How Does Democracy Cause Growth?*†

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Abstract: Recent empirical work established that democracy causes growth. In this paper, we explore the underlying institutions driving this relationship using data from the Varieties of Democracy project. As the mechanism for growth, we propose an economic blueprint formed by the extent of the market, incentives and opportunities, as well as the distribution of political power, each in turn determined by institutional building blocks. This blueprint differs across countries and shapes economic prosperity with increased democratic experience over time. We take our model to the data using heterogeneous treatment effects estimators, allowing for non-parallel trends and selection into institutional change, and run horse races between underlying institutions. We find that freedom of expression, freedom of association, and legislative executive constraints are the foremost drivers of long-run development. Erosion of these institutions, as witnessed recently, may jeopardise the perpetual growth effect of becoming a liberal democracy we establish for the 1959-2018 period.

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1 Introduction

Recent research establishes a positive long-run relationship between democracy and economic growth (e.g. Madsen et al., 2015; Acemoglu et al., 2019; Eberhardt, 2022; Boese-Schlosser and Eberhardt, 2024). Nevertheless, two important challenges to a better understanding of how democracy causes growth remain: first, the underlying political and economic institutions which drive the democracy-growth nexus have not been identified; and second, the existing literature has implicitly assumed that the democracy-growth relationship is the same across countries and over time spent in democracy, which makes it difficult to derive credible policy implications for individual countries (Durlauf, 2020).

The first challenge is to better understand *how* democracy fosters growth: Which institutional building blocks are essential, what is inside the black box? In a frequently-cited phrase from his seminal book *On Democracy* Robert Dahl suggests that "democracy has meant different things to different people at different times and places" (Dahl, 2000, 3). This is reflected in the variety of political institutions brought together in the binary indices of democracy in Papaioannou and Siourounis (2008); Cheibub et al. (2010); Boix et al. (2013) and Acemoglu et al. (2019): electoral rights, civil rights, executive constraints or a (selective) combination of all these — see Appendix Figure A-2. Acemoglu et al. (2019, fn 4), for instance, argue that their meta-index successfully captures "a bundle of institutions that characterize electoral democracies", but that this misses elements of a "broader set of inclusive institutions" (ibid) emphasized in other work by Acemoglu and Robinson (2012). Which elements of the 'bundle' matter most for economic prosperity, if indeed they are not all of equal significance, is left uncertain. This question is the focus of the present study.

The second challenge relates to the heterogeneity of democracy's effect on growth across countries and within countries over time: existing research typically models a homogeneous democracy-growth relationship *across countries* and presents the growth effect of democracy as an average *over time*. First, such assumptions ignore existing arguments for heterogeneous growth effects across democratisers, including 'elite-biased democratisation' (Albertus and Menaldo, 2018) among other work emphasising differential *modes* of regime change

(e.g. peaceful vs violent regime change or 'democratisation by mistake': Cervellati and Sunde, 2014; Treisman, 2020), or the negative implications of populist leaders for economic performance, regardless of political regime (Funke et al., 2023). A systematic analysis of heterogeneities is only possible when individual country regressions, not pooled regressions of all countries, form the basis of empirical investigation (Eberhardt, 2022). Second, charting the growth implications of regime change *over time* speaks to a political economy interpretation of the *experience* of democracy:[1] In the early years of democracy, many countries experience a phase of 'democratic overload' or a 'tumultuous youth,' where unresolved internal rivalries may resurface, and leaders might focus on short-term gains to satisfy an impatient public (Gerring et al., 2005). This initial period can create challenges for sustainable economic growth. However, as democratic institutions mature, decision-making processes become more formalized and stable. Over time, this 'political institutionalization' of authority fosters a more predictable and supportive environment for long-term economic growth. These thoughts point to the potential for non-linear growth effects with length of democratic experience. This aside, the focus on an average treatment effect in the existing literature pre-supposes that democracy has a one-off *levels* effect. If democracy fosters the 'right incentives' to innovate, then a permanent *growth* effect in line with many endogenous growth theories cannot be ruled out, but this can only be discovered if the length of time spent in democracy is explicitly acknowledged in the analysis *and* presentation of results.

The main contribution of our study is to overcome these challenges to answer the question "*Which institutional building blocks drive the democracy-growth relationship?*" We address the first challenge by developing a conceptual framework that outlines how change in political and economic institutions fosters economic growth over time. We then build an empirical model in line with this framework and trace the democracy-growth nexus from an

[1]We do not employ 'democratic capital stocks' (e.g. Gerring et al., 2005; Persson and Tabellini, 2009): these are computed over very long time horizons and may conflate the effects of *democratic experience* of the current regime with those of *democratic legacy*.

encompassing high-level concept of liberal democracy (Mukand and Rodrik, 2020)[2] down to its constituent components while accounting for the effect of 'rival' lower-level institutions (we refer to the comparison across mid- and lower level institutions as 'horse races'). Examples of these lower-level building blocks include free and fair elections or freedom of expression: tangible practices and reflections of sound institutions, rather than abstract high-level 'bundles'. We overcome the second challenge with an econometric implementation that allows us to study the evolution of *country-specific* effects of institutional change on economic growth *over time*. Our empirics provide insights in the relative relevance of different institutions for economic prosperity, evaluated over the time spent 'in regime'.

Our empirical analysis exploits the Varieties of Democracy (V-Dem) project's hierarchical indices to adopt an encompassing conceptual framework for liberal democracy including political rights, executive constraints, property rights, and other civil rights. The V-Dem data (Coppedge et al., 2021) offer a close mapping between the building blocks of liberal democracy and the empirical analysis of institutional change for a large sample of countries over 1959-2018. We dichotomise these indices to create regime change indices in a variety of ways with empirical results consistent across these alternatives.

Our empirical implementation uses the Chan and Kwok (2022) Principal Component Difference-in-Differences (PCDID) estimator. It arrives at country-specific estimates for the treatment effect and hence is not subject to recent concerns about the use of the two-way fixed effects estimator when treatment effects are likely to be heterogeneous (De Chaisemartin and d'Haultfœuille, 2020; Goodman-Bacon, 2021; Athey and Imbens, 2022). The PCDID estimator allows for pre-intervention non-parallel trends and endogenous selection into regime change by augmenting the estimation equation of a treated country with common factors estimated from the residuals of the same equation in the control sample. These common

[2]We construct regime dummies from continuous V-Dem indices. There is an unfortunate overlap in names between some of these and the regimes in V-Dem's 'Regimes of the World' dataset (Lührmann et al., 2018). We only ever use the latter for comparison of high-level democracy indices in Column [3] of Table 1 and Figure 2.

factors capture unobserved confounders such as total factor productivity or absorptive capacity.

We adopt the graphical form of presentation introduced in Boese-Schlosser and Eberhardt (2024) to report our findings: we employ multivariate local linear regression and plot the smoothed estimated treatment effects against the 'years in regime.' This enables us to study heterogeneous growth effects over time and to control for sample characteristics and regime reversal dynamics. In the comparison of mid- and low-level building blocks of democracy, we perform 'horse races' between different democracy components to evaluate their *individual* contributions to economic growth. We decompose the high-level concept of 'Liberal Democracy' into its core components: The mid-level measures of 'Electoral Democracy' and the 'Liberal Component'. This way, we can estimate the effect of each component on growth while controlling for the influence of the respective other. We proceed similarly when breaking down the mid-level components into low-level ones. This approach enables us to isolate the distinct roles and impetus of each of these components without ignoring the possibility of complementary effects.[3]

We have two main findings: first, becoming a 'liberal democracy' appears not to just have a one-off (levels) effect, but a *perpetual* growth effect of around half a percentage point per year in democracy in the long-run. Second, studying constituent components of liberal democracy, we establish that freedom of association, freedom of expression and legislative constraints on the executive drive economic prosperity in the long-run. In contrast, the initially strong positive effects of judicial constraints on the executive peters out after three decades, while clean elections have a moderate but stable positive effect and, surprisingly, the rule of law does not add to economic prosperity. These findings are robust to different definitions of regime change and an alternative empirical setup which explicitly models the inter-dependencies between different institutions in their effect on growth — see Appendix G.

The remainder of this paper is structured as follows: in Section 2 we review the constituent elements of our liberal democracy conceptual framework and sketch the mechanisms

[3]In Appendix G we adjust our methodology to explicitly model the interaction between different components arriving at qualitatively very similar results.

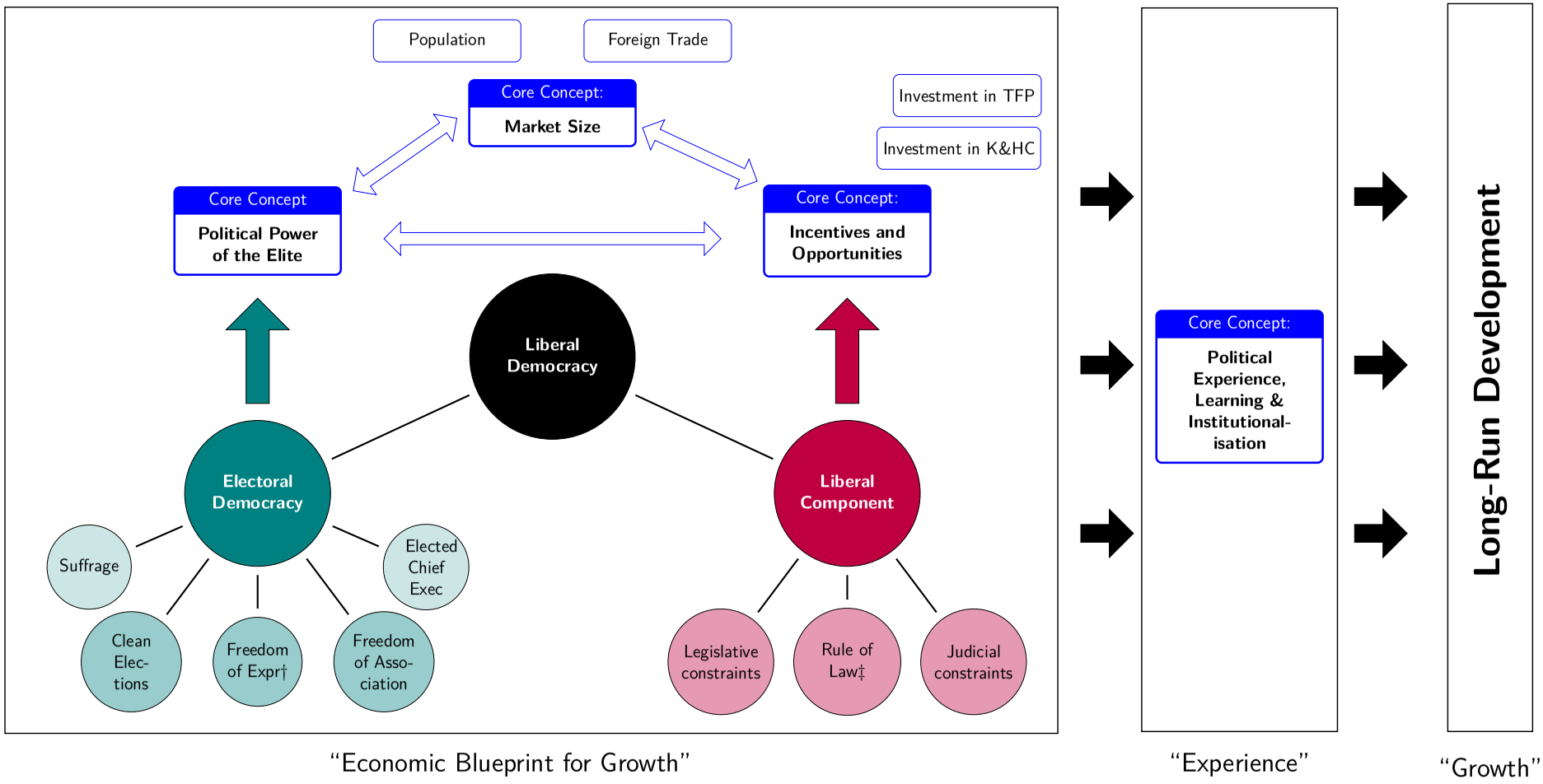
determining the democracy-growth nexus. The data proxies from V-Dem and data transformations are discussed in Section 3. The empirical strategy is provided in Section 4, with results presented in Section 5. Section 6 covers the conceptual implications of our findings, followed by notable limitations in Section 7. The conclusion reviews our findings in the context of the recent global experience of the erosion of democratic institutions.

2 Theory: From Institutions to Growth

Our aim is to unbundle the democracy-growth nexus to pinpoint the democratic building blocks driving this relationship. In this section, we present the conceptual framework that breaks up Liberal Democracy into its core components and provides the basis for our empirical analysis.

How can democracy foster economic development? Figure 1 provides a schematic overview of how this process can be synthesised. We differentiate between an endogenous process on the left of the diagram and a sequential process that accumulates over time on the right: Long-run economic growth following democratic regime change can be thought of as the outcome of the year-on-year amplification (right) of the 'economic blueprint for growth' (left). The blueprint, in turn, is formed by three factors: 'Incentives and opportunities' for firms and individuals determine economic fundamentals, 'market size' determines whether these fundamentals have the potential to foster long-term economic growth, and the 'political power' structure determines to what extent this potential can be realised to foster economic growth. These factors should not be viewed as (decision-making) processes *in isolation*, *sequentially* determining the economic outcomes of an institutional framework, but as a set of endogenous determinants. Over time, the impact of the 'blueprint' changes: 'experience' explains how and why the economic implications of regime change differ with time and hence also across countries. We discuss these elements in turn below.

Figure 1: Mechanisms — Institutions and Economic Development



Notes: This diagram shows the proposed mechanisms of how institutions lead to growth. There are four core concepts which together determine the economic effect of institutions. Shaded boxes are for institutions. † This includes 'alternative sources of information'. ‡ In its entirety this component also covers 'Individual Liberties and Equality before the Law.'

Incentives and Opportunities The 'right' institutions incentivise and offer opportunities for firms and individuals (i) to invest in capital accumulation (e.g. Hall and Jones, 1999; Acemoglu et al., 2001, 2002), namely physical capital (K) in the case of firms and human capital (HC) in the case of individuals, and/or (ii) to improve technological efficiency (TFP, see among others Aghion et al., 2007).[4]

Investment occurs when firms and individuals have confidence that they will gain the rewards of their investments. Achieving this requires secure property rights and protection against misappropriation of private returns — a combination of rights we refer to as the 'rule of law' and 'constraints on the executive'. These are, of course, the institutions commonly associated with Douglass North (North, 1981; North and Weingast, 1989) and 'getting incentives, opportunities and prices right' also entails the reduction of market frictions and the facilitation of transaction more generally, including foreign trade (Besley, 1995).

The democratic dividend from getting incentives 'right' is likely to differ across countries: individual countries will have different investment efficiency and different emphasis between capital- and innovation-based investment (e.g. developing vs. advanced economies).

Market Size The best blueprint for growth cannot deliver prosperity if there is only a limited market, if the country has a small population, is closed to international trade (by fate or choice), and/or is far from large, open economies with ample consumer demand to feed on. The incentives and opportunities that determine the potential for growth are themselves affected by this 'extent of the market' argument (e.g. Jones, 1995; Peters, 2021). The economic growth potential afforded an economy by its 'Northian' institutions is amplified or attenuated by the realities of its demographic, geographic or international environment (Acemoglu and Zilibotti, 2001). Hence we should expect two countries with identical institutions to experience different long-run growth if their market size differs substantially.

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[4] TFP improvements can be achieved through R&D and innovation (see Cirera and Maloney, 2017), including knowledge diffusion and spillovers (Halperin et al., 2009; Knutsen, 2015), and/or by addressing resource misallocation (e.g. structural transformation).

Political Power Structure This speaks to the fundamental political differences between democracy and autocracy: "[I]n no autocracy is it possible for the present-day rulers to effectively *constrain future decisions*, particularly those taken by their successors. This means that long-term *credible commitment* is impossible in an authoritarian setting" (Gerring et al., 2005, 336, emphasis added). Economic decision-making does not merely focus on the institutional environment *at the time of the decision* but also on potential future changes to this environment. The more concentrated political power in an economy, the more likely the 'Northian' institutions governing investment behaviour will be undermined and government decision-making will become "discretionary or even arbitrary" (Madsen et al., 2015, 175) in the future. Democratic institutions limit elite power through two key mechanisms: (i) the ability of citizens to hold leaders accountable through voting, and (ii) the freedom to access, share, and act upon information. Universal suffrage, the election of political leaders through popular votes, and free and fair elections exemplify the mechanisms that empower citizens through the ballot box. Executive constraints can go some way to reign in political leaders (Cox and Weingast, 2018), yet 'accountability' of a regime can ultimately only come from the power of the electorate to withdraw the leaders' mandate: "[d]emocracy is a system in which parties lose elections" (Przeworski, 1991, 10). Fair(er) elections provide strong incentives for politicians to be "more responsive to citizens' needs" by means of electoral sanction (Ofosu, 2019, 963). Similarly, the ability to access and share information is upheld by rights and freedoms such as freedom of expression, access to alternative sources of information, and the freedom to form political parties and civil society organizations. These elements collectively ensure that citizens can articulate and act on their preferences, further reinforcing democratic accountability.

Building Blocks of Democracy Our diagram indicates the three tiers of political and economic institutions we study to trace the democracy-growth relationship, afforded by the V-Dem project's hierarchical indices. At the highest level is our encompassing definition of democracy/institutions, Liberal Democracy. This combines electoral democracy emphasising participation on the one hand, and the liberal component with executive constraints and

the rule of law on the other — the latter is often seen as the "truly distinctive" feature of liberal democracy (Mukand and Rodrik, 2020, 765). We connect the 'mid-tier' concepts of 'electoral democracy' (polyarchy)[5] and the 'liberal component' to the core concepts of political power and incentives and opportunities, respectively. A third tier splits these into 'lower-level' components: freedom of speech, freedom of association, suffrage, elected leaders, and clean elections in case of polyarchy; and the rule of law guaranteeing individual liberties, along with judicial and legislative constraints on the executive in case of the liberal component.[6] Using this three-tiered framework, we can pinpoint those specific institutional elements of the broadly defined concept of liberal democracy that are driving the 'democratic dividend'.

Democratic Experience Abstracting from all other determinants of the magnitude of the democracy-growth relationship discussed so far, it is important to separate out long-run and short-run effects: the economic effects of democracy may change over time. Parts of the existing literature already recognise this, but the primary motivation here is the (economic or civil) upheaval during regime change, accompanied by a slump in the economic growth rate which could bias estimated effects of democracy downwards (e.g. Cervellati and Sunde, 2014; Acemoglu et al., 2019). Our motivation for 'nonlinear' within-country effects over time builds on a political economy interpretation of the *experience* of democracy (echoed in Gerring et al., 2005; Persson and Tabellini, 2009). Following regime change new democracies frequently face a period of upheaval which in some cases leads to reversal to autocracy or 'hybrid regimes' (Diamond, 2002; Brownlee, 2009). With expectations sky-high, leaders in new democracies may prioritise short-term policies to fire up the political business cycle or to pander to impatient political supporters. Internal struggles among factions may arise; if certain groups in society were previously disengaged or suppressed then their newly-established

[5]This follows Dahl (1971), closest in conceptual coverage to the polity2 variable from PolityIV (see Appendix Figure A-2).

[6]Over the past 50 years, 'Suffrage' and 'Elected Chief Executive' display near-universal coverage and limited temporal variation. Hence, we omit these from our analysis.

freedom may find them vociferously making demands or rehashing old animosities with other groups. These forms of 'democratic overload' may prove costly when a regime's bureaucracy is insufficiently institutionalised: lacklustre economic performance, disillusionment, and perhaps even nostalgia for the 'old' regime.

Yet if allowed time, things are likely to improve. One fundamental difference in policy-making between autocracies and democracies is that the former is leader-centred whereas the latter "generally involves many more players" (Gerring et al., 2005, 330), which implies debate, consensus-building, and input from experts: over time, governments may learn how to improve policy-making. In addition, the ongoing experience of democracy fosters the 'political institutionalisation' of authority patterns in the country and the behaviour of political institutions.

Implications There are three important implications for empirical modelling deriving from our discussion. First, it is to be expected that democratic regime change leads to differential long-run economic prosperity, due to differences in economic fundamentals and in market size — our empirics control for the latter (population growth and trade) and allow for the former by modelling *country-specific* treatment effects. Second, even two 'institutionally' identical countries with identical economic fundamentals may experience differential 'democratic dividends' if they vary in their 'democratic experience'. We allow for a non-linear learning effect in democracies by mapping treatment effects to 'years in treatment'. And third, the different focal points of analysis in a 'Northian' tradition (rule of law, executive constraints) and that of political scientists adopting a minimal definition of democracy (polyarchy) point to fundamentally different dominant drivers of growth through democratic regime change. Drilling down to these underlying institutional building blocks will enable us to run horse races between them to chart their relative significance for long-run economic prosperity.

3 Data and Descriptives

3.1 Concepts and Data Sources

Concepts & Measures Our analysis benefits from the use of the V-Dem dataset (Coppedge et al., 2021) in two distinct ways: from the underlying conceptualization of liberal democracy and the availability of hierarchical data. It allows for a direct mapping of the data to the concepts depicted in Figure 1 and enables us to empirically 'drill down' three tiers to systematically analyze the growth effects of each of the building blocks of liberal democracy while conditioning on the evolution of 'rival' building blocks.[7] The V-Dem dataset employs a wide range of lower-level indices distinguished either as 'factual in nature' based on extant sources or coded by country experts and coordinators,[8] which are then systematically aggregated and transformed to create the index variables across three tiers we use in this study. Due to the strategies employed in developing the underlying definitions, in the measurement scales applied in constructing individual lower-tier indices and, crucially, in the theoretical justification for the weighting and aggregation procedures to arrive at higher-tier measures, the V-Dem indices naturally lend themselves to hierarchical investigation (for more details including a comparison to PolityIV and other alternative democracy indices, see Boese, 2019).

The empirical counterpart to the concept of Liberal Democracy in the top tier of Figure 1 is V-Dem's Liberal Democracy Index. Liberal democracy consists of two second-tier components: electoral democracy and the liberal component (with empirical counterparts in the

[7] 'Drilling down' with PolityIV would not be possible, since (i) the theoretical elements feeding into the PolityIV democracy index do not map into our conceptual framework (highlighted in Figure A-2), (ii) its rules for weighting and aggregating constituent measures are arbitrary, and (iii) it treats periods of interregnum, interruption and transition ambiguously.

[8] The latter type variables are based on information on an ordinal scale and subsequently aggregated across coders using Bayesian item response theory models (Coppedge et al., 2017; Pemstein et al., 2022, 29f).

V-Dem dataset). The principle of Electoral Democracy rests on the eight institutional guarantees[9] outlined by Dahl (1971), capturing contestation and participation. These guarantees are integrated into the five building blocks of polyarchy, in turn corresponding to the concepts on the lowest tier of Figure 1: freedom of association, freedom of expression and alternative sources of information, clean elections, suffrage and elected officials.[10] Similarly, the Liberal Component, which covers "constitutionally protected civil liberties, strong rule of law, and effective checks and balances that limit the use of executive power" (Lindberg et al., 2014, 160), can be broken down into three components with empirical counterparts in the V-Dem data: the Equality before the Law and Individual Liberties index, capturing the extent to which rule of law prevails, as well as judicial and legislative constraints on the executive. Detailed definitions for the indices across all three tiers are provided in Appendix Table A-1.

Data Sources Our empirical analysis uses three main data sources: the V-Dem data (Coppedge et al., 2021, version 11), real income per capita and population data from the updated Maddison dataset (Maddison, 2007; Bolt and van Zanden, 2020), and trade data from IMF DOTS — we adopt export-share of trade and population growth as additional controls to capture the significance of the 'extent of the market'. Tellingly, the inclusion of a trade variable was indicated to affect the magnitude of the democracy-growth nexus in Papaioannou and Siourounis (2008, Table 3, column 5) and Acemoglu et al. (2019, Table 6, column 6).

[9]Freedom to form and join organizations, Freedom of expression, Right to vote, Eligibility for public office, Right of political leaders to compete for support, Alternative sources of information, Free and fair elections, Institutions for making government policies depend on votes and other expressions of preference (see Teorell et al., 2019; Boese and Wilson, 2023).

[10]We do not consider 'suffrage' and 'elected chief executive': 92% of observations in the full sample indicate universal suffrage, while the mean sample index value for 'elected officials' is 0.77. Adopting our mean index cut-off would only provide for three control group countries (ARE, SAU, THA) in the former and twelve in the latter — hence, these practices cannot offer a feasible control sample to estimate common factors.

