

Application Materials

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Inclusive Institutions, Unequal Outcomes: Democracy, State Capacity, and Income Inequality

Abstract

Although the relationship between democratic rule and income inequality has received important attention in recent literature, the evidence has been far from conclusive. In this paper, we explore whether the redistributive effect of democratic rule is conditional on state capacity. Previous literature has outlined that pre-existing state capacity may be necessary for inequality-reducing policies under democratic rule. In contrast to that intuitive view, this study argues that democratic rule and high state capacity combined produce higher levels of income inequality over time. This relationship operates through the positive effect of high-capacity democratic context on foreign direct investment and financial development. By making use of a novel measure of state capacity based on cumulative census administration, we find empirical support for these claims using fixed-effects panel regressions with the data from 126 industrial and developing countries between 1970 and 2013.

1. Introduction

Median voter and selectorate theories posit electoral democracy as fundamentally equalizing (Acemoglu and Robinson, 2006; Boix, 2003; Bueno de Mesquita et al., 2003; Meltzer and Richard, 1981).¹ However, these redistributive propositions have not received support in recent, more empirically-minded literature (Acemoglu et al., 2015; Remington, 2011; Scheve and Stasavage, 2017; Timmons, 2010; Wong, 2016). The skeptics of the inequality-reducing effects of democratic institutions have noted that deficiencies in mechanisms of responsiveness and accountability, clientelism, interest group capture, and the institutional legacies of authoritarianism may pose serious obstacles to redistributive policies under democratic rule (Albertus and Menaldo, 2018). It has also been suggested that such effects might be heavily context dependent (Dorsch and Maarek, 2019; Soifer, 2013).

Looking at context-conditionality could be a new way forward to clarify both the theoretical and empirical relationship between democracy and inequality. In this paper, we explore whether democracy's impact on inequality is conditioned by state capacity. It might be expected that pre-existing state capacity, in the form of functioning bureaucracies and territorial penetration, would be necessary for redistributive policies under democratic rule (Ziblatt, 2008).² For example, Soifer (2013) focused on the effect of inequality on democratization and argued that inequality-induced redistributive conflict only ensues in contexts of considerable levels of state capacity, which allows the implementation of redistributive taxation and transfer policies.

This study found no empirical support for these intuitive claims. Using fixed-effects panel regression models with data from 126 industrial and developing countries from 1970 to 2013, we show that democratic rule combined with high state capacity leads to increasing income inequality over time. This study's theoretical argument centers on the idea that democracy and high state capacity combined provide a context of optimal property rights protection and contract security. We argue that the high-quality investment environment backed by democratic and high-capacity state institutions increases income inequality through two transmission channels: the higher inflow of foreign direct investment (FDI) and the development of sophisticated financial sectors, which have been associated in recent literature with increasing income inequality. While income concentration in high-capacity democratic environments occurs through market inequality, we contend that fiscal policy in

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² We define "state capacity" as state institutions' ability to collect and manage information and to effectively execute policies in different areas, notably including market regulation and contract enforcement ("legal capacity") and resource extraction ("fiscal capacity") (Besley and Persson, 2009: 1219).

these contexts is not able to offset these changes. Multinational corporations and transnational elites become more relevant actors in national politics with increasing FDI flows and financial development, which allows them to exert downward pressure on labor-protecting regulations, redistributive taxation, and transfers.

Evaluating the effect of regime type on inequality at different levels of state capacity poses significant empirical challenges. Both regime type and state capacity tend to be endogenous to inequality levels and other socio-economic variables associated with economic development. Most importantly, democratic rule might create incentives to increase state capacity in order to levy more tax revenue and provide more public goods to citizens. We mitigate these concerns via a careful construction of a state capacity measure based on cumulative census administration, which is unlikely to reflect government policy priorities that are endogenous to democracy levels. We also use instrumental variables to relieve endogeneity concerns by instrumenting regime type with regional democratic diffusion. Our results, based on annual panel data, are robust to the system generalized method-of-moments estimator (GMM) analysis, alternative measurements of democracy, various sub-sample restrictions, such as excluding industrial and former Warsaw Pact countries from the analysis, and different lag structure specifications.

This paper joins several recent contributions in stressing the importance of conditional factors in the regime-inequality relationship. Our contribution is parallel to that of Dorsch and Maarek (2019), who argue that the effect of democracy on inequality is conditioned by the initial level of inequality. According to their argument, democratization tends to bring initial high or low levels of inequality to the “middle ground,” through either redistributive social policy or market reforms. We point to another factor that conditions the effect of democratic rule on inequality: state capacity, which principally affects inequality in the market income phase. This might well illuminate the institutional underpinnings of increasing within-country inequality in the last four decades in many parts of the world.³ The institutionalist literature has implicitly assumed that “inclusive institutions” do not only promote development but also more equal income distribution, at least in the long term (Acemoglu et al., 2001). In this paper, we provide evidence that this conclusion may not be warranted and that “inclusive” institutions—captured in the combination of democratic regime type and high-capacity state institutions—might well lead to a trend of steady increases in income inequality through different policy mechanisms.

The paper is structured as follows. In Section 2, we give an overview of the recent literature on democracy and inequality. In Section 3, we present our theoretical argument on the interactive relationship between democratic rule, state capacity, and inequality. Then, in Section 4, we present our research design and address issues of the measurement of key

³ There have been major exceptions to that trend, especially in Latin America, where inequality has declined since the end of 1990s, albeit very slowly.

variables. In Section 5, we present our results from fixed-effects panel models and the corresponding robustness checks. In Section 6, we test the transmission channels behind this relationship. In Section 7, we provide concluding remarks.

2. Democracy and Inequality

Democratic institutions have been conceptualized as a major source of responsiveness and accountability in the political economy literature, providing electoral incentives to redistribute income. Leaders in democratic nations need widespread support to achieve and sustain power and are, therefore, more likely to move beyond their narrow set of personal interests by appealing to a wider public through public policies (Meltzer and Richard, 1981). Compared to authoritarian polities, widespread enfranchisement in democracies is likely to result in higher public goods provision, which may help the poor to benefit from economic growth via investments in human capital (Baum and Lake, 2003; Lindert, 2004; Morgan and Kelly, 2013). These policies are expected to produce more equal income distribution over time.

Despite these plausible theoretical mechanisms, empirical evidence has not offered solid support for the inequality-reducing effects of democracy. Several empirical studies incorporating various regions of the developing world find that democracy does not induce lower income inequality (Acemoglu et al., 2015; Dorsch and Maarek, 2019; Gradstein and Milanovic, 2004; Timmons, 2010; Wong, 2016), more progressive taxation (Scheve and Stasavage, 2014), or pro-poor social policies (Mulligan, Gil, and Sala-i-Martin, 2004; Pagalayan, 2020; Ross, 2006). The causes of this “democratic unresponsiveness” have constituted a major puzzle for researchers. At the same time, some democracies might affect inequality more than others, and a focus on the social and institutional contexts in which democracies operate could offer a new way forward for fruitful theorizing.

In this paper, we concentrate on the question of whether democracy’s effect on inequality is conditioned on state capacity. We define “state capacity” as state institutions’ ability to collect and manage information and to effectively execute policies in different areas, notably including market regulation and contract enforcement (“legal capacity”) and resource extraction (“fiscal capacity”) (Besley and Persson, 2009: 1219). High state capacity implies a monopoly on violence over a territory and a cohesive and competent civil service and courts operating on the basis of well-established rules and routines. State capacity has received important attention recently as an explanatory variable in determining development outcomes (Hanson, 2015; Knutsen, 2013).

The previous literature has hinted that inequality reduction is more likely when both the political-electoral incentives stemming from regime characteristics and the state capacity to

redistribute exist. In low-capacity states, democratization should not matter for redistributive outcomes given their inability to collect taxes and implement social policy. Revenue extraction and policy implementation—both crucial for income redistribution—are dependent on the state's ability to penetrate its territory and implement decisions (Ziblatt, 2008). In low-capacity states, elites are able to escape taxation, lowering the state's ability to provide public goods and transfers (Scott, 1988). For example, income taxation requires identifying individual incomes both within the national territory and offshore, assessing value, and collecting payments. The implementation of redistributive policies, such as basic education, healthcare, social assistance, and insurance policies, is also likely to be dependent on the pre-existing capacity of the state institutions (Ziblatt, 2008).

3. Democracy, State Capacity, and Investor Confidence

In contrast to that intuitive account, we present a more nuanced understanding of the relationship between democracy, state capacity, and income inequality. Counterintuitively, we argue that democratic rule in the context of high state capacity is associated with increases in income inequality. It is plausible to think that democracy and high state capacity provide the context for optimal property rights and contract security, which favors investor confidence through lower-risk capital investments. The high-quality investment climate in a democratic, high-capacity setting increases inequality through two policy channels, financial development and larger FDI flows, that affect market income inequality. For several reasons—which we further introduce below—we believe that fiscal redistribution is not able to offset these inequality-concentrating mechanisms.

Under low state capacity, we would expect neither democratic nor authoritarian regime types to make much difference in terms of distributive outcomes, given that the state lacks the ability to undertake both redistributive policies and the provision of contract and property rights security. We also anticipate that in autocratic regimes, the level of state capacity does not matter for inequality. This is because different sub-types of authoritarian regimes are inherently diverse and have very different policy priorities in terms of property rights, contract security, and redistribution (Dorsch and Maarek, 2019). For instance, communist regimes in Eastern Europe and Asia led to extremely egalitarian outcomes over time, while many right-wing dictatorships in Latin America and Sub-Saharan Africa presided over the most unequal distributive outcomes in modern history. Our interactive theory therefore makes only the modest prediction that democratic rule is associated with increasing inequality in the context of high preexisting state capacity.

Democratic regimes have been widely portrayed as more likely to respect private property rights and provide greater rule of law, incentivizing capitalist investor confidence (North and Weingast, 1989; Olson, 2000). An influential argument has connected democracy with higher

FDI inflows precisely because of greater investment security (Busse and Hefeker, 2007; Jensen 2003, 2008). At the same time, democracy alone is not enough to secure investor confidence. Contract enforcement—based on state capacity to enforce the rule of law among private agents—is likely to be crucial for business confidence and attracting foreign investors, along with the protection of private property from arbitrary government involvement. Pre-existing state capacity clearly underlies this positive contractual environment (Besley and Persson, 2009). The “watchman” capacities of the state—Weberian-like central- and local-level bureaucracies, impartial courts, uniform weights and measures, and effective law enforcement institutions—are crucial for reducing uncertainty and transaction costs (Coase, 1960; Williamson, 1985). Therefore, it could be hypothesized that nations combining high state capacity with democratic rule achieve the highest FDI inflows (Li and Resnick, 2003).

In addition to fomenting FDI inflows, democratic high-capacity contexts offer an especially nurturing context for financial development. The checks and balances inherent to a democratic system reduce the government’s leverage in both expropriating assets and threatening property rights in the financial sector (Haber et al., 2008; Menaldo and Yoo, 2015). Yet these positive effects might not be achieved without pre-existing state capacity reducing important market failures that might otherwise result from information asymmetries and obstruct contract enforcement. For example, the creation of accurate property registers by the state allows banks to know who owns which assets, which facilitates the creation of contracts (Haber et al., 2008). The enforcement of modern bankruptcy law and the diffusion of the modern accounting standards underlying credit expansion may depend on the quality of bureaucracy and its ability to penetrate the reaches of the state territory. At the same time, stock market expansion is likely to depend on stronger corporate governance and the capacity to enforce bankruptcy laws (Becerra et al., 2012; Menaldo, 2016).

Thus far, we have argued that democratic and high-capacity state institutions are more likely to attract more FDI and help to develop sophisticated financial sectors. The second step of our argument connects these two variables with increasing income inequality. First, considerable recent evidence has pointed out that FDI flows may increase income inequality in both the developed and developing worlds (Basu and Guariglia, 2007; Jaumotte et al., 2013; Reuveny and Li, 2003). FDI inflows lead to an increased demand for skilled workers, associated with growing wage differentials between skilled and unskilled jobs, which is likely to increase income inequality (Decreuse and Maarek, 2015; Egan and Bogliaccini, 2017; Feenstra and Hanson, 1997; Kratou and Goaied, 2016). For example, investment by multinational corporations often creates a small sector of high wage earners and a large low-wage backward sector (Nafziger, 1997).⁴

⁴ Decreuse and Maarek (2015) show that FDI stock is negatively associated with the labor share in the host countries, though this effect is non-linear.

The development of a sophisticated financial system is another transmission channel by which investor confidence in high-state-capacity democracies produces higher income inequality. On the one hand, scholars have long recognized the growth-promoting and poverty-reducing effects of financial development through incentivizing and channeling savings (Beck et al., 2008). According to this view, financial development is likely to happen in the “extensive margin,” which is likely to be associated with more equal income distribution. On the other hand, financial development could be produced in the “intensive margin” through improvements in the quality and range of financial services available to those who already enjoy access to the financial system, which has an important potential to widen inequality and perpetuate intergenerational differences in economic opportunity (Greenwood and Jovanovic, 1990). Financial instruments, such as bonds and stocks, are likely to provide higher rates of returns to pre-existing capital, providing a basis for the concentration of financial assets (Piketty, 2014).

In addition, the un-equalizing effects of the financial system could work through a labor income channel. Financial sector employees are strongly concentrated at the top of the income distribution, and their earnings exceed those of employees with similar profiles (in terms of age, gender, and education) in other sectors. Asymmetric compensation schemes for bank managers may especially contribute to this un-equalizing dynamic (Denk and Cournède, 2015).⁵ Empirically, recent literature has provided evidence for both positive and negative associations between financial development and inequality. At least six recent papers find a positive association between financial sector size—usually proxied by private credit as a percentage of GDP—and an increase in income inequality, both in cross-national and subnational contexts (Dabla-Norris, et al., 2015; Denk and Cournède, 2015; Haan and Sturm, 2017; Jauch and Watzka, 2016; Jaumotte et al., 2013; Li and Yu, 2014). Other studies find that countries with higher levels of financial development have less income inequality (Hamori and Hashiguchi, 2012; Kunieda et al., 2014; Naceur and Zhang, 2016).

It might be expected that fiscal policy would offset the increase in market inequality in democratic high-capacity settings in the post-redistribution stage. However, while the context of high state capacity in democracies establishes preconditions for progressive taxation or social policy, the redistributive capacity does not automatically translate into policy outcomes. Inequality-increasing market processes also put pressure on fiscal policy, making it difficult to increase redistribution via taxes and transfers (Egan, 2010). With increasing FDI flows and more developed financial sectors, domestic and international corporate and financial elites become more relevant actors in national politics and are likely to exert

⁵ In addition, large financial sectors contribute to moral hazard problems. Given bailout expectations by the government, sophisticated financial instruments encourage the pursuit of high returns through risk-taking behaviors, benefiting members of the financial elite compared to other sectors of the economy (Korinek and Kreamer, 2014).

downward pressures on labor-protecting regulations and redistributive taxation and transfers (Wong, 2016).

A high concentration of income at the top increases potential resources for elite lobbying activities, augmenting their already disproportionate influence on policy making even in countries where considerable redistributive capacity exists (Acemoglu and Robinson, 2006). Starting in the mid-1970s, most industrial nations have experienced considerable reductions in marginal tax rates on income, which has contributed to higher inequality in the disposable income phase (Atkinson, 2015; Bartels, 2008; Gilens and Page, 2014). Egan (2010) shows that, in the Latin American context, accumulated FDI levels are associated with a greater likelihood of market economic reforms, such as lower tax burdens and domestic financial liberalization. Although further work needs to be done in this domain, it is likely that similar patterns of reinforcing elite dominance could be at play in other parts of the developing world, where economic elites enjoy similar political opportunities to concentrate capital.

To summarize, our theoretical propositions have the following empirical implications. Our main hypothesis is that democratic rule in a high-state-capacity context increases both market and post-redistribution inequality over time. We also posit that a democratic, high-capacity context is associated with larger annual FDI inflows and faster growth of the financial sector. For these reasons, we do not expect high-capacity democracies to experience larger fiscal transfers or redistribution, holding all else equal. Lastly, we also expect a positive association between FDI stock, financial development, and income inequality.

4. Research Design, Methods, and Data

We use annual fixed-effects panel regression models to test our propositions. We use unit fixed effects because we are particularly interested in changes within individual countries over time.⁶ Country-fixed effects allow us to account for country-specific omitted factors that are stable over time. The inclusion of a lagged dependent variable controls for autocorrelation. The model takes the following form:

$$\begin{aligned} Inequality_{i,t} = & \alpha_0 + \beta_0 Inequality_{i,t-1} + \beta_1 Democracy_{i,t-1} + \beta_2 State\ Capacity_{i,t-1} \\ & + \beta_3 Democracy * State\ Capacity_{i,t-1} + Controls_{i,t-1} + \gamma_i + \lambda_t + \mu_{i,t} \end{aligned}$$

Our main theoretical interest is the interaction term between the lagged values of democracy and the lagged values of cumulative state capacity; (β_3). γ_i and λ_t are the country- and year-fixed effects, respectively, while $\mu_{i,t}$ is the estimated residuals.

Variables and Measurement

⁶ List of countries is provided in the Appendix in Table A2.

Inequality: Our outcome variable is income inequality as measured by the Gini index. The Gini index ranges from 0 (perfect equality) to 100 (one person has all the income). We use the Standardized World Income Inequality Database (SWIID) (Solt, 2016) for our inequality measure. Using the Luxembourg Income Study (LIS) as the methodological standard for comparability, the SWIID incorporates data from various sources. The SWIID uses “model-based multiple imputation estimates of the many missing observations in the LIS series” (Solt, 2016, p. 1271), maximizing both comparability and sample size. Incomparability is reflected in the standard errors of the SWIID estimates, where the Gini estimates and their associated uncertainty are represented by 100 draws from the posterior distribution. The data set provides 100 imputations for each country-year observation (*ibidem*).⁷ The drawback of the SWIID data is therefore the reliance on estimation to fill in missing data points.

The SWIID is composed of four indicators—disposable income inequality (post-tax and -transfer), market income inequality (pre-tax and -transfer), absolute redistribution (the difference between the market income and disposable income Gini indexes), and relative redistribution (the percentage by which market income inequality is reduced). We expect a democratic high-capacity context to affect both market and disposable (net) income inequality. While we anticipate the inequality-increasing processes to work mostly through market income concentration, they also put a strain on fiscal redistribution, as we have argued above. Therefore, we present results with both net and market income inequality in our empirical analysis.

Democracy: We adopt the Boix et al. (2013) and Polity indicators as our main democracy measures. Boix et al.’s (2013) measure is based upon two principal components: 1) the use of elections to choose the legislature and, directly or indirectly, the chief executive, and 2) a minimum threshold of participation rights. The Polity democracy index consists of six component measures that record key qualities of executive recruitment, constraints on executive authority, and political competition (Marshall et al., 2017). It provides an ordinal ranking of political regimes on a scale of 10 to -10 (democracy to authoritarian regimes). Both of these measures offer almost universal country coverage over time. We further test the robustness of our results with the democracy indicators of Cheibub et al. (2010) and Dorsch and Maarek (2019) (based on the democracy measure initially developed by Papaioannou and Siourounis [2008] and Acemoglu et al. [2019]).

⁷ We make use of multiple imputation (MI) regression tools provided by Stata, as recommended by Solt (2016). We perform our main regressions over each of the 100 imputations in order to provide a reliable estimate of the coefficients, taking into account the standard errors across the 100 imputations. This allows the uncertainty of the SWIID to be reflected in MI regression estimates. Given that the MI estimation is computationally intensive, some MI regression tools are not available (e.g., 2LS2); we therefore chose to present the majority of our models with non-imputed estimates, calculating the mean of imputed series for each country-year, and performed the regressions on that single point estimate.

Given that inequality is likely to affect the prospects of democratic consolidation in different nations, issues of endogeneity must be discussed. Indeed, the level of inequality has figured as a crucial explanatory variable in previous studies of democratization (Acemoglu and Robinson, 2006; Ansell and Samuels, 2014; Boix, 2003). To mitigate reverse causality concerns, we make use of an instrumental variable strategy. Relying on previous work (Acemoglu et al., 2019; Dorsch and Maarek, 2019), we use regional waves of democratization as a source of exogenous variation in domestic democracy (Dorsch and Maarek, 2019). It is very unlikely that within-country inequality or other domestic economic and political variables could have an influence on the timing of regional democratization processes, while democratization waves clearly affect domestic democratization (Acemoglu et al., 2019; Huntington, 1991). It is implausible that democratic or autocratic waves have a direct effect on inequality in a particular country except through their effect on domestic political institutions. This instrument allows us to plausibly isolate an exogenous variation in democratic institutions.

