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Recessions, Inequality, and Democratization*

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Abstract

This paper explores the extent to which episodes of democratization can be explained by variation in income inequality. Modern empirical tests of this relationship have generally yielded null results, which we argue follow from the estimation of mis-specified models. Guided by a theoretical nuance of the "new economic view" of democratization proposed by Acemoglu and Robinson (2001), our empirical examination considers the possibility that the effect of income inequality on democratization may be heterogeneous across the business cycle. Employing fixed effects regressions over a panel of autocratic countries, we demonstrate that variation in income inequality can explain democratization following recessions, but that there is no statistically significant relationship following periods of economic growth.

Keywords: Democratization, distributive conflict, inequality, window of opportunity

JEL Codes: D72, D74, O15, P16, P48

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1 Introduction

At least since Marx, economic inequality has been among the most salient topics of revolutionary rhetoric and academic theories of political transitions to democracy. Indeed, a rich academic literature provides strong theoretical reasons to believe that political transitions are driven by distributive conflicts.[1] Yet, the recent consensus among empirical social scientists is that there is no statistically significant relationship between income inequality and the likelihood of democratization (Alemán and Yang, 2011; Gassebner *et al.*, 2013; Haggard and Kaufman, 2012; Houle, 2009; Teorell, 2010).[2] This paper reconsiders the link between income inequality and political transitions from autocracy to democracy. We argue that social scientists have not found a statistically significant relationship between economic inequality and political transitions to democracy due to the typical (implicit) assumption that the effect of inequality is homogenous across macroeconomic cycles. We demonstrate an empirically robust effect of inequality on the likelihood of democratization during recessionary periods, when autocratic regimes are particularly weak (and a revolutionary threat may be amplified). During periods of growth, on the other hand, there is no statistically significant relationship.

Our empirical investigation is guided by what has emerged as the most influential economic theory of democratization (Acemoglu and Robinson, 2001, 2006). In their canonical economic model of political transitions to democracy, Acemoglu and Robinson (2001) [henceforth AR] formalize a social tension over the control of political institutions and redistributive fiscal policy tools in a game-theoretic, rational-choice model of strategic interaction between an elite political class and a disenfranchised working class. AR describe democratization as an equilibrium outcome in which the elite voluntarily cede political power (and control over redistributive fiscal policy) to the disenfranchised when the threat of revolution is unusually high. AR relate the threat of revolution to the economic costs and benefits of revolting, which in their model are linked to both the degree of economic inequality and the state of the macroeconomy.

In the AR model, the economic benefit of revolting lies in the redistributive potential of a democratically-determined fiscal policy, which is greater for larger degrees of income inequality (following the classic models from the democratic political economy literature of Meltzer and Richard 1981, Roberts 1977, and Romer 1975). AR consider the economic cost of revolting to be pro-cyclical, since revolutionaries have diminished earnings opportunities during recessionary periods and this opens a "window of op-

[1] We do not attempt to survey the theoretical literature, but refer readers to the reviews provided by a few of its most prominent modern contributions (Acemoglu and Robinson, 2006; Boix, 2003).

[2] Houle (2009) summarizes the empirical literature prior to 2008, where some statistically significant relationships were found, though with methodological and data limitations that he outlines. There is some evidence that inequality leads to civil unrest, which sometimes precedes democratizations "from below" (Alesina and Perotti, 1996).

portunity" during which the revolutionary threat is enhanced temporarily. Crucially, the elite can prevent a revolution through tax concessions during normal times, but cannot credibly do so during transitory recessions. Rather than have their assets destroyed and/or confiscated in a revolution, the elite may preemptively enfranchise the population during periods of heightened revolutionary threat.[3]

In our reading of AR's theory of political transitions, a distributional grievance is required for a revolutionary threat to exist and given a revolutionary threat, a recession is required to prompt the elite to democratize. Our argument is rooted in the nuance of AR's model that the effect of income inequality on the likelihood of democratization is *conditional upon* the window of opportunity being open during recessionary periods.[4] Without examining the effect of inequality conditional upon the productive state of the macroeconomy, empirical research on the determinants of democratization has been ignoring an important non-linearity, which may explain the largely null results concerning the effect of inequality on transitions to democracy.[5]

The AR model predicts a statistically significant relationship between inequality and the likelihood of democratization when the window of opportunity is open during recessionary periods, but no relationship when the economy is growing. Indeed, using the most recent and comprehensive data on income inequality (Solt, 2009), this is precisely our finding. The result is robust to estimation over several alternative samples, to a variety of fixed effects configurations, to the use of several alternative indicators of democratization, and to the use of different sources for GDP data. Our result provides a simple explanation for why previous literature has found largely null results concerning inequality and democratization and offers new evidence in support of the new economic view.

Our paper is organized as follows. The next section presents the panel data set that we use, while the third section presents our baseline results that are discussed with reference to the empirical literature on democratization. The fourth section presents a wide range of sensible robustness checks that we have conducted and the final section offers our concluding remarks. A brief theoretical appendix presents a much simplified reprise

[3]See Brückner and Ciccone (2011); Burke and Leigh (2010); Lin and Sim (2014), for example, for recent evidence of the causal impact of transitory slowdowns on improvements of democratic institutions. See additionally Teorell (2010) for an overview of the relative importance of growth downturns.

[4]Of course, there are many factors besides economic recessions that provide windows of opportunity for anti-governmental rebels. We focus on the windows of opportunity associated with economic recessions since this has received the most attention so far in the empirical economics literature. Moreover, data on recessionary periods are easier to identify in the data than other transitory windows of opportunity for rebels, such as periods when a regime is weak due to external political factors.

[5]Though see Freeman and Quinn (2012) for a contribution that is similar to ours in spirit. They find that over a full sample, there is no relationship between inequality and democratization, but that there is a relationship among countries that are not integrated into the global financial system. Their finding is similarly motivated by a theoretical nuance of Acemoglu and Robinson (2006).

of the AR model of political transitions, in which we derive equilibrium comparative statics that are appropriate for an empirical investigation of binary democratization indicator variables.

2 Data

To investigate the extent to which democratization episodes have been based on distributional grievances and catalyzed by macroeconomic shocks, we gathered data from a variety of sources and constructed a panel of autocratic countries from 1960 – 2012. As is common in the literature on institutional change, we have constructed five year panels as the variables' average value over each five-year period.[6]

Democratization. The baseline regressions explain variation in a binary democratization indicator constructed from a democracy index that combines the composite Polity index of the Polity IV dataset (Marshall *et al.*, 2010) with the political freedom and civil liberties indexes of the Freedom House (2013).[7] We follow the method of Hadenius and Teorell (2005), which normalizes both the Polity and Freedom House measures to a scale from 0 – 10 where 0 is least democratic and 10 is most democratic and then averages the two normalized measures. To maximize the number of observations, we use the version which imputes missing Polity data by regressing Polity on the average Freedom House measure before taking the average of the two measures, which we refer to as FH_iPolity2 (see Hadenius and Teorell 2005 and Teorell *et al.* 2013 for details).

We generate our baseline democratization indicator using a threshold-crossing criteria. When coding the transition indicator for period t, we drop country-period observations from the sample that were not autocracies in period $t-1$, i.e., we drop observations with a lagged FH_iPolity2 score above 5 (the midpoint of the FH_iPolity2

[6]Throughout, we have interpolated missing yearly values by calculating the average growth rate between observations before collapsing the panels into five-year periods. Three primary benefits of using five-year panels are (i) smoothing out yearly measurement error, (ii) facilitating the use of a binary dependent variable based on Polity data that is sometimes imputed (Freeman and Quinn, 2012), and (iii) reducing significantly the possibility of endogeneity when lagging the independent variables. See, for example, Acemoglu *et al.* (2008), Cervalleti *et al.* (2014), Freeman and Quinn (2012), Tavares and Wacziarg (2001), and Teorell (2010).

[7]The Polity index codes the quality of democratic institutions by observation of, among other things, the competitiveness of political participation, the openness and competitiveness of choosing executives, and the constraints on the chief executive. The composite Polity index ranges from -10 to 10, where -10 represents a fully autocratic political system and 10 represents a fully competitive democratic political institution. The Freedom House data measures political rights and civil liberties, both measured on a scale of 1 (most free) to 7 (least free). Political rights include free participation in the political process, including the right to vote for distinct alternatives in political elections, complete for public office, join parties or other political organizations, and elect representatives who actually have an impact on policy choices. Civil liberties include freedom of expression and belief, the right to join associations or organizations, protection under the rule of law, and personal autonomy from the state.

range), and define the transition indicator for country i in period t as the following:

$$transition_{it} = \begin{cases} 0 & \text{if FH\_iPolity2}_{i,t} \leq 5 \text{ and FH\_iPolity2}_{i,t-1} \leq 5 \\ 1 & \text{if FH\_iPolity2}_{i,t} > 5 \text{ and FH\_iPolity2}_{i,t-1} \leq 5 \end{cases}$$

Over the whole period for which we have both Freedom House and Polity data (1972 – 2012), there were 84 instances of democratization as we have defined it.[8] Regrettably, data on GDP and inequality are not as consistently available and we lose many observations in the sample of our baseline regressions, in which we have 54 instances of democratization. Table 11 lists the instances of democratization in our baseline sample.