For ease of interpretation we log-transform the dependent variable (real GDP per capita), and multiply it with 100, so that regime change can be interpreted in terms of the percentage change in per capita income. In comparative analysis of high-level democracy indices we also adopt the V-Dem *Regimes in the World* categorisation (Lührmann et al., 2018, ROW); the polity2 variable from PolityIV (Marshall et al., 2017) to construct two binary democracy variables (cut-offs 0 and 5); and the Boix et al. (2013) definition of democracy.

Transformation of Democracy Indices Our empirical analysis relies on *binary* indices for liberal democracy and its constituent components, in line with much of the recent empirical literature (e.g. Acemoglu et al., 2019; Boese-Schlosser and Eberhardt, 2024). Since the V-Dem indices are quasi-continuous and range from zero to one this raises the question which cut-off to choose to create a binary democracy dummy. In our main analysis we adopt the index mean *for the entire sample* ($N = 157$), in robustness checks we consider a range from $1/4$ of a standard deviation below to $1/4$ of a standard deviation above the mean. Index means as well as the standard deviations for the high-, mid- and low-level democracy indices are presented in Appendix Table A-3. We do not find qualitatively substantial deviations in our results if we adopt alternative cutoffs.

3.2 Sample Makeup and Descriptives

Full Sample For the main analysis using V-Dem data our sample comprises 157 countries from 1959 to 2018 with on average 49 country observations (7,643 observations).[11] Determined by the definition of the democracy dummy, this contains three groups: (i) countries

[11] An additional 660 full sample observations for 40-72 countries are available for 1949-1958. However, only 2-7 control sample countries have observations in these early years, compared with 22-53 treatment sample countries. As a result, the information extracted from the control sample is a poor fit for the treatment sample and hence models for this longer panel uniformly fail the Alpha test (see Section 4.2). We therefore curtail the sample to 1959 as the start date. Only four regime changes take place between 1949 and 1958.

which were democracies throughout the sample period, (ii) those which were autocracies throughout the sample period, and (iii) those which became democracies and/or reverted to autocracy. In our analysis, the countries in (i) are discarded, although their respective index values form part of the calculations to determine the threshold for each democracy index. The countries in (ii) represent the control sample, and those in (iii) the treatment sample — we report the sample sizes of the latter two in our results plots and tables.

Descriptives Details on each of the 157 countries over 1959-2018 are tabulated in Appendix Table A-2. Simple descriptives reveal that over time the median country has become richer and more democratic.

Our panel is unbalanced. Appendix Figure A-1 indicates the differential start years in the sample for all 157 countries and for the polyarchy PCDID regressions (treated countries only). The patterns are next to identical, with around 30% of countries having start years after 1969. These differential patterns are taken into account when we analyse the democratic dividend.

Another feature that stands out is that several countries experienced multiple regime changes. Much of the existing literature on democracy and growth does not concern itself with 'regime change dynamics', whether a country had repeated episodes of crossing the democracy threshold (exceptions include Giavazzi and Tabellini, 2005, Papaioannou and Siourounis, 2008 and Eberhardt, 2022). As shown in Appendix Table A-4, *multiple* regime changes occur in 22%, 28% and 29% of countries for the liberal democracy, polyarchy and liberal component definitions of regime change, respectively. These regime change dynamics are taken into account when we present our results for the long-run democratic dividend.

4 Empirical Strategy

This section introduces novel methods to capture the impact of observable and unobservable heterogeneity on empirical estimates of treatment effects, building on the 'common factor' framework (Andrews, 2005; Pesaran, 2006; Bai, 2009). We discuss how we should think about these common factors, what they could represent, and why we do not use some of

the many observable proxies adopted in the cross-country growth literature to replace them. We then detail a novel difference-in-differences approach which extracts common factors from control countries to identify the causal effect of a discrete treatment variable in the face of endogenous selection into treatment and non-parallel pre-treatment trends. We close this section by explaining the strategy for presenting our empirical results.

4.1 Capturing unobserved heterogeneity using common factors

In our empirical approach we employ common factors to capture time-varying unobserved heterogeneity across countries. When it comes to this unobserved heterogeneity, growth economists have mastered the art of putting a label on 'our ignorance' (Abramovitz, 1956), everything we think may matter but we have not measured or cannot measure: total factor productivity (TFP). Whenever we run a cross-country regression of income per capita or its growth on some observed 'determinants', as is our intention here, we need to be concerned about capturing TFP, since its pervasiveness is the source of the perennial 'transmission bias' (Marschak and Andrews, 1944). Relatively tangible candidates capturing elements of TFP growth include investment in R&D, human capital development, infrastructure investment, and innovation incentives (tax breaks, grants); less tangible ones include 'absorptive capacity', trust, good citizenship, culture, the spread of the potato, genetic diversity, colonial heritage, the neolithic transition, staple crops, luck and many more.

These exaggerated lists highlight that there is an inherent *dimensionality problem* in cross-country growth empirics: following the seminal work of Barro (1991) empirical studies have included a myriad of growth determinants in their models, far too many to feasibly combine in a single study without running out of degrees of freedom, and the unpopularity of cross-country growth regressions since the early 2000s at least in part derives from the frequent 'kitchen-sink' approach to growth empirics or the lack of robustness of results to changes in the covariates (Durlauf, 2020). Thus, capturing all or even just the most relevant determinants of TFP with *observable* proxies is an impossible task.

The recent panel time series literature instead has employed *dimensionality-reducing*

tools to capture 'interactive fixed effects': global factors affecting all countries, but to a different extent (e.g. Eberhardt et al., 2013; Chirinko and Mallick, 2017; De Visscher et al., 2020; Madsen et al., 2021). We now explain how these unobserved common factors can help identify the democracy-growth nexus.

4.2 Heterogeneous Difference-in-Differences Estimation

Recent contributions to the macro panel econometric literature have been able to build bridges to the literature on policy evaluation using difference-in-differences specifications (Gobillon and Magnac, 2016; Chan and Kwok, 2022) and synthetic controls (Xu, 2017). What distinguishes these latest approaches from their canonical predecessors is the adoption of interactive fixed effects to address two well-known challenges to identification in these popular methods: (i) the presence of non-parallel trends prior to the policy change evaluated, and (ii) endogenous selection into 'treatment'. Our implementation adopts the Chan and Kwok (2022) PCDID estimator, which estimates a *country-specific* treatment effect and by employing interactive fixed effects allows for correlation between the unobserved determinants of growth and selection into democratic transition or reversal.[12]

Formally, using potential outcomes, define

$$y_{it} = \overline{\Theta}_i \, \mathbf{1}_{\{i \in I\}} \, \mathbf{1}_{\{t > T_{0i}\}} + y_{it}^0, \tag{1}$$

where $\overline{\Theta}_i$ refers to the time-averaged treatment effect on the treated unit i, $\mathbf{1}_{\{i \in I\}}$ is a dummy for the treatment group, and $\mathbf{1}_{\{t > T_{0i}\}}$ is a dummy for the (heterogeneous) treatment date. This is a reduced form model which already incorporates a decomposition of the potentially time-varying heterogeneous treatment effect: $\Theta_{it} = \overline{\Theta}_i + \widetilde{\Theta}_{it}$. We assume that the time-varying idiosyncratic component of this treatment effect over the treatment period is mean

[12] See Section 2 and Eberhardt (2022) for a discussion of potential sources of heterogeneity in the democracy-growth nexus. An application to the democracy-growth nexus can be found in Boese-Schlosser and Eberhardt (2024).

zero for treated units, i.e. $E(\widetilde{\Theta}_{it}|t > T_{0i}) = 0$. The full empirical model is

$$y_{it}^{0} = \beta_i' x_{it} + u_{it} \qquad u_{it} = \lambda_i' f_t + \epsilon_{it} \tag{2}$$

$$\Rightarrow \qquad y_{it} =: \overline{\Theta}_i \, \mathbf{1}_{\{i \in I\}} \, \mathbf{1}_{\{t > T_{0i}\}} + \beta_i' x_{it} + \mu_i' f_t + \varepsilon_{it}, \tag{3}$$

with the flexible assumption $x_{it} = \Lambda_i' f_t + \nu_{it}$, i.e. any controls x are endogeneous due to the common factor structure. f is a set of unobserved common factors and μ is some combination of the λ and Λ parameters. $\overline{\Theta}_i$ is what we seek to estimate: Chan and Kwok (2022) refer to this as ITET, the treatment effect of unit i averaged over the treatment period. The average treatment effect ATET is simply the average of the heterogeneous ITET across countries.

The implementation is straightforward: for the sample of countries which experienced variation in the treatment dummy over time we specify the following regression model

$$y_{it} = \alpha_i + \beta_i \text{ Dem}_{it} + \gamma_i' X_{it} + \delta_i' \hat{f}_t + \varepsilon_{it}, \tag{4}$$

where y is per capita GDP (in logs $\times 100$), Dem is the democracy dummy, and X is the set of additional controls (population growth and export share of trade). $\hat{f}$ are common factors estimated via PCA from the residuals of a heterogeneous regression of y on X *in those countries which never experienced democracy during the sample period* (control group). These estimated factors can capture the presence of uncommon and/or stochastic trends between treatment and control samples (Chan and Kwok, 2022). The empirical model accommodates selection into democracy given that we can allow for correlation between the estimated factors, the observable covariates (including the regime dummy), and the country intercept.

Below we present the ATET results for models augmented with one to six estimated factors. In line with the literature, we adopt robust regression (Hamilton, 1992) to compute outlier-robust means. Inference is based on a non-parametric variance estimator (Pesaran, 2006). Our main specification will be the model augmented with four factors, for which we present results using running line regressions — see the following section.

The main identifying assumptions for the PCDID estimator of β_i are as follows: (i) we can

capture all unobservable determinants of economic development with the common factor error structure; and hence (ii) ε_{it} is white noise and therefore orthogonal to all other elements of equation (4). These are standard assumptions for interactive fixed effects models made in the panel time series literature (Pesaran, 2006; Bai, 2009) and in Athey et al. (2021): they imply that the endogeneity surrounding democratic regime change as well as the nonparallel trends are entirely captured by the controls, the factor structure, and the deterministic components in their correlation with the treatment variable.[13]

The main threat to identification derives from idiosyncratic shocks to country i, such as financial crises or natural resource discoveries, which may further or thwart a drive to democratic regime change while simultaneously affecting economic prospects. Existing research suggests that financial crises have a significant international (and hence common factor) dimension (Arellano et al., 2017; Cesa-Bianchi et al., 2019), while oil exploration is guided by global prices (a common factor) and is known to follow rather then lead democratic regime change (Cust and Harding, 2020).

Standard Difference-in-Differences models stand or fall with the parallel trend assumption. In the present PCDID case, even though the estimator allows for nonparallel trends, we nevertheless have to pass a version of this diagnostic test: the Alpha test for weak parallel trends.[14] Put simply, this confirms whether the information extracted from the control

[13]Since we estimate the common factors there is potential for correlation between the error terms of treated and control countries — this bias can be removed if we require that asymptotically $\sqrt{T}/N_c \to 0$, where N_c is the number of control countries and T is the time series dimension of the panel.

[14]This employs the cross-section average of the residual from the control sample regression, say $\overline{\hat{u}}_t^c$, and enters this into the treated sample regression in equation (4) instead of the estimated factors. The Alpha test then checks whether the cross-country average of the country coefficients for $\overline{\hat{u}}_t^c$ is statistically significantly different from 1, which would violate the weak parallel trend assumption. Below we report the associated p-values, with a low p-value indicating the model may be misspecified.

country regressions (via the factors) is equally relevant in the treated country context.[15]

Finally, the inclusion of additional controls is only warranted if these are exogenous to the treatment dummy conditional on the estimated common factors — we have a theoretical motivation for the inclusion of variables capturing market size and present Wald (χ^2) test results to this effect alongside the ATET estimates.

4.3 Conditional Mean Results in Heterogeneous Treatment Models

The models introduced above provide country-specific treatment estimates. Below we present most of our results in graphical form, plotting local predictions for the estimated democracy coefficients $\hat{\beta}_i$ (treatment effect) against the *time spent in (democratic) regime* (treatment length), following the practice introduced in Boese-Schlosser and Eberhardt (2024). Presenting sample average results for country-specific democracy estimates (ATET) introduces all the sample and treatment heterogeneities across countries which blight pooled panel analysis, e.g. differential year of entry into the sample, countries moving back and forth between regimes. The ATET also ignores the arguments for a nonlinear relationship over the length of treatment developed above (Gerring et al., 2005).

Our graphical results are based on multivariate smoothing of the country estimates: running line regressions, which are k nearest neighbour locally linear regressions, allow us to *jointly* condition on all of the above characteristics. We plot the *predicted* values from this multivariate smoothing procedure against the years spent in regime. Standard errors are calculated based on the local weighted least squares fit and feed into our graphical presentation (filled markers for local estimates indicate statistical significance at the 10% level).

Furthermore, when moving to mid- and lower-tier democracy indices we can condition on the country-specific value and variability of one or more *'rival'* indices: for example, if the 'mid-level' polyarchy index in country i rises above the full sample mean in 1990 ('regime change')

[15] Alpha test results as well as the Wald tests for 'bad controls' are presented for all models, including those with alternative regime cutoffs, in Appendix Tables B-1 to B-3.

and remains above this threshold until 2018, then (in addition to the regime change count and country series start year) our running line regression for the income effect of polyarchy against length of time in the polyarchy regime controls for country i's liberal component index value in 1990 as well as the standard deviation of that index over the 1990-2018 period — we condition on the 'rival' building block. For a lower-level index, such as freedom of association, under the same scenario the regression controls for the values of the liberal component (mid-level 'rival'), as well as freedom of expression, and clean elections indices (low-level 'rivals') in 1990 along with the standard deviations for each of these indices over 1990-2018. While each $\hat{\beta}_i$ is estimated from a country-regression as defined in equation (4), the cross-country profile of the 'treatment effect' of regime change thus accounts for the evolution of *other political institutions* at and after regime change.

In Appendix G we investigate whether explicitly modelling one institutional building block while conditioning on another — for instance, clean elections may only lead to economic prosperity if civil rights are secure and executive powers constrained by the legislative or jurisprudence — leads to substantially different empirical results. It does not.

5 Empirical Results

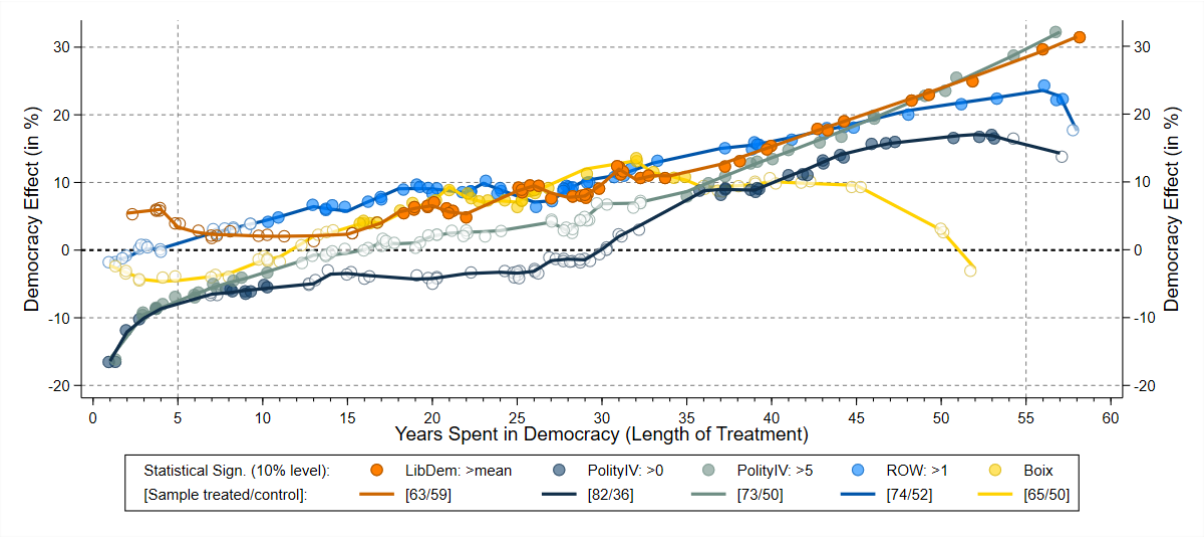
Before we show which components of liberal democracy drive the democracy-growth relationship, we need to establish that liberal democracy does in fact cause growth. We proceed to study the economic effects of mid- and lower-level components of liberal democracy thereafter. For the remainder of this section, we focus on discussing the empirical results, which we then tie back to our theory in the following section.

5.1 High-level Components of Democracy

First, we demonstrate the economic effects of democracy: We present robust mean ATET estimates for 'democracy dummies' derived from five high-level democracy indices, in columns [1] to [5] of Table 1: all of these estimates presented below adopt the PCDID specification

with population growth and exports/total trade as additional controls[16] and augmented with four estimated factors from the respective control groups — in a lower panel of the table we report ATET estimates for alternative specifications augmented with one to six factors. The Alpha tests for weak parallel trends and Wald tests for the exogeneity of the additional controls are also provided. The table further indicates the size of the treatment and control samples and median treatment length.

Figure 2: High-Level Indices for Democracy and Economic Development



Notes: We present the country-specific PCDID running line estimates for five different high-level indices for democracy as indicated. All estimates presented are taken from running line regressions, which further linearly condition on (i) the number of times a country experienced regime change, and (ii) the start year of the country series. The estimates can be interpreted as locally averaged ITET, with the scales indicating the percentage increase in per capita GDP associated with the number of years spent in democracy (x-axis). The filled (white) markers indicate statistical (in)significance at the 10% level. The markers are minimally dispersed for illustrative purposes. Table 1 reports the median number of years of 'treatment' for each model, from 22 to 26.5.

There is substantial heterogeneity between the estimates for PolityIV and V-Dem high-level indices as well as the size of respective treatment and control samples. All ATET estimates are positive, though only the two V-Dem measures are statistically significant.[17]

[16]For alternative controls see Appendix Section F.

[17]The alternative factor augmentations, as indicated in a lower panel of the table, yield

Diagnostic tests suggest that results for the more liberal PolityIV cutoff and the ROW definition of democracy are misspecified (Alpha $p < 0.1$) and further suffer from 'bad controls' (χ^2 statistic $p < 0.1$).

Figure 2 presents the smoothed predictions from running line regressions for the country-specific coefficients of the five high-level indices of democracy plotted against treatment length. Here and in all following graphs a filled marker indicates statistical significance at the 10% level, whereas a hollow marker indicates statistical insignificance.[18] Once we account for the poor diagnostics of some models (see above), the remaining specifications for the V-Dem Liberal Democracy (in orange), the PolityIV zero cut-off (dark blue line), and the democracy dummy by Boix et al. (2013, in yellow) yield qualitatively very different results: adopting the Liberal Democracy definition results in a long-run effect of over 20% higher per capita income after 45 years, and the relationship appears close to linear (implying an annualised growth effect of 0.44%). In line with the arguments laid out above, the initial years in regime do not show a significant effect, the democratic dividend begins to rise (and turn statistically significant) from around 17 years in regime.[19] The PolityIV cutoff arrives at a long-run effect of around 15% higher per capita income but after over three decades of lacklustre effects. Results for the Boix et al. indicator initially closely match those for Liberal Democracy until dropping off after three decades in treatment.

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qualitatively similar results in terms of relative magnitudes of ATETs for three or five factors as the specification augmented with four factors presented in detail.

[18] Predicted values (markers) are minimally perturbed to ease illustration. Democracy estimates at the extremes (0-5 years and 55-60 years in regime) are likely biased as they either have very few observations 'in regime' or 'out of regime' to reliably estimate a difference-in-differences; we add vertical lines at these values in all plots.

[19] In Panel (b) of Appendix Figure C-1 we present results for the Liberal Democracy definition using various thresholds (between $1/4$ of a standard deviation below and $1/4$ of a standard deviation above the mean). All plots display qualitatively very similar trajectories, in the longer term the lower (higher) thresholds result in attenuated (higher) effects.

Table 1: Regime Threshold Models of Democracy and Economic Development

	High-level indices					Mid-level indices	
	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Polity IV Cutoff >0	1.851 [1.733]						
Polity IV Cutoff >5		1.171 [1.673]					
V-Dem ROW Cutoff >1			3.742** [1.539]				
V-Dem Lib. Democracy > mean				3.810*** [1.363]			
Boix et al Dummy					1.794 [1.902]		
V-Dem Polyarchy > mean						3.113** [1.387]	
V-Dem Liberal Component > mean							4.925*** [1.681]
Additional Controls:							
Exports/Total Trade	0.025	-0.024	-0.046	0.011	0.08	0.021	0.031
	[0.066]	[0.078]	[0.087]	[0.074]	[0.078]	[0.084]	[0.064]
Population growth	-0.875	-1.582*	-1.412	-3.190	-2.040**	-2.258	-1.014
	[0.790]	[0.827]	[1.450]	[2.084]	[0.843]	[1.503]	[1.150]
Treatment Sample:							
Countries	82	73	74	63	65	77	72
Observations	4302	3862	3809	3281	3187	3956	3736
Median years in democracy	26.5	22	22.5	23	25	23	26
Control Sample:							
Countries	36	50	52	59	50	45	42
Observations	1614	2277	2386	2712	1995	2037	1880
Diagnostics:							
Alpha (p)	0.16	0.09	0.12	0.13	0.21	0.88	0.05
χ^2 Controls (p)	0.72	0.05	0.04	0.47	0.86	0.46	0.14
Alternative Specifications:							
1 factor	0.688	5.374*	4.341**	2.017	-0.01	2.323	3.017
2 factors	-1.315	0.046	3.049*	3.089	0.951	4.557**	2.231
3 factors	0.309	2.115	4.750***	4.161**	0.046	2.2	4.006**
4 factors	1.851	1.171	3.742**	3.810***	1.794	2.820**	4.901***
5 factors	3.316**	2.794*	5.147***	5.919***	1.793	3.646**	2.833**
6 factors	3.780**	2.180*	3.448***	3.629***	2.112	3.912***	3.116**

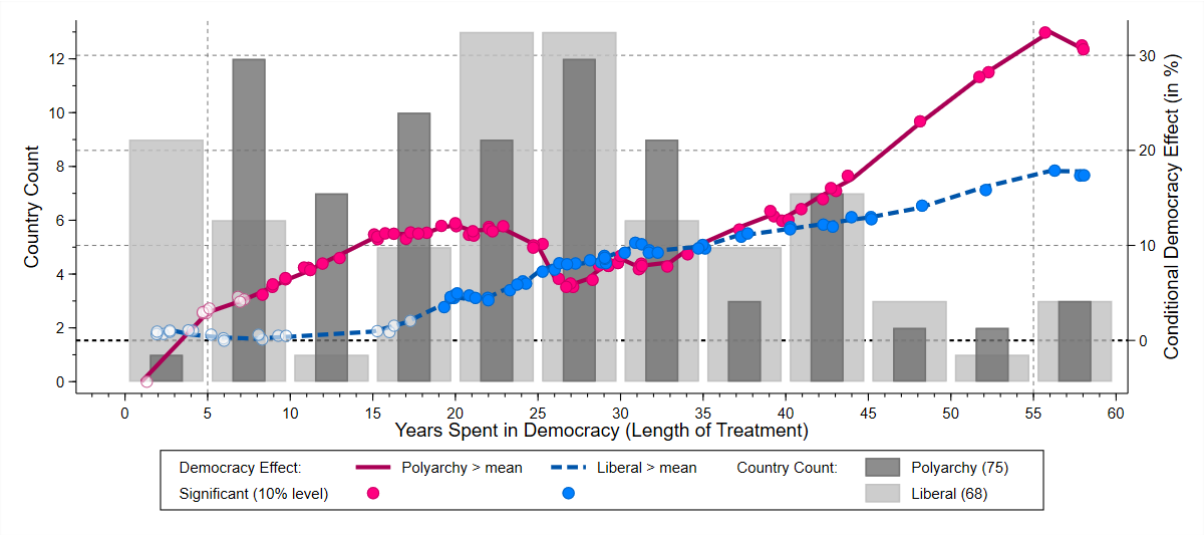
Notes: The table reports outlier-robust mean estimates for the Chan and Kwok (2022) Principal Component Difference-in-Differences (PCDID) estimator for empirical models of per capita GDP, see Equation (4). Democracy is defined based on: the two alternative Polity IV polity2 cutoffs, the V-Dem ROW cut-off, the mean cutoffs for the V-Dem liberal democracy, polyarchy and liberal component indices, and the index variable by Boix et al. (2013). All results are ATET estimates for the PCDID specification with *four* factors. In the final rows of the table, we present ATET estimates if we include between 1 to 6 factors. Statistical significance at the 10%, 5% and 1% level is indicated as *, **, and ***, respectively.