We construct our instrument through the following strategy. For our binary indicator of democracy (Boix et al., 2013), we calculate the fraction of countries with democratic institutions in the region that shared the same regime type at the beginning of the panel. For instance, for country i , we add up the number of countries sharing regime type in the same region that are democratic at the time, excluding country i . For our continuous Polity indicator, we calculate the average democracy score in a region to instrument Polity scores in a given year, excluding the country itself.⁸

A possible violation of the exclusion restriction is that democratic transitions in neighboring countries affect domestic economic growth rates, which could affect economic variables domestically—especially if regional economies are integrated—which in turn affects both inequality and the likelihood of domestic democratic transition (Acemoglu et al., 2019). To mitigate these concerns, we control for log of GDP per capita in all models.

State Capacity: Operationalizing state capacity in the context of our analysis is a complicated task. Similar to regime type, state capacity tends to be endogenous to inequality levels and other socio-economic variables associated with economic development. In addition, democratization might affect state capacity by creating incentives to gather more tax revenue and provide more public goods and services to citizens (Acemoglu et al., 2011). Most existing measures used in the literature—based on fiscal capacity or levels of public goods provision—reflect the policy preferences of governments and are likely to be directly endogenous to regime type and inequality levels (Bockstette, 2002). In addition, as we explain below, expert survey-based indicators, such as the Bureaucratic Quality Index of the International Country Risk Guide (ICRG) or the World Bank (WB) Worldwide Governance

⁸ Following the definition of Dorsch and Maarek (2019), we define the regions as follows: Africa, Central Asia, Eastern Europe, Europe/U.S., Middle East, South-East Asia, South/Central America.

Indicators, are likely to be affected by expert biases of different types (Kurtz and Schrank, 2012).

We make use of a novel measure of state capacity that is less vulnerable to these problems: the regular ability to conduct national population censuses (Hanson, 2015; Soifer, 2013). The capacity to undertake periodic censuses captures the ability of the central state to gather information about its subjects, proxying well for functioning central and local bureaucracies and effective law enforcement institutions (Mann, 1984). In addition, censuses also provide the state the necessary information for the construction of tax registers, cadastral maps, and other forms of systematization (Soifer, 2013). Census administration therefore captures the capacity to collect and manage information and effectively execute policies in different areas, including market regulation, property rights protection, and contract enforcement (“legal capacity”) and the ability to extract resources (“fiscal capacity”) across national territory (Besley and Persson, 2009; Knutsen, 2013).

Even if nations have incentives to manipulate the timing, reach, and coverage of the censuses—concerns which we discuss below—there are no major political incentives to avoid them altogether. They are infrequent in time—conducted usually every five or 10 years—and take up relatively few resources compared to the implementation of welfare policies or infrastructure programs. However, they serve multiple purposes for both democratic and autocratic nations of different development levels (Christopher, 2008). Censuses not only provide information to identify subjects for taxation, military conscription, and government programs but have also figured as crucial nation-building devices for nations in the developing world while contributing to social control and surveillance for authoritarian regimes (Anderson, 1991; Lieberman and Singh, 2017; Taylor, 2019).⁹ It is therefore plausible to believe that the absence of a census acts as a direct signal of extreme state weakness, while its presence indicates meeting a minimal threshold of state organization. Where states cannot conduct censuses regularly, they are surely unable to undertake property rights and contract enforcement, even if they have political incentives to do so (Centeno, 2002).

We use data from the United Nations Social and Housing Statistics Section database on national population censuses,¹⁰ which documents information on the presence or absence of a standard national census for every country-year during the period 1945–2015, which covers

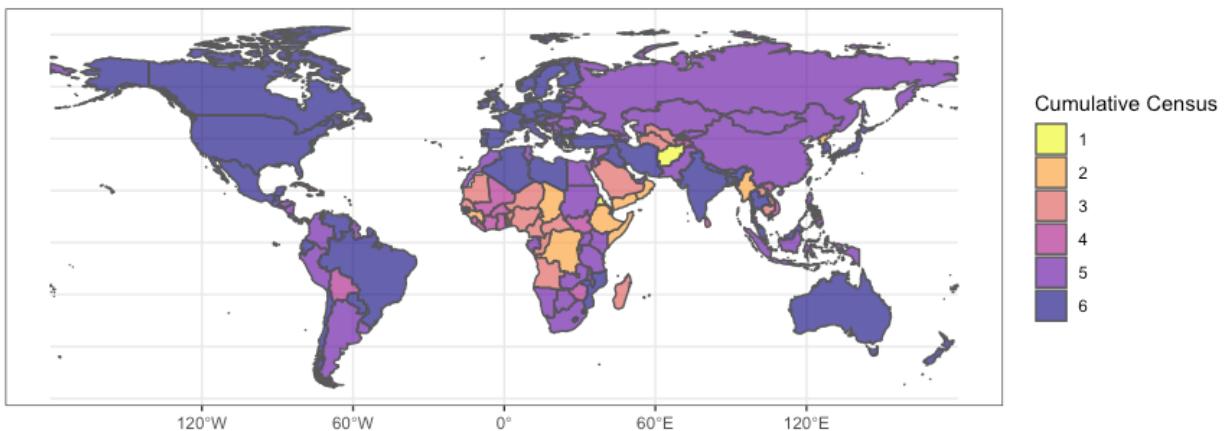
⁹ For instance, colonial independence movements, initially concerned with the censuses’ surveillance role, coopted them as a means of promoting national identity through the definition of a national population, akin to the definition of a national territory (Anderson, 1991).

¹⁰ The United Nations Social and Housing Statistics Section database excludes all censuses defined as “urban,” “administrative,” or “sample,” as well as all those described only as “scheduled,” since these censuses do not provide the government with systematic information about its entire population. This leaves two types of censuses in the sample: the standard census, as carried out in most countries, and the rolling census, carried out on an annual basis for a portion of the population in a small set of countries, including Iceland, Sweden, and Denmark (Hanson, 2015; Soifer, 2013).

13,466 country-years, as compiled by Hanson (2015).¹¹ An intuitive approach would be to create a lagged indicator measuring whether nations conducted a census in the past five or 10 years (Hanson, 2015; Soifer, 2013). Yet this measure is more likely to be endogenous to contemporary socio-economic situation and regime type, and the occurrence and timing of censuses could be manipulated by governments according to different policy priorities. For instance, it is possible that governments might determine the timing of censuses according to their electoral calendar to influence the boundaries of electoral districts (e.g., to exclude or include some particular ethnic and regional groups) or to show favorable population sizes in order to achieve more development aid from donors (Lieberman and Singh, 2017).

To mitigate these concerns, we construct a simple continuous indicator that counts the cumulative number of decades in which countries have conducted periodic censuses since 1950 for every country-year. The national censuses are conducted at either 10- or five-year intervals, and the absence of a census in a decade is likely to signal considerable weakness of the central government due to a lack of control over sub-national areas, absent bureaucracies, and inability to control national territory to its full extent. For instance, if a government were unable to conduct censuses in the 1950s and 1960s but able to do so in the 1970s and 1980s, the country receives a score of 2 for the whole decade of 1980–1990. The indicator has a global mean of 3.40 and standard deviation of 1.36. Figure 1 displays the cumulative census scores in 2010. In 2010, industrial countries have unanimously maximum values (6) on this indicator, while Somalia, Eritrea, Chad, Yemen, and Afghanistan possess the lowest values with only 1–2 census iterations.

Figure 1. Cumulative Census Variable in 2010



¹¹ The data for 1990–2020 is available in the United Nations Social and Housing Statistics Section <https://unstats.un.org/unsd/demographic-social/census/censusdates/>. The data for the period 1950–1990 is available at the United Nations Social and Housing Statistics Section. 2003. Ethnicity: A Review of Data Collection and Dissemination. Demographic and Social Statistics Branch, United Nations Statistics Division. At <http://unstats.un.org/unsd/demographic/sconcerns/popchar/Ethnicitypaper.pdf>.

This procedure—while rather blunt—creates an indicator that is largely unaffected by both expert coding bias and the policy priorities of governments, relieving inherent endogeneity bias (Soifer, 2013). This long-term measure—which captures the effect of censuses conducted in previous decades—is likely to “wash out” all temporary shocks resulting from the timing of elections, foreign aid priorities, or other time-variant policy agendas. These political incentives might explain why censuses are conducted in one particular year versus another but are unlikely to affect whether the census was conducted over a long time frame such as several decades. It is important to note that our measure captures all censuses conducted in the national territory since 1950 by any state—even those that were conducted under colonial administrations and nations that formed part of other countries. In this way, our measure accounts for pre-statehood state capacity. We demonstrate this point in the Appendix in Table A3., which lists all censuses in our sample that were undertaken under colonial administrations and parts of other countries.¹²

However, several potential criticisms of our measure merit discussion. First, our census indicator does not allow us to capture more subtle differences between countries that do not miss censuses, nor does it take into account more gradual increases or declines in state capacity occurring yearly.¹³ Despite these potential shortcomings, we argue that our indicator is considerably less susceptible to measurement error than the existing measurements based on expert evaluations, such as the Bureaucratic Quality Index (BQI) from the ICRG dataset and the WB World Governance Indicators, which are able to capture more subtle country-differences within regions.¹⁴ The “expert scores” are indeed likely to meaningfully reflect differences between countries in the same region (say between Sweden, Italy, and Albania in Europe).¹⁵

Yet these evaluations start to face enormous measurement validity issues—stemming from expert biases possibly inducing considerable measurement error—when comparing the aforementioned nations with countries outside of their political and cultural regions. Given

¹² Table A3. in the Appendix shows that states that emerged from other states with high capacity (had regular census administration) also had high capacity post-independence (i.e., had achieved a high cumulative census score by 2010), given that they had accumulated a high census score. As demonstrated by this table, the Soviet Union, Yugoslavia, and Czechoslovakia gave their high-capacity levels to successor states, given that all these censuses are captured by our measure. The table also shows that censuses conducted under colonial empires (British, French, and Portuguese) in other parts of the developing world are accounted for by our census measure as well.

¹³ We thank one of the anonymous reviewers for this comment.

¹⁴ For instance, our indicator does not allow us to capture any meaningful variation between industrial countries in Western Europe and North America, given that they have not missed censuses in any decade since the 1950s.

¹⁵ For example, Kurtz and Schrank (2012: 542) explain that measurements that rely on surveys, particularly of foreign investors or domestic firms, wrongly assume that “the interests of investors [...] and the interest of the state institutions are essentially coterminous.” In some instances where the state is strong and able to levy taxes and impose regulations, for example, the state will most likely “be judged ‘burdensome’ and ‘growth-inhibiting’ by many businesspersons” (Kurtz and Schrank, 2012: 542).

that what “high-quality bureaucracy” means in different countries is regionally and culturally specific, we cannot expect that quantitative gradations in expert scores for various dimensions meaningfully reflect differences in state strength (Kurtz and Schrank, 2012). A great advantage of our measure—besides its wide availability—is the fact that census occurrence is based on “hard” institutional data, which is not vulnerable to coding biases of the type that stem from expert evaluations (Knutsen, 2013; Kurtz and Schrank, 2012). Our simple measure is largely free of these measurement problems, as national censuses always include enumeration of the whole population (as defined by the UN), although their quality might vary considerably. The absence of a census gives a powerful indication of the weakness of state institutions in the developing world, despite the measure’s bluntness.

Second, another potential disadvantage of our measure, which sums up censuses over decades cumulatively, is that it cannot decline over time. To mitigate that concern, we have devised another cumulative census variable that introduces a penalty to the cumulative census score when countries miss the census in a decade. It is very plausible that when countries miss a census, state capacity is likely to decline. We believe that missing a census is likely to be a sign of inherent state fragility, which leads to a decline in state capacity. To demonstrate that our penalized measure is robust to different sizes of penalty, we create two versions of that variable. For every version, we subtract either 1 or 0.5 points from the accumulated state capacity variable when countries miss a census in a decade and find our results identical to the simple cumulative variable (Table 4).

Third, while all nations could potentially have a minimum of zero and a maximum of six censuses, colonial legacies could influence census administration and state capacity, confounding our results. Scholars have argued that former British colonies inherited higher institutional capacity and human capital stock at the time of independence compared to nations under French, Portuguese, and Belgian colonial rule (Cogneau and Moradi, 2014; La Porta et al., 1998; Landes, 1998).¹⁶ While former French, Belgian, and Portuguese colonies tend to have lower cumulative census scores, we show that these varying colonial legacies do not drive our results in any meaningful way. We capture the effects of different colonial legacies on different countries through sample restrictions and present evidence that our results are not driven by these trends in Table A6. in the Appendix.¹⁷

¹⁶ For instance, the British established a system of indirect rule—enabling local autonomy and self-governance—while the French relied on direct colonial rule accompanied by repression (Landes, 1998). Others have contrasted liberal British policies regarding missionary schooling to restrictive systems of state education in French dependencies, which led to higher human capital outcomes in British colonies (Cogneau and Moradi, 2014).

¹⁷ Table A.3 I shows that British colonies (with a cumulative census score of 4.5 in 2010) seemed to conduct more censuses than the French (3.38 in 2010), Belgian (3 in 2010) and Portuguese (4 in 2010) ones in the 1950s, and also have a higher cumulative census score in 2010. Yet, as we show in Table A6, varying colonial legacies do not confound our results.

Lastly, it might be that civil wars confound the relationship between cumulative census administration, democracy, and inequality. Civil wars are indeed the principal reason why nations are not able to take on censuses. Yet, while having a dreadful short-term effect on state capacity, not all civil wars lead to a deterioration of state capacity in the long term, which our measure intends to capture. As suggested by Pagalayan (2020), civil wars might incentivize central states to cater more public goods to sub-national regions that had been neglected by central governments before the conflict. In some cases, states have indeed started to conduct censuses rather quickly after civil wars with the aim of gathering information on citizens to provide better public services to them (Verpoorten, 2012). This discussion prescribes that we should not expect a clear relationship between civil wars and census administration proxying for state capacity. We account for these concerns by introducing control variables for civil conflict and ethnic fractionalization, variables commonly connected to domestic conflicts.

Our cumulative census measure is correlated to a reasonable degree with other proxies of state capacity. It has a .55 correlation with GDP per capita, a .33 correlation with tax revenue (as a percentage of GDP), and a .45 correlation with school enrollment. This suggests that the cumulative census variable is a reasonable proxy for “fiscal” state capacity. Our indicator has a slightly weaker association with “legal capacity”—property rights protection and contract enforcement. Our measure has a .39 correlation with Fraser Institute’s Economic Freedom Index, and .35 and .40 correlations with Property Rights Protection and Enforcement of Legal Contracts indicators in the same data base, respectively. Our indicator is not correlated with the Gini index (.03), which relieves the concern that censuses might be especially likely to be absent in low- or high-inequality nations.

Control Variables: Besides country- and year-fixed effects, we add a series of control variables to account for alternative factors that might be associated with inequality changes (in our baseline models). We add the log of GDP per capita to control for the level of economic development. We include trade openness as an indicator of economic openness, measured as imports and exports as a percent of GDP (Reuveny and Li, 2003). Inflation captures the macroeconomic situation of the country. Finally, we include the urban share of the population to account for the structure of the economy. Our control variables come from the World Development Indicators (WDI) of the World Bank. Descriptive statistics for these control variables are presented in the Appendix (Table A1.) We discuss the measurement of FDI, financial development, and other control variables in Section 6.

5. Results

We start the presentation of our results with models without the interaction term (Table 1). Our results directly replicate previous studies of inequality (Dorsch and Maarek, 2019;

Gradstein and Milanovic, 2004; Timmons, 2010; Wong, 2016). Models 1 and 2—using the MI approach, as suggested by Solt (2016)—show a lack of association between the Boix (Model 1) and Polity (Model 2) indicators of democracy and net inequality, respectively, while controlling for covariates typically used in the literature and considering country- and year-fixed effects.

In order to capture the conditional effect—and following Dorsch and Maarek (2019)—we first add an interaction between our binary Boix democracy indicator and the cumulative census score prior to democratization, therefore using a fixed state capacity variable for these interaction terms (Models 3 and 5).¹⁸ Model 3 presents results with MI estimation, Model 5 with imputed series. The results from columns 3 and 5 directly support our counterintuitive theoretical contentions: democratization and state capacity interact positively in producing higher inequality levels.¹⁹ Very similar coefficients are produced using the means of the imputed series.²⁰

These effects are substantively meaningful. The dichotomous democracy indicator allows us to calculate the long-run effect of democratic transitions under different levels of state capacity. The shift from democratic to authoritarian under the highest value of state capacity (six censuses) results in an increase in future inequality of 3.7 Gini points (Model 3), holding all other variables constant at their means. We follow the advice of Berry, Golder, and Milton (2012) and present the conditional effect of democracy at different levels of state capacity graphically, using the results from Model 5 (Table 1). Figure 2 shows that democracy has a positive effect on income inequality when state capacity is high at the moment of democratization (approximately two census iterations). To get a better sense of these results, Table 1 also provides the marginal impacts of the interaction term.

We obtain a similar result using the Polity continuous indicator as our democracy indicator (Models 4 and 6). While the continuous indicator does not allow us to calculate long-run effects, it allows us to evaluate the marginal impact of more gradual shifts in regime type, conditional on lagged levels of cumulative censuses (lagged in one period). Under the maximum level of state capacity (six censuses), the shift from full authoritarianism to full

¹⁸ The advantage of this approach is that it allows us to calculate the long-run effects of shifts from autocracy to democracy. Following Dorsch and Maarek (2019, eq. 4) and Brambor, Clark, and Golder (2006), we define the marginal effect of democracy when we include the interaction term as $\partial\text{Gini}\partial\text{Democracy} = 1 + 3*\text{State Capacity}$, for which the long-run effect is given by $1 + 3*\text{State Capacity}(\text{Max, Med}) 1 - 0$.

¹⁹ For Models 5 and 6, the stationarity of residuals were tested using conventional panel unit root tests. Thus, Fisher's tests with both the Augmented Dickey Fuller and the Phillips-Perron specifications were implemented. We report these tests in Table A4 in the Appendix. All variables in the main models were tested (models 5 and 6 in Table 1) i.e., dependent independent ones. All tests also included parameters to test for trend and drift. All tests included one lag, which is the same lag structure used in the estimation procedures. These tests were implemented using the “*xtfisher*” routine in Stata (v. 15). As the table suggests, most tests indicate stationary residuals at conventional levels of statistical significance.

²⁰ We prefer the median imputed series specification, as it is not as computationally intensive as MI models, while results are identical.

democracy (from -9 [10th percentile] to 10 [90th percentile] in Polity scores) would result in a 4.5-Gini-point increase in inequality in 10 years, holding all other variables constant at their means. The marginal effects of Polity are presented in Figure 3.

