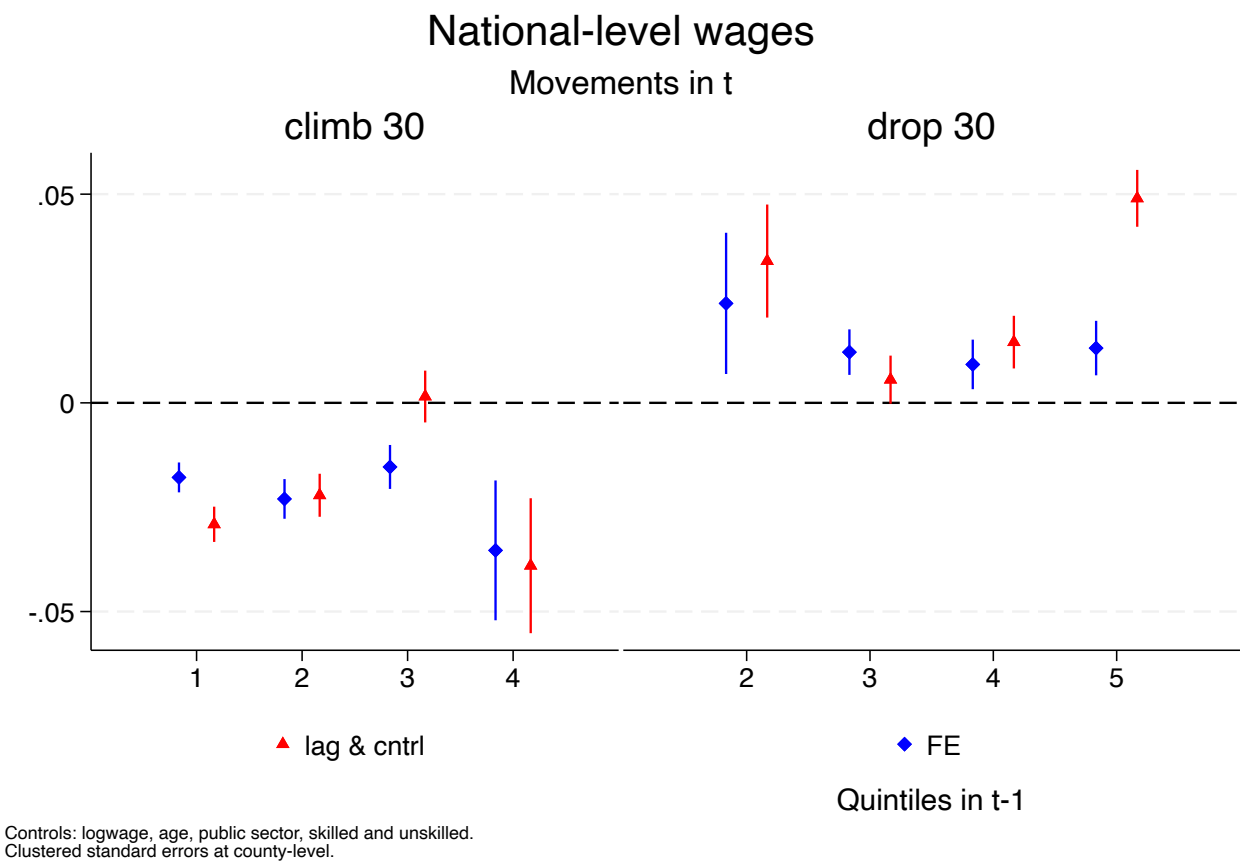
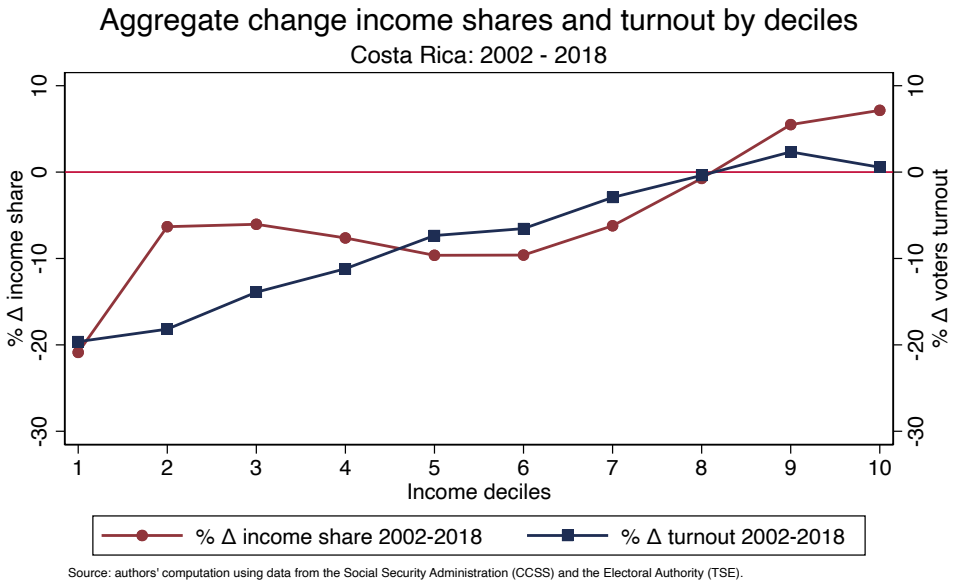


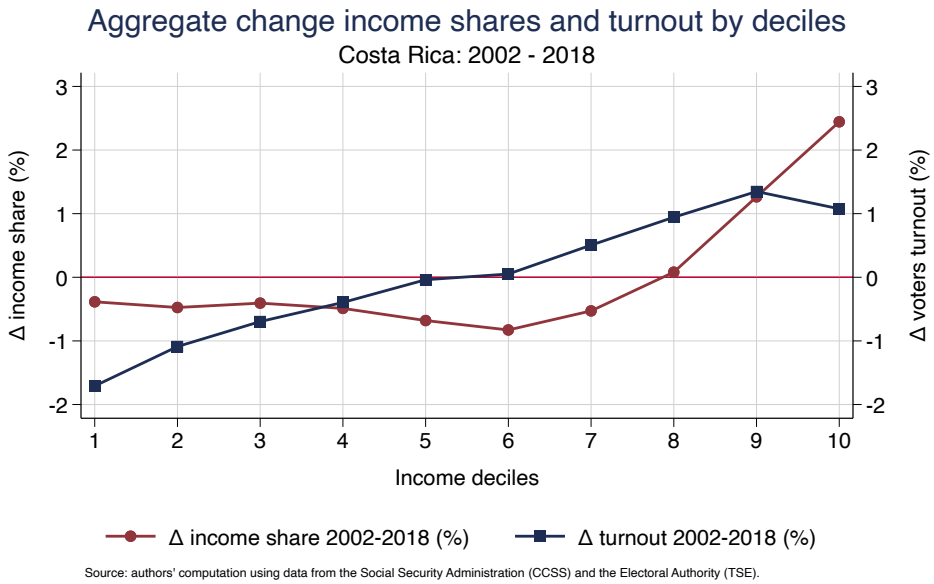
Fig. 24: "Droppers" & "climbers" by quintiles (national-level).

Once again, the question arises: how do these upward and downward movements affect individuals differently, depending on their position within the income distribution? To address this question, we examine the heterogeneous effects of ascending or descending in the income distribution by income quintile. Specifically, we analyse movements of three magnitudes: 30, 20, and 10 percentiles within the income distribution. Additionally, individuals are classified according to their position at various geographical levels, including national, county, district, polling district, and polling station. Figure 24 presents the regression coefficients depicting the effects of positive or negative movements of 30 percentiles for each income quintile. For movements of 20 and 10 percentiles, refer to Figure B.31 in the Appendix. The excluded categories encompass all individuals whose movements within the income distribution are less than 30 percentiles. It is important to note that individuals in the fifth quintile cannot climb 30 percentiles or more, just as individuals in the first quintile cannot drop 30 percentiles or more.

This graph reveals several notable elements. Firstly, individuals who experience upward mobility are less likely to participate in presidential elections, whereas those experiencing downward mobility demonstrate a higher likelihood of voting. This finding is statistically significant for most quintiles across both model specifications in the graphs: individual and year-fixed effects, and lag of turnout and controls. Secondly, the greatest reactions are observed in the extreme quintiles: upward mobility in the first and fourth quintiles and downward mobility in the second and fifth quintiles. This pattern remains consistent across all geographical levels of aggregation, as illustrated in Figures B.32 through B.39 in the Appendix. Lastly, the magnitude of the effects diminishes as the size of the changes decreases. In other words, the aforementioned points are less pronounced when examining changes of 20 and 10 percentiles. Nonetheless, the negative effect on individuals experiencing upward mobility and the positive effect on those experiencing downward mobility persist across all specifications and magnitudes of change.



(a) Aggregate % change in income shares and turnout by deciles.



(b) Aggregate change in income shares and turnout by deciles.

Fig. 25: Changes in income and turnout shares by deciles.

We conclude this section with a descriptive analysis of the percentage change in income share and voter turnout by income decile. Figure 25a illustrates the percentage change in income share and turnout share from 2002 through 2018. The data indicate that all income groups, except the top two deciles, experienced a decline in relative income

share over this period. Similarly, voter turnout decreased for all income groups in the most recent election compared to the earliest, except for the top two deciles. Additionally, Figure 25b corroborates these findings when income share is defined in absolute rather than relative terms. In terms of voter turnout, the bottom five percentiles have lost absolute turnout share, whereas the top five percentiles have gained. These findings lead to two primary conclusions. First, the observation that most groups are losing income share while only a few are gaining indicates a rise in inequality. Second, the overall decrease in voter turnout among most groups suggests a decline in aggregate electoral participation. These results partly explain the correlation between increasing inequality and decreasing electoral turnout. Further exploration of these aggregate trends will be addressed in the next subsection. Nonetheless, the overarching objective of this paper remains to establish a causal relationship at the individual level between changes in income and electoral outcomes.

4.6 Levels of inequality at the local level and turnout

In this subsection, we aim to establish a comprehensive connection between individual-level income changes and inequality and their subsequent effects on electoral turnout. Initially, it is observed that there are more "climbers" than "droppers" in our data, as indicated in Table B.22 in the Appendix. Consequently, if "climbers" exhibit lower voter turnout and "droppers" exhibit higher voter turnout, as suggested by our previous findings, the predominance of climbers over droppers could explain the overall decline in electoral turnout. Furthermore, inequality appears to be positively related to voter turnout.

Table 26 provides strong evidence that changes in inequality measures correlate with changes in voter turnout at the district level. Using several difference-regression models, both with and without control variables, we find that changes in the Gini coefficient positively correlate with the turnout share. Similar strong positive effects are observed for changes in the Top 10 per cent income share, while changes in the Bottom 50 per cent income share show strong negative effects. For instance, the point estimate for the Gini coefficient in column 6 is $\beta = 0.343$, indicating that for each unit increase in the Gini

coefficient, the change in turnout increases by 0.34 units, or a 34 per cent increase in the change of voter turnout. For example, if the Gini coefficient increases by 0.1, the voter turnout change is expected to increase by 0.034 (0.1 * 0.34).

We complement this analysis with Table B.23 in the Appendix, which presents the results from various regression models in levels, examining the relationship between inequality measures and turnout at the administrative district level. The point estimates for the Gini coefficient are positive and significant in most specifications, reinforcing the positive association between inequality and turnout. The results for the Top 10 per cent income share are less consistent, with some specifications showing positive coefficients and others showing negative coefficients. In contrast, the coefficients for the Bottom 50 percent income share are consistently negative across all specifications. These findings strongly suggest a positive relationship between inequality and turnout in the context studied.

To connect these findings, consider a scenario where the number of individuals experiencing downward mobility in the income distribution exceeds those experiencing upward mobility. This scenario would result in increased inequality. Given that droppers tend to have higher voter turnout, an increase in inequality would likely lead to an increase in overall turnout. In conclusion, our analysis indicates that greater inequality at the local level correlates with higher electoral turnout. This relationship appears intuitively correct, as the country's most developed regions also exhibit the highest levels of inequality. Figure B.24a in the Appendix presents a straightforward correlation between the Gini coefficient and the Social Development Index (SDI) at the district level. According to this index, the most unequal districts are also the most developed. The literature typically suggests that development, such as higher educational levels, positively correlates with voter turnout. In line with this, Figure B.24b illustrates a similar correlation, indicating that the most developed districts also exhibit higher levels of electoral turnout. Hence, the positive relationship between inequality and turnout remains robust and significant even when controlling for the Social Development Index at the district level, as shown in Tables 26 and B.23.

Effect of changes in inequality on turnout in presidential elections: 2002 - 2018 (district-level)

	(1) No controls	(2) SDI	(3) Average Income	(4) lag turnout	(5) Controls	(6) All controls
Panel A: effect of inequality on turnout in presidential elections						
D.Gini	0.359*** (0.027)	0.390*** (0.026)	0.357*** (0.026)	0.338*** (0.026)	0.376*** (0.026)	0.343*** (0.025)
Observations	1882	1879	1882	1882	1879	1879
r2_o	0.087	0.116	0.114	0.123	0.146	0.211
Panel B: effect of inequality on turnout in presidential elections						
D.top 10	0.308*** (0.037)	0.402*** (0.037)	0.320*** (0.036)	0.285*** (0.036)	0.388*** (0.036)	0.347*** (0.035)
Observations	1882	1879	1882	1882	1879	1879
r2_o	0.036	0.069	0.066	0.076	0.102	0.174
Panel C: effect of inequality on turnout in presidential elections						
D.bottom 50	-0.584*** (0.039)	-0.601*** (0.038)	-0.574*** (0.039)	-0.553*** (0.038)	-0.579*** (0.037)	-0.532*** (0.036)
Observations	1882	1879	1882	1882	1879	1879
r2_o	0.105	0.128	0.129	0.141	0.156	0.221
Social Development Index (SDI)		YES			YES	YES
log Average Income			YES		YES	YES
turnout presidential (t-1)				YES		YES

Standard errors in parentheses * p<0.1 ** p<0.05 *** p<0.01

Table 26: Inequality changes and changes in turnout (district level).

4.7 IV: Polling Station-Level inequality

This section aims to exploit the randomness in the assignment to polling stations within polling centres, similarly to section 4.2. However, in this case, the analysis is conducted at the individual level concerning the outcome variable, voter turnout, and individual-level income. Additionally, we are interested in examining the effects of local-level inequality on turnout. As inequality is inherently an aggregate-level measure, we combine local-level inequality with individual-level turnout data to explore this relationship. As explained in Section 4.4, we consider that inequality at the polling centre level is the relevant measure because it reflects the neighbourhood or close locality of voters. This consideration is confirmed by the results shown in Table 19. In this context, we incorporate polling centre-level inequality in our specifications and use polling station-level inequality as an instrument to address potential omitted variable bias.

$$turnout_{it} = \gamma_i + \delta_t + \beta_1 logwage_{it} + \beta_2 Gini_{PCt} + \beta_3 turnout_{i(t-1)} + \theta X_{it} + \epsilon_{it} \tag{18}$$
$$\epsilon_{iPCt} = u_{iPCt} + \alpha\omega_{iPCt}$$
$$Z_{it} = Gini_{PSt}$$

Equation 18 presents the specifications mentioned above. Specifically, we assume that the error term ϵ_{it} includes both random noise, represented by u_{iPCt}, and a potential omitted variable correlated with turnout, ω_{iPCt}. Both components are at the neighbourhood level (i.e., polling centre level). Since the omitted variable at the neighbourhood level is unknown, we employ our IV strategy to account for it. Consequently, the instrumental variable Z_{it} is a measure of inequality at the polling station level, $Gini_{PSt}$.

We posit that a measure of inequality derived from a combination of individuals randomly assigned to a polling station should not directly influence individual turnout. In other words, it is not correlated with the error term in the regression equation, satisfying the exogeneity condition. This measure also supports the exclusion restriction, where the instrument should affect the dependent variable solely through the endogenous explanatory variable. Given that individuals are alphabetically selected from the polling

centre, polling station-level inequality should be correlated with polling centre-level inequality. Additionally, the individual-level fixed effects, γ_i, in these specifications allows us to identify the impact of changing inequality on individuals' voting behaviour.

Table 27a displays the first stage results, which show the correlation between inequality at both levels: polling centre and polling station. The relationship is positive and statistically significant, confirming the relevance condition, meaning that the instrument is correlated with the endogenous explanatory variable. Furthermore, Table 27b presents the second stage of our IV specification. For all specifications, the coefficient of the Gini coefficient at the polling centre level is positive and statistically significant. Moreover, the order of magnitude of the coefficients for neighbourhood-level inequality (polling centre) are similar when using an IV strategy to those reported in 19. In conclusion, we confirm that after implementing an IV strategy, our preferred measure of local-level inequality, the polling centre, remains statistically significant and positive. This finding demonstrates that inequality at the neighbourhood level is a crucial dimension influencing political behaviour.

Effects of inequality at the POLLING STATION level on inequality at the POLLING CENTRE level, 2002-2018
First stage (individual-level)

	(1) OLS	(2) FE	(3) FE controls	(4) FE controls
Gini polling station	0.557***	0.376***	0.352***	0.405***
	(0.009)	(0.008)	(0.007)	(0.007)
logwage			0.006***	0.000
			(0.001)	(0.000)
Observations	4,450,595	4,450,595	4,450,595	3,029,004
r2_o	0.632	0.632	0.624	0.605
Individual-level controls				YES
Clustered SE	YES	YES	YES	YES
Year FE		YES	YES	YES
Individual FE		YES	YES	YES

Standard errors in parentheses * p<0.1 ** p<0.05 *** p<0.01
Clustered standard errors at the polling centre.
Controls: age, public sector, share skilled and share unskilled.

(a) IV: first stage.

Effects of income and income inequality on turnout in presidential elections, 2002-2018 (individual level)
Second stage (polling station IV)

	(1) 2SLS FE cntrls	(2) 2SLS FE cntrls lag	(3) 2SLS FE cntrls	(4) 2SLS FE cntrls lag
Gini Polling Centre	0.175***	0.454***	0.121***	0.397***
	(0.017)	(0.005)	(0.023)	(0.016)
logwage	0.004***	0.043***	0.001	0.041***
	(0.001)	(0.000)	(0.001)	(0.001)
L.turnout		0.278***		0.374***
		(0.001)		(0.001)
Observations	3,029,004	2,451,108	2,424,759	2,451,108
r2_a			-0.000	0.184
r2_o	0.016	0.182		
KPLM			400.445	238.616
CDWald			1.3e+06	1.1e+07
KPWald			3667.217	1.3e+04
Individual level controls	YES	YES	YES	YES
Turnout presidential (t-1)		YES		YES
Clustered SE			YES	YES
Year FE	YES	YES	YES	YES
Individual FE	YES		YES	

Standard errors in parentheses * p<0.1 ** p<0.05 *** p<0.01
Clustered standard errors at polling centre.
Controls: age, skilled and unskilled.

(b) IV: second stage.

Table 27: Changes in income and income inequality on turnout in presidential elections (IV).

4.8 The Effect of Income Shocks and Mass Layoffs on Voter Turnout

This section examines how income mobility and substantial changes in income distribution interact with mass layoffs to influence voter turnout in presidential elections. The analysis focuses on movements within the income distribution and employs firm-level employment reductions as an exogenous shock to capture unexpected changes in income.

Following the literature (see Jacobson et al. (1993a) and 1993b, Couch and Placzek (2010), Hummels et al. (2012) and 2014), we identify firms that suddenly experienced mass layoffs, those private companies of 50 employees or more, from the private sector, whose total workforce was reduced by 30 per cent or more during the last 12 months before the election concerning their average workforce during the previous three years (three years after the last election). We identify companies in this category as 1 in the categorical variable (change30 = 1).

The results indicate that substantial upward income mobility is associated with decreased voter turnout. Specifically, the coefficient for individuals whose income increased by 30 percentiles or more (climbdist30 = 1) is consistently negative and statistically significant across the models. For instance, in Model 6, the coefficient of -0.038 ($p < 0.01$) suggests that those who experience significant income gains are less likely to participate in elections, reflecting a sense of economic satisfaction or reduced motivation to engage politically due to improved personal circumstances.

Conversely, the impact of substantial downward income mobility (dropdist30 = 1) shows more variability. The coefficient is negative and significant in the first three columns, suggesting that individuals who experience significant income declines are generally less likely to vote. However, this direct negative effect diminishes in later models that control for additional variables. In columns four and six, the effect is positive and statistically significant.

The analysis of mass layoffs (change30 = 1), which captures instances where firms reduce their workforce by 30% or more, reveals a demobilising effect on voter turnout. The coefficient for this variable is negative and significant in several models, such as -0.021 ($p < 0.01$) in Model 6. This finding suggests that individuals employed in firms

experiencing large-scale layoffs are less likely to vote, highlighting the adverse impact of economic insecurity on political participation.

Of particular interest is the interaction between downward income mobility and mass layoffs (dropdist30xchange30). The interaction term is positive and significant in most models, indicating that when the income decline occurs in the context of a mass layoff, it mitigates the negative effect of income loss on voter turnout. In Model 6, for example, the coefficient is 0.011 ($p < 0.1$), suggesting that individuals who experience a substantial drop in income during a firm-level instability are more likely to vote than those whose income declines in a more stable employment context. This mobilisation effect may reflect heightened political engagement driven by economic hardship and dissatisfaction with broader economic conditions.

These findings underscore the complexity of the relationship between income dynamics, economic shocks, and voter behaviour. While upward mobility appears to reduce electoral participation, downward mobility, particularly when coupled with mass layoffs, can stimulate political engagement. The interaction term provides evidence that mass layoffs serve as exogenous economic shocks, helping to isolate the causal effects of income changes on turnout. This approach addresses endogeneity concerns and highlights the heterogeneous nature of voter responses to economic conditions. The analysis demonstrates the importance of considering individual-level income changes and broader economic contexts in understanding political participation.

5 Section B results: income shocks and electoral outcomes

In this second part of our paper, we shift our focus from voter turnout, the primary concern of Part One, to explore vote shares and various other electoral outcomes. Since our administrative data naturally lacks individual-level voting choices, we conduct this analysis at the most granular aggregate level available, the polling station, of which there are approximately 6500 in Costa Rica. It's worth noting that this examination could be extended to larger aggregated levels, such as the electoral district (2500), the administrative district ($\sim$500), or even the county (82 *cantones*). A noteworthy aspect of the Costa Rican

Effect of movements in the income distribution on turnout in presidential elections, 2002-2018 (individual level)
(30 percentiles change interacted with mass layoffs)

	(1) OLS	(2) FE	(3) FE controls	(4) FE controls	(5) FE controls	(6) FE controls
climb_dist30=1	-0.043***	-0.028***	-0.030***	-0.029***	-0.020***	-0.038***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)
drop_dist30=1	-0.059***	-0.010***	-0.033***	0.025***	0.000	0.035***
	(0.003)	(0.003)	(0.002)	(0.003)	(0.004)	(0.003)
change_30=1	-0.037***	0.010***	-0.030***	0.006***	0.005**	-0.021***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
drop_dist30=1 # change_30=1	0.022***	0.017**	0.019***	0.016**	0.024***	0.011*
	(0.006)	(0.007)	(0.005)	(0.007)	(0.008)	(0.006)
Observations	881,240	881,240	881,240	881,240	681,942	681,942
r2_o	0.002	0.000	0.171	0.028	0.008	0.180
Individual level controls					YES	YES
log Income				YES	YES	YES
Turnout presidential (t-1)			YES			YES
Year FE		YES	YES	YES	YES	YES
Individual FE		YES		YES	YES	

Standard errors in parentheses * p<0.1 ** p<0.05 *** p<0.01
Controls: public sector, age, skilled and unskilled.

Table 28: 30 percentiles change interacted with mass layoffs.

context and our dataset is the relatively small size of polling stations, with an average of around 500 voters per station. This granularity allows us to derive valuable insights about these 500 individuals by aggregating variables from our Social Security registries and other sources, such as income, at the polling station level.

In this section, we delve into one of the central themes of this paper: the impact of income changes on voting behaviour. While we previously examined the relationship between income and voter turnout in Section 4, our focus here shifts to the analysis of vote shares for specific political parties or groups of parties. At this juncture, we will primarily concentrate on two key electoral outcomes: electoral volatility and vote shares for traditional parties, specifically the National Liberation Party (PLN) and the Social Christian Unity Party (PUSC).

Our rationale for choosing these particular outcome variables stems from their significance in shedding light on our overarching research question: to what extent do increasing income inequality and exposure to globalization elucidate the shift from a two-party to a multi-party system? Electoral volatility, characterized by a rise in the number of political parties and the emergence of short-lived but occasionally influential political entities, directly reflects the growing complexity of the political landscape in our dataset. Simultaneously, the waning support for traditional parties that dominated the two-party era holds intrinsic value in deciphering the factors compelling voters to move away from the established political cleavages of the past.

5.1 Income gradients by political parties

This section begins by analysing the income-vote-share gradients, similar to those discussed in Chapter 1 of this thesis. In this analysis, polling stations are ordered according to their average wage, contrasting with the individual-level data that considers total individual wages. We leverage the detailed electoral results data at the most minor aggregation level, the polling station. While individual voting behaviour cannot be discerned, the exact vote counts at each polling station provide a rich dataset for combining income measures and electoral results.

We have generated vote-share gradients for all significant parties in Costa Rica from 2002 to 2018. Although our analysis includes all relevant parties, it primarily focuses on three: the National Liberation Party (PLN), the Citizen's Action Party (PAC), and the National Restoration Party (PRN). These parties illustrate the fragmentation of the political spectrum and exemplify distinct political agendas (see Figure B.40 for more details on the parties' ideologies and positions).

The PLN and the Social Christian Unity Party (PUSC) were central to the two-party system era. Given its historical significance as a winner in the 1948 civil conflict, consistent identity since 1951, and electoral successes, the PLN is considered representative of the old order and favoured by a segment of the economic elite. Conversely, the PAC emerged as a significant player by breaking the two-party dominance in 2002. Claiming to uphold the centre-left/social democratic tradition, especially after the PLN's perceived shift to the right, the PAC garnered support from the professional and academic elite, though not from the economic elite.

The PRN's rise in the 2014 and 2018 elections marks a significant shift in Costa Rican politics. Despite losing to the PAC in the second round of the 2018 election, the PRN's strong performance highlighted the emergence of a new political force: the evangelical Christian populist movement. This shift indicates changing political allegiances influenced by income and globalisation shocks. Thus, these three parties—PLN, PAC, and PRN—serve as prime examples of evolving political loyalties in Costa Rica, providing insight into how economic factors and globalisation influence electoral behaviour.

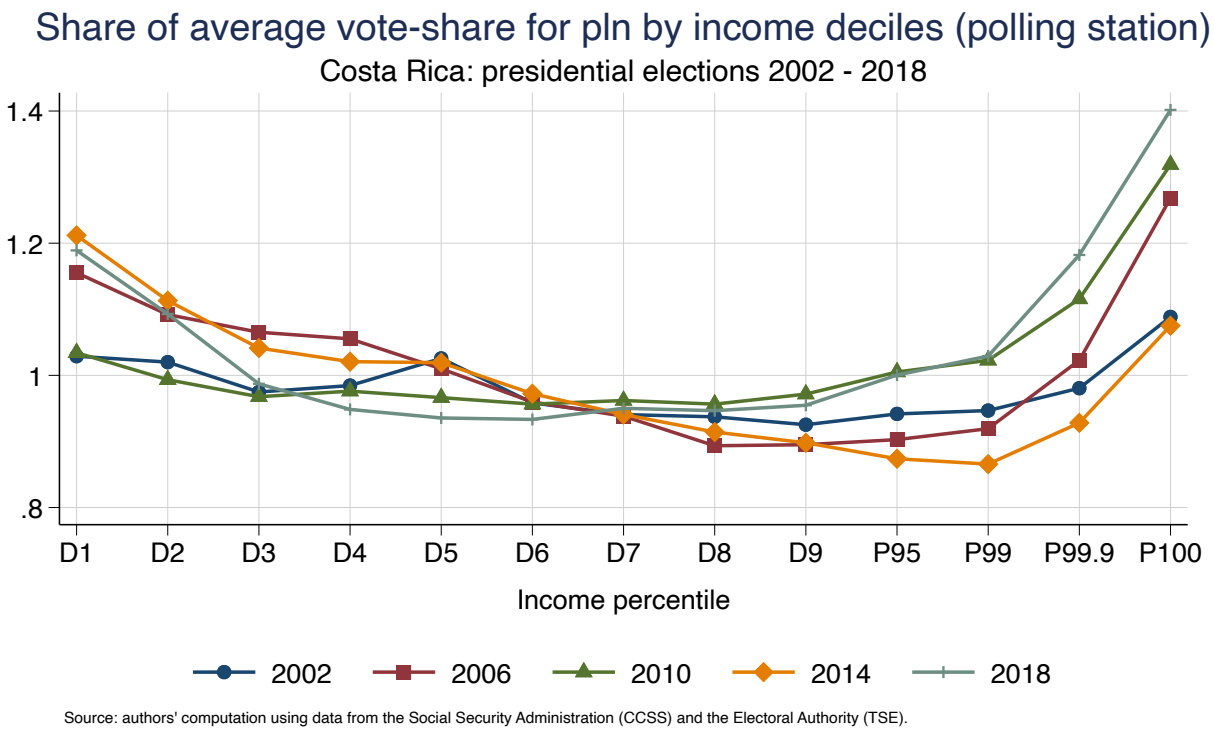


Table 29: Share of average vote-share PLN (decile polling station level / national level).

5.1.1 PLN (National Liberation Party)

Figure 29 illustrates a negative income-vote-share gradient for the National Liberation Party (PLN). Two key observations emerge: PLN's vote shares decline as the average income per polling station increases. Secondly, the economic elite, represented by the top 1 per cent and top 0.1 per cent income brackets, tend to vote for PLN more than the national average. The gradient, relatively flat in 2002, steepened significantly by 2014, indicating that the bottom decile and the top 0.1 per cent have consistently voted above average for PLN. This trend is further contextualised with historical data from political attitudes surveys by LAPOP, which allows us to produce income-vote-share gradients over the last five decades (see Figure B.47a in the Appendix). These surveys reveal a flat gradient in the 1970s, a positive gradient in the 1980s and 1990s, and a negative gradient from the 2000s. This shift coincides with our administrative data from 2002, highlighting that PLN's income-vote-share gradient has markedly changed from the two-party period to the last two decades.