5.2 Drilling Down (i): Mid-Level Indices

Having established that democracy has a positive and significant causal effect on economic growth, we now move to the next step in our analysis. We disaggregate the high-level concept of Liberal Democracy into its mid-level constituent components: electoral democracy (polyarchy) and the liberal component. We run 'horse races' between Electoral Democracy and the Liberal Component to assess their individual contributions to economic growth. Our approach acknowledges that these components function as complements rather than substitutes, meaning their effects on growth are interdependent. To isolate the economic impact of each component, we estimate its effect while controlling for the influence of the other.

For the V-Dem mid-level indices (Table 1, columns [6]-[7]), polyarchy and the liberal component, we can see statistically significant ATETs of around 3% and 5%, respectively. Note that the latter model fails the weak parallel trend test at the 5% level.

Figure 3: Horserace between 'polyarchy' and 'liberal component' effects



Notes: We run a horse race between the estimates of country results for the two mid-level democracy indices: the polyarchy (liberal component) running line estimates linearly control for the value of the liberal component (polyarchy) index in the year of regime change, the standard deviation of the same index over the treatment period, the number of regime switches and sample start year of each country. The bars indicate the country count for each 5-year interval of experience of democracy. Table 1 reports the median number of years of 'treatment': 23 and 26, respectively.

Figure 3 presents results from the horse race: the polyarchy running line regression here further controls for the index value of the liberal component (in the year of regime change) as well as its standard deviation during the time in the polyarchy regime and in analogy for the liberal component running line regression. The grey bars highlight the distribution of country estimates across treatment length.

Both mid-level measures of democracy display positive long-run effects on economic development, though these are more modest, around 18%, for the liberal component, than for polyarchy, around 30% — it would appear that the long-run growth effect we detect in the analysis of liberal democracy above is primarily driven by the polyarchy component. An alternative take on these results is that electoral democracy is *not exclusively* driving economic prosperity.[20] Next, we turn to our lower tier analysis to spell out *which* institutions matter *at which point* in the democratic 'endeavour' of countries.

5.3 Drilling Down (ii): Low-Level Indices of Democracy

We now further break down Electoral Democracy and the Liberal Component to analyze the economic effects of low-level indices. This allows us to directly test how the distinct elements identified in our theoretical framework manifest in practice and contribute to economic growth.

Figure 4 presents the horse races among the constituent components of polyarchy and the liberal component — the associated ATET estimates are presented in Table 2. The running line estimates, say for freedom of association, marked in purple in Panel (a) of Figure 4, control for the means and standard deviations of the other two sub-components (Freedom of Expression and Clean Elections) as well as of the liberal component in the way described in Section 4.3. The grey shaded bars indicate the distribution of country-estimates across the range of 'years of treatment'.[21]

[20] Our findings are largely robust to adopting more lenient or stringent definitions of 'regime change', see Appendix Figure D-1.

[21] When we talk of 'regime change' in the following we refer to the moment when the insti-

Table 2: Lower-level Institutions and Economic Development

	Polyarchy			Liberal Component		
	[1]	[2]	[3]	[4]	[5]	[6]
Freedom of Expression > mean	2.986					
	[2.525]					
Freedom of Association > mean		3.280				
		[2.930]				
Clean Elections > mean			1.926			
			[1.479]			
Rule of Law > mean				2.421*		
				[1.462]		
Judicial Constraints > mean					7.759***	
					[2.187]	
Legislative Constraints > mean						1.053
						[1.771]
Additional Controls:						
Exports/Total Trade	0.066	0.011	0.084	0.007	0.081	0.040
	[0.090]	[0.086]	[0.073]	[0.078]	[0.093]	[0.072]
Population growth	-1.926	-1.984*	-0.745	-0.634	-4.004**	-0.903
	[1.313]	[1.169]	[0.983]	[1.029]	[1.944]	[1.118]
Treatment Sample:						
Countries	90	84	79	80	64	76
Observations	4733	4458	4097	4164	3400	3936
Median Sample size (yrs)	58	58	58	58	58	58
Median Years in Regime	29	29	23	28	26.5	27
Control Sample:						
Countries	25	25	40	35	42	42
Observations	978	1029	1727	1546	1775	1850
Diagnostics						
Alpha (p)	0.52	0.69	0.02	0.65	0.31	0.03
χ^2 Controls (p)	0.20	0.07	0.02	0.30	0.04	0.18
Alternative Specifications:						
1 factor	2.282	-0.059	2.855	5.926***	6.436**	2.768
2 factors	5.907**	4.584	1.682	2.515	6.093**	0.233
3 factors	3.705	3.402	2.033	3.186*	6.949***	1.222
4 factors	2.986	3.28	1.926	2.421*	7.759***	1.053
5 factors	3.924	3.199	0.771	3.059**	6.976***	1.689
6 factors	4.435*	3.355	1.974	3.082**	7.566***	1.980

Notes: The table reports outlier-robust mean estimates for the Chan and Kwok (2022) Principal Component Difference-in-Differences (PCDID) estimator for empirical models of per capita GDP, see Equation (4). The respective democracy index is defined on the basis of the components of polyarchy (electoral democracy) in [1] to [3], and components of the liberal component in [4] to [6]. For all other details see Table 1.

The components of polyarchy, presented in Panel (a) result in varied long-run growth effects: while the trajectories of Freedom of Expression and Freedom of Association are clearly positive and statistically significant, the effect of Clean Elections stays flat at around 5%.[22] The ability to form parties and civil society organisations (Freedom of Association) as well as press freedom and the ability for citizens to discuss political matters freely (Freedom of Expression) appear to take a long time before bearing economic fruits. Clean Elections appear as a significantly positive driver of economic prosperity within ten years of regime change.

The building blocks of the liberal component, presented in Panel (b) of the same figure, suggest very strong positive effects of judicial constraints (covering independent courts and respect for the constitution and court rulings) in the first phase following regime change, up to around 30 years, but in the very long-run this institution no longer contributes to economic prosperity. Legislative constraints on the executive, on the other hand, are initially less important but their effect slowly and steadily increases with years spent in regime.[23] The rule of law (equality before the law and individual liberties), conditional on both executive constraints, appears to have no separate effect on economic prosperity. The more muted long-run effect of the mid-tier liberal component can hence be explained by the reduced economic significance of the rule of law and judicial constraints on the executive, while it is clear that guarantees that government agencies can question, investigate and exercise oversight over the executive are an important factor for long-run prosperity.

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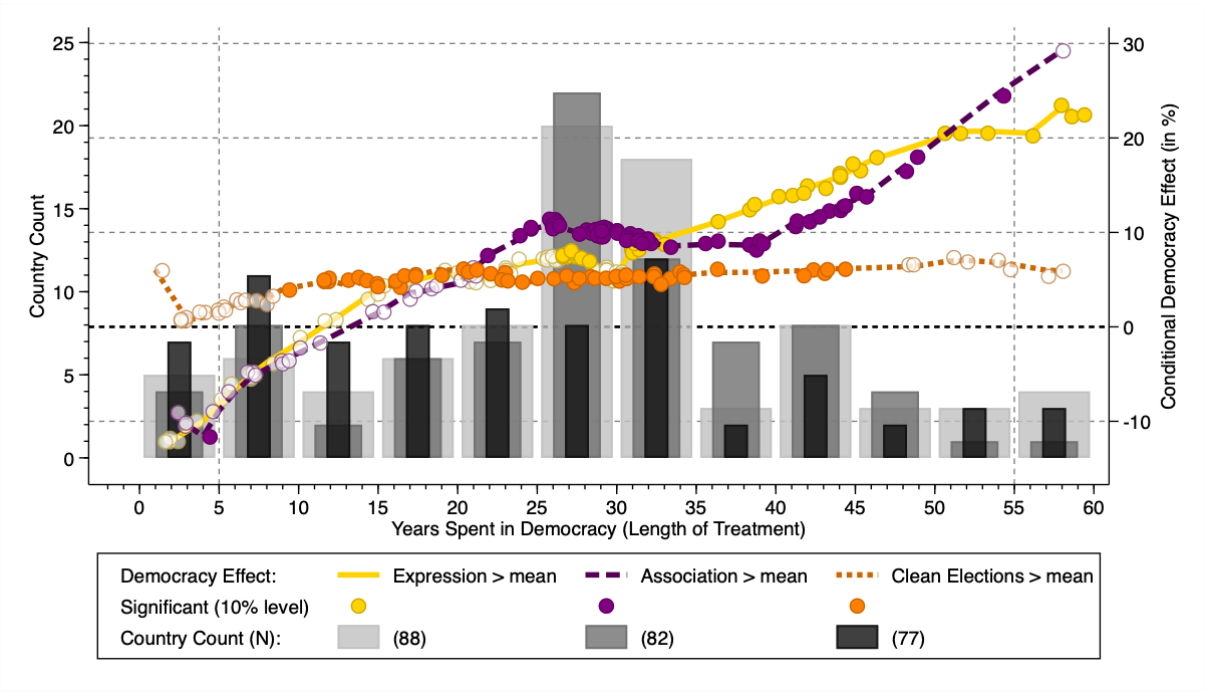
tutional index in question (e.g. freedom of association index) passes the adopted threshold (i.e. the mean index value across all 157 countries over 1959-2018).

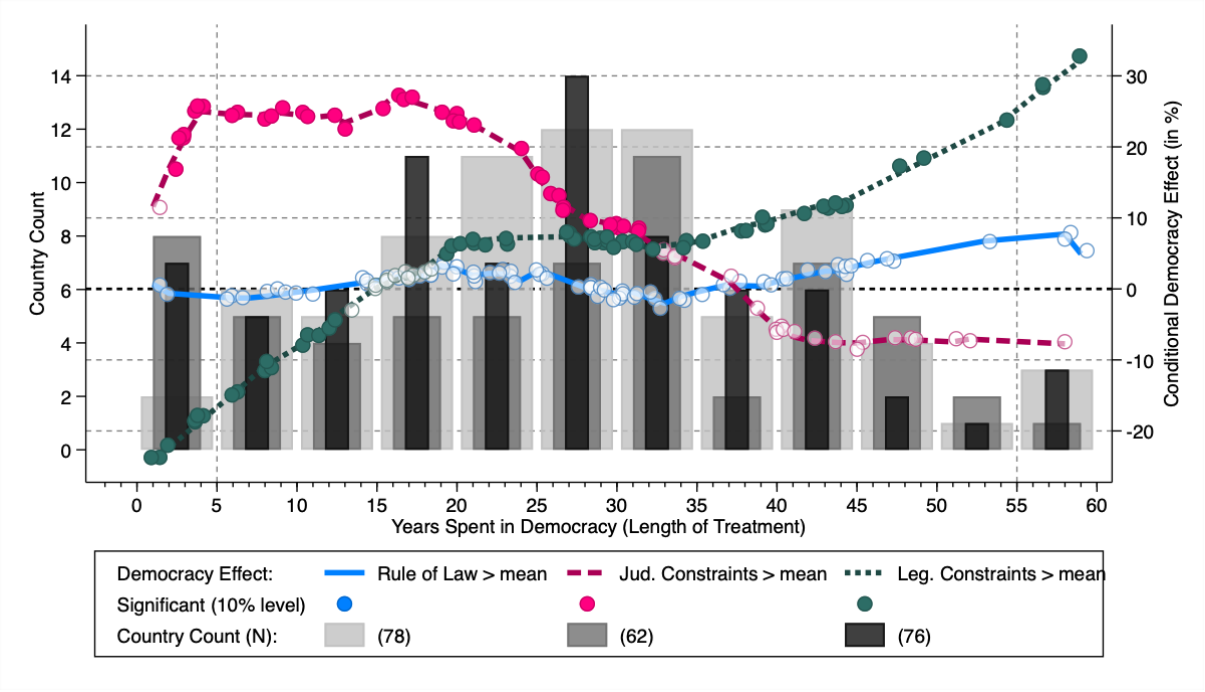
[22] Note that the latter analysis fails the Alpha test ($p < .02$). Alternative specifications in Appendix Figure E-1, panels (a) and (e) yield similar results but pass the Alpha test (see Table B-3).

[23] The sharp negative effect in the initial years seems to be driven by the experiences of Egypt, Libya and Algeria. The specification presented fails the Alpha test but Alternative specifications in Appendix Figure E-1, panels (a) and (b), yield similar results but pass the Alpha test (see Table B-2).

Figure 4: Horseraces between Low-level Indices of Democracy



(a) Components of Electoral Democracy (Polyarchy)



(b) Components of the Liberal Component

Notes: We run horse races between the estimates of country results for the low-level democracy indices: the running line regressions of the growth effect (y-axis) and the years of treatment (x-axis) additionally condition on the value and standard deviation of 'other' mid- and low-level democracy indices as described in the text. Shaded bars indicate the country distributions of treatment years, full (hollow) markers in the running line plots indicate statistical (in)significance at the 10% level. Table 2 reports the median number of years of 'treatment' for each model: 24 for clean elections, 29 for the other two polyarchy components; 27 for judicial constraints, 29 for the other two liberal components.

In Appendix Figure E-1 we confirm the robustness of these results to more lenient or stringent definitions of 'regime change'. Similarly, results are qualitatively unchanged if we only use export/trade as additional control (see Appendix F). In Appendix G we demonstrate that explicitly modelling one institutional building block while conditioning on another does not lead to qualitatively different empirical results.

6 Theoretical Implications and Interpretation

In the previous section, we disaggregated liberal democracy into mid- and low-level components to directly test our theoretical framework. Our findings clarify the relative importance of polyarchy versus the liberal component in driving long-run growth and emphasize the distinct economic significance of individual institutions at different stages of regime change.

Clean elections are the only component of liberal democracy exhibiting a moderate but stable positive effect on economic growth for all years in democracy. As a core component of electoral democracy, Clean Elections are integral to the political power structure outlined in our economic blueprint for growth. Specifically, they enable citizens to hold elites accountable by voting parties out of office, thereby reducing the concentration of political power. A less rigid concentration of power increases the likelihood that 'Northian' institutions will be upheld and strengthened, ultimately enhancing incentives and opportunities for investment.

Initially, strong positive growth effects of judicial constraints on the executive are diminished for those with three decades of 'treatment'. According to our theoretical framework, judicial constraints on the executive are integral to the 'Northian' institutions that foster an investment-friendly environment. These institutions incentivize investment in physical and human capital by credibly signalling that investors will be able to appropriate the returns on their investments. This pattern also aligns with interpretations of their role during the early stages of democracy: Judicial constraints act as a critical safeguard, preventing democratic backsliding and protecting against a reversion to authoritarianism (Boese et al., 2021). By stabilizing the political landscape during this period, judicial constraints not only shield young democracies but also foster the conditions necessary for investment and prosperity. Over time,

as political institutions mature and stabilize, the relative importance of judicial constraints may become less relevant, consistent with the observed diminished effects on growth.

The long-run drivers of growth identified in our analysis are freedom of association, freedom of expression, and legislative constraints on the executive. This finding highlights that the economic benefits of liberal democracy are not attributable to a single component but rather stem from a combination of factors. While our modeling allows for the possibility of a dominant driver, the results clearly demonstrate that sustained, long-term growth requires multiple elements working in tandem. These include citizens' ability to access, share, and act upon information, as well as a political power structure that ensures accountability — where leaders can be replaced through free and fair elections — and a functioning separation of powers, particularly through legislative constraints on the head of state.

The importance of legislative constraints for growth in the long-run may be tied to the specific historical period covered in this study (1959-2018). This time-frame focuses on the Third Wave of Democratization, which began in the mid-1970s and continued through the late 20th century (Huntington, 1991). During this period, democracies thrived in a favorable international environment, leading many to assume that long-established democracies were firmly consolidated and nearly impervious to autocratization. However, with the recent rise in attacks on the separation of powers, even in long-established democracies, future studies that include more data *after* the Third Wave may yield different results.

The finding that the rule of law does not significantly contribute to economic prosperity is surprising, given its theoretical importance in creating a stable and predictable environment for investment and economic activity. However, there are several potential interpretations: First, rule of law, including elements such as property rights, access to justice, and transparent laws, may have already been relatively well-established in many countries within the dataset during the 1959-2018 period. This could reduce the observed variation in its effect on growth, as its baseline presence might already be contributing indirectly to economic stability.[24] Second,

[24]In the full sample the 'rule of law' index has a mean of .62 and a standard deviation of .29 (up to 33% higher and up to 17% lower than the other low-level indices, respectively).

the positive effects of the rule of law might manifest over much longer periods, making them less discernible in the context of this study.

7 Limitations

Given our highly flexible empirical approach there are naturally limitations to our analysis (real and perceived) which need to be mentioned. First, we rely on dichotomising regime change across three tiers of democratic institutions. While this (popular) practice yields easily-interpretable results which are shown to be robust across reasonable alternative cutoffs, we cannot speak to the effect of *marginal* improvements in political institutions. Second, we argue that estimating treatment effects for individual countries and manipulating these using 'smoothing' and conditioning on their data and regime change characteristics can yield time profiles providing more nuanced insights than an ATET estimate across countries of diverse experience. However, we cannot speak to the causal effects on *individual countries*. Furthermore, from the perspective of a country with five years of treatment, we cannot confirm/test whether their outcome after a further twenty years will match that of those countries we analysed with twenty-five years of treatment — we estimate the central tendency over treatment length, but cannot guarantee that this is the trajectory countries will take as their institutions mature. Third, inclusion or omission of additional variables, be they observed or unobserved, will always be a matter of some uncertainty. We have tried to mitigate this caveat by estimating alternative specifications capturing *observables* (i.e. varying additional controls) and *unobservables* (i.e. including one to six common factors) with results robust across reasonable alternatives. Fourth, not all specifications we consider pass the diagnostic tests conducted, yet in the vast majority of cases reasonable alternatives (e.g. marginally more liberal regime cut-off) do so with qualitatively identical results.

8 Concluding Remarks

How does democracy cause economic growth? We trace the positive and significant causal relationship between liberal democracy and long-run economic growth to its constituent institutional components.

A key contribution of this paper is the development of a theoretical framework that traces the economic effects of democracy through its constituent components. Our framework unpacks Liberal Democracy into its core building blocks, allowing us to assess how electoral and liberal components — and their underlying institutions — affect economic growth. We argue that an economic blueprint for growth is shaped by institutions that create incentives and opportunities, ensure broad participation, and balance political power. Through democratic experience, these institutions stabilize, fostering accountability, reducing uncertainty, and promoting long-term investment, ultimately driving sustained economic growth. This theoretical framework in conjunction with the hierarchical V-Dem Data provides a structured way to understand how democracy fosters long-term economic development and helps identify the specific institutional drivers of this relationship.

Since studying individual institutions in isolation would be equivalent to asking whether the steering wheel *on its own* is relevant for the movement of a car, we employ two alternative strategies to condition our results on 'rival' institutions, equivalent to additionally accounting for the engine, wheels, and power transmission in our car analogy: first, we condition on the evolution of the rival institutions *after* treatment effect estimation, and second, we devise an interaction model which captures the treatment effect in the presence of both sets of institutions. The patterns emerging from these alternative approaches are very similar, suggesting that the former approach does not paint a misleading picture of the institutional driving forces studied. We further check our results using alternative definitions for 'regime change' and alternative specifications (regarding factor augmentation, additional control variables).

Our results provide a number of important insights into the democracy-growth nexus and the question 'how democracy causes growth'. First, our focus on an encompassing concept of 'liberal democracy' leads us to conclude that democratic regime change has a *permanent*

growth effect, on the order of half a percentage point per annum. Existing work in this literature found that the democratic dividend is a one-off (levels) effect. Our finding is important because it implies that liberal democracy has an economic dividend which keeps on giving. . . in perpetuity.

Second, we are able to trace this positive effect of democracy on growth through lower tiers of institutions, which shows that electoral democracy and its constituent components are important drivers of the long-run growth effect of liberal democracy. The liberal component and its constituent elements *clearly do matter* for economic prosperity, also in the long-run, but perhaps less substantially so. While we do not explicitly study sequencing of different political and economic institutions, one interpretation of our findings is that those institutions typically associated with Douglass North (rule of law, executive constraints) are of particular relevance for the growth process in the decade(s) immediately after democratic regime change, whereas the institutions political scientists associate with a minimal definition of democracy (polyarchy) *additionally* are also relevant in the very long-term.

In light of recent global developments, our findings act as a stark warning to policymakers about the economic prospects from change in political institutions: the past decade has seen substantial erosion of democratic institutions across the globe (Lührmann and Lindberg, 2019; Boese et al., 2022).[25] The global decline in democratic institutions has significant implications for long-term economic prosperity: if the current trend continues this may well erode the perpetual growth effect of democratisation we find and trace in this paper.

[25]The political institutions we identify as the driving force for growth are also those heavily affected by the ongoing wave of autocratisation (see Appendix H).

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Online Appendix — not for publication

A Data Appendix

Table A-1: V-Dem political institutions: Indices (V-Dem v11)

(I) High-level Index of Democracy		
Liberal Democracy	*v2x_libdem*	"[A]n electoral democracy in combination with constraints on the executive by the judiciary as well as the legislature and transparent and rigorously-enforced laws and individual liberties" (LLT 2017: 1).
(II) Mid-level Indices of Democracy		
(a) Electoral Democracy (Polyarchy)	*v2x_polyarchy*	Electoral participation and competition, clean elections, and inbetween elections freedom of expression and association (LLT 2017: 1).
(b) Liberal Component	*v2x_liberal*	Constitutionally protected civil liberties, strong rule of law, an independent judiciary and effective checks and balances on the executive (LLT 2017: 1).
(III) Low-level Indices of Democracy		
(a) Pertaining to Electoral Democracy/Polyarchy		
(i) Freedom of expression and alternative sources of information	*v2x_freexp_altinf*	The extent to which: "government respect[s] press and media freedom, the freedom of ordinary people to discuss political matters at home and in the public sphere, as well as the freedom of academic and cultural expression" (C: 42).
(ii) Freedom of association	*v2x_frassoc_thick*	The extent to which: "parties, including opposition parties, [are] allowed to form and to participate in elections, and civil society organizations [are] able to form and to operate freely" (C: 43).
(iii) Clean elections	*v2xel_frefair*	The extent to which: "elections [are] free and fair" (C: 44).
(iv)* Elected officials	*v2x_elecoff*	The extent to which: "the chief executive and legislature [are] appointed through popular elections" (C: 43).
(v)* Share of population with suffrage	*v2x_suffr*	"What share of adult citizens as defined by statute has the legal right to vote in national elections?" (C: 43)
(b) Pertaining to the Liberal Component		
(i) Equality before the law and individual liberties	*v2xcl_rol*	The extent to which: "laws transparent and rigorously enforced and public administration impartial, . . . citizens enjoy access to justice, secure property rights, freedom from forced labor, freedom of movement, physical integrity rights, and freedom of religion" (C: 45).
(ii) Judicial constraints on the executive	*v2x_jucon*	The extent to which: "the executive respect the constitution and comply with court rulings, and. . . the judiciary [is] able to act in an independent fashion" (C: 46).
(iii) Legislative constraints on the executive	*v2xlg_legcon*	The extent to which: "the legislature and government agencies e.g., comptroller general, general prosecutor, or ombudsman [are] capable of questioning, investigating, and exercising oversight over the executive" (C: 46).

Notes: * Not included in the analysis – see maintext for details. The labels in the first column are the full names given to respective concepts in V-Dem (we adopt version 11, C21), the second column reports the exact variable name, the third column gives a brief definition; citations: LLT – Lührmann et al. (2018); C – Coppedge et al. (2019); C21 – Coppedge et al. (2021). Return to Section 3.1 (Concepts and Data Sources) in the maintext.