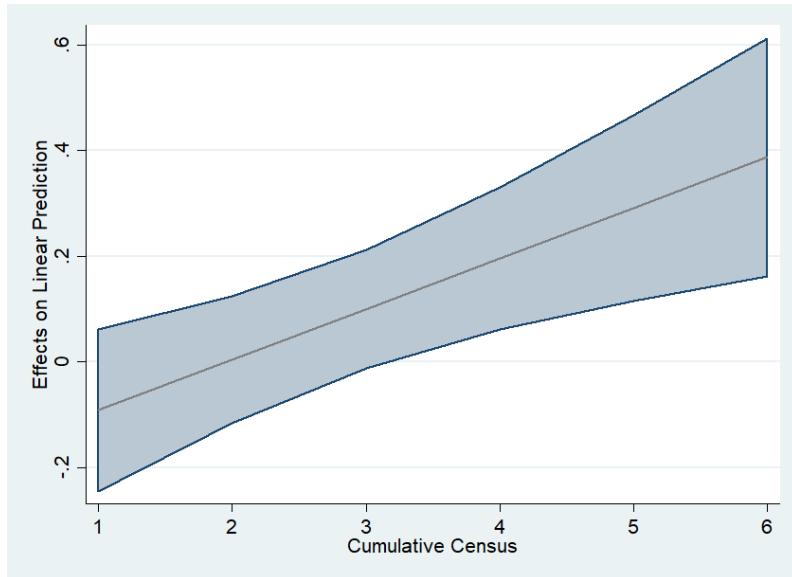
Table 1. Effect of Democracy and State Capacity on the Net Gini Index

	Multiple Imputation			Mean Imputed series		
	(1) Boix	(2) Polity	(3) Boix	(4) Polity	(5) Boix	(6) Polity
Gini Lagged	0.919*** (0.008)	0.920*** (0.008)	0.917*** (0.008)	0.921*** (0.008)	0.937*** (0.006)	0.941*** (0.006)
Boix Democracy	-0.065 (0.065)		-0.337*** (0.124)		-0.187* (0.102)	
Polity Democracy		-0.004 (0.006)		-0.021** (0.009)		-0.022*** (0.007)
Cumulative Census			-0.036 (0.048)	0.004 (0.086)	0.088** (0.040)	-0.043 (0.064)
Boix Democracy*Cumulative Census			0.107*** (0.037)		0.096*** (0.031)	
Polity*Cumulative Census				0.007** (0.003)		0.008*** (0.002)
GDP (log)	0.279** (0.134)	0.278** (0.137)	0.246* (0.129)	0.259* (0.133)	0.382*** (0.085)	0.426*** (0.083)
Inflation	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000* (0.000)	0.000* (0.000)
Urban Population	-0.013 (0.008)	-0.013 (0.008)	-0.008 (0.007)	-0.010 (0.008)	0.002 (0.005)	-0.001 (0.005)
Trade	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	0.001 (0.001)	0.000 (0.001)
LR effect at Census=6			3.67		6.17	
LR effect at Census=3			-0.19		1.6	
Marg. impact at Census=6			0.305	0.021	0.389	0.026
Marg. impact at Census=3			-0.016	0.000	0.101	0.002
Country and Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,190	4,006	4,019	3,962	3,778	3,962
R-squared	0.99	0.99	0.99	0.99	0.99	0.99

Notes: The dependent variable is the net Gini coefficient and the main explanatory variables are one-period-lagged democratic scores from Boix et al. (2013) and Polity IV by Marshall et al. (2016) interacted with the

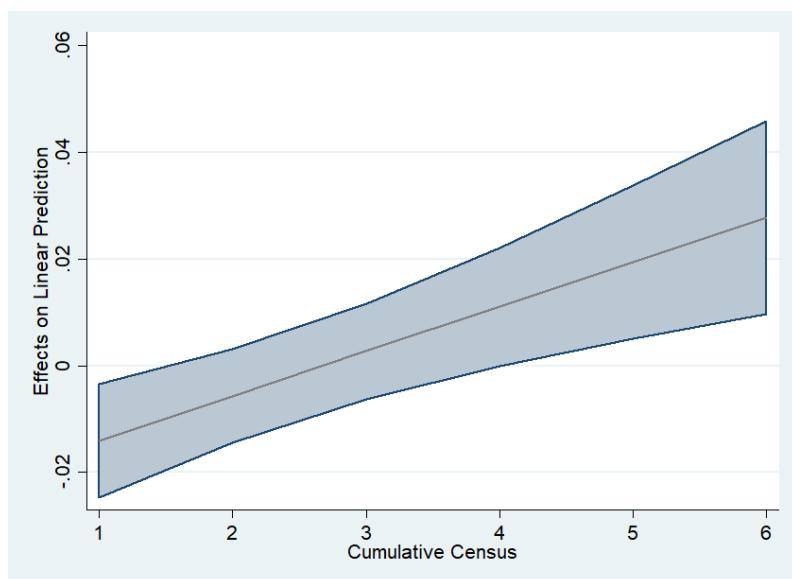
cumulative census variable. The unit of analysis is country-year. All specifications include a full set of country- and year-fixed effects. All independent variables are lagged one year. Standard errors are clustered at the country level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Figure 2. Marginal Effect of Boix Democracy Indicator on Gini Index for Different Pre-Democracy Cumulative Census Values



Note: Conditional Effect of Democracy and State Capacity on Inequality. The panel shows the predicted change in the Gini index from democratic transitions using Boix et al.'s (2013) democracy index at different pre-democracy cumulative census scores according to the estimates in Table 1, Model 5. The blue lines represent the 95% confidence intervals.

Figure 3. Marginal Effect of Polity Democracy Indicator on Gini Index for Different Lagged Cumulative Census Values



Note: Conditional Effect of Democracy and State Capacity on Inequality. The panel shows the predicted change in the Gini index from a one-unit change in democracy (Polity) at different lagged cumulative census values according to the estimates in Table 1, Model 6. The blue lines represent the 95% confidence intervals.

2SLS and GMM Estimations

Table 2 (Models 1–4) presents results from 2SLS instrumental variable regressions for both of our democracy indicators (Boix and Polity) with the means of imputed series. We consider both democracy and its interaction term with cumulative census values as endogenous and instrument for them with regional democracy share/scores and an interaction of the latter with the cumulative census indicator. We perform these analyses for our two democracy variables. We present the first stage's results in the Appendix (Table A5), where we demonstrate a positive association between our regional instruments, our democracy indicators, and second-stage results, with required statistics, in Table 2. In order to have an over-identified specification, as a third excluded instrument, we also use the regional wave measure from five years before our one-year lagged democratization/democracy score regressor (the sixth lag of the share of a country's region that is democratically governed, in the case of the Boix indicator).

In addition, we present F-statistics of excluded instruments for the first-stage regressions in Table 1. Cragg–Donald F-statistics give evidence that the set of instruments is strong (above the rule of thumb of 10). The large p-values in the Hansen J statistics also confirm that the excluded instruments are exogenous. The results from the 2SLS procedure are similar to those in Table 1, with coefficients of interaction term larger in size. The shift from democratic to authoritarian rule under the highest value of state capacity results in an 8-Gini-point increase in inequality in the long run, holding all other control variables constant at their means (Model 1).

Table 2. Effect of Democracy and State Capacity on the Net Gini Index—2SLS and GMM

	2SLS			GMM	
	(1) Boix	(2) Polity	(3) Boix	(4) Polity	(5) Boix
Lagged Gini	0.937*** (0.006)	0.944*** (0.006)	0.944*** (0.006)	0.941*** (0.009)	0.995*** (0.001)
Boix Democracy	-0.117 (0.245)		-0.096 (0.243)		-0.216** (0.087)
Boix*Cumulative Census	0.108** (0.053)		0.085* (0.055)		0.039* (0.024)
Polity Democracy		-0.055*** (0.015)		-0.062** (0.031)	-0.020*** (0.007)
Polity*Cumulative Census		0.007* (0.004)		0.011** (0.003)	0.005** (0.002)
Cumulative census	0.097* (0.056)	-0.082 (0.064)	0.133** (0.057)	0.012 (0.018)	0.001 (0.017)
					0.012 (0.018)

GDP (log)	0.392***	0.034	0.298**	0.017	0.201**	0.032*
	(0.088)	(0.045)	(0.093)	(0.021)	(0.179)	(0.017)
Inflation	0.000*	0.000	0.000	0.000	0.000***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Urban Population	0.001	0.006	0.002	0.006	-0.001*	-0.002**
	(0.006)	(0.006)	(0.006)	(0.009)	(0.001)	(0.001)
Trade	0.001	0.002	0.002*	0.001	0.000	0.000
	(0.001)	(0.001)	(0.001)	(0.001)		
Ethnic Diversity			8.099	1.613		
			(6.531)	(2.836)		
Civil Conflict			-0.091	-0.117*		
			(0.060)	(0.068)		
ODA (log)			-0.006	-0.007*		
			(0.004)	(0.004)		
Left			0.008	0.099*		
			(0.041)	(0.057)		
Growth			-0.604*	-0.069		
			(0.350)	(0.438)		
Fraser Index			0.013	0.015		
			(0.013)	(0.014)		
LR effect at Census=6	8.43		7.39		3.6	
LR effect at Census=3	3.29		2.84		-19.8	
Marg. impact at Census=6	0.531		0.414		0.018	
Mar. impact at Census=3	0.207		0.159		-0.099	
C-D F stat on excl. IVs	84.26	58.56	73.14	56.78		
Hansen J-stat p-value	0.11	0.14	0.12	0.26	0.38	0.9
Excluded Instruments	3	3	3	3		
Number of Instruments					98	124
AR(1)					0.000	0.000
AR(2)					0.888	0.640
Observations	4,034	4,020	3,999	3,894	3,160	3,042
R-squared	0.741	0.742	0.837	0.769	0.769	0.818

Notes: The dependent variable is the net Gini coefficient and the main explanatory variables are one-period-lagged democratic scores from Boix et al. (2013) and Polity IV by Marshall et al. (2016) interacted with the cumulative census variable. The unit of analysis is country-year. All specifications include a full set of country- and year-fixed effects. All independent variables are lagged one year. Standard errors are clustered at the country level. *** p<0.01, ** p<0.05, * p<0.1.

In Models 3 and 4, we further probe the validity of our instrumental variable strategy by including various control variables that might confound the conditional effect of democracy and state capacity on inequality. First, given that civil conflicts are likely to affect both census administration and inequality, we control for lagged events of civil conflict by including an indicator from the Uppsala Conflict Data Program and the Peace Research Institute (UCDP/PRI) Armed Conflict Dataset (Gleditsch et al., 2002). Second, left governments are more likely to engage in redistributive policies and investments in state capacity. We grasp this effect through the left partisanship indicator from the Database of Political Institutions (Beck et al., 2001). Third, we also control for Official Development Aid (ODA) as a percentage of GDP to account for its possible effects on census administration. Fourth, ethnic diversity could hinder redistributive policies (Pfetzing and Sturm, 2020), which we account

for by controlling for the Herfindahl index from the Ethnic Power Relations (EPR) Core Dataset (Cederman, Wimmer, and Min, 2010). Lastly, we control for the Fraser Institute Index of Economic Freedom, a summary index constructed from five components (size of government, legal system and property rights, sound money, freedom to trade internationally, and regulation) (Krieger and Meierrieks, 2016). In both models, our results remain unaltered, for both the Boix et al. (2013) and Polity measures.

To further bolster the robustness of our conclusions, we also provide results using the system method-of-moments estimator (GMM) introduced by Arellano and Bond (1991) and Arellano and Bover (1995) (Models 5 and 6). The GMM system uses lagged explanatory variables in levels and differences as instruments. AR(1) and AR(2) in Table 2 report the p-values for first- and second-order autocorrelated disturbances in the first differences equations, where the null denotes no correlation. The first-order serial correlation AR(1) is expected since we are including lags as instruments. However, a correlation at higher orders than 1 would lead to an inconsistent estimator. Hence, the null should not be rejected for AR(2). Our results are robust to GMM estimation.

Robustness Tests

In Table 3, we present further robustness tests considering some intuitive sample restrictions. In Models 1 and 2, we replicate our results with 5-year panels. The effect of political variables on distributive outcomes is usually slow-moving, and democracy might take time to produce results, so longer panel lengths may capture more substantive variation in the variables between each observation (Dorsch and Maarek, 2019). We take the variables' values in the first year of each five-year time period, starting from 1970 (independent variables are lagged by one panel period). We demonstrate that identical results to annual panels are obtained using 5-year panels, interacting Boix (Model 1) and Polity IV (Model 2) variables with our cumulative census indicator.²¹ A shift from autocracy to democracy under the highest cumulative census value (6) results in a 7-Gini-point increase in inequality in the long term.

In Models 3 and 4, we replicate our main results, excluding industrial countries from the sample. We replicate our results with both democracy measures. Therefore, we are certain that our results are not driven by an increasing inequality trend in the industrial world since the 1970s but can be generalized more widely to other regions (Atkinson, 2015; Piketty, 2014). In Models 3 and 4, we find an identical effect when excluding former Warsaw Pact nations, where inequality increased after democratization in a relatively high-capacity context. Both long-run and marginal effects look similar to those of previous models. *Further robustness.* The colonial origins of the countries could also affect our results. In Table A6.,

²¹ Lagged variables are thus lagged by one panel period.

we exclude French and British developing world colonies from our sample, and replicate our results. This gives evidence that different colonial legacies affecting state capacity do not affect our results.

Table 3. Effect of Democracy and State Capacity on the Net Gini Index: Robustness

	Mean Imputed series					
	5-year Panels		OECD Excluded		Warsaw Pact Excluded	
	(1) Boix	(2) Polity	(3) Boix	(4) Polity	(5) Boix	(6) Polity
Gini Lagged	0.714*** (0.032)	0.689*** (0.034)	0.942*** (0.007)	0.935*** (0.008)	0.937*** (0.006)	0.936*** (0.007)
Boix Democracy	-1.177** (0.555)		-0.112 (0.135)		-0.175* (0.105)	
Polity Democracy		-0.082** (0.041)		-0.024*** (0.008)		-0.003 (0.010)
Cumulative Census	0.024 (0.237)	0.448 (0.352)	0.153*** (0.049)	-0.068 (0.077)	0.092** (0.042)	-0.081 (0.075)
Boix *Cumulative Census	0.515*** (0.170)		0.080** (0.040)		0.093*** (0.032)	
Polity*Cumulative Census		0.041*** (0.013)		0.003* (0.002)		0.009*** (0.003)
Inflation	0.000 (0.000)	0.001 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000** (0.000)
Urban Population	-0.006 (0.028)	0.001 (0.029)	0.011* (0.007)	0.007 (0.007)	0.001 (0.005)	-0.003 (0.006)
Trade	0.013** (0.005)	0.002 (0.005)	0.002** (0.001)	0.000 (0.001)	0.001 (0.001)	0.000 (0.001)
GDP (log)	0.501*** (0.101)	1.692*** (0.481)	0.486*** (0.103)	0.540*** (0.101)	0.383*** (0.089)	0.460*** (0.103)
LR effect at Census=6	6.69		6.34		6.08	
LR effect at Census=3	1.29		2.21		1.65	
Marg. impact at Census=6	1.913	0.450	0.368	0.01	0.383	0.05
Marg. impact at Census=3	0.368	0.198	0.128	-0.02	0.104	0.02
Observations	692	665	3,170	2,987	3,782	3,469
R-squared	0.967	0.969	0.984	0.985	0.990	0.990

Notes: The dependent variable is the net Gini coefficient and the main explanatory variables are lagged democratic scores from Boix et al. (2013) and Polity IV by Marshall et al. (2016) interacted with the cumulative census variable. Models 1 and 2 consider 5-year panels, while for Models 3–6, the unit of analysis is country-year. All specifications include a full set of country- and year-fixed effects. Standard errors are clustered at the country level. *** p<0.01, ** p<0.05, * p<0.1.

We also test the robustness of our results using a variable which introduces a penalty to the cumulative census score when countries miss the census in a decade in Table 4. In Models 1 and 2 we subtract 1 and Models 3 and 4 0.5 points from the accumulated state capacity variable when countries miss a census, interacting these variables with our Boix et al. and Polity democracy indicators. These interaction terms remain significant and the substantive effects are similar to our baseline models in Table 1. In addition, to probe the robustness of our results to other democracy indicators, we show identical results to Table 1 with the democracy variables developed by Cheibub et al. (2010) and Dorsch and Maarek (2019) (based on Papaioannou and Siourounis [2008] and Acemoglu et al. [2015, 2019]; see Appendix [Table A7]).

Table 4. Effect of Democracy and State Capacity (Penalized Variables) on the Net Gini Index.

	Mean Imputed series			
	(1) Boix Penalized 1	(2) Polity Penalized 1	(3) Boix Penalized 0.5	(4) Polity Penalized 0.5
Lagged Gini	0.937*** (0.006)	0.941*** (0.006)	0.938*** (0.006)	0.940*** (0.006)
Boix Democracy	-0.209** (0.092)		-0.184* (0.105)	
Polity Democracy		-0.023*** (0.007)		-0.024*** (0.008)
Cumulative Census	-0.011 (0.037)	-0.100*** (0.038)	0.048 (0.041)	-0.026 (0.046)
Boix Democracy*Cumulative Census	0.069*** (0.025)		0.060** (0.027)	
Polity*Cumulative Census		0.007*** (0.002)		0.007*** (0.002)
GDP (log)	0.441*** (0.084)	0.429*** (0.082)	0.443*** (0.084)	0.435*** (0.082)
Inflation	0.000* (0.000)	0.000** (0.000)	0.000* (0.000)	0.000** (0.000)
Urban Population	-0.003 (0.005)	-0.001 (0.005)	-0.003 (0.005)	-0.002 (0.005)
Trade	0.001 (0.001)	0.000 (0.001)	0.001 (0.001)	0.000 (0.001)
Constant	-1.846** (0.901)	-1.870** (0.878)	-1.930** (0.900)	-1.958** (0.879)
Long-run effect at Census=6	3.25	0.32	2.84	0.3
Long-run effect at Census=3	-0.03	-0.03	-0.06	-0.05
Marginal impact at Census=6	0.205	0.019	0.176	0.018
Marginal impact at Census=3	-0.002	-0.002	-0.004	-0.003
Observations	4,034	3,977	4,034	3,977

R-squared	0.990	0.991	0.991	0.991
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Notes: The dependent variable is the net Gini coefficient and the main explanatory variables are one-period-lagged democratic scores from Boix et al. (2013) and Polity IV by Marshall et al. (2016) interacted with the penalized cumulative census variable. The unit of analysis is country-year. All specifications include a full set of country- and year-fixed effects. All independent variables are lagged one year. Standard errors are clustered at the country level. *** p<0.01, ** p<0.05, * p<0.1.

Lastly, we also explore if the inequality-increasing effect of democracy under high capacity works primarily through market (gross) inequality, as we have hypothesized in Section 3, rather than redistribution. In Models 1 and 2 (Table 5), we document a positive interactive effect of Boix et al. (2013) and Polity variables and the cumulative census variable on market inequality. In Models 3 and 4, we find no interactive effect of democracy variables and state capacity on fiscal redistribution (measured as an absolute difference between market and net inequality). This provides evidence that the impact of high-capacity democracy on the net Gini mostly occurs through changes in market income distribution rather than redistribution. Fiscal redistribution is not greater in high-capacity democracies, showing that it is not likely to offset inequality-increasing changes occurring in the market phase. Next, we turn to a test of concrete policy channels through which high-capacity democracies promote higher inequality.

Table 5. Effect of Democracy and State Capacity on the Market Gini Index and Redistribution

	Mean Imputed series			
	(1) Boix	(2) Polity	(3) Boix	(4) Polity
	DV: Market Gini	DV: Market Gini	DV: Redistribution	DV: Redistribution
Gini Lagged	0.985*** (0.003)	0.986*** (0.003)		
Redistribution Lagged			0.867*** (0.009)	0.871*** (0.008)
Boix Democracy	-0.224*** (0.035)		-0.242** (0.099)	
Polity Democracy		-0.023*** (0.002)		-0.013* (0.007)
Cumulative Census	-0.004 (0.014)	0.021 (0.022)	-0.099** (0.039)	0.091 (0.062)
Boix*Cumulative Census	0.066*** (0.010)		0.028 (0.030)	
Polity*Cumulative Census		0.007*** (0.001)		0.001 (0.002)
GDP (log)	0.025 (0.028)	0.021 (0.028)	-0.385*** (0.081)	-0.433*** (0.079)
Inflation	0.000*** (0.000)	0.000*** (0.000)	-0.000 (0.000)	-0.000 (0.000)
Urban Population	-0.005*** (0.005)	-0.004** (0.004)	-0.016*** (0.016)	-0.013*** (0.013)

	(0.002)	(0.002)	(0.005)	(0.005)
Trade	-0.000	-0.001**	-0.002**	-0.002*
	(0.000)	(0.000)	(0.001)	(0.001)
Long-run effect at Census=6	11.47		-0.07	
Long-run effect at Census=3	-1.73		-0.16	
Marginal impact at Census=6	0.17	0.019	-0.07	-0.007
Marginal impact at Census=3	-0.026	-0.002	-0.16	-0.01
Observations	4,019	3,962	4,019	3,962
R-squared	0.998	0.998	0.988	0.988

Notes: The dependent variable for Models 1 and 2 is the market Gini coefficient and, for Models 3 and 4, redistribution. The main explanatory variables are one-period-lagged democratic scores from Boix et al. (2013) and Polity IV by Marshall et al. (2016) interacted with the cumulative census variable. The unit of analysis is country-year. All specifications include a full set of country- and year-fixed effects. All independent variables are lagged one year. Standard errors are clustered at the country level. *** p<0.01, ** p<0.05, * p<0.1.

6. Mechanisms

In this section we empirically test the causal mechanisms underlying our theory. We expect democratic rule to be positively associated with FDI inflows and the size of the financial sector only when state capacity exceeds a minimum level. We do not expect democratic rule to have an effect on these variables under low capacity, given the state's inability to provide contract and property rights security. For reasons outlined in Section 3, we do not anticipate a positive effect of democracy on fiscal redistribution and government spending in high-capacity contexts. Lastly, we also expect to see a positive association between FDI stock and financial development and inequality.