5.1.2 PUSC (Social Christian Unity Party)

Figure B.44 shows the income gradient for the Social Christian Unity Party (PUSC), the other key player from the two-party period. Unlike PLN, PUSC displays a consistently negative income gradient, except for 2018, which is its best electoral result in two decades. Historical data from LAPOP surveys indicate a negative gradient for PUSC in the 1990s and 2000s, with a positive gradient in the 2010s likely driven by the 2018 electoral performance (see Figure B.47b in the Appendix). While PLN and PUSC had different income-vote-share gradients during the two-party period, recent decades show similar voter preferences aligned with income levels.

5.1.3 Historical Transition of Income-Vote-Share Gradients

To further understand the historical transition of PLN and PUSC gradients, we utilise administrative district voting data from the 1994 and 1998 elections. By ordering districts according to the average income in 2002, we estimate income-vote-share gradients using electoral results from 1994 and 1998. Figure B.48a illustrates the transition from a flat gradient in 1994 to a negative gradient in 2002, with increasing support for PLN from lower-income voters. This trend consolidates in Figure B.48b, covering 2010 to 2022, where the top income brackets also prefer PLN. However, the wealthiest districts (top 0.1 per cent) do not necessarily favour PLN. Conversely, Figures B.49a and B.49b reveal a generally flat gradient for PUSC, except for a very negative gradient in 2006 and a positive one in 2018.

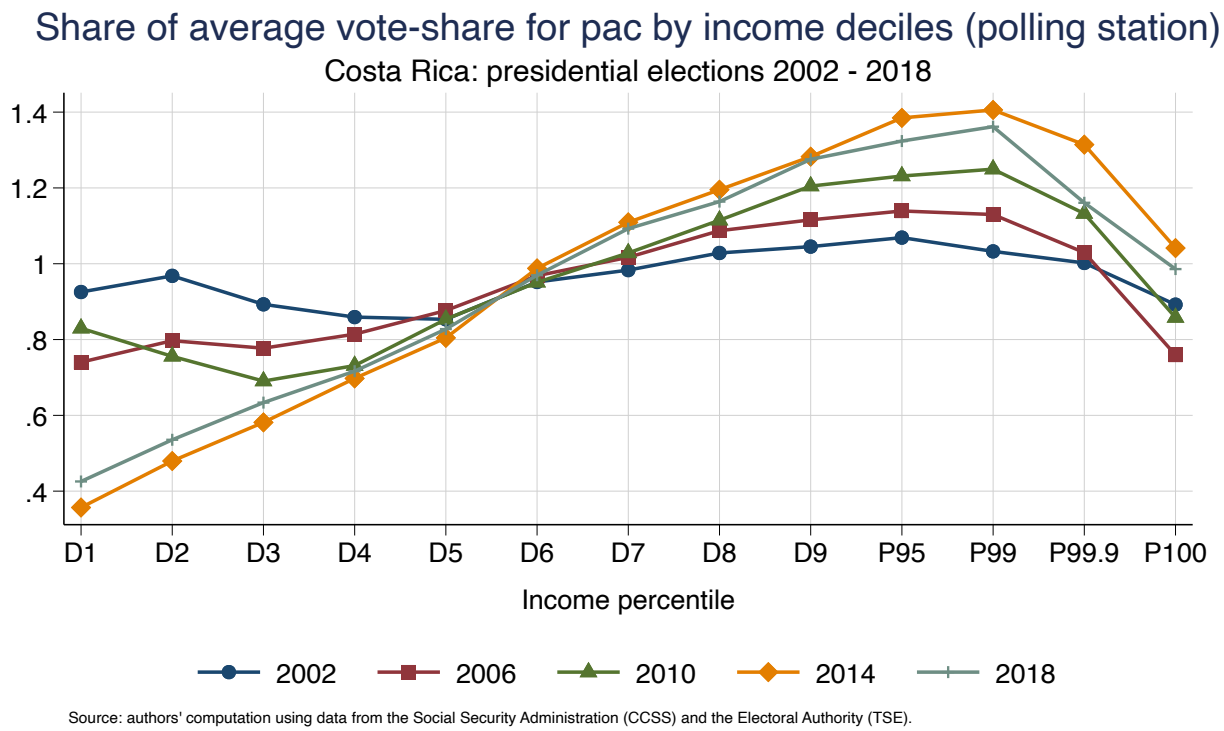


Table 30: Share of average vote-share PAC (decile polling station level / national level).

5.1.4 PAC (Citizen's Action Party)

Figure 30 illustrates the income-vote-share gradient for the PAC. Two notable features stand out: firstly, the gradient is markedly positive up to the 95th or 99th percentile; secondly, at the top of the income distribution (the top 1 per cent and top 0.1 per cent), PAC is distinctly not preferred by the economic elite. This finding is intriguing as PAC, a new social democratic party, exhibits an income-vote-share gradient like that of PLN in previous decades, where higher income correlates with more votes. However, during our analysis period, the top income brackets favour PLN. Considering that the very top of the income distribution constitutes a minority of total voters, though influential in other respects, it appears that PAC has occupied the political space vacated by PLN at the turn of the century.

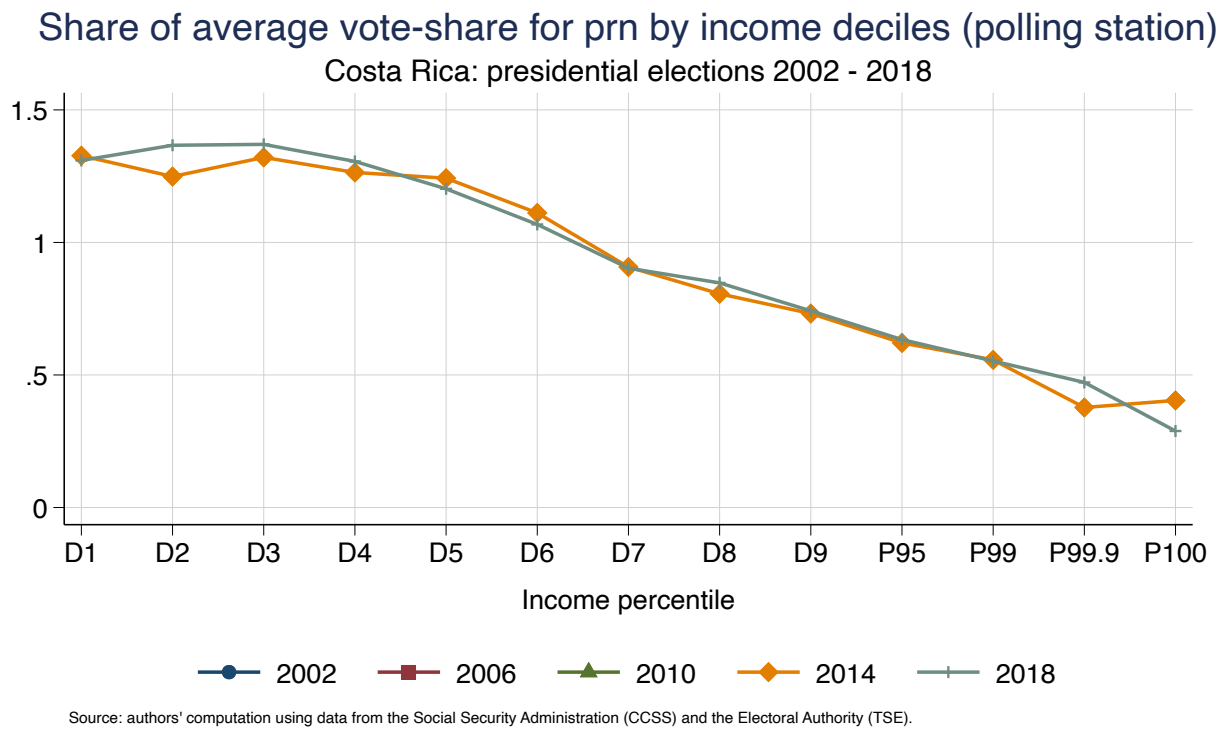


Table 31: Share of average vote-share PRN (decile polling station level / national level).

5.1.5 PRN (National Restoration Party)

Figure 31 displays the PRN's income-vote-share gradient. The gradient is unequivocally negative in the two elections covered by our administrative data, indicating that as income increases, the populist evangelical Christian option is less preferred by voters. This result aligns with the current gradient of PLN, suggesting that PRN and PLN compete for the same voter groups in relative income.

5.1.6 Other Parties

The income-vote-share gradients for other parties also provide insights. Figure B.45 shows voter preferences for the Libertarian Movement (ML), indicating a generally negative income-vote-share relationship, with vote shares increasing in the first three deciles, then decreasing and occasionally increasing again at the top of the distribution, such as in 2014. Although it is challenging to draw definitive conclusions from this graph alone, it sug-

gests a complex relationship between income and voting behaviour for ML. Conversely, the Broad Front's (FA) gradient has shifted from increasing in 2010 to markedly negative in 2014 and primarily flat in 2018, with a notable peak in the first decile. While conclusive interpretations are complex, the data suggest that the Leftist party has been more successful than the PAC in attracting voters at the bottom of the income distribution.

In conclusion, the transformation of political parties from the two-party period, particularly PLN, is evident in the changing direction of their income-vote-share gradients. PLN now faces two significant challenges: firstly, it has lost a substantial portion of its historical base, which was captured by other parties such as PAC until 2018; secondly, with its new gradient, it faces intense competition from new political actors like PRN. This evolving political landscape will be explored further in the following two sections, providing deeper insights into the interplay between income, globalisation shocks, and voter behaviour in Costa Rica.

5.2 Income levels and vote shares:

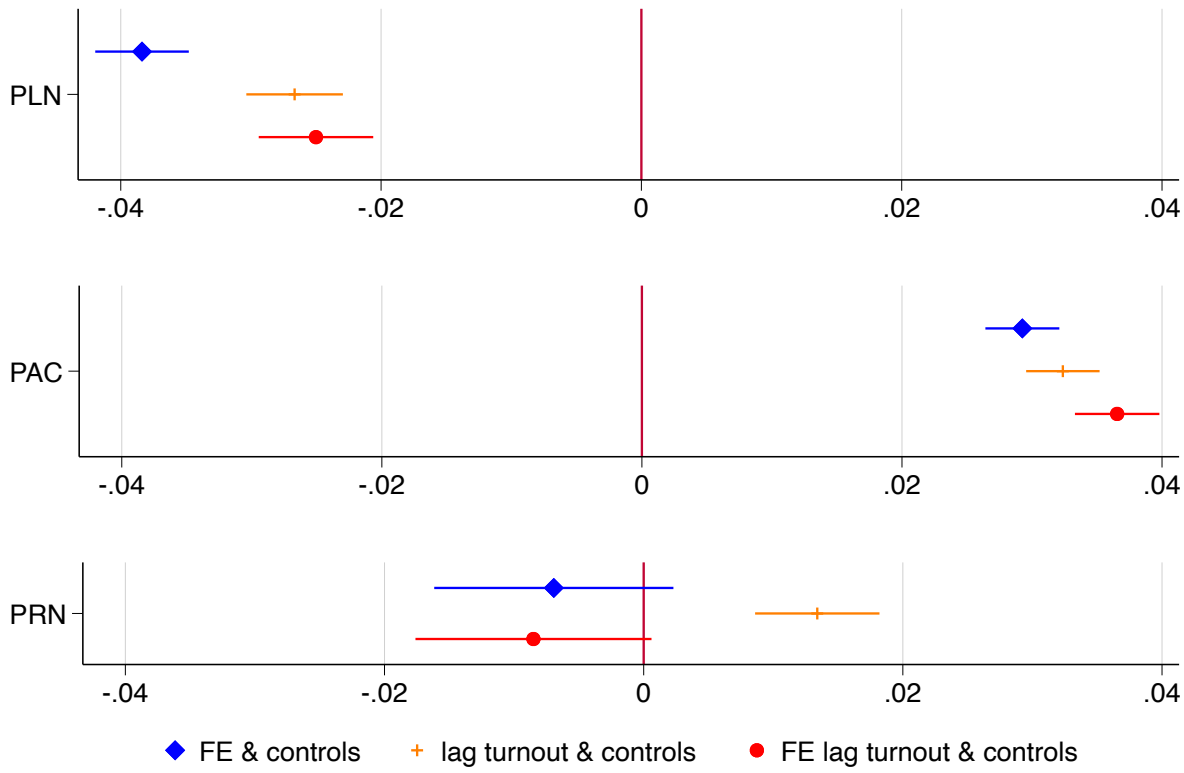
This section delves into the direct relationship between income levels and vote shares for political parties. Our primary focus is on the three main parties: the National Liberation Party (PLN), the Citizen's Action Party (PAC), and the National Restoration Party (PRN). However, we also present electoral results for all significant actors from 2002 to 2018 (see Figures B.50 to B.56 in the Appendix).

We conduct a series of fixed-effects regressions with vote shares as the dependent variable and log-average wage as the key independent variable (see equation 19). Figure 32 summarises the main results for our three focal parties. The analysis reveals that the vote share for PLN consistently decreases with rising income across all specifications, with the effect being statistically significant and substantial in magnitude. Conversely, the vote share for PAC increases with income, also displaying statistically significant coefficients of a similar magnitude but in the opposite direction to those of PLN.

$$\text{vote share}_{jt} = \gamma_j + \delta_t + \beta_1 \text{log average wage}_{jt} + \beta_2 \text{turnout}_{j(t-1)} + \theta X_{jt} + u_{jt} \qquad (19)$$

The coefficients for PRN are less definitive. They are negative in the presence of fixed effects and controls, albeit barely significant when standard errors are clustered. Without fixed effects, the coefficients tend to be positive and significant. It is crucial to note that PRN is only represented in two elections within our dataset, resulting in lower statistical power than other parties. Despite these limitations, we tentatively conclude that the effect of income on votes for PRN is negative.

For other political parties, the analysis shows that the effect is negative and significant for the Social Christian Unity Party (PUSC) in our most stringent specification (Column 7 in Figure B.51). For the Libertarian Movement (ML), the vote share is negative with fixed effects and controls (Columns 3 and 5). However, the effect is nearly zero and insignificant in the fully saturated regression (Column 7, Figure B.53). The vote share for the Broad Front (FA) increases with income in all specifications except the one without fixed effects or polling station-level controls (Column 4 in Figure B.54). Finally, vote shares for other smaller parties not included in this detailed analysis appear to be positively related to income across all specifications (Figure B.56).



Controls: public sector, skilled and unskilled.

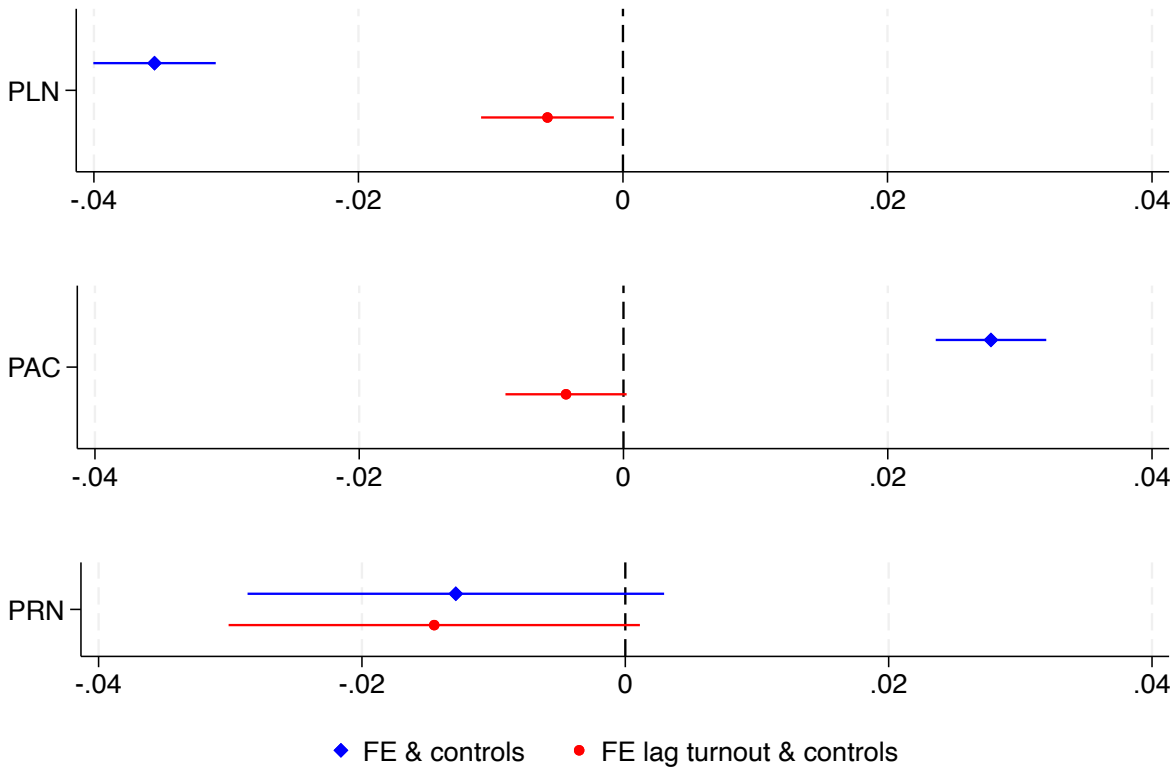
Table 32: Income and votes for PLN, PAC & PRN.

5.3 Random assignment to polling stations

This section builds on the methods and results outlined in Section 4.2 in Chapter 1. It leverages a unique feature of the data for causal identification: within a polling centre, such as a school, individual voters are assigned to different polling stations based on alphabetical ordering. While socioeconomic characteristics are not exogenous to neighbourhoods because individuals choose where to live, the assignment to polling stations within these centres is effectively random. This randomness is crucial because it is implausible to argue that specific letters of the alphabet are correlated with higher levels of income or other socioeconomic characteristics. Therefore, we exploit this particularity to identify the effect of changes at the polling station level. To isolate changes in average income at the polling station level, we use the specification in Equation 20.

$$\text{vote share}_{jPSt} = \gamma_{PC} + \delta_t + \beta_1 \text{log average wage}_{PSt} + \beta_2 \text{share turnout}_{PS(t-1)} + \theta X_{PSt} + u_{PSt} \tag{20}$$

In this analysis, we estimate regression models analogous to those depicted in Figure 32 at the polling station level. The primary feature of these fixed effects models is polling centre-level fixed effects, which allows us to estimate deviations at the polling station level from the overall trend at the polling centre. This approach is supported by including γ_{PC} in Equation 20. Figure 33 corroborates our previous findings: the log-average wage at the polling station level is negatively related to vote shares for the PLN and PRN. Conversely, it is positively associated with vote shares for PAC when using a specification with fixed effects and controls, thus confirming our prior results. For the complete set of results, refer to Tables B.57a to B.60 in the Appendix. These tables illustrate the negative correlation between income and vote shares for PUSC, a positive correlation for ML and FA, and a negative correlation again for PRN. In summary, by exploiting the random dimension in our data, we confirm the relationship between average income and vote shares for the main political agendas in our analysis. This finding reinforces the validity of our approach and the robustness of our results across different political parties.



Controls: public sector, skilled and unskilled.

Table 33: Income and votes for PLN, PAC & PRN (with polling centre FE).

5.4 From individual-level income changes to inequality

Our analysis continues with a series of fixed-effect regressions to identify the impact of position changes within the income distribution on voting behaviour (see Equation 21). We classify polling stations as "climbers" if they improve their income from one election to another and "droppers" if they worsen their positions between periods. We estimate the share of climbers and droppers at the polling station level, extending the methodology used in Chapter 1 but focusing on polling station-level data. Moreover, we examine the effects of changes in three magnitudes: 10 percentiles, 20 percentiles, and 30 percentiles. This approach allows us to understand how the propensity to vote changes when individuals gain or lose 10, 20, or 30 percentiles in their income distribution ranking. In addition to presidential elections, this part of the analysis also considers local elections.

$$\text{vote share}_{kt} = \gamma_k + \delta_t + \beta_1 \text{share climb}_{kt} + \beta_2 \text{turnout}_{k(t-1)} + \theta \text{logavewage}_{kt} + u_{kt} \quad (21)$$

Figure 34 presents the coefficients for our preferred specifications for the three main parties: PLN, PAC, and PRN. The results indicate that polling stations with more climbers tend to vote more for PLN, while those with an increasing share of droppers tend to vote less. A similar pattern is observed for PAC; though the coefficients are smaller in magnitude, they are still statistically significant. These findings suggest that the PLN and the PAC benefit from voters who climb the income distribution, whereas they lose support from those who experience relative income losses. In contrast, the situation for PRN is markedly different. Polling stations with a higher share of climbers tend to lose vote shares for PRN, while those with more droppers gain votes significantly. Both coefficients are statistically significant and substantial in magnitude.

Drawing an analogy to economic goods, if political parties were goods, PLN and PAC would be considered normal goods, whereas PRN would be classified as an inferior good. This analogy aligns with the income-vote-share gradients discussed in Section 5.1. However, the voting behaviour for PLN is surprising: despite exhibiting a negative gradient, polling stations with more climbers tend to vote more for PLN. One possible explanation for this anomaly is the party's appeal to the economic elite. Consequently, polling stations with more climbers may increasingly resemble the voting behaviour of the top 1 per cent. While further research is needed to substantiate this claim, PLN's current centre-to-centre-left political position and generally business-friendly stance offer plausible explanations for the observation that an increase in "winners" ("climbers") correlates with more votes for PLN.

Figures B.61 to B.67 present the regression results for other political parties, further elucidating the relationship between income distribution movements and voting behaviour. PUSC are like those observed for PRN. Specifically, votes for PUSC decrease as the share of climbers increases and increase as the share of droppers rises. The voting pattern for the ML resembles that of PLN; an increase in climbers correlates with more votes for ML,

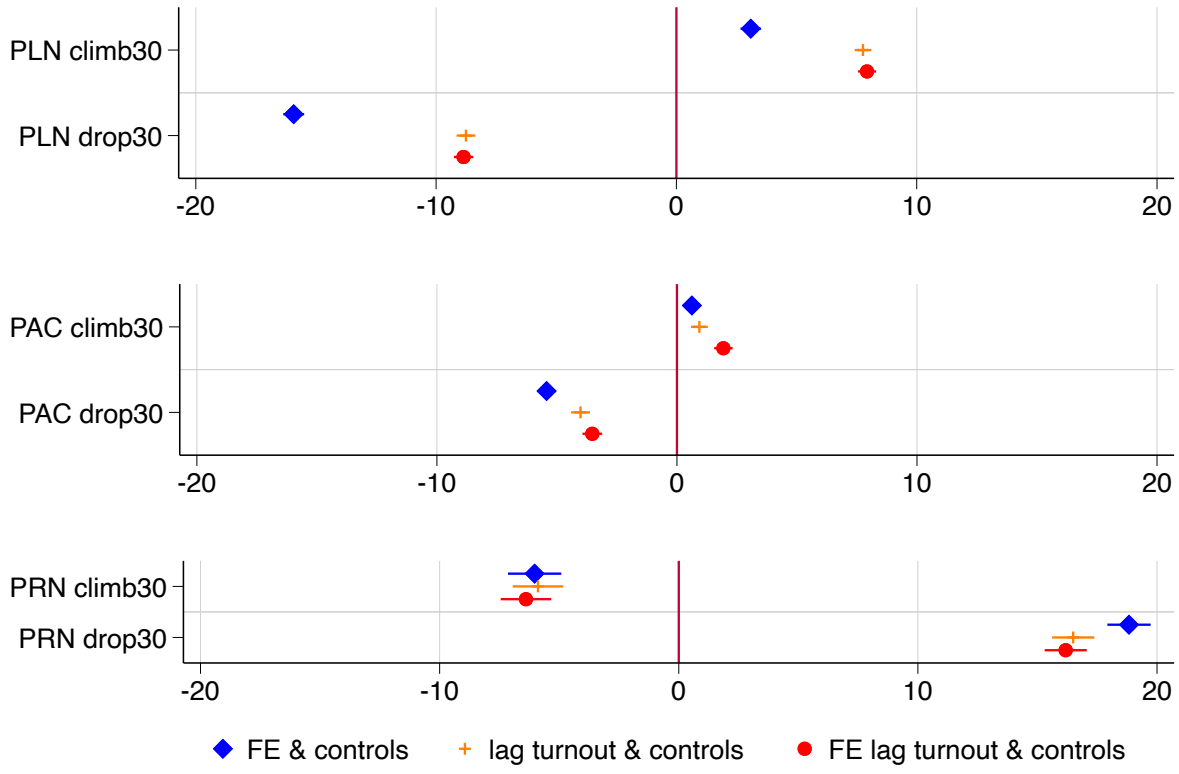
whereas an increase in droppers correlates with fewer votes. This consistency suggests that PLN and ML attract voters who experience upward mobility in the income distribution. The case of the FA is fascinating. Our results in Table B.65 indicate that both the share of climbers and droppers negatively impact voting for FA. This finding could be explained by the shifting shape of FA's income gradient over the years: it was positive in 2010, negative in 2014, and slightly U-shaped in 2018. This suggests that voters at both extremes of the income distribution tend to vote more than average for FA. Finally, other smaller parties tend to attract more voters as the share of droppers increases, while they attract fewer voters as the share of climbers increases. This trend highlights the appeal of these parties to individuals who experience economic setbacks.

5.5 Electoral volatility:

Table 35 delves into the relationship between average income at the polling station level and the Pedersen Index, which quantifies the net change in individual votes for various political parties within the electoral system (Pedersen, 1979). The Pedersen Index serves as a key indicator of electoral volatility (for additional details, see Appendix A.2). Equation 22 exhibits the basic specification of the model. While the direction of the coefficient varies across different model specifications, we find the most robust evidence in favor of a statistically significant negative association between income and electoral volatility in the more constrained models, those incorporating fixed effects and turnout lags (Columns 3 and 7). However, it's noteworthy that the magnitude of these coefficients is relatively modest.

$$\begin{aligned} V_{dt} &= \gamma_d + \delta_t + \beta \text{log PS ave wage}_{dt} + \theta X_{dt} + u_{dt} \\ \text{Pedersen Index: } V &= \frac{\sum_{j=1}^{n} |\Delta P_j|}{2} \end{aligned} \tag{22}$$

This finding carries significant implications for understanding the factors underpinning the unexpected support garnered by some emerging political parties. For instance, it may help elucidate the rise and subsequent electoral success of the Social Democratic



Controls: public sector, skilled and unskilled.

Table 34: "Droppers", "climbers" & votes for PLN, PAC & PRN.

Progress Party (PPSD), an outsider, in the 2022 election. In essence, the uptick in electoral volatility, driven by social dissatisfaction stemming from adverse income shocks, may partially account for the emergence of new political forces and the diminishing influence of established parties. This phenomenon aligns with the research conducted by Eichengreen et al. (2021) in a distinct context.

Figure B.42 further illustrates the trajectory of aggregate volatility in Costa Rica, as measured by the Pedersen Index. Notably, volatility has been on an upward trajectory since the 2000s, following a period of exceptionally low values during the 1980s and 1990s. This temporal pattern in electoral volatility coincides with the advent of the multiparty system in 2002, marking a significant departure from the previously entrenched two-party system over the preceding two decades. Our findings suggest that polling stations experiencing positive income gains from one election to the next tend to exhibit relatively stable voting preferences. In a future iteration of this paper, we intend to introduce a Bartik instrument that leverages polling station-level industry shares and international prices of agricultural products, akin to Section 4.3. This instrumental variable approach will enable us to draw causal inferences regarding the impact of income changes on electoral volatility.

6 Taking stock

Our study explores the relationship between globalisation, income inequality, and electoral outcomes in Costa Rica. We examine how these factors influence voter turnout by leveraging detailed individual-level data. Our findings align with existing literature, highlighting a robust positive correlation between income and individual-level voter turnout. Additionally, we observe a positive link between changes in income and turnout at both individual and polling station levels. The instrumental variable (IV) strategy enables us to establish a causal relationship between income fluctuations and voter turnout, validating the positive correlation between income levels and voter participation. The IV analysis confirms that changes in international agricultural prices significantly impact agrarian workers' wages and voter turnout.

Effects of changes in income on electoral volatility in presidential elections, 2002-2018 (polling station level)

	(1) OLS	(2) FE	(3) FE lag	(4) cluster lag	(5) FE controls	(6) lag controls	(7) FE lag controls
log_PS_ave_wage	0.003***	0.001**	-0.000**	0.001***	0.001	-0.000*	-0.001***
	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)
L.share_turnout			0.033***	0.041***		0.039***	0.033***
			(0.003)	(0.002)		(0.002)	(0.003)
Observations	25,712	25,712	25,173	25,173	25,712	25,173	25,173
r2_o	0.001	0.001	0.124	0.132	0.063	0.140	0.121
Polling station-level controls					YES	YES	YES
Clustered SE		YES	YES	YES	YES	YES	YES
Turnout presidential (t-1)			YES	YES		YES	YES
Year FE		YES	YES		YES		YES
Polling station FE		YES	YES		YES		YES

Standard errors in parentheses * p<0.1 ** p<0.05 *** p<0.01
Controls: public sector, skilled and unskilled.

Table 35: Income and electoral volatility (polling station-level).

6.1 Income Shocks and Turnout

Our analysis reveals that voter behaviour changes notably across income levels, with turnout increasing in a non-monotonic manner as income rises. Over time, the income-turnout gradient has pivoted, decreasing turnout among lower-income deciles and increasing turnout among higher-income deciles. Moreover, our results indicate that province-level inequality does not significantly influence voter turnout, whereas county-level inequality has a substantial impact. This suggests that smaller geographic divisions are more relevant for understanding the effects of economic disparities on political participation.

We also observe a U-shaped relationship between inequality and income quintiles in contexts of high inequality and an inverted U-shape in lower inequality contexts. Specifically, the lowest and highest income quintiles require greater inequality to achieve turnout levels similar to the middle quintile when Gini coefficients are high. Conversely, lower inequality levels see the middle quintile voting more. Increasing inequality may mobilise the poorest and wealthiest voters while potentially demobilising those in the middle.