Previous research has shown that the competing measures of democratic institutional quality are not perfect substitutes for identifying democratic transitions (Haggard and Kaufman, 2012) and that econometric results on democratization can be sensitive to which is used (Barron *et al.*, 2014; Boix *et al.*, 2012). In our robustness checks, we consider two types of modifications to the dependent variable: (i) we use alternative methods of constructing the *transition* variable using the FH_iPolity2 data and (ii) we construct the *transition* variable using alternative data sources (from Acemoglu *et al.* 2014, the Polity data set, Cheibub *et al.* 2010, and Haggard and Kaufman 2012).

Inequality. As for the inequality data, our benchmark results are obtained using the most standard measure of income inequality, the Gini coefficient, which is a normalized measure between 0 and 100, where higher levels indicate a more unequal income distribution. There are differences across countries (and time) as to how income distributions are measured, so we use the recent Standardized World Inequality Indicators Database (SWIID), constructed and maintained by Frederick Solt (Solt, 2009) as our primary source for inequality data. The SWIID combines the Luxembourg Income Study with the World Inequality Indicators Database and standardizes the measurements across the two databases yielding a cross-national panel that is significantly enlarged from the individual databases. An additional advantage of the Solt database is that it reports Gini coefficients for both the net income distribution (after taxes and transfers) and the gross income distribution. Throughout, we present results with both the gross and net Gini coefficients.

Economic downturns. For macroeconomic growth data, we use PPP-adjusted per capita GDP growth data from the World Development Indicators (World Bank, 2013). Using the raw growth rate data ($growth_{it}$), we construct a simple "macroeconomic downturn" indicator variable ($downturn_{it}$) that isolates the macroeconomic contraction

[8] Hadenius and Teorell (2007) use a FH_iPolity2 threshold of 7.5 rather than 5. The baseline regression results that we present in table 3 are robust to the threshold value suggested by Hadenius and Teorell (2007).

episodes that are the theoretical catalysts for democratization in the AR model.

$$downturn_{it} = \begin{cases} 1 & \text{if } growth_{it} \leq 0 \\ 0 & \text{if } growth_{it} > 0. \end{cases}$$

Recall that we are using 5-year panels, so the downturn indicator is isolating pronounced recessionary periods for the "window of opportunity" that the AR model highlights. In our robustness checks, we also show results using the raw growth rate data from WDI, raw growth rate data from the Penn World Tables (Heston *et al.*, 2012) [PWT], as well as with the downturn indicator constructed using the PWT growth data.

Table 1 provides a description of our data and summary statistics are presented in table 2. Throughout our analysis, we present results from a baseline sample of autocratic countries, defined using the FH_iPolity2 score, as well as from a sub-sample that excludes the transition economies of central and eastern Europe (signatories of the Warsaw Pact) and countries that were part of the former USSR. Table 11 notes the countries to have democratized that are in our baseline sample, but excluded from the reduced sample.

3 Panel regression results

This section presents the results of a series of panel regression models that highlight the theorized interaction effect of inequality and growth slowdowns as determinants of democratic transitions. In the tables of our baseline results, we first present results from regressions where growth downturns and inequality are not interacted and then present a series of regressions that highlight how the effect of inequality on the probability of a transition is conditional on the presence of an economic downturn. In all of the results reported, we also performed the regressions on a sub-sample of the autocratic countries that excludes transition economies and countries that were formerly part of the Soviet Union. We use the net income inequality data in our baseline specification, but all of the regressions were also ran with the market inequality measure. Our baseline specification controls for lagged per capita real national income, lagged FH_iPolity2 score, regime type indicators (military, monarchy, single party, personal rule), regional fixed effects and period fixed effects. In all tables, we report standard errors that have been clustered at the country level.

3.1 Baseline regression analysis

The first column of table 3 tests the extent to which macroeconomic downturns can explain democratic transitions. Formally, we estimate:

$$\text{prob}(transition_{i,j,t} = 1) = \alpha_1 downturn_{i,j,t-1} + x'_{i,j,t-1}\beta + \gamma_j + \delta_t + u_{i,j,t}, \quad (1)$$

where $transition_{i,j,t} = 1$ if a country i from region j that was autocratic in period $t-1$ became democratic in period t and $transition_{i,j,t} = 0$ if the country remained autocratic. The vector $x_{i,j,t-1}$ includes our standard battery of controls described above, the γ_t's denote a full set of time effects that capture common shocks to the probability of democratizing, and the γ_j's denote a full set of regional dummies that capture any time-invariant regional characteristics that affect the probability of democratization. Robustness tests demonstrate that estimates are quite similar when we also consider country, rather than regional, fixed effects (see table 5). The error term u_{ijt} captures all other factors not correlated with our controls which may also explain democratization, with $E(u_{i,j,t}) = 0$ for all i, j, and t. For both the full sample (panel A) and the sample that excludes the formerly communist countries (panel B), the effect of a lagged macroeconomic downturn is not a statistically significant explanatory variable for democratic transitions.

The second column of table 3 tests the extent to which income inequality can explain democratic transitions. Formally, we estimate:

$$\text{prob}(transition_{i,j,t} = 1) = \alpha_1 inequality_{i,j,t-1} + x'_{i,j,t-1}\beta + \gamma_j + \delta_t + u_{i,j,t}. \quad (2)$$

As with the results from the first column, the independent (unconditional) effect of income inequality is not a statistically significant explanatory variable for democratic transitions in the full sample. Interestingly, however, we estimate a statistically significant effect of inequality in the limited sample in panel B that, while quite small in magnitude, is of the sign predicted by the new economic view of democratization. Throughout our analysis, estimated coefficients on the inequality measure are more precisely estimated in the limited sample, which is to be expected considering that democratization in the formerly communist countries was not driven by distributional grievances.

The third column of results is from a regression that controls for both growth downturns and inequality at the same time. Formally, we estimate:

$$\begin{aligned} \text{prob}(transition_{i,j,t} = 1) \quad &= \alpha_1 downturn_{i,j,t-1} + \alpha_2 inequality_{i,j,t-1} \\ &+ x'_{i,j,t-1}\beta + \gamma_j + \delta_t + u_{i,j,t}. \end{aligned} \quad (3)$$

Here as well, we find no effect of growth downturns or inequality in the full sample. As previously mentioned, the first three regression models estimated do not, in our view, provide a proper test of the economic view concerning the relations between (i) macroeconomic downturns and democratization and (ii) income inequality and democratization. On point (i), in a society with low income inequality, the distributional motive that underlies the revolutionary threat is not present, so downturns should not independently trigger democratization. A similar comment on point (ii): in a society with high income inequality, but consistently strong economic growth, the "window of opportunity" for democratization never opens and there is no catalyst to strengthen the revolutionary threat and prompt democratization.

In a theoretical appendix, we develop a simplified reprise of the AR model that highlights the empirical prediction that highly unequal societies are more likely to democratize, but only during recessions. The next regression model investigates the extent to which the effect of income inequality on the probability of transition is conditional on whether or not the country was experiencing a macroeconomic downturn. This conditional relationship is investigated by including an interaction term between the downturn and inequality variables.

$$\begin{aligned} \text{prob}(transition_{i,j,t} = 1) \quad &= \alpha_1 downturn_{i,j,t-1} + \alpha_2 inequality_{i,j,t-1} \\ &+ \alpha_3 (downturn_{i,j,t-1} \times inequality_{i,j,t-1}) \\ &+ x'_{i,j,t-1}\beta + \gamma_j + \delta_t + u_{ijt} \end{aligned} \tag{4}$$

Hypotheses tests on parameter α_3 in equation (4) are, in our view, the most direct way to investigate the nuance of the economic view of democratization that inequality affects the probability of democratization, but only during recessionary periods. The results in column 4 of table 3 indicate that macroeconomic downturns decrease the probability of democratization in a perfectly equal society ($Gini = 0$) and increase the probability of democratization as inequality increases. Interestingly, the point estimates suggest the existence of a critical value for the Gini coefficient, above which a macroeconomic downturn, on average, has induced democratization. From column 4, the critical value for the net income Gini coefficient is 40.25 for the full sample and 40.35 for the sample that excludes the formerly Soviet and transition countries. The marginal effects of increased inequality seem both reasonable and economically significant. During recessionary periods, for example, a one standard deviation increase in the net Gini coefficient increases the probability of a future period democratization by 12.5 percentage points. As previously stated, there is no statistically significant effect of greater income inequality during growth periods.

Columns 5 – 9 of table 3 estimate logit regressions. Column 5 is the analogue to

column 3 that does not take into account the interaction effect between the two variables of primary interest. Note that the sample size is reduced for the logit regressions, which drop countries where the dependent variable has no variation, i.e., countries that remain autocratic throughout the entire period we investigate. The logit regressions in column 5 corroborate the results from the LPM regressions of column 3.