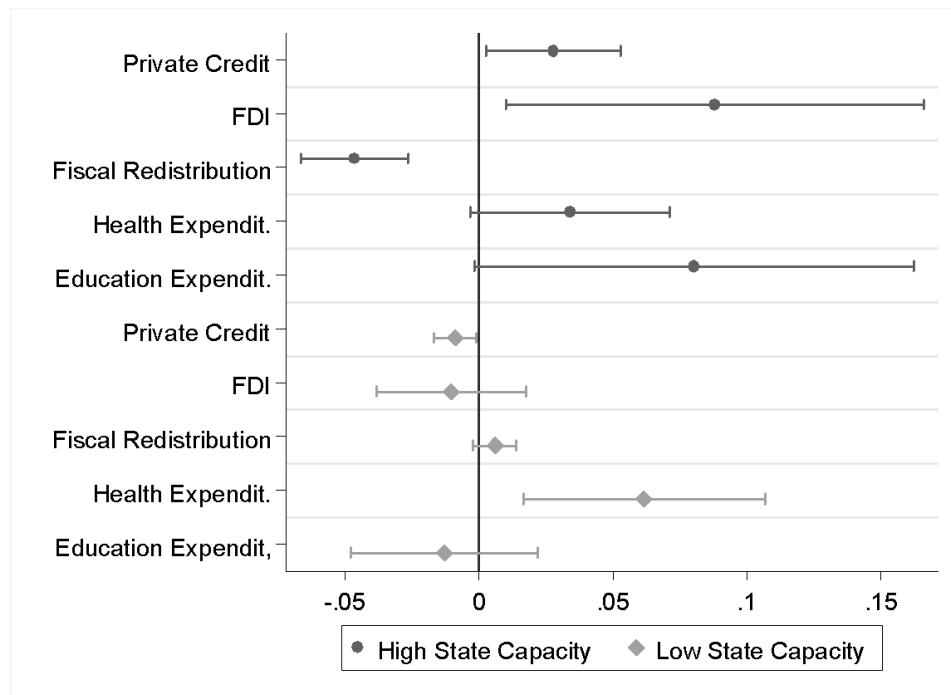
We measure financial development with an indicator commonly used in studies of financial development: private credit by deposit money banks and other financial institutions to GDP. This measurement captures the ratio of claims on the private sector by deposit money banks and other financial institutions to GDP (Beck et al., 2010). FDI is measured by annual FDI inflows to a country as a percentage of GDP, retrieved from WDI. We proxy fiscal policy through the fiscal redistribution measure introduced above and public goods provision through healthcare and education spending (as a percentage of GDP) and education levels through secondary school enrollment.

To investigate these policy mechanisms driving our theory, we present a series of split-sample regressions. For each policy area, we split the sample with respect to the level of state capacity at which the estimated impact of the Polity index on the Gini coefficient switches from positive to negative (at 3 from Model 6 of Table 1). We test these relationships using similar fixed-effects regressions as in the main analysis while controlling for GDP per capita, GDP annual change, and country- and year-fixed effects. To facilitate exposition, we have plotted the Polity coefficients for each of these 10 regressions in Figure 4. Lines around the point estimates represent 95% confidence intervals. Tables A8 and A9 in the Appendix

present the fixed-effects panel regressions that underlie the coefficient plots presented in Figure 4.

Figure 4 provides evidence that democratic rule favors FDI inflows and financial sophistication only in contexts where minimal state capacity has been met. Under low values of state infrastructural power, democracy lacks a relationship with these variables. This suggests that a minimal level of state capacity is necessary for democratic rule to improve the investment climate. By contrast, we find little evidence that democratic rule promotes fiscal redistribution and public goods provision in high-infrastructural power contexts. Democratic rule has a positive effect on health expenditure only in low-capacity contexts. As Knutsen (2013) and Hanson (2015) have argued, democratic rule may operate as a substitute for a capable state in providing better public goods in low-capacity contexts. This is explained by the special propensity of dictatorial rulers to choose non-welfare-promoting policies under low state capacity (Wintrobe, 1998). According to this rationale, a shift from dictatorship to democracy produces greater investments in redistributive social policy under low state capacity compared to democratization under high state capacity.

Figure 4. Policy Channels of Democratic Effect on Inequality at Different Levels of State Capacity



Note: This figure shows the estimated marginal effect of Polity on a series of policy areas for the subsamples with high state capacity (black dots) and low state capacity (gray diamonds), where the subsample cutoff is a cumulative census score of 3. The lines around the point estimates represent 95% confidence intervals.

Lastly, we expect to see a positive association between FDI inflows and financial development and inequality. To test this relationship, we use our baseline model (Model 3 in Table 1) and add lagged private credit and FDI stock (as percentage of GDP) as independent variables, while excluding democracy and state capacity variables (Table 6). Using net inequality as the outcome variable, Model 1 demonstrates a statistically significant relationship with Private Credit, while Model 2 displays a significant association between FDI stock and the Gini index. Models 3 and 4 produce similar results using system GMM analysis.

Table 6. Effect of Private Credit and FDI Stock on Net and Market Gini Indexes

	Mean Imputed Series			
	(1)	(2)	(3) GMM	(4) GMM
Lagged Gini	0.937*** (0.006)	0.934*** (0.007)	0.996*** (0.002)	0.996*** (0.002)
GDP per capita (log)	0.371*** (0.092)	0.377*** (0.097)	-0.007 (0.017)	0.009 (0.015)
Urban Population	-0.005 (0.005)	-0.004 (0.005)	-0.001 (0.001)	-0.001 (0.001)
Inflation	0.000*** (0.000)	0.000*** (0.000)	0.001** (0.000)	0.000** (0.000)
Trade	0.001 (0.001)	0.001 (0.001)	0.000 (0.000)	0.000 (0.000)
Private credit	0.003*** (0.001)		0.001* (0.001)	
FDI stock		0.044** (0.022)		0.029** (0.012)
Constant	-1.417 (0.978)	-0.782 (1.071)	0.054 (0.180)	-0.063 (0.185)
Hansen J-stat p-value			0.23	0.11
Number of Instruments			120	78
AR(1)			0.00	0.00
AR(2)			0.173	0.037
Observations	3,840	3,898	3,013	2,964
R-squared	0.991	0.991	0.991	0.991

Notes: The dependent variable is the net Gini coefficient. The main explanatory variables are one-period-lagged Private Credit and FDI stock. Models 3 and 4 present results from system GMM analysis. The unit of analysis is country-year. All specifications include a full set of country- and year-fixed effects. All independent variables are lagged one year. Standard errors are clustered at the country level. *** p<0.01, ** p<0.05, * p<0.1.

7. Conclusion

In this paper, we have explored whether the effect of democratic rule on income inequality is conditional on state capacity. Counterintuitively, we argue that democratization and democratic rule in the context of high state infrastructural power is associated with increases in income inequality. Larger financial sectors and FDI inflows favor income concentration through market incomes. To test our hypothesis, we introduced a novel measure of state capacity based on cumulative census administration. Our empirical results are robust to instrumental variable and GMM estimation and various alternative measures of democracy, and they apply beyond the context of the industrial world, a high-capacity democratic context where inequality has increased sharply in recent decades. In addition, we also test the mechanisms of our theory, finding consistent support for our claim that the interactive effect of democratic rule and infrastructural power posited in our main analysis might operate through financial development and FDI.

We join the recent literature in exploring the conditional relationship between democracy and inequality. Our contribution is parallel and complementary to that of Dorsch and Maarek (2019), who argue that the effect of democracy on inequality is conditioned by the level of inequality at the moment of democratization. Consistently with our findings, they show that inequality tends to increase after democratic transitions in autocratic nations that had developed a strong state to deliver public goods to the poor, given that their policies tend to move towards the “middle ground” after democratization. By contrast, in regimes that democratize under low capacity, inequality is usually high, which leads to greater catering to demands by median voters for larger redistribution, resulting in a decrease in income inequality after democratization.

Albertus and Menaldo (2018) stress another set of factors—authoritarian constitutions and other institutional legacies—that pose obstacles to fiscal redistribution after democratization and affect inequality that way. In this paper, we stress the inequality-increasing mechanisms associated with democratic rule in high-state-capacity contexts. We believe our conclusion speaks directly to recent scholarship on increasing inequality in the developed world and many regions of the developing world, reflecting the natural tendency of well-functioning capitalism to produce higher income concentration (Piketty, 2014). Institutional literature has implicitly assumed that “inclusive institutions” promote not only development but also more equal income distribution, at least in the long term (Acemoglu, Johnson, and Robinson, 2001). In this paper, we have provided evidence that this conclusion may not be warranted and “inclusive” institutions—captured in the combination of democratic regime type and high-capacity state institutions—might well lead to a trend of steady increases in income inequality, which we argue happens through financial development and FDI inflows. Further research should clarify the additional pathways through which high-capacity state institutions and democratic regime type affect inequality.

Appendix

Table A1. Descriptive Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
Net Gini	4,636	38.59	8.70	20.43	60.88
Market Gini	4,622	45.56	6.41	22.23	70.54
Redistribution	4,622	6.99	7.39	-13.86	25.43
Cumulative Census	4,449	3.42	1.36	0	6
Polity	4,445	3.80	6.59	-10	10
Boix Democracy	3,843	0.58	0.49	0	1
GDP per capita	4,225	12167.37	16971.26	182.71	111968.30
Urban Population share	4,464	53.72	23.51	4.99	100.00
Trade	7,144	70.59	47.25	0.02	441.60
Inflation	4,344	41.62	410.73	-98.70	15444.38
Private Credit	4,127	40.42	36.20	0.85	262.46
FDI Inflows	4,089	3.64	13.48	-58.32	451.72
Health Expenditure	2,616	3.53	2.05	0.27	10.05
Education Expenditure	2,528	4.39	1.66	0	13.21957
Ethnic Diversity	4,479	0.42	0.25	0.01	0.93
Civil Conflict	4,636	0.22	0.42	0	1
ODA	2,969	5.20	8.50	-0.68	181.10
Left	4,636	0.56	0.50	0	1
Fraser Index	2,105	6.59	1.07	2.47	8.88
Democracy Cheibub (2010)	3,928	0.59	0.49	0	1
Democracy Dorsch and Maarek (2019)	4,374	0.66	0.47	0	1

Table A2. List of Countries

Afghanistan, Albania, Argentina, Armenia, Australia, Austria, Bahamas, Bangladesh, Barbados, Belarus, Belgium, Benin, Bhutan, Bolivia, Bosnia, Botswana, Brazil, Bulgaria, Burkina Faso, Cambodia, Cameroon, Canada, Chad, Chile, China, Colombia, Costa Rica, Croatia, Cyprus, Czech Rep., Denmark, Djibouti, Ecuador, Egypt, El Salvador, Estonia, Ethiopia, Finland, France, Gambia, Georgia, Germany, Ghana, Greece, Guatemala, Guinea, Haiti, Honduras, Hungary, Iceland, India, Indonesia, Iran, Ireland, Israel, Italy, Japan, Jordan, Kazakhstan, Korea, Rep., Latvia, Lebanon, Lesotho, Liberia, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, Maldives, Malta, Mauritania, Mauritius, Mexico, Moldova, Mongolia, Morocco, Myanmar, Namibia, Nepal, Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Pakistan, Panama, Paraguay, Peru, Philippines, Poland, Portugal, Qatar, Romania, Russia, Rwanda, Senegal, Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tunisia, Turkey,

Uganda, Ukraine, United Kingdom, United States, Uruguay, Vanuatu, Venezuela, Zambia, Zimbabwe.

Table A3.

Country	Independence year	Prior ruling country/empire	Censuses under other countries
Armenia	1991	Soviet Union	1959, 1970, 1979, 1989
Bangladesh	1971	Pakistan	1951, 1961
Belarus	1991	Soviet Union	1959, 1970, 1979, 1989
Benin	1960	France	-
Bosnia	1992	Yugoslavia	1953, 1961, 1971, 1981, 1991
Botswana	1966	Britain	1946, 1964
Burkina Faso	1960	France	-
Cameroon	1960	France	-
Chad	1960	France	-
Croatia	1991	Yugoslavia	1953, 1961, 1971, 1981, 1991
Cyprus	1960	Britain	1960
Czech Rep.	1992	Czechoslovakia	1950, 1961, 1970, 1980, 1991
Djibouti	1977	France	1967
Eritrea	1993	Ethiopia	1984
Estonia	1991	Soviet Union	1959, 1970, 1979, 1989
Gambia	1965	Britain	1963
Georgia	1991	Soviet Union	1959, 1970, 1979, 1989
Ghana	1957	Britain	-
Guinea	1958	France	-
Kazakhstan	1991	Soviet Union	1959, 1970, 1979, 1989
Latvia	1991	Soviet Union	1959, 1970, 1979, 1989
Lesotho	1966	Britain	1956
Lithuania	1991	Soviet Union	1959, 1970, 1979, 1989
Macedonia	1991	Yugoslavia	1953, 1961, 1971, 1981, 1991
Madagascar	1960	France	-
Malawi	1964	Britain	-
Malaysia	1963	Britain	1951, 1960
Mauritania	1960	France	-
Morocco	1956	France	-
Namibia	1990	South Africa	1960, 1970, 1981
Niger	1960	France	-
Nigeria	1960	Britain	-
Russia	1991	Soviet Union	1959, 1970, 1979, 1989
Rwanda	1962	Belgium	-
Senegal	1960	France	-
Seychelles	1976	Britain	1960, 1971
Sierra Leone	1961	Britain	-
Singapore	1965	Malaysia	1957
Slovakia	1992	Czechoslovakia	1950, 1961, 1970, 1980, 1991
Slovenia	1991	Yugoslavia	1953, 1961, 1971, 1981, 1991
Tajikistan	1991	Soviet Union	1959, 1970, 1979, 1989
Tanzania	1961	Britain	1948, 1957
Togo	1960	France	-
Tunisia	1956	France	-
Uganda	1962	Britain	1948, 1959
Ukraine	1991	Soviet Union	1959, 1970, 1979, 1989

Vanuatu	1980	France	1967
Vietnam	1976	France	-
Zambia	1964	Britain	1950, 1963
Zimbabwe	1980	Britain	1962, 1969

Table A4. Unit Root Tests for Main Models (5) and (6) in Table 1

Variable	Fisher			Phillips-Perron	Conclusion
	No trend/drift	Trend	Drift		
Gini	0.6670	0.1793	0.0000	0.0000	Stationarity
Boix Democracy	1.0000	1.0000	0.0000	1.0000	Unit root
Polity Democracy	0.0063	0.0000	0.0000	0.0000	Stationarity
Cumulative Census	1.0000	0.0000	0.0000	1.0000	Stationarity
GDP (log)	0.9702	0.0978	0.0000	0.0860	Stationarity
Inflation	0.0000	0.0000	0.0000	0.0000	Stationarity
Urban Population	0.0000	0.0000	0.0000	0.0000	Stationarity
Trade	0.0007	0.0000	0.0000	0.0000	Stationarity

Note: Fisher's tests with both the Augmented Dickey Fuller and the Phillips-Perron specifications were implemented. The values in the table are combined p-values from different independent unit root tests (one per panel). All variables in the main models were tested (models 5 and 6 in Table 1). All tests also included parameters to test for trend and drift. All tests included one lag (same lag structure as the estimation strategy). These tests were implemented using the “xtfisher” routine in Stata (v. 15). The alternative hypothesis is stationarity. As the table suggests, most tests indicate stationary residuals at conventional levels of statistical significance.

Table A5. First-Stage Results

	(1)	(2)	(3)	(4)	(5)	(6)
DV:	DV:	DV:	DV:	DV:	De-	DV:
Democra	Democra	Boix*Cumula	Democra	mocracy	Polity*	Cumul
cy (Boix)	y (Boix)	tive Census	y (Polity)	(Polity)	Cumulative	Census
L. Boix Regional share	0.934*** (0.045)	1.130*** (0.048)	0.067 (0.142)			
L6. Boix Regional share	0.030 (0.036)	0.085** (0.037)	-0.007 (0.109)			
Boix Regional share *Cumulative Census		-0.101*** (0.007)	0.754*** (0.022)			
L. Polity Region Average				1.223*** (0.120)	1.375*** (0.126)	1.349*** (0.358)

L6. Polity Region Average			1.451***	0.128	0.124
			(0.312)	(0.317)	(0.380)
Polity Region Average				-0.029***	0.765***
*Cumulative Census				(0.009)	(0.027)
GDP (log)	- 0.124*** (0.013)	-0.078*** (0.014)	0.002 (0.042)	-2.738*** (0.200)	-2.578*** (0.205)
Inflation	-0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	0.000*** (0.000)	0.000*** (0.000)
Urban Population	0.001 (0.001)	-0.003*** (0.001)	-0.019*** (0.003)	0.100*** (0.012)	0.088*** (0.013)
Trade	0.001*** (0.000)	0.001*** (0.000)	0.001* (0.001)	0.014*** (0.003)	0.019*** (0.003)
Observations	6,543	6,139	6,039	5,676	5,589
R-squared	0.70	0.56	0.67	0.53	0.71
					0.49

Notes: The dependent variables are Boix et al. (2013) (Models 1 and 2) and Polity IV by Marshall et al. (2016) (Models 4 and 5) and their interaction with cumulative census values (Models 3 and 6). The key independent variables include lags of regional democracy share/average indicators and their interaction with cumulative census values. The unit of analysis is country-year. All specifications include a full set of country- and year-fixed effects. Standard errors are clustered at the country level. *** p<0.01, ** p<0.05, * p<0.1.

Table A6. Effect of Democracy and State Capacity on the Net Gini Index: Sample restrictions

	Mean Imputed Series			
	(1) Boix French Colonies Excluded	(2) Polity French Colonies Excluded	(3) Boix British Colonies Excluded	(4) Polity British Colonies Excluded
Gini Lagged	0.946*** (0.006)	0.945*** (0.006)	0.953*** (0.006)	0.959*** (0.006)
Boix Democracy	-0.240** (0.108)		-0.384*** (0.101)	
Polity Democracy		-0.021*** (0.007)		-0.027*** (0.007)
Cumulative Census	0.096** (0.041)	-0.037 (0.073)	0.036 (0.039)	0.015 (0.064)
Boix Democracy*Cumulative Census	0.107*** (0.032)		0.146*** (0.030)	
Polity Democracy*Cumulative Census		0.007*** (0.002)		0.009*** (0.002)
Inflation	0.000 (0.000)	0.000* (0.000)	0.000 (0.000)	0.000** (0.000)

Urban Population	0.004 (0.005)	-0.002 (0.005)	0.006 (0.005)	0.001 (0.005)
Trade	0.002** (0.001)	0.001 (0.001)	0.003*** (0.001)	0.001 (0.001)
GDP (log)	0.388*** (0.081)	0.412*** (0.090)	0.314*** (0.076)	0.329*** (0.080)
Constant	1.584*** (0.522)	-1.878** (0.946)	1.391*** (0.483)	-1.747** (0.846)
Long-run effect at Census=6	7.44	0.38	10.47	0.66
Long-run effect at Census=3	1.5	0	1.15	0
Marginal impact at Census=6	0.402	0.021	0.492	0.027
Marginal impact at Census=3	0.081	0	0.054	0
Observations	3,775	3,602	3,372	3,205
R-squared	0.991	0.991	0.993	0.993

Notes: The dependent variable is the net Gini coefficient and the main explanatory variables are one-period-lagged democratic scores from Cheibub et al. (2010) and Dorsch and Maarek (2019) interacted with the cumulative census variable. The unit of analysis is country-year. All specifications include a full set of country- and year-fixed effects. All independent variables are lagged one year. Standard errors are clustered at the country level. *** p<0.01, ** p<0.05, * p<0.1.

Table A7. Effect of Democracy and State Capacity on the Net Gini Index: Alternative Measures of Democracy

	Mean Imputed Series	
	(1) Cheibub	(2) Dorsch and Maarek
Lagged Gini	0.943*** (0.020)	0.935*** (0.018)
Democracy Cheibub	-0.251 (0.154)	
Democracy Dorsch and Maarek		-0.183 (0.169)
Cumulative Census	0.050 (0.067)	0.035 (0.079)
Democracy Cheibub*Cumulative Census	0.127*** (0.047)	
Democracy Dorsch & Maarek (2019)*Cumulative Census		0.096* (0.055)
GDP (log)	0.427** (0.189)	0.409** (0.190)
Inflation	0.000 (0.000)	0.000 (0.000)
Urban Population	0.004 (0.008)	-0.002 (0.008)
Trade	0.000 (0.002)	-0.000 (0.002)
LR effect at Census=6	8.96	6.05
LR effect at Census=3	2.28	1.62
Marginal impact at Census=6	0.51	0.39
Marginal impact at Census=3	0.13	0.105

Observations	3,445	3,905
R-squared	0.993	0.991

Notes: The dependent variable is the net Gini coefficient and the main explanatory variables are one-period-lagged democratic scores from Cheibub et al. (2010) and Dorsch and Maarek (2019) interacted with the cumulative census variable. The unit of analysis is country-year. All specifications include a full set of country- and year-fixed effects. All independent variables are lagged one year. Standard errors are clustered at the country level. *** p<0.01, ** p<0.05, * p<0.1.

