Essays on Intrahousehold Bargaining and Political Economy

by

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Abstract

The thesis is composed of three essays - one on development economics and two on political economy, with the unified aim of using economic theory alongside applied methods to answer relevant policy questions. Chapter 1 is co-authored with Dr. Krishna Pendakur and examines the effect of the introduction of the Canada Child Benefit (CCB) policy on intrahousehold bargaining and preferences. The CCB provided higher amounts of child benefit, under an umbrella title and the payment was targeted towards mothers in dual parent households. Using the Survey of Household Spending and implementing a difference-in-difference strategy within a structural model of the collective household, we find mild evidence of changes in preferences from the labeling of the benefit, while we see significant increase in women's resource shares among homeowners. We provide possible explanations for this heterogeneous treatment effect across homeowners and renters.

In Chapter 2, co-authored with Dr. Chris Bidner, we develop a theoretical model to understand the conditions that promote illiberal democracy, why it is harmful yet popular among citizens, and the nature of transitions between liberal and illiberal democracy, and outright non-democracy. In our model, *Elites* influence policy and heighten risk of transition to non-democracy while *Citizens* with heterogeneous preferences decide whether to resist *elites*. The model shows that illiberal democracies are more likely to emerge when *elites* become weaker. It explains the relatively frequent transitions between illiberal democracy and non-democracy and shows how the existence of liberal democracy relies upon these dynamics. Preliminary empirical support for our model is also provided.

While Chapter 2 theorizes the emergence of political regimes, Chapter 3 focuses on the characteristics of political regimes – election and liberalism. The paper documents the historical trend and pattern of transitions and differences in belief systems across countries distinguished by the characteristics of their political institutions. Using multiple empirical approaches, the paper then shows that competitive elections alongside liberalism, as in full democracies, is required for a political regime to fuel growth. Regimes with only competitive elections and lacking liberalism does not have a significantly different impact on growth than regimes with no elections. The paper further explores various mechanisms to gain insight into the differential effect of political characteristics on growth.

Keywords: political economy; growth; economic development; illiberalism; liberal democracy; canada child benefit policy; bargaining power

Dedication

This dissertation is dedicated to:

- my mother (*Ammu*), Tasneem Hossain, who taught me dedication, independence and to believe in myself
- my father, Manzurul Islam Chowdhury, who shared valuable knowledge with me
- my brother, Nafis Muntasir, for sharing his love of Economics with me, and my sister in law, Sabrina Zaman and adorable nephew, Azlan Muntasir.

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Finally, I would like to thank Allah for helping me navigate successfully throughout this PhD journey.

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Chapter 1

Labeling vs Targeting: How did the Canada Child Benefit affect household bargaining and preferences?

[1] [2]

1.1 Introduction

The Canada Child Benefit (CCB) was established in 2016 replacing the existing combination of child benefits provided through the Universal Child Care Benefit, the Canada Child Tax Benefit, and the National Child Benefit. The CCB was introduced with increased amount for benefits, a new label for the comprehensive benefit and was targeted towards primary caregivers, that is, the female parent in a dual parent household. We assess the impact of this policy change on the resource shares and preferences within the dual parent households. Using data from the Survey of Household Spending (SHS) from 2014 to 2019, we estimate changes in resource shares of the adult female (mother) and male (father) within the household, along with changes in their preference parameters using a collective model of the household. Our paper aims to inform researchers and policy makers how the different changes can affect household behavior in a collective household model.

To the best of our knowledge, our paper is the first to implement a difference-in-difference methodology using the changes in the child benefit policy, within a collective household model, to estimate changes in preferences and bargaining power. For the application of the

[1] co-authored with Krishna Pendakur

[2] We thank Dennis Ma for all his help at the Statistics Canada Research Data Center.

difference-in-difference methodology, the treatment group are dual parent households with children aged 0 to 18 years who are eligible to receive the child benefit and the control group are couples without children residing within the household and thus, not eligible to receive the CCB. The treatment is an indicator variable for the treatment group post change in the policy in June 2016. The identifying assumption here is that expenditures within households in the treatment and control group follow parallel trends, conditional on certain covariates. Any changes in the observed time path of households with children after the introduction of the CCB can then be attributed to the policy change.

We use the model of Lechene et al. (2022) to identify preferences and resources shares from estimates of linear Engel curves for clothing. The outcome variable of the reduced form model is the fraction of total household expenditure spent on a private assignable good. A private assignable good is one where the person level expenditure or consumption is observable. In this paper, we use clothing as the private assignable good since the data allows us to assign expenditure on clothing to men and women separately. The Engel curve relates this budget share to total household expenditure on all goods, at a fixed price vector.

Within the collective household model, we include the indicator for treatment such that it can affect preferences both directly, as well as through its effect on the resource share. This allows us to estimate the treatment effect on the parameters determining preferences and bargaining power. While a reduced form difference-in-difference estimation will allow us to estimate the treatment effect on observable variables, such as the budget share, expenditure and so on, this approach of blending difference-in difference methodology within the estimation of the structural model allows us to estimate the treatment effect on unobserved objects. Our unobserved objects of interest are: individual preferences for different goods; and, the resource shares of individuals within the household. Here, the resource share of an individual is the fraction of household expenditure spent on their consumption. Resource shares are influenced by bargaining power within the household, and are measures of the relative consumption of household members, therefore reflecting possible consumption inequality within households.

Existing literature has studied how child benefits affect behavior. Najjarrezaparast and Pendakur (2021) finds that the increase in the child benefits increased overall consumption and also suggests a possible effect of the change in the labeling as it increased expenditure on children, but not adults. Furthermore, they find heterogeneous treatment effects across renters and homeowners, and so we allow for that in our work as well.

Kooreman (2000) uses exogenous income from child benefits in Netherlands and finds that the marginal propensity to consume child's clothing from child benefits is higher than from other income sources. As the result holds for both two parents and single parent households, it suggests that it is the labeling effect of the child benefit that drives the change in marginal

propensity to consume for children, rather than the role of the recipients. The labeling of the benefit creates a moral obligation for the parents, mother or father regardless, to spend it on children's good. However, because these results focus on outcome variables that are directly observed, they do not speak to unobserved structural objects. With our model, we can distinguish between changes in behavior that stem from preference changes (due, e.g., to the moral obligations surrounding child benefits) and those that stem from changes in bargaining power. While our model does not estimate change in preferences for children's goods specifically, we do not find any overall changes in preferences towards adult's clothing arising from the introduction of the newly labeled CCB. This is suggestive of no significant change in preferences towards children's clothing either, in the context of Canada. We find significant changes in bargaining power of adults within home-owning households.

Bargaining power is often measured in the literature based on individuals' survey responses on questions about decision making within the household on reproduction, division of labor, health, social life, children's education and upbringing, finances and so on (Conference of European Statisticians Task Force, 2021). However, this may be erroneous due to differences in perception about contributions to decision making and may vary by contextual factors such as gender itself as illustrated in the findings by Acosta et al. (2020). Hence, our approach overcomes the issue of measurement error from unobservable biases by measuring intra-household bargaining power using structural estimates of resource shares within the household.

The CCB transferred money to the primary caregiver, that is, the mother in a dual parent household. Increasing the individual income of mothers may have increased their bargaining power with respect to fathers. Further, since child benefits follow children, and since mothers are more often custodial parents following divorce, this policy also enriched the outside option of married mothers. Therefore, one of our main focus is estimating the effect of this change on the resource shares of the mother and father within the household. We do find significant increases in resource shares for females within home-owning households. We provide two possible explanations for the heterogeneity in the treatment effect across homeowners and renters - the first explanation hinges on changes in the outside and inside option for women and the second explanation hinges on the difference in marginal price of shelter for homeowners and renters.

To the best of our knowledge, our paper is one of the first to study the effect of policy reform in child benefits on adult's preferences and resource shares using a structural model of the household. Structural models to study the effect of child benefits and child care has previously mostly focused on models of fertility and women's labor supply. Studies using US and Canadian data on subsidies paid on child care and increases in child benefits respectively find very small effects on female's labor force participation as well as fertility decisions (McNown and Ridao-cano, 2004; Ribar, 1995). Brink et al. (2007) compares a

Swedish child care fee reform against a possible alternative policy of increased child benefits using simulations of two discrete choice random utility models to show that overall welfare gains are higher from the child care fee reform while the increased child benefit makes income distribution more equal. Collective household models incorporating child benefits within the estimation has used the exogenous income from the benefit to test the income pooling hypothesis and the effect of targeting transfers to women (Lundberg et al., 1997; Alderman et al., 1995). These studies reject the income pooling hypothesis and suggest that resources controlled by women generally benefit the children. We contribute to this literature of structural models by using the change in the child benefit policy to implement a difference-in-difference methodology within the collective household model. This allows us to estimate the treatment effect of a change in the policy on structural parameters defining adults' preferences within the household.

Our findings contribute to the vast literature on the effect of targeting resources towards women. Lundberg et al. (1997) found that a shift in control of child allowance from fathers to mothers due to a policy change in the UK led to an increase in expenditure on women's and children's clothing. Other than government benefits, different forms of cash transfers have been targeted towards mothers. Attanasio and Lechene (2014) uses the targeted cash transfers of PROGRESA, a welfare program in rural Mexico, as a distribution factor to test whether they are channeled through only the sharing rule. The paper shows that the collective model can be used to explain the impact of the program on the structure of food expenditure and also cannot reject efficient decision making within the household. Armand et al. (2020) analyze a policy intervention in the Republic of North Macedonia where conditional cash transfers to mothers or fathers were randomized across municipalities and finds that targeting transfers to women led to increased expenditure on food and a more nutritious diet. Almås et al. (2018) use participants from the same intervention to elicit willingness to pay for a cash transfer in an experimental setting and uses it as a measure of empowerment to show that women who received the targeted cash transfers had stronger empowerment. Our findings align with the literature as we find that the targeted child benefit results in increased resource shares of women, except for the nuanced finding that this increase is significant only among homeowners. Given the previous finding in literature that resources controlled by women tend to benefit children, it suggests that the policy change can be beneficial for children. As our paper provides further insight that resource shares increase only among homeowners and not renters, it suggests further research is required on the heterogeneous effects of targeting transfers based on home ownership.

Our paper also contributes to the literature that analyzes the effect of changes in child benefit policies. A large body of literature focuses on how such policy changes affect expenditure within the household. Studies have found that changes in child benefit policies, such as increased amount of benefits, and changes in its structure increase expenditure on

children or bring about improvement in the environment for children and thus their physical and mental health (Milligan and Stabile, 2009, 2011; Kooreman, 2000; Hener, 2017). In response to the CCB, Najjarrezaparast and Pendakur (2021) found significant changes in consumption when looking at households below median income. The paper shows that rental-tenure households increased their annual consumption by roughly $3000 in response to the policy change, the composition of change being around $700 on food, on shelter by nearly $1400 and on children's clothing by around $300. Further, they find mild evidence of households with more children increasing spending on shelter by much more than those with fewer children. Given these existing findings, our paper focuses on how the changes in the child benefit policy affect preferences and resource shares of the adult female and male within the household. This can be a potential mechanism driving the changes in expenditure on children found in the existing literature. We find little or no evidence of changes in preference from labeling of the child benefit, while there is a sizable increase in women's resource shares due to targeting the benefits towards females. The latter effect is specific to home-owning households and not renters. Our findings therefore suggest that firstly, the targeting of the policy as opposed to the labeling can have a more beneficial impact on children; secondly, the impact on children's welfare can vary based on home ownership due to outside options or marginal price of shelter which should be brought into consideration when making policy reforms.

1.1.1 Canada Child Benefit Policy

In 2016, the Government of Canada introduced the Canada Child Benefit (CCB), a tax-free transfer to families with children conditional on income levels. Previously, there was a complex system of child benefits provided through the Universal Child Care Benefit, the Canada Child Tax Benefit, and the National Child Benefit. The introduction of the CCB resulted in all the benefits being combined under the single label of the Canada Child Benefit. Though the benefits are not required to be spent directly on the children, the labeling of the benefit as child benefit could lead to adults feeling morally obligated to direct the benefits received towards the child.

The CCB led to a significant rise in child benefits, the maximum benefit being $6,400 for children under six and $5,400 for children aged 6 to 17, payable to families with net incomes below $30,000. At higher family incomes, the benefit is reduced at claw-back rates that vary with the number of children and income bins. The increase in child benefits was large for the households below the median of the income distribution with them receiving an additional amount of approximately $2,300 per child per year (Government of Canada, 2016).

The CCB essentially plays the role of a basic income scheme for households with children. For instance, a household with zero income would receive around $6,000 per child annually regardless of their employment status under the CCB. When that same household starts

earning some market income, the amount of benefits they receive remain the same unless the income exceeds $30,000 per year. After that, their CCB is "clawed back" based on their income levels until the household earns an income in excess of $150,000 after which they no longer receive benefits.

The other structural change brought about by the introduction of the CCB is that it is paid to the parent who is considered the primary caregiver of the child. As per CRA (2019), if a household has two individuals of the opposite sex who are spouses or common law partners residing along with the child(ren), the female parent is considered the parent who is primarily responsible for the care of the children at home and the female parent receives the CCB unless notified otherwise. Hence, as we do not have data on exceptions of households where the male parent receives the CCB, in this paper, we assume that in a dual parent household with children, the female parent is the one receiving the benefits. If anything, this assumption underestimates our results of the effect of the CCB on bargaining power of the parents.

Therefore, given these changes, the CCB can affect within household expenditure shares in at least three ways: (1) budget effect: due to the significantly increased amount of benefits, it will have a direct impact on the household budget; (2) labeling effect: as the entire amount is now labeled child benefit, it may directly shift preferences of parents regarding how they spend the transfer; (3) targeting effect: finally, since the benefit is paid to females in dual parent, male-female households, the CCB can have an effect on the intra-household bargaining power and resource shares.

In the next section, we introduce the structural model that allows us to decompose the treatment effect into these three separate channels - budget, preferences and resource shares. Section 1.3 describes the dataset used for the the empirical analysis. We then provide an analysis of the pre-trends in Section 1.4 for ensuring a valid comparison group for implementing the difference in difference methodology, followed by the estimation results in Section 1.5. Finally, we discuss potential explanations for the findings in Section 1.6 and conclude in Section 1.7.

1.2 Model

We use the collective household model of Browning et al. (2013) (which we will refer to as BCL) on which we impose the identifying restrictions of Dunbar et al. (2013) (referred to as DLP from hereon) and use the linear estimator from Lechene et al. (2022) (hereafter referred to as LPW). In the collective household model, maximizing the household's objective function is analogous to a decentralized allocation due to Pareto efficiency of the household's resource allocation process. This allows conceptualization of the household's behavior as creating budget constraints for household members characterized by shadow budgets and

a household level shadow price vector. These are unobservable and different from observed household budget and market prices due to economies of scales arising from partial sharing of goods introduced in BCL. BCL did not require goods to be purely public or purely private. Shadow budgets add up to the total household budget and each individual's share of the household budget is the *resource share*. These are not equal across household members due to differences in bargaining power, and has a one-to-one correspondence with Pareto weights on individual utilities in the household's maximization problem.

Imposing restrictions from DLP on the interaction between prices and consumption technology function in the collective household model allows us to identify resource shares from data that does not contain price variation. The resource shares are identified using Engel curve functions of households facing a single price vector taking the form of the Almost Ideal demand system of Deaton and Muellbauer (1980). This requires the demand functions for one type of private assignable good, which are not consumed jointly by individuals, and the consumption can be assigned to types of individuals, such as clothing for male and female. We also impose the restriction from DLP that resource shares do not vary with total expenditure and that preferences are similar, not identical across people (SAP). SAP basically imposes a shape-invariance restriction only on the Engel curves of the private assignable goods.

Finally, we implement the theory-consistent linear reframing of DLP from LPW. This allows us to use a linear estimator of the household model which simplifies the methodology and allows us to overcome computational difficulties. LPW re-writes the model of DLP in a linear reduced form where the structural parameters, that is, resource shares and preference parameters, are non-linear functions of the reduced form estimates.

1.2.1 Setup

This section details the notation and setup of the proposed collective household model where the household is efficient, that is, allocations within the household are Pareto optimal. Let $i = m, f$ index adults (male and female respectively) within the household. Let $N = \sum_i N_i + N_c$ be the total number of individuals in a household where N_c is the number of children within the household.

In the model, unlike DLP, we assume that decision making is carried out by adults, and children are considered as attributes of the household, or, equivalently, spending on children is a non-assignable private good[3]. y denotes the observed household budget. The share of

[3]We choose this specification due to the model requiring that the Engel curves of all individual types have slopes in the same direction. Within the population we are studying (Canadian households), the Engel curves with regards to the private assignable good for which data is available (clothing) have slopes with same signs for adult male and female, while the slope has the opposite sign for children's clothing. That is, clothing is a necessity for adults and inferior good for children.

household budget allocated to adult i is denoted η_i. These resource shares are such that $\sum_i \eta_i = 1$. They can depend on household budgets, prices and other factors. Following DLP, we assume that the resource shares do not depend on the budget[4], that is, $\eta_i(y) = \eta_i$. Furthermore, we estimate the resource shares at a fixed price vector $\mathbf{p}$ as in DLP and LPW[5]. Each adult, $i = \{m, f\}$, within the household gets a personal budget equal to $\eta_i \cdot y$ which is an unobserved shadow budget based on their resource share and the total household budget[6].

To estimate resource shares, we use household level consumption data of assignable goods. Assignable goods are those for which we can observe the expenditure on or the quantity consumed of, by each type of individual. In this paper, we use clothing as an assignable good where expenditure on clothing for males and females is separately observed. Let w_i be the Engel curve function of adult i for clothing. This is the unobserved function determining what an individual would consume if facing a budget constraint. Let W_i be the household-level budget share for clothing of adult i. W_i is defined as the expenditure on clothing of i as a proportion of the total household budget. This is an observed function based on what the individual within the household does consume.

Define $\mathbf{z} = [\mathbf{s}\ \mathbf{B}]$ as a vector of preference shifters where $\mathbf{s}$ is a vector that include demographics and other factors that affect both preferences and resource shares. $\mathbf{B} = [K\ P\ T]$ is a vector where K is an indicator variable for having children (kids) eligible for the child benefit, P is a dummy indicating calendar time following the change in the child benefit policy (post-treatment), and T is an interaction term between K and P. Dual parent households that do not receive the child benefit policy include households without children and act as the control group ($K = 0$). Couples with children eligible for the child benefit policy make up the treatment group ($K = 1$) such that for this group, T is equal to zero in the period before the policy change and is equal to 1 after the policy change. The dollar value of the CCB received by each family depends on the number of children and income levels of the household. Its dependence on the age of children is relatively small. In contrast, the CCB is roughly linear in the number of children (that is, its value for a household with 2 children is twice that of a household with 1 child). In this work, we treat the policy change as a dichotomous variable by conditioning all relevant parameters on the number of children and

[4]There is some empirical evidence in the literature that supports this assumption (Cherchye et al., 2015; Menon et al., 2012). Note that we allow the resource shares to depend on other variables - preference shifters and distribution factors. Since we can condition on these variables, we suppress the conditioning here for simplicity.

[5]We do not observe market prices, and are thus unable to estimate shadow prices, that is, the within-household prices of consumption that accounts for economies of scale.

[6]Our estimation is restricted to households with one adult male and one adult female and thus, the shadow budget does not have to be adjusted for number of individuals of each type $i = \{m, f\}$

household budget (as a proxy for income level of the household). Heterogeneous treatment effects across renters and homeowners show up as interaction of the treatment (T) with an indicator variable for renters.

Let the individual Engel curve functions be given by the Almost Ideal demand system of Deaton and Muellbauer (1980) so that $w_i(y) = \alpha_i + \beta_i \ln y$. Substituting this in BCL, the budget shares for adults ($i = \{m, f\}$) is given as:

$$W_i = \eta_i(\mathbf{z})[\alpha_i(\mathbf{z}) + \beta(\ln y + \ln \eta_i(\mathbf{z}) - \ln N_i)] \tag{1.1}$$

where $\eta_i(\mathbf{z}) = \eta_i(p, \mathbf{z})$ is the resource shares at fixed prices p.

Note here that shadow prices faced by each type can still vary, as it depends on preference shifters and number of household members. The assumption here is that the child benefit policy does not affect the shadow prices, which is credible because changes in the labeling, amount of child benefits, and who receives it should not directly affect the economies of scale in household consumption. This functional form of the Engel curve also assumes Similarity Across People (SAP), that is, preferences are similar, but not identical across people such that $\beta_m = \beta_f = \beta$ (Dunbar et al., 2013; Lechene et al., 2022).

As in DLP, the resource shares are identified here through the relative magnitude of the semi-elasticities of the observable budget. It is the household's response to changes in the budget for the different types of individuals which identifies the resource shares, irrespective of the levels of the budget. For instance, if the household's response to an increase in the budget is higher for female's clothing, then the women's resource share is larger, even if the man's Engel curve is higher than women's. Additionally, to simplify the estimation of resource shares, we impose linear restrictions on the parameter β such that it does not depend on $\mathbf{z}$, further discussed in details in the next section.

1.2.2 Estimation of Resource Shares and Preference Parameters

Following LPW, we adopt a theory-consistent linear reframing of the collective household model described above. In order to reduce the complexity of the non-linearity of the equations, we restrict the preference shifters that enter the Engel curve equation through the budget and the resource shares. Let $\mathbf{z} = [\mathbf{s}\ \mathbf{B}] = [\mathbf{z_c}\ \mathbf{z_s}\ \mathbf{B}]$ such that preference shifters $\mathbf{s}$ are distinguished as $\mathbf{z_c}$ and $\mathbf{z_s}$. The vector $\mathbf{z_s}$ includes preference shifters that affect both preferences and resource shares such as ages of the household members, household size, home ownership and so on. The other preference shifters ($\mathbf{z_c}$) only affect preferences and not resource shares. In this paper, these include control variables for year, month, province of residence and city size. This restriction is imposed to reduce the complexity of the esti-

mation and we provide tests to show that variables in $\mathbf{z_c}$ indeed do not have any effect on the budget shares through the household budget[7].

As mentioned earlier, as Najjarrezaparast and Pendakur (2021) finds heterogeneous treatment effects across homeowners and renters, we include an indicator variable for renter (denoted R) in $\mathbf{z_c}$. We also interact the renter dummy variable with the treatment variable T. We thus have $\mathbf{B} = [K \;\; P \;\; T \;\; T \times R]$ where T allows us to identify the treatment effect on homeowners, and the interaction term $(T \times R)$ allows identification of the treatment effect on renters [8].

Applying the theory consistent linear reframing from LPW, let the shadow budget for parents ($i = \{m, f\}$) in the couples' household (that is, Equation 1.1) take the following linear form:

$$W_i(y, \mathbf{z}) = a_i(\mathbf{z}) + b_i(\mathbf{z}) \ln y + \varepsilon_i$$

Given the restriction imposed on preference shifters ($\mathbf{z_c}$) only affecting the preferences and not resource shares, the Engel curve equation can be rewritten as:

$$W_i(y, \mathbf{z}) = a_i(\mathbf{z_c} \; \mathbf{z_s} \; \mathbf{B}) + b_i(\mathbf{z_s} \; \mathbf{B}) \ln y + \varepsilon_i \tag{1.2}$$

Here, aligning Equation (1.1) and (1.2), we have

$$a_i(\mathbf{z}) = \eta_i(\mathbf{z_s} \; \mathbf{B})[\alpha_i(\mathbf{z_c} \; \mathbf{z_s} \; \mathbf{B}) + \beta \ln \eta_i(\mathbf{z_s} \; \mathbf{B}) - \beta \ln N_i]$$

and

$$b_i(\mathbf{z_s} \; \mathbf{B}) = \eta_i(\mathbf{z_s} \; \mathbf{B})\beta.$$

Since $\Sigma_i \eta_i(\mathbf{z_s} \; \mathbf{B}) = 1$, we have $\Sigma_i b_i(\mathbf{z_s} \; \mathbf{B}) = \beta$. So, we can rearrange to get

$$\eta_i(\mathbf{z_s} \; \mathbf{B}) = b_i(\mathbf{z_s} \; \mathbf{B}) / \sum_i b_i(\mathbf{z_s} \; \mathbf{B}) \qquad i = \{m, f\} \tag{1.3}$$

[7]Note that these restrictions are not required for identification of the parameters in the model and are only imposed for simplicity in estimation.

[8]We do not include interaction terms of the renter dummy with indicator for households with children $(K \times R)$ and indicator variable for calendar time post policy change $(P \times R)$. This is because we test for joint significance of the coefficients of these terms in our model and get a chi-square statistic such that we cannot reject the null hypothesis that the terms are jointly not significantly different from zero (test statistics provided in Table A.21). As a robustness check, we also provide results including these interaction terms in the model (results in Section A.2.8). There is still a positive significant treatment effect on the bargaining power of females among homeowners, but the difference in the treatment effect between homeowners and renters becomes insignificant. The treatment effect on the preference parameters remain qualitatively similar.

Approximate the model by letting

$$a_i(\mathbf{z}) = a_i(\mathbf{z_c}\ \mathbf{z_s}\ \mathbf{B}) = a_{i0} + a_{iK}K + a_{iP}P + a_{iT}T + a_{iz_c}\mathbf{z_c} + a_{iz_s}\mathbf{z_s} \tag{1.4}$$

and

$$b_i(\mathbf{z_s}\ \mathbf{B}) = b_{i0} + b_{iK}K + b_{iP}P + b_{iT}T + b_{iz_s}\mathbf{z_s} \tag{1.5}$$

As the Engel curves take the form of the Almost Ideal demand system, the structural parameter β is independent of $\mathbf{z}$ which implies the following linear restrictions:

$$\sum_i b_{iT} = \sum_i b_{iK} = \sum_i b_{iP} = \sum_i b_{iz_s} = 0 \tag{1.6}$$

These restrictions imply that the preference parameter governing the budget response of expenditure on clothing share of individuals does not vary with the preference shifters. We impose this restriction for two reasons. First, since the resource shares are estimated from Equation (1.3), the resource share would be undefined if β, the denominator came too close to zero. This restriction reduces the possibility of the denominator $(b_{m0}+b_{f0})$ being close to zero. Furthermore, the marginal effect of a covariate on the resource share does not depend on values of the covariates ($\mathbf{z_s}$ and $\mathbf{B}$). For robustness check, we provide the estimation results without imposing these restrictions in Section A.2.3 which show that estimates do not differ much and the results hold qualitatively.[9].