Table A-2: Sample Makeup

	ISO	Country	Start	End	Obs	Miss	GDP per capita			Liberal Democracy			Regime Change					
							Base	End	Δpa	Base	End	Δpa	+LD	-LD	+Pol	-Pol	+Lib	-Lib
1	AFG	Afghanistan	1959	2018	51	9	1,307	1,935	0.7%	0.07	0.19	1.7%	C	C	C	C	C	C
2	AGO	Angola	1959	2018	53	7	1,953	7,771	2.3%	0.04	0.21	2.8%	C	C	C	C	C	C
3	ALB	Albania	1982	2018	37	0	3,783	11,104	2.9%	0.06	0.42	5.4%	1	0	1	0	1	0
4	ARE	UAE	1977	2018	40	2	41,915	76,398	1.4%	0.05	0.09	1.6%	C	C	C	C	C	C
5	ARG	Argentina	1959	2018	60	0	8,354	18,556	1.3%	0.33	0.63	1.1%	2	1	3	3	2	2
6	ARM	Armenia	1993	2018	26	0	4,130	11,454	3.9%	0.34	0.34	0.0%	C	C	1	1	1	0
7	AUS	Australia	1959	2018	60	0	13,753	49,831	2.1%	0.77	0.82	0.1%	A	A	A	A	A	A
8	AUT	Austria	1961	2018	58	0	10,882	42,988	2.4%	0.69	0.76	0.2%	A	A	A	A	A	A
9	AZE	Azerbaijan	1993	2018	26	0	4,315	16,628	5.2%	0.18	0.06	-4.2%	C	C	C	C	C	C
10	BDI	Burundi	1970	2018	49	0	893	651	-0.6%	0.07	0.05	-0.9%	C	C	C	C	C	C
11	BEL	Belgium	1998	2018	21	0	31,481	39,756	1.1%	0.81	0.82	0.1%	A	A	A	A	A	A
12	BEN	Benin	1961	2018	58	0	1,482	2,220	0.7%	0.23	0.49	1.3%	1	0	1	0	1	0
13	BFA	Burkina Faso	1962	2018	55	2	1,060	1,590	0.7%	0.23	0.52	1.4%	2	1	2	1	1	0
14	BGD	Bangladesh	1974	2018	45	0	872	4,099	3.4%	0.20	0.11	-1.3%	C	C	1	1	C	C
15	BGR	Bulgaria	1982	2018	37	0	10,154	18,444	1.6%	0.06	0.52	5.9%	1	0	1	0	1	0
16	BHR	Bahrain	2002	2018	17	0	19,488	39,499	4.2%	0.07	0.04	-3.0%	C	C	C	C	C	C
17	BIH	Bosnia & Herz.	1994	2018	25	0	3,017	10,461	5.0%	0.06	0.35	7.0%	1	1	1	0	1	0
18	BLR	Belarus	1993	2018	26	0	9,077	18,727	2.8%	0.45	0.11	-5.4%	0	1	0	1	0	1
19	BOL	Bolivia	1959	2018	60	0	2,511	6,696	1.6%	0.12	0.36	1.9%	1	0	1	0	1	1
20	BRA	Brazil	1959	2018	60	0	3,201	14,034	2.5%	0.27	0.60	1.3%	1	0	1	0	1	1
21	BRB	Barbados	1959	2018	56	4	5,053	11,995	1.4%	0.37	0.66	1.0%	A	A	A	A	A	A
22	BWA	Botswana	2001	2018	18	0	8,083	15,842	3.7%	0.61	0.58	-0.3%	A	A	A	A	A	A
23	CAF	Central Afr. Rep.	1961	2018	54	4	1,597	623	-1.6%	0.12	0.25	1.3%	C	C	C	C	C	C
24	CAN	Canada	1959	2018	60	0	13,829	44,869	2.0%	0.67	0.77	0.2%	A	A	A	A	A	A
25	CHE	Switzerland	1959	2018	60	0	15,470	61,373	2.3%	0.56	0.86	0.7%	A	A	A	A	A	A
26	CHL	Chile	1959	2018	60	0	6,409	22,105	2.1%	0.39	0.80	1.2%	1	1	1	1	1	1
27	CHN	China	1979	2018	40	0	1,859	13,102	4.9%	0.05	0.05	0.2%	C	C	C	C	C	C
28	CIV	Cote d'Ivoire	1961	2018	58	0	2,114	3,714	1.0%	0.15	0.37	1.6%	1	0	1	0	2	1
29	CMR	Cameroon	1963	2018	56	0	1,366	2,888	1.3%	0.07	0.13	1.0%	C	C	C	C	C	C
30	COG	Congo, Rep.	1961	2018	58	0	2,020	5,715	1.8%	0.19	0.11	-1.0%	C	C	1	1	1	1
31	COL	Colombia	1959	2018	60	0	3,942	13,545	2.1%	0.24	0.51	1.2%	1	0	2	1	A	A
32	COM	Comoros	1970	2018	46	3	961	1,724	1.2%	0.06	0.21	2.4%	1	1	2	2	1	1
33	CPV	Cape Verde	1971	2018	48	0	1,435	6,831	3.3%	0.03	0.68	6.3%	1	0	1	0	2	1
34	CRI	Costa Rica	1959	2018	60	0	4,141	14,686	2.1%	0.65	0.84	0.4%	A	A	A	A	A	A
35	CUB	Cuba	1982	2018	37	0	4,487	8,326	1.7%	0.05	0.09	1.6%	C	C	C	C	C	C
36	CYP	Cyprus	1959	2018	60	0	3,814	27,184	3.3%	0.09	0.76	3.5%	1	0	1	0	1	0
37	CZE	Czech Republic	1994	2018	25	0	13,518	30,749	3.3%	0.83	0.71	-0.6%	A	A	A	A	A	A
38	DEU	Germany	1959	2018	60	0	11,440	46,178	2.3%	0.80	0.83	0.1%	A	A	A	A	A	A
39	DJI	Djibouti	1982	2018	37	0	3,043	3,296	0.2%	0.08	0.12	1.1%	C	C	C	C	C	C
40	DNK	Denmark	1959	2018	60	0	13,767	46,312	2.0%	0.87	0.89	0.0%	A	A	A	A	A	A
41	DOM	Dominican Rep.	1960	2018	48	11	2,075	15,912	3.5%	0.03	0.28	3.7%	1	1	2	1	C	C
42	DZA	Algeria	1959	2018	55	5	3,178	14,228	2.5%	0.04	0.16	2.4%	C	C	C	C	C	C
43	ECU	Ecuador	1961	2018	58	0	3,633	10,639	1.9%	0.19	0.48	1.6%	2	1	1	0	3	2
44	EGY	Egypt	1959	2018	60	0	1,545	11,957	3.4%	0.11	0.12	0.1%	C	C	C	C	C	C
45	ESP	Spain	1959	2018	60	0	5,085	31,497	3.0%	0.07	0.79	4.1%	1	0	1	0	1	0
46	EST	Estonia	1993	2018	26	0	12,207	27,409	3.1%	0.82	0.85	0.2%	A	A	A	A	A	A
47	ETH	Ethiopia	1959	2018	60	0	681	1,838	1.7%	0.03	0.15	2.4%	C	C	C	C	C	C
48	FIN	Finland	1959	2018	60	0	9,172	38,897	2.4%	0.78	0.84	0.1%	A	A	A	A	A	A
49	FRA	France	1959	2018	60	0	11,124	38,516	2.1%	0.65	0.80	0.3%	A	A	A	A	A	A
50	GAB	Gabon	1961	2018	58	0	4,415	17,614	2.4%	0.12	0.22	1.1%	C	C	C	C	C	C
51	GBR	United Kingdom	1959	2018	60	0	13,134	38,058	1.8%	0.71	0.81	0.2%	A	A	A	A	A	A
52	GEO	Georgia	1993	2018	26	0	3,793	11,985	4.4%	0.16	0.55	4.7%	2	1	1	0	1	0
53	GHA	Ghana	1959	2018	60	0	2,106	4,267	1.2%	0.30	0.62	1.2%	3	2	2	1	3	3
54	GIN	Guinea	1982	2018	37	0	858	1,606	1.7%	0.04	0.20	4.4%	C	C	C	C	C	C
55	GMB	The Gambia	1964	2018	55	0	1,274	1,882	0.7%	0.23	0.44	1.2%	2	1	2	1	2	1
56	GNB	Guinea-Bissau	1971	2018	48	0	1,333	1,501	0.2%	0.01	0.34	7.1%	C	C	3	2	2	1
57	GNQ	Equat. Guinea	1982	2018	37	0	2,533	28,529	6.5%	0.03	0.06	1.6%	C	C	C	C	C	C
58	GRC	Greece	1959	2018	60	0	4,846	23,451	2.6%	0.32	0.77	1.5%	1	0	1	0	1	1
59	GTM	Guatemala	1959	2018	60	0	3,524	7,402	1.2%	0.08	0.43	2.8%	1	0	1	0	1	0
60	HKG	Hong Kong	1959	2018	60	0	4,957	50,839	3.9%	0.18	0.28	0.8%	C	C	C	C	C	C

(Continued overleaf)

Table A-2: Sample Makeup (continued)

	ISO	Country	Start	End	Obs	Miss	GDP per capita			Liberal Democracy			Regime Change					
							Base	End	Δpa	Base	End	Δpa	+LD	-LD	+Pol	-Pol	+Lib	-Lib
61	HND	Honduras	1959	2018	60	0	2,090	5,042	1.5%	0.09	0.24	1.6%	C	C	1	1	C	C
62	HRV	Croatia	1994	2018	25	0	9,353	22,012	3.4%	0.22	0.62	4.1%	1	0	1	0	1	0
63	HTI	Haiti	1960	2018	59	0	1,809	1,729	-0.1%	0.03	0.26	3.6%	C	C	1	1	2	2
64	HUN	Hungary	1961	2018	51	7	6,083	25,623	2.5%	0.08	0.39	2.7%	1	0	1	0	1	0
65	IDN	Indonesia	1961	2018	58	0	1,690	11,852	3.4%	0.10	0.46	2.6%	1	0	1	0	1	0
66	IND	India	1959	2018	60	0	1,143	6,806	3.0%	0.53	0.41	-0.4%	1	1	1	1	A	A
67	IRL	Ireland	1959	2018	60	0	6,437	64,684	3.8%	0.68	0.81	0.3%	A	A	A	A	A	A
68	IRN	Iran	1965	2018	41	13	4,388	17,011	2.5%	0.08	0.15	1.1%	C	C	C	C	C	C
69	IRQ	Iraq	1959	2018	50	10	4,022	12,836	1.9%	0.08	0.25	1.9%	C	C	C	C	1	1
70	ISL	Iceland	1959	2018	60	0	10,702	43,439	2.3%	0.72	0.80	0.2%	A	A	A	A	A	A
71	ISR	Israel	1959	2018	60	0	7,175	32,955	2.5%	0.52	0.61	0.3%	A	A	A	A	A	A
72	ITA	Italy	1959	2018	60	0	9,011	34,364	2.2%	0.61	0.79	0.4%	A	A	A	A	A	A
73	JAM	Jamaica	1959	2018	60	0	4,050	7,273	1.0%	0.37	0.70	1.1%	A	A	A	A	A	A
74	JOR	Jordan	1959	2018	60	0	3,645	11,506	1.9%	0.16	0.25	0.8%	C	C	C	C	6	5
75	JPN	Japan	1959	2018	60	0	5,665	38,674	3.2%	0.75	0.74	0.0%	A	A	A	A	A	A
76	KAZ	Kazakhstan	1993	2018	26	0	9,174	25,308	3.9%	0.18	0.12	-1.6%	C	C	C	C	C	C
77	KEN	Kenya	1959	2018	60	0	1,148	3,377	1.8%	0.07	0.35	2.8%	1	1	2	2	1	0
78	KGZ	Kyrgyz Rep.	1993	2018	26	0	3,765	5,177	1.2%	0.21	0.34	1.9%	C	C	3	2	1	0
79	KHM	Cambodia	1959	2018	45	15	1,036	3,629	2.1%	0.15	0.08	-1.2%	C	C	C	C	C	C
80	KOR	Korea, Rep.	1959	2018	60	0	1,556	37,928	5.3%	0.15	0.80	2.8%	1	0	1	0	1	0
81	KWT	Kuwait	1974	2018	45	0	34,962	65,521	1.4%	0.28	0.29	0.1%	C	C	C	C	2	2
82	LAO	Lao PDR	1959	2018	49	11	765	6,451	3.6%	0.15	0.10	-0.8%	C	C	C	C	C	C
83	LBN	Lebanon	1959	2018	50	10	5,818	12,559	1.3%	0.21	0.31	0.6%	C	C	1	0	1	0
84	LBR	Liberia	1967	2018	52	0	4,065	818	-3.1%	0.11	0.44	2.8%	1	0	1	0	2	1
85	LBY	Libya	1959	2018	60	0	1,063	15,013	4.4%	0.12	0.16	0.4%	C	C	1	1	C	C
86	LKA	Sri Lanka	1959	2018	60	0	2,048	11,663	2.9%	0.49	0.48	-0.1%	1	1	2	2	1	1
87	LSO	Lesotho	2001	2018	18	0	1,997	2,731	1.7%	0.27	0.45	2.9%	1	0	1	0	A	A
88	LTU	Lithuania	1993	2018	26	0	8,621	27,371	4.4%	0.76	0.76	0.0%	A	A	A	A	A	A
89	LUX	Luxembourg	1998	2018	21	0	44,143	57,428	1.3%	0.78	0.78	0.0%	A	A	A	A	A	A
90	LVA	Latvia	1993	2018	26	0	8,439	24,313	4.1%	0.63	0.75	0.7%	A	A	A	A	A	A
91	MAR	Morocco	1959	2018	60	0	2,165	8,451	2.3%	0.07	0.26	2.1%	C	C	C	C	1	0
92	MDA	Moldova	1993	2018	26	0	5,384	6,747	0.9%	0.39	0.40	0.1%	A	A	A	A	A	A
93	MDG	Madagascar	1959	2018	60	0	1,804	1,428	-0.4%	0.09	0.28	1.9%	1	1	3	2	1	1
94	MEX	Mexico	1959	2018	60	0	4,497	16,494	2.2%	0.11	0.45	2.4%	1	0	1	0	1	0
95	MLI	Mali	1964	2018	55	0	888	1,667	1.1%	0.19	0.32	0.9%	2	2	2	1	2	1
96	MLT	Malta	1959	2018	60	0	2,278	32,029	4.4%	0.19	0.57	1.8%	1	0	1	0	1	0
97	MMR	Myanmar	1959	2018	60	0	885	5,838	3.1%	0.28	0.25	-0.1%	C	C	C	C	0	1
98	MNE	Montenegro	2007	2018	12	0	12,027	19,504	4.0%	0.40	0.35	-1.0%	0	1	0	1	A	A
99	MNG	Mongolia	1982	2018	37	0	1,814	13,383	5.4%	0.06	0.50	5.9%	1	0	1	0	1	0
100	MOZ	Mozambique	1959	2018	40	20	2,109	1,133	-1.0%	0.02	0.28	4.2%	C	C	1	2	A	A
101	MRT	Mauritania	1963	2018	47	9	944	3,458	2.3%	0.12	0.16	0.4%	C	C	1	1	C	C
102	MUS	Mauritius	1959	2018	58	2	4,251	20,139	2.6%	0.33	0.73	1.3%	1	1	1	1	A	A
103	MWI	Malawi	1967	2018	52	0	725	1,117	0.8%	0.09	0.44	3.1%	1	0	2	1	1	0
104	MYS	Malaysia	1968	2018	51	0	3,096	24,842	4.1%	0.20	0.26	0.5%	C	C	C	C	1	0
105	NAM	Namibia	2001	2018	18	0	5,888	9,043	2.4%	0.53	0.57	0.4%	A	A	A	A	A	A
106	NER	Niger	1961	2018	58	0	1,239	965	-0.4%	0.13	0.41	1.9%	3	2	3	2	3	2
107	NGA	Nigeria	1959	2018	58	2	1,288	5,238	2.3%	0.13	0.40	1.8%	1	0	2	1	1	1
108	NIC	Nicaragua	1959	2018	60	0	3,204	4,952	0.7%	0.03	0.06	1.0%	1	1	1	1	1	1
109	NLD	Netherlands	1959	2018	60	0	12,333	47,474	2.2%	0.73	0.83	0.2%	A	A	A	A	A	A
110	NOR	Norway	1959	2018	60	0	10,957	84,580	3.4%	0.77	0.86	0.2%	A	A	A	A	A	A
111	NPL	Nepal	1982	2018	37	0	1,135	2,727	2.4%	0.10	0.51	4.3%	2	1	2	1	3	2
112	NZL	New Zealand	1959	2018	60	0	15,350	35,336	1.4%	0.73	0.84	0.2%	A	A	A	A	A	A
113	OMN	Oman	1971	2018	48	0	5,923	36,478	3.8%	0.05	0.14	2.2%	C	C	C	C	C	C
114	PAK	Pakistan	1959	2018	60	0	1,009	5,510	2.8%	0.09	0.26	1.8%	C	C	1	1	C	C
115	PAN	Panama	1959	2018	60	0	3,124	22,637	3.3%	0.21	0.56	1.6%	1	0	1	0	1	0
116	PER	Peru	1959	2018	60	0	4,275	12,310	1.8%	0.27	0.68	1.6%	3	2	2	1	3	3
117	PHL	Philippines	1959	2018	60	0	2,393	8,139	2.0%	0.28	0.31	0.2%	1	1	1	0	1	1
118	POL	Poland	1961	2018	51	7	5,461	27,455	2.8%	0.14	0.55	2.4%	1	0	1	0	1	0
119	PRK	DPR Korea	1991	2018	28	0	2,316	1,596	-1.3%	0.02	0.01	-0.2%	C	C	C	C	C	C
120	PRT	Portugal	1959	2018	60	0	4,454	27,036	3.0%	0.08	0.84	4.0%	1	0	1	0	1	0

(Continued overleaf)

Table A-2: Sample Makeup (continued)

	ISO	Country	Start	End	Obs	Miss	GDP per capita			Liberal Democracy			Regime Change					
							Base	End	Δpa	Base	End	Δpa	+LD	-LD	+Pol	-Pol	+Lib	-Lib
121	PRY	Paraguay	1959	2018	60	0	2,385	9,339	2.3%	0.03	0.42	4.4%	1	0	1	0	1	0
122	QAT	Qatar	1973	2018	41	5	68,407	153,764	1.8%	0.08	0.10	0.6%	C	C	C	C	C	C
123	RUS	Russian Fed.	1982	2018	37	0	12,267	24,669	1.9%	0.03	0.11	3.9%	C	C	1	1	1	1
124	RWA	Rwanda	1965	2018	54	0	1,023	1,929	1.2%	0.16	0.11	-0.6%	C	C	C	C	C	C
125	SAU	Saudi Arabia	1965	2018	54	0	8,717	50,305	3.2%	0.04	0.05	0.1%	C	C	C	C	C	C
126	SDN	Sudan	1959	2018	60	0	1,647	3,380	1.2%	0.05	0.09	0.9%	C	C	C	C	C	C
127	SEN	Senegal	1961	2018	58	0	2,351	2,617	0.2%	0.28	0.56	1.2%	1	0	1	0	A	A
128	SGP	Singapore	1963	2018	51	5	4,049	68,402	5.0%	0.27	0.31	0.3%	C	C	C	C	C	C
129	SLE	Sierra Leone	1959	2018	56	4	1,157	1,684	0.6%	0.11	0.39	2.1%	2	1	1	0	2	1
130	SLV	El Salvador	1959	2018	60	0	2,788	8,598	1.9%	0.07	0.45	3.2%	1	0	1	0	1	0
131	STP	Sao Tome & Pr.	1970	2018	42	7	2,243	3,730	1.0%	0.09	0.55	3.7%	1	0	1	0	1	0
132	SVK	Slovak Republic	1995	2018	24	0	11,874	27,076	3.4%	0.55	0.70	1.1%	A	A	A	A	A	A
133	SVN	Slovenia	1994	2018	25	0	16,665	29,245	2.2%	0.77	0.77	0.0%	A	A	A	A	A	A
134	SWE	Sweden	1959	2018	60	0	13,211	45,542	2.1%	0.72	0.88	0.3%	A	A	A	A	A	A
135	SWZ	Eswatini	2001	2018	18	0	4,977	8,068	2.7%	0.10	0.13	1.2%	C	C	C	C	C	C
136	SYC	Seychelles	1971	2018	48	0	3,987	29,531	4.2%	0.23	0.46	1.5%	1	0	1	0	2	1
137	SYR	Syria	1959	2018	60	0	4,881	3,349	-0.6%	0.07	0.03	-1.3%	C	C	C	C	C	C
138	TCD	Chad	1961	2018	52	6	971	2,046	1.3%	0.12	0.08	-0.6%	C	C	C	C	C	C
139	TGO	Togo	1960	2018	59	0	1,058	1,451	0.5%	0.12	0.21	1.0%	C	C	2	1	C	C
140	THA	Thailand	1959	2018	60	0	1,581	16,649	3.9%	0.09	0.11	0.4%	2	2	2	2	3	3
141	TJK	Tajikistan	1993	2018	26	0	2,482	4,440	2.2%	0.06	0.05	-0.5%	C	C	C	C	C	C
142	TKM	Turkmenistan	1993	2018	26	0	4,604	26,318	6.7%	0.03	0.04	0.4%	C	C	C	C	C	C
143	TTO	Trinidad & Tob.	1959	2018	60	0	9,154	28,549	1.9%	0.37	0.64	0.9%	A	A	A	A	A	A
144	TUN	Tunisia	1959	2018	60	0	1,940	11,354	2.9%	0.12	0.65	2.9%	1	0	1	0	1	0
145	TUR	Turkey	1959	2018	60	0	3,030	19,270	3.1%	0.22	0.11	-1.2%	3	3	2	2	3	3
146	TZA	Tanzania	1959	2018	60	0	724	2,875	2.3%	0.12	0.33	1.8%	1	1	1	1	1	0
147	UGA	Uganda	1959	2018	60	0	1,116	2,045	1.0%	0.14	0.23	0.9%	C	C	C	C	C	C
148	UKR	Ukraine	1993	2018	26	0	7,090	9,813	1.3%	0.38	0.25	-1.6%	1	2	1	2	1	2
149	URY	Uruguay	1959	2018	60	0	7,450	20,186	1.7%	0.69	0.82	0.3%	1	1	1	1	1	1
150	USA	United States	1959	2018	60	0	17,900	55,335	1.9%	0.54	0.75	0.6%	A	A	A	A	A	A
151	UZB	Uzbekistan	1993	2018	26	0	5,193	11,220	3.0%	0.05	0.07	1.1%	C	C	C	C	C	C
152	VEN	Venezuela	1959	2018	58	2	12,078	10,710	-0.2%	0.47	0.08	-3.0%	0	1	0	1	0	1
153	VNM	Vietnam	1959	2018	52	8	1,262	6,814	2.8%	0.09	0.15	0.9%	C	C	C	C	C	C
154	YEM	Yemen	1991	2018	28	0	3,662	2,285	-1.7%	0.14	0.04	-4.6%	C	C	C	C	C	C
155	ZAF	South Africa	1999	2018	20	0	7,234	12,166	2.6%	0.60	0.63	0.2%	A	A	A	A	A	A
156	ZMB	Zambia	1965	2018	54	0	1,828	3,534	1.2%	0.21	0.26	0.4%	1	1	1	1	1	0
157	ZWE	Zimbabwe	1965	2018	39	15	1,568	1,611	0.1%	0.132	0.218	0.9%	C	C	C	C	2	3

Notes: We provide details on the 157 countries in the full sample of analysis, including Start and End Year of the country time series, the number of observations (Obs) and hence the number of missing observations (Miss). Real GDP pc is in US$ for the first and final year of the country sample, dto for the Liberal Democracy Index; Δpa refers to the average annual percentage change (in GDPpc growth or in the LibDem Index) over the country-specific sample period. The final set of columns indicate regime change as defined by the mean cutoff of the Liberal Democracy Index (LD), the Polyarchy Index (Pol) and the Liberal Component Index (Lib). +LD counts the occasions when a country overcame the threshold/cutoff, -LD counts the reversals, similarly for Pol and Lib. When countries had no regime change or reversal, they either always stayed below the threshold, in which case they are in the control group sample (C), or they always stayed above the threshold (A), in which case they are discarded. We report countries even if they were discarded in all of our analysis since their respective index scores informed the 'full sample mean' we employ to determine the primary cut-off for regime change across all measures of democracy and political institutions. As robustness check we use cutoffs from $1/4$ sd below the mean to $1/4$ sd above the mean — the regime change counts and control group makeup for these cutoffs are not presented here. Return to Section 3.2 (Descriptives) in the maintext.