Downward mobility within the income distribution is associated with increased voter turnout, especially among those experiencing the most significant drops. Individuals moving from higher to lower income quintiles show a marked increase in voting likelihood, suggesting that economic setbacks motivate electoral participation as a form of protest or discontent with current policies.

Upward mobility correlates with lower voter turnout, while downward mobility correlates with higher turnout. This pattern is significant across various income quintiles, particularly the extremes. This indicates a rise in inequality and a corresponding decrease in aggregate voter turnout. The positive relationship between inequality and turnout remains robust, even when controlling for the Social Development Index.

6.2 Income Shocks and vote-shares

The analysis of income shocks on electoral outcomes reveals several key insights. Firstly, the transformation of political parties from the two-party period, particularly PLN, is evident in the changing direction of their income-vote-share gradients. PLN now faces two significant challenges: it lost a substantial portion of its historical base, captured by other parties such as PAC until 2018, and it faces intense competition from new political actors like PRN.

If political parties were goods, PLN and PAC would be considered normal goods, whereas PRN would be classified as an inferior good. Surprisingly, despite exhibiting a negative gradient, polling stations with more climbers tend to vote more for PLN. One possible explanation for this anomaly is the party's appeal to the economic elite. Consequently, polling stations with more climbers may increasingly resemble the voting behaviour of the top 1 per cent.

We draw additional conclusions on other electoral outcomes beyond the results on vote shares for specific parties. Firstly, concerning income and electoral outcomes, we show that polling stations experiencing positive income gains tend to exhibit more stable voting preferences from one election to another (less electoral volatility). Moreover, areas experiencing such income gains tend to show a declining inclination to support traditional political parties of the past, such as PLN and PUSC.

A Annex

A.1 Effective number of electoral parties

The effective number of electoral parties is calculated as:

$$\frac{1}{\sum v_i^2}$$

- where vi is the percentage of the vote received by the ith party Laakso and Taagepera (1979).
- The "corrected" effective number of electoral parties is based on the methods of bounds suggested by Taagepera (1997).

A.2 Pedersen Index

→ Following Pedersen (1979):

$$V = \frac{\sum_{i=1}^{n} |P_{i,t+1} - P_{i,t}|}{\sum_{i=1}^{n} P_{i,t+1} + \sum_{i=1}^{n} P_{i,t}}$$

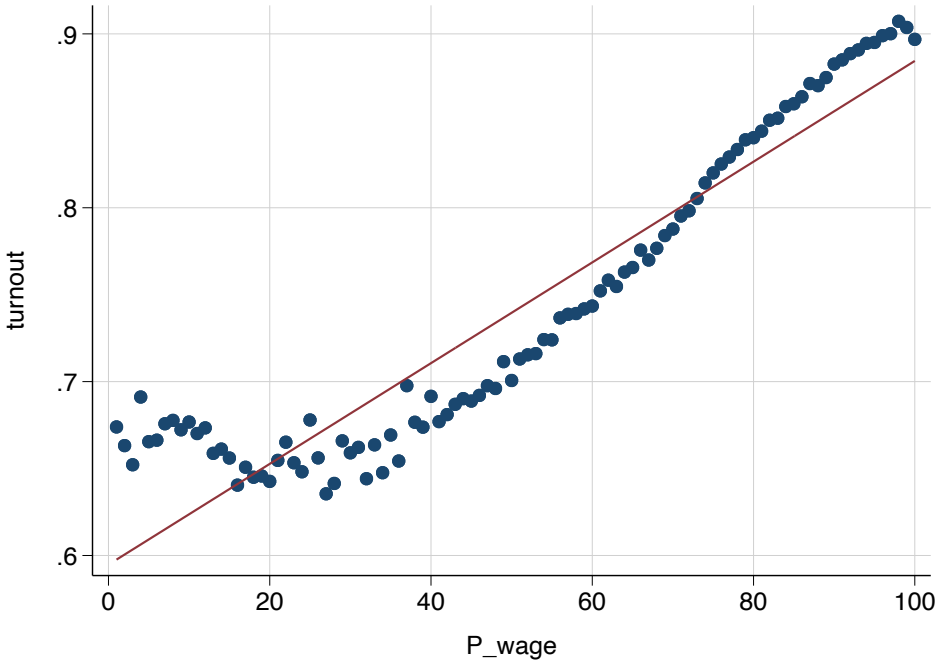
- It is the sum of the net change of party vote shares (before to after) divided by the sum of all party votes (before and after).
- The formula can therefore be simplified to:

$$V = \frac{\sum_{i=1}^{n} |P_{i,t+1} - P_{i,t}|}{2}$$

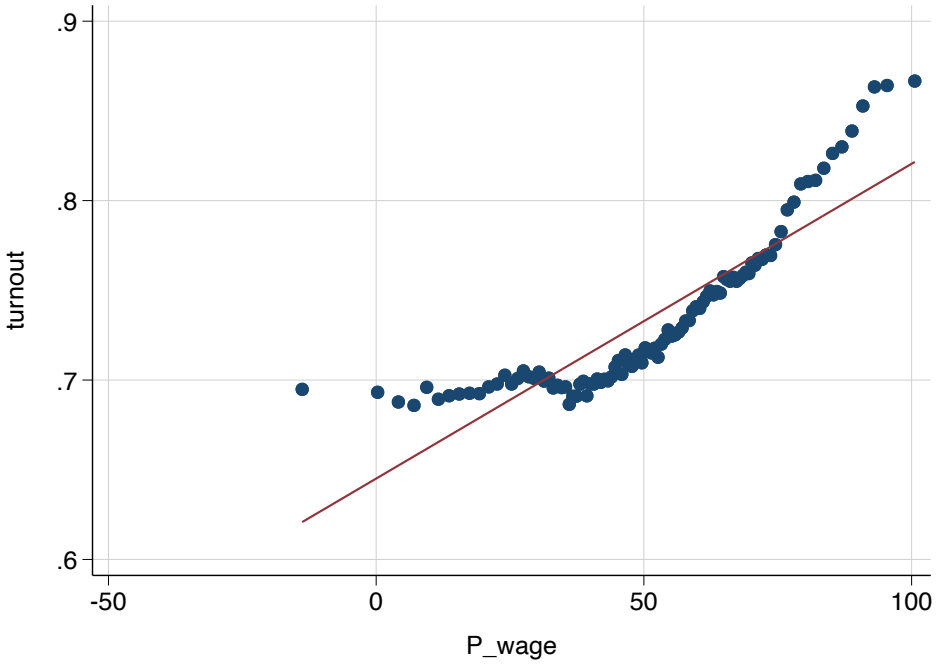
- Or simply:

$$V = \frac{\sum_{i=1}^{n} |\Delta P_i|}{2}$$

B Appendix



(a) No controls.



(b) Controls: public sector, age, skilled and unskilled.

Table B.1: Income percentiles and turnout: binned scatterplots with/without controls.

	(1) OLS	(2) FE	(3) FE lag	(4) FE controls lag
10 deciles of wage	0.029*** (0.000)	0.003*** (0.000)	0.021*** (0.000)	0.013*** (0.000)
L. turnout			0.223*** (0.001)	0.231*** (0.001)
Observations	4,451,747	4,451,747	3,338,994	2,451,591
r2_o	0.036	0.036	0.173	0.176
Individual level controls				YES
Turnout presidential (t-1)			YES	YES
Year FE		YES	YES	YES
Individual FE		YES		

Standard errors in parentheses * p<0.1 ** p<0.05 *** p<0.01
Controls: public sector, age, skilled and unskilled.

Table B.2: Relative income and turnout: linear probability.

	(1) OLS	(2) Clustered	(3) Clustered lag	(4) FE lag	(5) Controls	(6) Controls lag	(7) Controls lag FE
10 quantiles of wage	0.157***	0.190***	0.136***	0.137***	0.122***	0.089***	0.089***
	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
L. turnout			1.791***	1.795***		1.772***	1.781***
			(0.004)	(0.003)		(0.004)	(0.004)
Observations	4,451,747	4,451,747	3,338,994	3,338,994	3,029,723	2,451,591	2,451,591
Individual level controls					YES	YES	YES
Clustered SE		YES	YES		YES	YES	YES
Turnout presidential (t-1)			YES	YES		YES	YES
Year FE				YES			YES
Individual FE				YES			YES

Standard errors in parentheses * p<0.1 ** p<0.05 *** p<0.01
Controls: public sector, age, skilled and unskilled.

Table B.3: Relative income and turnout: ordered logit.

Effects of income on turnout in presidential elections, 2002-2018 (individual level)

	(1) FE province	(2) FE county	(3) FE district	(4) FE codigoe	(5) FE junta
logwage	0.010	0.015***	0.016***	0.017***	0.017***
	(0.006)	(0.002)	(0.001)	(0.001)	(0.000)
gini	0.803	0.351***	0.215***	0.140***	0.124***
	(0.437)	(0.101)	(0.034)	(0.020)	(0.005)
Observations	4,451,747	4,451,747	4,451,746	4,450,662	4,450,930
r2_o	0.019	0.025	0.029	0.031	0.030

Standard errors in parentheses * p<0.1 ** p<0.05 *** p<0.01
Clustered standard errors at the same level as Gini coefficients.
Individual and Year fixed effect.

(a) Individual and Year FE, no controls.

Effects of income on turnout in presidential elections, 2002-2018 (individual level)

	(1) FE province	(2) FE county	(3) FE district	(4) FE codigoe	(5) FE junta
logwage	0.035***	0.035***	0.035***	0.034***	0.035***
	(0.002)	(0.001)	(0.001)	(0.001)	(0.000)
L.turnout	0.228***	0.229***	0.229***	0.228***	0.229***
	(0.003)	(0.002)	(0.001)	(0.001)	(0.001)
gini	1.044***	0.573***	0.459***	0.470***	0.380***
	(0.274)	(0.062)	(0.028)	(0.019)	(0.005)
Observations	2,451,591	2,451,591	2,451,591	2,451,135	2,451,108
r2_o	0.177	0.177	0.177	0.177	0.177

Standard errors in parentheses * p<0.1 ** p<0.05 *** p<0.01
Clustered standard errors at the same level as Gini coefficients.
Controls: public sector, age, skilled and unskilled.
Year fixed effect.

(b) Year FE, lag of turnout and controls.

Table B.4: Income, inequality and turnout: other specifications.

	(1) OLS	(2) FE	(3) Year FE	(4) FE cntrls	(5) Year FE cntrls
logwage	0.052***	0.009***	0.053***	0.002	0.033***
	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)
Gini (province)	0.484**	0.716***	0.749***	0.501**	0.744***
	(0.216)	(0.212)	(0.144)	(0.240)	(0.163)
Gini (county)	-0.019	0.035	0.029	0.060	0.089
	(0.118)	(0.128)	(0.070)	(0.112)	(0.064)
Gini (district)	0.006	0.038	0.023	0.029	0.008
	(0.052)	(0.037)	(0.035)	(0.037)	(0.030)
Gini (polling district)	0.506***	-0.075**	0.395***	-0.056*	0.308***
	(0.032)	(0.031)	(0.027)	(0.028)	(0.030)
Gini (polling station)	0.178***	0.092***	0.022**	0.056***	0.021*
	(0.021)	(0.010)	(0.009)	(0.011)	(0.012)
L. turnout			0.219***		0.226***
			(0.002)		(0.002)
Observations	4,450,595	4,450,595	3,338,352	3,029,004	2,451,108
r2_o	0.034	0.021	0.173	0.028	0.178
Individual level controls				YES	YES
Turnout presidential (t-1)			YES		YES
Year FE		YES	YES	YES	YES
Individual FE		YES		YES	

Standard errors in parentheses * p<0.1 ** p<0.05 *** p<0.01
Clustered standard errors at county-level.
Controls: public sector, age, skilled and unskilled.

Table B.5: Income, inequality and turnout (individual-level).

	(1) FE province	(2) FE county	(3) FE district	(4) FE codigoe	(5) FE junta
logwage	0.016	0.021***	0.022***	0.023***	0.023***
	(0.009)	(0.002)	(0.001)	(0.001)	(0.000)
gini	0.818	0.348***	0.206***	0.128***	0.114***
	(0.476)	(0.103)	(0.036)	(0.022)	(0.009)
1.Q_wage	0.149***	0.085***	0.056***	0.045***	0.040***
	(0.032)	(0.014)	(0.008)	(0.006)	(0.005)
2.Q_wage	0.036*	0.024***	0.017***	0.021***	0.009**
	(0.015)	(0.009)	(0.006)	(0.005)	(0.004)
4.Q_wage	0.013	0.010	0.005	0.003	0.001
	(0.022)	(0.008)	(0.006)	(0.005)	(0.004)
5.Q_wage	0.104**	0.039**	0.015*	0.003	0.005
	(0.039)	(0.016)	(0.008)	(0.006)	(0.004)
1.Q_wage # c.gini	-0.310**	-0.153***	-0.090***	-0.067***	-0.052***
	(0.086)	(0.033)	(0.020)	(0.015)	(0.012)
2.Q_wage # c.gini	-0.081*	-0.050**	-0.032**	-0.043***	-0.010
	(0.036)	(0.021)	(0.014)	(0.012)	(0.011)
4.Q_wage # c.gini	-0.036	-0.033*	-0.023*	-0.022*	-0.017*
	(0.051)	(0.019)	(0.013)	(0.012)	(0.010)
5.Q_wage # c.gini	-0.262**	-0.124***	-0.067***	-0.045***	-0.050***
	(0.091)	(0.038)	(0.019)	(0.015)	(0.011)
Observations	4451747	4451747	4451746	4450662	4450930
r2_o	0.014	0.015	0.018	0.018	0.016

Standard errors in parentheses * p<0.1 ** p<0.05 *** p<0.01
Clustered standard errors at the same level as Gini coefficients.
Individual and Year fixed effect.

Table B.6: Interaction income quintiles and Gini (FE & NO controls).

	(1) FE province	(2) FE county	(3) FE district	(4) FE codigoe	(5) FE junta
logwage	0.005***	0.006***	0.005***	0.005***	0.006***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
gini	0.672	0.278***	0.158***	0.096***	0.076***
	(0.565)	(0.100)	(0.035)	(0.021)	(0.012)
1.Q_wage	0.145**	0.072***	0.044***	0.034***	0.025***
	(0.043)	(0.016)	(0.010)	(0.008)	(0.006)
2.Q_wage	0.062**	0.030**	0.023***	0.024***	0.010*
	(0.024)	(0.014)	(0.008)	(0.006)	(0.006)
4.Q_wage	-0.019	-0.003	0.001	-0.003	-0.003
	(0.022)	(0.009)	(0.008)	(0.006)	(0.006)
5.Q_wage	0.069	0.021	0.006	-0.007	-0.006
	(0.042)	(0.013)	(0.010)	(0.008)	(0.006)
1.Q_wage # c.gini	-0.322**	-0.156***	-0.099***	-0.084***	-0.054***
	(0.102)	(0.035)	(0.023)	(0.019)	(0.016)
2.Q_wage # c.gini	-0.147**	-0.071**	-0.056***	-0.062***	-0.020
	(0.053)	(0.031)	(0.018)	(0.016)	(0.014)
4.Q_wage # c.gini	0.038	0.004	-0.005	0.002	0.000
	(0.049)	(0.022)	(0.018)	(0.015)	(0.014)
5.Q_wage # c.gini	-0.173	-0.062**	-0.027	0.001	-0.006
	(0.092)	(0.030)	(0.023)	(0.018)	(0.015)
Observations	3,029,723	3,029,723	3,029,723	3,029,041	3,029,140
r2_o	0.027	0.023	0.021	0.019	0.019

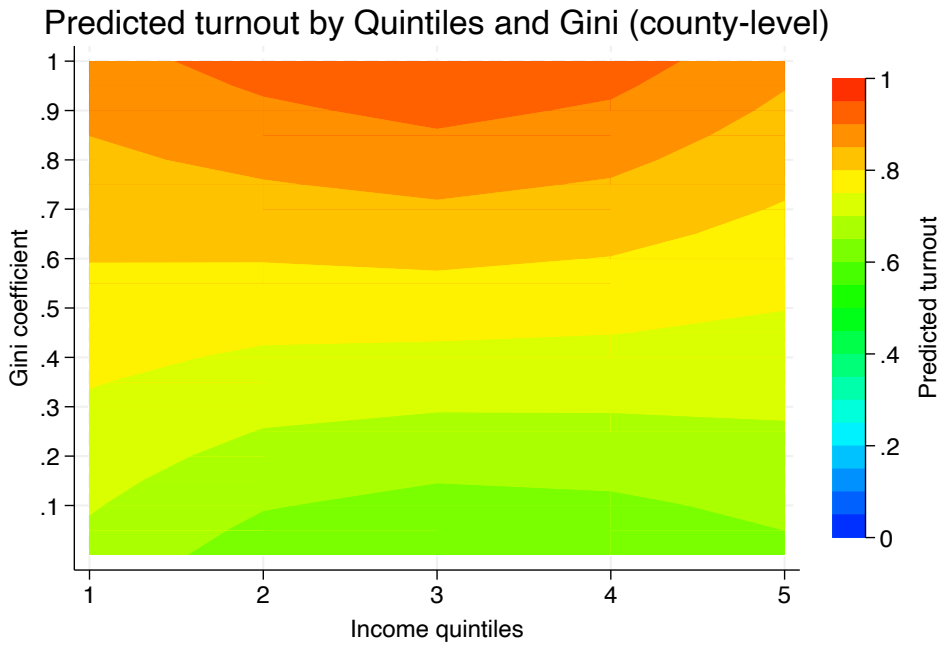
Standard errors in parentheses * p<0.1 ** p<0.05 *** p<0.01
Clustered standard errors at the same level as Gini coefficients.
Controls: public sector, age, skilled and unskilled.
Individual and Year fixed effect.

Table B.7: Interaction income quintiles and Gini (FE & controls).

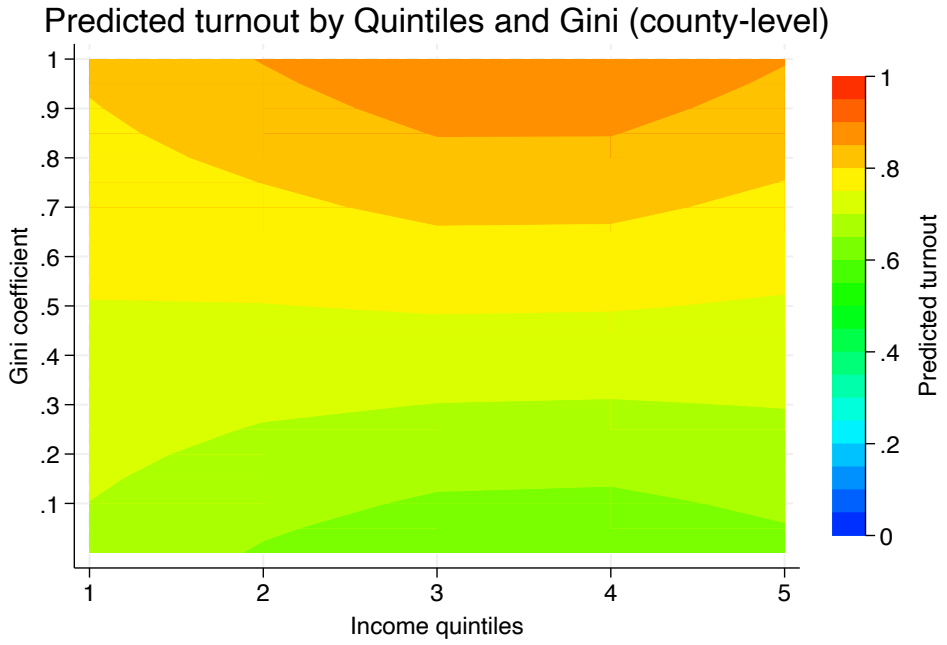
	(1) FE province	(2) FE county	(3) FE district	(4) FE codigoe	(5) FE junta
logwage	0.013*** (0.001)	0.018*** (0.002)	0.022*** (0.002)	0.021*** (0.001)	0.026*** (0.001)
gini	1.301*** (0.293)	0.679*** (0.084)	0.555*** (0.040)	0.606*** (0.025)	0.467*** (0.009)
L.turnout	0.227*** (0.003)	0.228*** (0.002)	0.228*** (0.001)	0.228*** (0.001)	0.229*** (0.001)
1.Q_wage	0.153*** (0.050)	0.040* (0.021)	0.036*** (0.011)	0.051*** (0.007)	0.034*** (0.005)
2.Q_wage	0.126*** (0.015)	0.042*** (0.014)	0.037*** (0.008)	0.044*** (0.006)	0.024*** (0.005)
4.Q_wage	-0.020 (0.043)	-0.000 (0.010)	0.009 (0.008)	0.010* (0.006)	0.009* (0.005)
5.Q_wage	0.167** (0.073)	0.103*** (0.021)	0.077*** (0.012)	0.076*** (0.008)	0.061*** (0.005)
1.Q_wage # c.gini	-0.380*** (0.114)	-0.114** (0.051)	-0.103*** (0.027)	-0.160*** (0.017)	-0.104*** (0.013)
2.Q_wage # c.gini	-0.336*** (0.031)	-0.145*** (0.032)	-0.128*** (0.019)	-0.158*** (0.014)	-0.099*** (0.013)
4.Q_wage # c.gini	0.115 (0.092)	0.057*** (0.022)	0.025 (0.019)	0.014 (0.015)	0.011 (0.012)
5.Q_wage # c.gini	-0.261* (0.156)	-0.145*** (0.047)	-0.114*** (0.030)	-0.130*** (0.021)	-0.112*** (0.013)
Observations	2,451,591	2,451,591	2,451,591	2,451,135	2,451,108
r2_o	0.178	0.178	0.177	0.178	0.177

Standard errors in parentheses * p<0.1 ** p<0.05 *** p<0.01
Clustered standard errors at the same level as Gini coefficients.
Controls: public sector, age, skilled and unskilled.
Individual and Year fixed effect.

Table B.8: Interaction income quintiles and Gini (Year FE & lag turnout).

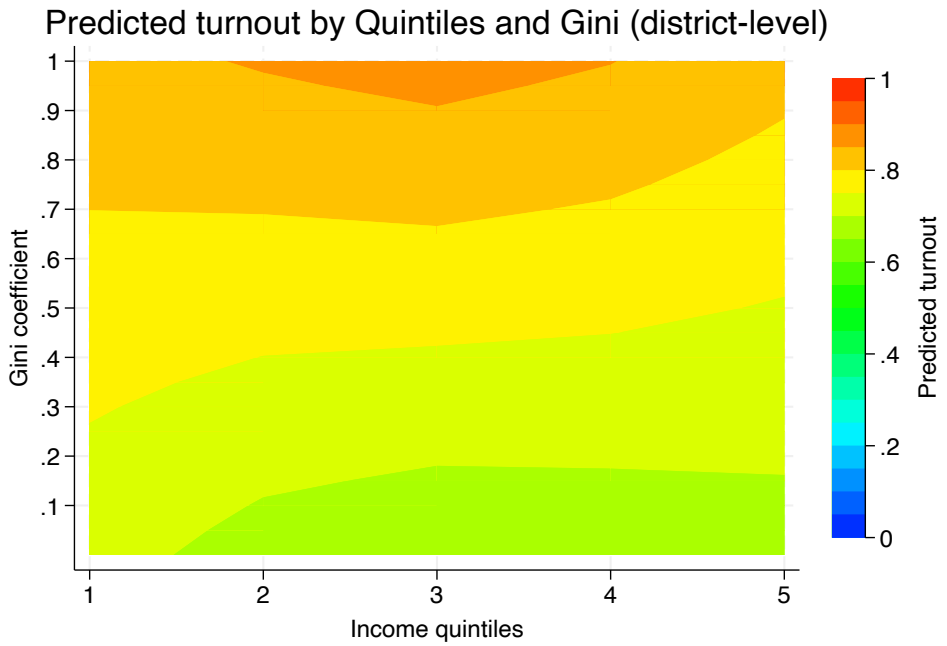


(a) FE & NO controls.

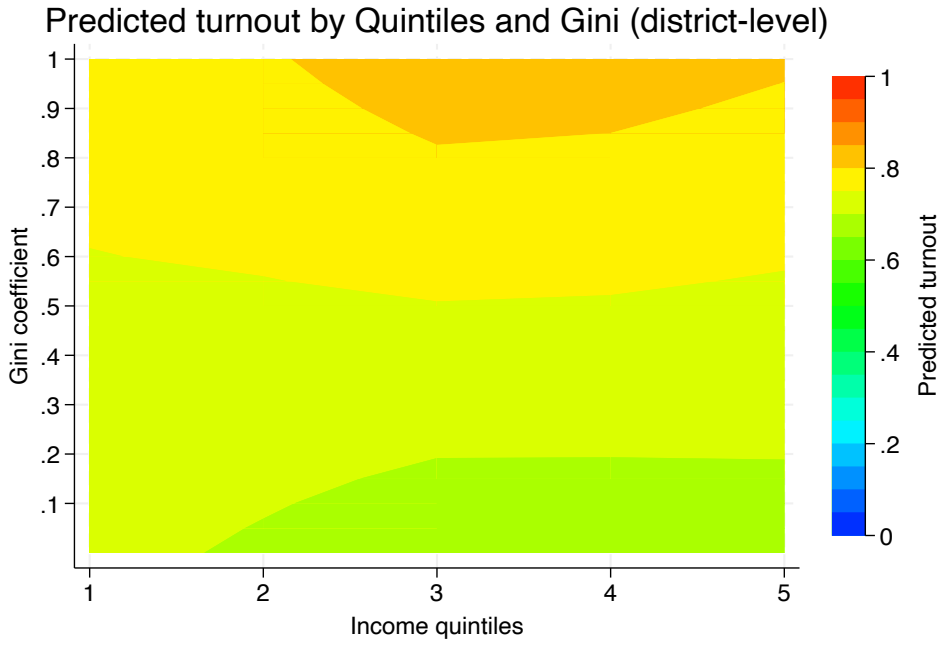


(b) FE & controls.

Table B.9: Interaction income quintiles and Gini (county-level).

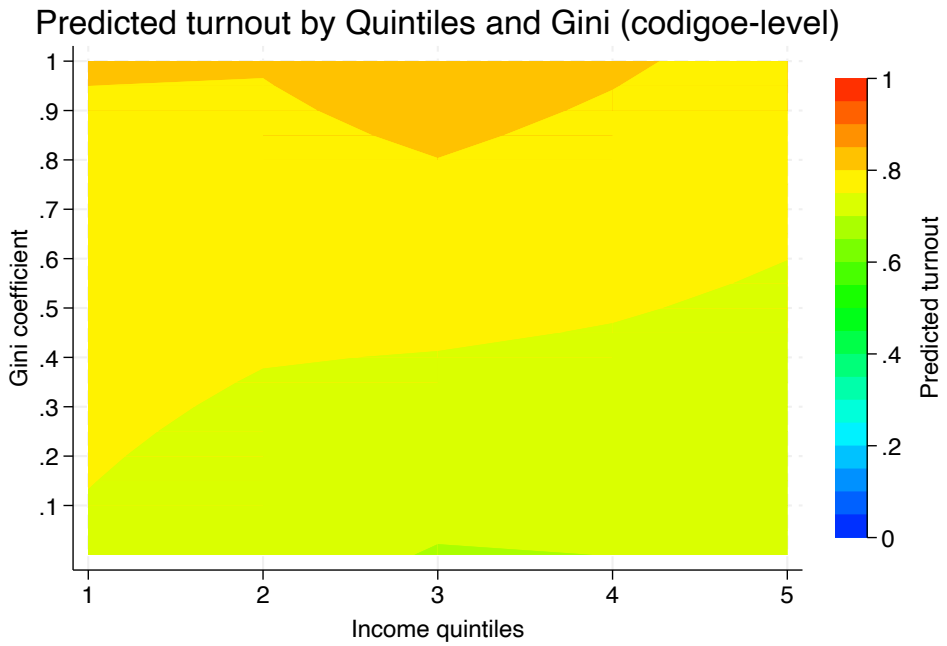


(a) FE & NO controls.

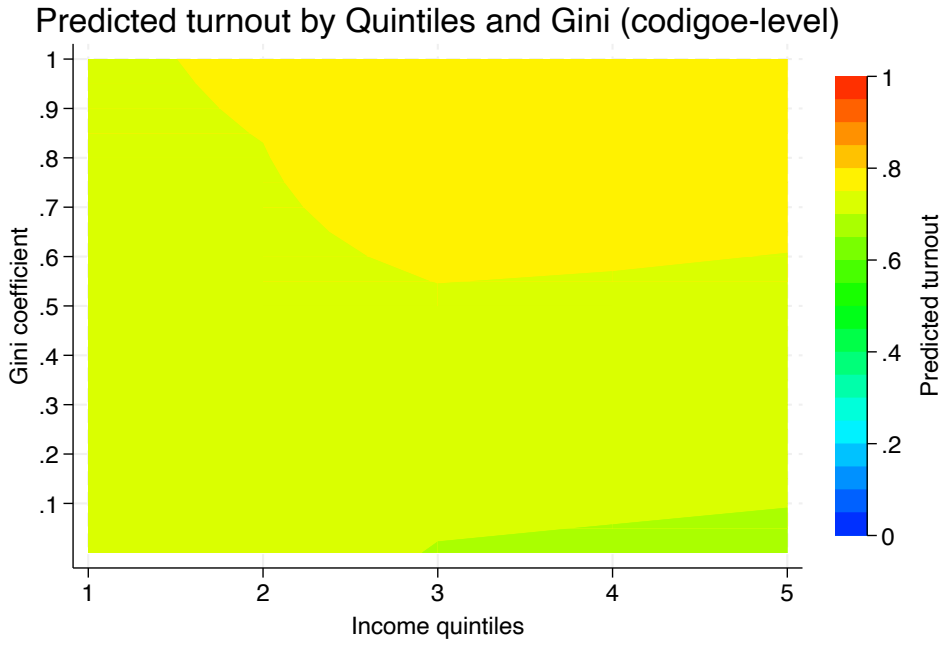


(b) FE & controls.