Given these linear restrictions, we have $\sum_i b_i(\mathbf{z_s}\ \mathbf{B}) = b_{m0} + b_{f0}$, implying the following parametric structure for resource shares which is linear in the variables:

$$\eta_i(\mathbf{z_s}\ \mathbf{B}) = \frac{(b_{i0} + b_{iK}K + b_{iP}P + b_{iT}T + b_{iz_s}\mathbf{z_s})}{(b_{m0} + b_{f0})}. \tag{1.7}$$

b_{iT} identifies the treatment effect on the resource shares:

$$\frac{\partial \eta_i(\mathbf{z_s}\ \mathbf{B})}{\partial T} = \frac{b_{iT}}{(b_{m0} + b_{f0})} \tag{1.8}$$

So the z-test on $\frac{b_{iT}}{(b_{m0}+b_{f0})} = 0$ is a test of the whether or not the change in the child benefit policy had any effect on the resource shares.

[9]We find no significant treatment effect on $\beta(\mathbf{z_s}\ \mathbf{B})$ when we estimate the model without imposing these linear restrictions from Equation (1.6) further providing justification for imposing these linear restrictions. Estimates of β and treatment effect on β are provided in Table A.8 and Table A.11.

Since, by assumption (from linear restriction 1.6), β does not respond to the treatment, the only preference effect is through α_i. We solve for α_i as follows:

$$\alpha_i(\mathbf{z}) = a_i(\mathbf{z})/\eta_i(\mathbf{z_s}\ \mathbf{B}) - \beta \ln \eta_i(\mathbf{z_s}\ \mathbf{B})$$

and we identify the treatment effect on preferences by computing the following difference:

$$\alpha_i(T=1, P=1, K=1, \mathbf{z_c}, \mathbf{z_s}) - \alpha_i(T=0, P=1, K=1, \mathbf{z_c}, \mathbf{z_s}) \tag{1.9}$$

We use Hansen (1982)'s generalized method of moments (GMM) to estimate the system of equations for budget shares of the adults within couples' households. That is, we estimate Equation (1.2) for $i = \{m, f\}$ where $a_i(\mathbf{z_c}\ \mathbf{z_s}\ \mathbf{B})$ and $b_i(\mathbf{z_s}\ \mathbf{B})$ take the forms of Equation (1.4) and (1.5). The model can also be estimated using equation-by-equation ordinary least squares (OLS) or seemingly unrelated regression (SUR). While using equation-by-equation OLS would be consistent, its associated inference would only be equivalent to SUR if the error terms of the budget shares were uncorrelated across equations for each individual type. This is not plausible as the error terms include factors affecting budget shares of adults within the same household and are likely to be correlated. Hence, SUR is preferred over OLS. However, we choose to use GMM over SUR since given the restrictions imposed by equation (1.6), SUR would be exactly identified whereas GMM is overidentified. Thus, using GMM, we can test the validity of the overidentifying restrictions in (1.6) by computing the Hansen's J statistic. Furthermore, if we expect the household budget to be endogenous and choose to use instrumental variables, the GMM estimator has the same number of degrees of freedom when using exogenous and endogenous regressors. This allows us to compare the two scenarios to determine if instrumenting is necessary by using the Hausman test.

Errors are clustered by province, the number of children, year and month. This is because firstly, Jones et al. (2019) suggests that since the child benefit policy in Canada not only vary by province, but also by the family size, errors should be clustered by province times number of children. Furthermore, seasonal changes usually affect clothing expenditure. So, we further cluster by year and month. This happily has the side effect of circumventing the issue of few clusters (Bertrand et al., 2004) which could otherwise lead to an underestimation of cluster adjusted standard errors.

1.3 Data

We use the Survey of Household Spending (SHS), a national monthly survey with data on household spending patterns, from 2014 to 2019. The survey collects data on household characteristics, spending and savings, housing and dwelling characteristics, income, pensions, spending and wealth. It is primarily used for deriving expenditure weights used

in calculating the Consumer Price Index and additionally used for investigating consumer demand behavior. The data is collected using both a questionnaire (interview) and an expenditure diary. The questionnaire is generally used to collect expenditures for more expensive, and less frequently purchased goods and services. The diary is used to collect expenditures for smaller, less valuable items that are purchased more frequently and could be more difficult to recall. However, the diary sample is much smaller and thus, this paper uses data from the interview only.

As described in Najjarrezaparast and Pendakur (2021), there are three features of the SHS that allow us to evaluate how the policy change affected spending. These three features are: (i) repeated cross-sectional data over the time frame; (ii) data on birth year and month allowing us to calculate the age of each household member; and (iii) person level data on expenditure on clothing and footwear. To elaborate on these, first of all, each year of the SHS has around 12,000 observations of households, with roughly 1,000 sampled in each calendar month. Thus, we observe repeated cross sections of households at the calendar-month level over 48 months from January 2014 to December 2017. Secondly, using SHS information on the birth month and year of every household member, we exactly identify the age of each household member given the month and year of survey. This allows us to identify households eligible for CCB by calculating the number of children aged less than 18 in the month prior to the survey date. Finally, detailed retrospective spending for different expenditure categories is collected. This includes person level spending in previous month for food, in previous 3 months for clothing and in the past year for categories such as household furnishings. We use the person level expenditure data on clothing and footwear to calculate budget shares and estimate the effect of the change in CCB on bargaining and preference parameters within the household.

We restrict our analysis to households with one male adult and one female adult (that is, $N_m = 1$ and $N_f = 1$) with a maximum age of 65 years of either adult. The sample comprises of households with no children, adult children who no longer live in the household or with at most three children. We also drop a small number of households[10] where the number of children one month prior to the survey is not the same as number of children three months prior to survey. The eligibility or the amount received from CCB during the sample period would change for these households and thus, we drop them from the sample to avoid possible measurement error.

Household expenditure is measured as the total of expenditure on food, shelter, transport, health, recreation and other household operating expenses, excluding any form of investment expenditure. Excluded investment expenditure on transport includes purchase

[10]The number of households dropped is less than 1% of the sample. Exact number is not reported due to confidentiality requirements of the SHS data agreement.

of recreational and all terrain vehicles, automobiles, sports utility vehicles, vans and trucks. Investment expenditure on shelter in the form of mortgage paid on owned principle residence is also excluded.

Expenditure on shelter mainly comprises of rent including utilities. However, this data is not available for homeowners in the data. Hence, we impute rent homeowners would have paid for their dwelling based on number of bedrooms, bathrooms, repairs required, how crowded the dwelling is and the period the dwelling was constructed in. Year and province dummies are also included in the specification to account for yearly trends in rent and province specific differences in housing costs. In the main specification, we use imputed rent for both renters and homeowners to ensure that any systematic measurement error is not arising from the imputation. However, we provide robustness checks using imputed rent for only homeowners and actual reported rent for renters[11].

Potential endogeneity concerns arise as measures of household expenditure often have measurement error (say, due to recall inconsistency). Furthermore, our measure of total household expenditure includes imputed rent for all households which could accentuate this measurement error. In addition, as our dependent variable is budget share where the denominator is total household expenditure, our regression model has household expenditure on both the right hand and left hand side of the budget share equations. To address these endogeneity concerns, we instrument household expenditure with total household income. Household income is less likely to have measurement error (say, recall is easier as most individuals know how much they earn from payroll). We provide the results from Hausman test to evaluate the consistency of the efficient OLS estimator by comparing results with the consistent, less efficient estimates when instrumenting household budget. We drop observations in the bottom and top 1% of the expenditure and income distribution to exclude possible outliers from the sample.

Clothing budget shares of man, woman and children are defined as the total expenditure on clothing for each type over total household expenditure. Demographics include ages of man, woman and average age of eligible children within the household, an indicator if the household is a renter as opposed to an owner and number of children in the household. Year and month dummies are included to control for time trends and province dummies are included to account for time-invariant, province specific factors. Our distribution factors ($\mathbf{z_s}$) include all these variables except for year, month and province dummies. This assumes

[11]We also ran the GMM estimation without included shelter expenses in the household expenditure to reduce possible measurement error from imputing rent. However, the reduced form estimates (provided in Table A.5) show higher standard errors suggesting that including shelter does not increase measurement error. Furthermore, as expenditure on shelter comprises a large portion of expenditure for Canadian households, we choose to include shelter expenses in all our specifications.

that the slope of the budget share with respect to household expenditure does not vary with year, month and province.

Table 1.1: Summary Statistics

	All		Treated		Untreated		Treated vs untreated
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation	Difference
Demographics							
Age: Male	43.51	11.19	40.14	7.36	46.76	13.11	-6.62***
Age: Female	41.29	11.12	37.60	6.75	44.85	13.16	-7.26***
Average age of children	3.57	4.91	7.27	4.72			7.27***
Number of children	0.91	1.04	1.85	0.68			1.85***
Proportion of renter (Renter dummy)	0.24	0.43	0.23	0.42	0.26	0.44	-0.03***
Proportion of households with children	0.49	0.50					
Expenditure in dollar amounts							
Total household expenditure	40,990	14,573	44,503	15,124	37,605	13,163	6898.23***
Expenditure on:							
Food	7,986	3,967	9,240	4,216	6,777	3,287	2462.86***
Household operations	1,646	2,846	1,646	2,842	1,645	2,850	1.30
Clothing	3,035	2,883	3,787	3,053	2,311	2,505	1476.05***
Transportation	11,845	14,647	12,444	14,751	11,268	14,523	1176.09***
Health	2,794	2,586	2,790	2,563	2,799	2,607	-8.71
Recreation	5,044	6,796	5,546	6,908	4,560	6,651	986.22***
Shelter (Imputed rent expenditure)	40,990	14,573	44,503	15,124	37,605	13,163	1383.65***
Total household income	104,842	60,676	108,229	59,642	101,580	61,483	6649.17***
Share in total household expenditure of:							
Adult clothing: Male	0.020	0.024	0.017	0.019	0.022	0.027	-0.005***
Adult clothing: Female	0.031	0.030	0.026	0.025	0.036	0.034	-0.010***
Children's clothing	0.019	0.029	0.038	0.031			

Summary statistics (weighted by the population weights) is provided in Table 1.1. Columns (1) and (2) report the mean and standard deviation of the variables for the total sample, columns (3) and (4) for the treated population, that is, households eligible for CCB and columns (5) and (6) for the households without children. Columns (7) and (8) provide a t-test of the significance of the difference in these variables across the treated and untreated population.

In the overall sample, average age of males and females is around 44 and 41 years respectively. Average age of children within the treated population is around 7 years and number of children is around 2. The proportion of renters in the total sample, as well as the treated and untreated population is around 23 to 26%. The proportion of households with children,

that is, treated population, is around 49%[12]. Columns (7) and (8) show that these demographic characteristics vary significantly across the treated and the untreated population and therefore we ensure controlling for these variables, along with total household expenditure. We also report the breakdown of household expenditure across different sub-categories. Finally, the table presents the share of adult and children clothing in total household expenditure which also varies significantly across the treated and untreated population. This is somewhat expected given the household composition since treated households are likely to direct some spending towards their children away from adult clothing.

1.4 Pre-trend

In this section, we provide the test for pre-trend, and provide some evidence to support the difference-in-difference strategy. We test whether couples with children eligible to receive the benefits would have followed the same trend as couples who are not eligible for the benefits (that is, either has no children or children aged above 18 not living within the same household), had they not received the treatment. This test aims to show that our control group serves as an appropriate counterfactual for estimating the treatment effect of the CCB on the resource shares. In other words, it shows us if the treatment and control group were following parallel trends prior to the change in the CCB so that we may feel comfortable that changes in the slope of the trend-line of the treatment group after the CCB can be attributed to the policy change.

Thus, for the pre-trend test, first, we restrict the sample to the period prior to the policy change, that is, from January 2014 to July 2016. We then estimate equation (1.2) using our main estimation strategy, that is - we include imputed rent for all households when measuring household expenditure; cluster errors at province, number of children, year and month; and impose summation restrictions on the slope coefficients (Equation 1.6). We then include interaction terms between indicator variables for year and month. Finally, we include interaction terms between dummy variables for year and month and the indicator variable for being in the treatment group (K). The test for parallel trends is undertaken through a joint test of significance of the coefficient estimates of these latter interaction terms. We include the interaction terms within both the slope and the levels of the budget share equations. The coefficients on these terms represent time trends within the relevant parameters of couples with eligible children relative to the control group.

The test for significance of these coefficients jointly in *both the slope and the constant term* gives a chi-square test statistic of 211.05 with a p-value of 0.00 which means we can reject

[12]The unweighted number of households in the sample and the sub-categories of treated and untreated population cannot be disclosed due to confidentiality requirements of the Statistics Canada Research Data Center.

the null hypothesis that these interaction terms are jointly zero. This is mostly driven by the test of joint significance of these coefficients *within the level term* which gives a chi-square test statistic of 83.24 and a p-value of 0.025 for the coefficients in the level. Thus, we can reject the hypothesis that these interaction terms affecting the level of the Engel curves are jointly equal to zero at the significance level of 2.5%. This suggests that the pre-trend of the level of the Engel curves may not follow parallel trends. Hence, the treatment effect on α_i should be interpreted with caution.

We get a chi-square test statistic of 72.06 and a p-value of 0.14 for the joint test of significance of the coefficients *in the slope term*. Hence, we fail to reject the null hypothesis that the coefficients of the interaction terms in the slope of the Engel curve is jointly equal to zero suggesting that the treatment group and the control group follow parallel trends in the slopes[13]. This implies that the time trend in the slope of Engel curves for clothing of dual parent households eligible for CCB was not significantly different from that among couples who were not eligible for the CCB. This is suggestive of our control group being a valid counterfactual for the treatment group, particularly for the estimation of treatment effect on the resource shares.

1.5 Results

1.5.1 Reduced form estimates

Before discussing the results from the GMM estimation, we first look at the treatment effect of the policy change on log of household budget using an OLS regression (shown in Table 1.2). The point estimates for the treatment effect on household budget is not significant. While this suggests no increase in total consumption from the additional benefits, it does not say much about possible shift in spending patterns within the household. Potential reasons for no effect on total household expenditure could be that the additional funds are not going towards consumption and instead being used for savings (say, for future expenses of the children) or for other investments (say, upgrades in housing, mortgage payments and so on).

This finding is in contrast to Najjarrezaparast and Pendakur (2021) (referred to as NP hereon), who find a positive significant treatment effect on total household budget among renters and within the total sample, but no significant effect on owners. The difference in our findings can arise for a multitude of reasons. First of all, our measure of household expen-

[13]Results are similar when the specification does not instrument for household expenditure. When using robust standard errors, for both with and without instruments, we always fail to reject that coefficients of the treatment variable interacted with year and time dummy is jointly equal to zero, for both the slope and the level terms. This provides evidence for parallel trends in the Engel curves of the treatment and control group. Results provided in Table A.1

diture includes imputed rent while theirs does not. Additionally, our sample is restricted to households with one adult male and one adult female, with or without children. The sample in NP includes households with 1 to 4 adults, with or without children. NP also restricts their sample to those below median income. If we do the same, we similarly see a significant positive treatment effect on renters. We still do not observe a significant point estimate of the treatment effect on household budget within the total sample. This could be because within our total sample, only 27% are renters whereas renters make up 53% of the sample in NP. Overall, even though we do not find any significant change in the household budget from the change in CCB, we can still expect to see within household change in preferences and resource shares stemming from the labeling and targeting channels.

Table 1.2: Treatment effect of CCB on household budget

	Total sample			Below median income		
	(1) Overall	(2) Renters	(3) Owners	(4) Overall	(5) Renters	(6) Owners
Treatment effect on log of household budget	0.001	0.021	-0.003	0.006	0.048**	-0.010
	(0.012)	(0.027)	(0.013)	(0.009)	(0.019)	(0.011)

Standard errors clustered at province, the number of children, year and month in parentheses
*** p<0.01, ** p<0.05, * p<0.1.
Household budget includes imputed rent for homeowners as in out main specification

We now present the results from the GMM estimation of the system of equations comprised of adults' budget shares within the households (Equation (1.2) for $i = \{m, f\}$). As mentioned in previous sections, our main specification uses imputed rent for both owners and renters[14]. A renter dummy and an interaction term between the renter dummy and indicator for treatment is included to allow for heterogeneous treatment effects between homeowners and renters[15]. Our specification also uses log of income as an instrument for log of household expenditure[16]. We present results for both specifications - with and without instruments along with Hausman test results for parameter estimates. Our main specification clusters

[14]Results using imputed rent for only owners and actual rent for renters remain qualitatively the same (provided in Section A.2.7).

[15]Results excluding the renter dummy and interaction term is provided in Section A.2.1.
We also provide the results when additionally including interaction terms of the renter dummy with indicator variables for households with children, and months post policy change in Section A.2.8. The treatment effect on the preference parameters and the bargaining power of homeowners is still robust across specifications. However, the difference in treatment effect between owners and renters is not robust across different specifications when we include these interaction terms.

[16]Results from using squared log of income as instruments for household expenditure are provided in Section A.2.6.

standard errors by province, number of children and year-month[17]. Finally, we impose the linear restrictions from Equation (1.6) on the slope term[18]. The reference group for the estimation, that is, when all covariates in $\mathbf{z}$ are equal to zero, refers to households in Ontario, in a population center of 100,000 or over, in June 2016 with two children where the children's average age is normalized to 10 and adult's age is 40[19].

Table 1.3: Reduced form estimates of constant and slope of budget share

	IV estimates		OLS estimates	
	(1) female	(2) male	(3) female	(4) male
a($\mathbf{z} = 0$)	0.020***	0.015***	0.023***	0.016***
	(0.002)	(0.002)	(0.002)	(0.001)
b($\mathbf{z} = 0$)	0.034***	0.012***	0.023***	0.013***
	(0.005)	(0.004)	(0.002)	(0.002)
Instrument for log of budget	Yes (with log of income)		No	

Standard errors clustered at province, the number of children, year and month in parentheses
*** p<0.01, ** p<0.05, * p<0.1.
IV estimates refer to GMM estimation instrumenting household budget/expenditure with income. OLS estimates refer to GMM estimation without instrument for household budget.

We first present the reduced form GMM estimates in Table 1.3. The coefficients in the system of equations of the Engel curves for $i = \{m, f\}$ are evaluated for the reference group. The constant term (a_i), that is, the level of the Engel curve is significant for both male and female. However, this does not play a role in the identification of the model. The slope of the Engel curve (b_i), is positive and significant at the 1% level for both adults. This suggests that clothing is a normal good for adults in Canadian households. For the identification of the model, we require the Engel curve to have non-zero slopes in the same direction for both adults. For our sample, among the reference group, we have positive slopes for both adults and so this condition is satisfied. Further, for estimation of the resource shares, we need the sum of b_m and b_w (that is, β) to be significantly different from zero as can be seen from Equation (1.7). This condition is also satisfied as the sum of the two coefficients is positive and significant at the 1% level. This gives us reassurance that our model is identified and the resource shares can be estimated.

[17]Results using only robust standard errors are qualitatively similar and provided in Section A.2.4 and Section A.2.5

[18]Results from relaxing this restriction are provided in Section A.2.3.

[19]For simplicity, we refer to this as $\mathbf{z} = \mathbf{0}$ without making the distinction between $\mathbf{z_c}$ and $\mathbf{z_s}$.

Next, we look at the coefficient estimates of the treatment effect from the reduced form regression (Table 1.4). Columns (1)-(3) provide results for the specification including instruments for log of household budget and columns (4)-(6) provides the results without instrumenting. The Hausman test statistic, which tests the consistency of the estimator without instrumenting for household expenditure against the less efficient estimator which uses the instrument is reported in column (7). The Hausman test statistic for the coefficient of the treatment effect on both the level and the slope for homeowners is such that we reject the null hypothesis at the 5% significance level. In other words, we reject the null hypothesis that both these estimators are consistent. Therefore, we lean towards using the specification instrumenting for household expenditure as our main specification and discuss those results.

Table 1.4: Reduced form estimates: Treatment effect

	IV estimates			OLS estimates			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	female	male	diff	female	male	diff	H-stat
Homeowner: Treatment effect	0.002	-0.001	0.003**	0.001	0.000	0.001	6.812
on level (a)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	
Renter: : Treatment effect	0.001	0.000	0.001	0.001	-0.001	0.002	0.901
on level (a)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	
Homeowner: Treatment effect	0.011***	-0.011***		0.004*	-0.004*		11.377
on slope (b)	(0.004)	(0.004)		(0.002)	(0.002)		
Renter: Treatment effect	-0.013**	0.013**		-0.007***	0.007***		0.995
on slope (b)	(0.006)	(0.006)		(0.003)	(0.003)		
Instrument for log of budget	Yes (with log of income)			No			

Standard errors clustered at province, the number of children, year and month in parentheses *** p<0.01, ** p<0.05, * p<0.1. IV estimates refer to GMM estimation instrumenting household budget/expenditure with income. OLS estimates refer to GMM estimation without instrument for household budget.

Table 1.4 shows that the treatment effect on the level term for both male and female Engel curves in not significantly different from zero for any household. However, in our main specification with the instrument for household budget, the treatment effect on the level term is significantly higher for the female's Engel curve as opposed to the male in homeowning households shown by the estimate of the difference in the treatment effect for the male and the female. On the other hand, the coefficient of the treatment effect within the slope term of the female's Engel curve is positive and significant for homeowners while it is negative and significant for renters. Given the linear restriction (1.6), the treatment effect is exactly the reverse for the males' Engel curves. These results are true for both

instrumented and non-instrumented specifications, though the significance levels vary. This finding is suggestive that the change in the CCB policy resulted in changes in the slope of the Engel curves and hence, potentially affected within household resource shares.

1.5.2 Estimates of Structural Parameters

We now move on to the estimates of the structural parameters: preference parameters and resource shares, and the treatment effect on them, as illustrated in Table 1.5. Once again, columns (1)-(3) presents results from our main specification, instrumenting for household expenditure and columns (4)-(6) present results without the instrument. Prior to discussing the parameter estimates, let us discuss the restrictions imposed and performance of the IV estimates over OLS estimates. First, column (7) presents the Hausman test statistic, which again suggests, particularly for the estimates of resource shares and the treatment effect on resource shares among homeowners, that the exogenous specification is not consistent. We therefore use the log of income as an instrument for the log of household budget. Furthermore, the bottom rows of Table 1.5 presents the Hansen's J-statistic for testing the validity of the overidentifying restrictions. For the IV estimates, we fail to reject the null hypothesis that all the overidentifying restrictions are jointly valid. For the exogenous GMM estimates (where we use the observed budget as an instrument for itself), we still have overidentifying restrictions due to the linear restriction imposed in (1.6), but we reject the null hypothesis at 5% significance level that the restrictions are jointly valid. Together, we take from this that dealing with endogeneity is important and that household income is a tolerably good instrument for observed household spending.

We also test whether the coefficient of the variables (year, month, province and city size) excluded from the slope term ($\mathbf{z_c}$) is jointly zero had they not been excluded. We fail to reject the null hypothesis which provides justification for excluding certain preference shifters from the slope term as they do not affect resource shares, but only preferences. Finally, we also test for the linear restrictions imposed in (1.6) by testing the null hypothesis that the coefficients of the covariates in the female's Engel curve is jointly equal to that in the male's Engel curves, and once again, fail to reject this hypothesis when using IV estimates. This gives us confidence in imposing these linear restrictions to enable us to estimate well behaved resource shares[20].

[20]Note that given the linear restriction in (1.6), we will not be observing any treatment effect on β. For robustness check, we relax this restriction and report the results for all parameters (α_i, β and η_i) in Table A.8. We find no significant effect on β further increasing our confidence in the specification imposing the restriction.

Table 1.5: Parameter estimates

	IV estimates			OLS estimates			
	(1) female	(2) male	(3) diff	(4) female	(5) male	(6) diff	(7) H-stat
Homeowner: α_i (at $z = 0$)	0.074***	0.054***	0.020	0.050***	0.071***	-0.021	2.025
	(0.013)	(0.009)	(0.022)	(0.006)	(0.009)	(0.014)	
Renter: α_i (at $z = 0$)	0.086***	0.062***	0.024	0.054***	0.085***	-0.031*	1.347
	(0.021)	(0.014)	(0.034)	(0.007)	(0.013)	(0.018)	
Homeowner: Treatment Effect on α_i (at z=0)	-0.036***	0.059***	-0.096***	-0.009	0.021*	-0.030*	4.873
	(0.014)	(0.020)	(0.031)	(0.006)	(0.012)	(0.018)	
Renter: Treatment Effect on α_i (at z=0)	0.010	-0.005	0.015	0.017*	-0.021	0.038*	0.057
	(0.033)	(0.019)	(0.051)	(0.010)	(0.014)	(0.023)	
Homeowner: η_i	0.462***	0.538***	-0.077	0.579***	0.421***	0.158	6.518
	(0.067)	(0.067)	(0.134)	(0.049)	(0.049)	(0.097)	
Renter: η_i	0.450***	0.550***	-0.100	0.605***	0.395***	0.209*	3.827
	(0.098)	(0.098)	(0.196)	(0.058)	(0.058)	(0.117)	
Homeowner:Treatment Effect on η_i	0.247***			0.098*			7.019
	(0.080)			(0.056)			
Renters:Treatment Effect on η_i	-0.029			-0.103			0.346
	(0.147)			(0.076)			
Treatment Effect on η_i: Homeowner vs Renters	0.276**			0.201***			
	(0.138)			(0.071)			
Hansen's J chi2 (dof=9)		13.978			20.503		
p-value		*0.123*			*0.015*		
Test for exclusion on slope		36.216			23.976		
p-value		*0.167*			*0.730*		
Test for linear restriction		13.085			21.417		
p-value		*0.159*			*0.011*		
Instrument for log of budget		Yes (with log of income)			No		

Robust standard errors clustered at province, the number of children, year and month in parentheses *** p<0.01, ** p<0.05, * p<0.1.

IV estimates refer to GMM estimation instrumenting household budget/expenditure with income. OLS estimates refer to GMM estimation without instrument for household budget.

Focusing first on the preference parameter (α_i), for both homeowners and renters the parameter estimates are significant and positive for both male and female. The difference in the parameter estimates across male and female within household is not significantly different from zero. This suggests that the Engel curves lie on somewhat the same level for males and females. Within renter households, the policy change does not affect the preference parameter α_i. The treatment effect of the policy change in home-owning households is a decrease for the female and increase for the male, both significant at 1% confidence level. The decrease in α_f relative to the increase α_m is also significantly higher, which may be indicative of a preference shift of the mother towards other expenditures (potentially children's goods) in lieu to the labeling aspect of the Canada Child Benefit policy. These results are however not robust across the different specifications as can be seen in Section A.2. Furthermore, the combined effect of the change in the preferences ($\alpha_m + \alpha_f$) is 0.023 and is not significantly different from zero. Thus, within the household, we do not find strong evidence of any overall effect on the preferences of the parents, suggesting that the new label of the benefit did not shift preferences away from adult's clothing significantly.

A possible reason could be that even though the CCB is an umbrella label for child benefits, the previous child benefits (Universal Child Care Benefit, Canada Child Tax Benefit and the National Child Benefit) all still included the phrase *"child benefit"*. So perhaps this change in label was not very salient or important. Thus, the policy change did not shift preferences away from adult's clothing and towards children's clothing through the labeling channel.