Table A-3: Democracy 'Thresholds' and Alternatives

	SD	Mean –1/4 SD	Mean –1/8 SD	Mean cut-off	Mean +1/8 SD	Mean +1/4 SD
Tier 1 *High-level Democracy Index*						
Liberal Democracy	0.282	0.284	0.319	0.354	0.390	0.425
Tier 2 *Mid-level Democracy Indices*						
Polyarchy	0.289	0.379	0.415	0.451	0.488	0.524
Liberal Component	0.289	0.482	0.518	0.555	0.591	0.627
Tier 3 *Low-level Democracy Indices: Elements of Polyarchy*						
F'm of Expression	0.329	0.497	0.538	0.579	0.620	0.661
F'm of Association	0.332	0.475	0.516	0.557	0.599	0.640
Clean Elections	0.354	0.379	0.423	0.467	0.512	0.556
Tier 3 *Low-level Democracy Indices: Elements of the Liberal Component*						
Rule of Law	0.292	0.548	0.584	0.621	0.657	0.694
Judicial Constr	0.311	0.486	0.525	0.564	0.603	0.641
Legislative Constr	0.326	0.449	0.490	0.530	0.571	0.612

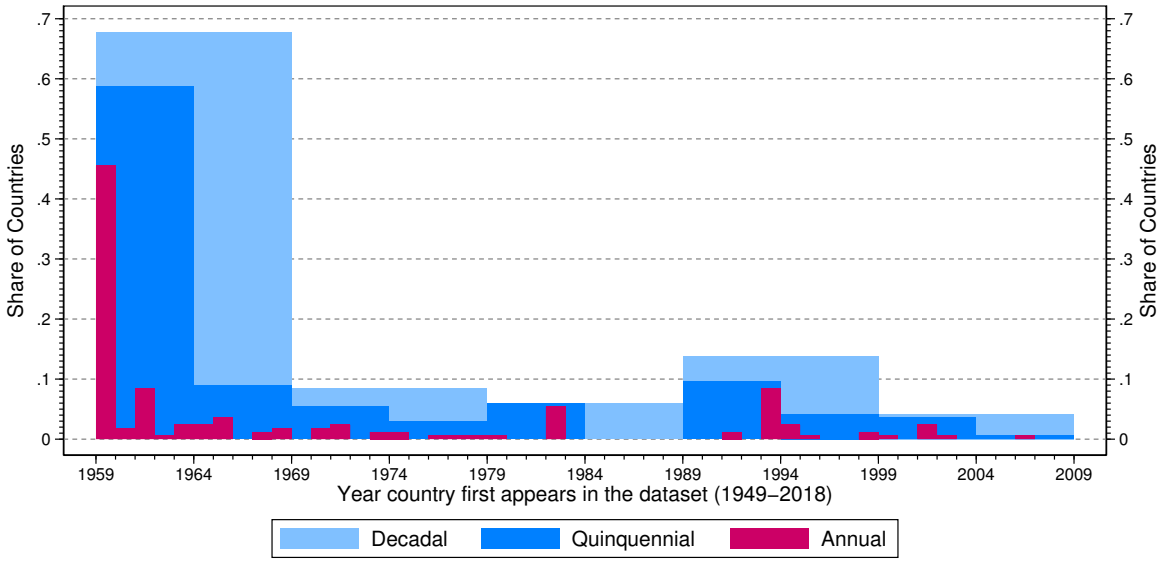
Notes: The table presents the definitions of our binary democracy indices used in the PCDID regressions. SD and Mean are the sample standard deviation and mean of the respective democracy index, where 'sample' includes all countries ($N = 157$, $n = 7,643$ for 1959-2018). The main analysis is conducted using the 'Mean cut-off', robustness checks use cut-offs ranging from $1/4$ of a standard deviation below to $1/4$ of a standard deviation above the sample mean. Return to Section 3.2 (Descriptives) in the maintext.

Table A-4: Regime Change Dynamics

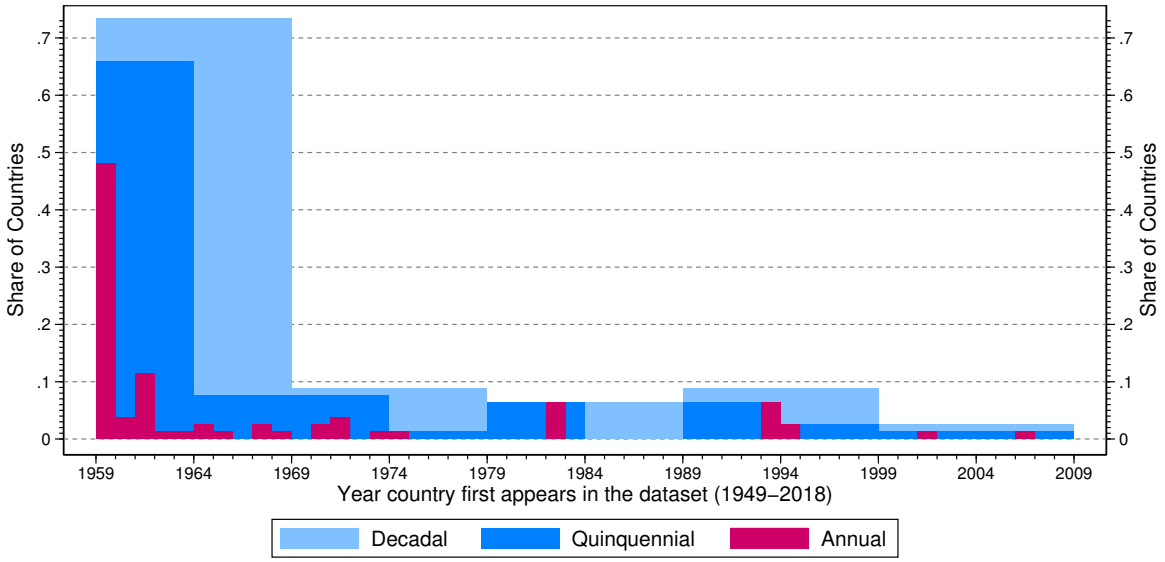
Indicator	Changes	Count	Share
Liberal Democracy	1	47	78%
(60 countries)	2	9	15%
	3	4	7%
Polyarchy	1	53	72%
(74 countries)	2	16	22%
	3	5	7%
Liberal Component	1	48	71%
(68 countries)	2	12	18%
	3	7	10%
	6	1	1%

Notes: The table presents frequency counts (and shares) of regime changes for the high- and mid-level democracy indices (adopting the mean cut-off). Return to Section 3.2 (Descriptives) in the maintext.

Figure A-1: Unbalancedness of the Panel



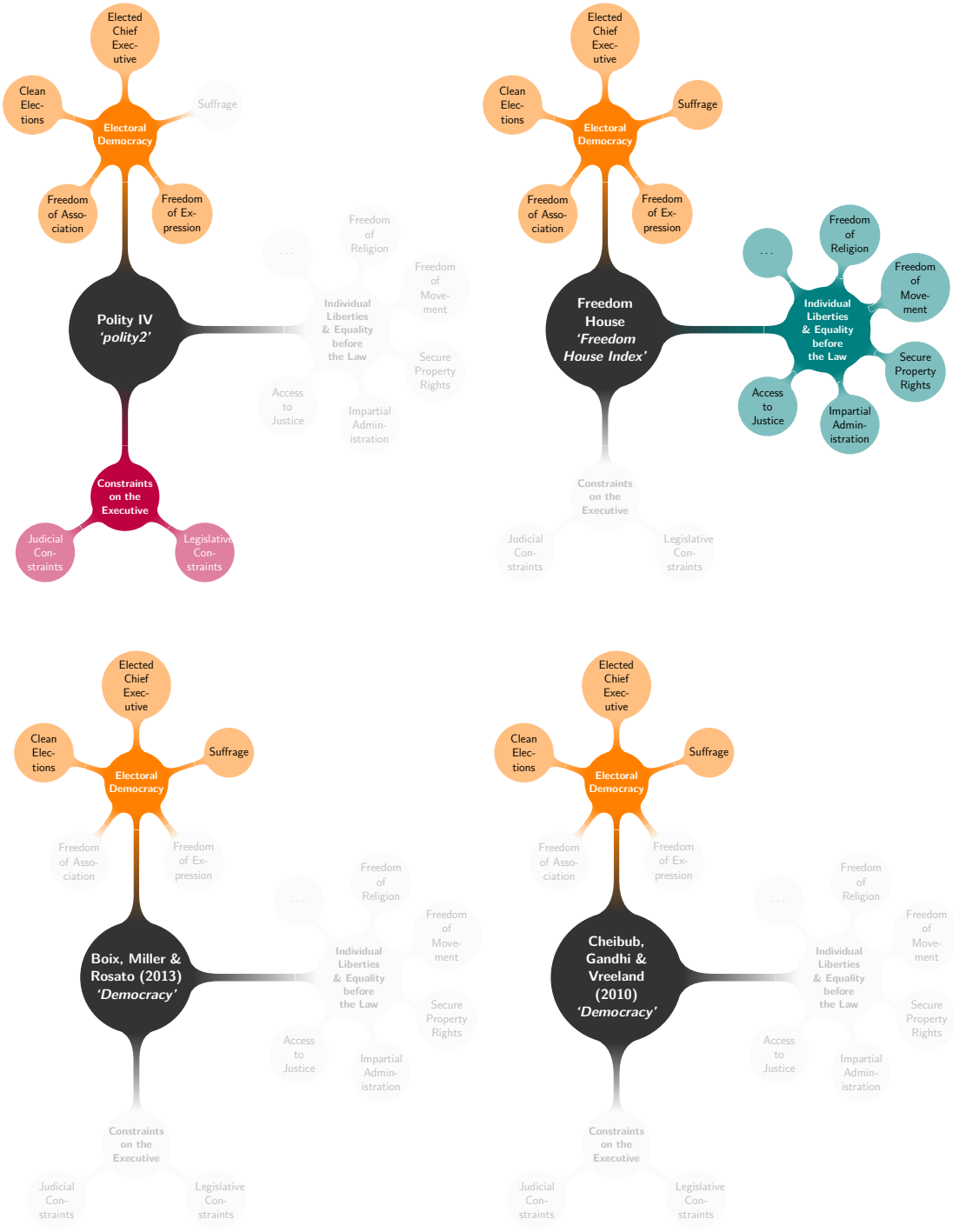
(a) Country Start Year: All Countries (N=157)



(b) Country Start Year: Polyarchy PCDID Regressions (N=80)

Notes: These histograms present the frequency share of sample countries which enter the data in the year, 5-year or 10-year period, as indicated. Panel (a) uses the full sample for all 157 countries, panel (b) the treated sample of countries which experienced variation in the electoral democracy dummy defined by the exceeding the mean threshold. Return to Section 3.2 (Descriptives) in the maintext.

Figure A-2: Alternative Empirical Measures of Democracy



Notes: We compare four popular measures for democracy with the V-Dem conceptual framework for liberal democracy (to aid presentation we ignore here that Executive Constraints and Civil Rights are combined under the V-Dem 'liberal component'). Faint grey aspects/strands are not covered by the democracy measure in question. Note that the Freedom House FHI *does* include aspects of executive constraints but since these are given much less significance than in the Polity IV or V-Dem we decided to shade them in grey. Our visualisations merely illustrate the elements covered by each measure for democracy, not the substantial variation in the aggregation procedure (see Boese, 2019, for detailed discussion). Return to Section 3.2 (Descriptives) in the maintext.

B Alternative cutoffs (all levels) — ATETs

Table B-1: ATET and Diagnostics: Alternative Cutoffs (High/Mid-Level)

	[1] -1/4 sd	[2] -1/8 sd	[3] mean	[4] +1/8 sd	[5] +1/4 sd
Panel (A) Liberal Democracy					
LibDem	4.115**	3.439**	3.810***	2.513*	2.455
(ATET)	[1.681]	[1.397]	[1.363]	[1.417]	[1.681]
Treated Countries	77	69	63	62	60
Observations	4001	3572	3281	3215	3143
Control Countries	43	51	59	64	66
Observations	1922	2351	2712	2980	3052
Alpha test (p)	0.02	0.30	0.12	0.04	0.04
χ^2 Controls (p)	0.07	0.04	0.47	0.07	0.02
Panel (B) Polyarchy					
Polyarchy	0.750	2.980**	2.820**	4.084***	3.621**
(ATET)	[1.523]	[1.480]	[1.420]	[1.562]	[1.469]
Treated Countries	85	80	77	76	69
Observations	4442	4142	3956	3908	3590
Control Countries	33	41	45	50	57
Observations	1428	1839	2037	2287	2605
Alpha test (p)	0.40	0.20	0.39	0.35	0.25
χ^2 Controls (p)	0.04	0.01	0.46	0.22	0.02
Panel (C) Liberal Component					
Liberal Component	0.983	3.337*	4.901***	6.577***	5.486***
(ATET)	[2.056]	[1.739]	[1.691]	[1.661]	[1.582]
Treated Countries	81	74	72	65	65
Observations	4230	3844	3736	3388	3409
Control Countries	32	39	42	50	53
Observations	1326	1712	1880	2288	2438
Alpha test (p)	0.39	0.17	0.06	0.11	0.00
χ^2 Controls (p)	0.23	0.05	0.14	0.08	0.12

Notes: The table reports outlier-robust mean PCDID estimates using alternative cutoffs for the 'regime change' dummies applied. The columns represent different definitions for the 'regime change' dummy, relative to the mean index in column [3]. Statistical significance at the 10%, 5% and 1% level is indicated as *, **, and ***, respectively. For the Alpha test for weak parallel trends we report the p value, same goes for the test for bad controls (all models have exports/trade and population growth as additional controls).

Table B-2: ATET and Diagnostics: Alternative Cutoffs (Liberal Component)

	[1] -1/4 sd	[2] -1/8 sd	[3] mean	[4] +1/8 sd	[5] +1/4 sd
Panel (A) Rule of Law					
Rule of Law (ATET)	2.049 [1.780]	1.290 [1.685]	2.421* [1.462]	4.221*** [1.473]	5.643*** [1.724]
Treated Countries	78	82	80	74	65
Observations	4144	4300	4164	3837	3347
Control Countries	26	29	35	41	51
Observations	1115	1273	1546	1873	2389
Alpha test (p)	0.10	0.26	0.36	0.35	0.13
χ^2 Controls (p)	0.01	0.08	0.30	0.57	0.06
Panel (B) Judicial Constraints					
Judicial Constraints (ATET)	5.634** [2.461]	4.577* [2.359]	7.759*** [2.187]	6.855*** [2.108]	7.836*** [2.167]
Treated Countries	61	62	64	62	58
Observations	3209	3277	3400	3295	3127
Control Countries	38	40	42	49	55
Observations	1571	1674	1775	2172	2460
Alpha test (p)	0.22	0.10	0.24	0.39	0.32
χ^2 Controls (p)	0.03	0.09	0.04	0.22	0.06
Panel (C) Legislative Constraints					
Legislative Constraints (ATET)	1.325 [1.866]	0.407 [1.391]	1.053 [1.771]	2.214 [1.820]	3.038* [1.620]
Treated Countries	81	79	76	75	76
Observations	4219	4091	3936	3854	3872
Control Countries	33	37	42	45	47
Observations	1391	1585	1850	2004	2124
Alpha test (p)	0.38	0.15	0.03	0.01	0.01
χ^2 Controls (p)	0.07	0.15	0.18	0.49	0.46

Notes: The table reports outlier-robust mean PCDID estimates using alternative cutoffs for the 'regime change' dummies applied. The columns represent different definitions for the 'regime change' dummy, relative to the mean index in column [3]. Statistical significance at the 10%, 5% and 1% level is indicated as *, **, and ***, respectively. For the Alpha test for weak parallel trends we report the p value, same goes for the test for bad controls (all models have exports/trade and population growth as additional controls).

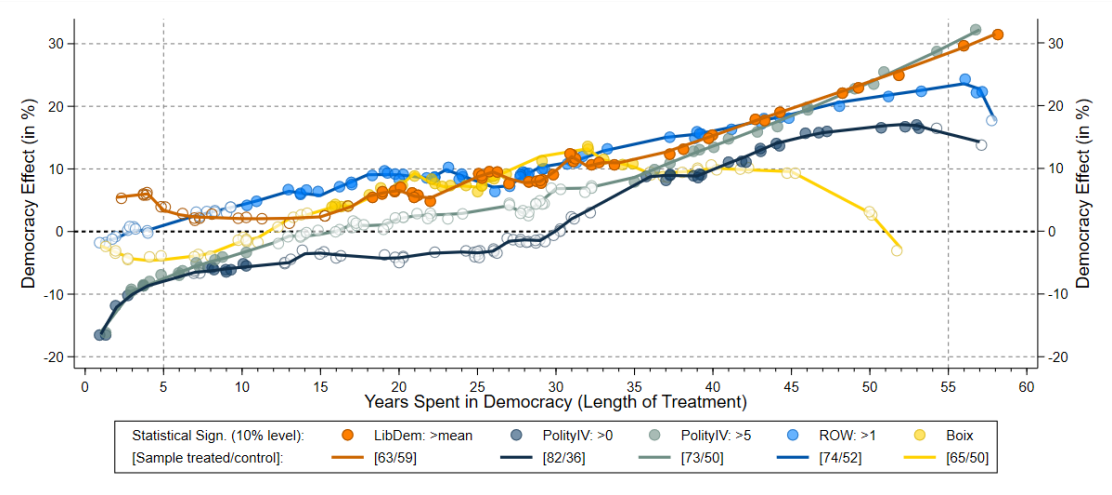
Table B-3: ATET and Diagnostics: Alternative Cutoffs (Polyarchy)

	[1] $-1/4$ sd	[2] $-1/8$ sd	[3] mean	[4] $+1/8$ sd	[5] $+1/4$ sd
Panel (A) Freedom of Expression					
Freedom of Expression (ATET)	3.817 [2.821]	1.461 [2.484]	2.986 [2.525]	4.479* [2.464]	3.489* [2.029]
Treated Countries	86	87	90	91	89
Observations	4524	4621	4733	4753	4652
Control Countries	23	25	25	28	32
Observations	912	978	978	1118	1339
Alpha test (p)	0.40	0.28	0.20	0.16	0.86
χ^2 Controls (p)	0.36	0.30	0.33	0.07	0.12
Panel (B) Freedom of Association					
Freedom of Association (ATET)	7.724** [3.482]	8.110** [3.296]	3.280 [2.930]	4.289 [3.030]	3.762* [2.066]
Treated Countries	87	85	84	83	81
Observations	4597	4518	4458	4431	4296
Control Countries	21	24	25	29	34
Observations	839	969	1029	1226	1438
Alpha test (p)	0.34	0.19	0.37	0.38	0.37
χ^2 Controls (p)	0.02	0.18	0.07	0.10	0.05
Panel (C) Clean Elections					
Clean Elections (ATET)	3.457* [1.774]	3.536** [1.736]	1.926 [1.479]	1.187 [1.363]	2.841* [1.521]
Treated Countries	90	89	79	77	69
Observations	4529	4563	4097	3979	3555
Control Countries	24	28	40	44	52
Observations	1047	1184	1727	1931	2355
Alpha test (p)	0.15	0.05	0.03	0.01	0.32
χ^2 Controls (p)	0.36	0.34	0.02	0.01	0.08

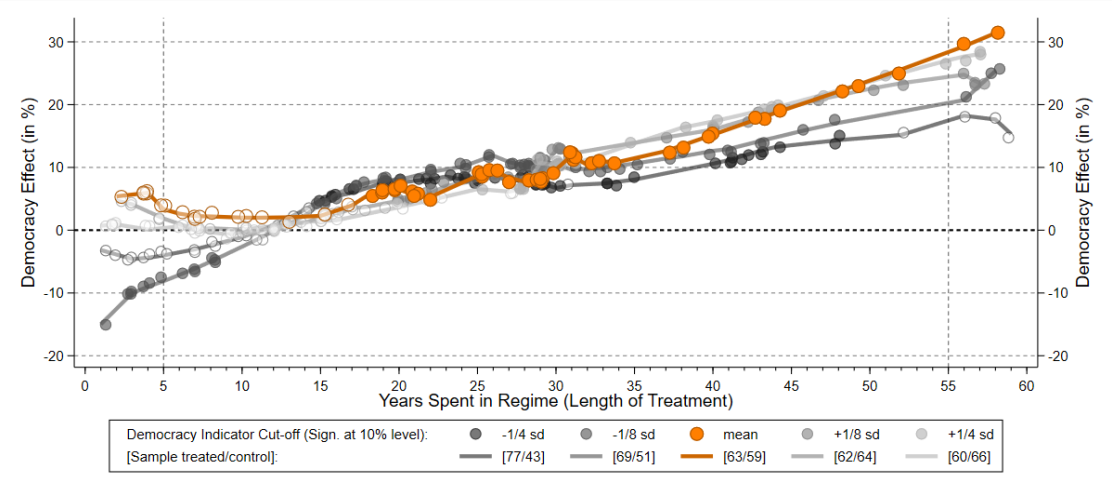
Notes: The table reports outlier-robust mean PCDID estimates using alternative cutoffs for the 'regime change' dummies applied. The columns represent different definitions for the 'regime change' dummy, relative to the mean index in column [3]. Statistical significance at the 10%, 5% and 1% level is indicated as *, **, and ***, respectively. For the Alpha test for weak parallel trends we report the p value, same goes for the test for bad controls (all models have exports/trade and population growth as additional controls).

C Alternative cutoffs for Liberal Democracy

Figure C-1: Liberal Democracy — Alternative Thresholds



(a) Five High-Level Democracy Indices

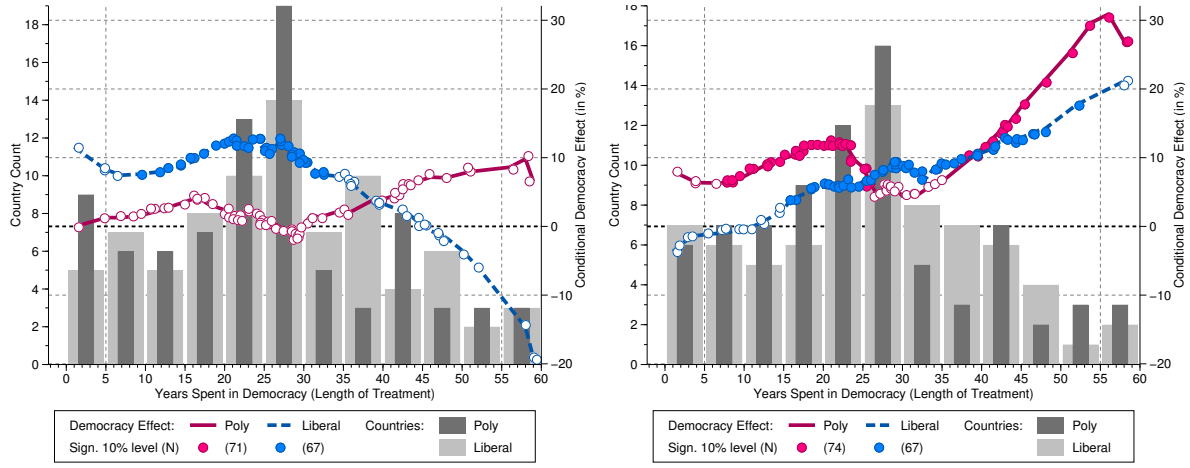


(b) Liberal Democracy (various cutoffs relative to the standardised index mean)

Notes: In the upper panel we present the country-specific PCDID running line estimates for five different high-level indices for democracy as indicated (replicated from the maintext). The lower panel focuses on democracy indices derived from the V-Dem liberal democracy index and we adopt alternative cutoffs around the standardised mean (-$1/4$sd, -$1/8$sd, mean, $+1/8$sd, $+1/4$sd,). All estimates presented are from running line regressions, which further linearly condition on (i) the number of times a country experienced regime change, and (ii) the start year of the country series. The estimates can be interpreted as locally averaged ITET, with the scales indicating the percentage increase in per capita GDP associated with the number of years spent in democracy (x-axis). The filled (white) markers indicate statistical (in)significance at the 10% level. The markers are minimally dispersed for illustrative purposes. The Alpha test for weak parallel trends is passed in all of the above models (5% level), exports/trade and population growth are never found to be bad controls. See Table B-1 for Diagnostics.