Columns 6 – 9 present regressions from fully interacted models in which we perform logit estimates separately on two different sets of subsamples. We fully interact the model according to, first, the economic downturn indicator and, second, an inequality indicator as method to cleanly estimate the conditional effect of recession and inequality on the democratization process. Our reason for estimating these fully interacted models is twofold. First, interpretation of interaction terms is difficult when using non-linear estimators such as logit (Ai and Norton, 2003). Second, marginal effects may not evolve linearly, as required in LPM estimates with an interaction term. For example, in column 4, the impact of a downturn increases linearly with the degree of inequality. In our simple reprise of the AR model (in appendix), however, we show that there may be tranquil times of consistent economic growth during which the degree of inequality may have no impact since a regime faces no threat of revolution for any given any degree of inequality during such times. Equivalently, we show that economic downturns may have an impact only if the degree of inequality is sufficiently high and no impact at all for low degree of inequality.

Columns 6 and 7 present logit estimates from a model fully interacted with the downturn indicator. Indeed, we find that the effect of inequality is statistically insignificant for observations that did not experience a downturn (column 6), but that greater inequality has a statistically significant positive effect among the observations that did experience a downturn (column 7). Similarly, in columns 8 and 9 we present logit estimats from a model that is fully interacted with an inequality indicator. As threshold values for inequality we use the turning point Gini coefficients calculated from the column 4 regressions (40.25 for panel A and 40.35 for panel B). Again consistent with column 4, we find that downturns do not have a statistically significant effect among observations with low inequality (column 8), but that in high inequality observations growth downturns have a statistically significant positive effect on the probability of democratization (column 9).

In table 3, the results are qualitatively and quantitatively quite similar between the two panels – in most cases coefficients larger and more precisely estimated in the reduced sample, increasing significance levels. Interestingly, in columns 2 and 3 of panel B inequality has an unconditional statistically significant effect once excluding the transition and former Soviet economies. Table 4 replicates table 3 using the market income Gini coefficient and yields virtually identical results. The calculated turning

point for the market income Gini coefficients from column 4 regressions were 43.64 for the full sample and 42.49 for the limited sample.

3.2 Discussion of baseline results

Place in the empirical literature. As mentioned earlier, the modern empirical literature on inequality and democratization has yielded largely null results, which we have argued may be due to mis-specified econometric tests. Moreover, by estimating the effect of inequality on democratization as conditional on the presence of a macroeconomic downturn, our paper bridges this literature with that which investigates the role of economic shocks in the process of democratization.

Indeed, there is empirical evidence that macroeconomic downturns are an important determinant of democratization (Teorell, 2010) and perhaps a causal one (Brückner and Ciccone, 2011; Burke and Leigh, 2010; Lin and Sim, 2014).[9] While this literature supports the notion that the revolutionary threat (and the incentive for the elite to democratize) may be amplified during recessionary periods, it does not address what is the underlying political grievance to form the revolutionary threat. Our paper contributes to this line of investigation by examining the extent to which recessions may amplify revolutionary threats based on income inequality.

Ours is not the first paper to demonstrate that the impact of inequality on the likelihood of democratization may be conditional on other macroeconomic variable. In a sophisticated analysis, Freeman and Quinn (2012) demonstrate a statistically significant relationship between inequality and democratization among a sub-set of countries that have not yet financially liberalized. The analysis of Freeman and Quinn (2012) is similarly motivated by a theoretical nuance of the AR model and our contribution is complementary to theirs.

Possibility of endogeneity. This paper has focused on establishing that correlations between inequality and the likelihood of democratization are conditional on the presence of recessions. Causal interpretations of our results must be tempered, for even with the use of explanatory variables that are lagged by five-year panels, it would be imprudent to rule out the possibility that the primary explanatory variables (economic downturns and income inequality) are endogenously determined.

With respect to economic downturns, for example, a common concern is that anticipation of the political instability that may precede democratization could negatively affect investment activity and drive economic downturns (Burke and Leigh 2010, for

[9] For the case of democratization in Africa, however, Barron *et al.* (2014) demonstrate that the results from Brückner and Ciccone (2011) are not robust to the use of alternative measures of democratic change, nor to the inclusion of critical omitted variables, nor to the extension of the sample to employ more recent data.

instance). Note, however, that anticipation of democratic institutional improvement may also go together with anticipation of better economic institutions, such as stronger protection of property rights, which should favour investment. Furthermore, note that democratization episodes are often sudden events that are impossible to anticipate (Kuran, 1989, 1991), even for savvy international businessmen.

Alternatively, elites may engage in land reform or support higher working class wages to reduce pressures to democratize by improving the distribution of income. In this case, if inequality measures are endogenously determined our estimates of the effect of inequality would be biased downward towards zero. Proper instrumentation of the inequality measure would yield an even larger estimated effect during recessionary periods.

Testing AR. Our investigation into how the relationship between inequality and democratization may be conditional on the incidence of a macroeconomic contraction was motivated by the AR theory of political transition to democracy. Our results provide additional support for the main empirical predictions of the AR theory, that inequality is the key determinant of revolutionary threats that may be amplified during recessionary periods and prompt the elite to voluntarily extend the democratic franchise to avoid a costly revolution.

While we view our contribution to be an advancement in terms of testing the AR theory, there is much work that remains. First of all, our analysis does not attempt to identify the political dynamics that precede democratization. For example, our democratization indicator does not distinguish between instances of voluntary versus contentious enfranchisements, which is a key element to the AR theory, nor have we directly tested the assumption that recessions amplify a "revolutionary threat".[10] Future research in this area should investigate the political dynamics that have preceded democratization episodes along the lines of Aidt and Jensen (2011) and Cervellati *et al.* (2014).

Furthermore, we are testing a simplified version of the AR model (see derivation in the theoretical appendix) in which the elite do not have the opportunity to repress a revolutionary threat or mount a counter-coup d'etat following a democratization. These additional theoretical elements lead to an inverted-U shaped relationship between income inequality and the probability of (consolidated) democratization. We have tested for a conditional inverted-U and found no evidence for such a relationship.[11]

[10] See Przeworski (2009) for a history of suffrage extensions. See Aidt and Franck (2013) and Aidt and Jensen (2011) for papers that support the role of the threat of revolution in the European experience of franchise extension in the 19th and early 20th century.

[11] These results are available from the authors upon request.

3.3 Robustness analysis

In this sub-section, we present a series of sensible robustness checks on the results from our baseline specifications that consider (i) alternative fixed effects specifications, (ii) alternative constructions of the dependent variable using the FH_iPolity2 data, (iii) alternative data sources for the dependent variable, (iv) alternative constructions and data sources for the macroeconomic downturn variable, and (v) more balanced panels.

First, we investigate whether the result is sensitive to alternative fixed effects strategies in table 5, where we present results from LPM regressions with interaction terms, analogous to column 4 from our table of baseline results. We show regressions with no additional controls, with controls but no fixed effects, with only period fixed effects, and with period and country fixed effects. The result is quite robust to these alternative fixed effect configurations using the net inequality data in columns 1 – 6. When using the market inequality data in columns 7 – 12, the result is robust to all of the alternative specifications except for those that include country fixed effects.

Second, in tables 6 and 7 we consider alternative constructions of the dependent variable using the FH_iPolity2 data. First, in table 6, we simply use the raw FH_iPolity2 index to re-estimate the regressions of columns 4 and 6 – 9 of the table of baseline results (the partially interacted model and the fully interacted models). Columns 1 – 5 use the after-tax inequality measure and 6 – 10 use the market inequality measure. This series of regressions are estimated with OLS since the dependent variable is continuous. Note that the FH_iPolity2 control amounts to the inclusion of a lagged dependent variable in table 6. Table 7 considers an alternative binary dependent variable that takes value one for marginal improvements in democratic political institutions that may capture democratic concessions that the elite make in the face of an amplified revolutionary threat. Following Burke and Leigh (2010), we consider "democratic change events" defined by increases in the FH_iPolity2 score of at least 2 for countries whose lagged FH_iPolity2 score was 5 or less. The partially interacted models in columns 1 and 6 are estimated with LPM and the fully interacted models in columns 2 – 5 and 7 – 10 are estimated with logit. The results appear quite robust to using these alternative dependent variable constructions and again the estimates for the limited sample are more precise.

Third, Table 8 considers binary dependent variables constructed from four alternative data sources. For both the full sample and the limited sample, we present results using both the net and the market income inequality measures in partially interacted LPM regressions. First, in columns 1 and 5, we consider only consolidated democratizations as identified by Acemoglu *et al.* (2014).[12] Second, in columns 2 and 6, we

[12]Following Papaioannou and Siourounis (2008), Acemoglu *et al.* (2014) also use a similar procedure

use the binary political institution data of Cheibub *et al.* (2010) to code transitions from autocracy to democracy.[13] Thirdly, in columns 3 and 7, we use a democratization indicator constructed from the composite Polity IV data set (Marshall *et al.*, 2010), without supplementing it with the Freedom House data.[14] Finally, in columns 4 and 8, we consider the transitions that have been identified as "distributive conflicts" in the careful historical analysis (1980 – 2000) of Haggard and Kaufman (2012), which we label as HK data. The results are reasonably robust to the use of these alternative data sources.[15]

Fourth, table 9 presents results from the partially interacted model using raw economic growth rate data from the WDI, the PWT and a downturn indicator variable constructed using the PWT growth rate data. For both the full and the restricted samples, we present results using both the after-tax and market income inequality measures. Recall that the downturn indicator takes value one when there is negative growth over a period, so the expected signs on the coefficients for the downturn indicator and interaction variables are opposite from those of the growth rate . The WDI growth rate and its interaction with inequality are statistically significant in the limited sample, though not in the full sample. The results are quite robust to using the PWT growth rate and mostly robust to using the downturn indicator calculated with PWT data.