Moving our focus to the estimates of the structural parameters for resource shares (η_i), the point estimates show that females have a resource share of 46% (45%) in home-owning households (renter households) while males have a higher share of 54% (55% in renter households). In the specification without instruments, the point estimates show the reverse with females having a higher share of 58% (60%) and males with a share of 42%(40%) among homeowners (renters). However, note that in either case, the difference between the resource shares of the female and male adult within the household is not significantly different from zero, that is, resources are approximately equally shared. The only exception is for renter households when using OLS estimates where the females have a significantly higher resources share. The estimates of the resource share is similar to what has been found in the literature regarding resource shares of female adults in developed countries (Lise and Seitz, 2011; Bargain and Donni, 2012; Bargain et al., 2022).

As we include an indicator variable for renters in $\mathbf{z}$, the coefficient on the treatment (T) is used to estimate the treatment effect on resource shares within households which own homes using (1.8). We find a significant and sizable increase of around 25% in the resource shares of females due to the introduction of the CCB. The magnitude is quite large and would lead to female adults consuming 70% of the resources post treatment. The OLS estimates are of a smaller magnitude of around 10%. Given that the H-statistic is not too large,

the true magnitude of the treatment effect on resource shares is likely somewhere within the confidence sets of the IV and OLS estimates. Using the Stein-like 2SLS estimator of Hansen (2017), we estimate the shrinkage estimator for the treatment effect as a weighted average of the OLS and IV estimate, with the weight being inversely proportional to the Hausman test statistic for exogeneity. Our specification has household budget as an endogenous variable, along with it's interaction terms with the preference shifters within the slope ($\mathbf{z_s}$). Hence, using the suggested shrinkage parameter, we find that according to the Stein-like estimator[21], the treatment effect is about 10%. Even then, the magnitude of the effect is quite large showing that the targeting aspect of the CCB did play a major role in reallocation of resources between adults within the household.

On the other hand, using the coefficient on the interaction term between the renter dummy and the treatment, we find no significant treatment effect on the resource shares in renting households. Furthermore, we compare the treatment effect on resource shares between homeowners and renters and find that the difference is significant at the 5% confidence level. These results qualitatively hold true for the specification without instrumenting and for all the different specifications used for robustness checks in Section A.2. This suggests that the introduction of the CCB increased bargaining power of females, but only within households which are homeowners and this effect was significantly different than the negative, but insignificant treatment effect on the resource shares among renters. In the next section, we discuss possible explanations for this heterogeneity in the treatment effect on resource shares.

1.6 Discussion

In this section, we discuss the possible reasons driving the effect of the child benefit policy on the parameters. The treatment effect we observe is on the resource shares with the main distinction being that women's resource share increases within households which are homeowners, while we see no significant effect on resource shares within renter households. An interesting observation is that when we do not make the distinction between homeowners and renters, the significant treatment effect we observe becomes statistically insignificant (as shown in the tables in Section A.2.1). Thus, in making the distinction between home-

[21] Hansen (2017) computes the Stein-like estimator as follows:

$$\hat{\beta}^* = w\hat{\beta}_{OLS} + (1-w)\hat{\beta}_{2SLS} \tag{1.10}$$

where

$$w = \begin{cases} \frac{\tau}{H_n} & \text{if } H_n \geq \tau \\ 1 & \text{if } H_n < \tau \end{cases} \tag{1.11}$$

and τ is equal to the number of endogenous regressors (m) minus 2 if $m > 2$, is 1 if $m = 2$, and is 0.25 if $m = 1$.

owners and renters, our paper provides useful insight into the possibility of heterogeneity in treatment effect of policy changes that can be crucial to keep in mind when introducing new policies.

Table 1.6: Treatment effect on probability of moving location of residence

	Indicator for moving residence		Indicator for moving residence	
	(1)	(2)	(3)	(4)
Homeowners: Treatment effect	-0.026***	-0.005	0.002	-0.006
	(0.009)	-0.010	(0.009)	-0.010
Renters: Treatment effect	0.103***		-0.044	
	(0.023)		(0.037)	
Treatment effect: Homeowners vs renters	0.129***		-0.046	
	(0.026)		(0.040)	
Renter dummy	Yes	No	Yes	No
$K \times R$ interaction term	No	No	Yes	Yes
$P \times R$ interaction term	No	No	Yes	Yes

Robust standard errors clustered at province, the number of children, year and month in parentheses *** p<0.01, ** p<0.05, * p<0.1.

$K \times R$ denotes renter dummy interacted with indicator for households with children

$P \times R$ denotes renter dummy interacted with indicator for post policy change time period

Given the treatment effect hinges on home ownership, we analyze whether the change in the CCB has any effect on the probability of the households moving (or changing their location of residence). We use a difference in difference methodology in a linear probability model on the likelihood of a household moving within the months of August 2014 to December 2017[22]. The identifying assumption here is that the probability of moving between treatment and control group before and after the treatment would follow the same trend had there not been a policy change. As in Najjarrezaparast and Pendakur (2021)[23], we find that after the change in the CCB, relative to households without children, homeowners with children are less likely to move whereas renters with children are significantly more likely to move. Further, after the introduction of the CCB, renters with children are also significantly more likely to move relative to homeowners with children. These results are illustrated in columns (1) and (2) of Table 1.6.

[22]We exclude the months prior to August 2014 such that the treated months (August 2016-December 2017) coincide with the months before the policy change (August 2014-December 2015) as the probability of moving can vary highly with the time of the year.

[23]The estimates slightly differ between our paper and Najjarrezaparast and Pendakur (2021) due to differences in sample and a slight coding error in the latter paper's estimation. The results are qualitatively similar.

Based on these results, there are two possible reasons driving the heterogeneous treatment effect on the resource shares. One reason could be that the change in the CCB, particularly targeting the payment to females as primary caregivers, improves the outside option for females in all households. However, given that shelter is a shareable good, the increased budget from the CCB can also be used to improve the value of being in the household by improving shelter. Homeowners are constrained here due to their inability to move as easily as renters whereas renters can upgrade their shelter. Thus, while the outside option for females increases in all households, the value of continuing to be in the household also increases for the female among renter households. This potentially balances out any possible treatment effect on the resource share within these households. On the other hand, as shelter cannot be upgraded by homeowners since homeowners are less mobile in terms of residence, only the outside option of the females improve which results in an increase in their resource shares from the changes in the CCB.

An alternative reason for the treatment effect on resource shares runs only through resource shares while Pareto weights remain fixed. The fact that homeowners are less likely to buy more shelter (through changing location of residence) than renters after the policy change implies that the marginal price of shelter is higher for owners than for renters. As a result, even with the additional funds from the CCB, the owners do not buy more shelter (say, by upgrading to better housing by changing location of residence). Hence, the recipient of the fund, that is, the females within the homeowner households are compensated by increased expenditure on non-shelter goods (in our case, clothing) which increases their resource shares within the household.

Both of these possibilities could plausibly drive the heterogeneity in the treatment effect observed between homeowners and renters. Future studies can thus focus on identifying which of the two is the driving mechanism. However, these findings are not robust to adding controls for renter dummy interacted with the indicator variable for households with children and the months post policy change (columns (3) and (4) of Table 1.6). That is, if we run the analysis separately for a sample of homeowners and renters, we observe no significant effect of the policy change on the probability of moving for either homeowners or renters. While this might be due to a sample size issue with majority of our sample being homeowners, and with relatively fewer households who moved post-policy change, the mechanisms discussed should be interpreted with caution. There may be other mechanisms at play here driving the heterogeneity in the treatment effect which can be explored in future studies.

1.7 Conclusion

Our study is the first step to identifying whether and how changes in the Canada Child Benefit policy affects preferences and resource allocation within the household. Our findings

reflect possible changes that may occur within households beyond the ones intended by a change in the policy. In the paper, we first present a collective model of the household depicted from LPW and incorporate a difference in difference strategy in the structural estimation of the model to estimate the treatment effect of the policy change on preferences and resource shares.

Using GMM to estimate the model, we find no evidence of any significant change in the overall preference of the adult female and male (mother and father) within the household. Individually, we find mild evidence of a decrease in the level of the Engel curve of females accompanied with an increase in that of males within home-owning households. This might suggest that while there is no overall change in preferences within the household, there may be some individual level changes in preferences arising from the new labeling of the child benefit. However, this result is not robust across all specifications.

Our results do suggest significant shifts in the resource shares of adults due to the policy change which are heterogeneous across homeowners and renters. We find that the resource shares for females significantly increase within homeowners, which can be expected given the CCB targets the payments towards the females in dual parent households. However, we do not observe an analogous treatment effect among renters where there is no significant change in the resource shares due to the policy change.

Given the heterogeneity in the treatment effect arises through home ownership, we provide two possible explanations. The first reason drives the change through the constraint faced by homeowners in moving. The policy change improves the outside option for females in all households. However, this is balanced out by an improvement in the female's inside option in renter households as the increased benefits/cash can be used to upgrade shelter. On the other hand, as homeowners are unable to move, the better outside option and no change in inside option leads to an increase in the females' resource shares. A second possibility suggested by the treatment effect on probability of moving is that homeowners face a higher marginal price of shelter. Thus, they choose not to purchase better shelter and instead, the recipient of the fund (females) are compensated by increased spending on their non-shelter goods. Further research on marginal pricing of shelter faced by homeowners and renters, as well as the effect on their outside option can allow identifying which of the two explanations are at play. However, we note that these findings about mobility are not very strong, and indeed not robust to some changes in model specification. So, further research on the mechanisms driving the heterogeneous responses of homeowners vs renters would be desirable.

A subsequent area for research involves estimating how our findings affected expenditure on children. The increase in expenditure on children's clothing due to the changes in the child benefit policy was more prominent among renter households as found in Najjarrezaparast

and Pendakur (2021). This, along with our findings, suggests that the increased bargaining power of the female may not be the channel that led to increased spending on children. No overall effect on preference parameters of the adults also suggest that the increased spending was not driven by a shift in preference of the male and female towards children's clothing due to the label of the benefit. Hence the effect may solely be running through the increase in budget which raises the question of whether we would see similar effects from a cash transfer. Future work could thus focus on explicitly decomposing how much of the change in expenditure on children arises from the change in resource shares, budget and preferences.

Chapter 2

A Theory of Illiberal Democracy and Political Transitions

[1] [2]

2.1 Introduction

Democratic backsliding is no longer happening in the form of sudden transitions from democracy to autocracy, but rather takes a more stepwise form of transitioning to illiberal democracies and eventually non-democracies. Some of the world's oldest democracies, including USA and India, have experienced the dismantling of democratic institutions and faced threats of authoritarianism (Repucci and Slipowitz, 2021). Democratic backsliding has changed from blatant forms of coups d'etat, executive coups and election fraud to subtle forms like promissory coups, executive aggrandizement and strategic manipulation of elections (Bermeo, 2016). A systematic empirical analysis of such backsliding is provided in Lührmann and Lindberg (2019) where episodes of gradual autocratization are identified using the V-Dem dataset (Coppedge et al., 2018), documenting the "third wave of autocratization" starting in early 1990s. The concept of such form of democratic backsliding has been widely studied in the political science literature. Large scale social and economic inequality, adoption of majoritarian institutions in an ethnically divided society, asymmetry in societal resources, and many such other issues have been attributed as causes for the emergence of hybrid regimes in Merkel et al. (2006). Formal theories of illiberal democracies suggest elites driving regimes towards illiberalism, or lack of economic security leading

[1] co-authored with Chris Bidner

[2] We are grateful for very useful comments and suggestions from participants of the Canadian Economic Association Conference 2021, Midwest Political Science Association Conference 2022 and seminar participants at Simon Fraser University.

citizens to vote for illiberal governments, even though they do not favor such regimes. These however fail to explain recent phenomenon where certain groups of citizens prefer illiberal democracies while others do not. Existing frameworks that address this issue by explaining hybrid regimes arising due to majority-minority cleavage however does not speak to the dynamics between the political regimes. To the best of our knowledge, our paper is the first to provide a formal economic theory in a dynamic setting that provide a theory of illiberal democracies and explore the conditions under which they arise and how transitions occur across different regimes.

We construct a general framework with a concrete meaning of illiberal democracy - a regime where elites exert over-sized influence on politics leading to policy distortion. More importantly, this influence creates an environment more conducive to transitioning to an authoritarian regime. Authoritarian regimes are where elites are in complete power, and thus entail the worst possible outcome for citizens. We model citizens as heterogeneous groups with different policy preferences. Certain groups' policy preference align with the elites along some dimension which results in them benefiting from policy distortion. This can arise, for example, due to the citizen group sharing the same social identity as the elite. Thus, they face a trade-off - resisting against elite influence provides protection from the prospect of non-democracy, but leads to lower flow payoffs. This is what determines citizens' optimal actions and provides insight into why, despite the threat of an authoritarian regime with negative consequences, citizens support illiberal democracies. We then allow elites to make investments which determine the likelihood with which they overtake political institutions and non-democracies arise. We find that elites invest less in increasing their chances to take over politics when some citizen groups prefer illiberal democracies and choose to not resist elite influence. These dynamics allow us to unearth interesting trends in the dynamics of transitions across political regimes, particularly, the systematic transitions between illiberal democracies and non-democracies. We now discuss our contributions in the relevant areas of the literature.

Hybrid regime - Illiberal Democracy

The political economy literature has mainly focused on political regimes classified in a binary manner. Our paper models political regimes beyond the binary measure, by allowing for the existence of hybrid regimes. We refer to these regimes as *"illiberal democracy"*, where elites' influence distorts policy and creates the scope for elites to take over political institutions resulting in a non-democracy. However, elites are only able to exert this influence through receiving partial citizen support. Recent literature has addressed the existence of such "hybrid" regimes which possess both democratic and authoritarian characteristics. Such regimes have been characterized as having competitive elections but limited inclusiveness and constraints on the executive (Bidner et al., 2014), or by size of population that can collectively

select incumbent and level of civil liberties (Persico, 2021). Imperfect democracies have also been modeled as regimes where elites' lobbying or clientelism leads to policies favoring elites within formal democracies (Grossman and Helpman, 1994). Acemoglu and Robinson (2008) discuss captured democracies where political institutions are democratic, but elites control economic institutions and repress citizens in labor markets. All these models focus mainly on policy distortion and/or suggest that the rise of hybrid regimes is entirely elite driven which poses the question of why citizens do not take any action against the elites. Our paper allows for elites to invest in completely taking over policy making decisions and we further allow citizens to choose to resist elites' influence. This highlights how citizens may also play a role in the rise of such imperfect democracies.

Citizen driven rise of Illiberal Democracy

Our framework incorporates the idea of citizen driven rise of illiberal democracies by modeling citizens as heterogeneous groups with different policy preferences. Some citizens' policy preferences align with the elites and thus, they benefit from the policy distortion that occurs when elites enter politics. Hence, our model shows how citizen support for illiberal democracy is inherently rational, and does not arise from irrational actions or distorted beliefs. The political economy literature has some work on why citizens may prefer illiberal democracies. Acemoglu et al. (2013) theorizes that citizens vote to dismantle checks and balances on government when institutions are weak and elites are more likely to be able to bribe the government. Most relevant to our model is Mukand and Rodrik (2020), which defines political regimes as a combination of property rights, political rights and civil rights, and suggests that electoral democracies often arise due to majority-minority cleavages. While providing important insights into citizen's roles and motives for supporting illiberalism, these theoretical models are in a static setting which does not allow the discussion of how citizens play a role in the transitions across different political regimes. Our paper thus contributes to this literature by modeling citizen support for captured democracies, but in a dynamic setting that allows insight into the transition dynamics that ensue.

While our model allows citizen driven illiberalism to arise in a unidimensional policy space concerning only, say, economic policy, it is also applicable when considering multimensional policy spaces that include issues such as social policy. This is particularly relevant because in recent times, illiberal democracies have been seen to often arise through citizen support, especially in the presence of identity cleavages. One of the most recent demonstrations is the Capitol Riot in the USA. Resurgence of racial animosity was used in political dialogue to turn majority against ethnic or racial minority (Huq and Ginsburg, 2018) in the US. Starkly put in Kaufman and Haggard (2019), the demonization of racial and ethnic minorities and existing resentments against immigrants was used to reduce support for centrist political parties and allow majoritarian or autocratic electoral campaigns. Bartels (2020)

further documents empirically that the best predictor of anti-democratic sentiments among American Republicans is ethnic antagonism, especially concerns about political power and government resources aimed towards immigrants, African-Americans and Latinos. Another prevalent example where ethnic identity created a divide across citizens is Hungary, one of the first countries in Europe moving towards authoritarian rule as documented in Bogaards (2018). From 2011, the incumbent Fidesz government brought changes to the electoral system, constitution and the justice system in ways that gave them a competitive advantage and facilitated an authoritarian regime. Hungary exhibited illiberalism through flawed voting rights of non-resident ethnic Hungarian, the government's handling of the refugee crisis, a combination of nativism and Christianity, and attacks towards academic freedom. In a more general context, Foa and Mounk (2016) uses the World Values Survey to document the threat of democratic de-consolidation that may arise in Europe and North America as a consequence of younger cohorts in consolidated democracies finding liberal institutions as less essential for democracy, being less politically engaged and having increased support for authoritarian political systems. Latin American countries have also been sliding back on the democratic scale, despite the third democratization wave of late 1900s. Populist leaders like Evo Morales in Bolivia and Hugo Chavez in Venezuela came into power under the rhetoric that they want to free the state from being controlled by elites, and used majority support through referendums to erode checks and balances (Acemoglu et al., 2013). Both leaders' social reforms involved efforts to eliminate discrimination, which was beneficial for the indigenous groups and led them to support these populist leaders, until the leaders' authoritarian measures started costing them in terms of economic or environmental policies.

Other forms of identity divide that facilitated the rise of illiberal democracy is religious divide, e.g., the Hindu-Muslim divide in India, Secularism-Islam divide in Turkey and Buddhist-Muslim conflict in Myanmar. For instance, using exogenous Ramadan timing, Colussi et al. (2021) shows empirically that in areas with mosques in Germany, increased salience in religious identity and cultural dissimilarity due to Ramadan tends to increase votes for extreme left and right parties due to worsened attitudes towards Muslims. This empirically highlights how salience in identity can lead to a deterioration in the liberal aspect of a democracy, while retaining the majoritarian aspect. Our model aims to explain the rise of illiberal democracies as well as persistence of liberal democracies in the presence of identity cleavages, whether or not income class differences between citizens is not dominant.

Overall, our model is relevant in the flourishing literature in identity and is able to explain cases of illiberal democracies emerging with citizen support all over the world. Shayo (2009) introduced identity in the political economy literature by modeling the benefit voters receive from status of belonging to an identity. Bonomi et al. (2020) shows how this can lead to distorted political beliefs, polarization and explain changing political cleavages. While we do not explicitly model manipulation of beliefs about polarization, parameters within the model

can be defined as functions of media bias, political dialogues regarding identity differences or negative shocks (as in Gratton and Lee (2020)) which could change how citizens weigh different policy dimensions and can potentially explain how illiberal democracies arise with citizen support. The generality of our framework thus opens up the scope of studying how increasing salience of identity can directly influence the political regime through its effect on collective action and divide among the citizens within the society.

Transitions across regimes

Our model focuses on the heterogeneity among voters, and the interplay with elites' investment in taking over political institutions. This allows us to analyze the trends in transitions between political regimes. We find that transitions out of non-democracy is more likely when elites are weak, and citizens are impatient. Furthermore, both transitions out of non-democracy and out of democracy are more likely when citizens are divided in their resistance. Such transition trends mirror the cyclical movement between illiberal democracies and non-democracies that we observe in data, further discussed in Section 2.2.

Our paper also speaks to democratic consolidation, which refers to securing new democracies against reverse waves and authoritarianism (Schedler, 1998). The term arose after the democratization wave around 1990s, when pressing concerns about stabilizing newly established democracies emerged. Notable theory of democratic consolidation in the economics literature is Persson and Tabellini (2009), which formalizes the consolidation of democracy as democratic capital arising from historical experience with political regimes in neighboring regions. Fitting into the general idea of slippery slopes leading to institutional persistence (Acemoglu et al., 2020), our setup speaks to the conditions under which democracies consolidate and liberal democracies persist. Our theory resonates with the idea of how the threat of a worse institutional arrangement for groups in control (namely non-democracy) can lead to persistence of a "good" equilibrium (namely liberal democracy). Stochastic shocks within a similar setup was also discussed in Acemoglu et al. (2015) where the direction of a society's institutional path changes only when such shocks occur. Our model differs from these models in the aspect that the selection of the regime next period does not occur by chance alone (stochastic shock) and is not chosen by any particular group in power. There is a nuanced difference in how all the groups' actions within society simultaneously interact and how these dynamics determine the regime next period.

While transitions between democratic and autocratic regimes have been extensively studied in the economics literature (Acemoglu and Robinson, 2000, 2001; Buchheim and Ulbricht, 2020), models of regime transition incorporating hybrid regimes is sparse. A relevant study is Gratton and Lee (2020) which models the rise of illiberal democracies from voters facing a trade-off between economic security and liberty. The theory focuses on possible shocks that voters cannot be protected from unless the government operates beyond the constraints of

a formal democracy. We take a different stance where some citizens whose preferences align with elites choose illiberalism, not to be protected from negative shocks but to exploit the benefit from policy distortion.

We also introduce the possibility of mobility within citizen groups and analyze how mobility affects the likelihood of illiberal democracies. We find that the effect of mobility on the likelihood of the emergence of illiberal democracy is nuanced and is conditional on the relative magnitude of the benefit of democracy as opposed to non-democracy for the citizen groups.

The paper is organized as follows - firstly, Section 2.2 presents some stylized facts as motivation. Section 2.3 lays out the general model and analyzes the equilibrium; Section 2.4 then extends the analysis by introducing mobility between the heterogeneous groups of citizens. Finally, concluding remarks are provided in Section 2.5.

2.2 Stylized facts

In this section, we present some stylized facts that motivate our model. First of all, we show the relation between attitudes of individuals towards those of differing identities and their views about aspects of liberalism. We then provide an illustration of trends in Polity score which provides an insight into the transition dynamics of non-democracies, illiberal democracies and liberal democracies.

Table 2.1: Relation between attitudes and illiberalism from World Value Survey

Neighbor:	Civil Rights	Strong rule	Army leader	Support for democracy
Different race	-0.041***	0.185***	0.186***	-0.146***
	(0.011)	(0.036)	(0.023)	(0.023)
Observations (N)	49303	47891	48414	49175
Immigrants/foreign workers	-0.033***	0.102***	0.126***	-0.108***
	(0.008)	(0.035)	(0.017)	(0.023)
Observations (N)	49220	47808	48331	49091
Different religion	-0.037**	0.178***	0.174***	-0.126***
	(0.013)	(0.046)	(0.038)	(0.025)
Observations (N)	49291	47880	48401	49164
Country Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes

Sample is restricted to 17 countries with a Polity score of at least 9 in 2006 in the WVS study[3]. Controls for Polity score is also included. Standard errors are clustered at the country level.

We carry out an empirical analysis to study the relation between salience in identity and attitudes towards the liberal aspects of democracy. Using data from Waves 6 and 7 of the World Value Survey for years 2010-2014 and 2017-2020, Table 2.1 presents the relation between individuals' attitudes towards neighbors of a different race, different nationality or of a different religion with measures for illiberalism. Individuals disliking having neighbors of different identity is indicative of salience in identity. We use the same measures of illiberalism as in Gratton and Lee (2020) - beliefs about whether civil rights is an important characteristic of democracy, whether political systems with a strong leader is good, whether political systems where the army rules is good and how good it is to have democracy as a political system. The sample is restricted to 17 countries with a Polity score of at least 9 in 2006 in the WVS study[4]. The results clearly reveal that individuals who mention that they would not like having neighbors of a different race, nationality or religion are significantly more likely to believe that civil rights is not a very important characteristic of democracy,

[4]The largest sample of democracies surveyed was in 2006 and thus, the sample countries were selected from 2006. We are fixing the sample of countries using a base year as we do not want the result to be driven by changes in countries, but rather want to identify the relation between regime and attitudes within country over the different survey waves.

political systems with a strong leader or where the army rules is good, and that democracy is not very good as a political system.

Transitions across regimes

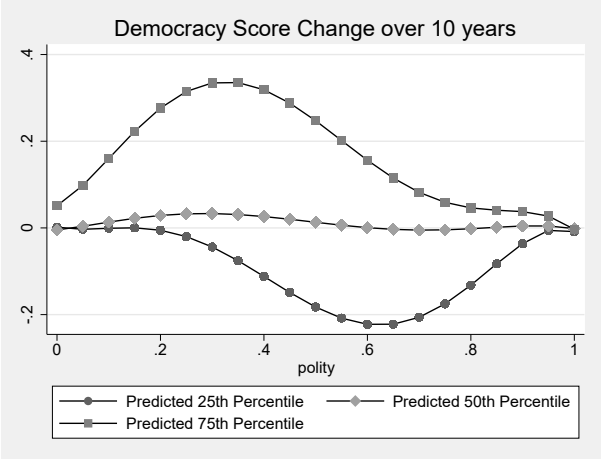

Figure 2.1: Trends in Changes across Polity V score

The systematic transitions between non-democracy and illiberal democracy is illustrated in Figure 2.1. Using Polity score ranging from 1950-2020 of the Polity IV dataset, we plot the fitted values of a fifth order polynomial regression of the 25^{th}, 50^{th} and 75^{th} percentile of ten-year changes in Polity score, at each value of the index, normalized between 0 to 1. In other words, for each value of the Polity score, there is an associated distribution of change in score over ten-year periods and the percentiles describe this distribution. If we only focused on the median value of the change (the 50^{th} percentile), it would seem like there is not much change in the Polity score, and regimes are stable. However, the instability of regimes, especially in nations with Polity scores in the mid-range becomes obvious when considering the huge gap between the 25^{th} and 75^{th} percentile. We can observe that for lower levels of the Polity index, a change in score is more likely to be an increase in the score, whereas countries with scores between 0.6 to 0.9 are more likely to experience a decrease in the Polity score. In summary, data suggests systematic transitions between non-democracy and illiberal democracy while liberal democracies tend to remain more stable.

2.3 Model

In this section, we present the basic model that allows us to analyze the equilibrium and provides insight into what leads to illiberal democracies and the transitions dynamics between regimes.

2.3.1 Setup

Consider an infinite horizon society in discrete time. The society is populated by two classes of agents: elites and citizens. Elites ($i = 0$) comprise a small fraction of the population while citizens make up the larger portion of the population. Citizens are divided into two groups, $i = \{1, 2\}$ with heterogeneous policy preferences. All agents discount the future with a discount factor of $\beta \in [0, 1)$. Each period starts in one of two possible states, $\omega_t \in \{\mathbf{D}, \mathbf{N}\}$. Political regimes are denoted $\phi \in \{N, D, \tilde{D}\}$. Within the state $\omega_t = \mathbf{N}$, the political regime is non-democracy ($\phi = N$). In the state, $\omega_t = \mathbf{D}$, the political regime can be illiberal democracy ($\phi = \tilde{D}$) or liberal democracy($\phi = D$). Regimes are determined based on the policies implemented, as discussed below.