Table B.10: Interaction income quintiles and Gini (district-level).

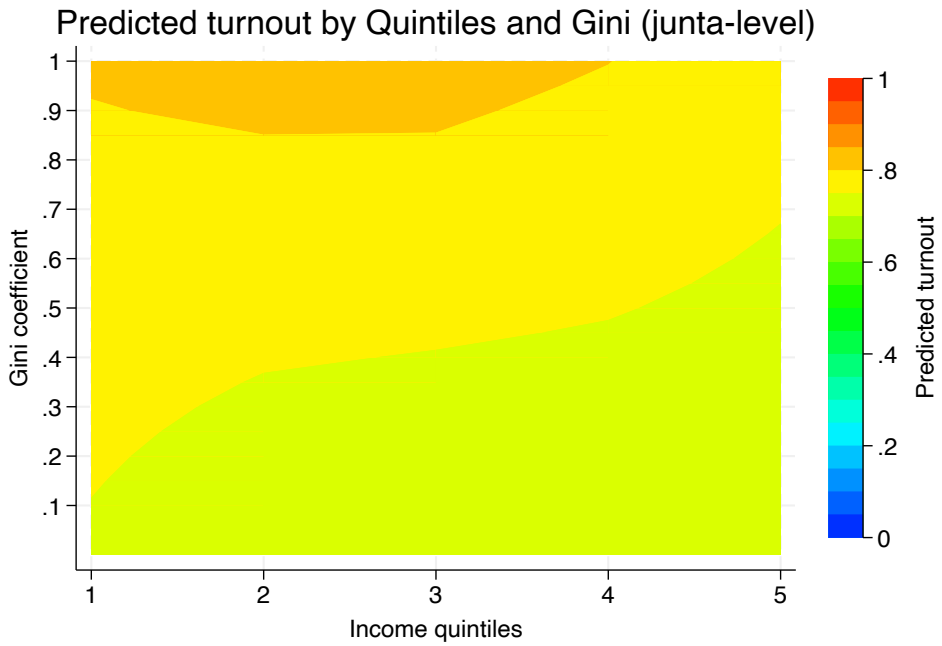


(a) FE & NO controls.

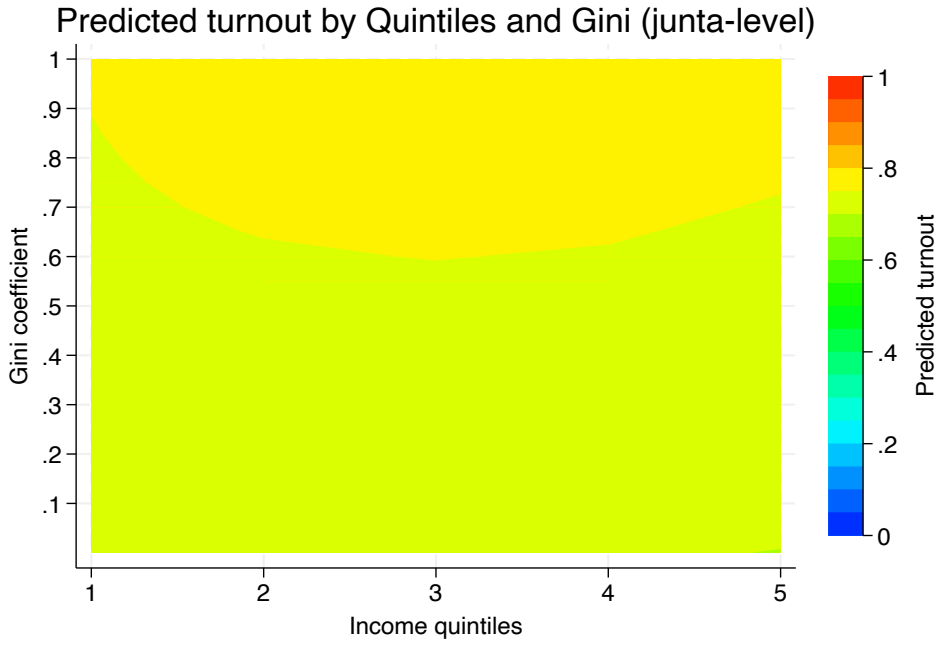


(b) FE & controls.

Table B.11: Interaction income quintiles and Gini (Polling district-level).

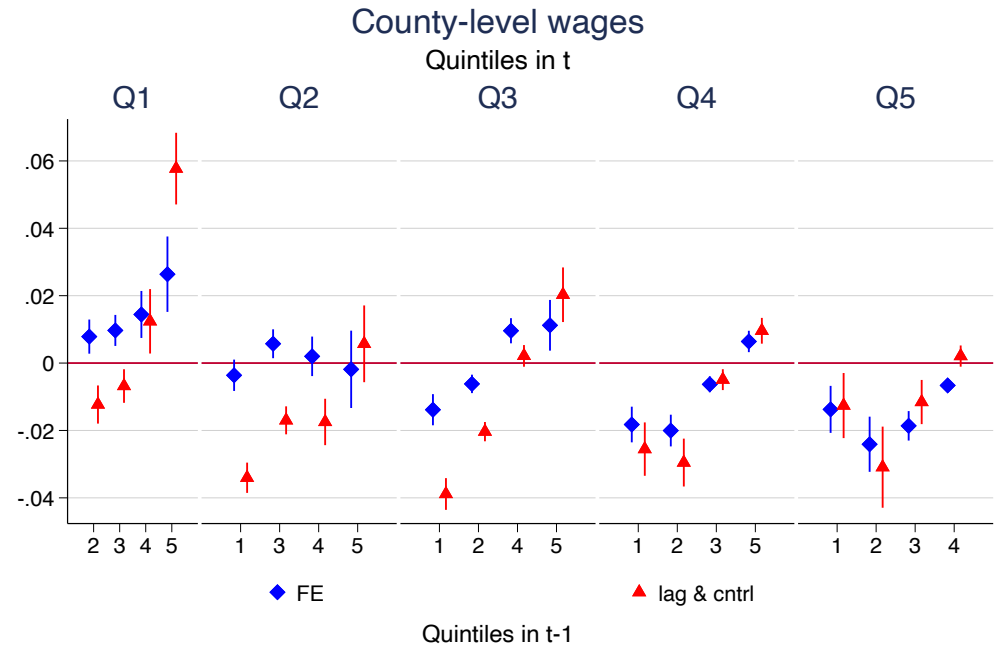


(a) FE & NO controls.



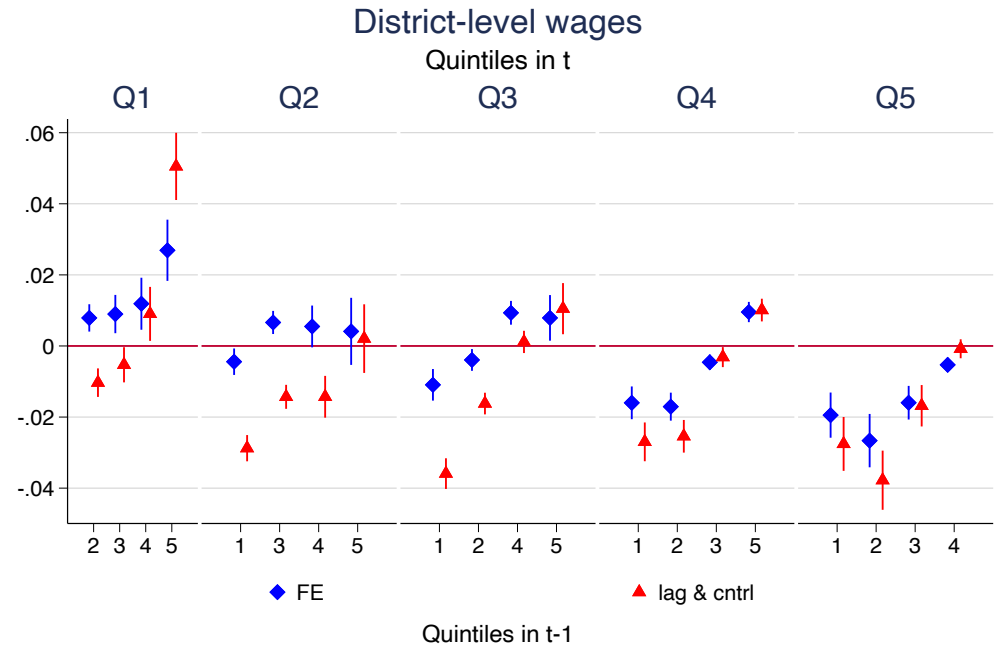
(b) FE & controls.

Table B.12: Interaction income quintiles and Gini (Polling station-level).



Controls: logwage, age, public sector, skilled and unskilled.
Clustered standard errors at county-level.

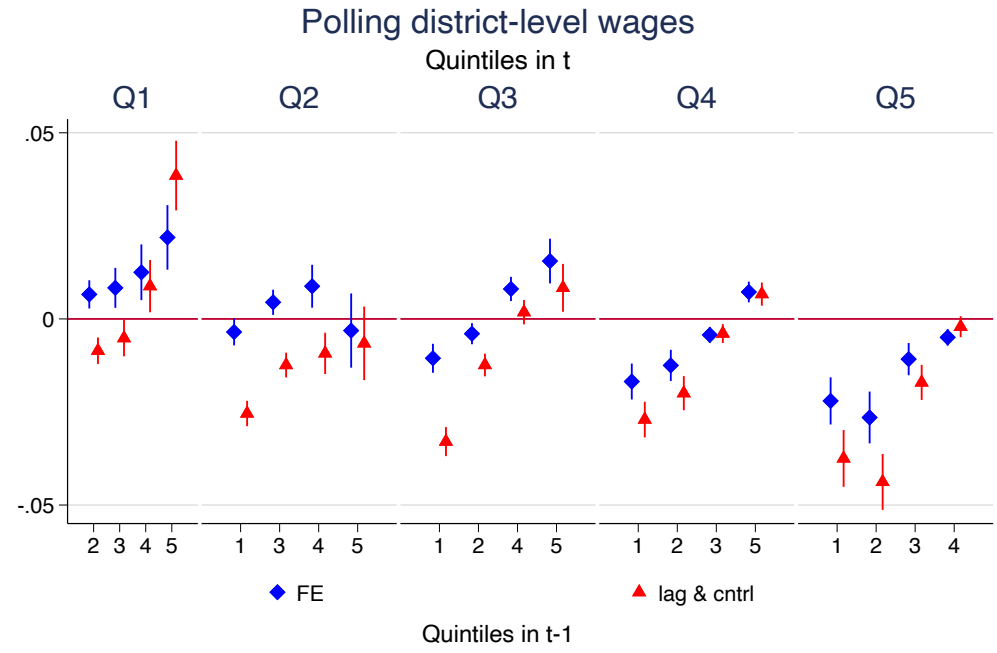
(a)



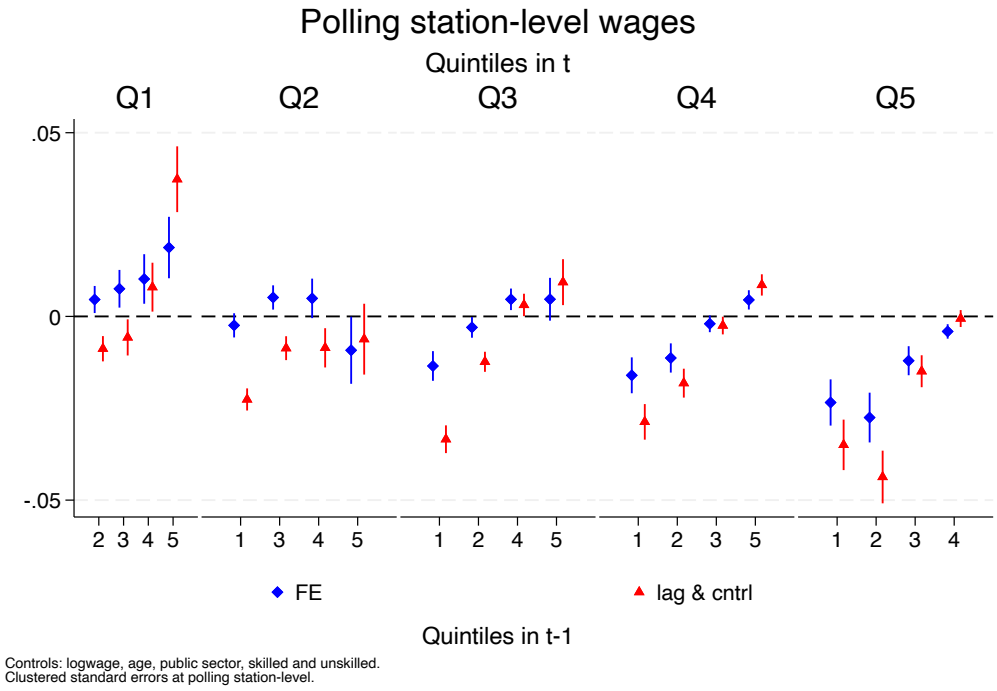
Controls: logwage, age, public sector, skilled and unskilled.
Clustered standard errors at district-level.

(b)

Table B.13: Changes in relative income and turnout (county and district).



(a)



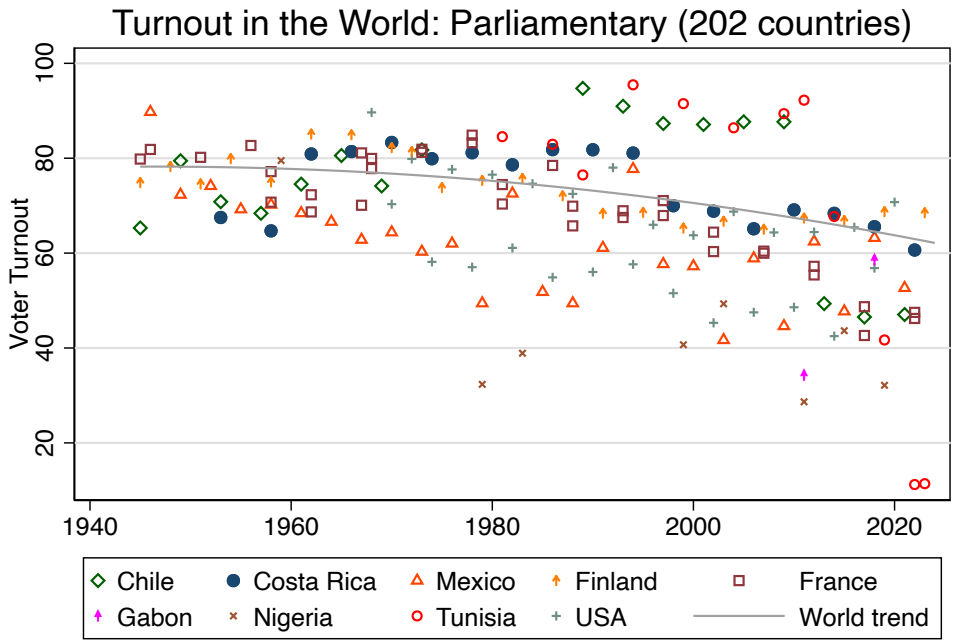
(b)

Table B.14: Changes in relative income and turnout (polling district and polling station).

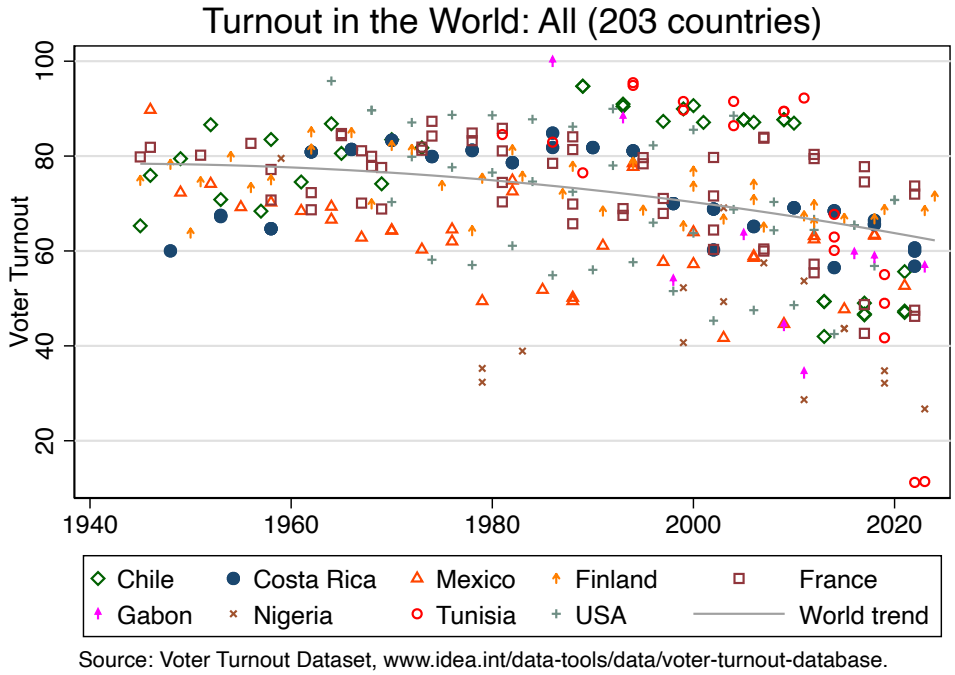
	Party name	Acronym	Founded	Ideology	Political position	Won presidential elections
	National Liberation Party	PLN	1951	Social democracy Third Way Figuerism	*Currently:* Centre to centre-left *Historically:* Centre-left to left-wing	Yes
	Social Christian Unity Party	PUSC	1977*	Christian democracy Liberal conservatism Economic liberalism	Centre-right	Yes
	Libertarian Movement Party	ML	1994	Libertarian conservatism Social conservatism Catholic social teaching Economic liberalism	Right-wing	No
pac	**Citizens' Action Party**	PAC	2000	Social democracy Progressivism Anti-corruption Figuerism	Centre-left	Yes
FRENTE AMPLIO	**Broad Front**	FA	2004	Democratic socialism Socialism of the 21st century Progressivism Environmentalism	Left-wing	No
Restauración	**National Restoration Party**	PRN	2005	Conservatism Social conservatism Christian right Anti-immigration	Right-wing	No
PLP+	**Liberal Progressive Party**	PLP	2016	Libertarianism Classical liberalism	Centre-right	No
	Social Democratic Progress Party	PPSD	2018	Liberalism Social conservatism Economic liberalism	Centre to centre-right	Yes
NUEVA REPÚBLICA	**New Republic Party**	NR	2018	Conservatism Social conservatism Christian right	Right-wing to far-right	No

*** PUSC is the heir of previous alliances with different names active in Costa Rican elections since 1953.**

Table B.15: Political Parties: Costa Rica



(a) Parliamentary elections.



(b) Presidential and parliamentary elections

Table B.16: Voter turnout: selected countries and global trend.

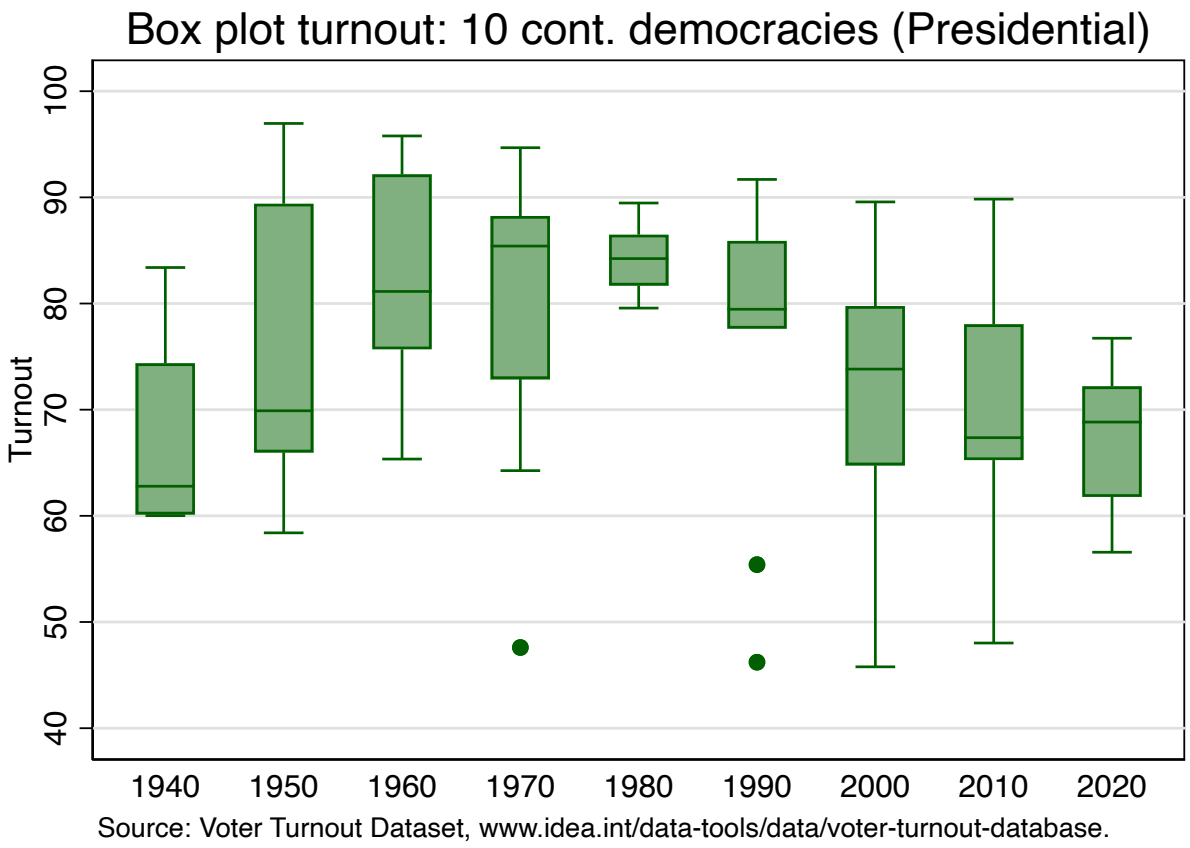
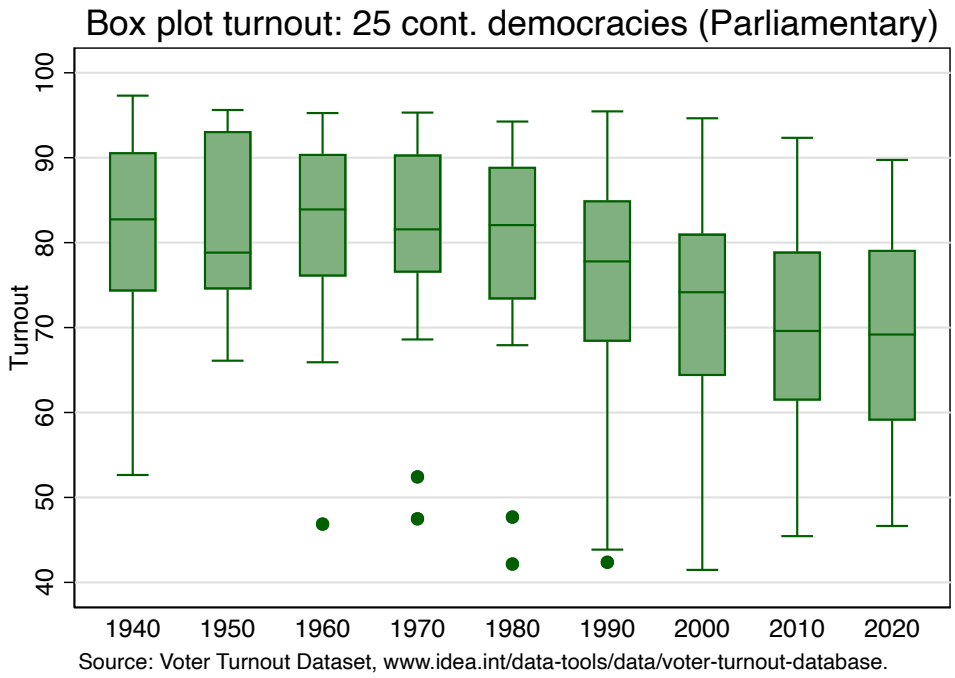
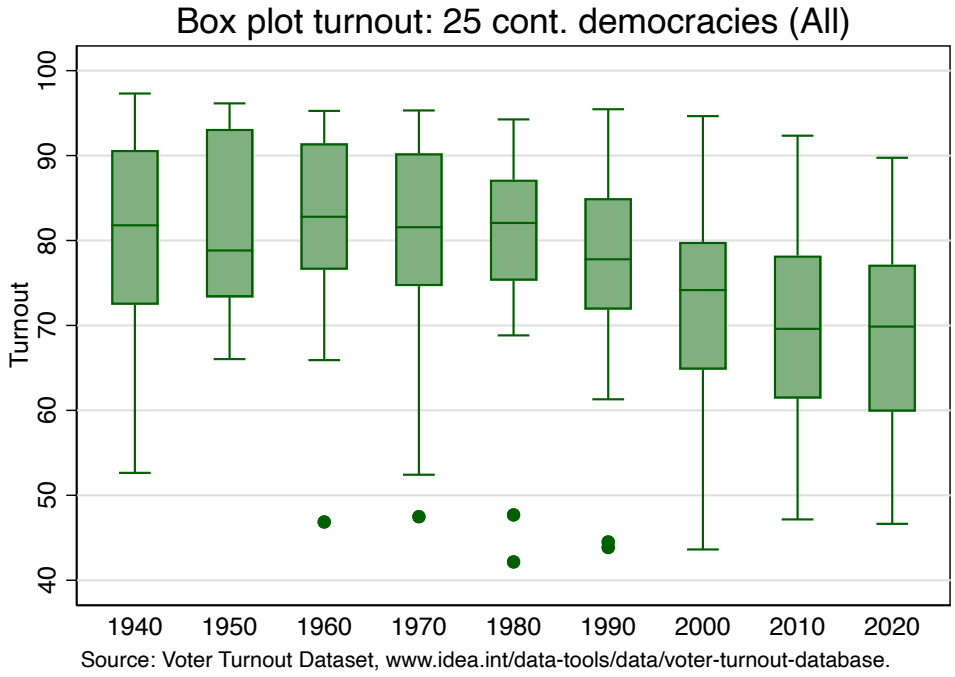


Table B.17: Voter turnout in presidential elections: 10 continuous democracies.

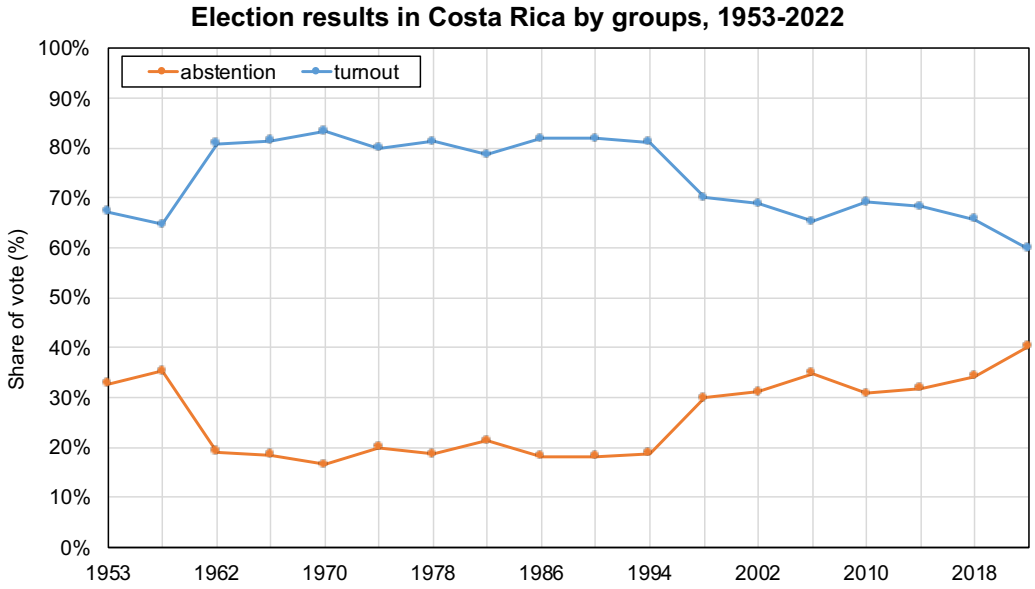


(a) Parliamentary elections.



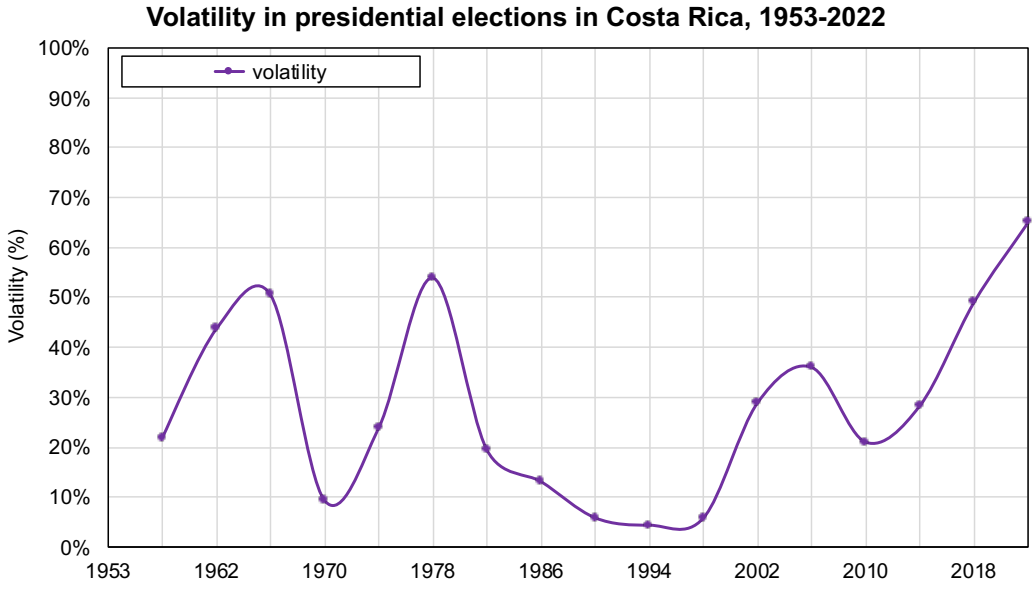
(b) Presidential and parliamentary elections

Table B.18: Voter turnout in 25 continuous democracies.