Finally, table 10 presents regression results on panels that we make increasingly balanced. In columns 1 – 3, we trim the panel of countries that do not have at least 5, 10, and 15 years of observations, respectively. Columns 4 – 6 repeat the exercise using the market income inequality measure. Results are quite robust to estimation over these alternative samples.

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of combining several measures of democratic institutional quality, including the Freedom House and Polity indexes and the binary measure of Cheibub *et al.* (2010). They only code transitions that have met a consolidation criteria as democratizations. Table 11 notes which democratizations in our baseline sample were not considered democratizations by Acemoglu *et al.* (2014).

[13]The key institutional factors that Cheibub *et al.* (2010) use to define democracy are popular elections of the executive and legislature, presence of multiple parties, and unconsolidated incumbent advantage.

[14]Recall that the composite Polity index ranges from -10 to 10, where -10 represents a fully autocratic political system and 10 represents a fully competitive democratic political institution. We code a period t transition as 1 if a country that had a non-positive Polity score in $t-1$ achieves a positive score in t. and 0 if a country had non-positive Polity scores in both $t-1$and t.

[15]Reassuringly, the calculated critical values for the Gini coefficient beyond which macro downturns are associated with democratic transitions are also reasonably similar to those calculated from our baseline regressions. Using the Acemoglu *et al.* (2014) data, the critical value for the after-tax (market) income Gini coefficient is 40.29 (43.71) for the full sample and 39.72 (41.63) for the reduced sample. Using the CGV transition variable, the critical value for the after-tax (market) income Gini coefficient 45.47 (47.62) for the full sample and 43.30 (46.32) for the reduced sample. Using the Polity2 transition variable, the critical value for the after-tax (market) income Gini coefficient is 39.40 (45.21) for the full sample and 38.56 (44.56) for the reduced sample. Finally, using the HK transition data, we calculate the critical value of the after-tax (market) income Gini coefficient to be 40.23 (44.89) for the full sample and 37.64 (43.22) for the reduced sample.

4 Conclusion

This paper has provided a series of results concerning what has become the standard economic view of democratization. The theory argues that the primary motivation for the disenfranchised to form a revolutionary threat is to install a democratic system of government and then enact a democratically-determined redistributive fiscal policy. The greater the income inequality in an un-democratic society, the more that the disenfranchised have to gain from a democratic revolution. Furthermore, to the extent that a democratic revolution may be destructive, there are also costs involved with revolting. The standard economic view holds that these costs are proportional to the economy's per capita output, and thus the revolutionary threat is counter-cyclical. The elite could offer concessions during the recessionary period, when the threat of revolt is higher, but they cannot commit to continued concessions throughout the business cycle. The elite may chose to extend the democratic franchise to avoid a destructive revolution and this is more likely to occur (i) during recessions and (ii) when inequality is higher (Acemoglu and Robinson, 2001, 2006).

The first implication of the theory has found some empirical support in the economics literature, though not without critics. The political science literature, on the other hand, has investigated the second implication and is far less supportive. The research presented here bridges these two empirical literatures by examining the extent to which the effects (growth shocks and inequality) can explain democratization when they are allowed to interact. Allowing for such interactions is a more direct test of the economic view, though we are not aware of any other studies to have made this point. Our paper presents some supporting evidence that there is an interactive effect between growth shocks and income inequality in transitions to democracy, providing new empirical support for the additional economic view of democratization.

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AR theoretical reprise

In this section, we present a very simplified two-period version of the Acemoglu and Robinson (2001) model of political transition. We highlight the subtle effect of inequality on the probability of democratization that we want to test. For simplicity, we do not consider the possibility of coups following democratization which may reverse the institution back to autocratic.

The economy is populated by a continuum of agents normalized to one acting in order to maximize their two-period income. Second period income is discounted at rate β. A proportion λ of the population is poor (p) and a proportion $(1-\lambda)$ is rich (r). Per period income is derived from asset h^i (which can be physical, human capital or land) with $i = \{p, r\}$. We express per capita assets of each group as a function of the total stock of assets h in the economy, $h^r = (1-\theta)h/(1-\lambda)$ and $h^p = \theta h/\lambda$. Parameter θ corresponds to the degree of inequality in the economy (a lower θ means a higher degree of inequality) and $\lambda > \theta > 0$ in a right-skewed distribution. We assume the degree of inequality does not evolve over time (as in AR) but may vary across societies. We simply assume θ is distributed over the support $\left[\underline{\theta}, \overline{\theta}\right]$ according to the cumulative distribution function $G(\theta)$. Income of an individual in group i simply corresponds to $y_t^i = A_t h^i$ with A_t corresponding to macroeconomic conditions. A_t follows a two-point distribution $\left\{A^l, A^h\right\}$ with $A^l < A^h$. Income can be redistributed through a linear tax τ and a lump sum transfer T^i. The cost of raising tax corresponds to $c(\tau)A_t h$ so that the

government budget constraint is $T_t = \tau_t A_t \left[\lambda h^p + (1-\lambda) h^r\right] - c(\tau) A_t h = \left[\tau_t - c(\tau)\right] A_t h$ in period t.[16]

In the AR framework, the political decision for the poor is whether or not to revolt and for the elite it's whether or not to extend the franchise. If the elite extend the franchise, the state becomes democratic and the poor can choose their preferred tax rate (since $\lambda > 1/2$, the median voter is poor). If the poor choose to revolt a fraction $1-\mu$ of all income is destroyed and a fraction $\pi > \theta$ of asset h goes to the poor for the future period (and future period income is $\pi A_t h/\lambda$).[17] We assume that the cost of revolution parameter μ may evolve randomly and is distributed over the support $\left[\underline{\mu}, \overline{\mu}\right]$ given the cumulative distribution function $F(\mu)$. This assumption simply reflects the fact that regimes may be strong or weak in some periods independently of business cycle shocks.

As in the AR model the rich elite loose everything if a revolution occurs so that if a revolutionary threat exists, the elite extend the franchise in order to avoid a costly revolution (revolution is never an outcome of the game). The state is initially controlled by the elite. During the first period of the game, the state of the economy A_t and the cost of revolution μ_t values are revealed. Then elite choose the tax rate t^e or choose to extend the franchise and workers decide whether or not to revolt.

In a democratic regime, the poor can choose their preferred tax rate τ^m. The tax rate chosen by the median voter (who is poor) is implicitly defined by $c'(\tau^m) = (\lambda - \theta)/\lambda$.[18] As in AR we define $\eta^p(\theta, \tau) A_t = \left[\tau - c(\tau)\right] A_t h - \tau A_t \theta h/\lambda$, which corresponds to the gain from redistribution for a poor individual. For a given tax rate, the more unequal the society is, the higher is the gain from redistribution for the poor. Since the elite can adjust the tax rate to deal with the threat of revolution, the maximum the elite can concede for redistribution is to set $t^e = \tau^m$. We thus evaluate the revolution constraint at $t^e = \tau^m$ in order to determine conditions under which elite cannot avoid a revolution by adjusting tax rate and thus must democratize. The revolution constraint can be written as

$$A_t \left[\theta h/\lambda + \eta^p(\theta, \tau^m)\right] + \beta \mathbf{E}(A) \theta h/\lambda > \mu A_t \left[\theta h/\lambda + \eta^p(\theta, \tau^m)\right] + \beta \mathbf{E}(A) \pi h/\lambda. \qquad (5)$$

The left hand side of the expression corresponds to the maximum value of not revolting for the poor when the elite do not extend the franchise and set tax rate at τ^m (the

[16] After-tax income corresponds to $\widehat{y}_t^i = (1-\tau) A_t h^i + T_t^i$. As is standard in this literature in order to obtain an interior solution for the preferred tax rate of the median voter, we suppose that $c(0) = 0$, $c'(0) = 0$, $c'(\tau) > 0$, $c''(\tau) \geq 0$ and $c'(1) = \infty$.

[17] Revolution could lead to democratization without expropriation – it would not change the result. We do not consider such a possibility in order to remain as close as possible to the AR model.