Policy and Payoffs

A policy is some $\theta \in \Theta \subset \mathbb{R}^K$ determined from the maximization of a weighted social welfare function

$$W_\eta(\theta_{\eta_\phi}) \equiv \eta_{0\phi} \cdot u_0(\theta_{\eta_\phi}) + \eta_{1\phi} \cdot u_1(\theta_{\eta_\phi}) + \eta_{2\phi} \cdot u_2(\theta_{\eta_\phi}). \tag{2.1}$$

where $u_i(\theta_{\eta_\phi})$ is the flow payoff of agent i conditional on the regime specific policy, θ_{η_ϕ}. The weights on each group $i = \{0, 1, 2\}$ is denoted as $\eta_\phi = (\eta_{0\phi}, \eta_{1\phi}, \eta_{2\phi})$ and depend on the political regimes.

Assumption 1. *Weights on agents' policy payoffs in each political regime is as follows:*

$$\eta_N = (1, 0, 0) \tag{2.2}$$
$$\eta_D = (0, \rho, 1 - \rho) \tag{2.3}$$
$$\eta_{\tilde{D}} = (\varepsilon, (1 - \varepsilon) \cdot \rho, (1 - \varepsilon) \cdot (1 - \rho)). \tag{2.4}$$

Assumption 1 characterizes the political regimes in our model. When the political regime is non-democracy (N), policy maximizes the elites' payoffs; in a liberal democracy (D), a weighted welfare function of citizen groups is maximized; and in an illiberal democracy ($\tilde{D}$), elites exert influence of $\epsilon \in (0, 1)$ on policy determination, but they do not entirely seize political power.

The policy preferences for group i is defined as:

$$u_i(\theta_{\eta_\phi}) = -\sum_k (\theta^*_{ik} - \theta_{\eta_\phi k})^2 \tag{2.5}$$

where θ^*_{ik} is the most preferred outcome in dimension k of the agents' most preferred policy vector θ^*_i. Using these payoffs for the social welfare maximization problem yields the

following policy:

$$\theta^*_{\eta_\phi} = \eta_{0\phi} \cdot \theta^*_0 + \eta_{1\phi} \cdot \theta^*_1 + \eta_{2\phi} \cdot \theta^*_2. \tag{2.6}$$

We now make some further assumptions on the policy bliss points for each agent to complete the description of the environment.

Assumption 2. *Let $\theta^*_{0k} \leq \theta^*_{2k}$ for each k. The preferred policy of the three classes of agents are ordered as follows:*

$$\theta^*_{1k} \in \left[\frac{\theta^*_{2k} - \theta^*_{0k}}{2}, \theta^*_{2k}\right] \tag{2.7}$$

for each k (strict for some k).

With Assumption 2, we first assume that the preferred policy alignment is closer between citizen groups relative to the elites. We further assume that elites have policy preferences that are more aligned with citizen group 1 rather than citizen group 2. Specifically, citizen group 1 has policy preferences that are more aligned with the citizen group 2 than with the elites ($i = 0$) such that

$$\theta^*_{2k} - \theta^*_{1k} \leq \theta^*_{1k} - \theta^*_{0k}$$

and that elites are aligned with citizen 1 more than citizen 2 in the sense that

$$\theta^*_{1k} - \theta^*_{0k} \leq \theta^*_{2k} - \theta^*_{0k}$$

for each k (strict for some k).

Next, we make some assumptions on the extent of influence elites exert in an illiberal democracy (ϵ).

Assumption 3. *Elite influence is sufficiently small, but relevant in determining payoffs for citizen* 1*, that is,*

- *ε is sufficiently small. Specifically, $\varepsilon \in [0, \bar{\varepsilon}_k]$ where* [5]

$$\bar{\varepsilon}_k \equiv \frac{(1-\rho) \cdot (\theta^*_{2k} - \theta^*_{1k})}{(1-\rho) \cdot (\theta^*_{2k} - \theta^*_{1k}) + (\theta^*_{1k} - \theta^*_{0k})}.$$

- *$\theta^*_{1k} - \theta^*_{0k} \neq 0$ for some k.*

[5] Details provided in Appendix B.1.1

Assumption 2 and 3 then results in the following ordering of payoffs for each group from each regime[6]:

$$\begin{aligned} \text{Elites:} \quad & u_{0D} \leq u_{0\tilde{D}} \leq u_{0N} \\ \text{Citizen 1:} \quad & u_{1N} \leq u_{1D} \leq u_{1\tilde{D}} \\ \text{Citizen 2:} \quad & u_{2N} \leq u_{2\tilde{D}} \leq u_{2D} \end{aligned} \tag{2.8}$$

This payoff ordering is a crucial element of our model. Intuitively, elites receive the highest payoffs from non-democracy as they completely control political institutions, second highest payoffs from illiberal democracy as they can somewhat influence policy making and finally, the lowest payoffs from liberal democracy. Citizens always receive the lowest payoffs from a non-democracy as elites capture all political institutions and thus, non-democracy is their least preferred regime. Since citizen group 1 shares interests with the elites, they receive a higher payoff when elites distort policy in elites' favor. Let us now discuss two relevant contexts where these payoff ordering hold.

Redistribution

This payoff ordering is relevant in the widespread discussion on redistribution policies and tax rate. Consider a uni-dimensional policy space with a focus on some economic policy, such as redistribution or the highest marginal tax rate. Assume that elites are the richest, citizen 1 is the middle income group such that their preference for economic policy is more aligned with the elites, relative to citizen 2 who comprises the low income group. This is illustrated in Figure 2.2.

In a non-democracy, policy would be closest to the elites' bliss point, that is, low levels of redistribution (denoted N). In the state of democracy where elites do not influence politics, the policy outcome would be that of a liberal democracy somewhere in between the citizens' bliss points, where their indifference curves are tangential conditional on the policy weight (denoted by D in Figure 2.2). However, an illiberal democracy where elites distort tax rate in their favors would benefit citizen 1 as it puts them on an indifference curve closer to their bliss point (policy denoted $\tilde{D}$). Non-democracy would still be the worst regime for both citizen groups as elites completely seize power and undermine both citizen groups' preferences and result in lowest levels of redistribution. Citizen 2 would receive the highest payoff in a liberal democracy where redistribution is highest. Hence, the payoff ordering is the same as assumed in Assumption 2.

[6]Details provided in Appendix B.1.1

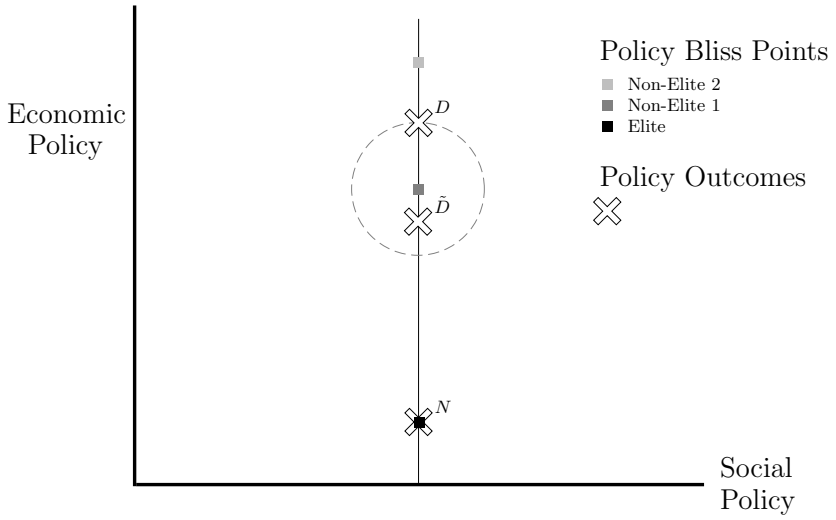

Figure 2.2: Policy Preference

The policy implications from this are in line with the empirical findings in Garcia and Von Haldenwang (2016) where the authors identify a U-shapes relation between tax to GDP ratio and the Polity score. Through an extensive literature review of the theoretical considerations, the paper summarizes the reasons behind either high or low taxation in both democracy and autocracy. The reasoning for high taxation in autocracies is because it is a form of appropriation by the rulers. This would imply lower redistribution to citizens. On the other hand, higher taxes lead to higher redistribution in liberal democracies. Using the Polity score, they find that tax collection is lowest in hybrid regimes, which would also lead to lower levels of redistribution relative to a liberal democracy, as illustrated in Figure 2.2. Note that our model differs here from Mukand and Rodrik (2020) as it allows illiberal democracy to exist even in the absence of identity cleavages and only based on heterogeneity by income class. Next, we consider the scenario where income class difference and identity cleavages co-exist.

Social Identity

Illiberalism within democracies in an environment where there is a social divide among citizens is a more commonly observed phenomenon in recent times. Let us consider a multidimensional policy space with economic and social policy (i.e., $k = 2$). For simplicity, assume that citizens have identical preferences about economic policy, but citizen 1 shares a social identity with the elites, whereas citizen 2 has a different social identity. Thus preference of citizen 1 about social policy aligns with that of the elites. The bliss points of each group is as illustrated in Figure 2.3.

As in the uni-dimensional case, liberal democracy gives the highest payoff to citizen 2. Illiberal democracy gives the highest payoff for citizen 1 due to the policy distortion by

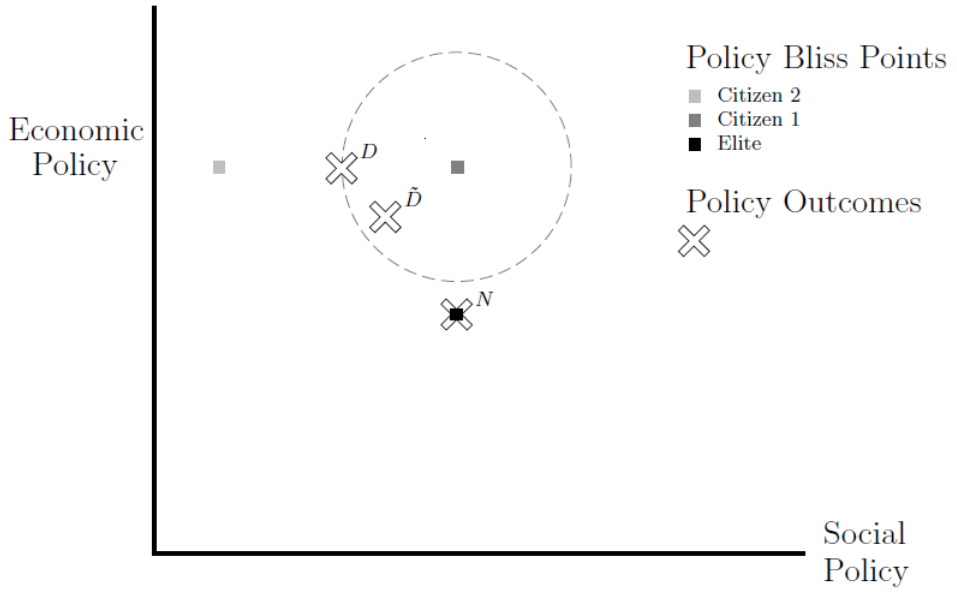

Figure 2.3: Policy Preference

elites leading to a policy outcome that puts them on an indifference curve with higher utility[7]. As discussed in Section 2.1, identity divide in the form of racial divides, religious identity, etc. can lead to divides among citizens that leads to the policy outcomes illustrated in 2.3 and thus the payoff ordering in Equation 2.8.

Timing

For the final set up of the model, the agents actions involves citizens choosing to resist (r_{it}) which determines their power (p_{ω_t}). Citizens' power plays a role in the probabilistic determination of flow payoff as well as future state ω_{t+1}. When the citizens are not powerful, elites can enter politics and distort policy. Once in politics, elites can completely seize power with probability δ_ω.

The timing of events in each state, $\omega_t \in \{\mathbf{D}, \mathbf{N}\}$ is as follows:

- Citizens choose level of resistance, $r_{it}(\omega_t) \in [0, 1]$ for $i \in \{1, 2\}$.

[7]While not explicitly modeled for simplicity, the flow payoffs of agents could be structured as a weighted combination of payoff from k policies. The differences in weights given on economic vs social policy will then influence the difference between $u_{1\tilde{D}}$ and u_{1D}. Changes in external factors (e.g., use of information technology, globalization, etc.) can shift these weights and explain how the increased importance given to social policy can lead to illiberalism.

- Power of citizens is determined as

$$p_{\omega_t} \equiv \alpha_{\omega_t} \cdot [\rho \cdot r_{1t} + (1-\rho) \cdot r_{2t}]$$

where $0 \leq \alpha_{\mathbf{N}} < \alpha_{\mathbf{D}} \leq 1$. Here, α_{ω_t} can be interpreted as the state dependent effectiveness of citizens' resistance in determining their power. Intuitively, their resistance in democracy is at least as effective as in non-democracy.

The share of citizen group 1 in determining citizens' power is ρ and that of citizen group 2 is $1-\rho$. This can be interpreted as population share, for instance, $\rho > 0.5$ means citizen group 1 is the majority and thus, their resistance is more significant in making citizens powerful. The interpretation of ρ is however, not restricted to population size, and can be interpreted in many different ways, for example, as citizen group 1's ability relative to group 2 to coordinate and organize.

- Payoffs for $i = \{0, 1, 2\}$ are realized.

When $\omega_t = \mathbf{D}$,

$$u_{it} = \begin{cases} u_{iD} & \text{w/p} \quad p_{\mathbf{D}} \\ u_{i\tilde{D}} & \text{w/p} \quad 1 - p_{\mathbf{D}} \end{cases}$$

Liberal democracies arise when citizens are powerful which occurs with probability $p_{\mathbf{D}}$. Otherwise, elites can distort policy leading to a flow payoff of $u_{i\tilde{D}}$.

When $\omega_t = \mathbf{N}$,

$$u_{it} = u_{iN}$$

The payoff in non-democracy does not depend on the power of the citizens because elites choose policy without taking citizens' preferences into consideration[8].

- Next state is then determined.

In the state of democracy, $\omega_t = \mathbf{D}$,

$$\omega_{t+1} = \begin{cases} \mathbf{D} & \text{w/p} \quad 1 - (1 - p_{\mathbf{D}}) \cdot \delta_{\mathbf{D}} \\ \mathbf{N} & \text{w/p} \quad (1 - p_{\mathbf{D}}) \cdot \delta_{\mathbf{D}} \end{cases}$$

When citizens are not powerful and elites completely seize power, the state changes from democracy ($\mathbf{D}$) to non-democracy ($\mathbf{N}$). Otherwise, the state remains in $\mathbf{D}$.

[8]This is a simplification in the model. In $\omega_t = \mathbf{N}$, the payoffs can still depend on $p_{\mathbf{N}}$. However, since elites choose policy, conditional on citizens' strategy, it would be always optimal to choose a policy that gives the elites maximum payoff.

If the current state is non-democracy, $\omega_t = \mathbf{N}$,

$$\omega_{t+1} = \begin{cases} \mathbf{D} & \text{w/p} \quad p_{\mathbf{N}} \cdot (1 - \delta_{\mathbf{N}}) \\ \mathbf{N} & \text{w/p} \quad 1 - p_{\mathbf{N}} \cdot (1 - \delta_{\mathbf{N}}) \end{cases}$$

When citizens are powerful and elites fail to completely seize power, the state changes from non-democracy ($\mathbf{N}$) to democracy ($\mathbf{D}$). Otherwise, the state remains in $\mathbf{N}$.

2.3.2 Equilibrium Analysis

In this section, we analyze the Markov perfect equilibria (MPE). The MPE is such that strategies are not conditional on the history of the game beyond the effect the history has on the payoff relevant state $\omega_t \in \{\mathbf{D}, \mathbf{N}\}$. Furthermore, we restrict our analysis to symmetric MPE such that the equilibrium strategies do not depend on individual identity of citizens or elites, and are identical across agents within each class - elites, citizen group 1 and citizen group 2.

The equilibrium analysis can be simplified through some observations of the state dependent payoff ordering. First of all, given that non-democracy is the least preferred regime for citizens, both groups of citizens always resist when state $\omega_t = \mathbf{N}$. Furthermore, since citizen group 2 has the highest payoff when elites are not in politics, they also always choose to resist when state $\omega_t = \mathbf{D}$. Hence, the analysis boils down to citizen 1's resistance in the state of democracy. The main trade-off they face is that resisting reduces the likelihood of elites influencing policy which reduces their flow payoff, but it benefits them through the reduced probability of a transition to non-democracy.

Formalizing citizen 1's problem, let V_ω be the value for citizen 1 in state ω. The above observations imply

$$V_{\mathbf{N}} = u_{N1} + \beta \cdot [(1 - \pi_{\mathbf{N}}) \cdot V_{\mathbf{D}} + \pi_{\mathbf{N}} \cdot V_{\mathbf{N}}] \tag{2.9}$$

where $\pi_{\mathbf{N}} \equiv 1 - \alpha_{\mathbf{N}} \cdot (1 - \delta_{\mathbf{N}})$ is the equilibrium probability of remaining in non-democracy. We also have

$$V_{\mathbf{D}} = p^*_{\mathbf{D}} \cdot u_{D1} + (1 - p^*_{\mathbf{D}}) \cdot u_{\tilde{D}1} + \beta \cdot [(1 - (1 - p^*_{\mathbf{D}}) \cdot \delta_{\mathbf{D}}) \cdot V_{\mathbf{D}} + (1 - p^*_{\mathbf{D}}) \cdot \delta_{\mathbf{D}} \cdot V_{\mathbf{N}}] \tag{2.10}$$

where $p^*_{\mathbf{D}} \equiv \alpha_{\mathbf{D}} \cdot [\rho \cdot r^*_1 + (1 - \rho)]$ is equilibrium power in democracy. These two can be solved to get $\{V_{\mathbf{D}}, V_{\mathbf{N}}\}$ as a function of r^*_1. There is generically two possible Markov-Perfect equilibria (details in Appendix B.1.2). One is where citizen 1 always resists with $r^*_1 = 1$ which we call the *Liberal Democracy equilibrium* since citizens act in sync to ensure that elites are not in power. The other equilibrium is where citizen 1 does not resist with $r^*_1 = 0$

in the state of democracy which leads to a higher probability of elites entering politics and the political regime becoming an illiberal democracy ($\tilde{D}$).

Proposition 1. *A symmetric Markov Perfect Equilibrium exists for* $r_1^* \in \{0, 1\}$.
An Illiberal Democracy equilibrium exists if and only if

$$\Gamma(\delta_{\boldsymbol{D}}, \delta_{\boldsymbol{N}}, \alpha_{\boldsymbol{N}}, \beta) \leq \Lambda(\varepsilon, \rho) \tag{2.11}$$

A Liberal Democracy equilibrium exists iff

$$\Gamma(\delta_{\boldsymbol{D}}, \delta_{\boldsymbol{N}}, \alpha_{\boldsymbol{N}}, \beta) \geq \Lambda(\varepsilon, \rho) \tag{2.12}$$

where

$$\Gamma(\delta_{\boldsymbol{D}}, \delta_{\boldsymbol{N}}, \alpha_{\boldsymbol{N}}, \beta) \equiv \frac{\beta \cdot \delta_{\boldsymbol{D}}}{\beta \cdot \delta_{\boldsymbol{D}} + (1-\beta) + \beta \cdot \alpha_{\boldsymbol{N}} \cdot (1 - \delta_{\boldsymbol{N}})} \tag{2.13}$$

and

$$\Lambda \equiv \frac{u_{1\tilde{D}} - u_{1D}}{u_{1\tilde{D}} - u_{1N}} \equiv \frac{\sum_k \Theta_k(0,\rho)^2 - \Theta_k(\varepsilon,\rho)^2}{\sum_k \Theta_k(1,\rho)^2 - \Theta_k(\varepsilon,\rho)^2} \tag{2.14}$$

where

$$\begin{aligned}
u_{1N} &\equiv \sum_k \Theta_k(1,\rho)^2 \equiv \sum_k (\varepsilon \cdot (\theta_{1k}^* - \theta_{0k}^*))^2 \\
u_{1\tilde{D}} &\equiv \sum_k \Theta_k(\varepsilon,\rho)^2 \equiv \sum_k (\varepsilon \cdot (\theta_{1k}^* - \theta_{0k}^*) - (1-\varepsilon) \cdot (1-\rho) \cdot (\theta_{2k}^* - \theta_{1k}^*))^2 \\
u_{1D} &\equiv \sum_k \Theta_k(0,\rho)^2 \equiv \sum_k ((1-\rho) \cdot (\theta_{2k}^* - \theta_{1k}^*))^2
\end{aligned}$$

Here, $\Theta_k(1,\rho)$ represents the utility of citizen 1 in non-democracy, $\Theta_k(\varepsilon,\rho)$ is utility in an illiberal democracy and $\Theta_k(0,\rho)$ is the utility in a full democracy (detailed workings in Equation B.1 in Appendix B.1.1). In Proposition 1, Equation 2.14 represents the added benefit of an illiberal democracy compared to a liberal democracy to citizen 1 as a ratio of the added benefit of an illiberal democracy compared to a non-democracy. If this ratio is high enough, then the benefit of elites influencing policy outweigh the threat of non-democracy for citizen 1. The threshold that determines this decision is given by Equation 2.13 which depends on the discount factor (β), the probability of elites completely taking over (δ_ω) and the effectiveness of citizens' resistance (α_{ω_t}). Thus, Proposition 1 suggests that if the benefit of elite involvement in politics is high enough for citizen 1, they choose not to resist, which results in lower power $p_{\mathbf{D}}$ of the citizens making it more likely for elites to enter politics. On the other hand, if the potential future costs of being in a non-democracy outweighs the

benefit from higher payoffs from elite involvement, citizen 1 chooses $r_1^* = 1$, making a liberal democracy more likely and thus, leading to a liberal democracy equilibrium.

An illiberal democracy equilibrium is thus supported by citizens (at least, certain citizen groups). This is unlike the common explanation that *"Democracy's erosion is, for many, almost imperceptible"* (Levitsky and Ziblatt, 2018), that is, citizens do not resist illiberalism because they do not notice it. Instead, our model suggests that rational optimization of citizens make them support democratic erosion since they benefit from policy distortion by the elites.

However, the non-resistance also raises the probability of transitioning to an authoritarian regime in the illiberal democracy equilibrium as opposed to the liberal democracy equilibrium. This can be seen clearly from the fact that the illiberal democracy equilibrium leads to citizens having lower power, $p_{\mathbf{D}}$ which increases the probability of elites entering politics. Given the exogenous probability, δ_ω, with which elites completely seize power once they enter politics, the probability of transition from state of democracy is higher in the illiberal democracy equilibrium. Mathematically, the probability of transitioning from state $\omega_t = \mathbf{D}$ to $\omega_{t+1} = \mathbf{N}$ in the illiberal democracy equilibrium is $(1 - (1 - \rho) \cdot \alpha_{\mathbf{D}}) \cdot \delta_{\mathbf{D}}$ which is greater than the probability, $(1 - \alpha_{\mathbf{D}}) \cdot \delta_{\mathbf{D}}$, in the liberal democracy equilibrium. The probability of transitioning from non-democracy to democracy is however equal across the two equilibria since both groups of citizens always resist in the state of non-democracy under both equilibrium.

Proposition 1 allows us to make meaningful comparative statics that provide insight into the likelihood of the rise of the illiberal democracy equilibrium (Proof in Appendix B.1.2).

Proposition 2. *The illiberal democracy equilibrium more readily arises when*

- *The elites are weak (as $\Gamma_{\delta_D} > 0$, $\Gamma_{\delta_N} > 0$ and $\Gamma_{\alpha_N} < 0$)*
- *Citizens are impatient (as $\Gamma_\beta > 0$)*
- *Citizen 1 plays a smaller role in determining citizens' power, that is, for a lower ρ (since $\Lambda_\rho \leq 0$)*

Intuitively, when there is a low probability of elites completely seizing power once they enter politics in the state of democracy ($\delta_{\mathbf{D}}$), or when there is lower persistence within non-democracy ($\delta_{\mathbf{N}}$), the threat and potential cost of transitioning to a non-democratic regime is also lower for citizen 1. Thus, they choose not to resist when in a democracy, leading to the illiberal democracy equilibrium. Furthermore, if the effectiveness of resistance in a non-democracy ($\alpha_{\mathbf{N}}$) is high enough, confidence in the ability to transition back to democracy where they receive the illiberal democracy payoff is also high. This leads to the higher likelihood of the illiberal democracy equilibrium.

Another interesting implication of Proposition 1 is that patience promotes the liberal democracy equilibrium. This is because the trade-off involving higher probability of transitioning to a non-democracy is a threat of the future and the costs are internalized by citizen 1 only when they care sufficiently about the future, thus leading them to resist when in a democracy.

We also have $\Lambda_\rho \leq 0$ which suggests that when citizen 1 has a higher weight in policy and citizens' power determination (higher ρ), the relative benefit of illiberal democracy is lower which makes it less likely for the illiberal democracy equilibrium to arise. If we interpret ρ as the population share of citizen 1, a higher population share would deter an illiberal democracy equilibrium. Consider the context of social identity cleavage. When it is the minority who share a social identity with elites (smaller ρ), an illiberal democracy equilibrium is more likely to arise. This result is in contrast with Mukand and Rodrik (2020) where they use the example of South Africa as a case of liberal democracy arising because elites share the same identity as the minority. The reasoning behind this in their model was the importance of civil rights to the elites, since their identity is the same as that of the minority. Our model can also predict a liberal democracy regime being prevalent despite being in an illiberal democracy equilibrium when citizen group 1 is a minority. The mechanism is however very different - liberal democracy as a regime is more likely to arise simply because the majority (citizen 2) always resists as they do not prefer policy distortion. This makes the citizens powerful (higher p_{ω_t}), rarely creating the opportunity for elites to influence policy and thus, making it less likely for an illiberal democracy to arise. The fact that the nation is in an illiberal democracy equilibrium does not hinder the existence of liberal democracy as long as ρ is sufficiently small. This can therefore potentially explain how rise in globalization and integration of different nationalities within communities could potentially be threatening the majority populations as ρ increases leading to the emergence of illiberal democracies.