Table A8. The Effect of Democracy on FDI and Financial Development

	(1)	(2)	(3)	(4)
	DV: Private Credit	DV: Private Credit	DV: FDI inflows	DV: FDI inflows
	High Capacity	Low Capacity	High Capacity	Low Capacity
Lagged DV	0.883*** (0.008)	0.957*** (0.008)	-0.117*** (0.023)	0.319*** (0.019)
Polity	0.028* (0.015)	-0.009* (0.005)	0.088* (0.047)	-0.010 (0.017)
GDP per capita	0.123*** (0.024)	0.080*** (0.014)	0.086 (0.078)	0.171*** (0.058)
% Change GDP	-0.603*** (0.089)	-0.227*** (0.076)	0.762** (0.310)	0.113 (0.271)
Constant	-0.199 (0.167)	-0.048 (0.033)	0.140 (0.566)	-0.383*** (0.134)
Wald p-value	0.06	0.06	0.05	0.54
Observations	1,950	3,096	2,105	2,802
R-squared	0.987	0.971	0.378	0.367

Notes: The unit of analysis is country-year. All specifications include a full set of country- and year-fixed effects. All independent variables are lagged one year. Standard errors are clustered at the country level. *** p<0.01, ** p<0.05, * p<0.1.

Table A9. The Effect of Democracy on Fiscal Redistribution

	(1)	(2)	(3)	(4)	(5)	(6)
	DV: Redistributio n	DV: Redistribution	DV: Health Expenditur e	DV: Health Expenditur e	DV: Education Expenditure	DV: Education Expenditure
	High Capacity	Low Capacity	High Capacity	Low Capacity	High Capacity	Low Capacity
Lagged DV	0.871*** (0.015)	0.830*** (0.012)	0.762*** (0.016)	0.709*** (0.026)	0.612*** (0.035)	0.805*** (0.020)
Polity	-0.046*** (0.012)	0.006 (0.005)	0.034 (0.023)	0.062** (0.027)	0.080 (0.050)	-0.013 (0.021)
GDP per capita	-0.012	0.005	0.089**	0.235	-0.008	0.118**

	(0.019)	(0.017)	(0.044)	(0.146)	(0.107)	(0.058)
% Change GDP	-0.172** (0.082)	0.049 (0.099)	-0.624*** (0.115)	-0.514 (0.335)	-0.344 (0.239)	-0.556** (0.245)
Constant	0.159*** (0.053)	0.084 (0.076)	0.170 (0.117)	0.750*** (0.103)	0.124 (0.268)	0.030 (0.118)
Wald p-value	0.00	0.23	0.13	0.02	0.11	0.54
Observations	2,020	2,056	1,770	874	612	1,099
R-squared	0.989	0.989	0.972	0.904	0.935	0.935

Notes: The unit of analysis is country-year. All specifications include a full set of country- and year-fixed effects. All independent variables are lagged one year. Standard errors are clustered at the country level. *** p<0.01, ** p<0.05, * p<0.1.

References

- Acemoglu, Daron, Suresh Naidu, Pascual Restrepo, and James A. Robinson. (2019). “Democracy Does Cause Growth.” *Journal of Political Economy* vol. 127, 1: 47-100.
- Acemoglu, D., Ticchi, A. Vindigni. (2011). “Emergence and persistence of inefficient states”, *J. Eur. Econ. Assoc.*, 9 (2), pp. 177-208.
- Acemoglu, Daron and James Robinson (2006). *The Economic Origins of Dictatorship and Democracy*. Oxford University Press.
- Acemoglu, Daron, Simon Johnson, and James Robinson (2001). “The Colonial Origins of Comparative Development: An Empirical Investigation.” *American Economic Review* 91, pp. 1369–1401.
- Acemoglu, Daron, Suresh Naidu, Restrepo, Pascual, James A. Robinson. (2015). “Democracy, Redistribution, and Inequality,” In Anthony B. Atkinson and François Bourguignon ed., *Handbook of Income Distribution*, Volume 2B.
- Albertus, Michael and Victor Menaldo (2018). *Authoritarianism and the Elite Origins of Democracy*. Cambridge University Press.
- Atkinson, Anthony (2015). *Inequality: What Can Be Done?* Harvard University Press.
- Basu, Parantap and Alessandra Guariglia (2007). “Foreign Direct Investment, Inequality, and Growth.” *Journal of Macroeconomics* 29.4: 824–839.
- Baum, Mathew and David Lake (2003). “The Political Economy of Growth: Democracy and Human Capital.” *American Journal of Political Science* 47, 2: 333–347.

Becerra, Oscar, Eduardo Cavallo, and Carlos Scartascini (2012). "The Politics of Financial Development: The Role of Interest Groups and Government Capabilities." *Journal of Banking and Finance* 36, 3: 626–643.

Beck, Thorsten, Asli Demirguc-Kunt, and Ross Levine (2010). "Financial Institutions and Markets across Countries and over Time: The Updated Financial Development and Structure Database." *The World Bank Economic Review* 24, 1: 77–92.

Beck, Thorsten, Asli Demirguc-Kunt, et al. (2008). "Finance, Firm Size and Growth." *Journal of Money, Credit and Banking* 40, 7: 1379–1405.

Berry, William, Matt Golder, and Daniel Milton (2012). "Improving Tests of Theories Positing Interaction." *Journal of Politics* 74, 3: 653–671.

Besley, Timothy and Torsten Persson (Aug. 2009). "The Origins of State Capacity: Property Rights, Taxation, and Politics." *American Economic Review* 99, 4: 1218–1244.

Boix, Carles (2003). *Democracy and Redistribution*. Cambridge University Press.

Boix, Carles, Michael K. Miller, and Sebastian Rosato. (2013). "A Complete Data Set of Political Regimes, 1800-2007." *Comparative Political Studies* 46 (12): 1523-54.

Brambor, Thomas, William Clark, and Matt Golder (2006). "Understanding Interaction Models: Improving Empirical Analyses." *Political Analysis* 14.01, pp. 63–82.

Bueno de Mesquita, Bruce et al. (2003). *The Logic of Political Survival*. MIT Press.

Busse, Matthias and Carsten Hefeker (2007). "Political Risk, Institutions and Foreign Direct Investment." *European Journal of Political Economy* 23.2, pp. 397–415.

Chaudhry, Kiren Aziz (1993). "The Myths of the Market and the Common History of Late Developers." *Politics & Society* 21.3, pp. 245–273.

Christopher. A.J. (2008). "The quest for a census of the British Empire c.1840-1940." *Journal of Historical Geography* 34 268-285.

Coase, Ronald (1960). "The Problem of Social Cost." *Journal of Law and Economics* 3.1, pp. 1–44.

Cogneau, Denis, and Alexander Moradi. 2014. "Borders that Divide: Education and Religion in Ghana and Togo since Colonial Times." *Journal of Economic History* 74, no. 3: 694–728.

Dabla-Norris, Era et al. (2015). *Causes and Consequences of Income Inequality: A Global Perspective*. IMF Staff Discussion Note 15/13. IMF.

De Haan, Jakob, and Jan-Egbert Sturm (2017). "Finance and Income Inequality: A Review and New Evidence." *European Journal of Political Economy* 50, pp. 171–195.

Denk, O. and B. Cournède (2015), "Finance and income inequality in OECD countries", *OECD Economics Department Working Papers*, No. 1224, OECD Publishing.

DiGiuseppe, Matthew, Colin Barry, and Richard Frank (2012). "Good for the Money: International Finance, State Capacity, and Internal Armed Conflict." *Journal of Peace Research* 49.3, pp. 391–405.

Dorsch, Michael and Paul Maarek. 2019. "Democratization and the conditional dynamics of income distribution." *American Political Science Review*, vol. 113: 385 - 404.

Egan, Patrick. 2010. "Hard Bargains: The Impact of Multinational Corporations on Economic Reform in Latin America." *Latin American Politics and Society*, 52: 1.

Feenstra, Robert and Gordon Hanson (1997). "Foreign Direct Investment and Relative Wages: Evidence from Mexico's Maquiladoras." *Journal of International Economics* 42.3-4, pp. 371–393.

Gradstein, Mark and Branko Milanovic (2004). "Democracy and Income Inequality: An Empirical Analysis." *World Bank Policy Research Working Papers Series* 2561.

Greenwood, Jeremy and Boyan Jovanovic (1990). "Financial Development, Growth, and the Distribution of Income." *The Journal of Political Economy* 98.5, pp. 1076–1107.

Haber, Stephen, Douglass North, and Barry Weingast (2008). "Political Institutions and Financial Development." Ed. by Stephen Haber, Douglass North, and Barry Weingast. Stanford University Press.

Hamori, S., Hashiguchi, Y., 2012. "The effect of financial deepening on inequality: some international evidence." *J. Asian Econ.* 23, 353–359.

Hanson, Jonathan (2015). "Democracy and State Capacity: Complements or Substitutes?" *Studies in Comparative International Development* 50.3, pp. 304–330.

Huber, Evelyne and John Stephens (2012). *Democracy and the Left: Social Policy and Inequality in Latin America*. The University of Chicago Press.

Huntington, Samuel P. (1991). *The Third Wave: Democratization in the Late Twentieth Century*. Norman: University of Oklahoma Press.

Jaumotte, Florence, Subir Lall, and Chris Papageorgiou (2013). "Rising Income Inequality: Technology, or Trade and Financial Globalization?" *IMF Economic Review* 61.271-309.

- Jensen, Nathan (2003). "Democratic Governance and Multinational Corporations: Political Regimes and Inflows of Foreign Direct Investment." *International Organization* 57.3, pp. 587–616.
- Jensen, Nathan (2008). "Political Risk, Democratic Institutions, and Foreign Direct Investment." *Journal of Politics* 70.4, pp. 1040–1052.
- Knutsen, Carl Erik (2013). "Democracy, State Capacity and Economic Growth." *World Development* 43, pp. 1–18.
- Korinek, Anton and Jonathan Kreamer (2014). "The Redistributive Effects of Financial Deregulation." *Journal of Monetary Economics* 68, S55–S67.
- Kratou H, Goaied M. 2016. "How can globalization affect income distribution? Evidence from developing countries." *Int. Trade J.* 30(2):132–58
- Krieger, T., Meierrieks, D., (2016). "Political capitalism: The interaction between income inequality, economic freedom and democracy." *European Journal of Political Economy*, 45, pp. 115-132.
- Kunieda T., K. Okada, A. Shibata. "Finance and inequality: how does globalization change their relationship?" *Macroecon. Dyn.*, 18 (2014), pp. 1091-1128
- Kurtz, Marcus and Andrew Schrank (2012). "Capturing State Strength: Experimental and Econometric Approaches." *Revista De Ciencia Política* 32.3, pp. 613–622.
- La Porta, Rafael, Florencio Lopez-de Silanes and Andrei Shleifer. (1998). "Law and Finance." *Journal of Political Economy*, 106, no. 6: 1113–55.
- Landes, David S. 1998. *The Wealth and Poverty of Nations: Why Some Are So Rich and Some So Poor*. New York: W.W. Norton.
- Li, Jie and Han Yu (2014). "Income Inequality and Financial Reform in Asia: The Role of Human Capital." *Applied Economics* 46.24, pp. 2920–2935.
- Li, Quan and Adam Resnick (2003). "Reversal of Fortunes: Democratic Institutions and Foreign Direct Investment Inflows to Developing Countries." *International Organization* 57.1, pp. 175–211.
- Lieberman, Evan S., and Prerna Singh. (2017). "Census Enumeration and Group Conflict: A Global Analysis of the Consequences of Counting." *World Politics*, Volume 69, Number 1, pp. 1-53.
- Lindert, Peter (2004). *Growing Public: Social Spending and Economic Growth since the Eighteenth Century*. Cambridge University Press.

Mann, Michael (1984). "The Autonomous Power of the State: Its Origins, Mechanisms and Results." *European Journal of Sociology* 25.02, pp. 185–213.

Marshall, Monty, Keith Jagers, and Ted Gurr. 2017. Polity IV Project: Dataset Users' Manual. Arlington: Center for Systemic Peace.

Meltzer, Allan and Scott Richard (1981). "A Rational Theory of the Size of Government." *Journal of Political Economy* 89.5, pp. 914–927.

Menaldo, Victor (2016). "The Fiscal Roots of Financial Underdevelopment." *American Journal of Political Science* 60.

Menaldo, Victor and Daniel Yoo (2015). "Democracy, Elite Bias, and Financial Development in Latin America." *World Politics* 67.4, pp. 726–759.

Mulligan, Casey, Richard Gil, and Xavier Sala-i-Martin (2004). "Do Democracies Have Different Public Policies than Nondemocracies?" *Journal of Economic Perspectives* 18.1, pp. 51–74.

Naceur, S.B., R. Zhang. "Financial development, inequality and poverty: some international evidence." *IMF Working Paper 16/32*. IMF, Washington DC (2016)

Nafziger, Wayne (1997). *Economics of Developing Countries*. Prentice Hall.

North, Douglass and Barry Weingast (1989). "The Constitution of Commitment: The Evolution of Institutions Governing Public Choice in Seventeenth Century England." *Journal of Economic History* 49.4, pp. 803–831.

Olson, Mancur (2000). *Power And Prosperity: Outgrowing Communist And Capitalist Dictatorships*. Basic Books.

Pagalayan, Agustina (2020). "The Non-Democratic Roots of Mass Education: Evidence from 200 Years. *American Political Science Review*. pp. 1 - 20

Papaioannou, Elias, and Gregorios Siourounis. (2008). "Democratization and Growth." *Economic Journal* 118 (532): 1520–51.

Piketty, Thomas (2014). *Capital in the Twenty First Century*. Belknap Press: An Imprint of Harvard University Press.

Pleninger, Regina, and Sturm, Jan-Egbert. (2020) "The Effects of Economic Globalisation and Ethnic Fractionalisation on Redistribution", *World Development*, 130, 104945: 1-19.

Reuveny, Rafael and Quan Li (2003). "Economic Openness, Democracy, and Income Inequality: An Empirical Analysis." *Comparative Political Studies* 36.5, pp. 575–601.

Rodrik, Dani (1999). "Democracies Pay Higher Wages." *Quarterly Journal of Economics* 114.3, pp. 707–738.

Ross, Michael (2006). "Is Democracy Good for the Poor?" *American Journal of Political Science* 50.4, pp. 860–874.

Scheve, Kenneth and David Stasavage (2012). "Democracy, War, and Wealth: Lessons from Two Centuries of Inheritance Taxation." *The American Political Science Review* 106.1, pp. 81–10.

Scheve, Kenneth and David Stasavage (2017). "Wealth Inequality and Democracy." *Annual Review of Political Science* 20.1, pp. 451–468.

Scott, James (1988). *Seeing like a State*. Yale University Press.

Soifer, Hillel. (2013). "State Power and the Economic Origins of Democracy." *Studies in Comparative International Development* 48.1, pp. 1–22.

Solt, Frederick (2016). "The Standardized World Income Inequality Database." *Social Science Quarterly* 97.5, pp. 1267–1281.

Timmons, Jeffrey (2010). "Does Democracy Reduce Economic Inequality?" *British Journal of Political Science* 40.4, pp. 741–757.

United Nations. (2015). Social and Housing Statistics Section.
<https://unstats.un.org/unsd/demographic-social/census/censusdates/>.

Verpoorten, Marijke. (2012). "Detecting hidden violence: The spatial distribution of excess mortality in Rwanda." *Political Geography* 31, 44–56.

Williamson, Oliver (1985). *The Economic Institutions of Capitalism*. New York: Free Press.

Wintrobe, Ronald. 1998. *The Political Economy of Dictatorship*. New York: Cambridge University Press.

Wong, Matthew (2016). "Democratic Persistence and Inequality: The Role of Foreign Direct Investments." *Studies in Comparative International Development* 51.2, pp. 103–123.

World Bank. (2020). World Development Indicators.

Ziblatt, Daniel (2008). "Why Some Cities Provide More Public Goods than Others: A Subnational Comparison of the Provision of Public Goods in German Cities in 1912." *Studies of Comparative International Development* 43, p. 273–289.



Still for sale: the micro-dynamics of vote selling in the United States, evidence from a list experiment

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Abstract

In nineteenth-century United States politics, vote buying was commonplace. Nowadays, vote buying seems to have declined. The quantitative empirical literature emphasizes vote buying, ignoring the micro-dynamics of vote selling. We seem to know that vote buyers can no longer afford this strategy; however, we do not know what American voters would do if offered the chance to sell their vote. Would they sell, and at what price, or would they consistently opt out of vote selling? A novel experimental dataset representative at the national level comprises 1479 US voters who participated in an online list experiment in 2016, and the results are striking: Approximately 25% would sell their vote for a minimum payment of \$418. Democrats and Liberals are more likely to sell, while education or income levels do not seem to impact the likelihood of vote selling.

Keywords Vote buying · Vote selling · Clientelism · List experiments · United States

Vote sellers and vote buyers

Prior research on clientelism usually focuses on whether parties have attempted to buy votes (Vicente and Wantchekon 2009; Vicente 2014; Rueda 2015, 2017; Reynolds 1980; Nichter 2014; de Jonge 2015; Finan and Schechter 2012; González-Ocantos et al. 2014; Diaz-Cayeros et al. 2012; Brusco et al. 2004). Unfortunately, while this is an important question, it overlooks the conditions under which citizens would sell their vote. In fact, Nichter and Peress (2017) explain that studies continue to view clientelism typically as a top-down process, generally overlooking citizens'

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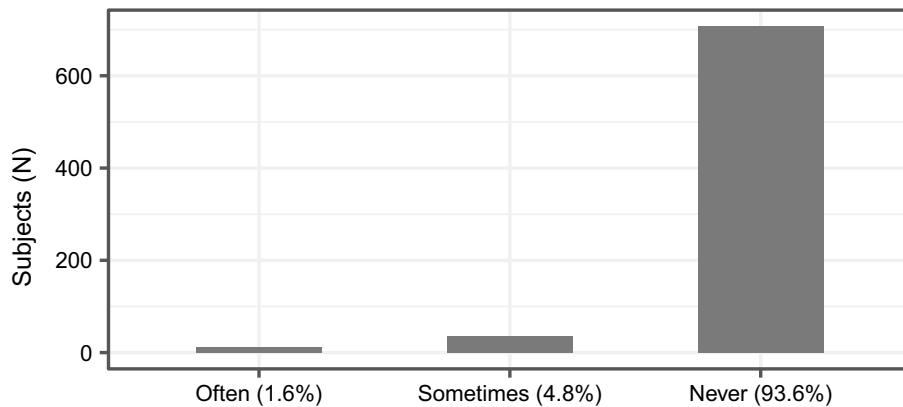


Fig. 1 Frequency of clientelism in the United States (2010). Note figure shows the frequency of survey respondents, $N = 755$. Source: LAPOP, 2010 wave for the United States. Question is clien1: “In recent years and thinking about election campaigns, has a candidate or someone from a political party offered you something, like a favor, food, or any other benefit or object in return for your vote or support? Has this happened often, sometimes, or never?”

demands. Since several questions pertaining to vote sellers remain unanswered, a bottom-up reconceptualization is necessary. For instance: *What would voters do if offered the chance to sell their vote? Would they sell it? And at what price?*¹

To illustrate the issue at hand, Fig. 1 shows responses of US citizens asked whether a candidate or a member of a political party has offered something in exchange for their vote, completely ignoring voters’ preferences. The figure begs the question of whether survey respondents who answered “never” *would* still be willing to sell their votes.

It seems that whether studies focus on vote buying or vote selling depends partly on methodological rather than theoretical decisions.² On the one hand, historical and/or ethnographically based contributions describe clientelist transactions from the point of view of voters, focusing on the conditions that make vote selling most likely (Posada-Carbó 1996; Sabato 2001; Auyero 2000; Szwarcberg 2013; Borges 2019). On the other hand, statistical, survey, and/or experimentally based work mostly explores issues related to vote buying. For example, using a field experiment in Benin, Wantchekon (2003) stresses the role of incumbency on vote buying. Jensen and Justesen (2014, p. 227) focus on the impact of “poverty on vote buying,” while Khemani (2015, p. 84) shows that “vote buying in poor democracies is associated with lower [public] investments.” Hence, and except for several important quantitative studies (Corstange 2012; Imai et al. 2015; Nicther and Peress 2017; Hicken et al. 2015, 2018; Michael and Thachil 2018), the emphasis of statistical studies remains on studying vote buying. Importantly, other statistically based studies have explored attitudes toward vote buying (Bratton 2008; Weitz-Shapiro 2012).