[18] This solution simply corresponds to $\tau^m = \arg\max_{\tau} \left\{(1-\tau) A_t \theta h/\lambda + (\tau - c(\tau)) A_t h\right\}$.

maximum fiscal concession). In the second period, since there is no threat of revolt, workers do not enjoy any redistribution.[19] The right-hand side corresponds to the value of revolting for the poor: they only enjoy a fraction μ of income in the first period and get the revolutionary outcome on the second period. Rearranging, we obtain

$$(1-\mu)A_t\left[\theta h/\lambda + \eta^p(\theta,\tau^m)\right] > \beta \mathbf{E}(A)(\pi-\theta). \tag{6}$$

When A_t decreases, it's obvious to see that the left-hand side decreases more than the right hand side of 5 and the threat of revolution increases as a result. There exists a threshold parameter A^* such that workers find it optimal to revolt when $A_t < A^*$, since only the left-hand side of 6 monotonically decreases in A_t. That is, when output is sufficiently low (and the opportunity cost of revolting is sufficiently low as a result), workers find it optimal to revolt if the elite do not extend the franchise (and elite will effectively concede democracy as a result). This is the so called "window of opportunity", a short time period for which benefit of revolt is greater than the cost which is temporary low. The threshold macroeconomic parameter is given by the following:

$$A^* = \frac{\beta \mathbf{E}(A)(\pi-\theta)}{(1-\mu)\theta h/\lambda + \eta^p(\theta,\tau^m)}. \tag{7}$$

Note that $\partial A^*/\partial \mu > 0$: when the cost of revolution is lower (higher μ) the threshold A^* below which output must be for the elite to concede democracy is higher (in other words, the threat of revolution is greater). Also note that $\partial A^*/\partial \theta < 0$: for a higher degree of inequality (lower θ) the threshold A^* increases (the threat of revolution increases). To see this, note that $\partial \eta^p(\theta,\tau^m)/\partial\theta = -\tau^m h/\lambda < 0$ due to the envelope theorem. Due to the fact that $\partial A^*/\partial\mu > 0$, we have that $A^*(\underline{\mu},\underline{\theta}) < A^*(\overline{\mu},\underline{\theta})$ and $A^*(\underline{\mu},\overline{\theta}) < A^*(\overline{\mu},\overline{\theta})$. Additionally, the fact that $\partial A^*/\partial\theta < 0$ implies that $A^*(\overline{\mu},\overline{\theta}) < A^*(\overline{\mu},\underline{\theta})$ and $A^*(\underline{\mu},\overline{\theta}) < A^*(\underline{\mu},\underline{\theta})$.

We now discuss particular parameter value configurations in line with our empirical results. First, consider the case where $A^h > A^*(\overline{\mu};\underline{\theta})$. That is, when the state of the economy is high, the poor are not willing to revolt even if the degree of inequality is high and cost of revolting is low. In such a case, the degree of inequality should have no impact on the probability of having a democratization episode – whatever the cost of revolting or the degree of inequality there is no threat of revolution when the state

[19] This captures the fact that the elite cannot commit to future redistribution as in the AR model. This is naturally obtained in our two-period simplified model (workers will never find it optimal to revolt in the second period and there is no revolution threat for the elite). In the AR model with infinite horizon, it simply comes from the fact that when there is an economic shock and the threat of revolution increases, the elite cannot commit to redistribute in the future when state of the economy is normal and threat of revolution disappears.

of the economy is high.

Second, let's take, for instance, $A^*(\underline{\mu},\overline{\theta}) < A^*(\overline{\mu},\overline{\theta}) < A^l < A^*(\underline{\mu},\underline{\theta}) < A^*(\overline{\mu},\underline{\theta}) < A^h$. In such a case, we have the following comparative static results that can motivate our empirical investigation into why income inequality may matter for democratization only for certain states of the macroeconomy:

1. First, the degree of inequality should affect the probability of having a democratization episode only during periods of low economic output (recessions). To see this, note that $A^*(\underline{\mu},\underline{\theta}) < A^*(\overline{\mu},\underline{\theta}) < A^*(\underline{\mu},\overline{\theta}) < A^*(\overline{\mu},\overline{\theta}) < A^h$. That is, when the state of the economy is good, there is no parameter configuration under which the revolution constraint is violated and democratization can occur. When state of the economy is low, on the other hand, the degree of inequality affects the probability the revolution constraint is violated. This is due to the fact that $A^*(\underline{\mu},\overline{\theta}) < A^*(\overline{\mu},\overline{\theta}) < A^l < A^*(\underline{\mu},\underline{\theta}) < A^*(\overline{\mu},\underline{\theta})$ and for $\theta < \theta^*$, $\partial \text{prob}\left[A^* > A^l\right]/\partial\theta > 0$ since $\partial A^*/\partial\theta < 0$.

2. Equivalently, the degree of inequality must be sufficiently high for the economic shock to have a positive impact on the probability of having the revolution constraint violated (and democratization as a result). For very low degrees of inequality, the regime is never threatened whatever the state of the economy and cost of revolt. To see this, note that for the lowest degree of inequality, $\overline{\theta}$, economic shock have no impact on the probability of democratization since $A^*(\underline{\mu},\overline{\theta}) < A^*(\overline{\mu},\overline{\theta}) < A^l$. There exist a θ^* such that $A^*(\overline{\mu},\theta^*) = A^l$. For any $\theta < \theta^* < \overline{\theta}$ there is a positive probability revolution constraint is violated and democratization occurs during recession. As a result, recessions affect the probability of democratization occurs only for sufficiently high degrees of inequality, $\theta < \theta^*$, since $A^*(\underline{\mu},\underline{\theta}) < A^*(\overline{\mu},\underline{\theta}) < A^h$ and democratization can never occur if state of the economy is good

Tables of Results

Table 1: Data description

Source / Variable	Description
Hadenius and Teorell (2005)	http://www.concepts-methods.org/Files/WorkingPaper/PC.pdf
FH_iPolity2	Continuous index variable ranging from 0 to 10, where 0 represents complete autocracy and 10 represents complete democracy. The index combines two well-known measures of the quality of democratic institutions, the composite Polity 2 index (Marshall *et al.*, 2010) and the Freedom House index of political rights and civil liberties (Freedom House, 2013).
transition	Binary variable constructed from $FH\_iPolity2$. $transition_t = 0$ if $FH\_iPolity2_{t-1} \leq 5$ and $FH\_iPolity2_t \leq 5$. $transition_t = 1$ if $FH\_iPolity2_{t-1} \leq 5$ and $FH\_iPolity2_t > 5$.
Solt (2009)	http://myweb.uiowa.edu/fsolt/swiid/swiid.html
gini_market	Continuous index variable, 0 – 100, where 0 corresponds to perfect income equality and 100 corresponds to perfect income inequality. A custom missing-data algorithm was used to standardize the United Nations Universitys World Income Inequality Database, with data collected by the Luxembourg Income Study serving as the standard. $gini\_market$ is a measure of gross income inequality, before taxation and transfers by fiscal authorities.
gini_net	Continuous index variable, 0 – 100, where 0 corresponds to perfect income equality and 100 corresponds to perfect income inequality. $gini\_net$ is a measure of net income inequality, after taxation and transfers by fiscal authorities.
World Bank (2013)	http://data.worldbank.org/data-catalog/world-development-indicators
growth	Continuous variable. Annual percentage growth rate of GDP per capita based on constant local currency (inflation adjusted). GDP per capita is gross domestic product divided by midyear population. GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy.
downturn	Binary variable constructed from $growth$. $downturn_t = 0$ if $growth_t \geq 0$ and $downturn_t = 1$ if $growth_t > 0$.

Notes: All data was sourced from the Quality of Government database (Teorell, Charron, Dahlberg, Holberg, Rothstein, Sundin and Svensson, 2013).

Table 2: Summary statistics for baseline sample

	Panel A: Full sample				
	Obs.	Mean	Std. Dev.	Min	Max
FH_iPolity2	279	3.428	1.987	0.25	9.333
transition	279	0.194	0.396	0	1
market gini	263	44.791	9.244	24.604	74.556
net gini	265	41.717	8.780	21.117	65.316
growth rate	279	1.699	4.230	-30.256	19.467
downturn	279	0.280	0.450	0	1
income per capita	277	1591.122	3102.827	122	32680
	Panel B: Excluding transition and formerly USSR				
FH_iPolity2	248	3.515	1.940	0.667	9.050
transition	248	0.198	0.399	0	1
market gini	235	45.864	8.910	28.793	74.556
net gini	235	42.976	8.216	27.349	65.316
growth rate	248	1.453	3.996	-30.256	12.123
downturn	248	0.290	0.455	0	1
income per capita	246	1618.734	3264.31	122	32680

Table 3: Binary DV: Democratic transition. Baseline results – net income inequality data