2.3.3 Endogenous δ

The model presented establishes the different regimes that may arise as a result of citizens' actions and the probability of transition in states under two different equilibrium. However, so far, the elites do not take any action in the game, and thus has no role in determining the equilibrium. The emergence of different regimes and transition between non-democracy and democracy are both likely to be influenced by elites. In this section, we check the robustness of the model's prediction by enriching the model and allowing elites to invest in influencing the probability with which they completely seize power, δ while incurring a cost $c(\delta_\omega)$ where $c'(\delta_\omega) > 0$ and $c''(\delta_\omega) > 0$. In democracy, the elites choose $\delta_{\mathbf{D}}$ in the event that they get the opportunity to enter politics, that is, citizens are not powerful. In non-democracy, the elite choose $\delta_{\mathbf{N}}$ which determines the likelihood that the elites retain their power and the state

remains a non-democracy. In either case, the elite's choice of δ_ω influences the determination of the state in the following period. The problem of the elite in state ω is thus:

$$\max_{\delta_\omega \in [0,1]} \{\beta \cdot [\delta_\omega \cdot E_{\mathbf{N}} + (1 - \delta_\omega) \cdot E_{\mathbf{D}}] - c(\delta_\omega)\} \tag{2.15}$$

where $E_{\mathbf{N}}$ and $E_{\mathbf{D}}$ are the equilibrium values for the elite in non-democracy and democracy respectively, defined as follows:

$$\begin{aligned} E_{\mathbf{D}} &= p^*_{\mathbf{D}} u_{D0} + (1 - p^*_{\mathbf{D}}) u_{\tilde{D}0} + \beta \cdot [(1 - (1 - p^*_{\mathbf{D}}) \cdot \delta^*) \cdot E_{\mathbf{D}} \ ... \\ &\quad ... + (1 - p^*_{\mathbf{D}}) \cdot \delta^* \cdot E_{\mathbf{N}}] - (1 - p^*_{\mathbf{D}}) \cdot c(\delta^*) \end{aligned} \tag{2.16}$$

$$E_{\mathbf{N}} = u_{N0} + \beta \cdot [p^*_{\mathbf{N}} \cdot (1 - \delta^*) \cdot E_{\mathbf{D}} + (1 - p^*_{\mathbf{N}} \cdot (1 - \delta^*)) \cdot E_{\mathbf{N}}] - p^*_{\mathbf{N}} \cdot c(\delta^*) \tag{2.17}$$

Firstly, solving the elites' problem shows that the optimal δ_ω is independent of state, that is, $\delta^*_{\mathbf{D}} = \delta^*_{\mathbf{N}} = \delta^*$. This is due to the timing of events - elites choose their action after the citizens have chosen whether to resist and payoffs for that period are realized. This is because in the state of democracy, citizens' actions determine whether elites can enter politics in the first place, and it is only if they do that elites can invest in changing the probability of transitioning to a state of non-democracy. In the state of non-democracy, citizens choose to resist, payoffs are realized and then the elites can invest in changing the probability of retaining complete control over policy and remaining in non-democracy. Secondly, from the optimization problem, we can deduce that δ^* is larger in the liberal democracy equilibrium since the elites invest more in taking over power when they benefit relatively more from non-democracy (Proof in Appendix B.1.2).

Proposition 3. *The elite invest more in the Liberal Democracy equilibrium*

This gives interesting predictions concerning the transition dynamics across the states and political regimes. First, a transition from the state of non-democracy to democracy is likely even if, and more so, in the illiberal democracy equilibrium. The reasoning, while counter-intuitive at first glance, is quite straightforward. If citizen 1 does not resist in democracy, citizens' power is lower which makes it more probable for elites to enter politics. Given the payoff in state $\omega_t = \mathbf{D}$ is that of an illiberal democracy ($u_{0\tilde{D}}$), transitions to democracy is not too costly for the elites which makes them invest less in remaining in non-democracy ($\delta^*_{\mathbf{N}}$) or seizing power in democracy ($\delta^*_{\mathbf{D}}$). Hence, we are likely to observe transitions from non-democratic to democratic state, but the regime in the democratic state is more likely to be an illiberal democracy.

On the other hand, transitions out of democracy to non-democracy may be higher in either equilibrium. In liberal democracy equilibrium, the probability of transitioning out of democracy is $(1 - \alpha_{\mathbf{D}}) \cdot \delta^*(r^* = 1)$ whereas in illiberal democracy equilibrium it is

$(1-(1-\rho)\cdot\alpha_{\mathbf{D}})\cdot\delta^*(r^*=0)$. Thus, transitions out of democracy are faster in the illiberal democracy equilibrium if

$$\frac{\delta^*(r^*=0)}{\delta^*(r^*=1)} \geq \frac{1-\alpha_{\mathbf{D}}}{1-\alpha_{\mathbf{D}}+\rho\cdot\alpha_{\mathbf{D}}}.$$

This holds for $\alpha_{\mathbf{D}}$ sufficiently close to one. This is because for a small $\alpha_{\mathbf{D}}$, resistance of both citizens in the liberal democracy equilibrium is less effective, but δ^* is higher which increases the possibility of transitioning to a non-democracy. Thus, for sufficiently high $\alpha_{\mathbf{D}}$, our model predicts frequent transitions out of illiberal democracy to non-democracy and vice versa. Finally, for a sufficiently high $\alpha_{\mathbf{D}}$, as resistance makes citizens powerful and keeps elites out of politics, transitions out of democracy will be rare in the liberal democracy equilibrium.

These transition dynamics implied by Proposition 3 align with the transition in regime scores illustrated in Figure 2.1. As discussed in Section 2.2, we expect to observe frequent transitions to illiberal democracies from non-democracy and vice versa when in the illiberal democracy equilibrium. Thus, our model resonates the systematic transitions between non-democracies and illiberal democracies that we observe in the real world. Our model also predicts that in the liberal democracy equilibrium, regimes with very high Polity scores are relatively stable and rarely experience decreases in score as shown in Figure 2.1. Hence, our model allows us to understand the underlying mechanisms that give rise to the transition dynamics across political regimes that we observe in the real world. We highlight that the motive of citizens for protecting liberal democracies is to avoid the worst outcome of an authoritarian regime, even if flow payoffs are slightly lower. This resonates with the rightmost part of Figure 2.1 where, for very high scores on the Polity index (≥ 0.9), regimes are stable with very little change/decrease in the scores. This can also be observed from the transition matrix in Appendix B.2 where countries with very high scores on the Polity index (≥ 0.9), generally liberal democracies, tend to be stable as most transitions across the period 1900-2020 occurred between non-democracies and illiberal democracies.

While the transition dynamics above are based on the idea that the parameters are fixed across time, illiberalism in established democracies could also potentially arise from parameter changes that result in a switch between the two equilibria. For instance, increased levels of immigration or melting pots of culture could lead to a change in ρ which could lead to certain citizen groups not choosing to resist elites, thus resulting in a switch from the liberal democracy to the illiberal democracy equilibrium. Events of war and conflict could also change demographic structure in ways that lead to a switch in equilibrium. Another interesting possibility is that illiberal democracies arise because of changes in $\alpha_{\mathbf{N}}$. Suppose $\alpha_{\mathbf{N}}$ starts off low but increases in an unanticipated manner, for instance, due to superior communication technology or strengthening of national solidarity. With this higher $\alpha_{\mathbf{N}}$, citizen 1 are less fearful of transition to non-democracy, thus leading to a switch to the

illiberal democracy equilibrium. On the other hand, changes in citizen's discount factor, for example, increased life expectancy making them more patient could lead to a switch towards the liberal democracy equilibrium. Sudden increase in investment by elites in δ^* due to, say, green movements threatening capitalists could also result in a switch to the liberal democracy equilibrium. The general framework of our model therefore allows exploration of a wide range of scenarios that we leave for future research.

2.4 Extensions

2.4.1 Mobility

So far, we have assumed that group affiliation is determined exogenously and there is no movement across groups. However, unlike in the context of say, racial identity, it is often possible for identity to change, the most common example being across income classes. To introduce this idea of mobility between groups, suppose that citizens are mobile in terms of their group affiliation. Let π_{ij} denote the (exogenous) probability of transitioning from group i to group j, where $i, j \in \{1, 2\}$. Then the value functions for citizens satisfy:

$$\mathbf{V} = A\mathbf{u} + \beta \cdot B\mathbf{V}$$

where $\mathbf{V}$ is a vector of state and citizen group specific value functions and A is a matrix of the power distribution that determines the regime and the payoff from the vector $\mathbf{u}$. Each element in matrix B denotes the associated probability of receiving the relevant equilibrium values of vector $\mathbf{V}$. This probability depends on whether a citizen remains in their current group or becomes a member of the other group (that is, on π_{ij}), and the state in the next period (details in Appendix B.1.3). Denote $\mathbf{V} = \mathbf{V}(r^*_{D1}, r^*_{D2}, r^*_{N1}, r^*_{N2})$ to explicitly recognize the dependence of values on equilibrium actions.

To derive equilibrium strategies, first note that it will remain optimal for both groups to resist in non-democracy as long as the payoff ordering based on the assumptions made in Section 2.3 holds. Given Equation 2.8[9], the incentive constraint of citizen group 2 suggests that they will still always prefer to resist in all states. As before, the analysis then boils down to determining the strategy of citizen 1 in the democracy state. To simplify, using the results from Section 2.3.3, we set $\delta_{\mathbf{D}} = \delta_{\mathbf{N}} = \delta$. Then, citizen 1's preference for resisting as opposed to not resisting, that is, the incentive constraint simplifies to the following, the

[9]For the purpose of notational convenience and simplicity, we do not delve into the micro-foundations of payoff determination in this section.

sign of which determines their decision:

$$-\left\{u_{\tilde{D}1}-u_{D1}\right\}+\frac{\beta\cdot\delta}{1-\tilde{\beta}}\cdot\left[\varphi\cdot\Delta_{u_1}+(1-\varphi)\cdot\Delta_{u_2}\right] \tag{2.18}$$

where, letting $\tilde{\beta}\equiv\beta\cdot\left[1-(1-p_{\mathbf{D}})\cdot\delta-\alpha_{\mathbf{N}}\cdot(1-\delta)\right]$, we have

$$\varphi\equiv\frac{\pi_{11}-(\pi_{11}+\pi_{22}-1)\cdot\tilde{\beta}}{1-(\pi_{11}+\pi_{22}-1)\cdot\tilde{\beta}} \tag{2.19}$$

and

$$\Delta_{u_1}\equiv(p_{\mathbf{D}}\cdot u_{D1}+(1-p_{\mathbf{D}})\cdot u_{\tilde{D}1})-u_{N1} \tag{2.20}$$

$$\Delta_{u_2}\equiv(p_{\mathbf{D}}\cdot u_{D2}+(1-p_{\mathbf{D}})\cdot u_{\tilde{D}2})-u_{N2} \tag{2.21}$$

The first term of Equation 2.18 is the cost of resisting, that is, a lower flow payoff and the second term is the benefit of resisting, that is, avoiding non-democracy. If the expression is positive (when $p_{\mathbf{D}}=\alpha_{\mathbf{D}}$) then a *liberal democracy equilibrium* arises. If it is negative (when $p_{\mathbf{D}}=(1-\rho)\cdot\alpha_{\mathbf{D}}$) then an *illiberal democracy equilibrium* arises.

The mobility parameters (π_{11},π_{22}) have an effect on the decision only through φ. In particular, φ is increasing in π_{11} but decreasing in π_{22}. Thus the effect of 'mobility' depends on the specifics. If we assume $\Delta_{u_1}<\Delta_{u_2}$ [10], a higher π_{11} or lower π_{22} will lower the term $\left[\varphi\cdot\Delta_{u_1}+(1-\varphi)\cdot\Delta_{u_2}\right]$. For instance, consider the case of "general" mobility where $\pi_{11}=\pi_{22}=\pi\in[0.5,1]$. Here we have

$$\varphi=\left(\frac{\pi-(2\pi-1)\cdot\tilde{\beta}}{\left[1-(2\pi-1)\cdot\tilde{\beta}\right]}\right), \tag{2.22}$$

which is increasing in π. Thus, a higher π (lower general mobility) would lower the benefit of resisting making an illiberal democracy equilibrium more likely.

[10] An example of when $\Delta_{u_1}<\Delta_{u_2}$ holds true - first, assume $u_{N1}=u_{N2}$, that is, in non-democracy, elites treat all citizens similarly. Given this, $\Delta_{u_1}\leq\Delta_{u_2}$ is satisfied if $\frac{p_{\mathbf{D}}}{(1-p_{\mathbf{D}})}\geq\frac{u_{\tilde{D}1}-u_{\tilde{D}2}}{u_{D2}-u_{D1}}$. As $p_{\mathbf{D}}$ is endogenous to citizen 1's decision to resist, a stricter assumption would be $\frac{(1-\rho)\alpha_{\mathbf{D}}}{(1-(1-\rho)\alpha_{\mathbf{D}})}\geq\frac{u_{\tilde{D}1}-u_{\tilde{D}2}}{u_{D2}-u_{D1}}$ which would ensure $\Delta_{u_1}<\Delta_{u_2}$. This assumption thus implies that the benefit from illiberal democracy for citizen 1 relative to citizen 2 compared to the benefit of liberal democracy for citizen 2 relative to citizen 1 is sufficiently small. This holds true for $\frac{(1-\rho)\alpha_D}{(1-(1-\rho)\alpha_D)}$ sufficiently large. However, if we also assume $u_{D1}=u_{D2}$, then we always have $\Delta_{u_1}>\Delta_{u_2}$. In that case, the predictions from Proposition 4 goes in the opposite direction.

Consider another case where the proportion of citizens in either group does not change regardless of mobility. Let $\pi_{12} = m$ and $\pi_{21} = \frac{\rho}{1-\rho} \cdot m$. We then get

$$\varphi = \left(\frac{1 - m - (1 - \frac{m}{1-\rho}) \cdot \tilde{\beta}}{1 - (1 - \frac{m}{1-\rho}) \cdot \tilde{\beta}} \right), \tag{2.23}$$

which is decreasing in m as long as $\rho < 1 - \tilde{\beta}$. Thus, a lower m (lower mobility) would lead to a higher φ which again makes an illiberal democracy equilibrium more likely. These examples along with the assumptions allow us insight into the relation between mobility and the emergence of the two possible equilibrium.

Proposition 4. *Assuming $\Delta_{u_1} < \Delta_{u_2}$,*

1. *Greater 'general' mobility tends to promote the liberal democracy equilibrium*
2. *Illiberal democracy equilibrium is more likely if there is*
   (a) *Smaller 1-to-2 mobility (higher π_{11})*
   (b) *Greater 2-to-1 mobility (lower π_{22})*

Proposition 4 suggests that the effect of "social mobility" is nuanced - as mobility eases group boundaries, it is more likely to promote liberal democracy equilibrium as suggested in de Tocqueville (1835), but it also depends on whether group 1 is more likely to enter group 2 or the reverse. This is because the benefits of illiberal democracy is more pronounced for citizen 1, if they are less likely to become a member of citizen 2 in the future; or, even if they do become citizen 2, if there is a high possibility of reverting back to being citizen 1.

If we consider mobility as economic/social mobility, where elites rank highest, and citizen 2 ranks lowest, then our model also shows that under certain restrictions on payoffs ($\Delta_{u_1} < \Delta_{u_2}$), greater upward mobility promotes illiberal democracies. Qualitatively similar results regarding upward mobility and instability of democracy is found in Acemoglu et al. (2018) where the median voter gives more voice to the poor if there is more downward mobility and to the rich if there is higher upward mobility. However, the mechanism in our paper differs from Acemoglu et al. (2018) since the transitions are determined probabilistically (where the probabilities depend on the strategies) as opposed to the current group in power choosing which group comes to power in the future. The critical distinction in the predictions arise from the fact that our model still predicts transitions across political regimes in an environment with zero mobility (as in the baseline model in Section 2.3.2).

Proposition 4 is also somewhat in accordance with the POUM (Prospect of Upward Mobility) hypothesis formalized in Benabou and Ok (2001) which suggests that upward mobility

leads to policies that do not support the poor. However, in their model [11], the poor prefer lower redistribution as they expect to move up the income ladder in the future. The result in our paper is more subtle in the sense that the poor (citizen 2) will support liberal democracy equilibrium regardless of upward mobility. However, those in the middle group status will support an illiberal democracy as long as there is sufficient upward mobility such that they do not get stuck with the low income group in the event that their group affiliation changes in the future. The intuition here is that in the future, if the likeliness of being stuck as citizen 2 is low enough, members of citizen 1 are willing to undermine the other group not only because they will receive a higher flow payoff, but also because the prospect of lower payoffs from being in citizen group 2 is sufficiently low. Another interesting extension to study would be introducing mobility between citizens and elites, but it is a relatively less likely scenario that we leave for future research.

2.5 Conclusion

Our paper presents a formal economic theory of illiberal democracies in a dynamic setting highlighting how rational actions of citizens can lead to illiberalism. In our paper, illiberalism arises from elites exerting over-sized influence over policy making, facilitated by citizen support that stems from heterogeneity in preferences among citizens. The model suggests that if the benefit from elite involvement is sufficiently high for some citizen groups, an illiberal democracy equilibrium arises where these groups support the illiberal democracy regime despite an increased threat of transitioning to non-democracy. Otherwise, a liberal democracy equilibrium arises where citizens resist elite involvement. The illiberal democracy equilibrium is more probable when elites are weak such that their ability to completely seize power is lower or citizens are impatient. It is also more likely to arise when citizens whose preference align more with the elites plays a smaller role in determining citizens' overall power.

We then introduce elites' investment in the probability of seizing complete power and find that they invest more in the liberal democracy equilibrium. This provides interesting insight into the transition dynamics across regimes. Transition from a state of non-democracy to democracy is more likely in the illiberal democracy equilibrium. Furthermore, in the state of democracy, when the collective power of citizens is sufficiently high, transitions out of illiberal democracy to autocracy is also more likely in the illiberal democracy equilibrium relative to the liberal democracy equilibrium. Our model can hence explain the systematic transitions between non-democracies and illiberal democracies observed in the real world.

[11] The setup of their model also differs significantly from ours. One of the main distinction is the timing such that individuals actions today affect policy tomorrow. This is unlike our model where today's action determines today's regime and thus, policy.

We also discuss how the framework is applicable to scenarios of differences among citizen groups due to income class and social identity leading to support for democratic, yet illiberal institutions. We further extend our model to allow mobility between groups of citizens which provides nuanced insight into the conditions under which mobility can enhance or restrict possibility of illiberal democracies. Identifying potential causes of illiberal democracies is the first step to safeguard the political institutions of democracies. This is vital as studies suggest that democracies do lead to economic growth (Acemoglu et al., 2019). Potential future research involve constructing valid measures for the extent of illiberalism within democracies and empirically decomposing how much of it is citizen driven as opposed to being driven by elite investment. These findings can inform policy decisions regarding strengthening checks and balances on the government, as well as nation building and unity among communities of different identities.

Chapter 3

Are Elections Enough?

[1]

3.1 Introduction

Democracies have been forming globally over the past four decades and are currently the most common political regime. However, countries categorized under the same political regime often have different institutional characteristics. For instance, in 1985, both Argentina and Greece were classified as a democracy according to the Polity IV data as they scored 8 on the Polity scale which ranges from -10 to 10. The Polity score breakdown shows that they also had the same score on competitiveness of executive recruitment component, i.e., both countries' leaders were chosen via competitive elections matching two or more major parties. However, the score on political competition component shows that in Argentina, these political groups were exclusive rather than inclusive and social groups were routinely excluded from the political process. On the other hand, in Greece, political parties and processes were inclusive and respected human rights and civil liberties [2]. Economists have generally categorized political regimes in a binary manner as democracy and non-democracy, to study their implications on a nation's economic development (Acemoglu et al., 2019; Doucouliagos and Ulubaşoğlu, 2008, and many more). This example hints that the dichotomous measure is too broad to identify finer differences in the characteristics of these regimes since data shows that in 1985, income per capita was significantly higher in Greece than in Argentina. Political scientists have explored this idea of different types of democracies with distinct political characteristics (Schmidt, 2002). Democracies

[1]I am grateful for very useful comments and suggestions from participants of the Canadian Economic Association Conference 2019 and seminar participants at Simon Fraser University.

[2]The variables referred to as competitiveness of executive recruitment is *exrec* and political competition is *polcomp* in the Polity IV data.

have been differentiated based on various categories, for example, parliamentary vs presidential democracy[3] based on power allocation between president and legislature, direct vs representative democracy based on the process of policy making, and many more.

Combining these two ideas from the field of economics and political science, this paper thus provides insight into how the characteristics of the political regime a country transitions to affects economic outcomes. Focusing on two components of democracy - election, a necessary condition to be classified as democracy, and liberalism, an additional component, this paper studies whether these components of democracy play a role in economic development and their relative magnitudes. Election, as commonly understood, is how formal and fair the process of selecting political leaders is. Liberalism is defined as requiring major political parties to be inclusive in nature and for non-violation of civil liberties and human rights. The main contribution of this paper is empirically analyzing the relation between these components of democracy and economic outcomes. Our findings suggest that the standard dichotomous approach in economics of categorizing regimes as democracy and non-democracy is too broad when trying to analyze the relation between political regimes and growth. We find that elections alone are not associated with economic growth and the political component, liberalism, is positively associated with growth within democracies. This hints at how liberal democracies perform better in terms of economic outcomes, relative to both electoral democracies and non-democracies. This suggests that the finding that democracies outperform autocracies in studies using dichotomous measures of political regimes is primarily driven by the liberalism component and not the electoral component alone. This association is extremely important to study in an era of democratization where most new democracies are electoral democracies and not liberal democracies. We further provide insight into the mechanisms behind these findings showing that competitive elections improve market reforms and reduce conflict. This is however insufficient to translate to higher GDP as opposed to the case of liberalism which improves resource allocation and thus increases productivity, stability and in turn,is correlated with better economic performance.

The relation between income and democracy has long been contested. A strand of literature suggests that democracies hurt growth due to reasons such as short term political horizon of modern democracy distracting leaders from policies of long term growth (Moyo, 2018) or offsetting effects of human and physical capital accumulation in democracies (Tavares and Wacziarg, 2001). Theoretically, Acemoglu and Robinson (2006) suggests that political elites may block economic and institutional change when innovation threatens to erode their power and there is higher benefit of staying in power. There is also a vast literature,

[3]Persson and Tabellini (2006) finds that presidential democracy leads to faster growth than parliamentary democracy due to the difference in the implemented economic policies.

both theoretical and empirical, on how democracy enhances economic development through political rights and constraints on executives (Papaioannou and Siourounis, 2008; Barro, 1996; Armijo and Gervasoni, 2010) and the order of political and economic liberalization (Giavazzi and Tabellini, 2005). Besley et al. (2010) shows that intermediate levels of political participation (measured as Democrats' vote share) across US states, results in policies like lower taxation, higher infrastructure expenditure and pro-growth right to work laws which in turn boosts economic growth.

Conversely, some argue in favor of the modernization theory according to which countries transition towards democracy as per capita income increases or that there exists a non-linear effect of income on democracy (Acemoglu et al., 2008; Heid et al., 2012; Moral-Benito and Bartolucci, 2012). Epstein et al. (2006) distinguishes between partial and full democracies and lends support to the modernization theory by showing that economic growth makes existing democracies more consolidated and promotes transitions from autocracies to democracies. Given the potential simultaneity, an empirical analysis of the effect of political institutions on growth gives rise to endogeneity concerns. This paper uses the empirical methodology of Acemoglu et al. (2019)[4] which implements a variety of econometric methods to address endogeneity, alongside a new dichotomous measure of democracy. ANRR concludes that democracy does cause growth, potentially through an increase in economic reforms, private investment, government capacity and a reduction in social unrest.

Despite the vast literature on the relation between income and democracy, to the best of our knowledge, very few empirical studies have focused on the heterogeneity across democracies. This paper explores how having both elections and liberalism differs from countries with and without elections. This provides further insight into the following aspects: (1) how having competitive elections is related to growth; (2) how having liberalism is related to growth relative to having only competitive elections; and further, (3) how a combination of competitive election and liberalism can foster growth relative to having neither of these components. BenYishay and Betancourt (2014) un-bundles political regimes into analogous dimensions of civil liberties and political rights and empirically shows persistence of the dimensions and the role of civil liberties in predicting political rights within electoral democracies, which potentially increases the sustainability of these democracies.

Our paper empirically establishes that competitive elections alone have no significant relation with economic growth, and findings in previous literature that democracy leads to growth seems to be associated entirely with the liberalism component. While elections do change the conflict mechanism between political parties and citizens, and creates market reforms, issues like clientelism likely leads to reduction in productivity. Liberalism on the

[4]Referred to as ANRR from here on in the paper.

other hand leads to improved distribution of resources, stability and duration of political regime which translates to enhanced productivity and thus leads to higher economic growth.

The next section describes the dataset used for the empirical analysis along with detailed description of the characteristics of political regimes. Section 3.3 then provides a brief summary of the trends in political regimes and transitions across them and then shows how belief systems regarding democracy and political systems vary across the regimes based on the above-mentioned political characteristics. The methodology for the empirical analysis is presented in Section 3.4, followed by the results and robustness checks in Section 3.5. Finally, potential channels of how features of political regimes affect growth are discussed in Section 3.6.

3.2 Data

The data is a panel of 155 countries from 1900 to 2017. We analyze political regimes based on the components used to construct the Polity IV measure of democracy and autocracy. We use the Polity score for the analysis since it is the most commonly used measure in the political economy literature, thus allowing the best comparison with other studies. The Polity score is an additive twenty one point scale (-10 to -10) comprising of various components. Generally, democracies are categorized as having a Polity score above 0 and the strength (or consolidation) of the democracy is indicated by higher values on the scale. However, this composite measure does not address the heterogeneity within the democracies, such as the one described in the example above about Argentina and Greece. Thus, we breakdown the political regimes focusing on two dimensions of democracy - election and liberalism.

Bollen (1993) defines liberal democracies as *the extent to which a political system allows political liberties and democratic rule*. The paper explains political liberties to be the extent to which the people of a country have the freedom to express various political opinions in any media, and to form or participate in any political group. Democratic rule is defined as the extent to which the nation's government is accountable to the general population and each individual is entitled to participate in the government directly or through representatives. As in this definition, conceptually, we define democracies as nations which have both political liberties (what we term liberalism) and democratic rule (what we term election). Electoral democracies lack political rights according to our definition and only allows democratic rule to exist. Non-democracies have neither of these components.

In terms of data, a country is defined to have a high ranking in the *"election"* dimension if it receives the highest score in the concept variable of executive recruitment in Polity IV data. The variable measures the extent of institutionalization, competitiveness and openness of the mechanism through which political leaders are selected. A nation receives the highest

score if it is deemed to have free and fair elections with two or more candidates from at least two major parties and the outcomes are institutionally uncertain.

A country is defined to have a high ranking in the *"liberalism"* dimension if it has the highest score in the political competition concept variable. This measures the extent of institutionalization of participation such that there are binding rules on the organization and expression of political preferences. The highest score on this component is coded when stable and enduring political groups regularly compete for political influence and no significant issues, groups or political action is regularly excluded from the political process. It requires major political parties to be inclusive in nature and for non-violation of civil liberties and human rights. Starr (2007) suggests that modern liberalism works well economically because while it aims for social inclusion and shared prosperity, its actions also aim to achieve more equal living standards for the people which also serves the macroeconomic goals of growth and stability.