¹ It is important to note that clientelism as a practice involves more than just buying or selling votes. Other goods might be involved in the clientelist transaction—for instance, public jobs or public infrastructure, e.g., see for example Dixit and Londregan (1996), Calvo and Murillo (2004), and Khemani (2015). However, this paper’s focus is on just vote buying and vote selling.

² I thank one of the anonymous reviewers for this comment.



They suggest that a strong stigma is attached to vote buying, which might make voters unwilling to sell their vote. For instance, González-Ocantos et al. (2014, p. 208) designed a list experiment to study attitudes toward vote buying in Latin America. They conclude that most respondents find vote buying “unacceptable when provided with a hypothetical example.”

While the quantitative literature has advanced several important avenues of research, it has overlooked many important questions. The wording of the Latin American Public Opinion Project (LAPOP) question illustrates part of the issue. By focusing on vote buying, it gives the falsely optimistic impression that US voters systematically “oppose” vote buying, “thus” rarely engaging in clientelism (as Fig. 1 strongly suggests). Furthermore, most quantitative studies were conducted primarily in developing countries, seriously narrowing the scope of our inferences. In part, this is because the clientelism literature usually focuses on realized behaviors only—that is, actual clientelist transactions. Unfortunately, by ignoring attitudes of potential vote sellers, particularly when it comes to the willingness to sell, selection bias seriously threatens causal inferences.

This paper makes both methodological and substantive contributions to the literature by leveraging a list experiment on hypothetical vote selling in a consolidated democracy. We believe that studying hypothetical behaviors—such as the willingness to sell—is a valuable exercise. Geddes (1990, p. 131) explains the well-known selection issues of studying “only cases that have achieved the outcome of interest.” Hence, if we are interested in understanding the micro-dynamics of clientelism—particularly as a supply-and-demand issue—we should incorporate the preferences of both sellers and buyers, potential and/or actual. Since the focus of this paper is on the willingness to sell, we believe that we can also learn from *unrealized* clientelist transactions. Following the lead of González-Ocantos et al. (2014), this paper presents experimental evidence of hypothetical vote selling in the United States.

In 2016, a novel dataset representative at the national level was collected. A total of 1479 US voters participated in a list experiment between March 2 and March 6. This experiment made possible both the identification of the demographic factors that would make US voters more likely to sell their vote, and at what price, and the investigation of whether they would systematically lie about selling their vote. The results are striking. The data suggest that a sizable portion of US voters are willing to sell their vote (approximately 25%), would sell it for at least \$418, and would systematically lie about it (approximately 8%). Given that these data are representative at the national level (i.e., this is not a convenient sample), these findings are surprising. Democrats and Liberals are systematically more likely to sell than Republicans. Education and income levels do not seem to have a systematic impact on the willingness to sell.

While this paper essentially describes the phenomenon, it leaves for future research further consideration of the causes of hypothetical vote selling in the United States. Ultimately, this paper attempts to bring voters back into the quantitative study of clientelism, particularly by studying their willingness to sell.



The United States as a case

At first, many advanced democracies were clientelist political systems. For instance, Stokes et al. (2013, p. 200) explain that in the nineteenth-century United States, “vote buying was commonplace” and “the major urban political institution in the late nineteenth century” (Erie 1990, p. 2). In Chicago, New York City, Newark, and other large American cities, votes were exchanged for “cash, food, alcohol, health care, poverty relief, and myriad other benefits” (Stokes et al. 2013, p. 200). The street price of the right to vote freely was low. Bensel explains that “[voters] handed in a party ticket in return for a shot of whiskey, a pair of boots, or a small amount of money” (Stokes et al. 2013, p. 227). In general, students of American political development have analyzed vote buying in detail, confirming both its early development and its generalized practice (Bensel 2004; Campbell 2005).³

However, vote buying currently seems to have declined considerably, for two competing reasons. Stokes et al. (2013, p. 201) show that industrialization drove up the electorate’s median income, making vote buying more expensive for party machines. However, Kitschelt and Wilkinson (2006, p. 320) disregard the industrialization hypothesis, focusing on the lower levels of “[s]tate involvement in the public sector.”

Regardless, clientelist linkages are now rare. Figure 1 suggests that 93.6% of US respondents have never received a clientelist offer from a political party. While only a very small percentage (4.8%) report receiving such an offer from a political party, we do not know whether survey respondents *would* sell their votes. This paper presents systematic evidence that they would. Consequently, the counterintuitive results presented in this paper make our descriptive efforts worth pursuing. Representing the United States as a “crucial case,” both the narrative and the findings follow a “least-likely” design approach. As Levy (2008, p. 12) explains, “[i]nferential leverage from a least likely case is enhanced if our theoretical priors for the leading alternative explanation make it a most likely case for that theory.” The vote-buying literature mostly considers developing countries and describes vote sellers as poor (Weitz-Shapiro 2014, p. 12), uneducated (González-Ocantos et al. 2014), and undemocratic (Carlin and Moseley 2015). Thus, previous literature implies that the willingness to sell votes in the United States should be low, making it a difficult case study on vote selling.

The evidence that this paper presents may be associated with a probable erosion of American democracy.⁴ In a highly controversial pair of articles, Foa and Mounk (2016, p. 7) document a deep “crisis of democratic legitimacy [that] extends across a [...] wider set of indicators” in the United States. They find that 26% of millennials declare that it is “unimportant” in a democracy for people to “choose their leaders in free elections” (Foa and Mounk 2016, p. 10, and Foa and Mounk 2017). These findings raise many (unanswered) questions regarding the actual value that American electoral institutions hold for citizens, possibly undermining the legitimacy of

³ For the British case during the Victorian era see Kam (2017).

⁴ Relatedly, see Levitsky and Ziblatt (2018).



the integrity of voting. Is voting unimportant enough to lead US citizens to sell their votes if offered the possibility?

The next section gives a historical account of vote buying and vote selling in the United States. The section also attempts to situate both within a historical context. It particularly shows how vote buying and vote selling transitioned from their status as an important institution in American elections to a scarcely practiced electoral method. The following section explains the experimental design. Immediately thereafter, the paper presents the statistical analyses of the experimental data. The last section offers some working hypotheses and possible lines for future research.

Vote selling and patronage in the United States: a brief historical account

While all US states made bribery of voters illegal early in US history, these laws were purposely ignored. Well before the Gilded Age (1877–1896), several norms aimed to prohibit bribery, clientelism, and patronage. For instance, as early as 1725, the New Jersey legislature had already outlawed many electoral malpractices (Bensel 2004, p. 59). However, these restrictions were systematically bypassed. To circumvent property qualifications, for instance, office-seekers (and their supporters) commonly bought “freeholds for landless men in return for their vote” (Campbell 2005, p. 6), a practice known as “fagot voting.” Since it was a coercive bribe, after “the election, the land was simply returned to the original owner” (p. 6).

Weak institutions, poor bureaucracies, and bad-quality record-keeping helped to foster electoral malpractice.⁵ First, most states did not have actual registration laws, making voter eligibility difficult to determine (Argersinger 1985, p. 672). Historians frequently report that judges at polling places had a hard time determining not only the age of the potential voter,⁶ but also whether the prospective voter was a US citizen, especially in cases that involved newly naturalized immigrants with strong foreign accents (Bensel 2004, p. 20). Consequently, it was often up to the judge’s discretion whether to let prospective voters cast a ballot. Since judges were party appointees (Argersinger 1985, p. 672), their discretionary powers were systematically used to shape electoral outcomes.

Low literacy levels also helped to sustain vote selling in the United States. For example, in Kentucky and Missouri, the law required voters to verbally announce their choices at the polling places, instead of using party tickets (Bensel 2004, p. 54). Of course, the *viva voce* method was convenient for party workers who usually swarmed around the polling places. However, the ticket system eventually supplanted this method.

⁵ The U.S. Bureau of the Census did not exist. Consequently, it was relatively easy to invent names, “repeat,” or use any other subterfuge to “stuff the ballot box.” In fact, “a St. Louis politician admitted registry fraud but argued that there was no proof that the names he copied into the registry were of real people and, therefore, no crime had been committed” (Argersinger 1985, p. 680).

⁶ Judges used as a rough proxy whether the prospective voter had the ability to grow a beard (Bensel 2004, p. 20).



The “party strip” or “unofficial” ballot system also permitted all sorts of fraudulent election practices. The parties themselves produced party tickets. Since tickets varied by size and color, it made “the voter’s choice of party a public act and rendered voters susceptible to various forms of intimidation and influence while facilitating vote buying” (Argersinger 1985, p. 672). Similarly, Rusk (1970, p. 1221) explains that distinctive ticket colors and shapes “assured instant recognition of the ballot by the voters [and] party workers.” Reynolds and McCormick (1986, p. 836) present similar evidence. Consequently, party workers hired to monitor the voting window (Argersinger 1985, p. 672) had ample opportunity to punish or reward voters accordingly.

The ticket system required very strong party machines, which, in turn, required considerable economic resources to make the system work. However, political machines were oiled not only with money. On the one hand, many “ticket peddlers” (Argersinger 1985, p. 672) were volunteers (Bensel 2004, p. 17), saving some of the costs needed to maintain the machine. Most of these volunteers “enjoyed the patronage of elected party officials by holding government jobs, drawing public pensions, servicing government contracts, or enjoying special licensing privileges” (Bensel 2004, p. 17). On the other hand, political appointees “from janitor to secretary of state” and some corporations donated annually part of their salaries and revenues (Reynolds 1980, p. 197). Thus, parties amassed huge amounts of money.

With all these resources flooding the polls on election day, voting was truly an interesting spectacle. On that day, party agents would offer voters plenty of liquor as an incentive to vote the party ticket. Hence, “the street or square outside the voting window frequently became a kind of alcoholic festival in which many men were clearly and spectacularly drunk [to the point that] some could not remember whether or not they had voted” (Bensel 2004, p. 20). Even before the Gilded Age, American elections were engineered according to these “principles.” When running for the Virginia House, a young George Washington “spent nearly 40 pounds—a considerable sum for the day—on gallons of rum, wine, brandy, and beer; all used to win over the votes of his neighbors” (Campbell 2005, p. 5).⁷

The Australian ballot system significantly reduced the frequency of most of this malpractice (Rusk 1970, p. 1221). However, as vote selling and vote buying were so embedded in what was considered normal, the immediate effect of the Australian system was to reduce turnout (Reynolds and McCormick 1986, p. 851).

Today, the modus operandi of clientelism has changed, and both the frequency of vote buying/selling and the importance of party machines have declined. Scholars have pointed out that “party machines are a thing of the past” (Stokes et al. 2013, p. 230). However, some contemporary accounts remain of vote buying and selling in American elections. For instance, Campbell (2005, pp. 243–244) explains how a Democratic leader in Logan County, West Virginia, accepted \$35,000 in cash to support Senator Kennedy. As the Democratic leader explained, “this money was for one purpose: ‘We bought votes with it [...] that’s the way real politics works.’ ” Other examples are the famous primary election in March 1972 in Chicago (p. 262)

⁷ \$1250 in 2017 US dollars. Conversion based on Williamson (2018).



and the elections in the coal-rich Appalachian Mountains during the 1980s (p. 275). Similarly, nonacademic sources find that during the 2010 elections, “selling votes [was a] common type of election fraud” (Fahrenthold 2012). Others find that “[v]ote-buying is extremely common in *developed* [...] countries” (Leight et al. 2016, p. 1). If vote buying is “a thing of the past,” why do we still see it? How common is vote selling? The next two sections attempt to quantify—in an unbiased way—the willingness to sell votes among a representative sample of US voters.

Experimental design

The study of individual preferences depends on truthful answers. However, under certain circumstances, individuals might not want to answer truthfully, due to social pressure. For instance, to avoid having the interviewer judge them, individuals might not want to reveal having done something illegal, such as selling one’s vote. Failing to consider this systematic source of bias will pose threats to causal inference.

Since list experiments administer two lists of items (one to the control group, one to the treated group), list experiments are well suited to eliciting truthful answers (Blair 2015). Both lists look identical (e.g., each containing the same three items); however, the treatment list traditionally includes a fourth item, the sensitive item related to some socially condemned behavior. Respondents are asked how many items on the list they would endorse, not which ones. For instance, if an experimental subject answers “2,” the interviewer will not know whether that number includes the sensitive item. Consequently, if the survey respondent wants to endorse the sensitive item, the answer will be “masked” by the other items in the list. This concealment makes this technique suitable for studying socially condemned behaviors, such as vote buying (Corstange 2008; González-Ocantos et al. 2012; Corstange 2012; Blair and Imai 2012), drug use (Druckman et al. 2015), sexual preferences (LaBrie and Earleywine 2000), and attitudes toward race (Kuklinski et al. 1997; Redlawsk et al. 2010).

Given that both lists are assigned randomly, the mean number of nonsensitive activities that respondents endorse should be equal across the two lists. However, if there are any differences in means between the two groups, the differences should be attributed only to the presence of the sensitive item.

Blair and Imai (2012) and Imai et al. (2015) provide a statistical framework to analyze list data efficiently.⁸ They formalize two assumptions, namely, that there are (1) “no design effects” (i.e., the inclusion of a sensitive item has no effect on respondents’ answers to control items), and (2) “no liars” (i.e., respondents give truthful answers for the sensitive item). When the two assumptions hold and the item counts for types $y = 0$ and 4 are fully observed,⁹ experimental subjects with

⁸ While list experiments are common, researchers unfortunately “[utilize] only a difference in means estimator, and [do] not provide a measure of the sensitive item for each respondent” (Glynn 2013, p. 159).

⁹ For a hypothetical treatment list of four items.



item-count types $y = 1, 2$, and 3 can be inferred using multivariate techniques that allow for inferring who answered “yes” to the sensitive item. In addition, the statistical analyses permit studying the relationship between preferences over the sensitive item (i.e., vote selling) and an individual’s characteristics, such as income and party identification. Also, the design includes a “direct” question on the sensitive item, also making possible an estimation of the amount of social-desirability bias.

Collected in 2016, the data ($N = 1479$) are representative at the national level.¹⁰ Figure 6 shows the geographical distribution of survey respondents, grouped by party identification. The experiment was framed as a study about crime in the United States, not as a study about vote selling.¹¹ While pretesting the study, it was decided that the experiment needed to mask a very serious felony (selling one’s vote) among other equally serious felonies (such as stealing) and other less serious crimes (such as speeding or downloading music illegally from the Internet). Otherwise, the vote-selling item would have stood out among the other items, making it seem totally negative and undoable, and/or making the true purpose of the study obvious.

Before splitting the subject pool into the subjects’ respective experimental conditions, participants were asked to read an excerpt describing four illegal activities (including vote selling).¹² All were formatted as news pieces. The idea was to explain “vote selling” to “newsreaders.”

As Fig. 2 suggests, to prevent possible priming effects,¹³ the order in which experimental subjects answered the direct question¹⁴ and the list experiment were randomly assigned. To be sure, all subjects answered both the direct question and the list experiment. To further prevent the possibility of biased answers when asking the direct question to individuals in the treated group, the direct question stated that the hypothetical possibility of doing one of the illegal things mentioned previously in the excerpt would be randomly assigned. However, all participants were directly asked whether they would be interested in selling their vote. Direct answers were then used to estimate the proportion of “liars.”

As a follow-up, subjects answering “yes” to the direct question answered a pricing test that asked them to indirectly put a price on their votes. Following standard practice in marketing research, participants slid a handle indicating which price was considered “too cheap” for one’s vote. The slide ranged from \$0 to \$1000, in one-dollar increments. The idea was to capture the respondent’s willingness to sell. The pricing test particularly measures the lowest bound at which the participant would perceive the least economic benefit that was still enough to make selling his/her vote interesting. Moving forward, the list experiment contemplated one control and two

¹⁰ Research Now SSI collected the data between March 2 and March 6. Survey respondents belong to the online panel owned and administered by SSI. Notice of IRB Exemption Protocol #E16-292 is kept on file at the Office of Research and Regulatory Affairs of Rutgers University.

¹¹ To isolate the risks and costs associated with engaging in any illegal activity, the next phrase was included: “assuming you would not go to jail.”

¹² See “Appendix” for wording.

¹³ Blair and Imai (2012, p. 54) explain that asking the direct question to individuals in the treated group might bias the results.

¹⁴ See “Appendix” for wording.



possible treatments, each with different vote-selling prices. Since pricing a vote is difficult and based on several pretests, an arbitrarily low (\$100) or an arbitrarily high (\$500) price appeared. Participants randomly assigned to the treatment condition answered only one of these two treatments. More than hard-pricing tests, these two treatments account for possible different elasticities that might have interacted with individual socioeconomic backgrounds, mainly defined by income.¹⁵

Subjects randomly assigned to the control condition answered the following question:

Now, you will have to type HOW MANY, if any, of the following illegal activities you might engage in, assuming you would not go to jail.

(1) steal an iPod from a large department store
 (2) speed on the highway because you're late for work/school
 (3) download your favorite music from the internet illegally

Type in HOW MANY (NOT WHICH), if any, of these things you would do.

In turn, subjects randomly assigned to the treatment condition answered one of the following two treatments. Subjects assigned to the “low” price condition read the same vignette, but the next line was added in the third place: (3) sell your vote to a candidate for \$100. Those assigned to the “high” price condition read the following line: (3) sell your vote to a candidate for \$500.¹⁶

Figure 3 shows the distinct frequencies of participants declaring how many (if any) illegal things they would do. Notice that the figure shows the total number of items, not which ones. For instance, a frequency of “3” does not mean the frequency of the third item, but describes the total number of individuals answering that they would do three of the illegal activities described in the vignette.¹⁷ The order of the items was not randomized, to avoid violating the stable unit treatment value assumption (SUTVA).¹⁸

Showing that the probability of being assigned to any condition is not associated with individual covariates is important. Table 1 shows a multinomial logistic model. The dependent variable is the treatment condition (high treatment, low treatment, and control). The independent variables are observable characteristics captured

¹⁵ Holland and Palmer-Rubin (2015, p. 1189) explain that “the poor are thought to be more susceptible to vote buying.”

¹⁶ Since one of the two sentences was added, item (3) download your favorite music from the Internet illegally was moved to the fourth place.

¹⁷ The experimental design passes the standard tests for design effects (floor and ceiling effects). See Table 3.

¹⁸ Morton and Williams (2010, p. 98) explain that the treatment should be invariant or “stable.”



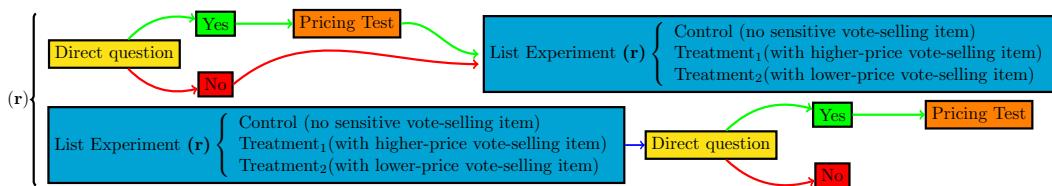


Fig. 2 Experimental flow of the list design. Note this figure shows the flow of the list experiment. Notice that (1) the order in which experimental subjects answered both the direct question and the list experiment was randomized; (2) there are two treatments, one with a selling price of \$100 (“low”) and one with a selling price of \$500 (“high”)

by a short questionnaire included in the study. Four variables were used: income, education, party identification, and political ideology. These were the same set of variables used when estimating likely vote sellers (below). Conveniently, the base category in the multinomial logistic regression is the control condition. The coefficients in the table are all zeros (and statistically nonsignificant). Consequently, these results show no observable differences between the “high” treatment condition and the control group. The same applies to the “low” condition.¹⁹

The paper acknowledges that considerable friction and transaction costs in the real world might mean that creating a market for vote selling would not be easy. For instance, party identification might increase (or decrease) the cost of selling one’s vote, presumably preventing (or fostering) the transaction. If the party of both sellers and buyers should match, fostering vote selling might represent a win–win situation for both. This experimental design does not consider blocking on party identification, as that might have increased considerably the number of cells.

Statistical analyses

Would US citizens sell their vote?

Table 2 shows a simple difference-in-means analysis between each treated group and the control group. On average, the control group would do 1.116 things on the list. Subjects treated under the “low” condition (\$100) would do 1.182 things on the list, while subjects in the “high” condition (\$500) would do 1.189 things.

Three important points characterize this bivariate analysis. First, the mean differences between treated groups (i.e., “low” and “high” treatments) are statistically zero, implying that neither treatment should introduce design bias into the experiment. Second, while treated subjects do have slightly higher means when compared to the control group (indicating some vote-selling propensity), these differences are not statistically significant. Third, while not statistically significant, $0.066 \times 100 = 6.6\%$ of subjects would sell their vote under the “low”

¹⁹ I thank the anonymous reviewer at *Acta Politica* for this suggestion.