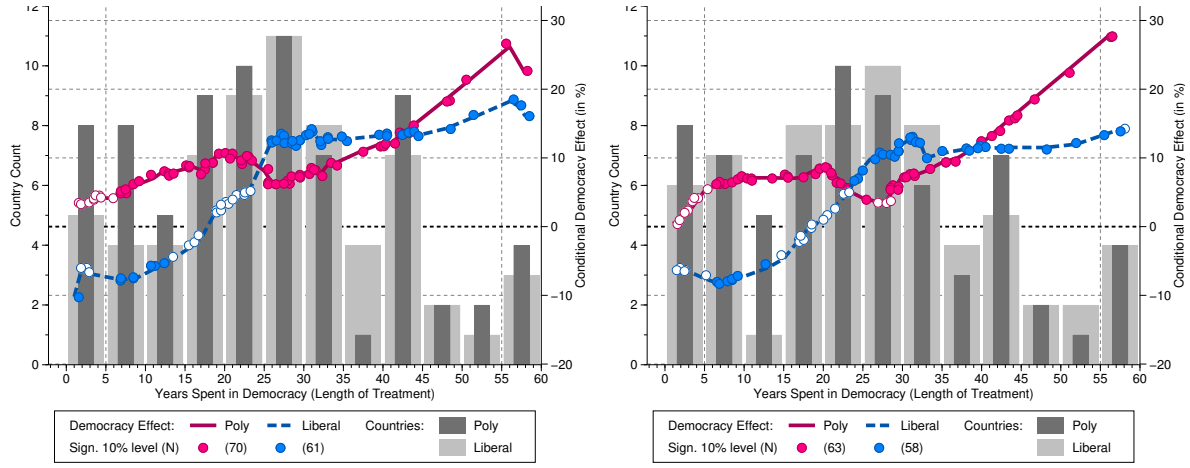
D Alternative cutoffs: Horseraces (mid-level indices)

Figure D-1: Mid-Level Indices of Democracy: Horseraces for Alternative Cutoffs



(a) Regime Change: Mean – 1/4 SD

(b) Regime Change: Mean – 1/8 SD



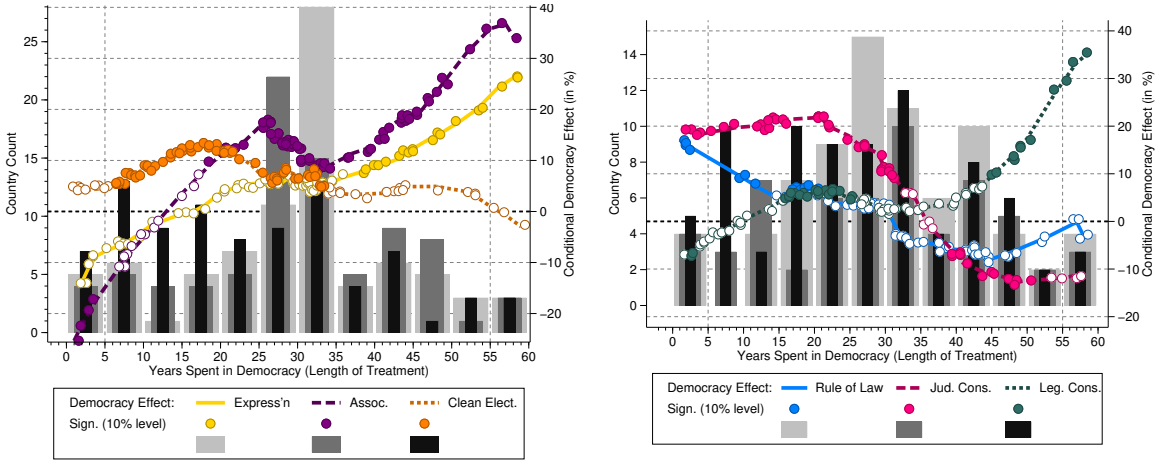
(c) Regime Change: Mean + 1/8 SD

(d) Regime Change: Mean + 1/4 SD

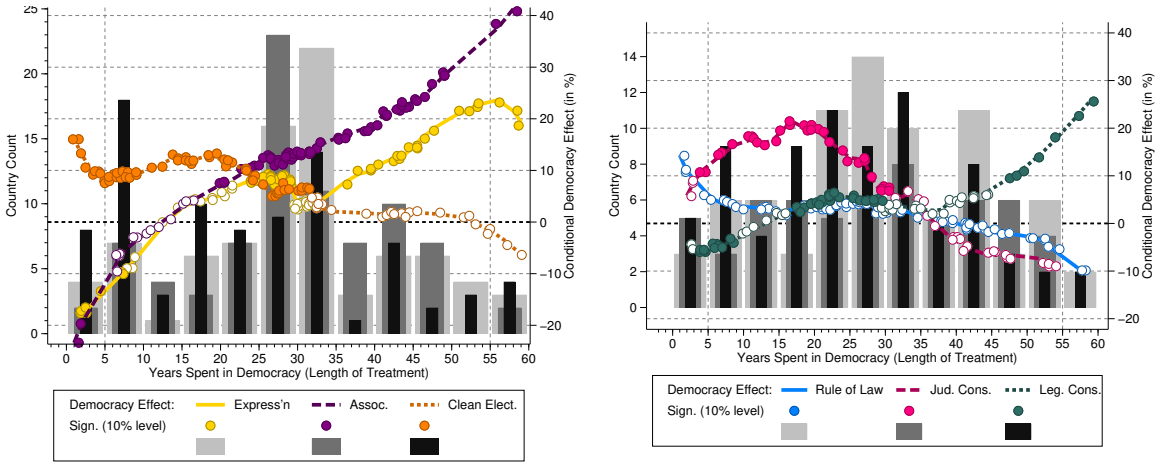
Notes: The plots in this figure presents the horseraces between polyarchy and the liberal component. Compared with panel (c) of Figure 3 in the maintext (using the mean as cutoff) we adopt alternative regime change cutoffs between mean – 1/4 SD and mean + 1/4 SD.

E Alternative cutoffs: horseraces for low-level indices

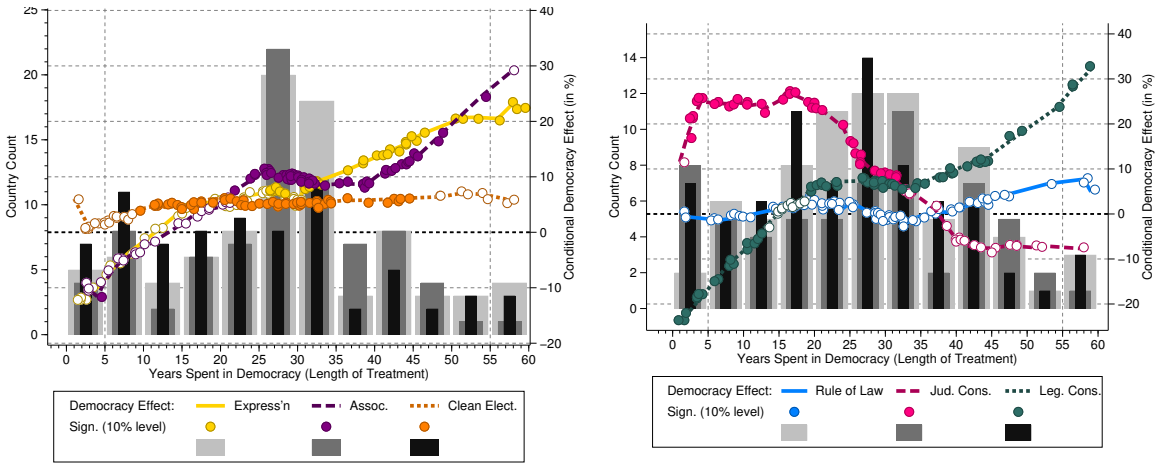
Figure E-1: Low-Level Indices of Democracy: Horseraces for Alternative Cutoffs



(a) Cutoff Mean – 1/4 SD: Polyarchy (left), Liberal Component (right)



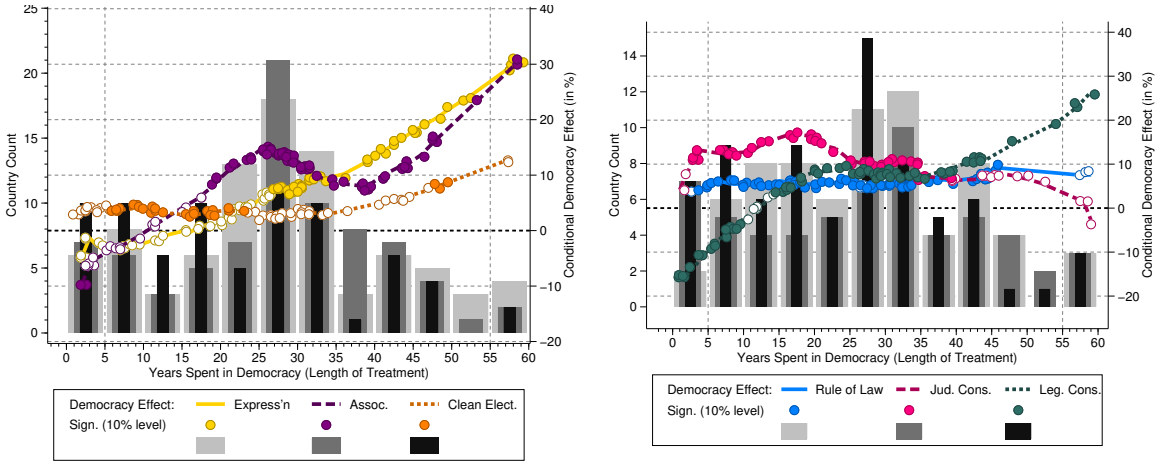
(b) Cutoff Mean – 1/8 SD: Polyarchy (left), Liberal Component (right)



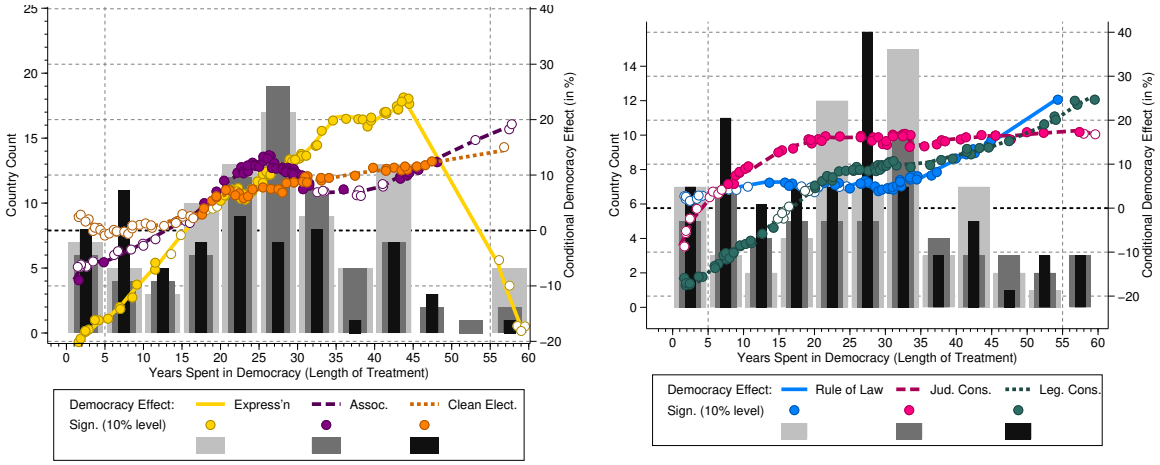
(c) Cutoff Mean (Benchmark): Polyarchy (left), Liberal Component (right)

(continued overleaf)

Figure E-1: Low-Level Indices of Democracy: Horseraces (cont'd)



(d) Cutoff Mean + 1/8 SD: Polyarchy (left), Liberal Component (right)

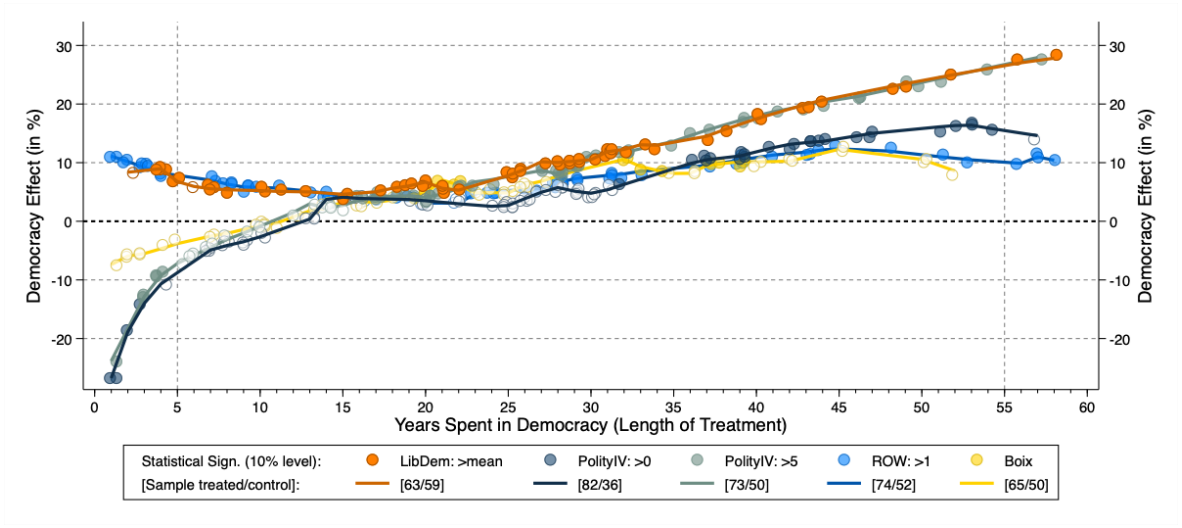


(e) Cutoff Mean + 1/4 SD: Polyarchy (left), Liberal Component (right)

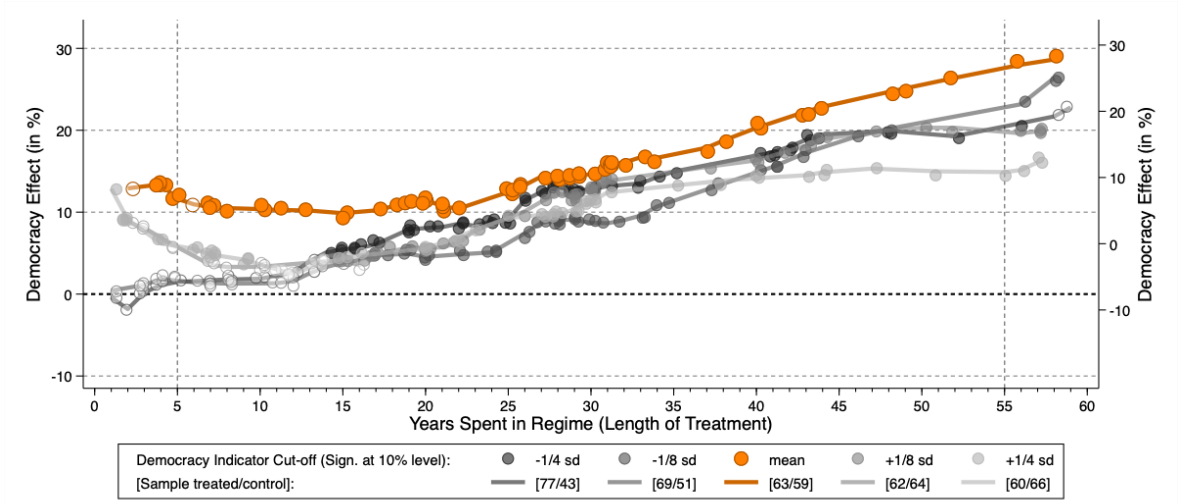
Notes: The plots in this figure presents the horseraces between the lower-level building blocks of polyarchy and the liberal component. Compared with panel (c) of Figure 3 in the maintext (using the mean as cutoff) we adopt alternative regime change cutoffs between mean – 1/4 SD and mean + 1/4 SD. Said plot is reprinted here as panel (c) for reference.

F Robustness: PCDID with exports/trade as control

Figure F-1: High-Level Indices for Democracy and Economic Development



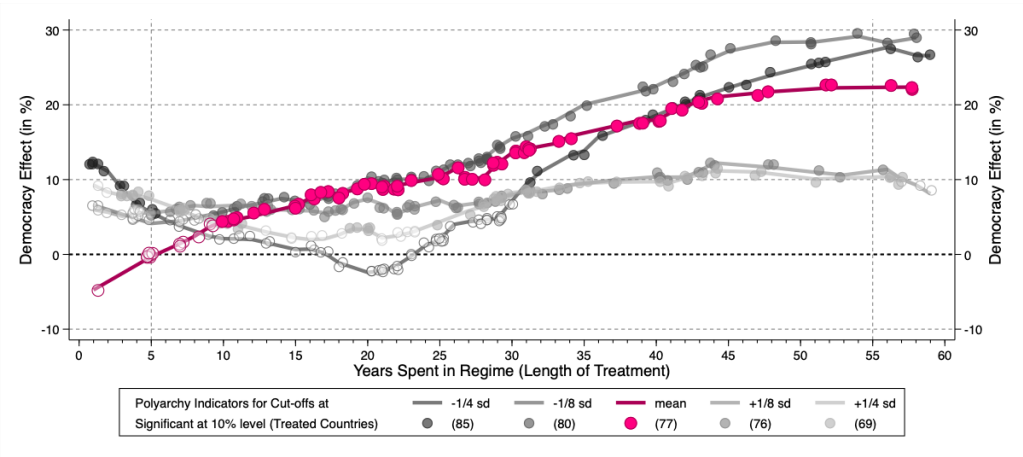
(a) Five High-Level Democracy Indices



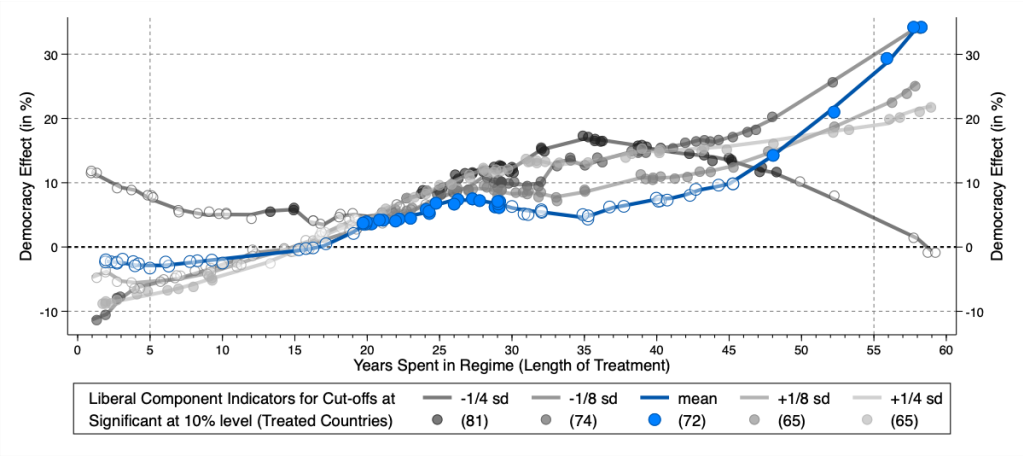
(b) Liberal Democracy (various cutoffs relative to the standardised index mean)

Notes: In the upper panel we present the country-specific PCDID running line estimates for five different high-level indices for democracy as indicated. The lower panel focuses on democracy indices derived from the V-Dem liberal democracy index and we adopt alternative cutoffs around the standardised mean (-$1/4$sd, -$1/8$sd, mean, $+1/8$sd, $+1/4$sd,). All estimates presented are from running line regressions, which further linearly condition on (i) the number of times a country experienced regime change, and (ii) the start year of the country series. The estimates can be interpreted as locally averaged ITET, with the scales indicating the percentage increase in per capita GDP associated with the number of years spent in democracy (x-axis). The filled (white) markers indicate statistical (in)significance at the 10% level. The markers are minimally dispersed for illustrative purposes. The Alpha test for weak parallel trends is passed in all of the above models (5% level), exports/trade is never found to be a bad control. See Table B-1 for Diagnostics.

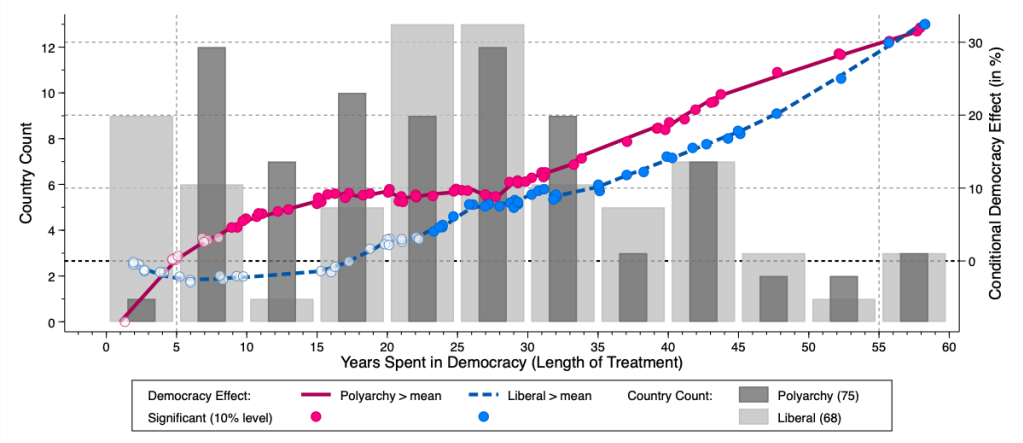
Figure F-2: Mid-level Democracy Indices and Horseraces



(a) Polyarchy Indicator for Democracy: Different Cut-offs



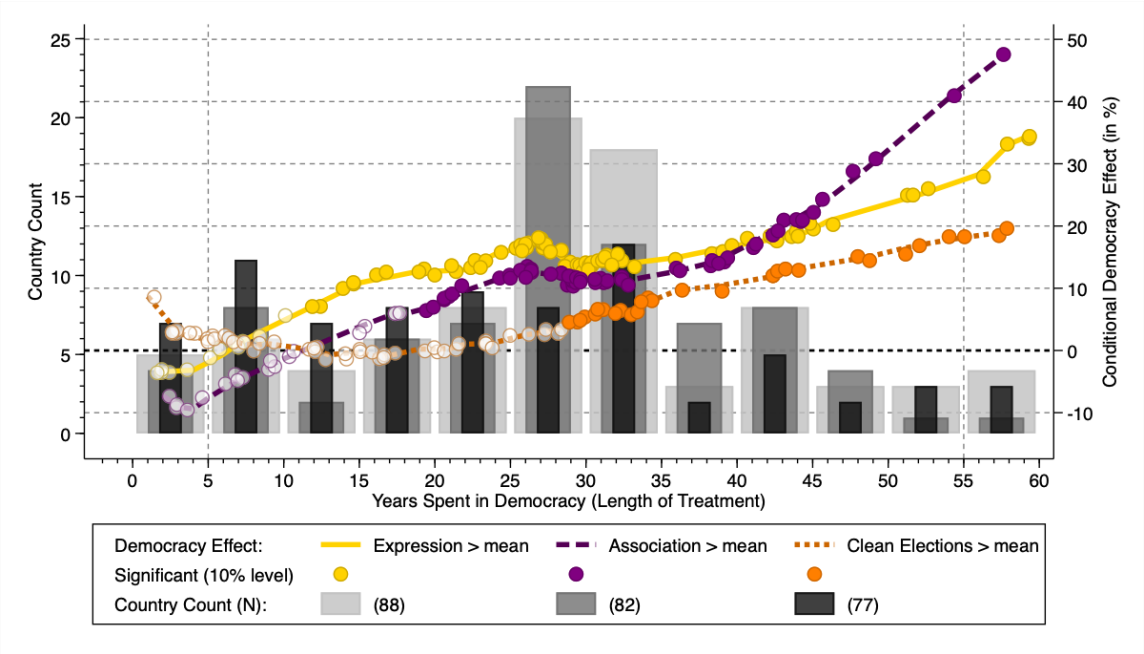
(b) Liberal Component Indicator for Democracy: Different Cut-offs



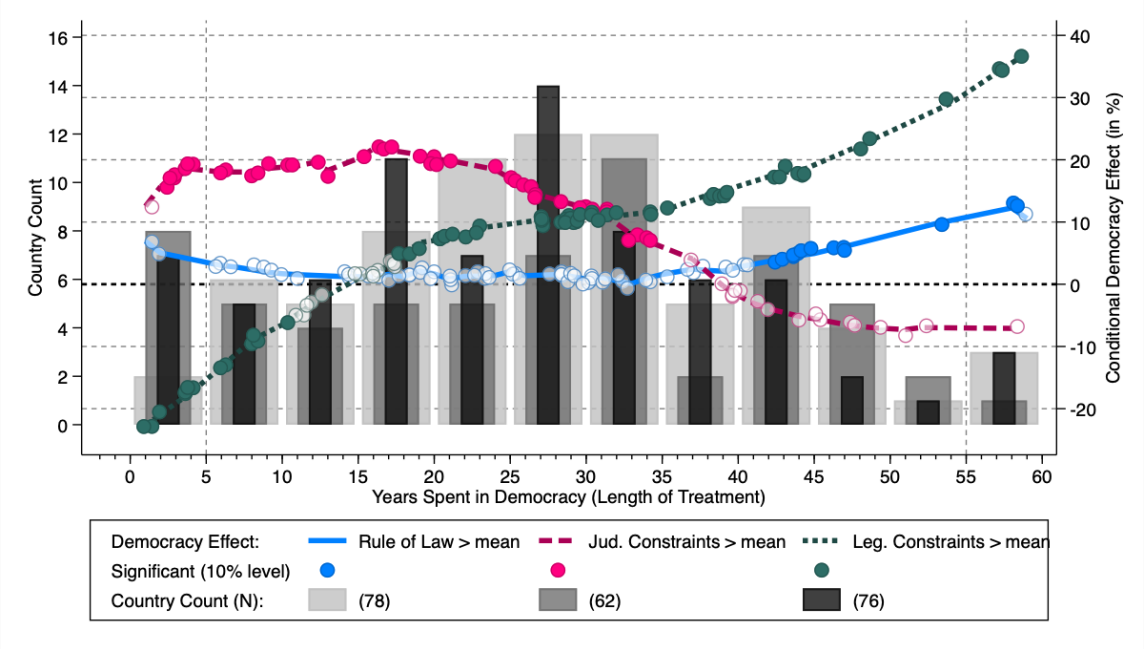
(c) Horse race: Conditional 'polyarchy' and 'liberal component' effects

Notes: Panels (a) and (b) present running line plots for polyarchy and the liberal component using different cutoffs. In Panel (c) we run a horse race between the estimates of country results for the two mid-level democracy indices: the polyarchy (liberal component) running line estimates linearly control for the value of the liberal component (polyarchy) index in the year of regime change, the standard deviation of the same index over the treatment period, the number of regime switches and sample start year of each country. The bars indicate the country count for each 5-year interval of experience of democracy. The Alpha test for weak parallel trends is rejected in both models (5% level), however, exports/trade is found to be a bad control in the liberal component model. See Table B-1 for Diagnostics.