Source: author's computations using official election results.
Note: the figure shows the share of electoral turnout and abstention in presidential elections in Costa Rica between 1953 and 2022. Provisional results for 2022.

Table B.19: Electoral turnout Costa Rica: 1953 - 2022



Source: author's computations using official election results.
Note: the figure shows the share of electoral volatility in presidential elections in Costa Rica between 1953 and 2022. Provisional results for 2022.

Table B.20: Electoral volatility Costa Rica: 1953 - 2022

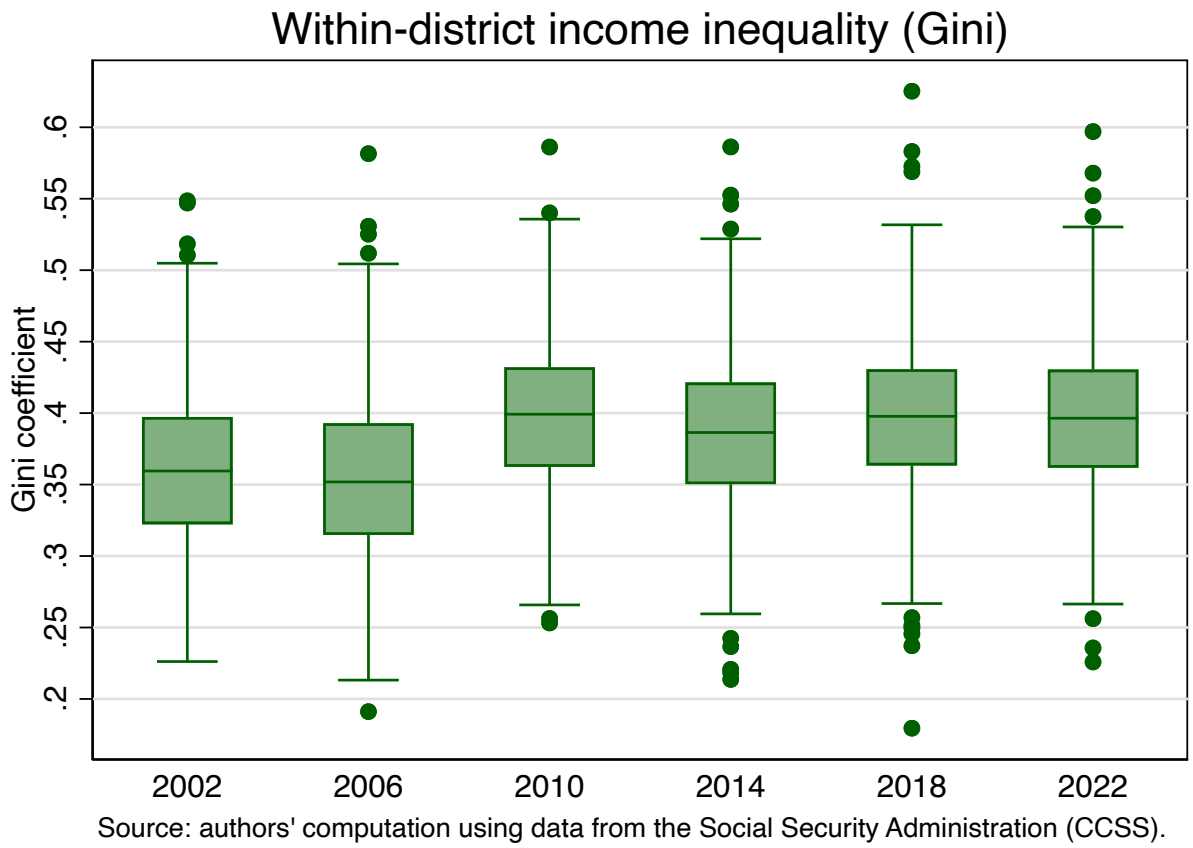


Table B.21: Within-district income inequality (average Gini coefficient.)

Descriptive Statistics: characterization of "climbers" and "droppers" (30 percentiles)

Year	Total workers	# climb / drop		Δ employer	Δ public/private	Δ industry	Δ occupation
	#	#	%	%	%	%	%
Panel A: number and composition of "climbers 30"							
2006	818,910	43,115	5.3%	76.4%	10.0%	60.8%	62.2%
2010	1,006,288	52,724	5.2%	76.5%	14.4%	50.0%	65.7%
2014	1,115,375	50,671	4.5%	74.0%	12.9%	45.9%	55.9%
2018	1,247,241	60,208	4.8%	74.2%	10.0%	57.2%	65.0%
2022	1,302,280	54,907	4.2%	75.3%	9.0%	41.7%	45.7%
Panel B: number and composition of "droppers 30"							
2006	818,910	20,485	2.5%	80.2%	10.2%	63.6%	59.5%
2010	1,006,288	26,171	2.6%	78.8%	8.8%	50.6%	62.0%
2014	1,115,375	30,173	2.7%	77.3%	9.4%	53.9%	59.2%
2018	1,247,241	32,617	2.6%	74.9%	10.6%	58.9%	63.4%
2022	1,302,280	40,062	3.1%	72.2%	7.6%	28.8%	33.4%

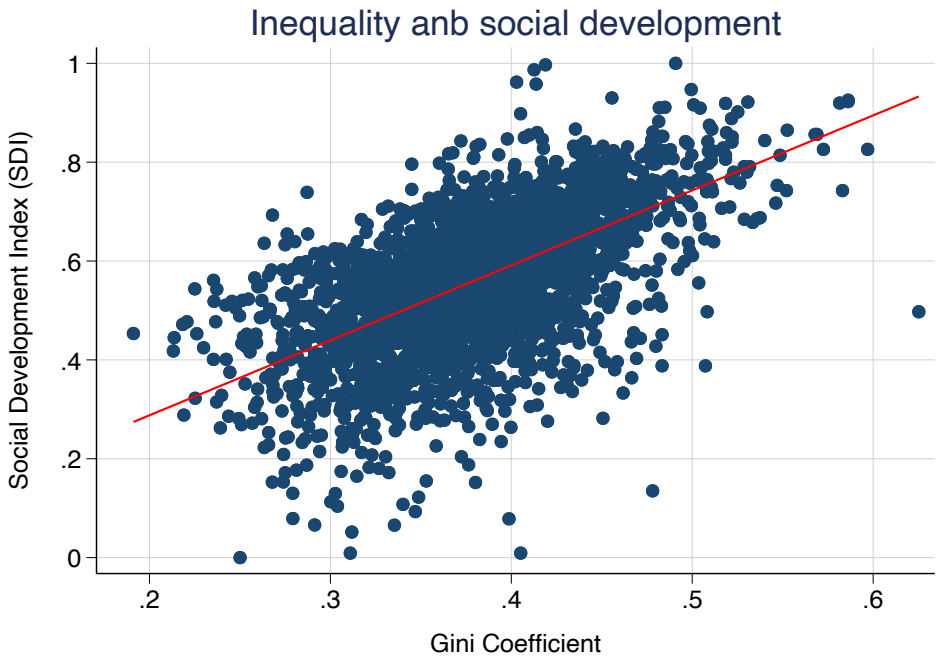
Table B.22: Descriptive Statistics: "droppers" and "climbers".

Effect of inequality on turnout in presidential elections: 2002 - 2018 (district-level)

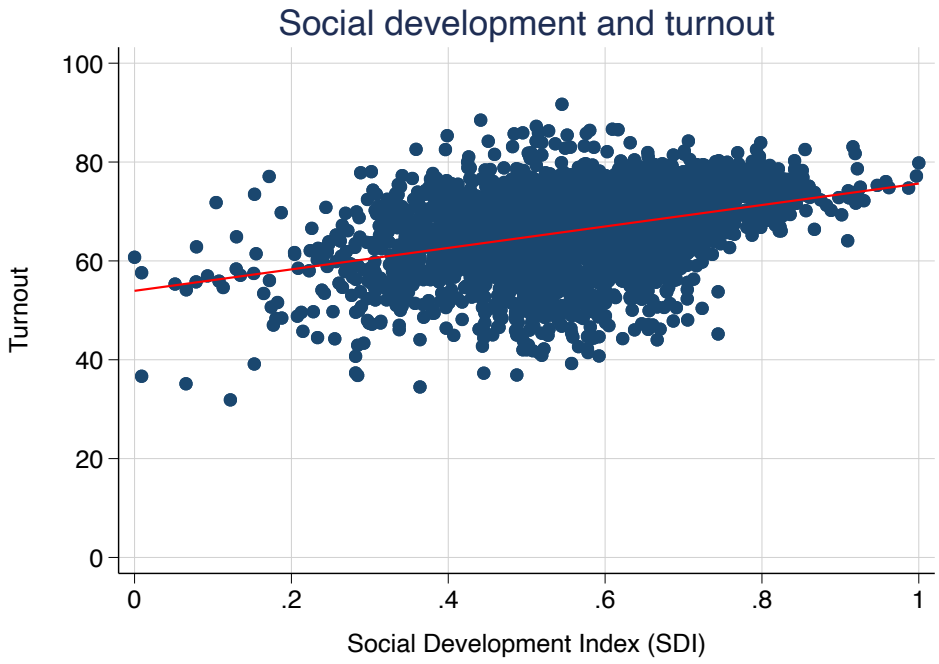
	(1) OLS	(2) Controls	(3) Controls Year FE	(4) Controls district FE	(5) FE	(6) Controls FE
Panel A: effect of inequality on turnout in presidential elections						
gini	0.112***	0.287***	0.050*	0.207***	0.002	-0.021
	(0.024)	(0.029)	(0.027)	(0.031)	(0.026)	(0.027)
Observations	2,365	2,347	2,347	2,347	2,365	2,347
r2_o	0.137	0.133	0.206	0.860	0.137	0.905
Panel B: effect of inequality on turnout in presidential elections						
Top 10	0.028	0.211***	-0.015	0.115***	-0.096***	-0.060*
	(0.032)	(0.038)	(0.033)	(0.039)	(0.033)	(0.033)
Observations	2,365	2,347	2,347	2,347	2,365	2,347
r2_o	0.090	0.103	0.188	0.857	0.090	0.905
Panel C: effect of inequality on turnout in presidential elections						
Bottom 50	-0.253***	-0.513***	-0.130***	-0.385***	-0.078*	-0.001
	(0.038)	(0.043)	(0.041)	(0.046)	(0.040)	(0.042)
Observations	2,365	2,347	2,347	2,347	2,365	2,347
r2_o	0.162	0.158	0.222	0.862	0.162	0.905
Social Development Index (SDI)		YES	YES	YES		YES
log Average Income		YES	YES	YES		YES
Year FE			YES		YES	YES
District FE				YES	YES	YES

Standard errors in parentheses * p<0.1 ** p<0.05 *** p<0.01

Table B.23: Local inequality and turnout (district-level)



(a)



(b)

Table B.24: Scatterplots SDI, Gini coefficient and Turnout (district level).

Descriptive Statistics (individual-level data): turnout of formal workers in Costa Rica, 2010, 2014 and 2018.

Year		2010 (wage earners)	2014 (wage earners)	2018 (wage earners)
Sector	Public Sector	85.3%	86.1%	85.4%
	Private Sector	72.2%	72.0%	70.0%
Industry	UNSPECIFIED ACTIVITIES	78.5%	77.7%	80.7%
	Agriculture, hunting and forestry	64.9%	58.4%	55.7%
	Mining and quarrying	70.6%	67.7%	64.7%
	Manufacturing	75.7%	74.5%	72.4%
	Electricity, gas and water supply	84.0%	84.6%	83.6%
	Construction	64.9%	63.3%	58.0%
	Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods	73.7%	73.3%	70.8%
	Hotels and restaurants	60.0%	58.4%	54.2%
	Transport, storage and communications	74.7%	73.6%	70.8%
	Financial intermediation	87.1%	88.9%	87.7%
	Real estate, renting and business activities	74.5%	74.9%	73.7%
	Public administration and defence; compulsory social security	85.1%	85.3%	84.5%
	Education	89.7%	91.0%	89.7%
	Health and social work	82.2%	83.6%	83.2%
	Other community, social and personal service activities	76.9%	78.9%	76.2%
	Activities of private households as employers and undifferentiated production activities of private households	75.7%	73.0%	70.9%
	Extraterritorial organizations and bodies	88.8%	91.9%	88.9%
edu_level/occupation	unknown	83.4%	82.1%	83.5%
	unskilled	64.1%	60.9%	58.4%
	semi-skilled	78.1%	76.1%	73.5%
	skilled	78.8%	80.5%	79.3%
income	bottom 50	70.3%	67.8%	65.6%
	middle 40	80.6%	81.1%	80.0%
	top 10	89.7%	91.3%	90.2%
	top 1	89.4%	90.5%	90.1%
All workers	Average turnout	76.7%	76.0%	74.3%
	Observations	847,825	999,498	1,112,599

Source: authors' computation using data from Social Security (CCSS) and the Electoral Board (TSE) of Costa Rica.

Table B.25: Descriptive Statistics (individual-level data): turnout.

Descriptive Statistics (individual-level data): income of formal workers in Costa Rica, 2010, 2014 and 2018.

Year		2010 (wage earners)	2014 (wage earners)	2018 (wage earners)	2022 (wage earners)
Sector	Public Sector	664,949	918,331	997,703	1,094,395
	Private Sector	330,674	443,263	528,754	608,214
Industry	UNSPECIFIED ACTIVITIES	358,912	492,258	664,945	751,823
	Agriculture, hunting and forestry	199,640	300,830	356,739	400,599
	Mining and quarrying	317,384	397,032	440,153	494,539
	Manufacturing	429,310	550,381	634,129	678,578
	Electricity, gas and water supply	731,526	924,580	1,010,378	1,019,035
	Construction	303,978	367,227	389,817	416,777
	Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods	328,118	416,512	488,522	534,937
	Hotels and restaurants	248,067	310,828	358,643	369,415
	Transport, storage and communications	458,822	547,486	598,235	643,319
	Financial intermediation	745,558	996,716	1,069,244	1,170,433
	Real estate, renting and business activities	427,273	540,273	671,213	817,469
	Public administration and defence; compulsory social security	648,114	902,125	971,876	1,092,256
	Education	549,851	703,614	824,173	867,829
	Health and social work	412,581	521,567	624,979	656,310
	Other community, social and personal service activities	338,596	470,104	551,806	632,039
	Activities of private households as employers and undifferentiated production activities of private households	129,084	156,835	183,626	192,653
	Extraterritorial organizations and bodies	795,609	1,151,704	1,230,515	1,485,694
edu_level/occupation	unknown	667,931	764,008	941,148	1,203,112
	unskilled	207,924	261,340	299,212	323,196
	semi-skilled	400,031	478,247	533,090	579,092
	skilled	503,116	723,275	842,169	917,028
income	bottom 50	177,980	238,040	266,975	298,466
	middle 40	475,376	607,989	698,604	800,728
	top 10	1,313,016	1,692,992	1,947,703	2,162,748
	top 1	3,893,942	5,052,150	5,879,700	6,445,689
All workers	Average wage	436,213	565,104	646,939	728,626
	Observations	847,825	999,498	1,112,599	916,973

Source: authors' computation using data from Social Security (CCSS) and the Electoral Board (TSE) of Costa Rica.
Note: all figures are in normal Costa Rican colones (CRC).

Table B.26: Descriptive Statistics (individual-level data): income.

Effect of movements in the income distribution on turnout in presidential elections, 2002-2018 (individual level)

	(1) OLS	(2) FE	(3) FE controls	(4) FE controls	(5) FE controls	(6) FE controls
Panel A: Effect of movements in the income distriution on turnout in presidential elections (30 percentiles)						
climb_dist30	-0.028***	-0.018***	-0.019***	-0.019***	-0.014***	-0.023***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
drop_dist30	-0.066***	-0.015***	-0.037***	0.012***	-0.003	0.020***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)
Observations	2,497,775	2,497,775	2,497,775	2,497,775	1,798,799	1,798,799
r2_o	0.001	0.001	0.172	0.029	0.019	0.181
Panel B: Effect of movements in the income distriution on turnout in presidential elections (20 percentiles)						
climb_dist20	-0.041***	-0.017***	-0.025***	-0.017***	-0.013***	-0.024***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
drop_dist20	-0.079***	-0.011***	-0.043***	0.010***	0.001	0.008***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)
Observations	2,497,775	2,497,775	2,497,775	2,497,775	1,798,799	1,798,799
r2_o	0.003	0.002	0.172	0.029	0.021	0.181
Panel C: Effect of movements in the income distriution on turnout in presidential elections (10 percentiles)						
climb_dist10	-0.046***	-0.014***	-0.026***	-0.013***	-0.010***	-0.021***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
drop_dist10	-0.087***	-0.009***	-0.046***	0.007***	0.001	-0.002**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Observations	2,497,775	2,497,775	2,497,775	2,497,775	1,798,799	1,798,799
r2_o	0.006	0.004	0.173	0.029	0.022	0.181
Individual level controls					YES	YES
log Income				YES	YES	YES
Turnout presidential (t-1)			YES			YES
Year FE		YES	YES	YES	YES	YES
Individual FE		YES		YES	YES	

Standard errors in parentheses * p<0.1 ** p<0.05 *** p<0.01
Controls: public sector, age, skilled and unskilled.

Table B.27: Movements in the income distribution and turnout (individual level).

Effect of movements in the income distribution on turnout in presidential elections, 2002-2018 (polling station level)

	(1) OLS	(2) FE	(3) FE controls	(4) FE controls	(5) FE controls
Panel A: Effect of movements in the income distriution on turnout in presidential elections (30 percentiles)					
share_climb30	8.655***	4.746***	4.656***	8.752***	9.788***
	(0.316)	(0.402)	(0.440)	(0.394)	(0.437)
share_drop30	-20.839***	-24.167***	-24.696***	-15.070***	-15.392***
	(0.340)	(0.400)	(0.418)	(0.427)	(0.450)
Observations	32751	32750	31966	32720	31939
r2_o	0.103	0.096	0.118	0.150	0.160
Panel B: Effect of movements in the income distriution on turnout in presidential elections (20 percentiles)					
share_climb20	9.954***	8.909***	9.101***	12.270***	13.627***
	(0.206)	(0.271)	(0.290)	(0.259)	(0.281)
share_drop20	-15.437***	-17.624***	-18.178***	-11.743***	-11.954***
	(0.234)	(0.282)	(0.297)	(0.280)	(0.295)
Observations	32751	32750	31966	32720	31939
r2_o	0.122	0.118	0.134	0.206	0.216
Panel C: Effect of movements in the income distriution on turnout in presidential elections (10 percentiles)					
share_climb10	8.407***	9.595***	9.778***	12.367***	13.178***
	(0.102)	(0.138)	(0.144)	(0.123)	(0.128)
share_drop10	-10.380***	-11.930***	-12.373***	-8.224***	-8.211***
	(0.147)	(0.180)	(0.190)	(0.160)	(0.168)
Observations	32751	32750	31966	32720	31939
r2_o	0.184	0.184	0.183	0.361	0.362
log Income				YES	YES
Turnout presidential (t-1)			YES		YES
Year FE		YES	YES	YES	YES
Polling station FE		YES	YES	YES	YES

Standard errors in parentheses * p<0.1 ** p<0.05 *** p<0.01

Table B.28: Movements in the income distribution and turnout (polling station level).

Effect of movements in the income distribution on turnout in local elections, 2002-2016 (individual level)

	(1) OLS	(2) FE	(3) FE controls	(4) FE controls	(5) FE controls	(6) FE controls
Panel A: Effect of movements in the income distriution on turnout in local elections (30 percentiles)						
climb_dist30	-0.039***	-0.026***	-0.028***	-0.032***	-0.002	-0.008***
	(0.002)	(0.003)	(0.002)	(0.003)	(0.003)	(0.002)
drop_dist30	-0.024***	0.024***	-0.007***	0.076***	0.003	-0.001
	(0.002)	(0.003)	(0.002)	(0.003)	(0.005)	(0.002)
Observations	1,066,880	1,066,880	976,919	1,066,626	763,959	713,706
r2_o	0.001	0.000	0.117	0.001	0.016	0.120
Panel B: Effect of movements in the income distriution on turnout in local elections (20 percentiles)						
climb_dist20	-0.049***	-0.023***	-0.033***	-0.029***	-0.001	-0.012***
	(0.001)	(0.002)	(0.001)	(0.002)	(0.003)	(0.001)
drop_dist20	-0.035***	0.018***	-0.015***	0.055***	0.003	-0.004*
	(0.002)	(0.002)	(0.002)	(0.003)	(0.004)	(0.002)
Observations	1,066,880	1,066,880	976,919	1,066,626	763,959	713,706
r2_o	0.002	0.000	0.117	0.001	0.016	0.120
Panel C: Effect of movements in the income distriution on turnout in local elections (10 percentiles)						
climb_dist10	-0.054***	-0.018***	-0.032***	-0.025***	-0.003*	-0.013***
	(0.001)	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)
drop_dist10	-0.048***	0.016***	-0.022***	0.039***	0.002	-0.005***
	(0.001)	(0.002)	(0.001)	(0.002)	(0.003)	(0.001)
Observations	1,066,880	1,066,880	976,919	1,066,626	763,959	713,706
r2_o	0.003	0.000	0.118	0.001	0.016	0.121
Individual level controls					YES	YES
log Income				YES	YES	YES
Turnout presidential (t-1)			YES			YES
Year FE		YES	YES	YES	YES	YES
Individual FE		YES		YES	YES	

Standard errors in parentheses * p<0.1 ** p<0.05 *** p<0.01
Controls: female, public sector, age, skilled and unskilled.

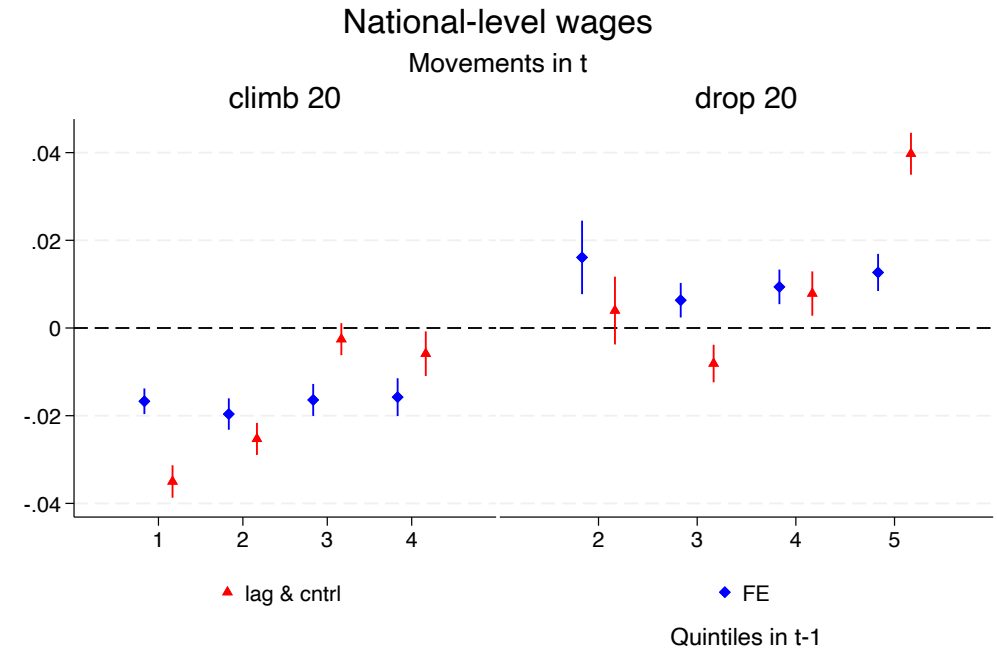
Table B.29: Movements income distribution and turnout (local elections individual).

Effect of movements in the income distribution on turnout in local elections, 2002-2018 (polling station level)

	(1) OLS	(2) FE	(3) FE controls	(4) FE controls	(5) FE controls
Panel A: Effect of movements in the income distriution on turnout in local elections (30 percentiles)					
share_climb30	-11.448***	-14.240***	-9.037***	-9.717***	-9.415***
	(0.220)	(0.281)	(0.254)	(0.245)	(0.226)
share_drop30	-3.670***	-1.667***	5.442***	6.928***	3.532***
	(0.334)	(0.458)	(0.408)	(0.406)	(0.431)
Observations	15857	15857	15831	15831	15312
r2_o	0.193	0.190	0.351	0.390	0.396
Panel B: Effect of movements in the income distriution on turnout in local elections (20 percentiles)					
share_climb20	-9.146***	-10.751***	-6.976***	-7.154***	-6.895***
	(0.123)	(0.152)	(0.146)	(0.139)	(0.130)
share_drop20	1.299***	2.950***	5.622***	6.703***	5.059***
	(0.186)	(0.242)	(0.214)	(0.212)	(0.224)
Observations	15857	15857	15831	15831	15312
r2_o	0.269	0.267	0.399	0.439	0.444
Panel C: Effect of movements in the income distriution on turnout in local elections (10 percentiles)					
share_climb10	-5.086***	-5.594***	-3.975***	-3.787***	-3.638***
	(0.047)	(0.054)	(0.066)	(0.062)	(0.059)
share_drop10	1.391***	1.725***	2.711***	3.307***	2.568***
	(0.080)	(0.098)	(0.095)	(0.094)	(0.097)
Observations	15857	15857	15831	15831	15312
r2_o	0.428	0.428	0.479	0.515	0.515
Income			YES		
log Income				YES	YES
Turnout presidential (t-1)					YES
Year FE		YES	YES	YES	YES
Individual FE		YES	YES	YES	YES

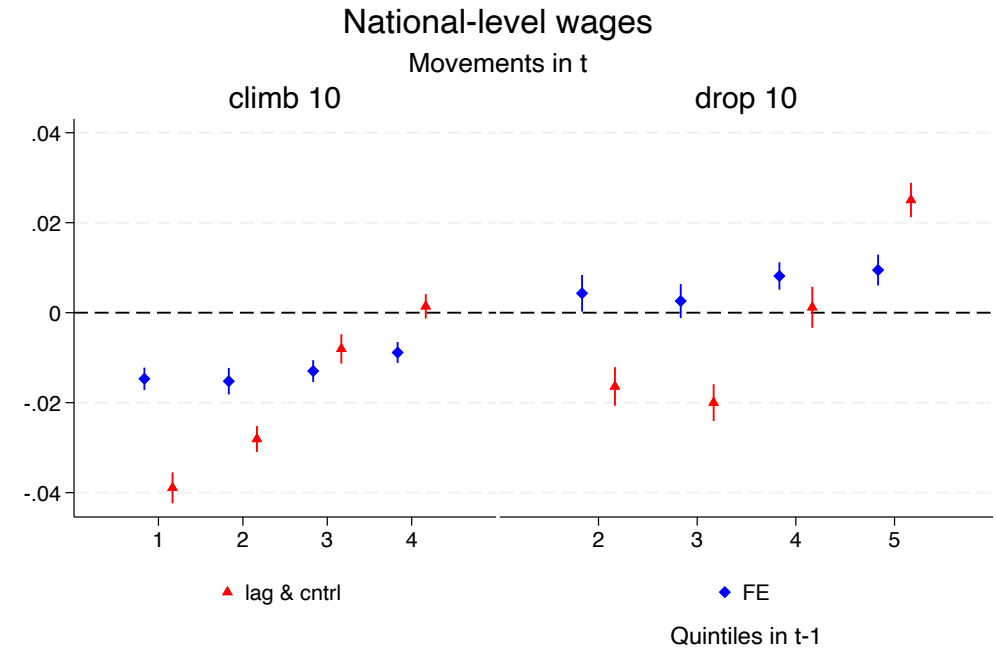
Standard errors in parentheses * p<0.1 ** p<0.05 *** p<0.01

Table B.30: Movements income distribution and turnout (local elections polling station).



Controls: logwage, age, public sector, skilled and unskilled.
Clustered standard errors at county-level.

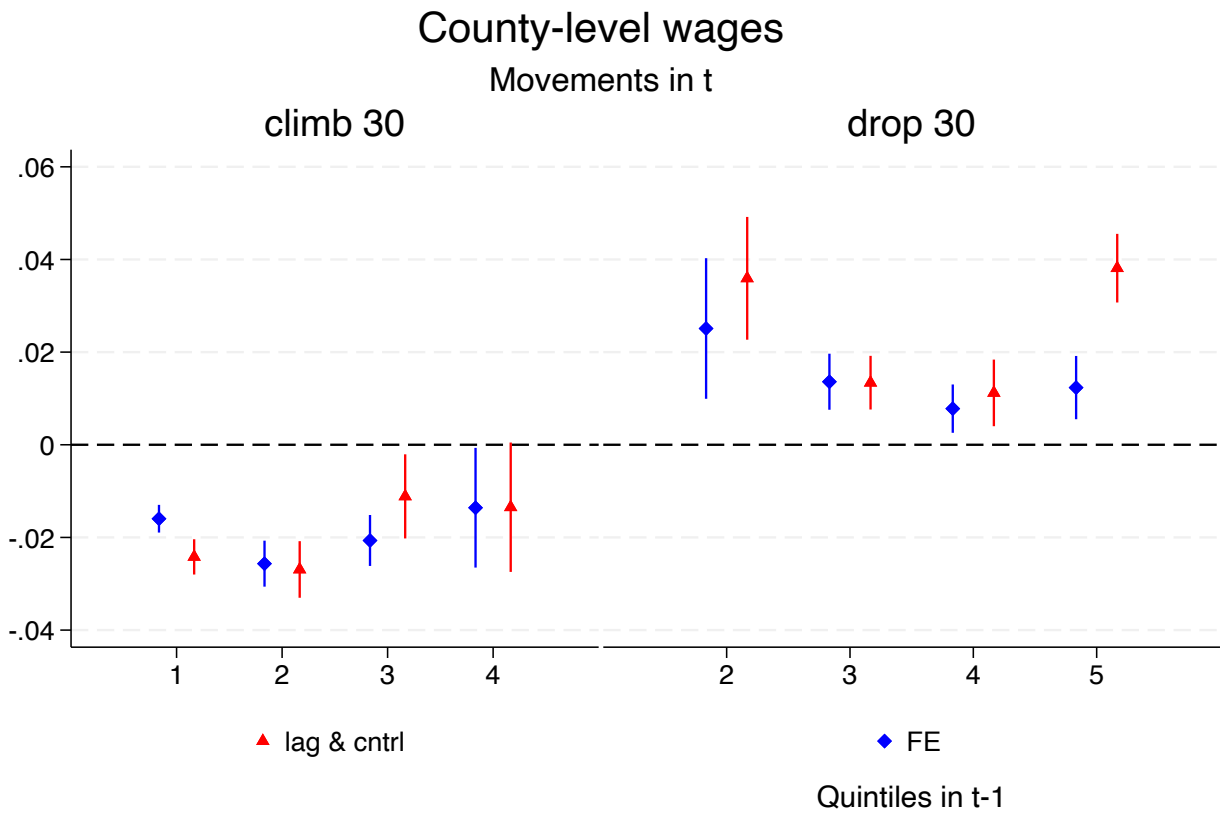
(a)



Controls: logwage, age, public sector, skilled and unskilled.
Clustered standard errors at county-level.