	Panel A: Full sample of autocratic countries								
	Linear Probability Model				Logit				
	all observations				all obs.	downturn = 0	downturn = 1	Gini $<$ t.p.	Gini $\geq$ t.p.
prob(transition)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
downturn_{t-1}	0.0155		0.0561	-0.5737**	0.4023			-3.0363	2.0861**
	(0.041)		(0.065)	(0.270)	(0.586)			(2.200)	(0.831)
inequality_{t-1}		0.0035	0.0031	-0.0017	0.0261	-0.0524	0.0859*		
		(0.003)	(0.003)	(0.003)	(0.028)	(0.040)	(0.051)		
$\text{downturn}_{t-1} \times \text{inequality}_{t-1}$				0.0143**					
				(0.006)					
N	406	279	279	279	240	165	64	70	127
Transitions	63	54	54	54	49	28	17	14	34
R^2 / pseudo-R^2	0.3003	0.3372	0.3392	0.3589	0.3400	0.3283	0.5314	0.3837	0.4514
	Panel B: Excluding formerly USSR and transition countries								
	Linear Probability Model				Logit				
	all observations				all obs.	downturn = 0	downturn = 1	Gini $<$ t.p.	Gini $\geq$ t.p.
prob(transition)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
downturn_{t-1}	0.0365		0.0895	-0.7153***	0.9322			-6.7349	2.1641***
	(0.041)		(0.068)	(0.227)	(0.642)			(4.284)	(0.840)
inequality_{t-1}		0.0062**	0.0064**	-0.0006	0.0705**	-0.0218	0.2520**		
		(0.003)	(0.003)	(0.003)	(0.035)	(0.047)	(0.110)		
$\text{downturn}_{t-1} \times \text{inequality}_{t-1}$				0.0177***					
				(0.005)					
N	377	251	251	251	213	146	56	48	122
Transitions	57	49	49	49	44	24	16	10	33
R^2 / pseudo-R^2	0.3283	0.3746	0.3815	0.4049	0.4188	0.3384	0.6919	0.5136	0.4555
FH_iPolity2 control	✓	✓	✓	✓	✓	✓	✓	✓	✓
Income control	✓	✓	✓	✓	✓	✓	✓	✓	✓
Regime type control	✓	✓	✓	✓	✓	✓	✓	✓	✓
Period fixed effect	✓	✓	✓	✓	✓	✓	✓	✓	✓
Regional fixed effect	✓	✓	✓	✓	✓	✓	✓	✓	✓

Notes: Standard errors have been clustered at the country level. The turning point net Gini coefficient is calculated from column (4) as 40.251445 for panel A and as 40.354236 for panel B.

Table 4: Binary DV: Democratic transition. Baseline results – market income inequality data

	Panel A: Full sample of autocratic countries								
	Linear Probability Model				Logit				
	all observations				all obs.	downturn = 0	downturn = 1	Gini $<$ t.p.	Gini $\geq$ t.p.
prob(transition)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
downturn_{t-1}	0.0155		0.0525	-0.6124**	0.4167			-3.0641	2.1117**
	(0.041)		(0.064)	(0.245)	(0.566)			(1.875)	(0.952)
inequality_{t-1}		0.0032	0.0031	-0.0015	0.0286	-0.0397	0.0899**		
		(0.003)	(0.003)	(0.003)	(0.025)	(0.039)	(0.044)		
$\text{downturn}_{t-1} \times \text{inequality}_{t-1}$				0.0140***					
				(0.005)					
N	406	276	276	276	238	165	62	75	118
Transitions	63	54	54	54	49	28	17	15	31
R^2 / pseudo-R^2	0.3003	0.3396	0.3420	0.3620	0.3433	0.3255	0.5381	0.3782	0.4713
	Panel B: Excluding formerly USSR and transition countries								
	Linear Probability Model				Logit				
	all observations				all obs.	downturn = 0	downturn = 1	Gini $<$ t.p.	Gini $\geq$ t.p.
prob(transition)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
downturn_{t-1}	0.0365		0.0958	-0.6220**	0.9001			-2.1001*	2.0485**
	(0.041)		(0.065)	(0.261)	(0.621)			(1.199)	(0.848)
inequality_{t-1}		0.0048*	0.0047*	-0.0006	0.0594*	-0.0139	0.1319***		
		(0.003)	(0.003)	(0.003)	(0.030)	(0.045)	(0.048)		
$\text{downturn}_{t-1} \times \text{inequality}_{t-1}$				0.0146***					
				(0.005)					
N	377	248	248	248	211	146	54	45	125
Transitions	57	49	49	49	44	24	16	10	31
R^2 / pseudo-R^2	0.3283	0.3756	0.3833	0.4021	0.4178	0.3375	0.6460	0.6478	0.4060
FH_iPolity2 control	✓	✓	✓	✓	✓	✓	✓	✓	✓
Income control	✓	✓	✓	✓	✓	✓	✓	✓	✓
Regime type control	✓	✓	✓	✓	✓	✓	✓	✓	✓
Period fixed effect	✓	✓	✓	✓	✓	✓	✓	✓	✓
Regional fixed effect	✓	✓	✓	✓	✓	✓	✓	✓	✓

Notes: Standard errors have been clustered at the country level. The turning point market Gini coefficient is calculated from column (4) as 43.643349 for panel A and as 42.490436 for panel B.

Table 5: Binary DV: Democratic transition. Fixed effects investigation.

	Panel A: Full sample											
	After-tax income inequality						Market income inequality					
prob(transition)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
$downturn_{t-1}$	-0.6157**	-0.5708**	-0.5916**	-0.4978*	-0.3842	-0.6637**	-0.5090**	-0.4363*	-0.4704*	-0.5118**	-0.2119	-0.3766
	(0.271)	(0.275)	(0.267)	(0.255)	(0.376)	(0.303)	(0.254)	(0.237)	(0.263)	(0.255)	(0.387)	(0.371)
$inequality_{t-1}$	-0.0018	-0.0056**	-0.0013	0.0010	-0.0021	-0.0035	-0.0013	-0.0035	-0.0001	0.0007	-0.0047	-0.0054
	(0.003)	(0.003)	(0.003)	(0.003)	(0.006)	(0.006)	(0.002)	(0.002)	(0.002)	(0.003)	(0.007)	(0.006)
$downturn_{t-1} \times inequality_{t-1}$	0.0162**	0.0153**	0.0153**	0.0127**	0.0113	0.0168**	0.0127**	0.0113**	0.0115**	0.0119**	0.0070	0.0098
	(0.006)	(0.006)	(0.006)	(0.006)	(0.009)	(0.007)	(0.005)	(0.005)	(0.006)	(0.005)	(0.008)	(0.008)
FH_iPolity2 control		✓				✓		✓				✓
Income control		✓				✓		✓				✓
Period fixed effect			✓	✓	✓	✓			✓	✓	✓	✓
Region fixed effect				✓						✓		
Country fixed effect					✓	✓					✓	✓
N	296	286	296	295	296	286	293	283	293	292	293	283
R^2 / within R^2	0.0422	0.1587	0.0619	0.2101	0.1568	0.2355	0.0328	0.1520	0.0526	0.2059	0.1484	0.2238
	Panel B: Excluding formerly USSR and transition countries											
	After-tax income inequality						Market income inequality					
prob(transition)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
$downturn_{t-1}$	-0.8054***	-0.7878***	-0.7958***	-0.5765**	-0.7529**	-0.7524**	-0.5624**	-0.4803*	-0.5245*	-0.5079*	-0.3632	-0.3498
	(0.252)	(0.228)	(0.256)	(0.243)	(0.363)	(0.328)	(0.282)	(0.245)	(0.292)	(0.284)	(0.443)	(0.428)
$inequality_{t-1}$	-0.0019	-0.0048*	-0.0016	0.0018	-0.0027	-0.0009	-0.0016	-0.0026	-0.0004	0.0007	-0.0059	-0.0044
	(0.003)	(0.003)	(0.003)	(0.003)	(0.006)	(0.006)	(0.003)	(0.002)	(0.003)	(0.003)	(0.007)	(0.007)
$downturn_{t-1} \times inequality_{t-1}$	0.0203***	0.0200***	0.0199***	0.0146***	0.0193**	0.0189**	0.0139**	0.0123**	0.0128**	0.0120**	0.0100	0.0095
	(0.006)	(0.005)	(0.006)	(0.005)	(0.009)	(0.008)	(0.006)	(0.005)	(0.006)	(0.006)	(0.009)	(0.008)
FH_iPolity2 control		✓				✓		✓				✓
Income control		✓				✓		✓				✓
Period fixed effect			✓	✓	✓	✓			✓	✓	✓	✓
Region fixed effect				✓						✓		
Country fixed effect					✓	✓					✓	✓
N	267	258	267	266	267	258	264	255	264	263	264	255
R^2 / within R^2	0.0579	0.1900	0.0693	0.2546	0.1672	0.2481	0.0384	0.1749	0.0495	0.2427	0.1456	0.2311

Notes: Standard errors have been clustered at the country level.