Table 3.1: Combinations of Components of Political Institutions

Election	Liberalism	Times observed	Number of countries
Low	Low	7,239	135
High	Low	2,124	90
High	High	2,553	50

Countries coded as cases of "transition" (polity score -88) & "interregnum" (polity score -77) in Polity IV are recoded with the last observed component ranking.
We code high in liberalism only in democracies, and thus only conditional on scoring high in election. 7 countries observed (102 observations) with low score in election and high in liberalism are considered low in both.

Countries can be sorted into three different combination of the components within a political regime, as described in Table 3.1. By definition, we code high in liberalism only within democracies since cases of liberal autocracies are rare and we are focusing on the heterogeneity within democracies. A comparison of existing regime scores and the regimes identified from these combinations is provided in Section C.1. Furthermore, while we prefer the Polity dataset because of its wide usage, as robustness check, we also use data from the Varieties of Democracy (V-Dem) dataset (Coppedge et al., 2018) for alternative measures of the two components. The *"election"* dimension is measured using the Electoral Democracy Index (EDI) which is a continuous variable ranging from 0-1 which determine the selection of the chief executive, suffrage and freedom of association and expression. The *"liberalism"* dimension is measured using an adjusted Liberal Democracy Index (LDI)[5] such that the

[5]The LDI is constructed in the dataset as $.25 * v2x_{polyarchy}^{1.585} + .25 * v2x_{liberal} + .5 * v2x_{polyarchy}^{1.585} * v2x_{liberal}$ where $v2x_{polyarchy}$ is the measure of EDI. In order to allow easier interpretation of coefficients, this index is adjusted by deducting the additive component of EDI ($.25 * v2x_{polyarchy}^{1.585}$). The multiplicative component ($.5 * v2x_{polyarchy}^{1.585} * v2x_{liberal}$) allows liberalism to have a higher effect on growth when EDI is high. The adjusted LDI includes a country's score in the liberal component and is higher when a country has both high EDI and a high liberal score, accounting for the analysis of liberalism conditional on having electoral competition. Another reason why we prefer the Polity score over the VDem measure is because of how this

measure emphasizes equality before the law and individual liberties and judicial and legislative constraints on the executive such that individual and minority rights are protected against other majority groups. In Section C.5.6, we also provide robustness checks using Regimes of the World classification of nations into electoral and liberal democracies from the VDem dataset. While this measure does not specifically focus on the characteristics, the distinguishing feature between non-democracies and electoral democracy is elections and between electoral democracies and liberal democracies is liberalism. Outcome variables throughout the paper include income, taken from Maddison (2018) measured as the log of GDP per capita in year 2011 US dollars. Other measures of economic development and a wide range of control variables are also used, the details of which are provided in Section C.1.

3.3 A Look at the Political Regimes

3.3.1 Historical Trend of Political Regimes

The worldwide perception is that democracy has flourished in the modern world and is the ideal political regime. In this section, we take a closer look at the components of these democracies and find that the increase in democracies was primarily driven by the countries with only competitive election, but low liberalism. Between the 1960s and 1980s, there was a rise in the number of countries scoring low in both components while number of countries with only competitive elections declined slightly and number of countries ranking high in both dimensions remained relatively stable. In number, however, the latter two cases (high in only election and high in both) were significantly lower, as shown in Figure 3.1.

The figure also plots the trend in the number of the democracies defined according to the Polity Score (if Polity score is greater than zero). It shows a drastic increase in democracies around the 1990s and a steady increasing trend of the total number of democracies from 2000 onwards. However, this is driven by countries scoring high only in the election component and is comprised of countries previously in the Soviet Union (30%), in Africa (28%) and Latin America and the Carribean (23%). The trend suggests that surges in democracies in recent times have been fueled by increases in democracies where political parties have directed agendas that are not necessarily aimed at the broader groups of citizens.[6]

measure is non-linearly constructed from sub-components which does not allow a clear decomposition of these components.

[6]Figure 3.1 uses the entire sample which includes countries with missing observations for components within the time sample. Thus, the total number of countries are not balanced throughout the time period. Fixing the sample to countries observed in all periods between 1900 and 2010 significantly reduces the sample and the total number of countries ranking high in both is higher across all periods, but the trend across time remains the same.

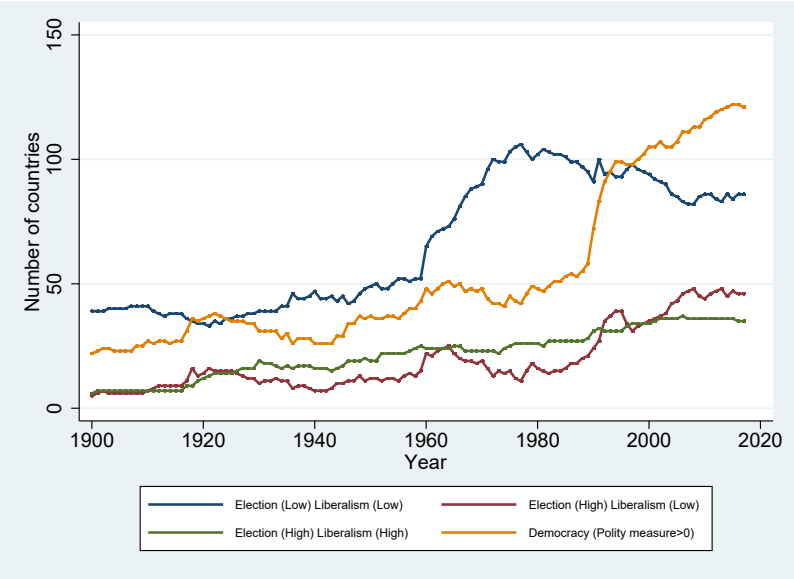

Figure 3.1: Number of countries in each regime from 1960 to 2010

The transitionary trends across these differing political institutions also suggest similar patterns. Figure 3.2 illustrates that transitions are most pronounced between nations scoring low in both components and nations introducing competitive elections only. Countries scoring high in liberalism from having only elections is sparsely scattered across the time period, mostly occurring in recent years. Transitions from ranking low in both to high in both is also sparsely scattered over time, with most transitions being pre-1960. Figure C.2 in Section C.2 show similar trends in switches between low and high for the scores of each dimension.

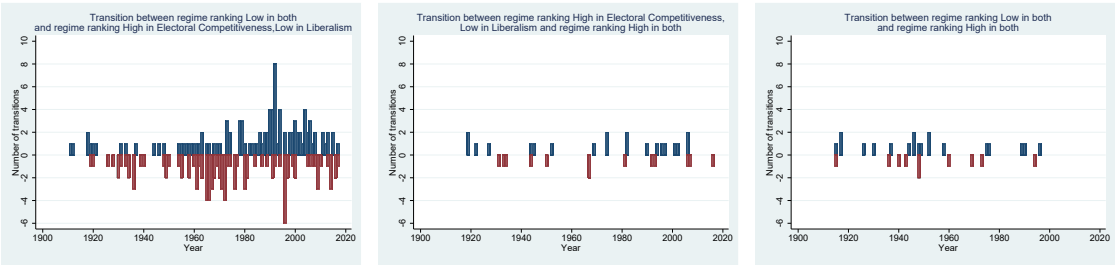

Figure 3.2: Transitions between regimes from 1960 to 2010

Table 3.2 further shows the persistence of the two characteristics where both the components are positively, significantly correlated with last year's score. Interestingly, the analysis suggests that while being liberal makes it more likely for a nation to have competitive elections in the future, the opposite does not hold true. Hence, the liberal aspect likely increases the persistence of a democratic regime, but being a democracy with only competitive elections does not predict consolidation of democracy such that liberalism is introduced. As

Table 3.2: Persistence of dimensions

	Election (1)	Liberalism (2)	Election (3)	Liberalism (4)
Election 1st lag	0.898***	0.005	0.890***	0.004
	(0.009)	(0.003)	(0.010)	(0.004)
Liberalism 1st lag	0.027***	0.944***	0.028***	0.943***
	(0.008)	(0.006)	(0.008)	(0.005)
Observations	11752	11752	10196	10196
Countries in sample	155	155	155	155

Robust standard errors clustered at country level in parentheses *** p<0.01, ** p<0.05, * p<0.1. All columns include country and time fixed effects. Columns (3) & (4) further controls for four lags of GDP per capita.

Table 3.2 shows, liberalism last period is positively significantly correlated with scoring high in election in the current period, but having elections is not significantly correlated with liberalism in the current period.

Overall, these show that in recent years, most democracies tend to have the ingredients of a democracy in the minimalist sense with only elections, but lacking liberalism and this does not guarantee consolidation into full democracies which score high in both components. Therefore, this paper identifies how each of these two components that make up democracies are related to economic outcomes.

3.3.2 Beliefs

Table 3.3: Effect of dimensions on beliefs about country's elections in democracies

	How often in country's elections (Not at all - Very often)				
	(1) Votes are counted fairly	(2) Election officials are fair	(3) Opposition prevented from running	(4) Voters are threatened with violence at polls	(5) Voters are offered a genuine choice
Liberalism	0.290***	0.206***	-0.092	-0.252***	0.037
	(0.036)	(0.038)	(0.054)	(0.061)	(0.045)
Observations	26068	25448	24632	25050	25759
R-squared	0.180	0.129	0.074	0.171	0.046

Robust standard error clustered at country level in parentheses *** p<0.01, ** p<0.05, * p<0.1. Controls for gender, age, marital status, highest education level, employment status, income scale and ethnic group are included, alongside year dummies.

We next study how opinions about politics and political institutions vary with the components of political regimes. Our analysis in this section shows that it is crucial to distinguish political regimes based on individual components instead of aggregated binary measures since people's views about the fundamentals of elections in democracies, democratic characteristics and political systems in general largely vary within democracies that differ across the dimensions of election and liberalism. Data on people's views on democracy is taken from the six waves of the World Value Survey longitudinal data (Inglehart et al., 2018) ranging from 1981-2014. The findings emphasize that our categorization of regime characteristics is not simply a quantitative cutoff. The regimes also vary qualitatively through

systematic differences in people's beliefs, which is a potential channel through which growth is affected by political characteristics. People's beliefs about political regimes in nations with only competitive elections are similar to non-democracies while those in democracies with liberalism tend to vary significantly. This systematic difference in belief systems, regarding elections and political characteristics, across democracies with and without liberalism signifies the importance of not bundling the dimension of elections and liberalism into a dichotomous measure of democracy and autocracy.

We compare beliefs of individuals across democracies with and without liberalism about the electoral system within their nations. We find that individuals in democracies scoring high in liberalism believe having fairer elections. Table 3.3 shows the responses to particular characteristics of elections in democracies scoring high in both dimensions relative to those scoring high only in the election component. The regression results suggest that individuals in countries scoring high in liberalism believe that votes are counted fairly, election officials are fair very often, and voters are rarely threatened with violence at the polls, relative to people in countries with only competitive elections. Beliefs about whether opposition candidates are prevented from running or whether voters are offered a genuine choice (Column 3 & 6) are not significantly different. This is not surprising since the definition for scoring high in election dimension requires the nation to have free, fair and competitive elections with uncertain outcomes. Thus, given both types of democracies score high in election dimension, candidates running in election and voters being given a genuine choice exists in both by definition and so beliefs should not be significantly different.

Table 3.4: Effect of dimensions on beliefs about democratic characteristics in democracies

	Democratic Characteristic (Not Essential - Essential)					
	(1)	(2)	(3)	(4)	(5)	(6)
	People choose leaders in free election	People obey their rulers	Civil rights protect people's liberty	Army takes over when govt. is incompetent	Religious authorities interpret law	Economy is prospering
Liberalism	0.052***	-0.150***	0.025	-0.177***	-0.177***	-0.107**
	(0.018)	(0.049)	(0.025)	(0.018)	(0.030)	(0.046)
Observations	68633	38638	66877	66868	66385	28984
R-squared	0.043	0.104	0.052	0.113	0.130	0.042

Robust standard errors clustered at country level in parentheses *** p<0.01, ** p<0.05, * p<0.1. Controls for gender, age, marital status, highest education level, employment status, income scale and ethnic group are included, alongside year dummies.

Individuals in nations with both competitive elections and high liberalism mostly have a view of what is essential in a democracy that is in accordance with the definition of full democracy in the traditional sense - where civil liberties alongside elections is considered an integral component of democracy. Table 3.4 show that individuals in countries scoring high in both dimensions believe that choosing leaders in free election is an essential characteristic of democracy. People obeying their rulers, the army taking over when the government is incompetent and the religious authorities interpreting law is not considered as essential characteristics of democracy, relative to beliefs of individuals living in countries scoring high

in only competitive elections. Individuals also do not believe that the economy prospering is an essential characteristics of democracy indicating that they believe that political institutions need not be shaped by economic characteristics. However, opinions regarding civil rights and protecting people's liberty is not significantly different across the democracies (column 3). This may be because individual in both electoral and liberal democracies have similar beliefs about how essential civil rights protecting people's freedom is as a democratic characteristic, irrespective of whether it is observed or not within the regime.

Table 3.5: Effect of dimensions on opinions about political system in democracies

	Democracies (Disagree strongly-Agree)			
	(1)	(2)	(3)	(4)
	have economic systems that runs badly	have indecisiveness & too much squabbling	are not good at maintaining order	may have problems but is better
Liberalism	-0.095***	-0.052	-0.065***	-0.015
	(0.029)	(0.037)	(0.020)	(0.021)
Observations	31224	31548	31475	32198
R-squared	0.064	0.042	0.040	0.029

Robust standard errors clustered at country level in parentheses *** p<0.01, ** p<0.05, * p<0.1. Controls for gender, age, marital status, highest education level, employment status, income scale and ethnic group are included, alongside year dummies.

Beliefs about order and economic system within a democracy also differ significantly across individuals living in countries with high score in liberalism compared to those with only competitive elections. Results in Table 3.5 suggest that in democracies scoring high in both dimensions relative to nations with only elections, individuals disagree strongly that economic system runs badly in democracies and democracies are not good at maintaining order. This is indicative of more stability and better performing economy where liberalism is high alongside elections. Opinions about democracies being more indecisive and having squabbles, and about democracy having problems but being better than other political systems is not significantly distinct across the different democracies. All of these suggest that the understanding of what is democracy and what features are necessary in a democracy differ significantly across individuals based on the level of liberalism within the nations.

Finally, we turn towards the relation between the dimensions of democracy on people's opinions about political systems in general. We find that beliefs about political institutions in regimes with only elections have more resemblance to beliefs in regimes without competitive elections rather than to democracies ranking high in both components. While views do not differ about whether having a democratic system is good or bad, Table 3.6 shows that individuals in nations with liberalism believe that having a strong leader who does not have to bother with parliament and elections, having experts and not the government deciding what is good for the nation and having the army rule is very bad as a political system. Individuals in countries with only elections however do not have a significantly different opinion than countries scoring low in both components.

Table 3.6: Effect of dimensions on beliefs about political systems

	(Political system (Very Bad- Very Good))			
	(1)	(2)	(3)	(4)
	Having strong leader	Having experts making decisions	Having army rule	Having democractic system
Election	0.043	0.013	0.007	-0.009
	(0.037)	(0.022)	(0.025)	(0.019)
Liberalism	-0.175***	-0.086***	-0.173***	0.030
	(0.037)	(0.021)	(0.026)	(0.019)
Observations	170352	167289	168154	172407
R-squared	0.059	0.030	0.107	0.020

Robust standard errors clustered at country level in parentheses *** p<0.01, ** p<0.05, * p<0.1. Controls for gender, age, marital status, highest education level, employment status, income scale and ethnic group are included, alongside year dummies. The questions rating from very bad to very good political systems for column 1 is: Having a strong leader who does not have to bother with parliament and elections, column(2) is having experts, not government, make decisions according to what they think is best for the country.

All in all, the stark contrast in people's views about how elections are conducted in democracies, democratic characteristics and political systems in general, highlight the importance of distinguishing between political regimes based on individual features instead of aggregating them. Non-democracies, and democracies with only electoral component are more similar in their belief structure as opposed to democracies with both elections and liberalism. Furthermore, these different belief systems could also enforce mechanisms through which regimes influence growth. These beliefs could however arise due to factors such as regime duration or economic conditions, and these factors need to be taken into consideration when estimating the effect of these regimes on economic outcomes. We discuss the empirical strategy to tackle such concerns in the next section.

3.4 Empirical Strategy: Effect on Growth

We estimate the causal effect of each dimension of democracy on economic growth using a variety of state-of-the-art empirical strategies from ANNR and the political economy literature.

3.4.1 Panel approach

The baseline estimation strategy uses the panel structure of the data to estimate:

$$y_{ct} = \beta_1 \, Election_{ct} + \beta_2 \, Liberalism_{ct} + \mathbf{X_{ct}}\eta + \alpha_c + \delta_t + \epsilon_{ct} \tag{3.1}$$

where y_{ct} is the log of GDP per capita (or outcome of interest) in country c in period t . *Election* is a dummy variable that is equal to 1 if a nation ranks high *only* in the election dimension. *Liberalism* is a dummy variable equal to 1 if and only if the country ranks high

in *both* components [7]. $\mathbf{X_{ct}}$ is a vector of controls. Most specifications in our analysis include 4 lags of the dependent variable, as suggested in ANRR, to control for the dynamics of GDP (denoted $\sum_{j=1}^{4} \gamma_j y_{ct-j}$). This controls for trends in GDP preceding changes in regime characteristics as shown in Figure C.3 in Section C.3 since there are increases or dips in GDP per capita preceding transitions. α_c is country fixed effects, included to control for country specific characteristics such as cultural and institutional persistence, geography and other time invariant factors such as ancestral institutions of local level democracy which have been shown to influence present day national level democracy as well as growth (Giuliano and Nunn, 2013). δ_t controls for year fixed effects. The identifying assumption when including lags of GDP as control is that conditional on level of GDP in previous years and time invariant country characteristics, the components of political regimes of a country are uncorrelated with other unobservable variables affecting current GDP per capita. While this is a strong assumption which poses potential endogeneity concerns if violated, it provides results that we can treat as the baseline.

Our focus is on identifying how the disaggregated characteristics of democracy is associated with income and economic outcomes. The estimate of β_1 is meant to capture the effect of elections on the outcomes of interest and β_2 captures the effect of introducing the liberal aspect within democracies.[8] The effect of these characteristics on income, after 25 years, is determined recursively and the long run effect of a particular component (assuming a permanent transition) is measured as $\frac{\hat{\beta}}{1-\sum_{j-1}^{4} \hat{\gamma_j}}$ using the relevant estimated $\hat{\beta}$. The dynamic panel estimates potentially suffer from an asymptotic Nickell bias (Nickell, 1981) of order $1/T$. Given our rather large $T = 117$, this bias is likely to be very small. We still carry out an Arellano Bond specification (Arellano and Bond, 1991) and the HHK estimator (Hahn et al., 2004) as in ANRR, though these also suffer from other endogeneity concerns discussed in Section 3.5. We also carry out multiple other strategies to address these biases as best we can, using state of the art econometric methods. Furthermore, we use a semiparametric approach to estimate the effect of the political characteristics on economic outcomes years after the change takes place.

3.4.2 Semiparametric approach

The second strategy for estimating the effect on growth of changes in regime characteristics is a semi-parametric approach. Selection into a change in combinations of the score (transition between regimes) is modeled as a function of observables, as in the baseline estimation.

[7] As mentioned in Table 3.1 in Section 3.2, *Liberalism* is coded high only in democracies, that is, where *Election* is already high.

[8] While these coefficients can also be interpreted as the effect of a transition across nations with different political institutions, it must be noted that this estimate does not take into account any path dependence in political institutions.

However, the semi-parametric model does not put restrictions on the growth dynamics, thus allowing us to get an insight into the time path of the effect of these components on GDP.

Let a transition be denoted $OD_{ct} \in \{0, 1\}$. The initial regime with a certain set of democratic characteristics of the country is denoted O, and the new regime with a different score on the dimensions is denoted D, that is, if a country is transitioning from low to high score in election dimension only, O denotes a regime scoring low in election and D is a regime with high score in only elections. For a country, c, transitioning from O to D at time t, $OD_{ct} = 1$ if $D_{ct} = 1$ and $O_{ct-1} = 1$. For a country continuing to score low in elections O, $OD_{ct} = 0$ where $O_{ct} = 1$ and $O_{ct-1} = 1$.[9] Considering OD as a treatment, let $\Delta y^s_{ct}(OD) = y^s_{ct} - y_{ct-1}$ denote the potential change in log GDP per capita from time $t-1$ till time $t+s$. Hence, the effect of a transition from regime O to regime D, at time t, on GDP, s periods after a change in the score can be represented as:

$$\beta^s = \mathbf{E}(\Delta y^s_{ct}(1) - \Delta y^s_{ct}(0) | D_{ct} = 1, O_{ct-1} = 1) \tag{3.2}$$

Equation (3.2) estimates the treatment effect on the treated without making any parametric assumptions about the path followed by GDP. The main endogeneity concern here is that countries experiencing a change in the dimensions may be different from countries that do not. Thus, conditional mean independence is assumed, which means that conditional on covariates, the change in scores does not affect the conditional mean of the potential outcomes. Using lags of GDP as additional covariates, this assumption restricts countries that are in regime O at time $t-1$ and have followed similar GDP per capita patterns to follow parallel trends. The estimation is done separately for each of the s years which allows non-linearity of the growth process which we cannot observe from the baseline model. Three different estimation methods are used for this method, the details of which are provided in Section C.4.1. Further robustness checks are conducted using an instrumental variable approach and randomization tests (details provided in Section C.5.3 and Section C.5.4 respectively).

[9]Since a country falls into any one of the three possible combinations of the dimensions at any given time t, it is by default true that if $D_{ct} = 1$ and $O_{ct-1} = 1$, then $O_{ct} = 0$ and $D_{ct-1} = 0$ and if $O_{ct} = 1$ and $O_{ct-1} = 1$, then $D_{ct} = 0$ and $D_{ct-1} = 0$. Note that O & D represent a combination of the dimensions and not the dimension itself.

3.5 Results

3.5.1 Baseline Results

In this section, we present the results from the baseline model which highlight that while binary measures of democracy show that democracy boosts economic growth, competitive elections alone has no significant impact. Instead, liberalism and non-exclusion of groups from the political process is essential for economic growth in democracies relative to autocracies. This finding is particularly important in an era where most democratizations have focused on the electoral component alone and lack other fundamental features like liberalism as illustrated in Figure 3.1.

Table 3.7: Effect of dimensions of political regimes on GDP per capita

	Within estimates					
	(1)	(2)	(3)	(4)	(5)	(6)
Democracy(binary)	0.616***	0.551**	0.617**			
	(0.225)	(0.229)	(0.301)			
Election				4.6	0.177	
				(4.374)	(0.199)	
Liberalism				23.895***	1.225***	
				(6.251)	(0.323)	
Electoral index						-3.008
						(2.034)
Liberal index						7.091**
						(3.231)
Long-run effect of democracy	21.151***	18.936**	17.235**			
	(7.643)	(7.611)	(8.237)			
Effect of democracy after 25 years	13.515***	12.103**	13.382**			
	(4.72)	(4.915)	(6.242)			
Long-run effect: Election					5.499	-91.378
					(6.015)	(58.998)
Effect after 25 years: Election					3.693	-62.073
					(4.102)	(41.106)
Long-run effect: Liberalism					38.020***	215.396**
					(9.602)	(89.747)
Effect after 25 years: Liberalism					25.531***	146.320**
					(6.504)	(63.901)
Persistence of GDP process	0.971***	0.964***	0.967***		0.968***	0.971***
	(0.003)	(0.005)	(0.004)		(0.003)	(0.003)
Observations	9977	9977	6512	10585	10077	9743
Countries in sample	155	155	150	155	155	149
Controls (Income lags)	Yes	Yes	Yes	No	Yes	Yes

Robust standard errors clustered at country level in parentheses *** p<0.01, ** p<0.05, * p<0.1.
Column 1 & 2 uses Democracy measure from Polity IV (democracy if polity score>0 & polity score>4 respectively) & Column 3 uses democracy measure from ANRR (2019). Column 6 uses continuous measures of Electoral Democracy Index and the adjusted Liberal Democracy Index.

Using the dynamic panel estimation, we compare the effect of binary measures of democracy on growth as opposed to the effect of democratic characteristics. The results illustrated in Table 3.7 suggest that the positive effect of binary measures of democracy on growth are

driven entirely by the liberalism aspect of democracies and election plays no role in it. Columns (1) to (3) give the results for the effect of different binary measures of democracy on GDP per capita. All three measures of democracy - democracy if Polity score greater than zero, greater than or equal to 5, and the democracy score from ANRR shows a positive significant impact on growth. Column (4) shows results from the baseline specification with no controls and column (5) controls for four lags of GDP per capita. The results clearly show that competitive elections have no significant impact on economic growth while liberalism has a significant positive impact on growth. Results in column (5) suggest that liberalism increases log GDP per capita by 1.22%, the magnitude being approximately double of the effect of binary measures. Assuming a permanent transition, this effect translates to a 38% increase in GDP per capita in the long run. The specification for Column (6) uses the continuous measures of EDI and adjusted LDI from the VDem data, representing the election and liberalism dimensions respectively and the results suggest that a 0.1 change in LDI increases growth by around 0.7% while the EDI has no significant impact. Figure 3.3 illustrates these regression results - the coefficients and 95% confidence interval shows a significant association between the binary measures of democracy (Polity score greater than 0, greater than or equal to 5 and ANRR measure) and GDP per capita. The coefficients of election and liberalism from column (5) are illustrated as well and clearly shows how the correlation between democracy and growth primarily stems from liberalism and not election. Overall, these findings demonstrate that while democracy has been shown to positively impact economic growth, the electoral component used to distinguish democracies from autocracies plays no significant role in this impact. It is the liberal aspect of a democracy that boosts growth.

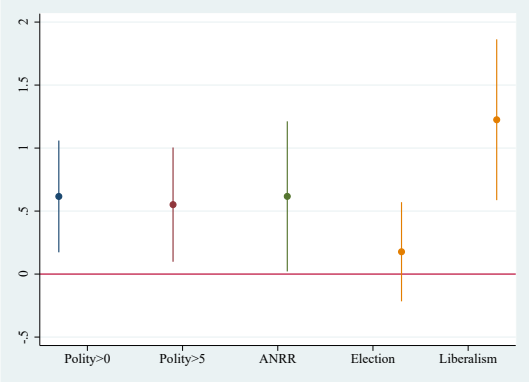

Figure 3.3: Coefficients and the 95% confidence interval bar from baseline regression

(Columns 1,2,3 & 5 of Table 3.7)

While we refer to the association as the effect, we acknowledge that causality in such a setting is difficult to establish without certain biases. As mentioned above, the dynamic panel estimates potentially suffer from an asymptotic Nickell bias (Nickell, 1981) of order

$1/T$. Given our rather large $T = 117$, this bias is likely to be very small. [10] We next present results obtained after including further control variables.