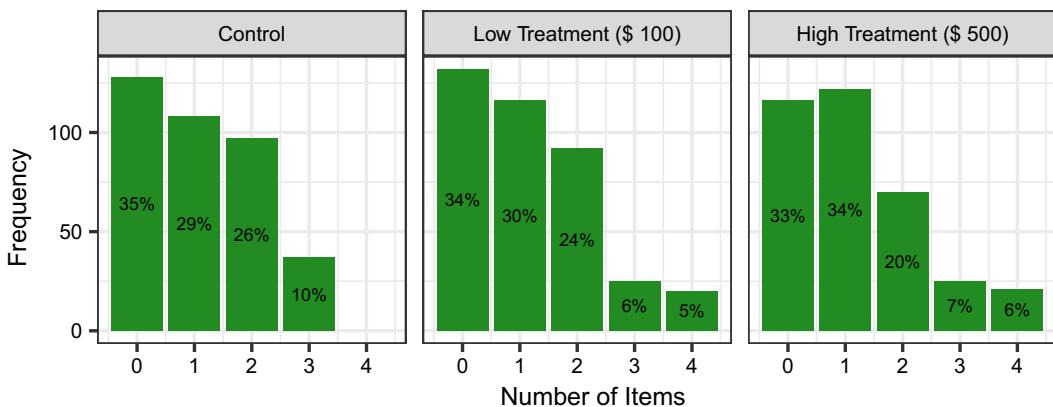


Fig. 3 Frequency and percentages of subjects declaring how many (if any) illegal things they would do. Note notice that the X-axis denotes the number of items, not which ones. Percentages show proportions per condition

Table 1 Covariate balance: multinomial logistic regression for both treatment conditions

	High	Low
Ideology	0.019 (0.068)	-0.031 (0.067)
Party Id.	-0.125 (0.083)	0.022 (0.080)
Income	-0.021 (0.022)	0.006 (0.021)
Education	0.049 (0.048)	-0.008 (0.047)
AIC	2449.471	2449.471
BIC	2499.583	2499.583
Log likelihood	-1214.736	-1214.736

The table shows a multinomial logistic regression. The dependent variable is the treatment condition (high, low, control). In both models, the base category is the control condition. The independent variables are observable characteristics captured by a short questionnaire included in the study. This set of covariates is the same as the one used in the statistical analyses of the list experiment. Since all estimated coefficients are close to zero and statistically nonsignificant, we can safely assume that the randomization mechanism worked as expected, i.e., there are no observable differences across the different treatment conditions. Reference category is control condition. Intercept was excluded from the table. $N = 1479$

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

condition, while $0.073 \times 100 = 7.3\%$ of subjects would sell their vote under the “high” condition. While these estimations score substantially under what is found through the multivariate approach used in this study, as shown below, they are also highly inefficient.

Bivariate calculations are statistically inefficient; hence, the data should be analyzed using multivariate techniques instead. Following the advice of Blair and Imai



Table 2 Differences in means between Treatments (high and low) and the Control group

Condition	Mean	Difference with control condition	Confidence intervals	t	df	p value
Low (\$100)	1.182	1.182–1.116 = 6.6%	[−9%, 22%]	0.846	748	0.398
High (\$500)	1.189	1.189–1.116 = 7.3%	[−8%, 23%]	0.913	700	0.361

The table shows two-tailed *t* tests between each experimental treated unit (“low” and “high” conditions) and the control group. The table shows that $0.066 \times 100 = 6.6\%$ of subjects would sell their vote under the “low” condition, while $0.073 \times 100 = 7.3\%$ of subjects would sell their vote under the “high” condition. Also, 95% confidence intervals are shown. It is evident that they are quite wide and not statistically significant

(2012) and Blair (2015), we took a statistical multivariate approach.²⁰ Exploiting the “low” and “high” treatments, we estimated two identical statistical models. In both models, the outcome variable is the item count of things that subjects would do. The idea is to estimate what we cannot observe (i.e., vote selling), using information that we do observe (i.e., socioeconomic and political variables captured by the questionnaire). The model considers the most common covariates studied in the vote-buying literature (Calvo and Murillo 2004; Stokes 2005; Kitschelt and Wilkinson 2006; Nazareno et al. 2008; Weitz-Shapiro 2012; González-Ocantos et al. 2014; Oliveros 2016; Bahamonde 2018)—that is, income, education, party identification, and political ideology.

Leveraging this multivariate approach makes estimating the proportion of hypothetical vote sellers possible. For both the “low” and “high” treatments, Fig. 4 shows the proportions of declared vote sellers (“Direct Question”), predicted vote sellers (“List Experiment”), and the difference between the two (“Social Desirability”).²¹ Substantively, the figure suggests that after combining the estimates of the “low” and “high” treatments, approximately 25% of the nationally representative sample would be willing to sell their vote.²² While a considerable proportion answered the direct question affirmatively (18%),²³ the analyses still suggest that survey respondents systematically underreported their true answers—that is, approximately 8% of the nationally representative sample would have lied.²⁴

The difference-in-means approach in Table 2 suggests that between 6.6 and 7.3% would be willing to sell their votes. However, the multivariate approach in Fig. 4 suggests that 25% would be willing to do so. While at first these differences might seem huge, they are not. As the literature suggests, multivariate approaches to analyzing list experiment data are far more efficient (Blair and Imai 2012; Blair 2015).

²⁰ The R package *list* was used (Blair 2015). The estimation method used was the “ml” and the maximum number of iterations was 200,000. The remaining arguments of the package were left at their default values.

²¹ Since the estimated quantities do not vary across the different treatments (“low” and “high”), it is reasonable to think that there are no specific concerns associated with the (arbitrarily) chosen prices.

²² This number was calculated averaging over the “high” (27%) and “low” (23%) estimates.

²³ This number was calculated averaging over the “high” (19%) and “low” (17%) estimates.

²⁴ This number was calculated averaging over the “high” (8%) and “low” (7%) estimates.



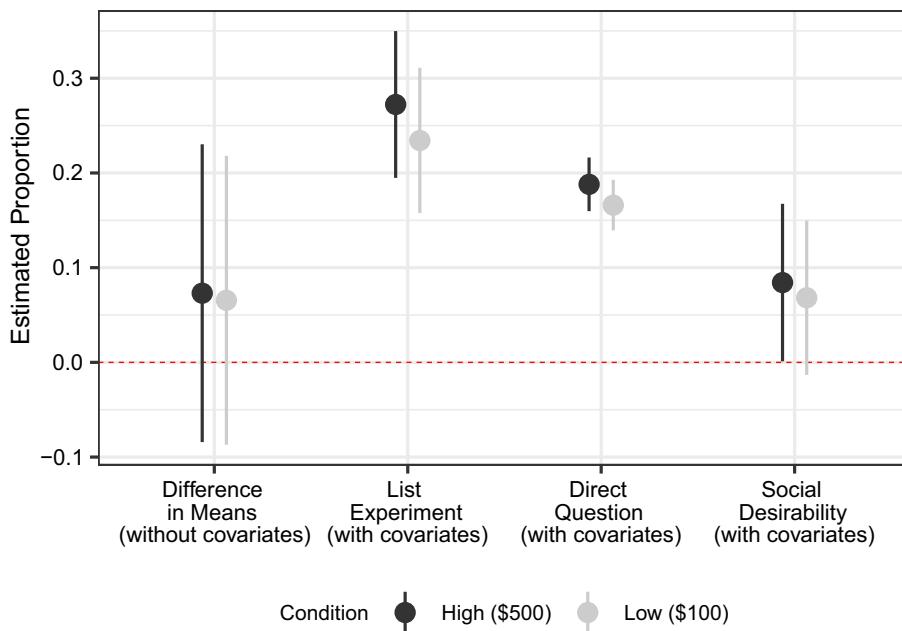


Fig. 4 List experiment data: declared and predicted vote sellers. Note figure summarizes Table 2 by showing the simple difference in means (without covariates). It also shows the proportion of declared (“Direct Question”) and predicted (“List Experiment”) hypothetical vote sellers, and the difference (“Social Desirability”). The three sets of main estimates were obtained via a multivariate procedure (including covariates). Combining both “low” and “high” treatments, 25% would be willing to sell their votes. And of those who answered affirmatively when asked directly (18%) an estimated additional 8% lied about it. “Liars” answer the direct question negatively, but they are likely sellers. The figure shows 95% confidence intervals. There are two arbitrarily “low” and “high” vote-selling prices. The reason for having both was to control for possible price elasticities. The figure suggests some small differences that are not statistically significant. Consequently, these arbitrary pricing decisions do not threaten the experimental design

Within the framework of regression analysis, the difference-in-means approach is just a bivariate lineal model.²⁵ Instead, the multivariate approach is also a lineal model, but it incorporates covariates. We claim that due to the multivariate’s greater efficiency than that of the difference-in-means approach, the former is a far better approach than the latter. One way of showing the efficiency of a statistical model is by examining its standard errors (King 1986, p. 676): the worse the data’s fit is, the greater the standard errors are, the more imprecise the model is, and the wider are the confidence intervals. Considering the statistical uncertainty of both methods (depicted in Fig. 4), it is easy to see that the multivariate approach is far more efficient than the difference-in-means approach. Since it uses more information when fitting the data (the covariates), it gives more precise estimates (narrower confidence intervals). Furthermore, going beyond efficiency issues, the estimates of both methods are statistically indistinguishable. Since the confidence intervals of

²⁵ With just a constant 1 on the right-hand side of the equation.



both approaches overlap, it is not possible to say that the estimated 7.3% and 6.6% are “smaller” than the estimated 25%.²⁶

Moving forward, the estimated proportion of vote sellers—“List Experiment” in Fig. 4—is calculated using information from subjects with fully observable preferences, i.e., subjects with an item count of 0 or 4. We know that the former would not do anything, and the latter would do all things mentioned in the list (including the sensitive item). Using the identified covariates (income, education, party identification, and political ideology), a model is fitted to predict all subjects with 0’s and 4’s on the left-hand side. Using this information makes obtaining individual-level vote-selling predictions possible, i.e., participants who would do 1, 2, or 3 things on the list (shown in Fig. 7 in the “[Appendix](#)”). Then, these individual-level predictions are compared with the direct question that all experimental subjects answered. If a subject is a predicted vote seller but answers the direct question negatively, it is inferred that due to concerns of social desirability, she might have chosen to lie.

What is the price for which US citizens would sell their vote?

Participants were also asked to declare which price they considered “too cheap” for their vote. The intention was to capture the respondent’s willingness to sell. The test measures the lowest bound at which participants would perceive the least possible economic benefit but enough to make them sell. Since it is the lowest threshold, the understanding is that a higher price will still be economically attractive.

The results indicate that the average survey respondent would sell his/her vote for \$418 ($N = 189$), a very expensive price. These results are not unrealistic. While the selling price is very high, it matches what others have found. Bahamonde (2018, p. 52) finds that clientelist political parties in Brazil do target affluent voters at considerably higher prices. Part of the argument is that higher levels of economic development not only raise personal income, but also shift the broker’s vote-buying capacity upward.²⁷ That is, higher income does not necessarily stop vote buying; it just makes it more expensive.²⁸

Stokes et al. (2013) analyze the (im)possibility of expensive vote selling. Industrialization has driven up the median income of the electorate, increasing the selling price while turning vote buying into an increasingly expensive strategy for winning elections. Thus, from the demand-side (parties), vote buying is no longer an efficient mass strategy for party machines. Evidently, with the selling price so expensive, political parties cannot catch up with the supply-side, making vote buying in the United States a rare event (as Fig. 1 suggests). This situation has forced party machines to turn to other, less prohibitively costly alternatives. Thus, these results suggest that from the supply-side (i.e., voters), the vote is still up for sale, only for a very high price that party machines cannot afford.

²⁶ I thank the two anonymous reviewers of *Acta Politica* for stimulating this discussion.

²⁷ Similarly, see Abramo and Speck (2001, p. 14). For the Philippine case, see Schaffer (2004).

²⁸ In fact, there is some anecdotal evidence suggesting that a broker purchased one man’s vote for \$800 during the 2010 elections in eastern Kentucky (Shawn 2012, p. 6).



Since the pricing test is based on the direct question, its results require a word of caution. The list experiment does suggest that some respondents lied when directly asked if they would sell their vote. Consequently, we should expect the pricing test to be biased to some degree. Also, only a small proportion of respondents answered the direct question affirmatively. In addition, prices are the product of supply-and-demand dynamics. In this context, prices result from the interaction between parties (buyers) and voters (sellers). This research design observes only the sellers' side. Hence, we limit our inferences even more by thinking about these results as only suggestive of some willingness to sell. Hence, more than acting as definitive and final pricing tests, these findings do seem to suggest that the vote-selling price is high enough to deter political parties from engaging in vote selling. Finally, future research should design and conduct more complex studies where the design incorporates supply-and-demand dynamics.

Who are the most-likely vote sellers?

The proportion of likely vote sellers was estimated using a multivariate approach. The variables used were the most common explanatory factors studied in the clientelism literature. Ultimately, this procedure allows for profiling participants into likely vote sellers. Figure 5 shows estimated vote-selling probabilities at different levels of all variables used in the multivariate approach.

The analyses suggest that Democrats and Liberals are more likely to sell. These findings are in line with research that studies the different constitutive values of Liberals and Conservatives. Political psychologists have found that compared with Conservatives, Liberals construct their moral systems primarily upon narrower psychological foundations. Particularly, Liberals consider less important both the authority/respect and the purity/sanctity dyads (Graham et al. 2009, p. 1029). This might lead Liberals to engage more frequently in behaviors that might be considered “wrong,” such as vote selling. In fact, Gray et al. (2014, p. 7) explain that Conservatives “see impure violations as relatively more wrong.”

Unlike the conventional wisdom (Kitschelt 2000; Calvo and Murillo 2004; Weitz-Shapiro 2012; Carlin et al. 2015), Fig. 5 shows that education and income levels do not make vote selling more likely. Poverty has long been associated with vote selling. Brusco et al. (2004), Stokes et al. (2013), and Nazareno et al. (2008) explain that since the poor derive more utility from immediate transfers relative to returns associated with future (and uncertain) policy packages, clientelist political parties only target the poor. For instance, Weitz-Shapiro (2014, p. 12) explains that “[a]lmost *universally*, scholars of clientelism treat and analyze [this] practice as an exchange between politicians and their poor clients.”²⁹ The evidence presented in this paper aligns with that of others who have recently questioned the importance of this canonical predictor. Szwarcberg (2013) “challenges the assumption [that brokers] will always distribute goods to low-income voters in exchange for electoral

²⁹ My emphasis.



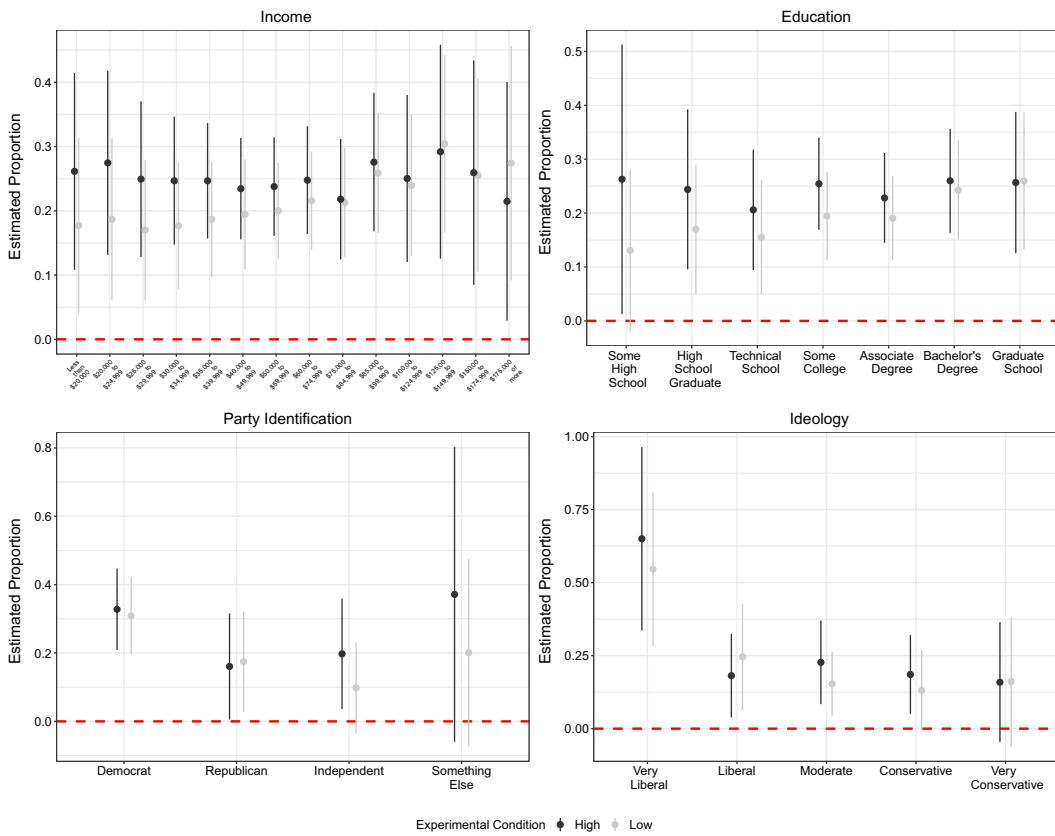


Fig. 5 List experiment: covariates used to estimate likely vote sellers. Note these variables were used in the multivariate statistical model to estimate individual-level probabilities of vote selling. The figure shows the predicted probabilities and their corresponding 95% confidence intervals for income, education, party identification, and ideology. Since the vote-selling prices were set arbitrarily, the reason for two experimental conditions (“low” and “high”) was to control for possible price elasticities. While there are some perceptible changes, they are not statistically significant. Consequently, these arbitrary decisions do not threaten the identification strategy

support,” while González-Ocantos et al. (2012) and Holland and Palmer-Rubin (2015) find that income had little or no effect on vote buying.³⁰ Notably, Bahamonde (2018) explains that brokers target individuals when they are identifiable and groups when brokers need to rely on the spillover effects of clientelism. Both mechanisms occur regardless of individual levels of income.

There do seem to be important substantive differences between the “low” and “high” vote-selling treatments. That is, factors that heavily determine economic status (income and education) seem to be more elastic to marginal increments in the buying price. As Fig. 5 shows, low-income and less-educated individuals are willing to sell their votes in a similar proportion to wealthier and more-educated respondents. However, poorer and uneducated individuals are more willing to sell their votes, conditional on higher prices. This might indicate that for them, behaving

³⁰ Relatedly, González-Ocantos et al. (2014, p. 205) and Corstange (2012, p. 494) also find very weak results for education in Peru and Nicaragua, and in Lebanon, respectively.



illegally is worthwhile but only when the payoff is “large enough.” These results are in line with those of experimental and applied economists who argue that “risk aversion decreases as one rises above the poverty level and decreases significantly for the very wealthy” (Riley and Chow 1992, p. 32). In other words, less-educated and low-income individuals, who are more fragile and precarious, tend to avoid risks and, hence, illegal activities. On the contrary, higher-income and more-educated individuals seem unaffected by the different stimuli and sell their vote in the same proportion, regardless of the price. For instance, highly educated individuals (graduate school level) sell their vote in the same proportion, under both the “low” (26%) and “high” (26%) conditions.

General discussion

Two conflicting pictures emerge. On the one hand, leaving aside concerns about social-desirability bias, we “know”—using nonexperimental data—that most people have never been offered the possibility to sell their vote (as per Fig. 1). On the other hand, the results presented here strongly suggest that they *would*. While buyers (e.g., parties) are not buying, a large proportion of latent vote sellers is willing to sell their vote.

While vote buying/selling in the United States was commonplace during the nineteenth century, higher median incomes have increased the cost of this strategy as a feasible tool to win elections, in turn, making vote buying rare in the United States. The paper confirms this hypothesis by suggesting that an important estimated proportion of US voters—25%—is very much willing to sell their vote, but for an estimated very expensive price—\$418. Overall, these results are striking, and the author is not aware of any other experimental design in which subjects in an industrialized democracy are asked whether they would sell their votes, and, moreover, which produces positive results. The paper began by establishing the tension between supply and demand sides within a clientelist relationship and noting that qualitative research usually focuses on vote selling, while quantitative studies usually focuses on vote buying. Furthermore, most of the literature concentrates its efforts on studying developing countries, mostly paying attention to realized clientelist transactions. As discussed, both aspects pose threats of selection bias to our inferences. This paper tries to fill these gaps by studying hypothetical vote selling via an experimental design implemented in an advanced democracy.