Table 6: Alternative DV constructions – FH_iPolity2 raw index

	Panel A: Full sample of autocratic countries									
	After-tax income inequality					Market income inequality				
prob(transition)	LPM (1)	downturn = 0 (2)	downturn = 1 (3)	Gini $<$ t.p. (4)	Gini $\geq$ t.p. (5)	LPM (6)	downturn = 0 (7)	downturn = 1 (8)	Gini $<$ t.p. (9)	Gini $\geq$ t.p. (10)
downturn_{t-1}	-2.1873			-0.5214	0.5766*	-1.9629*			-0.2478	0.5042*
	(1.333)			(0.546)	(0.288)	(1.162)			(0.494)	(0.287)
inequality_{t-1}	-0.0076	-0.0123	0.0464*			-0.0073	-0.0134	0.0399*		
	(0.015)	(0.014)	(0.026)			(0.013)	(0.012)	(0.023)		
$\text{downturn}_{t-1} \times \text{inequality}_{t-1}$	0.0524*					0.0447**				
	(0.028)					(0.022)				
N	279	203	76	143	136	276	202	74	132	144
R^2	0.5708	0.5895	0.6189	0.6181	0.6249	0.5771	0.6203	0.6234	0.6094	0.6757
	Panel B: Excluding formerly USSR and transition countries									
	After-tax income inequality					Market income inequality				
prob(transition)	LPM (1)	downturn = 0 (2)	downturn=1 (3)	Gini $<$ t.p. (4)	Gini $\geq$ t.p. (5)	LPM (6)	downturn = 0 (7)	downturn=1 (8)	Gini $<$ t.p. (9)	Gini $\geq$ t.p. (10)
downturn_{t-1}	-1.9642			-0.8453	0.6994**	-1.3228			-0.3165	0.5660**
	(1.186)			(0.542)	(0.286)	(1.088)			(0.858)	(0.270)
inequality_{t-1}	0.0125	0.0085	0.0622**			0.0076	0.0005	0.0479**		
	(0.014)	(0.014)	(0.025)			(0.013)	(0.013)	(0.021)		
$\text{downturn}_{t-1} \times \text{inequality}_{t-1}$	0.0508**					0.0353*				
	(0.024)					(0.021)				
N	251	183	68	90	161	248	182	66	42	206
R^2	0.6337	0.7579	0.6188	0.6783	0.6717	0.6417	0.6843	0.6613	0.8585	0.6276
FH_iPolity2 control	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Income control	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Regime type control	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Period fixed effect	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Regional fixed effect	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Notes: Standard errors have been clustered at the country level. The turning point net Gini coefficient is calculated from column (1) as 41.71 for panel A and as 38.64 for panel B. The turning point market Gini coefficient is calculated from column (6) as 43.89 for panel A and as 37.44 for panel B.

Table 7: Alternative Binary DV construction: Δ FH_iPolity2 ≥ 2

	Panel A: Full sample of autocratic countries									
	After-tax income inequality					Market income inequality				
prob(transition)	LPM (1)	downturn = 0 (2)	downturn = 1 (3)	Gini $<$ t.p. (4)	Gini $\geq$ t.p. (5)	LPM (6)	downturn = 0 (7)	downturn = 1 (8)	Gini $<$ t.p. (9)	Gini $\geq$ t.p. (10)
downturn_{t-1}	-0.4406			-1.5110	1.7951**	-0.4642*			-1.1508	1.8066**
	(0.265)			(1.493)	(0.822)	(0.256)			(1.030)	(0.862)
inequality_{t-1}	0.0002	-0.0227	0.1318**			-0.0004	-0.0159	0.0941*		
	(0.003)	(0.039)	(0.058)			(0.003)	(0.035)	(0.049)		
$\text{downturn}_{t-1} \times \text{inequality}_{t-1}$	0.0108*					0.0104**				
	(0.006)					(0.005)				
N	279	167	67	118	111	276	167	65	123	111
R^2 / pseudo-R^2	0.2792	0.4379	0.3050	0.2748	0.3807	0.2786	0.2739	0.3469	0.4013	0.3429
	Panel B: Excluding formerly USSR and transition countries									
	After-tax income inequality					Market income inequality				
prob(transition)	LPM (1)	downturn = 0 (2)	downturn = 1 (3)	Gini $<$ t.p. (4)	Gini $\geq$ t.p. (5)	LPM (6)	downturn = 0 (7)	downturn = 1 (8)	Gini $<$ t.p. (9)	Gini $\geq$ t.p. (10)
downturn_{t-1}	-0.4147			-1.6439	1.8646**	-0.3584			-1.0111	1.8066**
	(0.267)			(1.298)	(0.751)	(0.295)			(1.452)	(0.862)
inequality_{t-1}	0.0033	0.0402	0.1560**			0.0018	0.0370	0.0948**		
	(0.003)	(0.052)	(0.061)			(0.003)	(0.051)	(0.044)		
$\text{downturn}_{t-1} \times \text{inequality}_{t-1}$	0.0107*					0.0088				
	(0.006)					(0.006)				
N	251	148	60	63	121	248	148	58	99	108
R^2 / pseudo-R^2	0.3208	0.4507	0.3361	0.3314	0.4134	0.3147	0.3311	0.3577	0.4226	0.3339
FH_iPolity2 control	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Income control	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Regime type control	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Period fixed effect	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Regional fixed effect	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Notes: Standard errors have been clustered at the country level. The turning point net Gini coefficient is calculated from column (1) as 40.98 for panel A and as 38.66 for panel B. The turning point market Gini coefficient is calculated from column (6) as 44.44 for panel A and as 40.50 for panel B.

Table 8: Binary DV: Democratic transition. Alternative DV data sources

	Panel A: Full sample							
	After-tax income inequality				Market income inequality			
prob(transition)	ANRR 2014 (1)	CGV 2010 (2)	Polity2 (3)	HK 2012 (4)	ANRR 2014 (5)	CGV 2010 (6)	Polity2 data (7)	HK 2012 (8)
downturn_{t-1}	-0.5284*	-0.2469	-0.4174	-0.3083*	-0.5511**	-0.4283*	-0.6274**	-0.4666**
	(0.268)	(0.226)	(0.305)	(0.169)	(0.243)	(0.237)	(0.305)	(0.217)
inequality_{t-1}	-0.0004	-0.0016	0.0003	-0.0030	-0.0004	-0.0012	-0.0005	-0.0030
	(0.003)	(0.003)	(0.003)	(0.002)	(0.003)	(0.002)	(0.003)	(0.002)
$\text{downturn}_{t-1} \times \text{inequality}_{t-1}$	0.0131**	0.0051	0.0106	0.0077*	0.0126**	0.0088*	0.0139**	0.0104 **
	(0.006)	(0.005)	(0.007)	(0.004)	(0.005)	(0.005)	(0.006)	(0.005)
Transitions	51	45	43	13	51	45	43	13
R^2	0.3449	0.2663	0.2575	0.1551	0.3460	0.2880	0.2704	0.1741
N	279	326	273	234	276	323	267	231
	Panel B: Excluding transition and formerly USSR							
	After-tax income inequality				Market income inequality			
prob(transition)	ANRR 2014 (1)	CGV 2010 (2)	Polity2 (3)	HK 2012 (4)	ANRR 2014 (5)	CGV 2010 (6)	Polity2 data (7)	HK 2012 (8)
downturn_{t-1}	-0.6166***	-0.2549	-0.4821*	-0.2353	-0.5172**	-0.4515*	-0.6715**	-0.3900
	(0.223)	(0.235)	(0.284)	(0.206)	(0.255)	(0.249)	(0.319)	(0.254)
inequality_{t-1}	0.0014	0.0007	0.0032	-0.0017	0.0009	-0.0003	0.0012	-0.0019
	(0.003)	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)	(0.003)	(0.002)
$\text{downturn}_{t-1} \times \text{inequality}_{t-1}$	0.0155***	0.0057	0.0125**	0.0063	0.0124**	0.0096**	0.0151**	0.0091*
	(0.005)	(0.005)	(0.006)	(0.005)	(0.005)	(0.005)	(0.006)	(0.005)
Transitions	46	40	39	12	46	40	39	12
R^2	0.3929	0.2987	0.2935	0.1627	0.3869	0.3262	0.3009	0.1819
N	251	293	247	213	248	290	241	210
Political control	✓	✓	✓	✓	✓	✓	✓	✓
Income control	✓	✓	✓	✓	✓	✓	✓	✓
Regime type control	✓	✓	✓	✓	✓	✓	✓	✓
Period fixed effect	✓	✓	✓	✓	✓	✓	✓	✓
Regional fixed effect	✓	✓	✓	✓	✓	✓	✓	✓

Notes: Standard errors have been clustered at the country level.

Table 9: Binary DV: Democratic transition. Raw growth data and PWT data

	Panel A: Full sample					
	After-tax income inequality			Market income inequality		
prob(change event)	growth, WDI (1)	growth, PWT (2)	downturn, PWT (3)	growth, WDI (4)	growth, PWT (5)	downturn, PWT (6)
downturn_{t-1}	0.0449**	0.0289**	-0.3325	0.0463**	0.0305**	-0.4590*
	(0.019)	(0.014)	(0.241)	(0.019)	(0.014)	(0.231)
inequality_{t-1}	0.0043	0.0027	-0.0017	0.0044*	0.0031	-0.0023
	(0.003)	(0.002)	(0.003)	(0.003)	(0.002)	(0.003)
$\text{downturn}_{t-1} \times \text{inequality}_{t-1}$	-0.0011**	-0.0007**	0.0088*	-0.0011**	-0.0007**	0.0109**
	(0.001)	(0.000)	(0.005)	(0.000)	(0.000)	(0.005)
R^2	0.3401	0.3126	0.3272	0.3418	0.3162	0.3362
N	285	311	314	282	307	310
	Panel B: Excluding transition and formerly USSR					
	After-tax income inequality			Market income inequality		
prob(change event)	growth, WDI (1)	growth, PWT (2)	downturn, PWT (3)	growth, WDI (4)	growth, PWT (5)	downturn, PWT (6)
downturn_{t-1}	0.0870***	0.0421*	-0.3274	0.0677**	0.035	-0.4305
	(0.032)	(0.022)	(0.282)	(0.031)	(0.025)	(0.276)
inequality_{t-1}	0.0077***	0.0057**	0.0004	0.0063**	0.0048**	-0.0012
	(0.003)	(0.002)	(0.004)	(0.003)	(0.002)	(0.003)
$\text{shock}_{t-1} \times \text{inequality}_{t-1}$ t	-0.0022***	-0.0012**	0.0089	-0.0016***	-0.0009*	0.0105*
	(0.001)	(0.001)	(0.006)	(0.001)	(0.001)	(0.005)
R^2	0.3881	0.3398	0.3488	0.3838	0.3402	0.3559
N	256	276	277	253	272	273
FH_iPolity2 control	✓	✓	✓	✓	✓	✓
Regime type control	✓	✓	✓	✓	✓	✓
Period fixed effect	✓	✓	✓	✓	✓	✓
Regional fixed effect	✓	✓	✓	✓	✓	✓

Notes: Standard errors have been clustered at the country level. We have dropped observations with growth rates greater than 25 in absolute value.