Figure F-3: Horseraces between Low-level Indices of Democracy



(a) Components of Electoral Democracy (Polyarchy)



(b) Components of the Liberal Component

Notes: We run horse races between the estimates of country results for the low-level democracy indices: the running line regressions of the growth effect (y-axis) and the years of treatment (x-axis) additionally condition on the value and standard deviation of 'other' mid- and low-level democracy indices; e.g. for the 'freedom of expression' analysis this is the liberal component (mid-level 'rival' to polyarchy), freedom of association, and clean elections (both 'rival' subcomponents of polyarchy). In analogy for the other subcomponents presented. Shaded bars indicate the country distributions of treatment years, full (hollow) markers in the running line plots indicate statistical (in)significance at the 10% level. Freedom Alpha test for weak parallel trends is passed in all of the above models (5% level), exports/trade is found to be a bad control in the Freedom of Association and Judicial Constraints models. See Tables B-3 and B-2 for Diagnostics.

G Robustness: Conditionality between Constituent Components of Liberal Democracy

Our above analysis has operationalised democratic regime change in a treatment effect framework which somewhat abstracts from any explicit *dependencies between political institutions*: for instance, the 'rule of law' effect on economic development may be *conditional* on the country being a functioning 'electoral democracy' or vice-versa. Given that in our horse races the running line regressions condition on the magnitude and variability of 'other'/'rival' political institutions, we have not ignored this issue. However, it could be argued that adopting a specification which puts *interaction effects* at the heart of the analysis would provide a clearer test of our assumption that the above results are meaningful and robust to such 'conditionalities.'

We restrict the potential for interactions to make this implementation feasible: (i) we can interact the two mid-level democracy indices, but for the 'lower-level' analysis we only interact the sub-component of polyarchy with the liberal component, and vice-versa; and (ii) we do not estimate 'full' models including index A, index B and their interaction — this would make it difficult to identify each component separately due to the limited degrees of freedom (requiring three sets of estimated factors from different control samples) and the high levels of collinearity between the three dummy variables.[26] Instead, we estimate models which *only* include the interaction variable: the intuition is that if conditionality between institutions, in a fashion not captured by our previous empirical implementation, plays a significant quantitative role for economic development then we should be able to detect this deviation when comparing the results for the 'pure' interaction effect with those for the effects of individual index A and B, respectively. Put differently, these interaction effect models simply require that for regime change to occur both indices combined in the interaction have to have breached the respective mean index threshold.

G.1 Modelling Conditionality

We extend the previous PCDID single treatment Difference-in-Differences specification to a model where we study the *interaction* of two treatments. Generically, we denote a treatment A at some point T_A and a treatment B at some other point T_B — the timing/relative order

[26] Fewer than 11% of all observations for the polyarchy and liberal component dummies (using the mean as the cut-off) are not jointly zero or jointly one, in the 'treated' sample for the interaction effect this rises to 12.5%. Naturally for the interaction term this overlap is even greater.

of the two is ignored: treatment A does not *require* treatment B or vice-versa. However, we are explicit in modelling the joint or interaction effect of having received both treatments at some point T_A or T_B, whichever comes later. Our reduced form treatment effects model with interactive fixed effects is then

$$y_{it} = \overline{\Theta}_i^{AB} \mathbf{1}_{\{i \in \mathcal{A} \cap \mathcal{B}\}} \mathbf{1}_{\{t > \max(T_i^A, T_i^B)\}} + \mu_i^{\mathsf{AB}\prime} f_t^{\mathsf{AB}} + \beta_i' x_{it} + \epsilon_{it}, \tag{A1}$$

where we already implement the decomposition of a time-varying heterogeneous treatment effect into, generically, $\Theta_{it} = \overline{\Theta}_i + \widetilde{\Theta}_{it}$, with $E(\widetilde{\Theta}_{it} | t > T_i) = 0$ for all treated units since this represents the demeaned, time-varying idiosyncratic component of Θ_{it}. As a result the error term takes the following form

$$\epsilon_{it} = \varepsilon_{it} + \widetilde{\Theta}_{it}^{AB} \mathbf{1}_{\{i \in \mathcal{A} \cap \mathcal{B}\}} \mathbf{1}_{\{t > \max(T_i^A, T_i^B)\}}, \tag{A2}$$

with ε white noise.[27] In equation (A1) $\mathcal{A} \cap \mathcal{B}$ is the group of countries which received both treatments and we construct the control group accordingly as those countries which never experienced treatment A or B: we use AB to identify this group.

This is a very restrictive specification, in that we ignore those groups of countries which experienced one but not the other treatment, and hence may distort the true counterfactual. Since our focus is on the potential complementarity between treatments A and B we therefore adopt an alternative model which captures the counterfactual in the groups which did not receive treatment A (or B) regardless of whether they received the other:

$$y_{it} = \overline{\Theta}_i^{AB} \mathbf{1}_{\{i \in \mathcal{A} \cap \mathcal{B}\}} \mathbf{1}_{\{t > \max(T_i^A, T_i^B)\}} + \mu_i^{\mathsf{A}\prime} f_t^{\mathsf{A}} + \mu_i^{\mathsf{B}\prime} f_t^{\mathsf{B}} + \beta_i' x_{it} + \epsilon_{it}, \tag{A3}$$

with the same error structure and related assumptions as those indicated above. The difference between the two implementations is in the control group(s) from which the factors augmenting the treatment regression are estimated: (i) in model (A1) these are all countries which experienced neither treatment A nor treatment B; (ii) in model (A3) all countries which experienced neither treatment, or only experienced treatment A or treatment B.

For ease of illustration we present the empirical implementation using the two mid-level democracy indices, polyarchy (poly) and the liberal component (lib). For each country which experienced variation in both the polyarchy and liberal component regime change dummies

[27] This reduced form error ϵ_{it} has mean zero but can be weakly dependent (e.g. spatial or serial correlation) and/or heteroskedastic.

we estimate:

$$y_{it} = \alpha_i + \beta_i^{AB}\,(\text{poly}_{it} \times \text{lib}_{it}) + \gamma_i' X_{it} + \delta_i^{\text{AB}\prime} \hat{f}_t^{\text{AB}} + e_{it} \tag{A4}$$

$$\text{and} \quad y_{it} = \alpha_i + \beta_i^{AB}\,(\text{poly}_{it} \times \text{lib}_{it}) + \gamma_i' X_{it} + \delta_i^{\text{A}\prime} \hat{f}_t^{\text{A}} + \delta_i^{\text{B}\prime} \hat{f}_t^{\text{B}} + e_{it} \tag{A5}$$

for the two implementations, respectively. The estimated common factors, of which there are three sets, are constructed via principal component analysis from the residuals of the following three regressions:

$$y_{it} = \psi_i^{\text{A}} + \theta_i \text{lib}_{it} + \phi_i^{\text{A}\prime} X_{it} + \nu_{it}^{\text{A}} \qquad \forall\, i \notin \mathcal{A} \tag{A6}$$

$$y_{it} = \psi_i^{\text{B}} + \xi_i \text{poly}_{it} + \phi_i^{\text{B}\prime} X_{it} + \nu_{it}^{\text{B}} \qquad \forall\, i \notin \mathcal{B} \tag{A7}$$

$$\text{and} \quad y_{it} = \psi_i^{\text{AB}} + \phi_i^{\text{A}\prime} X_{it} + \nu_{it}^{\text{AB}} \qquad \forall\, i \notin \mathcal{A} \cap \mathcal{B}. \tag{A8}$$

We present ATET results as well as running line regressions predictions of the estimated regime change effect and the length of treatment controlling for sample start year and the count of threshold crossings.

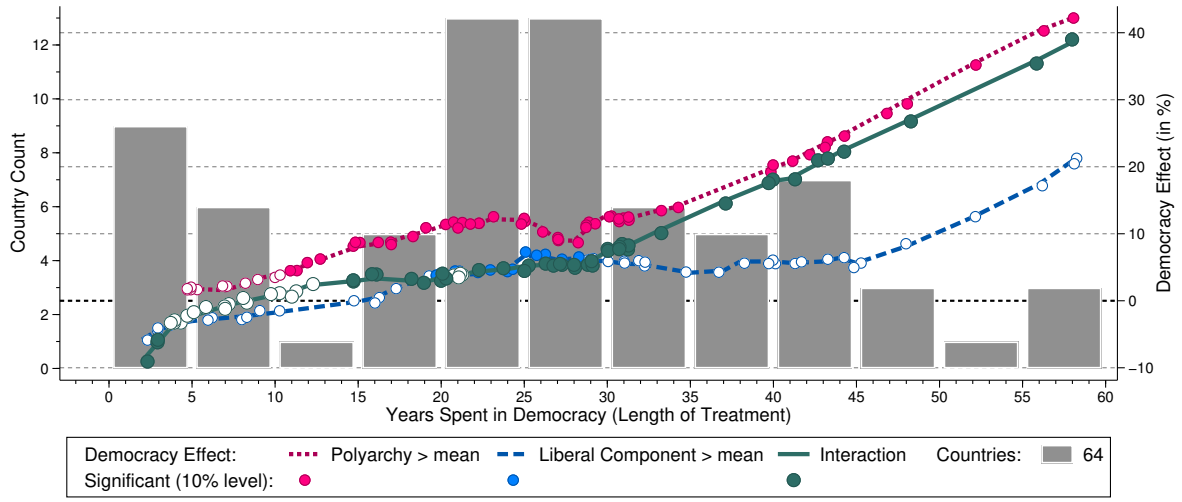
G.2 Empirical Results

In Appendix Figure G-1 we present the running line estimates for polyarchy (short pink dashes), the liberal component (long blue dashed), and their interaction (solid emerald line) — these results are based on the specification in equation (A5), which includes factors from two control groups. The profile of the interaction results in this graph first matches that of the liberal component effect and subsequently that of the polyarchy effect. Importantly, it does not appear to clearly *exceed* the polyarchy effect but instead roughly represents the average between the two effects in isolation. This would imply that a conditional effect of electoral democracy — requiring the liberal component to be in place as well — does not yield higher growth effects over the longer term. The simpler, more restrictive, interaction model based on equation (A4) yields a qualitatively identical conclusion (see Appendix Figure G-5).

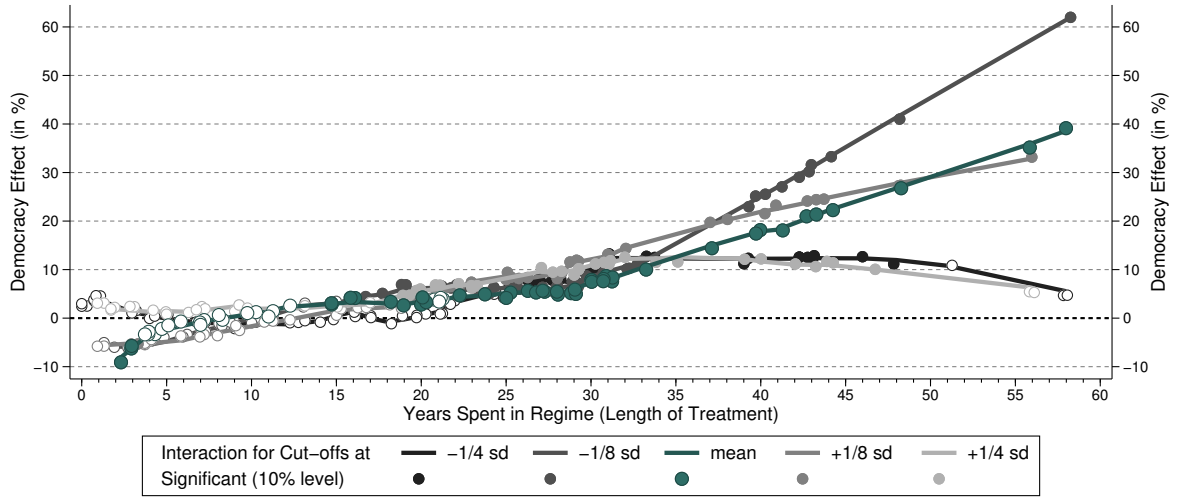
Appendix Figure G-2 presents the interaction estimates alongside the respective low-level components and the mid-level 'rival'. Across the six models investigated the interaction specification typically closely matches the results for one or the other individual component or mid-level index, only the Legislative Constraints interaction with Polyarchy in panel (e) suggests a substantially higher trajectory with increasing years in regime, a gap of +30%. Appendix Figures G-3 and G-4 plot the robustness checks using alternative regime index cut-offs.

Appendix Figures G-6 and G-7 for the simpler interaction model shows some deviations

Figure G-1: Mid-Level Democracy Indices: Interaction



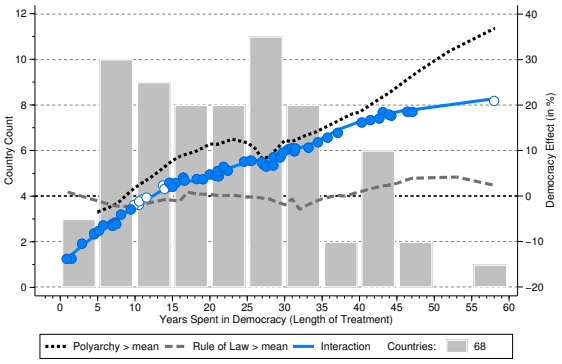
(a) Liberal Component $\times$ Polyarchy vs its components ($N = 64$)



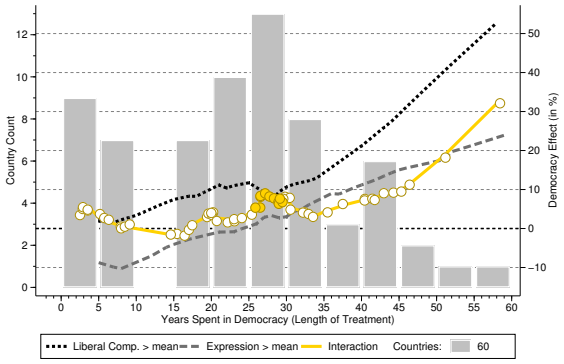
(b) Various cutoffs

Notes: The figure presents sample-specific running line estimates for polyarchy (short-dashed line), the liberal component (dashed line) and a specification adopting an interaction between the two (solid coloured line; filled markers indicate statistical significance at the 10% level), holding the sample constant (hence the deviation from the results in panel (a) of Figure 3). The grey bars in these plots indicate the sample distribution (countries). The results in this figure are based on the specification in equation (A5), which includes factors from two control groups as described in the text. Results for the more restrictive specification in equation (A4) can be found in Appendix Figure G-5.

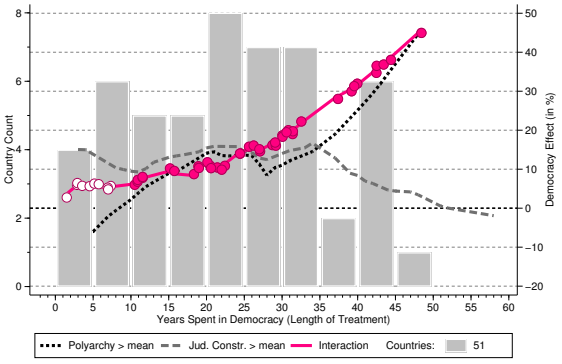
Figure G-2: Low-Level Democracy Indices: Interaction



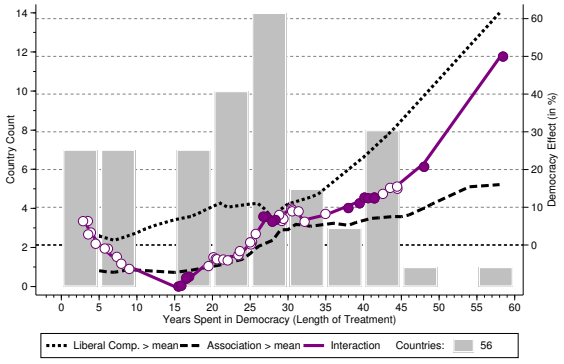
(a) Rule of Law $\times$ Polyarchy ($N = 68$)



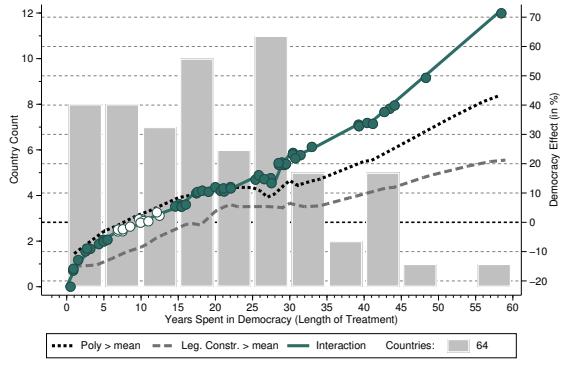
(b) Fr'm of Expr'n $\times$ Lib. Comp. ($N = 60$)



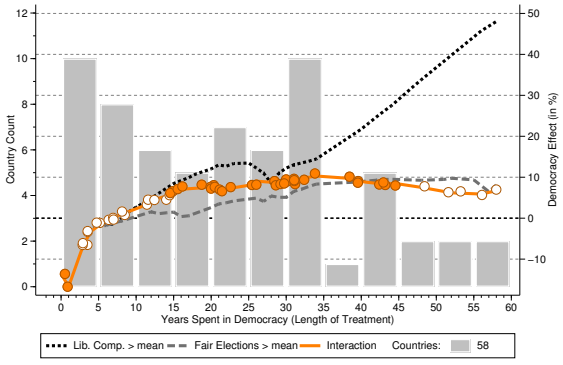
(c) Judic. Constraints $\times$ Polyarchy ($N = 51$)



(d) Fr'm of Assoc'n $\times$ Lib. Comp. ($N = 56$)



(e) Legisl. Constraints $\times$ Polyarchy ($N = 64$)



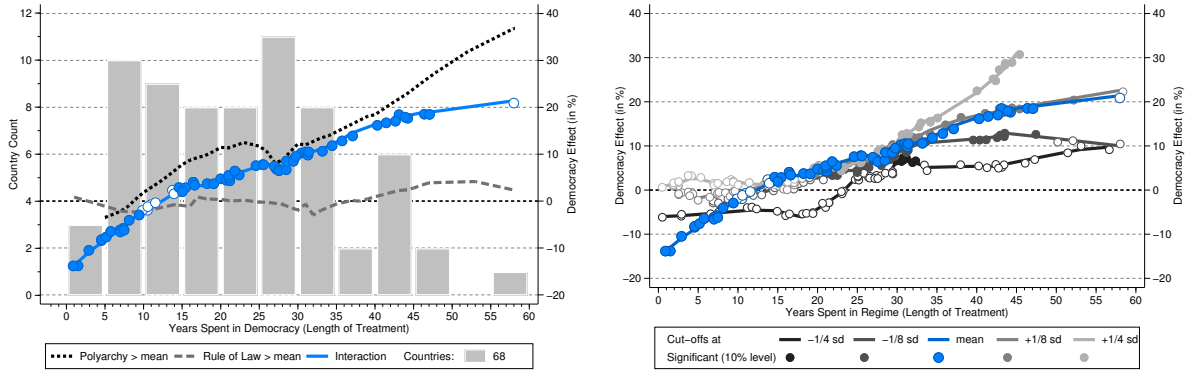
(f) Clean Elections $\times$ Lib. Comp. ($N = 58$)

Notes: The plots in this figure present running line regressions for the interaction effect of three sub-components of the liberal component (Rule of Law, Judicial Constraints on the Executive, and Legislative Constraints on the Executive) in the left column and of polyarchy (Freedom of Expression, Freedom of Association, and Free and Fair Elections) in the right column. In each case we show the sample-specific running line estimates for polyarchy or the liberal component (short-dashed line), that for the sub-component (dashed line) and that for a specification adopting an interaction between the two (solid coloured line; filled markers indicate statistical significance at the 10% level), holding the sample constant between these three models in each plot. The grey bars indicate the sample distribution (countries) for the interaction model.

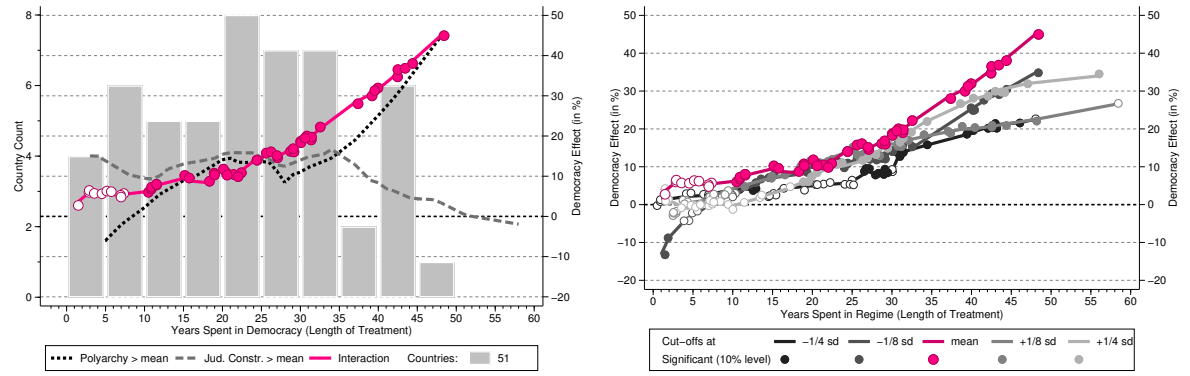
for legislative constraints (again), as well as Freedom of Expression and of Association results. Visually, these appear very different, until one realises that the number of observations on which the strong upward trajectories in the right tail are based is at most 4 (Freedom of Expression) or 2 (Legislative Constraints and Freedom of Association).

Broadly speaking, these exercises did not yield any substantial deviations in the effects from interaction models relative to the effects based on individual low-level or mid-level components of liberal democracy. Hence, we believe our empirical approach in the main results section is robust and meaningful in determining the low-tier drivers of the liberal democracy-growth nexus.