3.5.2 Including Control Variables

Other time-varying factors may affect both the components of political regimes and GDP growth. Thus, we control for some of these different factors and the results from the baseline model hold. Additional control variables do make the magnitude of the effect of liberalism on growth closer to the effect of binary measures of democracy while the effect of elections continue to be insignificant. In Column (2) of Table 3.8, we control for differential trend in GDP across countries by including dummies for quintile of GDP per capita rank of the country in 2000 interacted with year effects.[11] This allows us to compare countries within the same GDP quintile in 2000 and with similar trends in GDP per capita which addresses concerns that countries adopting different political characteristics may be on an entirely different growth path. We find that introducing competitive elections does not significantly affect growth while liberalism alongside elections has a positive effect on growth (significant at the 5% level). As can be observed in Figure 3.1, the large increase in electoral democracies, transitioning primarily from non-democracies occurs during those years with the dissolution of the Soviet Union and transitions in Sub-Saharan Africa. Column (3) therefore adds dummies for Soviet union and Soviet satellite countries interacted with dummies for the year 1989, 1990, 1991 and post 1992 to control for unobserved factors relating to these events that may be driving the results. Even then, results do not change - the effect of liberalism is still significant at the 5% level and the magnitude is higher than the baseline estimates.

Political regime transitions often involve periods of conflict which could also hamper growth. Thus, controlling for lags of social unrest, a dichotomous measure indicating if there were riots and revolts from ANRR, results remain unchanged (column 4). Other possible omitted variables could be international trade and financial flows as policies implemented may have resulted from better economic relations with other countries leading to changes in their level of trade and foreign asset flow, and thereby affecting the nation's GDP. Hence, we control for lags of exposure to trade as a share of GDP (data from ANRR). We observe that even in this case, the previous results hold, though the magnitude is smaller (column 5). Controlling

[10] We carry out an Arellano Bond specification (Arellano and Bond, 1991) and the estimator proposed in Hahn et al. (2004) referred to as the HHK estimator in ANRR, regardless of a small expected Nickell bias. Results are provided in Appendix C.5.1.

[11] The year 2000 is selected to maximize the number of countries used to construct the control variable. The results are qualitatively similar when using GDP per capita quintiles for 1900 but the sample size is much smaller.

Table 3.8: Effect of redefined democracy types on GDP per capita(with controls)

Covariates include		GDP in 2000 quantiles x year effects	Soviet dummies	Lags of unrest	Lags of trade	Lags of financial flows	Lags of demographic structure	Region x regime x year effects	Region x Lags of income
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Election	0.177	0.014	0.195	-0.189	-0.004	0.126	-0.140	-0.097	0.130
	(0.199)	(0.210)	(0.198)	(0.230)	(0.233)	(0.226)	(0.234)	(0.249)	(0.180)
Liberalism	1.225***	1.300***	1.217***	0.988***	0.707**	1.321***	0.587	0.918***	0.625**
	(0.323)	(0.375)	(0.319)	(0.326)	(0.354)	(0.394)	(0.392)	(0.343)	(0.251)
Long-run effect: Election	5.499	0.435	6.130	-4.727	-0.104	2.701	-3.404		
	(6.015)	(6.473)	(6.048)	(5.704)	(5.712)	(4.945)	(5.766)		
after 25 years: Election	3.693	0.290	4.079	-3.643	-0.081	2.152	-2.759		
	(4.102)	(4.318)	(4.091)	(4.363)	(4.445)	(3.916)	(4.646)		
Long-run: Liberalism	38.020***	40.052***	38.290***	24.675***	17.337**	28.393***	14.262		
	(9.602)	(10.900)	(9.605)	(7.253)	(8.455)	(7.298)	(9.605)		
after 25 years: Liberalism	25.531***	26.694***	25.475***	19.016***	13.493**	22.620***	11.562		
	(6.504)	(7.281)	(6.459)	(5.770)	(6.636)	(6.002)	(7.726)		
Persistence of GDP process	0.968***	0.968***	0.968***	0.960***	0.959***	0.953***	0.959***		
	(0.003)	(0.004)	(0.003)	(0.006)	(0.005)	(0.007)	(0.006)		
Observations	10077	9951	10070	5757	5932	5432	7095	10077	10077
Countries in sample	155	151	154	147	145	149	149	155	155

Column (1), for comparability, reports the baseline result from Column (2) in Table 3.7.
Robust standard errors clustered at country level in parentheses *** p<0.01, ** p<0.05, * p<0.1.
Long run effects for column (8) & (9) not estimated due to time intensive methods and results varying with left out region.

for lags of external financial flow (data from Lane and Milesi-Ferretti (2017)) gives similar estimates as the baseline, as shown in column (6).

The effect of liberalism on growth becomes insignificant when controlling for changes in the population structure. A younger population who value elections or have preferences for certain policies can also impact growth by changing labor supply or introducing more technology oriented industries and thus needs to be controlled for. Column (7) shows that controlling for four lags of demographic structure makes the effect of liberalism insignificant. However, note that data on population shares is available only after 1960 during which, variation in liberalism was minimal. Thus, it is possible that insufficient information could be inflating the standard errors.

Analyzing the effect among countries within the same region and with the same political characteristics at the beginning of our sample or when first observed within the data, the estimated effect of liberalism is smaller than the baseline but still significant at 5%. This shows that the baseline results are not driven by cultural or institutional differences across regions or by differences in political characteristics in the initial regime of the countries. In column (9), we allow for the lagged income to have a differential effect on growth based on region. This controls for potential differences in growth trends that are region specific but could also possibly affect political characteristics of nations within the region. The effect of liberalism is smaller relative to that of the baseline in the short run but positive and significant nonetheless. The same exercise ran using only binary measures once again shows

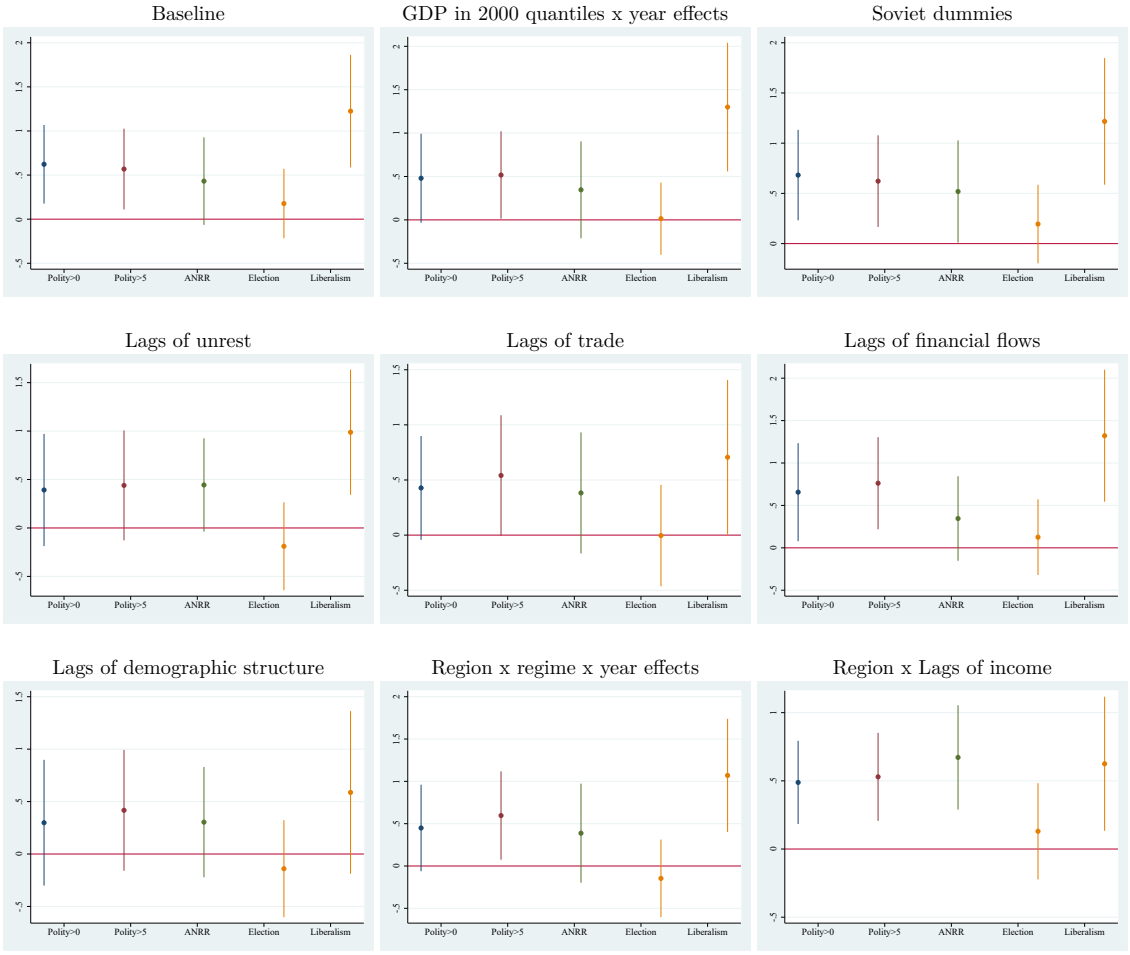

Figure 3.4: Coefficients and 95% confidence interval bar from baseline regression with control variables from Table 3.8 and Table C.2

a significant positive effect of democracy on growth[12], while our analysis shows that the effect on growth is primarily driven by liberalism and not election highlighting the need to decompose the components that define democracy. The results from the baseline model with controls are summarized in Figure 3.4. It is once again highlighted that when including controls, binary measures of democracy is (weakly) positively associated with growth across almost all specifications with different control variables. However, in all cases, election has no significant correlation and liberalism is mostly positively significantly associated with growth.

[12]Results in Section C.5.2

3.5.3 Semiparametric approach

We now discuss the results from the semi-parametric approach. While less precise, the baseline results still hold such that elections alone does not have a significant impact on growth, but liberalism does increase it, especially on average in the long run. Figure 3.5 illustrates the effect of changes in the dimensions of democracy on GDP per capita using the semiparametric estimation approach. Five year averages of the estimates are provided in Table 3.9 for each of the three different semiparametric approach discussed in Section C.4.1. These summarize the effect of the transitions between different combinations of the political characteristics. We run separate regressions for the case where a non-democracy introduces only elections, a democracy with elections introduces only liberalism and finally, where both elections and liberalism are simultaneously introduced in a non-democracy.

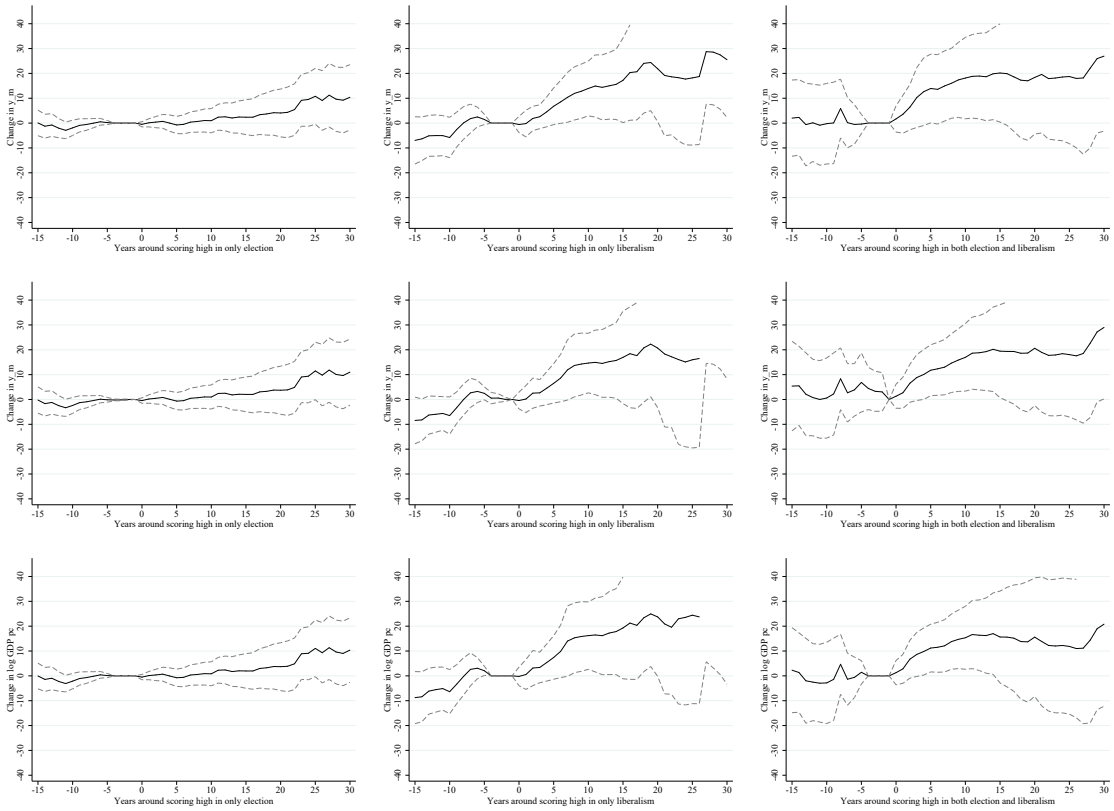

Figure 3.5: Effect on GDP per capita of changes in dimensions of democracy using Regression Adjustment, Inverse Propensity Weighting and Doubly Robust estimator

The first column of Figure 3.5 plots the estimated GDP per capita before and after introducing only elections, compared with having no elections using the three approaches described in Section C.4.1 respectively. The results show a significant and positive effect on average growth around 24 to 27 years after introducing elections, but is otherwise not significantly different from zero. However, this cannot necessarily be interpreted as a positive effect of

elections on growth as the methodology cannot account for the fact that liberalism might have been introduced by 25 years after introduction of election or it could also be the effect of building democratic capital over time.

The second column of Figure 3.5 illustrates the effect of a change in the ranking from low to high in liberalism, conditional on already having elections. The third column is when both competitive elections and liberalism is introduced relative to scoring low in both dimensions. The confidence intervals for both these cases are relatively larger mostly due to the rarity of the occurrence of such changes in the entire sample (20 and 19 cases respectively, relative to 100 cases of introducing only elections). Both plots show significant positive effect on growth along with the summarized results in Table 3.9. However, the pre-trend effect on GDP growth (column 1) in case of introducing only liberalism is positive and significant using the inverse propensity weighting and doubly robust estimator and thus, the result needs to be interpreted with caution. Using the regression adjustment approach, the pre-trend is controlled for as the effect on GDP per capita in the 5 years before scoring high in liberalism is insignificant. The positive significant effect on growth is visible robustly across all three methods from 5 years onwards after the change in the liberalism score. Reverse transitions also exhibit similar patterns with adverse impact on growth arising from scoring low in liberalism, as illustrated in Figure C.4 in Section C.4.2.

Table 3.9: Semiparametric effects of democracy types on GDP per capita

Average effects on log GDP per capita of scoring high	-5 to -1 years (1)	0 to 4 years (2)	5 to 9 years (3)	10 to 14 years (4)	15 to 19 years (5)	20 to 24 years (6)	25 to 29 years (7)
			Panel A: Regression Adjustment approach				
only Election	0.041	0.144	0.162	2.075	3.198*	6.501***	9.992***
	(0.085)	(0.534)	(0.931)	(1.295)	(1.832)	(2.348)	(2.842)
only Liberalism	0.292	1.641	10.091***	14.768***	21.329***	19.133***	24.346***
	(0.213)	(1.128)	(2.197)	(2.937)	(4.342)	(5.531)	(5.453)
both Election & Liberalism	-0.077	6.926***	15.176***	18.876***	18.590***	18.512***	20.581***
	(0.400)	(2.282)	(3.246)	(3.955)	(5.020)	(5.543)	(6.748)
			Panel B: Inverse propensity weighted estimator				
only Election	-0.105	0.223	0.216	1.973	2.842	6.174***	10.565***
	(0.111)	(0.538)	(0.928)	(1.289)	(1.835)	(2.347)	(2.893)
only Liberalism	0.730*	1.905	10.998***	15.008***	19.218***	17.473**	32.976***
	(0.404)	(1.248)	(2.533)	(3.119)	(4.784)	(6.906)	(7.441)
both Election & Liberalism	3.530*	5.893***	13.531***	18.773***	19.078***	18.739***	20.787***
	(1.879)	(1.789)	(2.584)	(3.465)	(4.867)	(5.506)	(6.267)
			Panel C: Doubly-robust estimator				
only Election	0.025	0.126	0.091	1.853	2.787	6.079***	10.066***
	(0.086)	(0.536)	(0.927)	(1.282)	(1.823)	(2.336)	(2.840)
only Liberalism	0.413**	2.445*	12.486***	16.777***	21.838***	22.145***	35.483***
	(0.189)	(1.420)	(2.854)	(3.576)	(4.920)	(6.854)	(8.713)
both Election & Liberalism	0.286	5.860***	12.660***	16.311***	14.785***	13.190**	13.466*
	(0.481)	(1.721)	(2.430)	(3.305)	(4.922)	(5.949)	(6.933)

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

We also conduct a placebo test by randomizing the observed changes in scores and re-estimating the effect of the dimensions on economic growth. The randomization tests show that the effect of liberalism on growth is insignificant when the timing is randomized across the sample, between countries and within countries suggesting that the findings are not spurious, and are not driven by either global trends or time invariant cross sectional factors (details provided in Section C.5.4). Overall, the patterns across the different approaches, including robustness checks, are similar and the estimates of both short run and long run effect are within the 95% confidence interval of the baseline estimates when using additional controls and the semi-parametric approach.

3.6 Potential Mechanisms

This section analyzes potential ways in which the characteristics of political regimes may affect growth. Using the dynamic panel approach and controlling for GDP growth path, we study the mechanisms through which competitive election and liberalism could potentially affect growth. Findings suggest that elections act as a substitute for conflict between political parties and the citizens, but does not necessarily lead to a redistribution of political power and resources, potentially due to clientelism. Once liberalism is also introduced, the distribution of economic power resources improves leading to higher productivity alongside stability. These mechanisms can overall explain why election does not seem to be significantly associated with growth, but liberalism is.

The findings corroborate the theory of oligarchic vs democratic societies (Acemoglu, 2008) where nations with only the electoral component are similar to oligarchic societies in which political power is in the hands of major producers. While reforms are directed to improve the market, barriers are created to restrict entry of new entrepreneurs which leads to inefficiency. Regimes scoring high in both dimensions are instead analogous to democratic societies where the power is distributed more widely which leads to higher productivity and thus boosts economic growth. This is because we find that the election dimension increases market reforms such as financial market and trade liberalization. It also robustly boosts the distribution of economic power resources, that is the dispersion of economic resources within the society. However, this effect does not spillover to increased productivity and growth. Instead, it is the introduction of liberalism which further improves the distribution of economic power resources that significantly increases total factor productivity. This could be a result of implemented policies as well as confidence of individuals in the political regime. Having only competitive elections rather reduces productivity which could be a consequence of increased clientelism. It could also be due to the targeted distribution of resources for particular gains, which signals that democracies scoring high in only competitive elections are more representative of oligarchic societies where the distribution of resources are biased towards particular groups. Theories of democracy in the economics literature often

refer to democracy as a regime where power is shared among the majority (Acemoglu and Robinson, 2001). This finding suggests that the empirical analogue of democracy, as used in the theoretical literature, refers to liberal democracy as opposed to electoral democracy. To study countries that democratized, but transitioned into electoral democracies and not liberal democracies, theory needs to reflect this finding that elections alone does not lead to sufficient redistribution of power that would translate into increased economic growth.

Table 3.10: Effect of Dimensions on Potential Mechanisms (Within estimates)

	Log TFP	Market reforms	Distribution of economic power resources	Pluralism	Clientelism	Health equality	Infant Mortality rate
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Election	-0.740**	0.752*	0.050***	0.019***	0.005**	0.003	-0.335*
	(0.342)	(0.390)	(0.018)	(0.006)	(0.002)	(0.009)	(0.188)
Liberalism	1.159***	0.251	0.070**	0.010*	0.001	0.018*	0.535
	(0.421)	(0.508)	(0.030)	(0.005)	(0.002)	(0.010)	(0.399)
Long-run effect: Election	-11.682**	6.134*	4.821***	0.222***	0.085***	0.043	-10.228*
	(5.227)	(3.306)	(1.771)	(0.078)	(0.031)	(0.151)	(5.525)
after 25 years: Election	-10.008**	5.863*	4.996***	0.195***	0.069***	0.036	-5.084*
	(4.381)	(3.115)	(1.794)	(0.067)	(0.026)	(0.124)	(2.818)
Long-run effect: Liberalism	18.308***	2.049	6.763**	0.117*	0.017	0.302*	16.343
	(6.180)	(4.140)	(2.907)	(0.063)	(0.035)	(0.165)	(12.648)
after 25 years: Liberalism	15.685***	1.959	7.010**	0.103*	0.014	0.248*	8.124
	(5.188)	(3.959)	(2.994)	(0.055)	(0.028)	(0.134)	(6.141)
Persistence of outcome process	0.937***	0.877***	0.990***	0.915***	0.942***	0.940***	0.967***
	(0.011)	(0.015)	(0.001)	(0.009)	(0.007)	(0.007)	(0.004)
Observations	3930	4762	6099	6981	9745	9627	8413
Countries in sample	102	136	126	143	149	149	148

	Likelihood of unrest	Coups	Likelihood of Civil War	Internal armed conflict	International armed conflict	Political Stability	Regime duration
	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Election	-7.209***	-0.055***	0.011	-0.011	-0.003	0.076	-2.873***
	(2.493)	(0.017)	(0.007)	(0.010)	(0.009)	(0.051)	(0.781)
Liberalism	-3.944	0.015	-0.016*	-0.019	-0.056***	0.177**	1.578**
	(3.026)	(0.011)	(0.009)	(0.015)	(0.017)	(0.072)	(0.718)
Long-run effect: Election	-11.294***	-0.058***	0.042	-0.042	-0.006	0.258	-61.627***
	(3.838)	(0.018)	(0.029)	(0.041)	(0.023)	(0.169)	(12.524)
after 25 years: Election	-11.294***	-0.058***	0.042	-0.042	-0.006	0.258	-43.197***
	(3.838)	(0.018)	(0.029)	(0.041)	(0.023)	(0.169)	(10.210)
Long-run effect: Liberalism	-6.180	0.016	-0.065*	-0.074	-0.144***	0.600**	33.848**
	(4.779)	(0.012)	(0.037)	(0.061)	(0.046)	(0.256)	(15.037)
after 25 years: Liberalism	-6.180	0.016	-0.065*	-0.073	-0.144***	0.600**	23.725**
	(4.779)	(0.012)	(0.037)	(0.060)	(0.046)	(0.256)	(10.597)
Persistence of outcome process	0.362***	0.051	0.746***	0.744***	0.609***	0.705***	0.953***
	(0.030)	(0.047)	(0.020)	(0.023)	(0.041)	(0.036)	(0.005)
Observations	5604	7104	7903	7328	7328	1637	9374
Countries in sample	147	147	145	149	149	149	148

Robust standard errors, clustered at country level, in parentheses *** p<0.01, ** p<0.05, * p<0.1. All specifications control for four lags of GDP and four lags of the outcome process.

Both election and liberalism promotes electoral pluralism, that is, the participation of other parties, which is required by definition for scoring high in both dimensions- in the area of elections and policy implementation respectively. Liberalism further boosts health equality which measures the extent to which high quality basic healthcare is guaranteed to all, such that citizens can exercise their basic political rights. Democracies with electoral competition

reduce infant mortality rate, as documented in earlier work (Navia and Zweifel, 2003), but is not a sufficient channel to influence economic growth.

In terms of conflict, competitive elections essentially give voice to the citizens such that they reveal their preferences through elections instead of riots and revolutions. Liberalism adds to this by ensuring inclusion of all socioeconomic groups such that the chances of civil war is reduced. Liberalism also reduces international armed conflict, maybe due to better maintained diplomatic relations. It also increases political stability and elongates the duration of regimes classified as democracy and non-democracy, as shown in columns (13) and (14). Only elections on the other hand reduce the duration of a political regime. Stability is therefore another plausible mechanism through which liberalism contributes to economic growth due to increased confidence in the economy and political institutions. The binary measure of democracy seems to have the combined effect of election and liberalism on these outcomes of interest, suggesting once again that the breakdown of the binary measure provides further insight into the potential mechanisms through which regime characteristics affect growth (details in Table C.5 in Section C.5.5).

Summarizing the potential mechanisms, results suggest that scoring high in elections change the conflict mechanism between political parties and the citizens. However, political power may continue to remain in the hands of a select few which can result in resource misallocation due to clientelist motives. Regimes additionally scoring high in liberalism address this inefficiency by improving the distribution of economic power resources which leads to higher productivity and stability, thus resulting in economic growth.

3.7 Conclusion

The paper studies the effects of components that constitute a political regime on economic growth, beyond the binary measure of autocracy and democracy. Breaking down the dimensions of democracy into two broad categories - elections and liberalism allows the analysis of heterogeneous democracies. The paper documents the historical trend of political regimes identifying that majority of democracies in today's world only score high in electoral dimension and not the liberalism dimension. Recent democratization waves have been driven with transitions to democracies lacking competitive political participation and inclusion, that this paper broadly coins as "liberalism". Furthermore, this paper documents how opinions of individuals regarding the electoral system in their nation and their beliefs about the ingredients of democracy and political systems systematically differ across these heterogeneous political regimes.

The main contribution of this paper is analyzing the effect of these components of political regimes and their combinations on growth, which allows for certain insights that cannot be studied from binary measures of political regimes or standalone effects of political charac-

teristics. This paper uses the Polity IV dataset to define ranking in each of the dimensions of election and liberalism and provides empirical evidence that economic growth is not significantly different across regimes scoring high in only the electoral dimension and regimes scoring low in both dimensions. Only through the introduction of liberalism, alongside competitive elections is a positive effect on growth possible. This suggests that elections alone are not a sufficient component for democracy to boost growth. Political participation of different groups, aiming policies at the wider population and respect for human rights and civil liberties is crucial alongside competitive elections. These results are robust using the dynamic panel approach, adding control variables, the semi-parametric approach, as well as the estimator proposed in Hahn et al. (2004). Future work remains to be done in more specialized settings which allow the use of relevant instruments to causally identify the effects of the dimensions on growth.

Analyzing potential mechanisms, this paper concludes that despite competitive elections improving market reforms and reducing conflict, liberalism improves the distribution of resources in a way that boosts productivity and stability which allows better economic performance. Future research possibilities include formalizing the findings under a comprehensive theoretical model to allow in-depth understanding of the fundamental characteristics required in a democracy to enhance economic growth and social welfare.