Table 10: Binary DV: Democratic transition. Towards a balanced panel

	Panel A: Full sample					
	After-tax income inequality			Market income inequality		
prob(change event)	> 5 years (1)	> 10 years (2)	> 15 years (3)	> 5 years (4)	> 10 years (5)	> 15 years (6)
downturn$_{t-1}$	-0.7946***	-0.6995**	-0.7854**	-0.6769**	-0.5303*	-0.4784
	(0.294)	(0.307)	(0.340)	(0.273)	(0.278)	(0.299)
inequality$_{t-1}$	-0.0054	-0.0050	-0.0045	-0.0048	-0.0029	-0.0014
	(0.004)	(0.004)	(0.005)	(0.004)	(0.003)	(0.004)
downturn$_{t-1}\times$inequality$_{t-1}$	0.0195***	0.0180**	0.0180**	0.0158***	0.0132**	0.0106*
	(0.007)	(0.007)	(0.008)	(0.006)	(0.006)	(0.006)
R^2	0.4285	0.3763	0.4010	0.4321	0.3778	0.3902
N	186	171	129	184	169	127
	Panel B: Excluding transition and formerly USSR					
	After-tax income inequality			Market income inequality		
prob(change event)	> 5 years (1)	> 10 years (2)	> 15 years (3)	> 5 years (4)	> 10 years (5)	> 15 years (6)
downturn$_{t-1}$	-0.6815**	-0.6395*	-0.7950**	-0.5447*	-0.4627	-0.5117*
	(0.330)	(0.355)	(0.343)	(0.305)	(0.322)	(0.301)
inequality$_{t-1}$	-0.0025	-0.0034	-0.0048	-0.0024	-0.0019	-0.0026
	(0.004)	(0.005)	(0.005)	(0.004)	(0.004)	(0.004)
shock$_{t-1}\times$inequality$_{t-1}$	0.0174**	0.0169**	0.0184**	0.0135**	0.0121*	0.0114*
	(0.007)	(0.008)	(0.008)	(0.006)	(0.007)	(0.006)
R^2	0.4449	0.3797	0.3831	0.4483	0.3821	0.3710
N	169	156	126	167	154	124
FH_iPolity2 control	✓	✓	✓	✓	✓	✓
Regime type control	✓	✓	✓	✓	✓	✓
Period fixed effect	✓	✓	✓	✓	✓	✓
Regional fixed effect	✓	✓	✓	✓	✓	✓

Notes: Standard errors have been clustered at the country level.

Table 11: Democratic transition, 1972 – 2010. FH_iPolity2 threshold-crossing criteria

country	time period	GDP growth$_{t-1}$	Net Gini$_{t-1}$	Net Gini$_{t+1}$	country	time period	GDP growth$_{t-1}$	Net Gini$_{t-1}$	Net Gini$_{t+1}$
Albania[a]	1990 – 1994	0.59875143	.	28.0223	Mexico	1990 – 1994	-0.81006305	45.75931	48.52621
Argentina	1985 – 1989	-1.588587	40.39324	43.12595	Mongolia	1990 – 1994	2.72407	.	34.36277
Armenia[b]	2000 – 2004	6.6718224	43.60137	38.22755	Mozambique	1995 – 1999	0.35548142	.	43.16706
Bangladesh	1990 – 1994	.47139566	29.03575	34.07188	Nepal	1990 – 1994	2.4258478	31.35108	42.41514
Bolivia	1980 – 1984	1.3782828	47.28748	48.07338	Nepal	2005 – 2009	1.5942708	45.90997	.
Bosnia and Herzegovina[c]	2000 – 2004	33.1358	31.34504	34.15216	Nicaragua	1990 – 1994	-6.0855815	.	52.84115
Brazil	1985 – 1989	-0.87364509	51.80535	51.62943	Niger	1990 – 1994	1.4894132	.	47.51131
Bulgaria[a]	1990 – 1994	4.2974414	21.11688	27.09256	Niger	2000 – 2004	0.19667837	47.51131	42.90371
Burundi	2005 – 2009	-0.44114552	36.323	.	Nigeria	1980 – 1984	-.80189548	51.04012	47.03493
Cape Verde	1990 – 1994	4.233563	40.11286	50.54889	Nigeria	2000 – 2004	0.12627181	49.59867	.
Central African Republic	1995 – 1999	-3.2104029	57.06052	44.51993	Pakistan	1985 – 1989	3.7068806	33.60579	35.27655
Chile	1990 – 1994	5.6388512	51.80719	52.00827	Panama	1990 – 1994	-3.0545884	49.69383	51.71814
Croatia	2000 – 2004	4.0404271	29.41292	27.70873	Paraguay	1990 – 1994	1.2123294	.	53.15181
Czechoslovakia[a]	1990 – 1994	.	19.51539	.	Peru	1980 – 1984	-0.34401648	53.62664	55.13491
Ecuador	1980 – 1984	3.0802634	47.87196	45.76368	Peru	2000 – 2004	1.9023636	53.58627	50.33112
El Salvador	1980 – 1984	1.0984231	46.70345	46.07441	Philippines	1985 – 1989	-1.4341187	43.3194	42.38044
Ethiopia	1995 – 1999	-7.5346687	41.34513	.	Poland[a]	1990 – 1994	.	26.83595	30.29912
Ghana	1995 – 1999	1.2533877	36.91615	39.40947	Portugal	1975 – 1979	7.9580053	30.23566	30.60797
Greece	1975 – 1979	5.0700934	32.90662	32.34943	Romania[a]	1990 – 1994	-1.0767396	19.86865	27.58579
Guatemala	1985 – 1989	-2.6635406	46.71217	54.06861	Russia[b]	1995 – 1999	.	26.27164	.
Guinea-Biussau	1995 – 1999	1.439557	48.71349	36.20636	Senegal[c]	1985 – 1989	-1.1343487	49.10647	49.38421
Guyana	1990 – 1994	-0.43554313	.	42.40846	Senegal	2000 – 2004	1.8849026	42.14108	36.46976
Haiti	1995 – 1999	-9.3986487	53.92298	54.37456	Serbia and Montenegro	2000 – 2004	.	29.22845	.
Haiti	2005 – 2009	-2.3129623	54.37456	.	Sierra Leone	2000 – 2004	-6.2664286	51.7655	43.75809
Honduras	1980 – 1984	4.254432	52.40306	52.13841	South Africa	1990 – 1995	-0.9598904	62.18617	59.73333
Hungary[a]	1990 – 1994	1.5580404	23.69318	30.25498	Spain	1975 – 1979	5.0518799	30.94354	30.4766
Indonesia	2000 – 2004	0.2761307	33.59033	36.02671	Suriname	1990 – 1994	-1.3545858	.	48.81926
Kenya	2000 – 2004	0.20270938	47.88778	46.10921	Taiwan	1990 – 1994	.	26.92656	28.49401
Korea, South	1985 – 1989	4.6233239	35.25042	30.91105	Tanzania[c]	2005 – 2009	3.8464447	34.50254	.
Kyrgyzstan[b]	2005 – 2009	3.8455911	31.29589	.	Thailand	1980 – 1984	5.4452765	44.64527	49.49432
Lebanon	2005 – 2009	2.2247601	43.20097	.	Turkey	1985 – 1989	1.1885131	50.04522	43.9077
Lesotho	1995 – 1999	3.1502315	59.2804	51.6119	Uganda	1980 – 1984	.	39.68992	41.00848
Liberia	2005 – 2009	5.359093	38.41682	.	Uruguay	1985 – 1989	-3.3905343	40.85515	40.54154
Madagascar	1990 – 1994	-0.45624914	46.78335	42.5568	Yugoslavia	1995 – 1999	.	29.33561	.
Malawi	1995 – 1999	-0.26532436	60.19334	41.79978	Zambia	1990 – 1994	-0.98247157	63.43211	60.47676
Mali	1990 – 1994	.3672818	36.02125	48.97723	Zimbabwe	1975 – 1979	6.146676	54.40755	52.38535

[a]: Signatory to the Warsaw pact.
[b]: Formerly part of the USSR.
[c]: Not identified by Acemoglu *et al.* (2014) as a democratization.