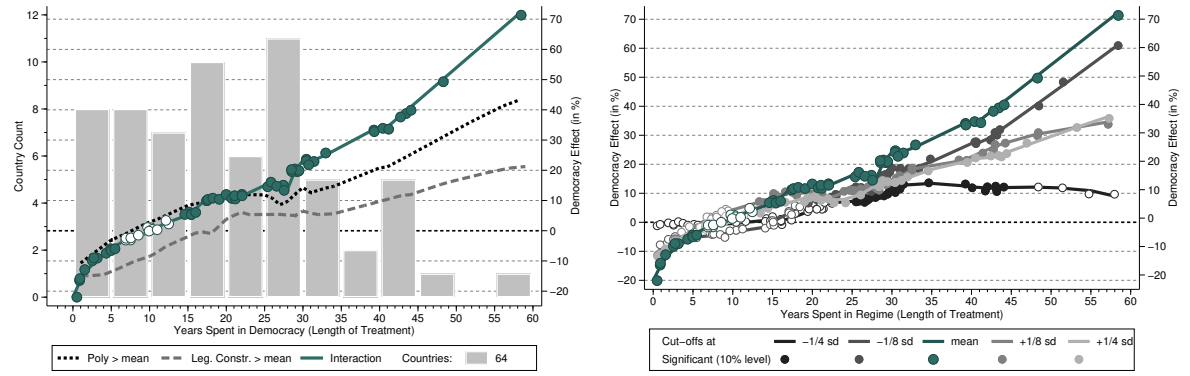
Figure G-3: Low-Level Indices of Dem. (lib. component): Interaction w/ Polyarchy



(a) Rule of Law $\times$ Polyarchy vs comp's (left, $N = 68$), altern. cutoffs (right)



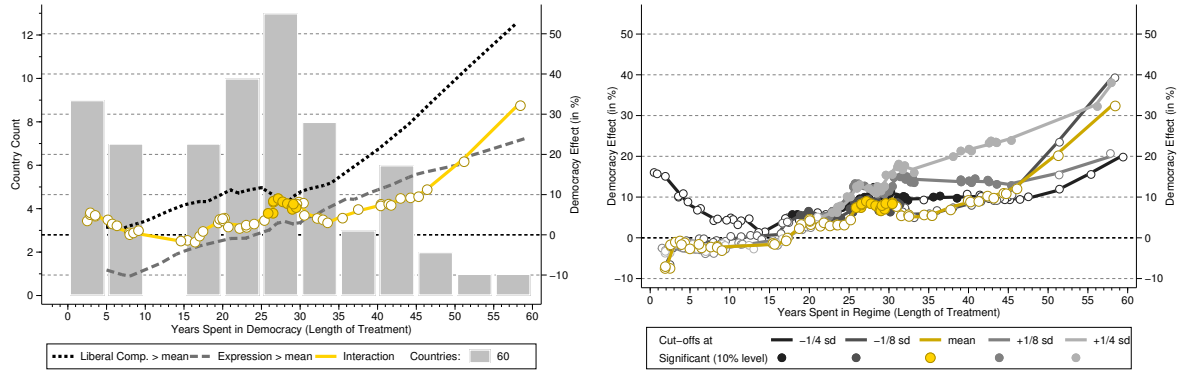
(b) Jud. Constr. $\times$ Polyarchy vs comp's (left, $N = 51$), altern. cutoffs (right)



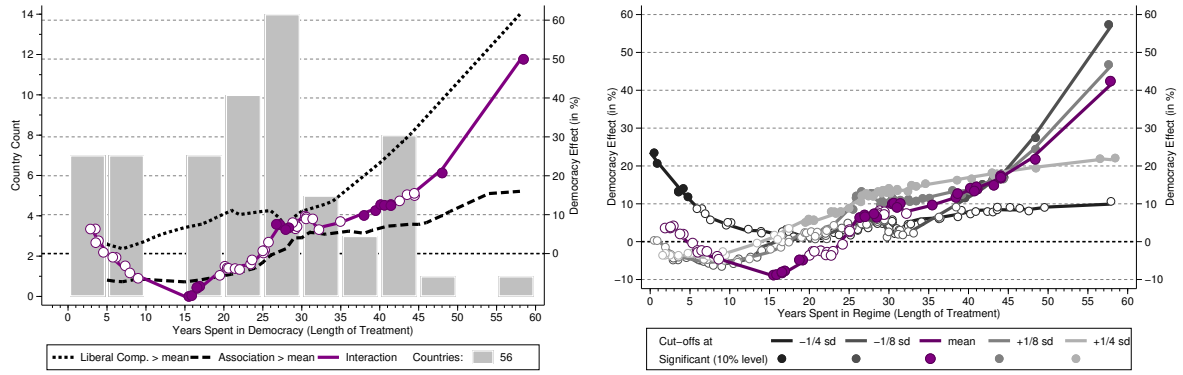
(c) Leg. Constr. $\times$ Polyarchy vs comp's (left, $N = 64$), altern. cutoffs (right)

Notes: The plots in this figure present running line regressions for three sub-components of the liberal component (Rule of Law, Judicial Constraints on the Executive, and Legislative Constraints on the Executive). In each case of the left panel we show the sample-specific running line estimates for polyarchy (short-dashed line), that for the sub-component (dashed line) and that for a specification adopting an interaction between the two (solid coloured line; filled markers indicate statistical significance at the 10% level), holding the sample constant. The grey bars in these plots indicate the sample distribution (countries) for the interaction model. In each plot of the right panel we investigate different cutoffs to create the standardised 'regime change' dummies in the interaction model: mean, mean $\pm 1/8$ sd, mean $\pm 1/4$ sd.

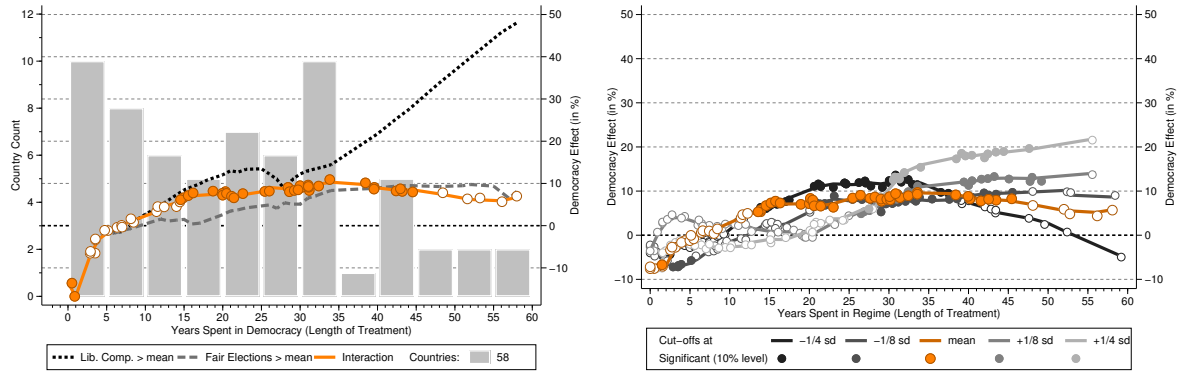
Figure G-4: Low-Level Indices of (Electoral) Democracy: Interaction with the Liberal Component



(a) F'dom of Expression × Lib. Comp. vs its comp's (left, $N = 60$), altern. cutoffs (right)



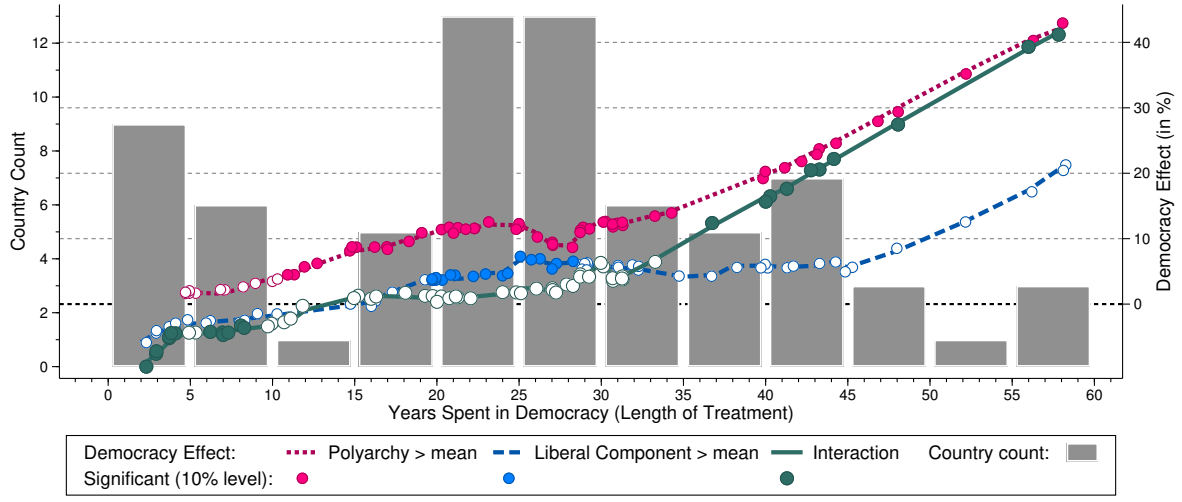
(b) F'dom of Assoc'n × Lib. Component vs its comp's (left, $N = 56$), altern. cutoffs (right)



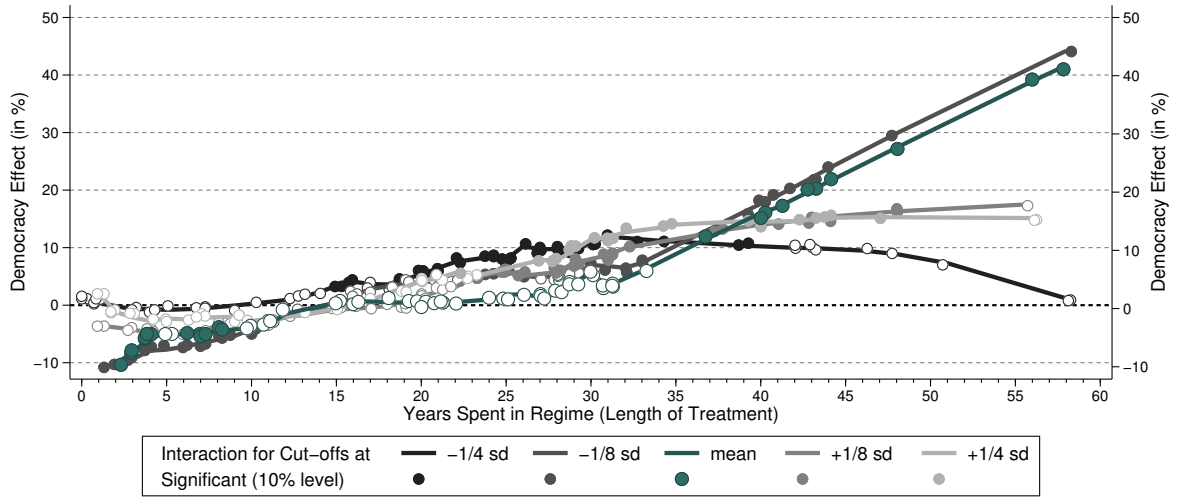
(c) Free and Fair Elections × Lib. Comp. vs its comp's (left, $N = 58$), altern. cutoffs (right)

Notes: The plots in this figure present running line regressions for three sub-components of polyarchy (freedom of expression and association, respectively; free and fair elections). In each case of the left panel we show the sample-specific running line estimates for the liberal component (short-dashed line), that for the sub-component (dashed line) and that for a specification adopting an interaction between the two (solid coloured line; filled markers indicate statistical significance at the 10% level), holding the sample constant. The grey bars in these plots indicate the sample distribution (countries) for the interaction model. In each plot of the right panel we investigate different cutoffs to create the standardised 'regime change' dummies in the interaction model: mean, mean $\pm 1/8$ sd, mean $\pm 1/4$ sd.

Figure G-5: Mid-Level Democracy Indices: Simple Interaction Model



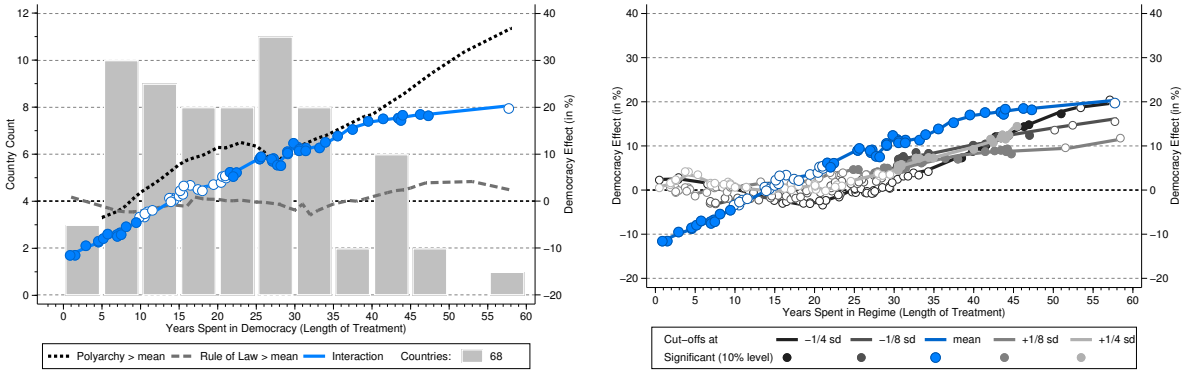
(a) Liberal Component $\times$ Polyarchy vs its components ($N = 64$)



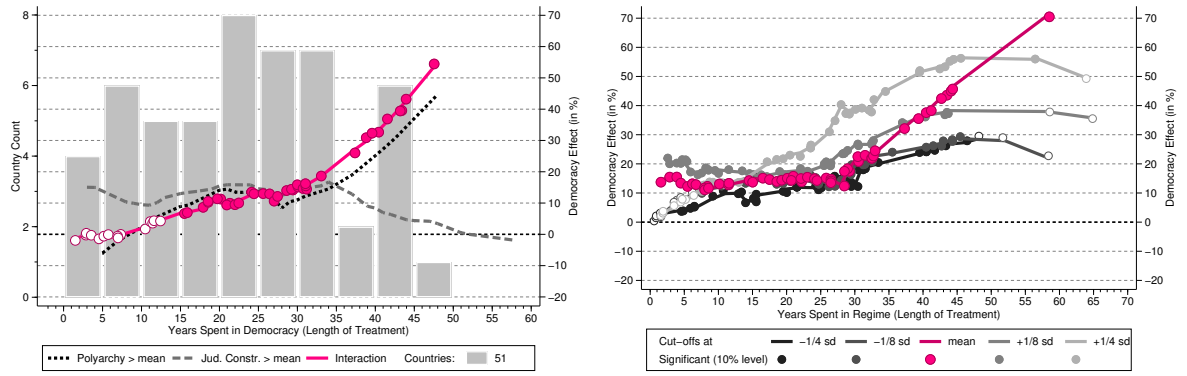
(b) Various cutoffs

Notes: We present sample-specific running line estimates for polyarchy (short-dashed line), for the liberal component (dashed line) and for a specification adopting an interaction between the two (solid coloured line; filled markers indicate statistical significance at the 10% level), holding the sample constant. The grey bars in these plots indicate the sample distribution (countries). Results for the alternative (less restrictive) specification in equation (A5) can be found in Figure G-1.

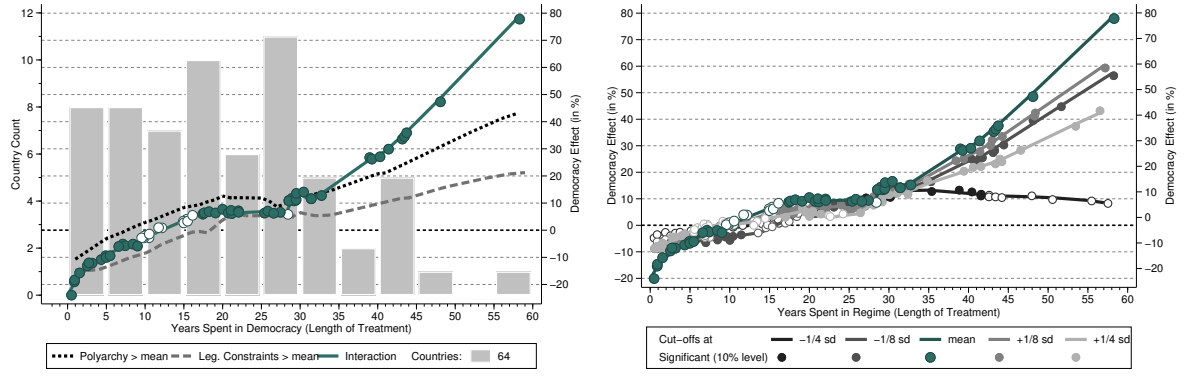
Figure G-6: Indices from Low-Level Dem. (liberal comp't): Interaction w/ Polyarchy



(a) Rule of Law $\times$ Polyarchy vs its comp's (left, $N = 68$), altern. cutoffs (right)



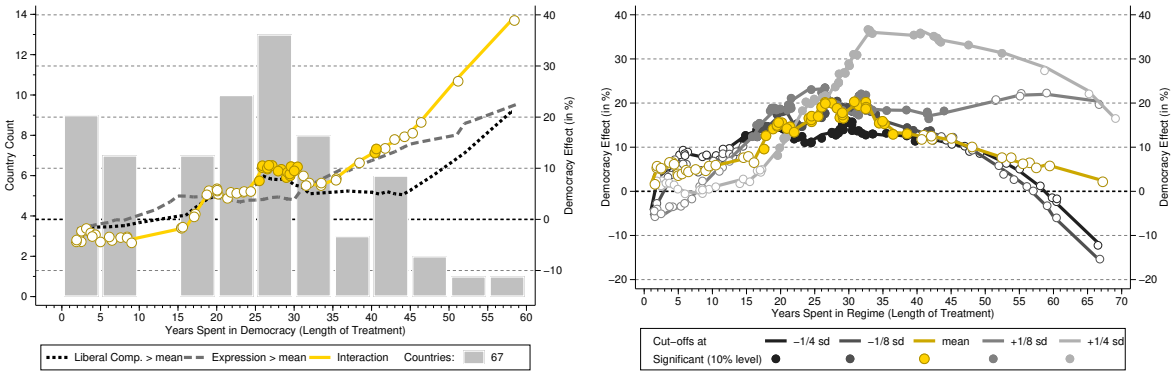
(b) Judicial Constraints $\times$ Polyarchy vs its comp's (left, $N = 51$), altern. cutoffs (right)



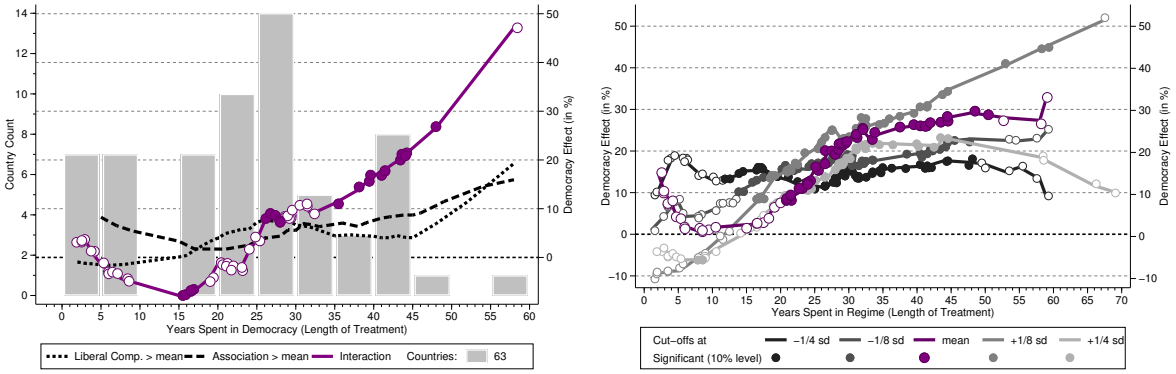
(c) Legislative Constraints $\times$ Polyarchy vs its comp's (left, $N = 64$), altern. cutoffs (right)

Notes: The plots in this figure present running line regressions for three sub-components of the liberal component (Rule of Law, Judicial Constraints on the Executive, and Legislative Constraints on the Executive). In each case of the left panel we show the sample-specific running line estimates for polyarchy (short-dashed line), that for the sub-component (dashed line) and that for a specification adopting an interaction between the two (solid coloured line; filled markers indicate statistical significance at the 10% level), holding the sample constant. The grey bars in these plots indicate the sample distribution (countries). In each plot of the right panel we investigate different cutoffs to create the standardised 'regime change' dummies in the interaction model: mean, mean $\pm 1/8$ sd, mean $\pm 1/4$ sd. All interaction models presented in this figure adopt the 'simple' empirical implementation in equation (A4) of the paper. The 'alternative' specification in equation (A5) is presented in Figure G-2.

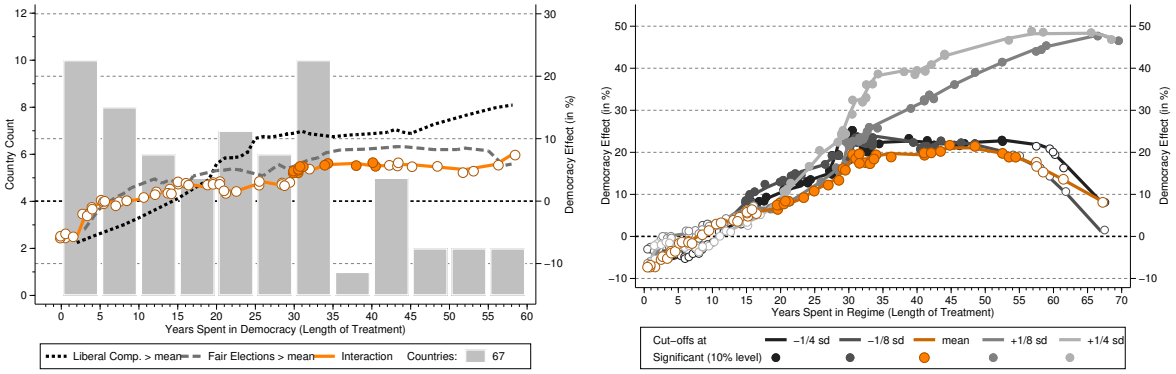
Figure G-7: Indices from Low-Level Indices of (Electoral) Democracy: Interaction with the Liberal Component



(a) F'dom of Expression × Lib. Comp. vs its comp's (left, $N = 67$), altern. cutoffs (right)



(b) F'dom of Association × Lib. Comp. vs its comp's (left, $N = 63$), altern. cutoffs (right)



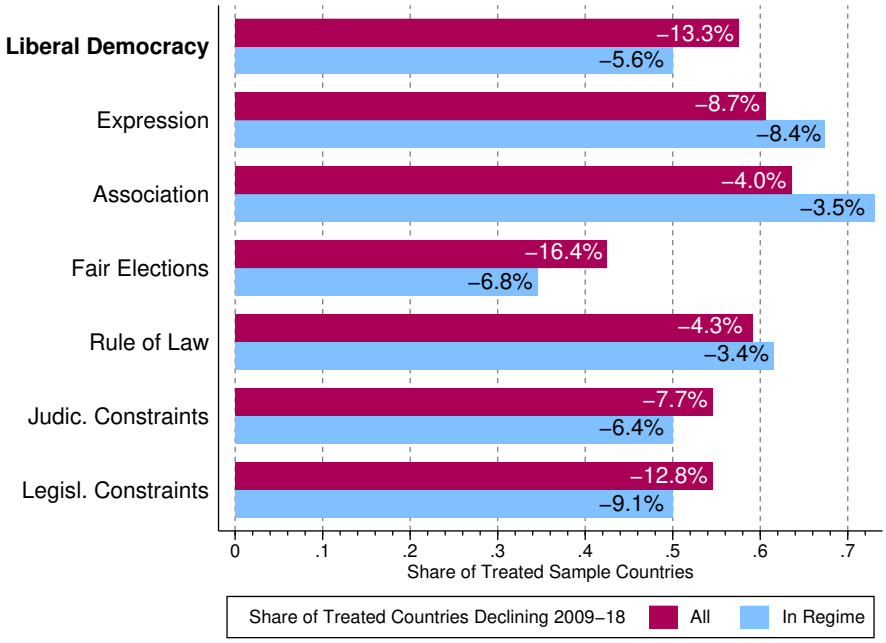
(c) Free and Fair Elections × Lib. Comp. vs its comp's (left, $N = 67$), altern. cutoffs (right)

Notes: The plots in this figure present running line regressions for three sub-components of polyarchy. In each case of the left panel we show the sample-specific running line estimates for the liberal component (short-dashed line), that for the sub-component (dashed line) and that for a specification adopting an interaction between the two (solid coloured line; filled markers indicate statistical significance at the 10% level), holding the sample constxant. The grey bars in these plots indicate the sample distribution (countries). In each plot of the right panel we investigate different cutoffs to create the standardised 'regime change' dummies in the interaction model: mean, mean $\pm 1/8$ sd, mean $\pm 1/4$ sd. All interaction models presented in this figure adopt the 'simple' empirical implementation in equation (A4) of the paper. The 'alternative' specification in equation (A5) is presented in Figure G-2.

H Democracy in Retreat?

Figure H-1 charts the share of our sample of 'treated' countries for the analysis of 'liberal democracy' in which the index for the respective democratic institution *declined* over the 2009-2018 period (i.e. prior to the emergence of Covid-19 which triggered restriction of civil liberties in many countries). Exactly half of the treated sample which, following our definition, are still classified as Liberal Democracies in 2018 (light blue bar) saw a decline in this Tier 1 index; the median change for these 33 countries was a drop of 5.6% from their 2009 index value. If we ignore whether countries are classified as Liberal Democracy in 2018 or not (dark pink bar) then closer to two-thirds of countries saw a decline, with a median decline of 13.3%.

Figure H-1: Erosion of Democratic Institutions (2009-2018)



Notes: The figure charts the share of countries in the treatment sample for 'liberal democracy' (N=66; orange line in Panel (a) of Figure 2) for which the respective index *declined* over the 2009-2018 period. We report two shares for each institution: one for all countries in the treatment sample and one for those countries which in 2018 were 'in regime' (i.e. above the mean value of the respective institutional index). Liberal Democracy is the Tier 1 concept, Freedom of Expression, Freedom of Association and Fair Elections are Tier 3 components of electoral democracy, the remaining institutions are Tier 3 components of the liberal component. The percentages reported represent the median change in the respective index from 2009 to 2018 among those countries which experienced decline.

Studying the constituent components of electoral democracy and the liberal component in the remainder of the chart, we can see that with the exception of 'Fair Elections' *all* these democratic institutions declined in half or more sample countries. It is interesting to

point out that the median proportional changes among countries which did see erosion of democratic institutions were most substantial for Legislative Constraints on the Executive, Freedom of Expression and Fair Elections (-9.1%, -8.4% and -6.8%, respectively): exactly those institutions we highlighted as being the lower-tier driving force of the democracy-growth nexus in the long-run. The global decline in democratic institutions has significant implications for long-term economic prosperity: if the current trend continues this may well erode the perpetual growth effect of democratisation we find and trace in this paper.