(b)

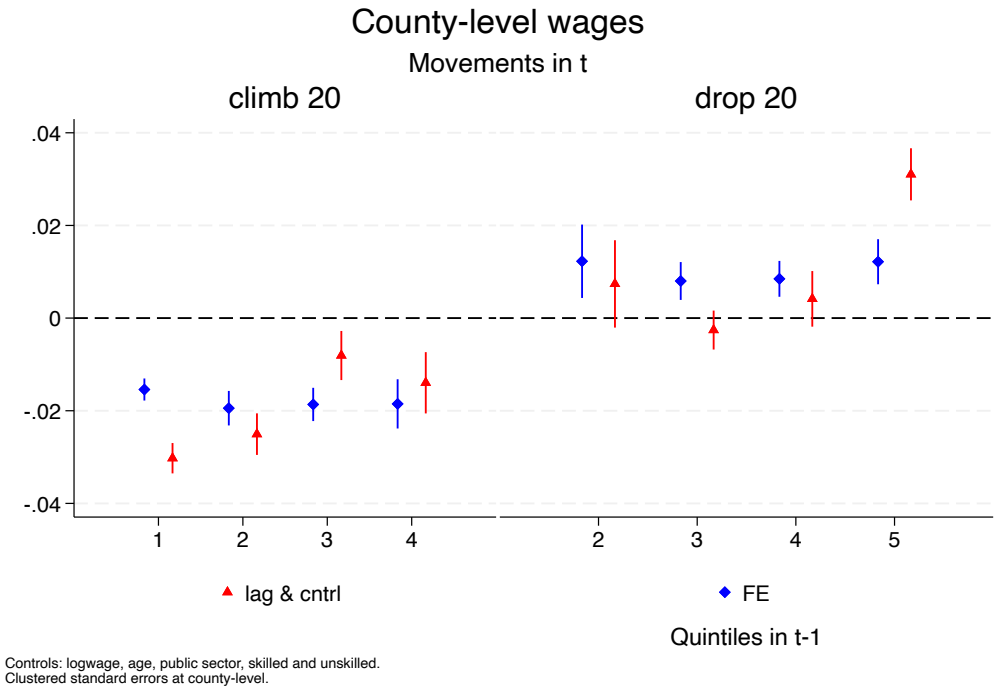
Table B.31: "Droppers" & "climbers" by quintiles (national-level).



Controls: logwage, age, public sector, skilled and unskilled.
Clustered standard errors at county-level.

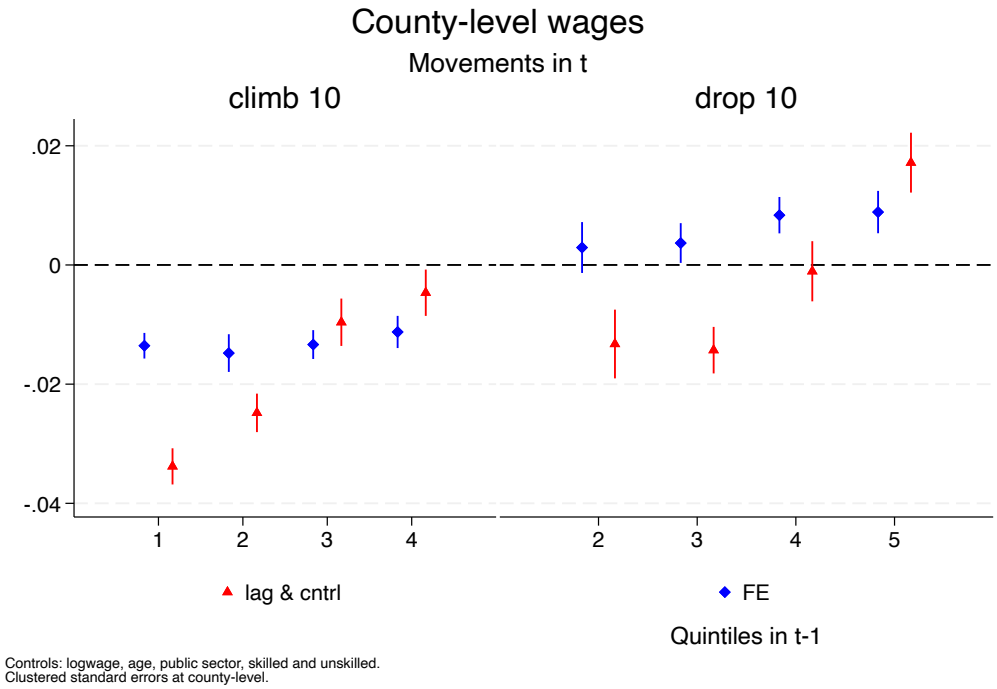
Table B.32: "Droppers" & "climbers" by quintiles (county-level).

Back to From individual-level income changes to inequality.



Controls: logwage, age, public sector, skilled and unskilled.
Clustered standard errors at county-level.

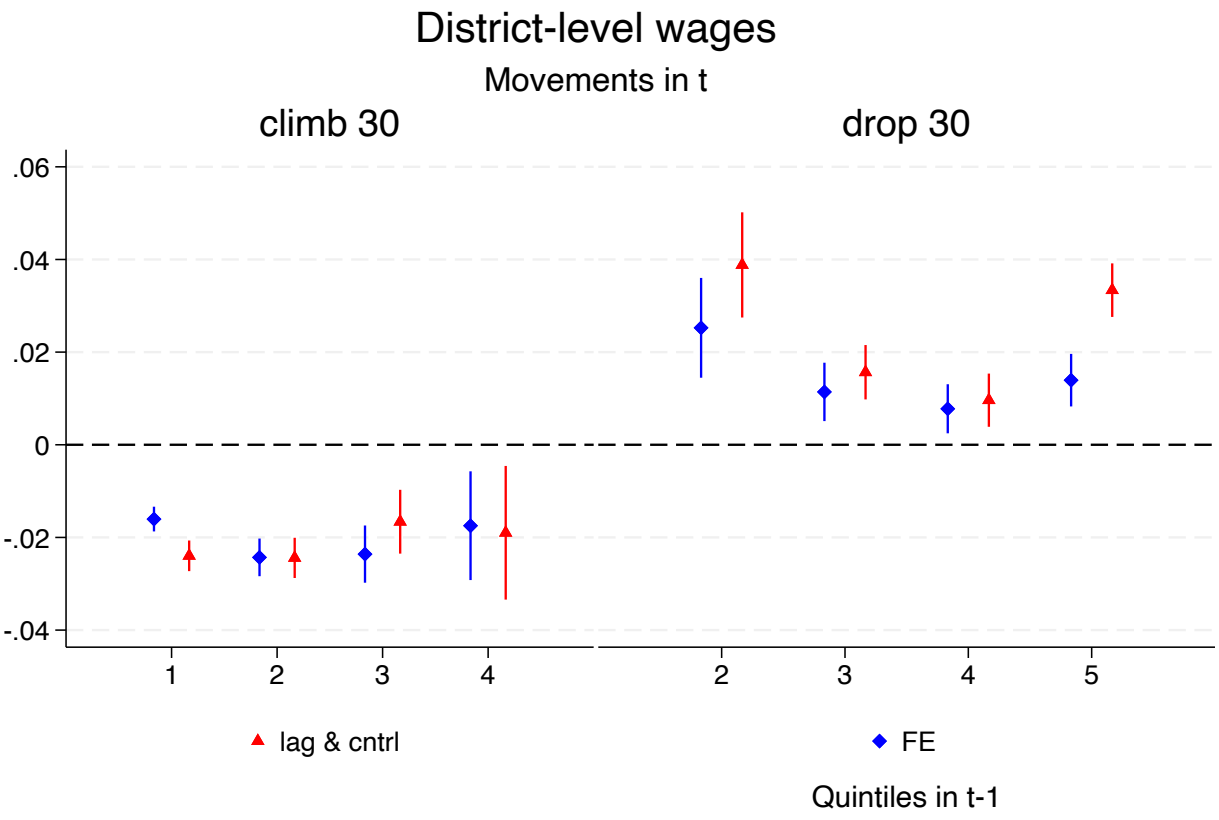
(a)



Controls: logwage, age, public sector, skilled and unskilled.
Clustered standard errors at county-level.

(b)

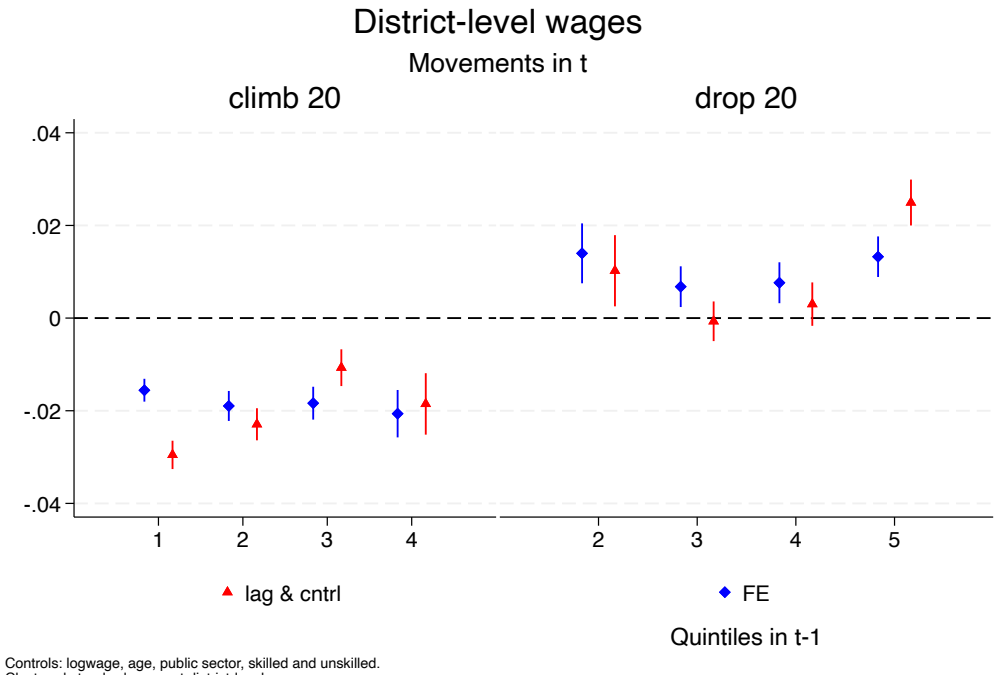
Table B.33: "Droppers" & "climbers" by quintiles (county-level).



Controls: logwage, age, public sector, skilled and unskilled.
Clustered standard errors at district-level.

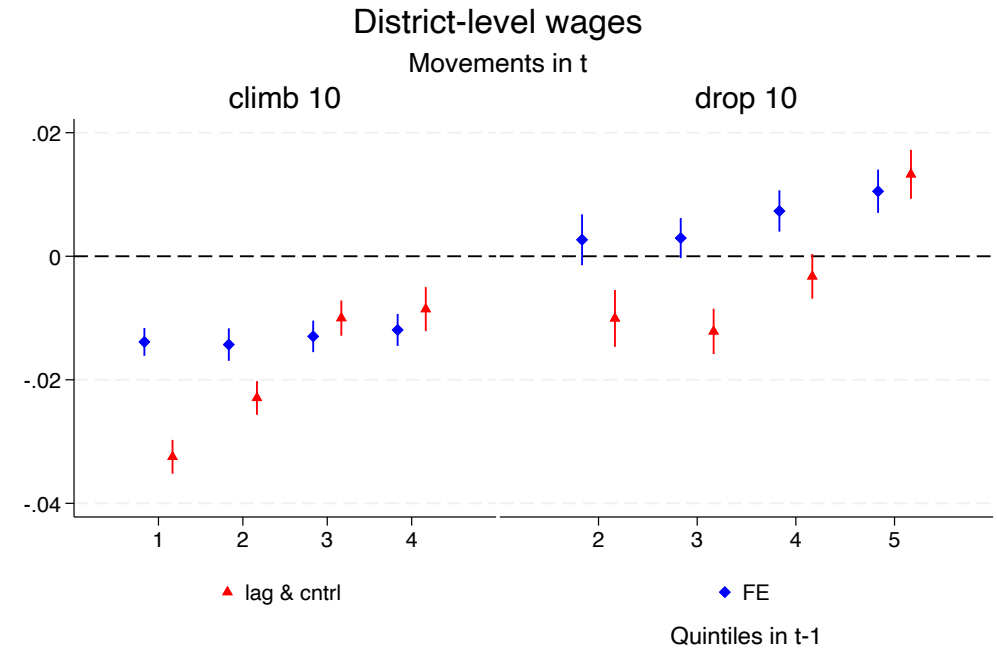
Table B.34: "Droppers" & "climbers" by quintiles (district-level).

Back to From individual-level income changes to inequality.



Controls: logwage, age, public sector, skilled and unskilled.
Clustered standard errors at district-level.

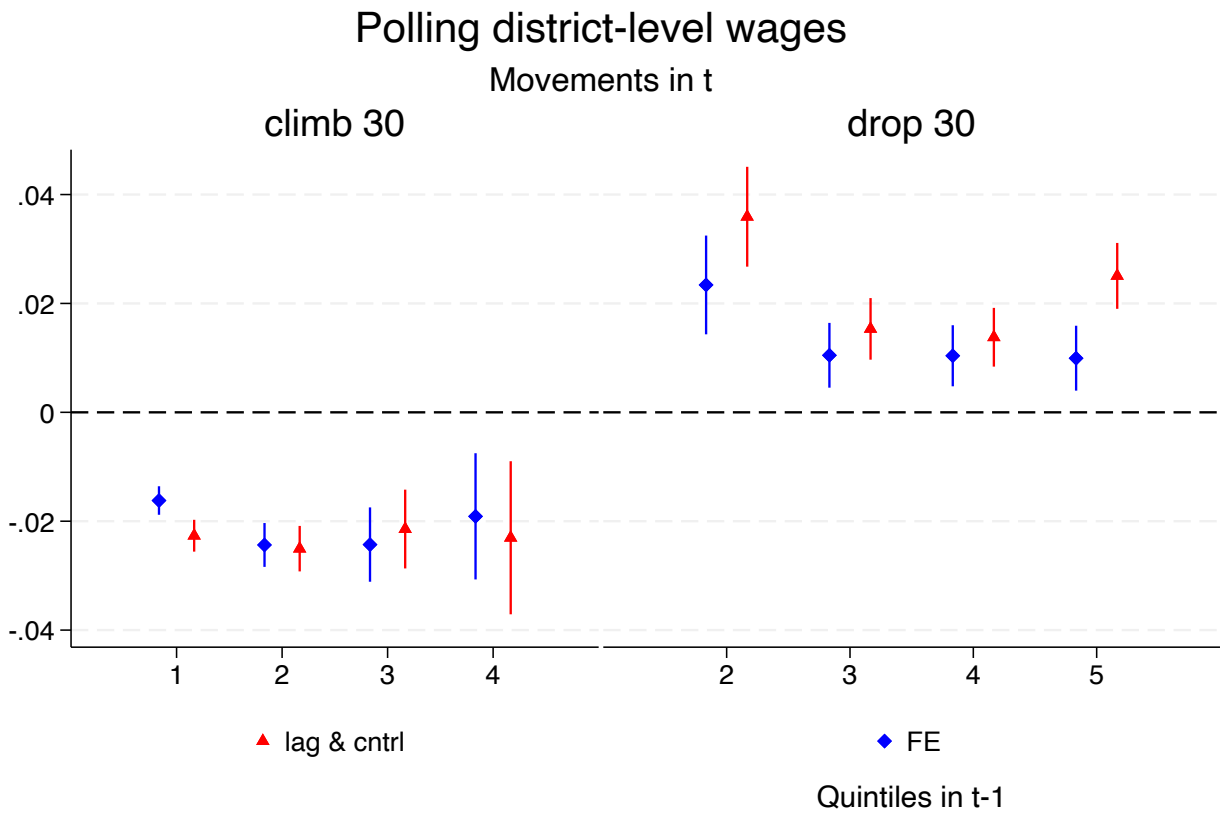
(a)



Controls: logwage, age, public sector, skilled and unskilled.
Clustered standard errors at district-level.

(b)

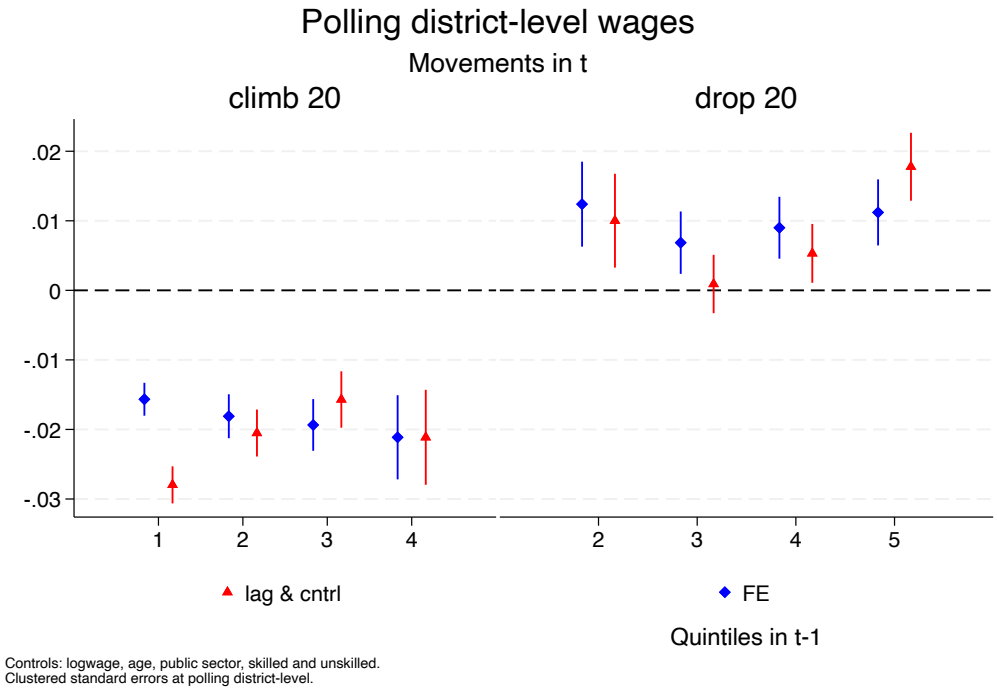
Table B.35: "Droppers" & "climbers" by quintiles (district-level).



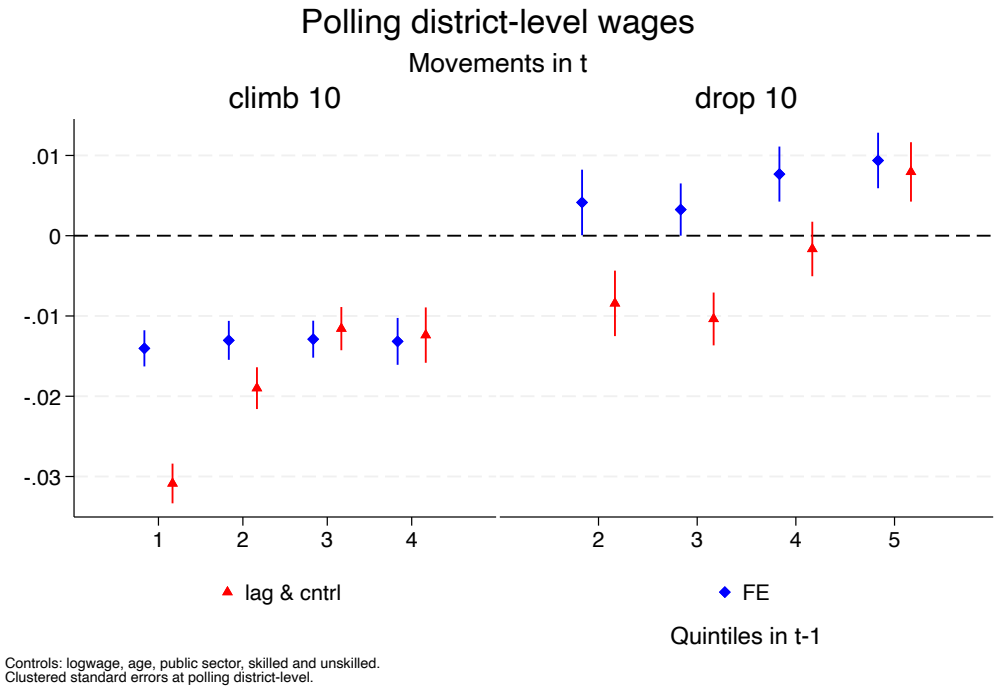
Controls: logwage, age, public sector, skilled and unskilled.
Clustered standard errors at polling district-level.

Table B.36: "Droppers" & "climbers" by quintiles (polling district-level).

Back to From individual-level income changes to inequality.

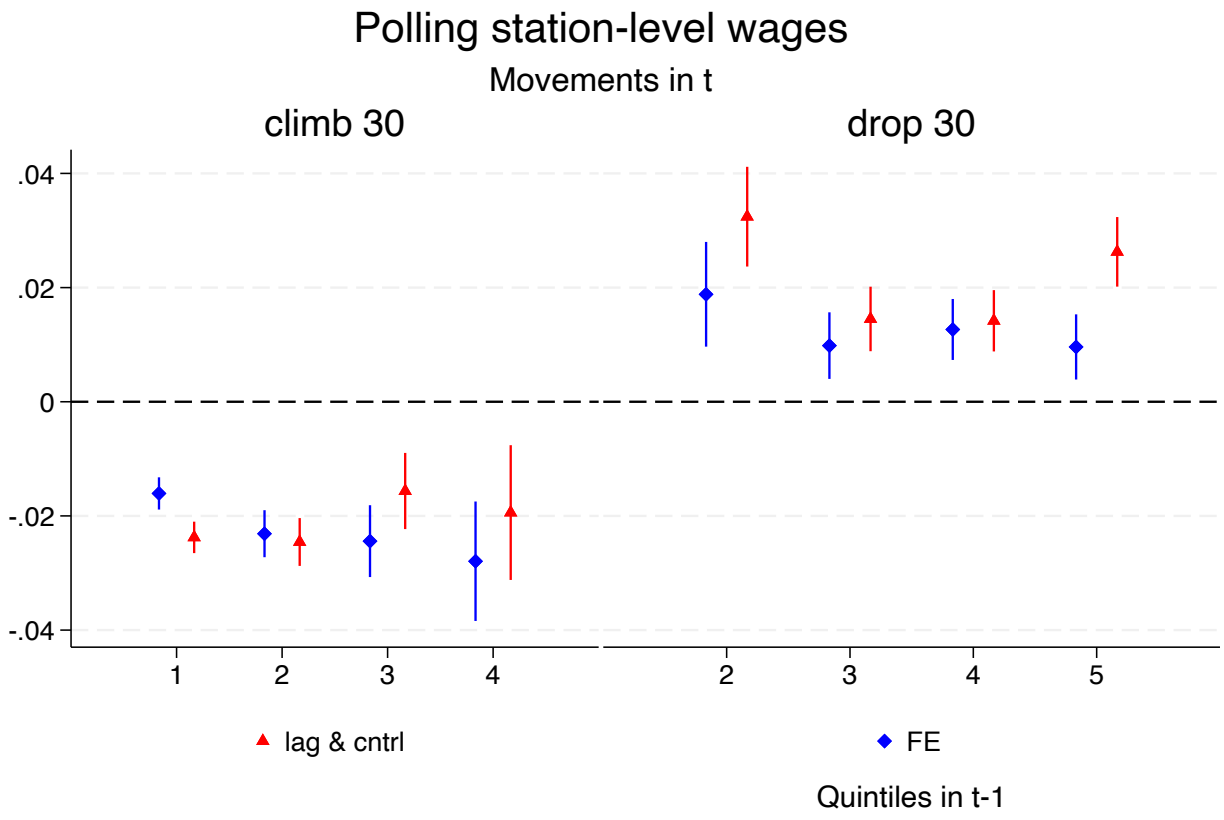


(a)



(b)

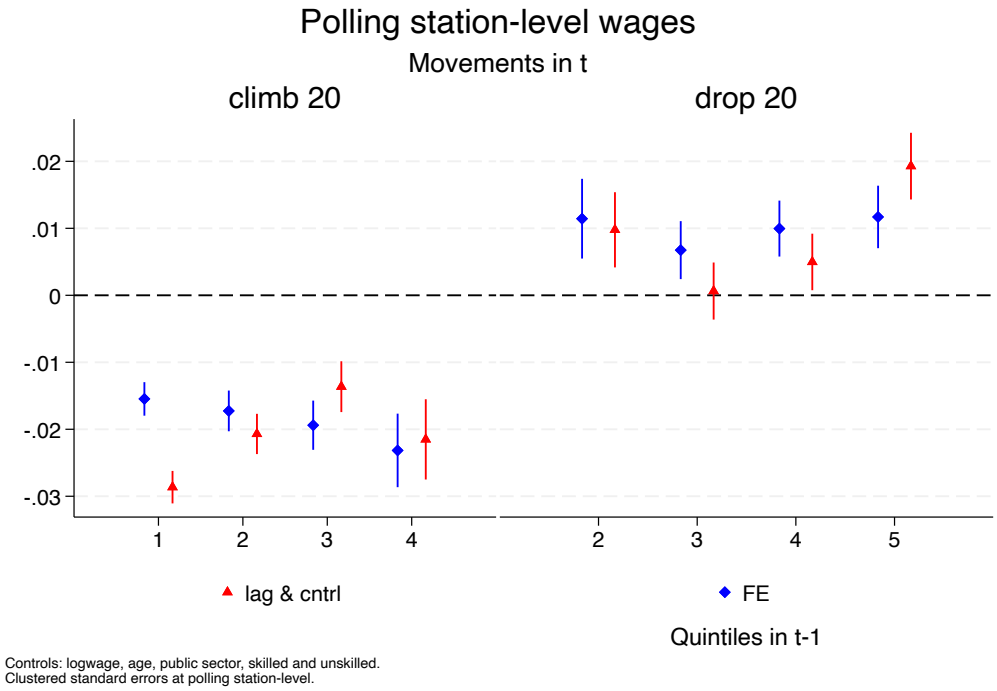
Table B.37: "Droppers" & "climbers" by quintiles (polling district-level).



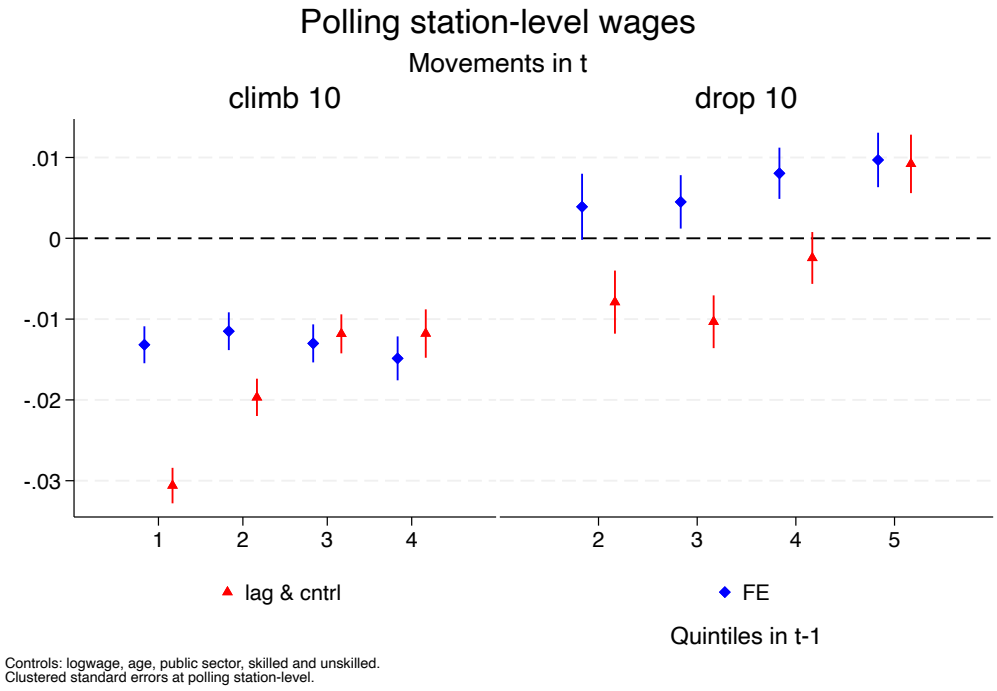
Controls: logwage, age, public sector, skilled and unskilled.
Clustered standard errors at polling station-level.

Table B.38: "Droppers" & "climbers" by quintiles (polling station-level).

Back to From individual-level income changes to inequality.



(a)



(b)

Table B.39: "Droppers" & "climbers" by quintiles (polling station-level).