While the paper is rather descriptive, the author believes that the exercise was worth pursuing. The experimental evidence of a large critical mass willing to sell their votes in a developed country is novel. It is hoped that the paper sets the stage for future research and encourages other scholars to field the experimental design presented here in a comparative setting, to include both developed and developing countries. Future research should also consider different values placed on different offices.³¹ It is reasonable to think that presidential, Senate, House, state-legislature,

³¹ I owe this point to Christopher Chambers-Ju.



mayoral, and city-council elections produce different incentives and constraints regarding buying and selling votes. Also, future research should consider blocking party identification—for example, designing a more complex experiment, in which not only the price varies but also the vote-selling treatment is partisan.

Acknowledgements I thank Virginia Oliveros, Richard Lau, David Redlawsk, Christopher Chambers-Ju, Jessica Price, Maria Akchurin, the 2016 Experimental Research Group in Political Psychology at Rutgers University—New Brunswick, the Social Sciences Seminar at O’Higgins University, and the two anonymous reviewers at *Acta Politica* for their comments. This project was funded by the Center for the Experimental Study of Psychology and Politics at Rutgers University—New Brunswick. Bastián Garrido provided excellent research assistance. Usual caveats apply.

Appendix

Experimental manipulations and vignettes

Distractor paragraph. The next paragraph was used to distract subjects from the main purpose of the study, and also to define vote selling.

Washington, D.C.- A department store downtown had a robbery incident last week, reporting several missing iPods from their inventory. Authorities also inform that a group of local residents are trying to ``sell'' their votes to political candidates ahead of a local election for city council. Residents approached some of the candidates running for office and offered to vote for that candidate in return for monetary compensation. In a different subject matter, the local police station released a report on driving habits and behaviors in the Capitol district last week. Finally, cyber-crime has become an increasingly serious issue in the area in the past few years.

Direct Question. All subjects read the next paragraph, and then *all* answered the direct question:

Now you will be entered into a random lottery for the opportunity to do ONE of the illegal things you just read before. This means that you might be randomly offered to hypothetically do ANY of the activities mentioned before.



After a random assignment, you have been selected for the opportunity to hypothetically sell your vote. This means that you will have the hypothetical opportunity to accept money from a candidate for your vote. Would you be willing to accept the offer, assuming you would not go to jail? By selecting ``Yes,'' you could earn up to \$1,000.

Testing for design effects

See Table 3.

Table 3 Test for list experiment design effects

Respondent types	Low condition		High condition	
	Estimate	Standard error	Estimate	Standard error
(y = 0, t = 1)	0.0031	0.0346	0.0183	0.0351
(y = 1, t = 1)	-0.0063	0.0349	-0.0345	0.0353
(y = 2, t = 1)	0.0169	0.0226	0.0299	0.0237
(y = 3, t = 1)	0.0519	0.0113	0.0593	0.0126
(y = 0, t = 0)	0.3429	0.0242	0.3277	0.0249
(y = 1, t = 0)	0.2982	0.0347	0.3264	0.0351
(y = 2, t = 0)	0.2453	0.0299	0.2322	0.0307
(y = 3, t = 0)	0.0481	0.0193	0.0407	0.02

Since the Bonferroni-corrected p values of the *low* (0.8567) and *high* (0.3298) conditions are above the specified α (0.05), I fail to reject the null of no design effects

Geographical distribution of survey respondents

See Fig. 6.



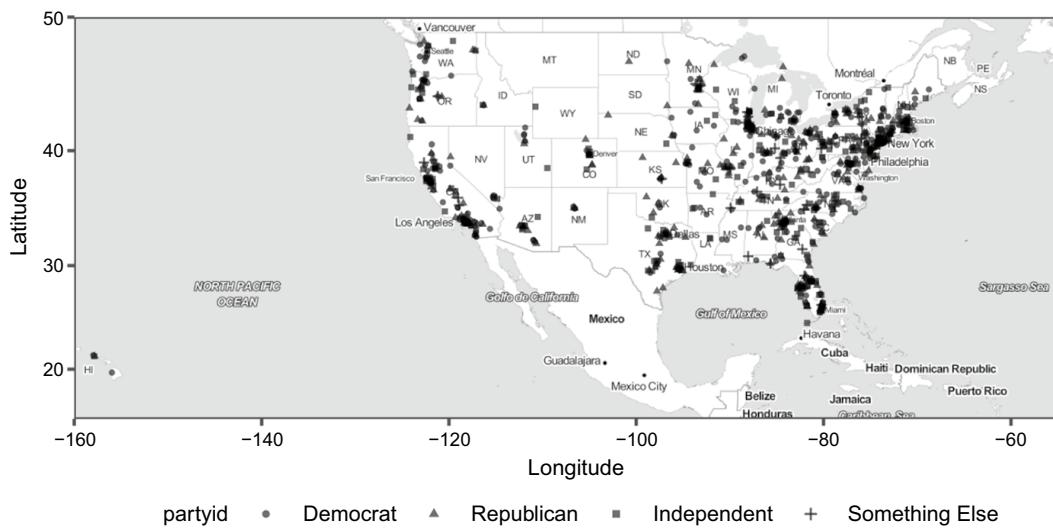


Fig. 6 Geographical distribution of survey respondents by party identification

Individual predictions

The vertical axis of Fig. 7 shows the estimated probabilities of the entire experimental sample, sorted across the horizontal axis. The figure is relevant as it openly shows the amount of uncertainty of the statistical estimates. Ultimately, these individual-specific predictions will be used to profile likely vote sellers.

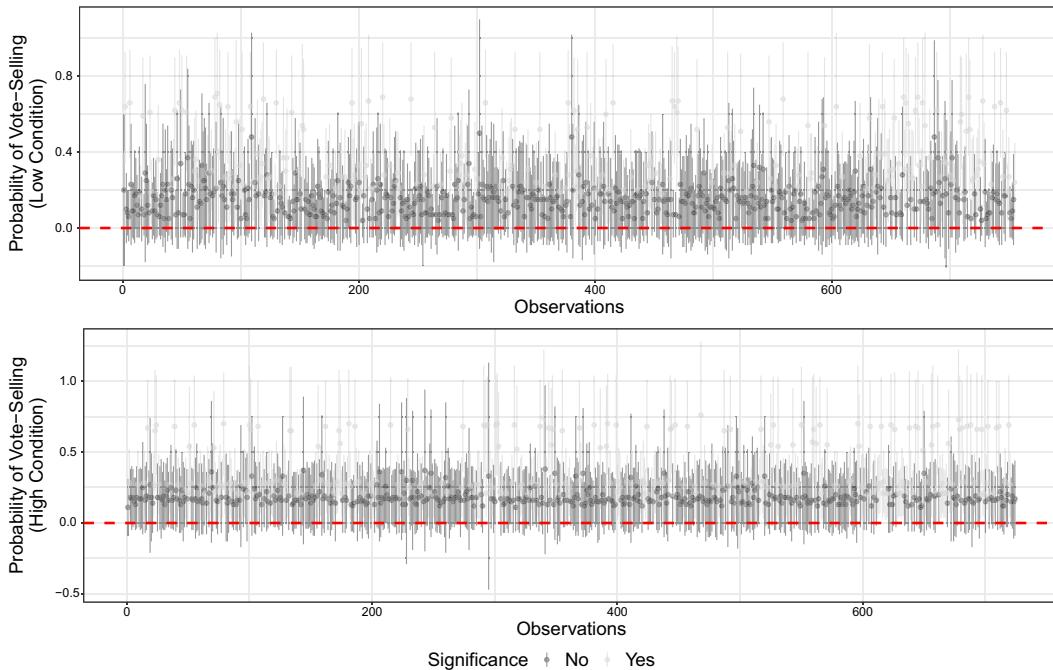


Fig. 7 Individual estimated probabilities of vote selling. Note figure shows the individual probabilities of vote selling ($N = 1479$) under the "low" and "high" conditions. After fitting the model, and following the advice of Blair and Imai (2012) and Imai et al. (2015), individual probabilities of vote selling under the "low" and "high" conditions were estimated. The figure also shows 95% confidence intervals



Still for sale: the micro-dynamics of vote selling in the United...

References

- Abramo, Claudio, and Bruno Speck. 2001. *Report on Brazil*. Technical report.
- Argersinger, Peter. 1985. New Perspectives on Election Fraud in the Gilded Age. *Political Science Quarterly* 100 (4): 669–687.
- Auyero, Javier. 2000. The Logic of Clientelism in Argentina: An Ethnographic Account. *Latin American Research Review* 35 (3): 55–81.
- Bahamonde, Hector. 2018. Aiming Right at You: Group Versus Individual Clientelistic Targeting in Brazil. *Journal of Politics in Latin America* 10 (2): 41–76.
- Bensel, Richard. 2004. *The American Ballot Box in the Mid-nineteenth Century*. Cambridge: Cambridge University Press.
- Blair, Graeme. 2015. Survey Methods for Sensitive Topics. *Comparative Newsletter* 12: 12–16.
- Blair, Graeme, and Kosuke Imai. 2012. Statistical Analysis of List Experiments. *Political Analysis* 20 (1): 47–77.
- Borges, Mariana. 2019. *When Voters Help Politicians: Understanding Elections, Vote Buying, and Voting Behavior Through the Voters' Point of View*. Evanston: Northwestern University.
- Bratton, Michael. 2008. Vote Buying and Violence in Nigerian Election Campaigns. *Electoral Studies* 27 (4): 621–632.
- Brusco, Valeria, Marcelo Nazareno, and Susan Stokes. 2004. Vote Buying in Argentina. *Latin American Research Review* 39 (2): 66–88.
- Calvo, Ernesto, and María Victoria Murillo. 2004. Who Delivers? Partisan Clients in the Argentine Electoral Market. *American Journal of Political Science* 48 (4): 742–757.
- Campbell, Tracy. 2005. *Deliver the Vote: A History of Election Fraud, an American Political Tradition: 1742–2004*. New York: Carroll and Graf.
- Carlin, Ryan, and Mason Moseley. 2015. Good Democrats, Bad Targets: Democratic Values and Clientelistic Vote Buying. *The Journal of Politics* 1 (77): 14–26.
- Carlin, Ryan, Matthew Singer, and Elizabeth Zechmeister (eds.). 2015. *The Latin American Voter: Pursuing Representation and Accountability in Challenging Contexts*. Ann Arbor: University of Michigan Press.
- Corstange, Daniel. 2008. Sensitive Questions, Truthful Answers? Modeling the List Experiment with LISTIT. *Political Analysis* 17 (1): 45–63.
- Corstange, Daniel. 2012. Vote Trafficking in Lebanon. *International Journal of Middle East Studies* 44 (3): 483–505.
- Díaz-Cayeros, Alberto, Federico Estévez, and Beatriz Magaloni. 2012. Strategies of Vote Buying: Democracy, Clientelism, and Poverty Relief in Mexico: 1–381.
- Dixit, Avinash, and John Londregan. 1996. The Determinants of Success of Special Interests in Redistributive Politics. *The Journal of Politics* 58 (4): 1132–1155.
- Druckman, James, Mauro Gilli, Samara Klar, and Joshua Robison. 2015. Measuring Drug and Alcohol Use Among College Student-Athletes. *Social Science Quarterly* 96 (2): 369–380.
- Erie, Steven. 1990. *Rainbow's End: Irish-Americans and the Dilemmas of Urban Machine Politics, 1840–1985*. Berkeley: University of California Press.
- Fahrenthold, David. 2012. Selling Votes is Common Type of Election Fraud. The Washington Post. https://www.washingtonpost.com/politics/decision2012/selling-votes-is-common-type-of-election-fraud/2012/10/01/f8f5045a-071d-11e2-81ba-ffe35a7b6542_story.html.
- Finan, Rederico, and Aura Schechter. 2012. Vote-Buying and Reciprocity. *Econometrica* 80 (2): 863–881.
- Foa, Roberto, and Yascha Mounk. 2016. The Danger of Deconsolidation: The Democratic Disconnect. *Journal of Democracy* 27 (3): 5–17.
- Foa, Roberto, and Yascha Mounk. 2017. The Signs of Deconsolidation. *Journal of Democracy* 28 (1): 5–15.
- Geddes, Barbara. 1990. How the Cases You Choose Affect the Answers You Get: Selection Bias in Comparative Politics. *Political Analysis* 2 (1): 131–150.
- Glynn, Adam. 2013. What Can We Learn with Statistical Truth Serum? Design and Analysis of the List Experiment. *Public Opinion Quarterly* 77 (S1): 159–172.
- González-Ocantos, Ezequiel, Chad de Jonge, Carlos Meléndez, Javier Osorio, and David Nickerson. 2012. Vote Buying and Social Desirability Bias: Experimental Evidence from Nicaragua. *American Journal of Political Science* 56 (1): 202–217.



- González-Ocantos, Ezequiel, Chad Kiewiet de Jonge, and David Nickerson. 2014. The Conditionality of Vote-Buying Norms: Experimental Evidence from Latin America. *American Journal of Political Science* 58 (1): 197–211.
- Graham, Jesse, Jonathan Haidt, and Brian Nosek. 2009. Liberals and Conservatives Rely on Different Sets of Moral Foundations. *Journal of Personality and Social Psychology* 96 (5): 1029–1046.
- Gray, Kurt, Chelsea Schein, and Adrian Ward. 2014. The Myth of Harmless Wrongs in Moral Cognition: Automatic Dyadic Completion from Sin to Suffering. *Journal of Experimental Psychology* 143 (4): 1600–1615.
- Hicken, Allen, Stephen Leider, Nico Ravanilla, and Dean Yang. 2015. Measuring Vote-Selling: Field Evidence from the Philippines. *American Economic Review* 105 (5): 352–356.
- Hicken, Allen, Stephen Leider, Nico Ravanilla, and Dean Yang. 2018. Temptation in Vote-Selling: Evidence from a Field Experiment in the Philippines. *Journal of Development Economics* 131: 1–14.
- Holland, Alisha, and Brian Palmer-Rubin. 2015. Beyond the Machine: Clientelist Brokers and Interest Organizations in Latin America. *Comparative Political Studies* 48 (9): 1186–1223.
- Imai, Kosuke, Bethany Park, and Kenneth Greene. 2015. Using the Predicted Responses from List Experiments as Explanatory Variables in Regression Models. *Political Analysis* 23 (02): 180–196.
- Jensen, Peter Sandholt, and Mogens Justesen. 2014. Poverty and Vote Buying: Survey-Based Evidence from Africa. *Electoral Studies* 33: 220–232.
- Kam, Christopher. 2017. The Secret Ballot and the Market for Votes at 19th-Century British Elections. *Comparative Political Studies* 50 (5): 594–635.
- Khemani, Stuti. 2015. Buying Votes Versus Supplying Public Services: Political Incentives to Under-invest in Pro-poor Policies. *Journal of Development Economics* 117: 84–93.
- de Jonge, Chad Kiewiet. 2015. Who Lies About Electoral Gifts? *Public Opinion Quarterly* 79 (3): 710–739.
- King, Gary. 1986. How Not to Lie with Statistics: Avoiding Common Mistakes in Quantitative Political Science. *American Journal of Political Science* 30 (3): 666–687.
- Kitschelt, Herbert. 2000. Linkages Between Citizens and Politicians in Democratic Polities. *Comparative Political Studies* 33 (6–7): 845–879.
- Kitschelt, Herbert, and Steven Wilkinson (eds.). 2006. *Patrons, Clients and Policies: Patterns of Democratic Accountability and Political Competition*, vol. 392. Cambridge: Cambridge University Press.
- Kuklinski, James, Paul Sniderman, Kathleen Knight, Thomas Piazza, Tetlock Philip, Gordon Lawrence, and Barbara Mellors. 1997. Racial Prejudice and Attitudes Toward Affirmative Action. *American Journal of Political Science* 41 (2): 402–419.
- LaBrie, Joseph, and Mitchell Earleywine. 2000. Sexual Risk Behaviors and Alcohol: Higher Base Rates Revealed Using the Unmatched-Count Technique. *Journal of Sex Research* 37 (4): 321–326.
- Leight, Jessica, Rohini Pande, and Laura Ralston. 2016. *Value for Money in Purchasing Votes? Vote-Buying and Voter Behavior in the Laboratory*.
- Levitsky, Steven, and Daniel Ziblatt. 2018. *How Democracies Die*. New York: Crown.
- Levy, Jack. 2008. Case Studies: Types, Designs, and Logics of Inference. *Conflict Management and Peace Science* 25 (1): 1–18.
- Michael, Adam, and Tariq Thachil. 2018. How Clients Select Brokers: Competition and Choice in India's Slums. *American Political Science Review* 112 (4): 775–791.
- Morton, Rebecca, and Kenneth Williams. 2010. *Experimental Political Science and the Study of Causality: From Nature to the Lab*. Cambridge: Cambridge University Press.
- Nazareno, Marcelo, Valeria Brusco, and Susan Stokes. 2008. *Why Do Clientelist Parties Target the Poor?*.
- Nichter, Simeon. 2014. Conceptualizing Vote Buying. *Electoral Studies* 35: 315–327.
- Nichter, Simeon, and Michael Peress. 2017. Request Fulfilling: When Citizens Demand Clientelist Benefits. *Comparative Political Studies* 50 (8): 1086–1117.
- Oliveros, Virginia. 2016. Making it Personal: Clientelism, Favors, and Public Administration in Argentina. *Comparative Politics* 48 (3): 373–391.
- Posada-Carbó, Eduardo. 1996. *Elections Before Democracy: The History of Elections in Europe and Latin America*. London: Palgrave Macmillan.
- Redlawsk, David, Caroline Tolbert, and William Franko. 2010. Voters, Emotions, and Race in 2008: Obama as the First Black President. *Political Research Quarterly* 63 (4): 875–889.
- Reynolds, John. 1980. The Silent Dollar': Vote Buying in New Jersey. *New Jersey History* 98 (3): 191–211.



Still for sale: the micro-dynamics of vote selling in the United...

- Reynolds, John, and Richard McCormick. 1986. Outlawing 'Treachery': Split Tickets and Ballot Laws in New York and New Jersey, 1880–1910. *The Journal of American History* 72 (4): 835–858.
- Riley, William, and Victor Chow. 1992. Asset Allocation and Individual Risk Aversion. *Financial Analysts Journal* 48 (6): 32–37.
- Rueda, Miguel. 2015. Buying Votes with Imperfect Local Knowledge and a Secret Ballot. *Journal of Theoretical Politics* 27 (3): 428–456.
- Rueda, Miguel. 2017. Small Aggregates, Big Manipulation: Vote Buying Enforcement and Collective Monitoring. *American Journal of Political Science* 61 (1): 163–177.
- Rusk, Jerrold. 1970. The Effect of the Australian Ballot Reform on Split Ticket Voting: 1876–1908. *The American Political Science Review* 64 (4): 1220–1238.
- Sabato, Hilda. 2001. On Political Citizenship in Nineteenth-Century Latin America. *The American Historical Review* 106 (4): 1290.
- Schaffer, Schaffer. 2004. Vote Buying in East Asia. Unpublished Manuscript.
- Shawn, Eric. 2012. Drug Money Funds Voter Fraud in Kentucky. *Fox News* 1–9.
- Stokes, Susan. 2005. Perverse Accountability: A Formal Model of Machine Politics with Evidence from Argentina. *American Political Science Review* 99 (3): 315–325.
- Stokes, Susan, Thad Dunning, Marcelo Nazareno, and Valeria Brusco. 2013. *Brokers, Voters, and Clientelism: The Puzzle of Distributive Politics*. Cambridge: Cambridge University Press.
- Szwarcberg, Mariela. 2013. The Microfoundations of Political Clientelism. Lessons from the Argentine Case. *Latin American Research Review* 48 (2): 32–54.
- Vicente, Pedro. 2014. Is Vote Buying Effective? Evidence from a Field Experiment in West Africa. *The Economic Journal* 124 (574): F356–F387.
- Vicente, Pedro, and Leonard Wantchekon. 2009. Clientelism and Vote Buying: Lessons from Field Experiments in African Elections. *Oxford Review of Economic Policy* 25 (2): 292–305.
- Wantchekon, Leonard. 2003. Clientelism and Voting Behavior: Evidence from a Field Experiment in Benin. *World Politics* 55 (April): 399–422.
- Weitz-Shapiro, Rebecca. 2012. What Wins Votes: Why Some Politicians Opt Out of Clientelism. *American Journal of Political Science* 56 (3): 568–583.
- Weitz-Shapiro, Rebecca. 2014. *Curbing Clientelism in Argentina: Politics, Poverty, and Social Policy*. Cambridge: Cambridge University Press.
- Williamson, Samuel. 2018. Seven Ways to Compute the Relative Value of a U.S. Dollar Amount, 1774 to Present. MeasuringWorth.

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