	Party name	Acronym	Founded	Ideology	Political position	Won presidential elections
	National Liberation Party	PLN	1951	Social democracy Third Way Figuerism	*Currently:* Centre to centre-left *Historically:* Centre-left to left-wing	Yes
	Social Christian Unity Party	PUSC	1977*	Christian democracy Liberal conservatism Economic liberalism	Centre-right	Yes
	Libertarian Movement Party	ML	1994	Libertarian conservatism Social conservatism Catholic social teaching Economic liberalism	Right-wing	No
pac	**Citizens' Action Party**	PAC	2000	Social democracy Progressivism Anti-corruption Figuerism	Centre-left	Yes
FRENTE AMPLIO	**Broad Front**	FA	2004	Democratic socialism Socialism of the 21st century Progressivism Environmentalism	Left-wing	No
Restauración	**National Restoration Party**	PRN	2005	Conservatism Social conservatism Christian right Anti-immigration	Right-wing	No
PLP+	**Liberal Progressive Party**	PLP	2016	Libertarianism Classical liberalism	Centre-right	No
	Social Democratic Progress Party	PPSD	2018	Liberalism Social conservatism Economic liberalism	Centre to centre-right	Yes
NUEVA REPÚBLICA	**New Republic Party**	NR	2018	Conservatism Social conservatism Christian right	Right-wing to far-right	No

*** PUSC is the heir of previous alliances with different names active in Costa Rican elections since 1953.**

Fig. B.40: Political Parties: Costa Rica

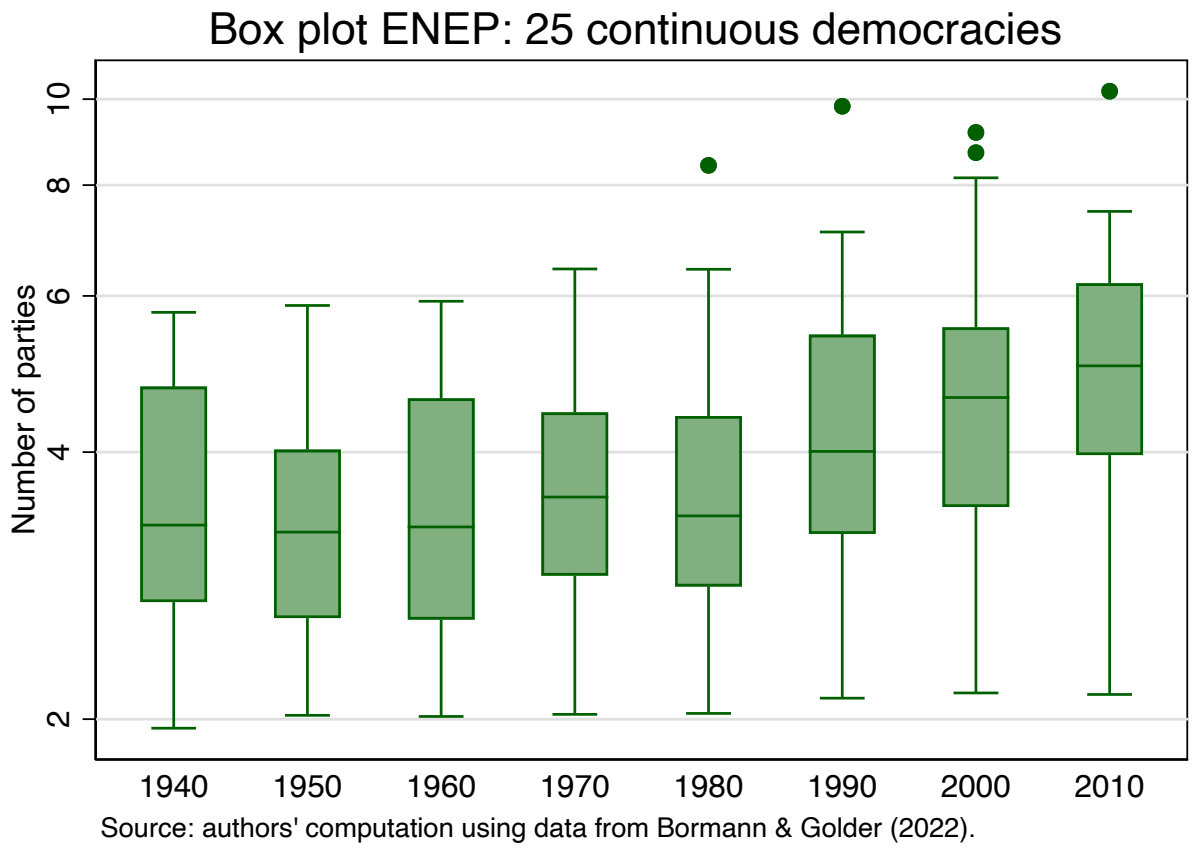
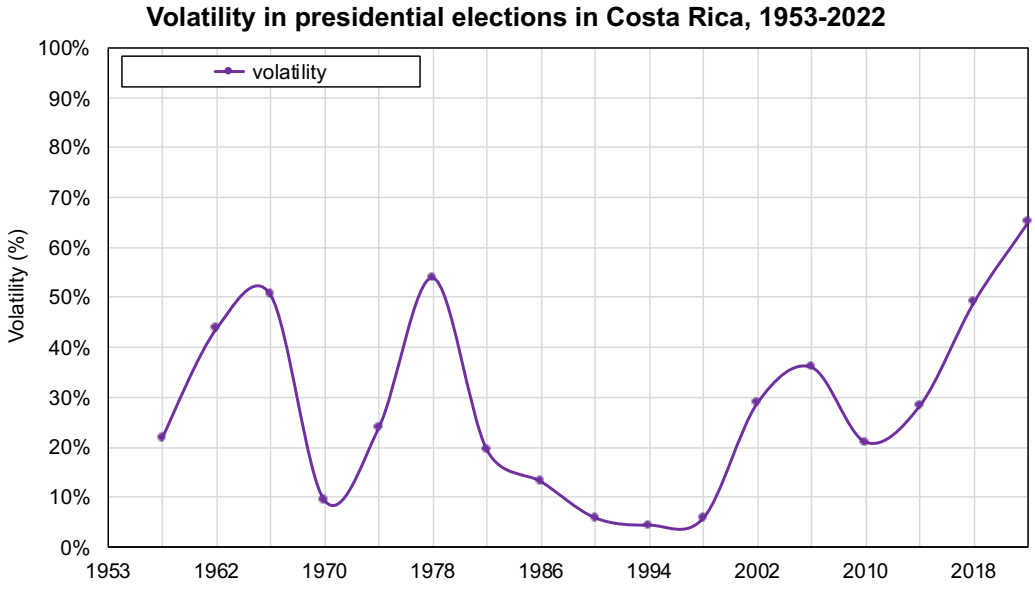


Fig. B.41: Effective number of electoral parties: 25 continuous democracies



Source: author's computations using official election results.
Note: the figure shows the share of electoral volatility in presidential elections in Costa Rica between 1953 and 2022. Provisional results for 2022.

Fig. B.42: Electoral volatility Costa Rica: 1953 - 2022

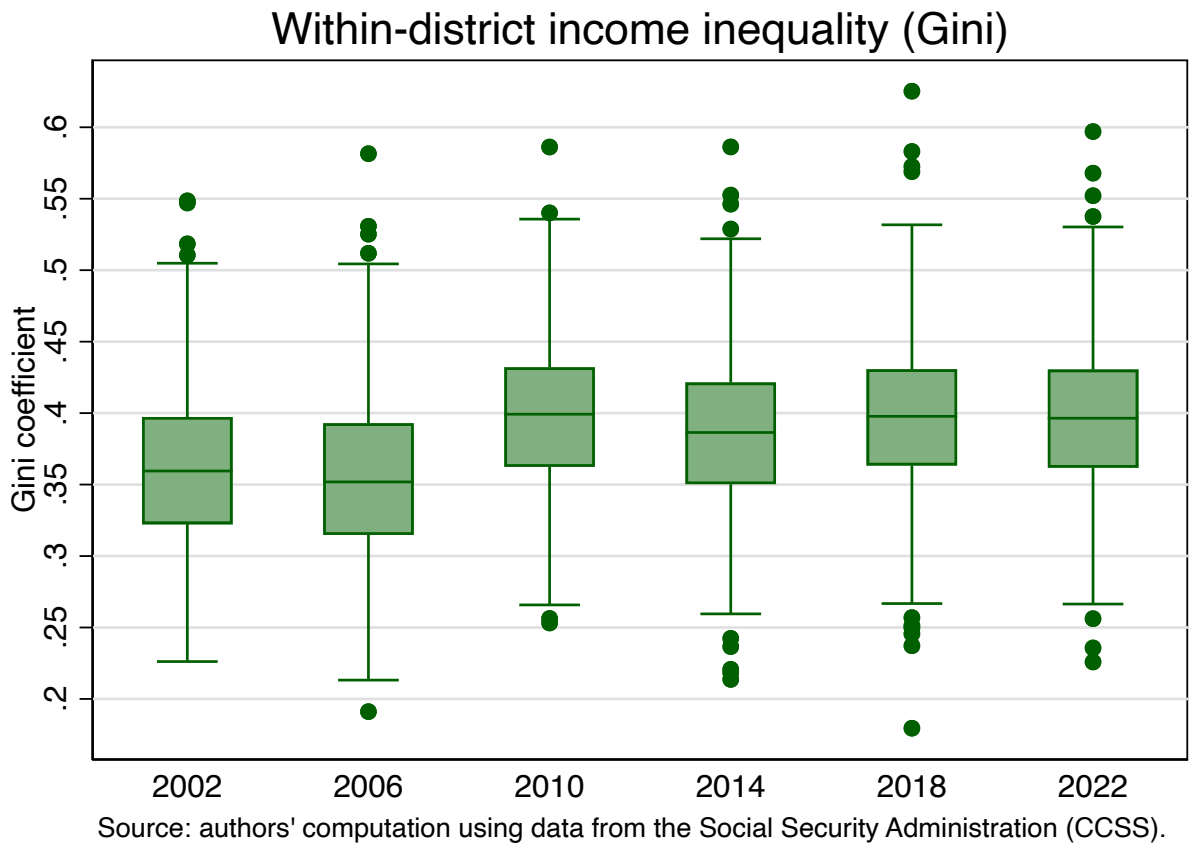


Fig. B.43: Within-district income inequality (average Gini coefficient.)

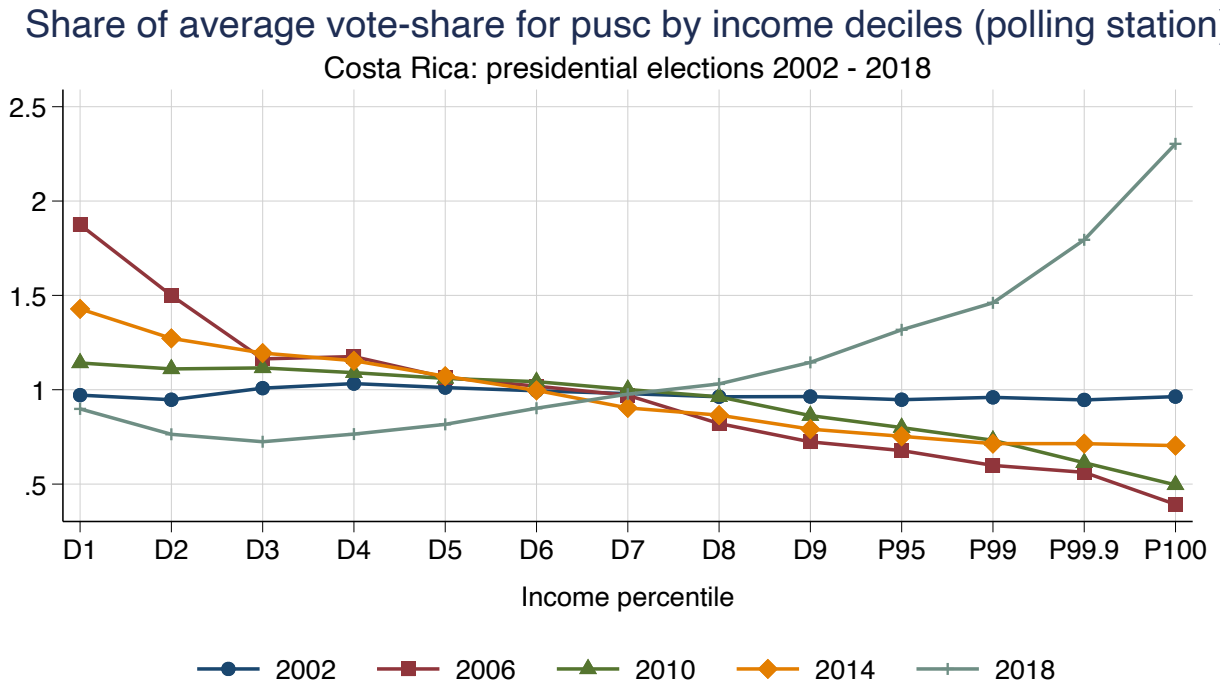


Fig. B.44: Share of average vote-share PUSC (decile polling station level / national level).

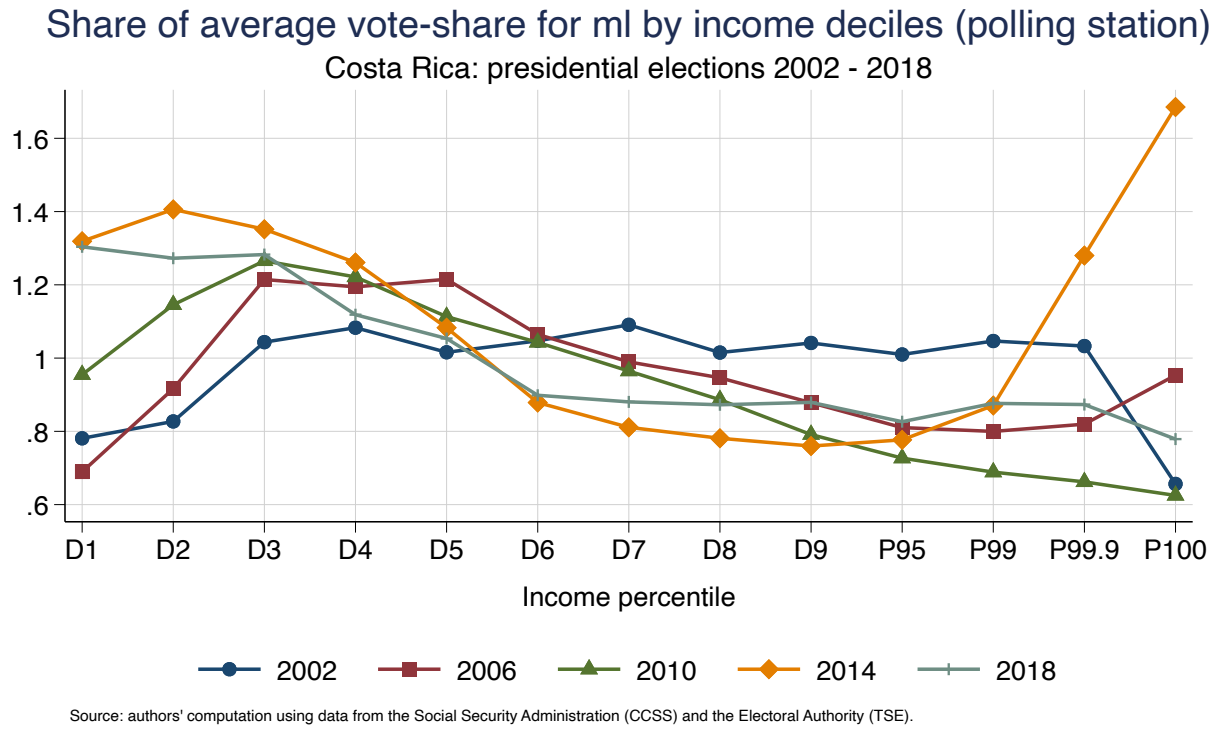


Fig. B.45: Share of average vote-share ML (decile polling station level / national level).

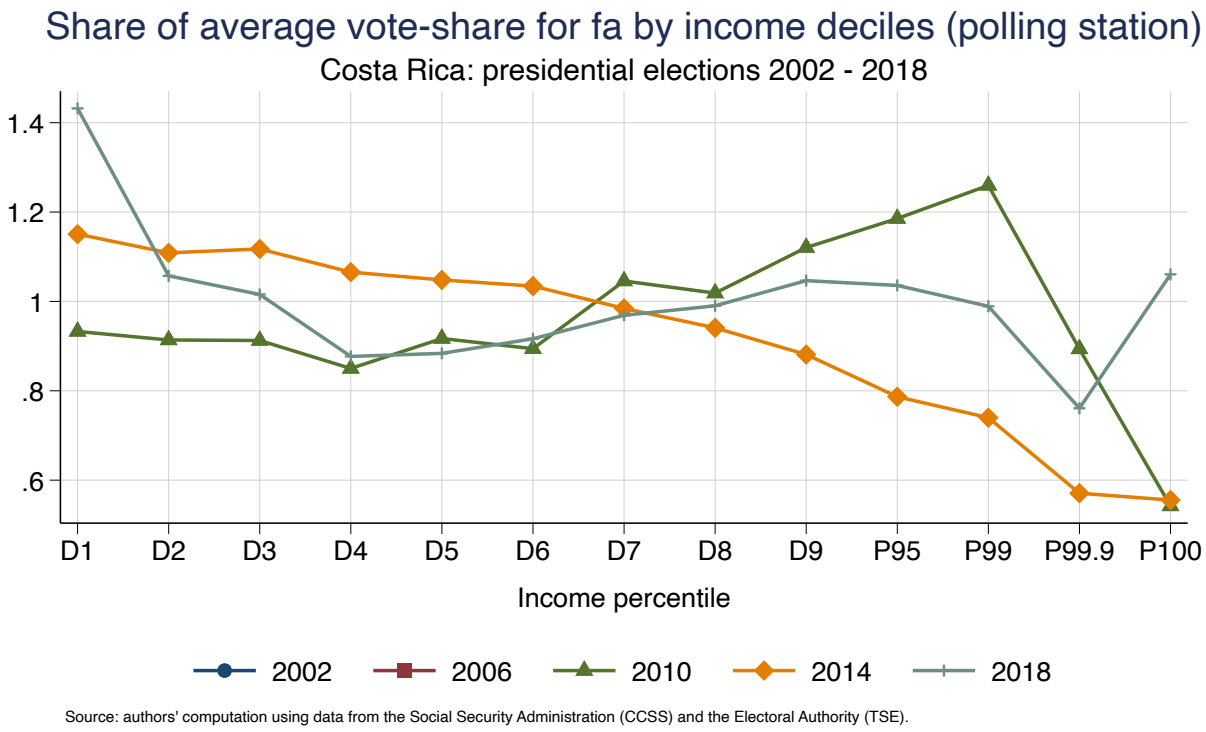
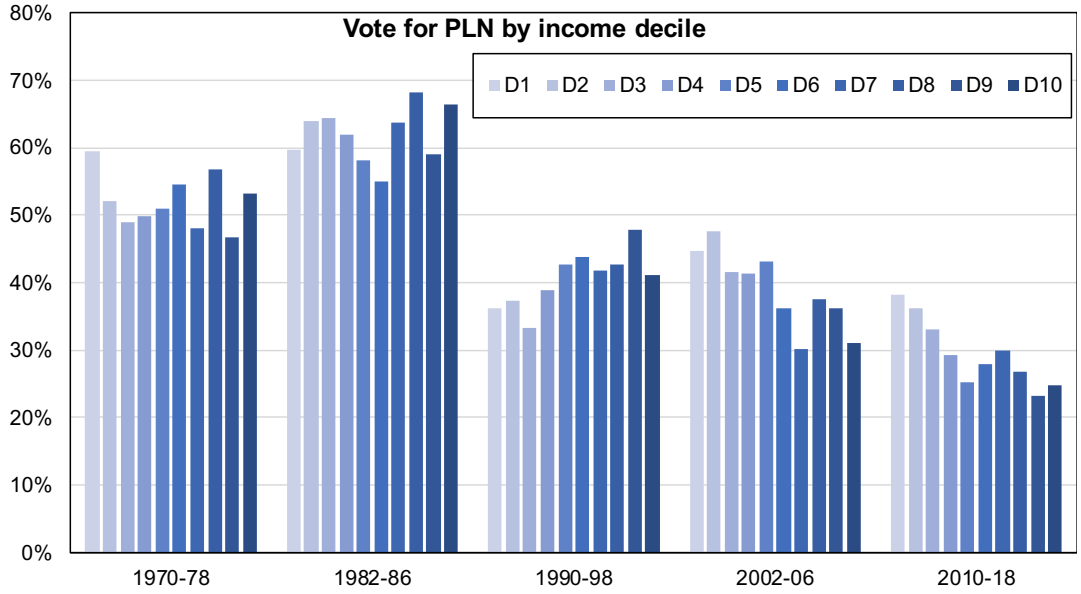
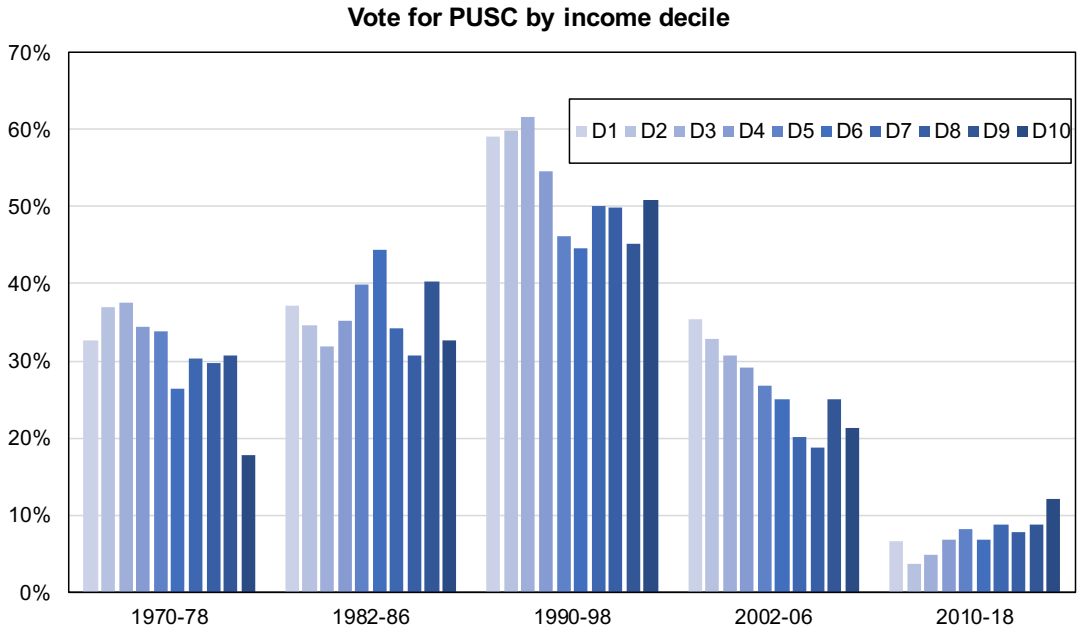


Fig. B.46: Share of average vote-share FA (decile polling station level / national level).



Source: authors' computations using Costa Rican political attitudes surveys.
Note: the figure shows the share of votes received by PLN by income decile.

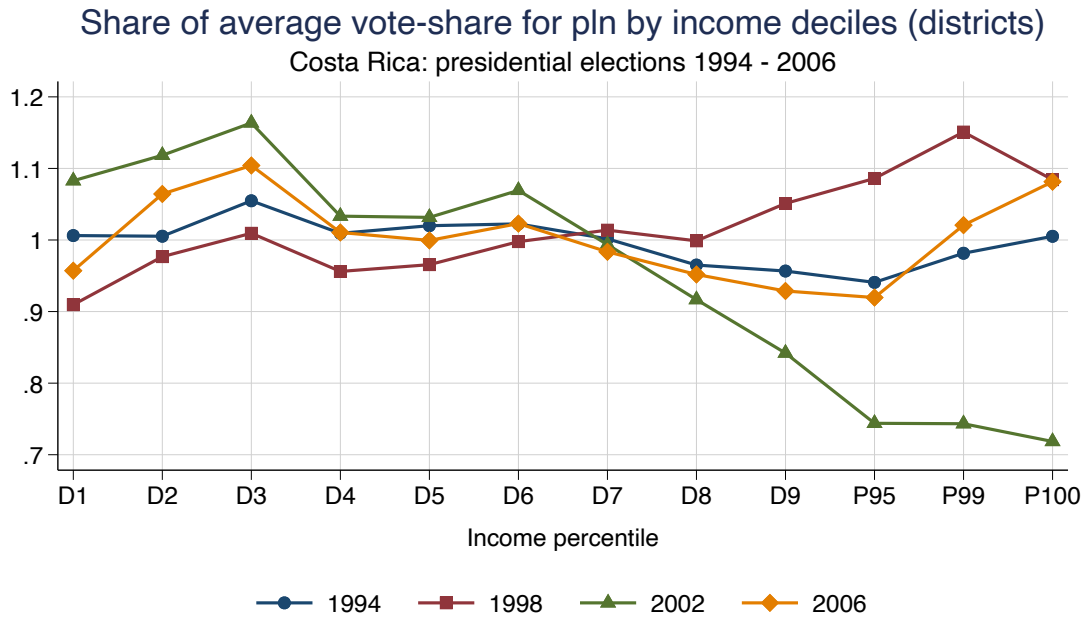
(a) PLN.



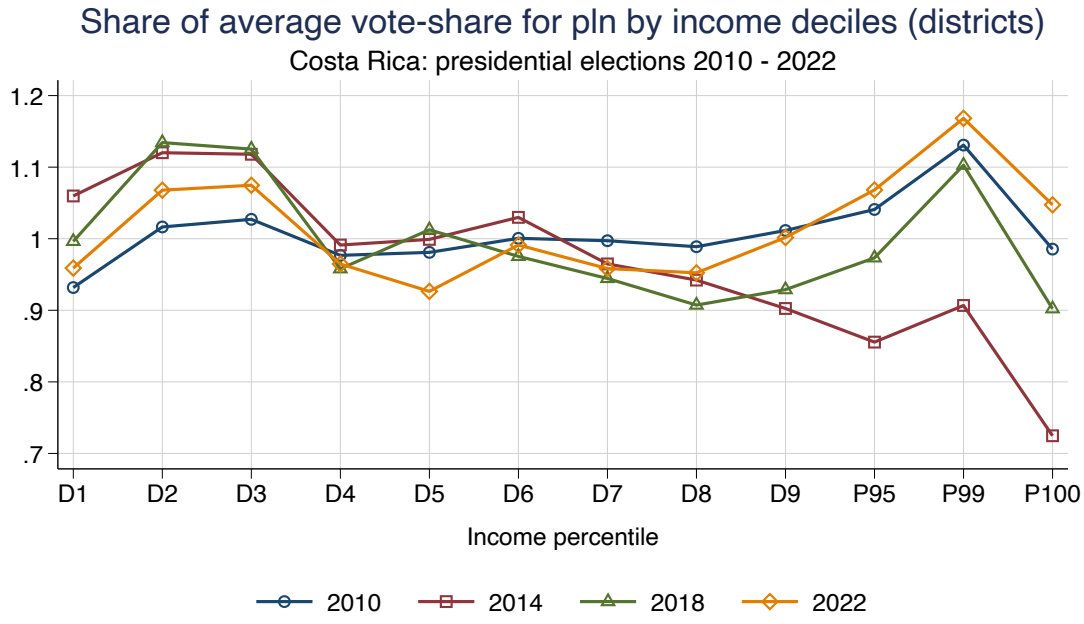
Source: authors' computations using Costa Rican political attitudes surveys.
Note: the figure shows the share of votes received by PUSC by income decile.

(b) PUSC.

Fig. B.47: Historical vote-shares by income deciles (surveys).

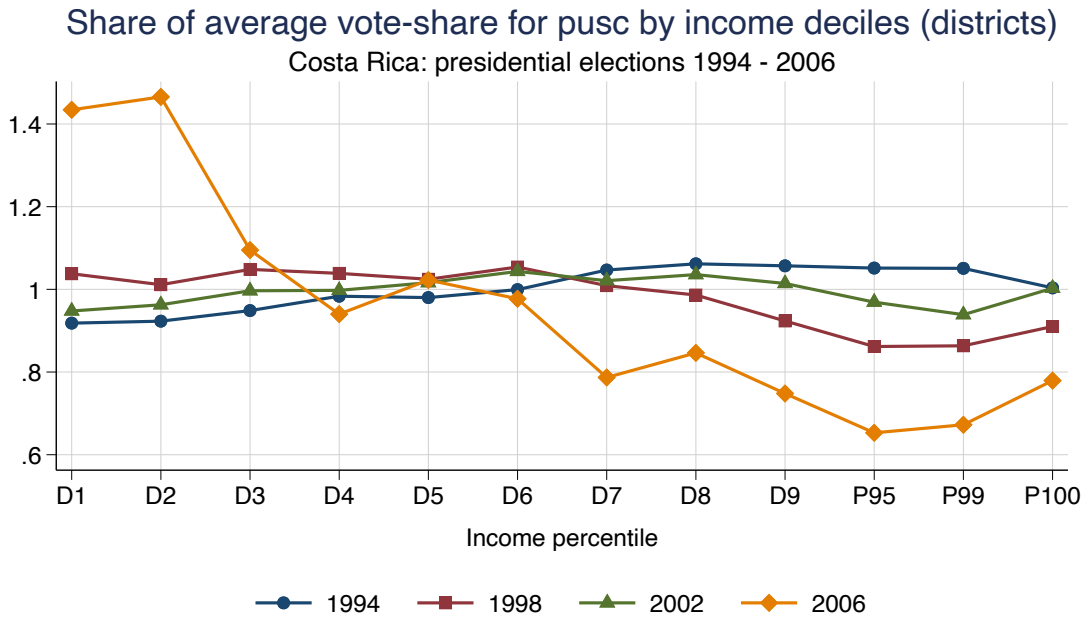


(a) 1994-2006.

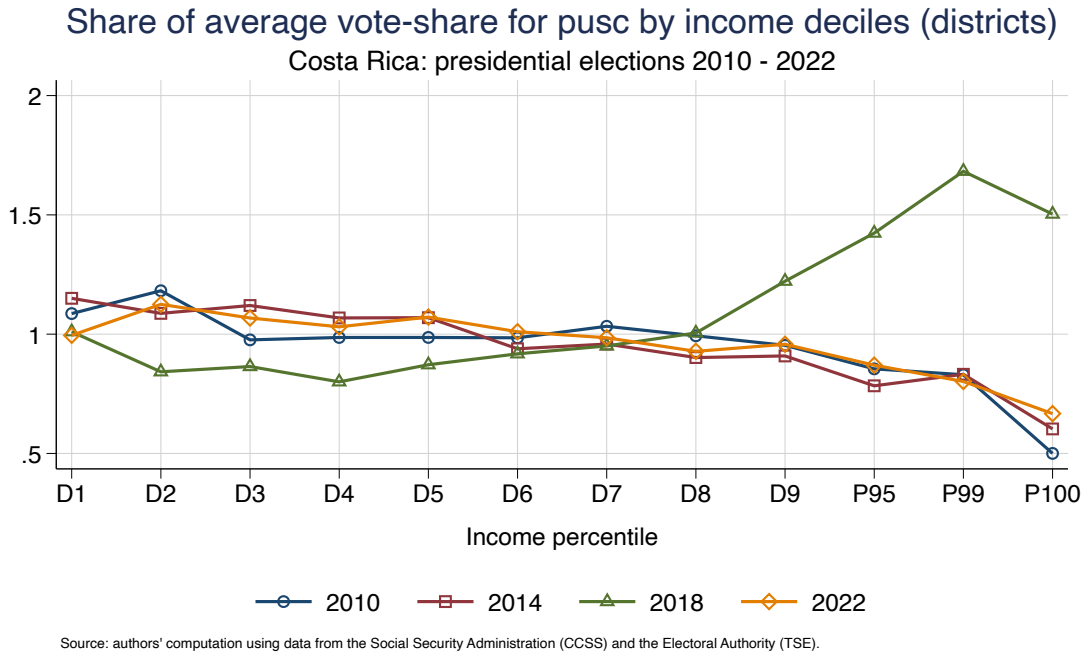


(b) 2010-2022.

Fig. B.48: Share of average vote-share PLN (decile district level / national level).



(a) 1994-2006.



(b) 2010-2022.

Fig. B.49: Share of average vote-share PUSC (decile district level / national level).

Effects of changes in income on vote shares for PLN in presidential elections, 2002-2018 (polling station level)

	(1) OLS	(2) FE	(3) FE lag	(4) cluster lag	(5) FE controls	(6) lag controls	(7) FE lag controls
log_PS_ave_wage	-0.049***	-0.050***	-0.065***	-0.054***	-0.038***	-0.027***	-0.025***
	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)
L.share_turnout			-0.228***	-0.086***		-0.065***	-0.250***
			(0.014)	(0.009)		(0.010)	(0.014)
Observations	32,393	32,393	25,173	25,173	32,393	25,173	25,173
r2_o	0.087	0.087	0.108	0.111	0.091	0.157	0.148
Polling station-level controls					YES	YES	YES
Clustered SE		YES	YES	YES	YES	YES	YES
Turnout presidential (t-1)			YES	YES		YES	YES
Year FE		YES	YES		YES		YES
Polling station FE		YES	YES		YES		YES

Standard errors in parentheses * p<0.1 ** p<0.05 *** p<0.01
Controls: public sector, skilled and unskilled.

Table B.50: Income and vote-shares for PLN.

Effects of changes in income on vote shares for PUSC in presidential elections, 2002-2018 (polling station level)

	(1) OLS	(2) FE	(3) FE lag	(4) cluster lag	(5) FE controls	(6) lag controls	(7) FE lag controls
log_PS_ave_wage	-0.030***	-0.034***	0.011***	0.002***	0.024***	-0.016***	-0.015***
	-0.001	-0.001	-0.001	-0.001	-0.002	-0.001	-0.001
L.share_turnout			0.097***	0.014***		-0.007	0.112***
			-0.007	-0.005		-0.005	-0.007
Observations	32,393	32,393	25,173	25,173	32,393	25,173	25,173
r2_o	0.027	0.027	0.001	0.001	0.166	0.073	0.057
Polling station-level controls					YES	YES	YES
Clustered SE		YES	YES	YES	YES	YES	YES
Turnout presidential (t-1)			YES	YES		YES	YES
Year FE		YES	YES		YES		YES
Polling station FE		YES	YES		YES		YES

Standard errors in parentheses * p<0.1 ** p<0.05 *** p<0.01
Controls: public sector, skilled and unskilled.

Table B.51: Income and vote-shares for PUSC.

Effects of changes in income on vote shares for PAC in presidential elections, 2002-2018 (polling station level)

	(1) OLS	(2) FE	(3) FE lag	(4) cluster lag	(5) FE controls	(6) lag controls	(7) FE lag controls
log_PS_ave_wage	0.039***	0.017***	0.011***	0.030***	0.029***	0.032***	0.037***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
L.share_turnout			0.096***	0.424***		0.327***	0.095***
			(0.010)	(0.009)		(0.008)	(0.010)
Observations	32,393	32,393	25,173	25,173	32,393	25,173	25,173
r2_o	0.060	0.060	0.131	0.137	0.212	0.321	0.246
Polling station-level controls					YES	YES	YES
Clustered SE		YES	YES	YES	YES	YES	YES
Turnout presidential (t-1)			YES	YES		YES	YES
Year FE		YES	YES		YES		YES
Polling station FE		YES	YES		YES		YES

Standard errors in parentheses * p<0.1 ** p<0.05 *** p<0.01
Controls: public sector, skilled and unskilled.

Table B.52: Income and vote-shares for PAC.

Effects of changes in income on vote shares for ML in presidential elections, 2002-2018 (polling station level)

	(1) OLS	(2) FE	(3) FE lag	(4) cluster lag	(5) FE controls	(6) lag controls	(7) FE lag controls
log_PS_ave_wage	0.004***	0.008***	-0.008***	-0.004***	-0.008***	0.003***	0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
L.share_turnout			-0.194***	-0.190***		-0.165***	-0.201***
			(0.011)	(0.007)		(0.007)	(0.011)
Observations	32,393	32,393	25,173	25,173	32,393	25,173	25,173
r2_o	0.001	0.001	0.037	0.038	0.073	0.048	0.047
Polling station-level controls					YES	YES	YES
Clustered SE		YES	YES	YES	YES	YES	YES
Turnout presidential (t-1)			YES	YES		YES	YES
Year FE		YES	YES		YES		YES
Polling station FE		YES	YES		YES		YES

Standard errors in parentheses * p<0.1 ** p<0.05 *** p<0.01
Controls: public sector, skilled and unskilled.

Table B.53: Income and vote-shares for ML.

Effects of changes in income on vote shares for FA in presidential elections, 2002-2018 (polling station level)

	(1) OLS	(2) FE	(3) FE lag	(4) cluster lag	(5) FE controls	(6) lag controls	(7) FE lag controls
log_PS_ave_wage	0.000	0.004***	0.005***	-0.002***	0.018***	0.015***	0.019***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
L.share_turnout			0.271***	0.089***		0.139***	0.274***
			(0.012)	(0.007)		(0.007)	(0.012)
Observations	19,566	19,566	19,027	19,027	19,566	19,027	19,027
r2_o	0.000	0.000	0.007	0.008	0.016	0.042	0.029
Polling station-level controls					YES	YES	YES
Clustered SE		YES	YES	YES	YES	YES	YES
Turnout presidential (t-1)			YES	YES		YES	YES
Year FE		YES	YES		YES		YES
Polling station FE		YES	YES		YES		YES

Standard errors in parentheses * p<0.1 ** p<0.05 *** p<0.01
Controls: public sector, skilled and unskilled.

Table B.54: Income and vote-shares for FA.

Effects of changes in income on vote shares for PRN in presidential elections, 2002-2018 (polling station level)

	(1) OLS	(2) FE	(3) FE lag	(4) cluster lag	(5) FE controls	(6) lag controls	(7) FE lag controls
log_PS_ave_wage	0.009***	0.038***	0.033***	0.016***	-0.007	0.013***	-0.009*
	(0.002)	(0.004)	(0.004)	(0.002)	(0.005)	(0.002)	(0.005)
L.share_turnout			-0.344***	-0.388***		-0.327***	-0.316***
			(0.032)	(0.015)		(0.016)	(0.032)
Observations	12,961	12,961	12,874	12,874	12,961	12,874	12,874
r2_o	0.002	0.002	0.046	0.054	0.005	0.088	0.035
Polling station-level controls					YES	YES	YES
Clustered SE		YES	YES	YES	YES	YES	YES
Turnout presidential (t-1)			YES	YES		YES	YES
Year FE		YES	YES		YES		YES
Polling station FE		YES	YES		YES		YES

Standard errors in parentheses * p<0.1 ** p<0.05 *** p<0.01
Controls: public sector, skilled and unskilled.

Table B.55: Income and vote-shares for PRN.

Effects of changes in income on vote shares for other in presidential elections, 2002-2018 (polling station level)

	(1) OLS	(2) FE	(3) FE lag	(4) cluster lag	(5) FE controls	(6) lag controls	(7) FE lag controls
log_PS_ave_wage	0.012***	0.017***	0.013***	0.008***	-0.001	0.004***	0.004***
	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
L.share_turnout			0.070***	-0.003		0.010**	0.073***
			(0.008)	(0.005)		(0.005)	(0.008)
Observations	32,393	32,393	25,173	25,173	32,393	25,173	25,173
r2_o	0.022	0.022	0.008	0.010	0.095	0.039	0.029
Polling station-level controls					YES	YES	YES
Clustered SE		YES	YES	YES	YES	YES	YES
Turnout presidential (t-1)			YES	YES		YES	YES
Year FE		YES	YES		YES		YES
Polling station FE		YES	YES		YES		YES

Standard errors in parentheses * p<0.1 ** p<0.05 *** p<0.01
Controls: public sector, skilled and unskilled.

Table B.56: Income and vote-shares for other parties.

Effects of changes in income on vote shares for PLN in presidential elections, 2002-2018 (polling station level)

	(1) OLS	(2) FE	(3) FE lag	(4) FE controls	(5) FE lag controls
log_PS_ave_wage	-0.049***	-0.033***	-0.009***	-0.035***	-0.006**
	(0.001)	(0.002)	(0.002)	(0.002)	(0.003)
L.share_turnout			0.052***		0.054***
			(0.008)		(0.008)
Observations	32,393	32,360	25,138	32,360	25,138
r2_a	0.087	0.719	0.843	0.720	0.844
Polling station-level controls				YES	YES
Clustered SE		YES	YES	YES	YES
Turnout presidential (t-1)			YES		YES
Year FE		YES	YES	YES	YES
Polling centre FE		YES	YES	YES	YES

Standard errors in parentheses * p<0.1 ** p<0.05 *** p<0.01
Clustered standard errors at polling centre.
Controls: public sector, skilled and unskilled.

(a) PLN.

Effects of changes in income on vote shares for PUSC in presidential elections, 2002-2018 (polling station level)

	(1) OLS	(2) FE	(3) FE lag	(4) FE controls	(5) FE lag controls
log_PS_ave_wage	-0.030***	0.000	-0.002	-0.004**	-0.004**
	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)
L.share_turnout			0.035***		0.030***
			(0.006)		(0.006)
Observations	32393	32360	25138	32360	25138
r2_a	0.027	0.862	0.681	0.863	0.688
Polling station-level controls				YES	YES
Clustered SE		YES	YES	YES	YES
Turnout presidential (t-1)			YES		YES
Year FE		YES	YES	YES	YES
Polling centre FE		YES	YES	YES	YES

Standard errors in parentheses * p<0.1 ** p<0.05 *** p<0.01
Clustered standard errors at polling centre.
Controls: public sector, skilled and unskilled.

(b) PUSC.

Table B.57: Income and vote-shares (polling centre FE).

Effects of changes in income on vote shares for PAC in presidential elections, 2002-2018 (polling station level)

	(1) OLS	(2) FE	(3) FE lag	(4) FE controls	(5) FE lag controls
log_PS_ave_wage	0.039***	0.034***	-0.001	0.028***	-0.004*
	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
L.share_turnout			0.003		-0.003
			(0.009)		(0.009)
Observations	32393	32360	25138	32360	25138
r2_a	0.060	0.622	0.785	0.638	0.788
Polling station-level controls				YES	YES
Clustered SE		YES	YES	YES	YES
Turnout presidential (t-1)			YES		YES
Year FE		YES	YES	YES	YES
Polling centre FE		YES	YES	YES	YES

Standard errors in parentheses * p<0.1 ** p<0.05 *** p<0.01
Clustered standard errors at polling centre.
Controls: public sector, skilled and unskilled.

(a) PAC.

Effects of changes in income on vote shares for ML in presidential elections, 2002-2018 (polling station level)

	(1) OLS	(2) FE	(3) FE lag	(4) FE controls	(5) FE lag controls
log_PS_ave_wage	0.004***	0.003***	0.005***	0.004***	0.003*
	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)
L.share_turnout			-0.005		-0.005
			(0.007)		(0.007)
Observations	32393	32360	25138	32360	25138
r2_a	0.001	0.785	0.770	0.792	0.770
Polling station-level controls				YES	YES
Clustered SE		YES	YES	YES	YES
Turnout presidential (t-1)			YES		YES
Year FE		YES	YES	YES	YES
Polling centre FE		YES	YES	YES	YES

Standard errors in parentheses * p<0.1 ** p<0.05 *** p<0.01
Clustered standard errors at polling centre.
Controls: public sector, skilled and unskilled.

(b) ML.

Table B.58: Income and vote-shares (polling centre FE).

Effects of changes in income on vote shares for FA in presidential elections, 2002-2018 (polling station level)

	(1) OLS	(2) FE	(3) FE lag	(4) FE controls	(5) FE lag controls
log_PS_ave_wage	0.000	0.003***	0.003***	0.004***	0.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
L.share_turnout			0.016***		0.016***
			(0.006)		(0.006)
Observations	19566	19538	18989	19538	18989
r2_a	-0.000	0.849	0.851	0.849	0.851
Polling station-level controls				YES	YES
Clustered SE		YES	YES	YES	YES
Turnout presidential (t-1)			YES		YES
Year FE		YES	YES	YES	YES
Polling centre FE		YES	YES	YES	YES

Standard errors in parentheses * p<0.1 ** p<0.05 *** p<0.01
Clustered standard errors at polling centre.
Controls: public sector, skilled and unskilled.

(a) FA.

Effects of changes in income on vote shares for PRN in presidential elections, 2002-2018 (polling station level)

	(1) OLS	(2) FE	(3) FE lag	(4) FE controls	(5) FE lag controls
log_PS_ave_wage	0.009***	-0.027***	-0.026***	-0.013	-0.015*
	(0.002)	(0.008)	(0.007)	(0.008)	(0.008)
L.share_turnout			-0.131***		-0.127***
			(0.017)		(0.017)
Observations	12961	12923	12827	12923	12827
r2_a	0.002	0.813	0.818	0.815	0.820
Polling station-level controls				YES	YES
Clustered SE		YES	YES	YES	YES
Turnout presidential (t-1)			YES		YES
Year FE		YES	YES	YES	YES
Polling centre FE		YES	YES	YES	YES

Standard errors in parentheses * p<0.1 ** p<0.05 *** p<0.01
Clustered standard errors at polling centre.
Controls: public sector, skilled and unskilled.

(b) PRN.

Table B.59: Income and vote-shares (polling centre FE).

Effects of changes in income on vote shares for other in presidential elections, 2002-2018 (polling station level)

	(1) OLS	(2) FE	(3) FE lag	(4) FE controls	(5) FE lag controls
log_PS_ave_wage	0.012***	-0.000	0.001	0.003***	0.003***
	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
L.share_turnout			-0.009		-0.006
			(0.006)		(0.006)
Observations	32393	32360	25138	32360	25138
r2_a	0.022	0.780	0.787	0.782	0.790
Polling station-level controls				YES	YES
Clustered SE		YES	YES	YES	YES
Turnout presidential (t-1)			YES		YES
Year FE		YES	YES	YES	YES
Polling centre FE		YES	YES	YES	YES

Standard errors in parentheses * p<0.1 ** p<0.05 *** p<0.01
Clustered standard errors at polling centre.
Controls: public sector, skilled and unskilled.

Table B.60: Income and vote-shares for other parties (polling centre FE).

Effect of movements in the income distribution on votes for PLN in presidential elections, 2002-2018
(30 percentiles)

	(1) OLS	(2) FE	(3) FE controls	(4) FE controls	(5) FE controls
share_climb30	2.451***	4.127***	3.097***	7.764***	7.931***
	(0.160)	(0.203)	(0.218)	(0.177)	(0.193)
share_drop30	-12.962***	-15.580***	-15.926***	-8.759***	-8.857***
	(0.183)	(0.216)	(0.222)	(0.199)	(0.205)
Observations	25902	25902	25352	25882	25334
r2_o	0.168	0.167	0.187	0.364	0.368
log Income				YES	YES
Turnout presidential (t-1)			YES		YES
Year FE		YES	YES	YES	YES
Polling station FE		YES	YES	YES	YES

Standard errors in parentheses * p<0.1 ** p<0.05 *** p<0.01

Table B.61: "Droppers", "climbers" & votes for PLN (polling station).

Effect of movements in the income distribution on votes for PUSC in presidential elections, 2002-2018
(30 percentiles)

	(1) OLS	(2) FE	(3) FE controls	(4) FE controls	(5) FE controls
share_climb30	-2.146***	-2.102***	-1.854***	-3.638***	-3.884***
	(0.081)	(0.103)	(0.111)	(0.095)	(0.105)
share_drop30	4.821***	6.460***	6.844***	3.617***	3.891***
	(0.093)	(0.110)	(0.113)	(0.107)	(0.111)
Observations	25,902.00	25,902.00	25,352.00	25,882.00	25,334.00
r2_o	0.095	0.093	0.099	0.226	0.219
log Income				YES	YES
Turnout presidential (t-1)			YES		YES
Year FE		YES	YES	YES	YES
Polling station FE		YES	YES	YES	YES

Standard errors in parentheses * p<0.1 ** p<0.05 *** p<0.01

Table B.62: "Droppers", "climbers" & votes for PUSC (polling station).

Effect of movements in the income distribution on votes for PAC in presidential elections, 2002-2018
(30 percentiles)

	(1) OLS	(2) FE	(3) FE controls	(4) FE controls	(5) FE controls
share_climb30	4.311***	0.147	0.623***	0.936***	1.935***
	(0.159)	(0.174)	(0.191)	(0.178)	(0.197)
share_drop30	-4.926***	-5.469***	-5.430***	-4.016***	-3.525***
	(0.182)	(0.186)	(0.194)	(0.201)	(0.209)
Observations	25902	25902	25352	25882	25334
r2_o	0.039	0.012	0.040	0.005	0.026
log Income				YES	YES
Turnout presidential (t-1)			YES		YES
Year FE		YES	YES	YES	YES
Polling station FE		YES	YES	YES	YES

Standard errors in parentheses * p<0.1 ** p<0.05 *** p<0.01

Table B.63: "Droppers", "climbers" & votes for PAC (polling station).

Effect of movements in the income distribution on votes for ML in presidential elections, 2002-2018
(30 percentiles)

	(1) OLS	(2) FE	(3) FE controls	(4) FE controls	(5) FE controls
share_climb30	4.120***	6.520***	5.922***	7.906***	7.563***
	(0.111)	(0.138)	(0.146)	(0.136)	(0.147)
share_drop30	-6.135***	-8.518***	-8.451***	-5.952***	-6.059***
	(0.127)	(0.148)	(0.148)	(0.153)	(0.156)
Observations	25902	25902	25352	25882	25334
r2_o	0.094	0.093	0.125	0.168	0.187
log Income				YES	YES
Turnout presidential (t-1)			YES		YES
Year FE		YES	YES	YES	YES
Polling station FE		YES	YES	YES	YES

Standard errors in parentheses * p<0.1 ** p<0.05 *** p<0.01

Table B.64: "Droppers", "climbers" & votes for ML (polling station).

Effect of movements in the income distribution on votes for FA in presidential elections, 2002-2018
(30 percentiles)

	(1) OLS	(2) FE	(3) FE controls	(4) FE controls	(5) FE controls
share_climb30	-1.530***	-2.105***	-1.337***	-2.011***	-1.436***
	(0.123)	(0.194)	(0.218)	(0.193)	(0.217)
share_drop30	-0.695***	-1.110***	-2.032***	-2.195***	-3.148***
	(0.137)	(0.190)	(0.196)	(0.207)	(0.217)
Observations	19740	19740	19190	19725	19177
r2_o	0.012	0.012	0.018	0.016	0.019
log Income				YES	YES
Turnout presidential (t-1)			YES		YES
Year FE		YES	YES	YES	YES
Polling station FE		YES	YES	YES	YES

Standard errors in parentheses * p<0.1 ** p<0.05 *** p<0.01

Table B.65: "Droppers", "climbers" & votes for FA (polling station).

Effect of movements in the income distribution on votes for PRN in presidential elections, 2002-2018
(30 percentiles)

	(1) OLS	(2) FE	(3) FE controls	(4) FE controls	(5) FE controls
share_climb30	-5.747***	-5.311***	-6.027***	-5.887***	-6.389***
	(0.249)	(0.569)	(0.568)	(0.538)	(0.539)
share_drop30	11.192***	19.384***	18.828***	16.495***	16.182***
	(0.270)	(0.462)	(0.462)	(0.449)	(0.449)
Observations	13123	13123	13027	13115	13019
r2_o	0.121	0.112	0.150	0.075	0.105
log Income				YES	YES
Turnout presidential (t-1)			YES		YES
Year FE		YES	YES	YES	YES
Polling station FE		YES	YES	YES	YES

Standard errors in parentheses * p<0.1 ** p<0.05 *** p<0.01

Table B.66: "Droppers", "climbers" & votes for PRN (polling station).

Effect of movements in the income distribution on votes for other in presidential elections, 2002-2018
(30 percentiles)

	(1) OLS	(2) FE	(3) FE controls	(4) FE controls	(5) FE controls
share_climb30	-3.081***	-3.729***	-3.889***	-4.522***	-4.957***
	(0.076)	(0.100)	(0.109)	(0.100)	(0.111)
share_drop30	6.356***	7.822***	8.146***	6.346***	6.592***
	(0.087)	(0.106)	(0.111)	(0.112)	(0.118)
Observations	25902	25902	25352	25882	25334
r2_o	0.173	0.173	0.179	0.204	0.209
log Income				YES	YES
Turnout presidential (t-1)			YES		YES
Year FE		YES	YES	YES	YES
Polling station FE		YES	YES	YES	YES

Standard errors in parentheses * p<0.1 ** p<0.05 *** p<0.01

Table B.67: "Droppers", "climbers" & votes for other (polling station).

Effect of inequality on electoral volatility in presidential elections: 2002 - 2018 (district level)

	(1) GLS	(2) GLS controls	(3) GLS FE	(4) GLS FE	(5) GLS FE	(6) GLS FE
Panel A: effect of inequality (Gini) on turnout in presidential elections						
district gini	0.246***	0.204***	0.204***	0.139***	0.061	0.132***
	(0.027)	(0.028)	(0.028)	(0.024)	(0.046)	(0.042)
Observations	2328	2303	2303	2301	2303	2301
r2_o	0.022	0.010	0.222	0.419	0.486	0.562
Panel B: effect of inequality (Bottom 50) on turnout in presidential elections						
Bottom 50	-0.431***	-0.349***	-0.350***	-0.221***	-0.013	-0.170***
	(0.044)	(0.044)	(0.044)	(0.038)	(0.066)	(0.061)
Observations	2328	2303	2303	2301	2303	2301
r2_o	0.019	0.017	0.226	0.419	0.485	0.562
Social Development Index (SDI)		YES	YES	YES	YES	YES
log Average Income		YES	YES	YES	YES	YES
Turnout presidential (t-1)				YES		YES
Year FE			YES	YES	YES	YES
District FE					YES	YES

Standard errors in parentheses

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

Table B.68: Inequality and electoral volatility

Effect of inequality on vote share for traditional parties in presidential elections: 2002 - 2018 (district level)

	(1) GLS	(2) GLS controls	(3) GLS FE	(4) GLS FE	(5) GLS FE	(6) GLS FE
Panel A: effect of inequality (Gini) on vote share for traditional parties in presidential elections						
district gini	-0.256***	-0.309***	-0.310***	-0.197***	-0.056	-0.096**
	(0.033)	(0.037)	(0.037)	(0.031)	(0.041)	(0.040)
Observations	2317	2302	2302	2300	2302	2300
r2_o	0.006	0.193	0.665	0.765	0.894	0.901
Panel B: effect of inequality (top 10) on vote share for traditional parties in presidential elections						
top 10	-0.215***	-0.287***	-0.297***	-0.234***	-0.165***	-0.176***
	(0.033)	(0.040)	(0.039)	(0.032)	(0.042)	(0.040)
Observations	2317	2302	2302	2300	2302	2300
r2_o	0.013	0.191	0.663	0.767	0.895	0.902
Social Development Index (SDI)		YES	YES	YES	YES	YES
log Average Income		YES	YES	YES	YES	YES
Turnout presidential (t-1)				YES		YES
Year FE			YES	YES	YES	YES
District FE					YES	YES

Standard errors in parentheses

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

Table B.69: Inequality and vote for traditional parties

Effects of inequality on pro-globalization parties in presidential elections, 2002-2018 (district level)

	(1) GLS	(2) GLS controls	(3) GLS FE	(4) GLS FE	(5) GLS FE	(6) GLS FE
Panel A: Effect of inequality (Gini) on pro-globalization parties in presidential elections						
district gini	0.088***	0.105***	0.105***	0.115***	0.162***	0.151***
	(0.020)	(0.022)	(0.022)	(0.022)	(0.034)	(0.034)
Observations	2317	2302	2302	2300	2302	2300
r2_o	0.001	0.188	0.748	0.750	0.849	0.850
Panel B: Effect of inequality (Bottom 50) on pro-globalization parties in presidential elections						
Bottom 50	-0.160***	-0.176***	-0.176***	-0.197***	-0.201***	-0.179***
	(0.033)	(0.034)	(0.034)	(0.034)	(0.048)	(0.049)
Observations	2317	2302	2302	2300	2302	2300
r2_o	0.005	0.185	0.749	0.751	0.848	0.849
Social Development Index (SDI)		YES	YES	YES	YES	YES
log Average Income		YES	YES	YES	YES	YES
Turnout presidential (t-1)				YES		YES
Year FE			YES	YES	YES	YES
District FE					YES	YES

Standard errors in parentheses

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

Table B.70: Inequality and vote for pro-globalization parties

Effects of inequality on conservative parties in presidential elections, 2002-2018 (district level)

	(1) GLS	(2) GLS controls	(3) GLS FE	(4) GLS FE	(5) GLS FE
Panel A: Effect of inequality (Gini) on consevative parties in presidential elections					
district gini	0.021***	0.028***	0.028***	0.056*	0.006
	(0.006)	(0.007)	(0.007)	(0.029)	(0.009)
Observations	2822	2805	2805	2805	2805
r2_o	0.003	0.042	0.916	0.381	0.943
Panel B: Effect of inequality (Bottom 50) on conservative parties in presidential elections					
Bottom 50	-0.046***	-0.057***	-0.057***	-0.085**	-0.017
	(0.009)	(0.011)	(0.011)	(0.042)	(0.013)
Observations	2822	2805	2805	2805	2805
r2_o	0.005	0.022	0.916	0.381	0.943
Social Development Index (SDI)		YES	YES	YES	YES
log Average Income		YES	YES	YES	YES
Year FE			YES		YES
District FE				YES	YES

Standard errors in parentheses

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

Table B.71: Inequality and vote for conservative parties

Descriptive Statistics (individual-level data): income of formal workers in Costa Rica, 2010, 2014 and 2018.

Year		2010 (wage earners)	2014 (wage earners)	2018 (wage earners)	2022 (wage earı
Sector	Public Sector	664,949	918,331	997,703	1,094.
	Private Sector	330,674	443,263	528,754	608.
Industry	UNSPECIFIED ACTIVITIES	358,912	492,258	664,945	751.
	Agriculture, hunting and forestry	199,640	300,830	356,739	400.
	Mining and quarrying	317,384	397,032	440,153	494.
	Manufacturing	429,310	550,381	634,129	678.
	Electricity, gas and water supply	731,526	924,580	1,010,378	1,019.
	Construction	303,978	367,227	389,817	416.
	Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods	328,118	416,512	488,522	534.
	Hotels and restaurants	248,067	310,828	358,643	369.
	Transport, storage and communications	458,822	547,486	598,235	643.
	Financial intermediation	745,558	996,716	1,069,244	1,170.
	Real estate, renting and business activities	427,273	540,273	671,213	817.
	Public administration and defence; compulsory social security	648,114	902,125	971,876	1,092.
	Education	549,851	703,614	824,173	867.
	Health and social work	412,581	521,567	624,979	656.
	Other community, social and personal service activities	338,596	470,104	551,806	632.
	Activities of private households as employers and undifferentiated production activities of private households	129,084	156,835	183,626	192.
	Extraterritorial organizations and bodies	795,609	1,151,704	1,230,515	1,485.
edu_level/occupation	unknown	667,931	764,008	941,148	1,203.
	unskilled	207,924	261,340	299,212	323.
	semi-skilled	400,031	478,247	533,090	579.
	skilled	503,116	723,275	842,169	917.
income	bottom 50	177,980	238,040	266,975	298.
	middle 40	475,376	607,989	698,604	800.
	top 10	1,313,016	1,692,992	1,947,703	2,162.
	top 1	3,893,942	5,052,150	5,879,700	6,445.
All workers	Average wage	436,213	565,104	646,939	728.
	Observations	847,825	999,498	1,112,599	916.

Source: authors' computation using data from Social Security (CCSS) and the Electoral Board (TSE) of Costa Rica.
Note: all figures are in normal Costa Rican colones (CRC).

Table B.72: Descriptive Statistics (individual-level data): income.

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