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Appendix A

Labeling vs Targeting: How did the Canada Child Benefit affect household bargaining and preferences?

A.1 Pre-trend

Table A.1: Reduced form estimates

	IV	OLS	IV	OLS
	(1)	(2)	(3)	(4)
Level term (a_m and a_f)				
Chi-square test statistic	83.24	101.06	55.11	70.12
p-value	*0.0252*	*0.0007*	*0.6545*	*0.1745*
Slope term (b_m and b_f)				
Chi-square test statistic	72.06	61.77	48.89	44.69
p-value	*0.1368*	*0.4128*	*0.8468*	*0.9300*
Errors	Cluster	Cluster	Robust	Robust
Instrument of log household expenditure	Yes	No	Yes	No

Linear restrictions on the slope term do not affect the pre-trend test statistics

A.2 Robustness checks

A.2.1 Estimates from IV specification excluding renter dummy

Table A.2: Reduced form estimates

	(1) female	(2) male	(3) female	(4) male	(5) female	(6) male	(7) female	(8) male
a($\mathbf{z}=0$)	0.025***	0.017***	0.026***	0.018***	0.025***	0.017***	0.026***	0.018***
	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)
b($\mathbf{z}=0$)	0.023***	0.011	0.018***	0.008	0.023***	0.011	0.018***	0.008
	(0.002)	(0.002)	(0.004)	(0.003)	(0.002)	(0.002)	(0.004)	(0.003)
Errors	Clustered		Clustered		Robust		Robust	
Summation restriction on slope	Yes		No		Yes		No	

Standard errors (robust or clustered at province, the number of children, year and month in parentheses) *** p<0.01, ** p<0.05, * p<0.1.
All specifications include use log of income as an instrument for household budget.

Table A.3: Coefficient of treatment effect

	(1) female	(2) male	(3) diff	(4) female	(5) male	(6) diff	(7) female	(8) male	(9) diff	(10) female	(11) male	(12) diff
Treatment effect on level (a)	0.002	-0.002		0.001	-0.002	0.003	0.002	-0.002	0.000	0.001	-0.002	0.003
	(0.002)	(0.002)		(0.003)	(0.003)	(0.004)	(0.002)	(0.002)	0.000	(0.004)	(0.003)	(0.004)
Treatment effect on slope (b)	0.001	-0.001	0.002	0.001	0.000	0.002	0.001	-0.001	0.002	0.001	0.000	0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Errors	Clustered			Clustered			Robust			Robust		
Summation restriction on slope	Yes			No			Yes			No		

Standard errors (robust or clustered at province, the number of children, year and month in parentheses) *** p<0.01, ** p<0.05, * p<0.1.

Table A.4: Parameter estimates

	(1) female	(2) male	(3) diff	(4) female	(5) male	(6) diff	(7) female	(8) male	(9) diff	(10) female	(11) male	(12) diff
α_i (at $z=0$)	0.590***	0.410***	0.180*	0.589***	0.411***	0.178	0.590***	0.410***	0.180*	0.589***	0.411***	0.178
	(0.052)	(0.052)	(0.104)	(0.058)	(0.058)	(0.117)	(0.051)	(0.051)	(0.102)	(0.057)	(0.057)	(0.114)
Treatment Effect on α_i (at z=0)	0.050	0.000	0.000	0.057	0.000	0.000	0.050	0.000	0.000	0.057	0.000	0.000
	(0.057)	0.000	0.000	(0.064)	0.000	0.000	(0.055)	0.000	0.000	(0.063)	0.000	0.000
η_i	0.049***	0.073***	-0.024	0.048***	0.071***	-0.022	0.049***	0.073***	-0.024	0.048***	0.071***	-0.022
	(0.006)	(0.010)	(0.015)	(0.007)	(0.011)	(0.016)	(0.006)	(0.010)	(0.015)	(0.007)	(0.012)	(0.016)
Treatment Effect on η_i	-0.003	0.009	-0.012	-0.004	0.010	-0.014	-0.003	0.009	-0.012	-0.004	0.010	-0.014
	(0.006)	(0.011)	(0.017)	(0.007)	(0.013)	(0.018)	(0.006)	(0.011)	(0.016)	(0.007)	(0.013)	(0.018)
Hansen's J chi2 (dof=7)		16.116						16.116				
p-value		*0.024*						*0.024*				
Test for exclusion on slope		23.971			56.866			24.029			53.897	
p-value		*0.730*			*0.518*			*0.728*			*0.629*	
Test for linear restriction		18.173						17.406				
p-value		*0.011*						*0.015*				
Errors	Clustered			Clustered			Robust			Robust		
Summation restriction on slope	Yes			No			Yes			No		

Standard errors (robust or clustered at province, the number of children, year and month in parentheses) *** p<0.01, ** p<0.05, * p<0.1.

A.2.2 Estimates using total household expenditure excluding shelter expenses

Table A.5: Reduced form IV estimates

	(1) female	(2) male	(3) female	(4) male
a($\mathbf{z}=0$)	0.043***	0.029***	0.043***	0.029***
	(0.003)	(0.002)	(0.003)	(0.002)
b($\mathbf{z}=0$)	0.013***	0.007***	0.013***	0.007***
	(0.003)	(0.003)	(0.003)	(0.003)
Instrument for log of budget (with log of income)	Yes		Yes	
Errors	Clustered		Robust	

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.
All specifications include renter dummy and treatment indicator interacted with renter dummy.

A.2.3 Relaxing linear restriction on slope coefficients

Table A.6: Reduced form estimates

	IV estimates		OLS estimates	
	(1) female	(2) male	(3) female	(4) male
a($\mathbf{z}=0$)	0.021***	0.016***	0.024***	0.017***
	(0.002)	(0.002)	(0.002)	(0.001)
b($\mathbf{z}=0$)	0.032***	0.011	0.018***	0.009
	(0.009)	(0.007)	(0.004)	(0.003)
Instrument for log of budget	Yes (with log of income)		No	

Robust standard errors clustered at province, the number of children, year and month in parentheses *** p<0.01, ** p<0.05, * p<0.1.

Table A.7: Coefficient of treatment effect (no summation restriction)

	IV estimates			OLS estimates			
	(1) female	(2) male	(3) diff	(4) female	(5) male	(6) diff	(7) H-stat
Homeowner: Treatment effect on level (a)	0.002*	-0.001	0.003**	0.001	0.000	0.001	6.788
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	
Renter: : Treatment effect on level (a)	0.002	0.001	0.001	0.000	-0.001	0.002	0.072
	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	
Homeowner: Treatment effect on slope (b)	0.018***	-0.007		0.003	-0.004		5.301
	(0.007)	(0.005)		(0.004)	(0.003)		
Renter: Treatment effect on slope (b)	-0.004	0.019**		-0.007	0.007*		0.943
	(0.013)	(0.010)		(0.005)	(0.004)		
Instrument for log of budget	Yes (with log of income)			No			

Robust standard errors clustered at province, the number of children, year and month in parentheses *** p<0.01, ** p<0.05, * p<0.1.

Table A.8: Parameter estimates (no summation restriction)

	IV estimates			OLS estimates			
	(1) female	(2) male	(3) diff	(4) female	(5) male	(6) diff	(7) H-stat
Homeowner: α_i (at $z = 0$)	0.077***	0.037***	0.040	0.049***	0.068***	-0.019	1.656
	(0.025)	(0.013)	(0.036)	(0.007)	(0.010)	(0.015)	
Renter: α_i (at $z = 0$)	0.113	0.032	0.082	0.054***	0.085***	-0.031	0.184
	(0.125)	(0.022)	(0.146)	(0.008)	(0.015)	(0.020)	
Homeowner: Treatment Effect on α_i (at $z = 0$)	-0.041	0.077***	-0.118***	-0.010	0.024*	-0.034*	1.642
	(0.026)	(0.023)	(0.043)	(0.008)	(0.014)	(0.019)	
Renter: Treatment Effect on α_i (at $z = 0$)	-0.017	0.022	-0.039	0.014	-0.025	0.040	0.059
	(0.129)	(0.026)	(0.152)	(0.012)	(0.016)	(0.024)	
Homeowner: β (at $z = 0$)	0.032***	0.000	0.000	0.032***	0.000	0.000	0.001
	(0.008)	0.000	0.000	(0.005)	0.000	0.000	
Renter: β (at $z = 0$)	0.022*	0.000	0.000	0.035***	0.000	0.000	1.209
	(0.013)	0.000	0.000	(0.006)	0.000	0.000	
Homeowner:Treatment Effect on β (at $z = 0$)	0.011			-0.001			2.225
	(0.010)			(0.005)			
Renters:Treatment Effect on β (at $z = 0$)	0.015			0.000			0.701
	(0.019)			(0.007)			
Homeowner: η_i	0.400***	0.600***	-0.200	0.576***	0.424***	0.153	3.381
	(0.110)	(0.110)	(0.221)	(0.055)	(0.055)	(0.109)	
Renter: η_i	0.291	0.709**	-0.418	0.605***	0.395***	0.210*	1.249
	(0.287)	(0.287)	(0.575)	(0.061)	(0.061)	(0.122)	
Homeowner:Treatment Effect on η_i	0.316***			0.112*			4.127
	(0.120)			(0.064)			
Renters:Treatment Effect on η_i	0.138			-0.109			0.680
	(0.310)			(0.080)			
Treatment Effect on η_i: Homeowner vs Renters	0.178			0.221***			
	(0.258)			(0.076)			
Test for exclusion on slope		74.953			59.938		
p-value		*0.066*			*0.405*		
Instrument for log of budget		Yes (with log of income)			No		

Robust standard errors clustered at province, the number of children, year and month in parentheses *** p<0.01, ** p<0.05, * p<0.1.

A.2.4 Estimates using robust standard errors with linear restriction on slope coefficients

Table A.9: Reduced form estimates

	IV estimates		OLS estimates	
	(1) female	(2) male	(3) female	(4) male
a($\mathbf{z} = 0$)	0.020***	0.015***	0.023***	0.016***
	(0.002)	(0.002)	(0.002)	(0.001)
b($\mathbf{z} = 0$)	0.034***	0.012	0.023***	0.013
	(0.005)	(0.005)	(0.002)	(0.002)
Instrument for log of budget	Yes (with log of income)		No	

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

Table A.10: Coefficient of treatment effect

	IV estimates			OLS estimates			
	(1) female	(2) male	(3) diff	(4) female	(5) male	(6) diff	(7) H-stat
Homeowner: Treatment effect on level (a)	0.002	-0.001	0.003**	0.001	0.000	0.001	6.605
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	
Renter: : Treatment effect on level (a)	0.001	0.000	0.001	0.001	-0.001	0.002	0.749
	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	
Homeowner: Treatment effect on slope (b)	0.011***	-0.011***		0.004*	-0.004*		9.836
	(0.004)	(0.004)		(0.002)	(0.002)		
Renter: Treatment effect on slope (b)	-0.013*	0.013*		-0.007***	0.007***		0.797
	(0.007)	(0.007)		(0.003)	(0.003)		
Instrument for log of budget	Yes (with log of income)			No			

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

Table A.11: Parameter estimates

	IV estimates			OLS estimates			
	(1) female	(2) male	(3) diff	(4) female	(5) male	(6) diff	(7) H-stat
Homeowner: α_i (at $z = 0$)	0.074***	0.054***	0.020	0.050***	0.071***	-0.021	2.006
	(0.014)	(0.009)	(0.022)	(0.006)	(0.009)	(0.014)	
Renter: α_i (at $z = 0$)	0.086***	0.062***	0.024	0.054***	0.085***	-0.031	1.438
	(0.021)	(0.013)	(0.033)	(0.007)	(0.013)	(0.019)	
Homeowner: Treatment Effect on α_i (at $z = 0$)	-0.036***	0.059***	-0.096***	-0.009	0.021*	-0.030*	4.903
	(0.014)	(0.020)	(0.030)	(0.006)	(0.012)	(0.017)	
Renter: Treatment Effect on α_i (at $z = 0$)	0.010	-0.005	0.015	0.017*	-0.021	0.038*	0.050
	(0.035)	(0.019)	(0.054)	(0.010)	(0.014)	(0.023)	
Homeowner: η_i	0.462***	0.538***	-0.077	0.579***	0.421***	0.158*	6.151
	(0.067)	(0.067)	(0.134)	(0.047)	(0.047)	(0.095)	
Renter: η_i	0.450***	0.550***	-0.100	0.605***	0.395***	0.209*	4.195
	(0.097)	(0.097)	(0.193)	(0.060)	(0.060)	(0.121)	
Homeowner:Treatment Effect on η_i	0.247***			0.098*			6.498
	(0.080)			(0.054)			
Renters:Treatment Effect on η_i	-0.029			-0.103			0.299
	(0.156)			(0.077)			
Treatment Effect on η_i: Homeowner vs Renters	0.276*			0.201***			
	(0.148)			(0.070)			
Hansen's J chi2 (dof=9)		13.978			20.503		
p-value		*0.123*			*0.015*		
Test for exclusion on slope		31.833			24.152		
p-value		*0.327*			*0.721*		
Test for linear restriction		12.766			20.532		
p-value		*0.173*			*0.015*		
Instrument for log of budget		Yes (with log of income)			No		

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

A.2.5 Estimates using robust standard errors relaxing linear restriction on slope coefficients

Table A.12: Reduced form estimates (no summation restriction)

	IV estimates		OLS estimates	
	(1) female	(2) male	(3) female	(4) male
a($\mathbf{z}=0$)	0.021***	0.016***	0.024***	0.017***
	(0.002)	(0.002)	(0.002)	(0.001)
b($\mathbf{z}=0$)	0.032***	0.011	0.018***	0.009
	(0.009)	(0.007)	(0.004)	(0.003)
Instrument for log of budget	Yes (with log of income)		No	

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

Table A.13: Coefficient of treatment effect (no summation restriction)

	IV estimates			OLS estimates			
	(1) female	(2) male	(3) diff	(4) female	(5) male	(6) diff	(7) H-stat
Homeowner: Treatment effect on level (a)	0.002*	-0.001	0.003**	0.001	0.000	0.001	6.166
	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	
Renter: : Treatment effect on level (a)	0.002	0.001	0.001	0.000	-0.001	0.002	0.081
	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	
Homeowner: Treatment effect on slope (b)	0.018***	-0.007		0.003	-0.004		5.295
	(0.007)	(0.005)		(0.004)	(0.003)		
Renter: Treatment effect on slope (b)	-0.004	0.019*		-0.007	0.007*		0.900
	(0.013)	(0.010)		(0.005)	(0.004)		
Instrument for log of budget	Yes (with log of income)			No			

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

Table A.14: Parameter estimates (no summation restriction)

	IV estimates			OLS estimates			
	(1) female	(2) male	(3) diff	(4) female	(5) male	(6) diff	(7) H-stat
Homeowner: α_i (at $z = 0$)	0.077***	0.037***	0.040	0.049***	0.068***	-0.019	1.633
	(0.025)	(0.013)	(0.037)	(0.007)	(0.011)	(0.015)	
Renter: α_i (at $z = 0$)	0.113	0.032	0.082	0.054***	0.085***	-0.031	0.188
	(0.123)	(0.022)	(0.144)	(0.008)	(0.016)	(0.021)	
Homeowner: Treatment Effect on α_i (at $z = 0$)	-0.041	0.077***	-0.118***	-0.010	0.024*	-0.034*	1.631
	(0.025)	(0.023)	(0.043)	(0.007)	(0.014)	(0.019)	
Renter: Treatment Effect on α_i (at $z = 0$)	-0.017	0.022	-0.039	0.014	-0.025	0.040	0.061
	(0.127)	(0.027)	(0.150)	(0.012)	(0.017)	(0.025)	
Homeowner: β (at $z = 0$)	0.032***	0.000	0.000	0.032***	0.000	0.000	
	(0.008)	0.000	0.000	(0.005)	0.000	0.000	
Renter: β (at $z = 0$)	0.022*	0.000	0.000	0.035***	0.000	0.000	
	(0.012)	0.000	0.000	(0.006)	0.000	0.000	
Homeowner:Treatment Effect on β (at $z = 0$)	0.011			-0.001			
	(0.010)			(0.005)			
Renters:Treatment Effect on β (at $z = 0$)	0.015			0.000			
	(0.019)			(0.007)			
Homeowner: η_i	0.400***	0.600***	-0.200	0.576***	0.424***	0.153	3.119
	(0.113)	(0.113)	(0.226)	(0.053)	(0.053)	(0.107)	
Renter: η_i	0.291	0.709**	-0.418	0.605***	0.395***	0.210*	1.253
	(0.287)	(0.287)	(0.575)	(0.063)	(0.063)	(0.126)	
Homeowner:Treatment Effect on η_i	0.316***			0.112*			3.769
	(0.122)			(0.062)			
Renters:Treatment Effect on η_i	0.138			-0.109			0.679
	(0.311)			(0.081)			
Treatment Effect on η_i: Homeowner vs Renters	0.178			0.221***			
	(0.257)			(0.075)			
Test for exclusion on slope		56.230			57.492		
p-value		*0.541*			*0.494*		
Instrument for log of budget		Yes (with log of income)			No		

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

A.2.6 Instrumenting with square of log income

Table A.15: Reduced form estimates

	(1) female	(2) male	(3) female	(4) male	(5) female	(6) male	(7) female	(8) male
a($\mathbf{z}=0$)	0.021***	0.015***	0.022***	0.016***	0.021***	0.015***	0.022***	0.016***
	(0.002)	(0.002)	0.000	0.000	(0.002)	(0.002)	(0.002)	(0.002)
b($\mathbf{z}=0$)	0.035***	0.010	0.031***	0.007	0.035***	0.010	0.031***	0.007
	(0.005)	(0.004)	(0.007)	(0.010)	(0.005)	(0.005)	(0.008)	(0.006)
Errors	Clustered		Clustered		Robust		Robust	
Summation restriction on slope	Yes		No		Yes		No	

Standard errors (robust or clustered at province, the number of children, year and month in parentheses) *** p<0.01, ** p<0.05, * p<0.1.
All specifications include renter dummy and treatment indicator interacted with renter dummy.

Table A.16: Coefficient of treatment effect

	(1) female	(2) male	(3) diff	(4) female	(5) male	(6) diff	(7) female	(8) male	(9) diff	(10) female	(11) male	(12) diff
Homeowner: Treatment	0.002	-0.001	0.003*	0.002*	-0.001	0.003**	0.002	-0.001	0.003*	0.002*	-0.001	0.003**
effect on level (a)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
Renter: : Treatment	0.000	0.000	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.001	0.001	0.001
effect on level (a)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Homeowner: Treatment	0.014***	-0.014***		0.021***	-0.008	0.030***	0.014***	-0.014***		0.021***	-0.008	0.030***
effect on slope (b)	(0.004)	(0.004)		(0.007)	(0.005)	(0.008)	(0.004)	(0.004)		(0.007)	(0.005)	(0.008)
Renter: Treatment	-0.015**	0.015**		-0.010	0.018*	-0.027**	-0.015**	0.015**		-0.010	0.018*	-0.027**
effect on slope (b)	(0.006)	(0.006)		(0.012)	(0.009)	(0.013)	(0.007)	(0.007)		(0.012)	(0.010)	(0.013)
Errors	Clustered			Clustered			Robust			Robust		
Summation restriction on slope	Yes			No			Yes			No		

Standard errors (robust or clustered at province, the number of children, year and month in parentheses) *** p<0.01, ** p<0.05, * p<0.1.
All specifications include renter dummy and treatment indicator interacted with renter dummy.

Table A.17: Parameter estimates

	(1) female	(2) male	(3) diff	(4) female	(5) male	(6) diff	(7) female	(8) male	(9) diff	(10) female	(11) male	(12) diff
Homeowner: α_i (at $z=0$)	0.050***	0.071***	-0.021	0.049***	0.068***	-0.019	0.050***	0.071***	-0.021	0.049***	0.068***	-0.019
	(0.006)	(0.009)	(0.014)	(0.007)	(0.010)	(0.015)	(0.006)	(0.009)	(0.014)	(0.007)	(0.011)	(0.015)
Renter: α_i (at $z=0$)	0.054***	0.085***	-0.031*	0.054***	0.085***	-0.031	0.054***	0.085***	-0.031	0.054***	0.085***	-0.031
	(0.007)	(0.013)	(0.018)	(0.008)	(0.015)	(0.020)	(0.007)	(0.013)	(0.019)	(0.008)	(0.016)	(0.021)
Homeowner: Treatment Effect	-0.009	0.021*	-0.030*	-0.010	0.024*	-0.034*	-0.009	0.021*	-0.030*	-0.010	0.024*	-0.034*
on α_i (at $z=0$)	(0.006)	(0.012)	(0.018)	(0.008)	(0.014)	(0.019)	(0.006)	(0.012)	(0.017)	(0.007)	(0.014)	(0.019)
Renter: Treatment Effect	0.017*	-0.021	0.038*	0.014	-0.025	0.040	0.017*	-0.021	0.038*	0.014	-0.025	0.040
on α_i (at $z=0$)	(0.010)	(0.014)	(0.023)	(0.012)	(0.016)	(0.024)	(0.010)	(0.014)	(0.023)	(0.012)	(0.017)	(0.025)
Homeowner: η_i	0.415***	0.585***	-0.170	0.319**	0.681***	-0.363	0.415***	0.585***	-0.170	0.319**	0.681***	-0.363
	(0.070)	(0.070)	(0.141)	(0.130)	(0.130)	(0.261)	(0.069)	(0.069)	(0.138)	(0.131)	(0.131)	(0.263)
Renter: η_i	0.426***	0.574***	-0.149	0.228	0.772**	-0.543	0.426***	0.574***	-0.149	0.228	0.772**	-0.543
	(0.103)	(0.103)	(0.205)	(0.313)	(0.313)	(0.626)	(0.098)	(0.098)	(0.195)	(0.308)	(0.308)	(0.616)
Homeowner:Treatment Effect	0.299***			0.403***			0.299***			0.403***		
on η_i	(0.083)			(0.139)			(0.082)			(0.140)		
Renters:Treatment Effect	-0.021			0.161			-0.021			0.161		
on η_i	(0.145)			(0.338)			(0.153)			(0.335)		
Treatment Effect on η_i:	0.321**			0.242			0.321**			0.242		
Homeowner vs Renters	(0.136)			(0.275)			(0.146)			(0.273)		
Summation restriction on slope	Yes			No			Yes			No		

Standard errors (robust or clustered at province, the number of children, year and month in parentheses) *** p<0.01, ** p<0.05, * p<0.1.
All specifications include renter dummy and treatment indicator interacted with renter dummy.

A.2.7 Results using imputed rents for only owners and actual rent for renters

Table A.18: Reduced form estimates

	IV estimates		OLS estimates	
	(1) female	(2) male	(3) female	(4) male
a($\mathbf{z}=0$)	0.020***	0.015***	0.023***	0.016***
	(0.002)	(0.002)	(0.002)	(0.001)
b($\mathbf{z}=0$)	0.033***	0.011	0.022***	0.012
	(0.005)	(0.004)	(0.002)	(0.002)
Instrument for log of budget	Yes (with log of income)		No	

Standard errors clustered at province, the number of children, year and month in parentheses *** p<0.01, ** p<0.05, * p<0.1.
IV estimates refer to GMM estimation instrumenting household budget/expenditure with income. OLS estimates refer to GMM estimation without instrument for household budget.

Table A.19: Reduced form estimates: Treatment effect

	IV estimates			OLS estimates			
	(1) female	(2) male	(3) diff	(4) female	(5) male	(6) diff	(7) H-stat
Homeowner: Treatment effect on level (a)	0.001	-0.001	0.003*	0.000	0.000	0.000	6.422
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	
Renter: : Treatment effect on level (a)	0.001	0.000	0.001	0.001	-0.001	0.002	0.620
	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)	(0.002)	
Homeowner: Treatment effect on slope (b)	0.011***	-0.011***		0.003	-0.003		12.268
	(0.004)	(0.004)		(0.002)	(0.002)		
Renter: Treatment effect on slope (b)	-0.012**	0.012**		-0.008***	0.008***		0.713
	(0.006)	(0.006)		(0.002)	(0.002)		
Instrument for log of budget	Yes (with log of income)			No			

Standard errors clustered at province, the number of children, year and month in parentheses *** p<0.01, ** p<0.05, * p<0.1.
IV estimates refer to GMM estimation instrumenting household budget/expenditure with income. OLS estimates refer to GMM estimation without instrument for household budget.

Table A.20: Parameter estimates

	IV estimates			OLS estimates			
	(1) female	(2) male	(3) diff	(4) female	(5) male	(6) diff	(7) H-stat
Homeowner: α_i (at $z = 0$)	0.071***	0.054***	0.017	0.048***	0.072***	-0.024	
	(0.014)	(0.010)	(0.023)	(0.006)	(0.010)	(0.015)	
Renter: α_i (at $z = 0$)	0.078***	0.061***	0.017	0.050***	0.084***	-0.034*	
	(0.019)	(0.014)	(0.032)	(0.007)	(0.013)	(0.019)	
Homeowner: Treatment Effect on α_i (at $z = 0$)	-0.035**	0.058***	-0.093***	-0.008	0.019	-0.027	
	(0.014)	(0.021)	(0.032)	(0.006)	(0.013)	(0.018)	
Renter: Treatment Effect on α_i (at $z = 0$)	0.008	-0.005	0.013	0.021**	-0.026*	0.048**	
	(0.028)	(0.018)	(0.045)	(0.010)	(0.014)	(0.023)	
Homeowner: η_i	0.472***	0.528***	-0.056	0.593***	0.407***	0.187*	6.118
	(0.072)	(0.072)	(0.144)	(0.052)	(0.052)	(0.105)	
Renter: η_i	0.466***	0.534***	-0.068	0.620***	0.380***	0.240**	3.618
	(0.101)	(0.101)	(0.201)	(0.060)	(0.060)	(0.120)	
Homeowner:Treatment Effect on η_i	0.243***			0.087			6.872
	(0.084)			(0.060)			
Renters:Treatment Effect on η_i	-0.028			-0.139*			0.811
	(0.145)			(0.077)			
Treatment Effect on η_i: Homeowner vs Renters	0.271**			0.226***			
	(0.134)			(0.071)			
Hansen's J statistic (dof=9)		25.789			21.790		
p-value		*0.002*			*0.010*		
Test for exclusion on slope		37.501			21.624		
p-value		*0.134*			*0.835*		
Test for linear restriction		22.731			25.192		
p-value		*0.007*			*0.003*		
Instrument for log of budget		Yes (with log of income)			No		

Robust standard errors clustered at province, the number of children, year and month in parentheses *** p<0.01, ** p<0.05, * p<0.1.
IV estimates refer to GMM estimation instrumenting household budget/expenditure with income. OLS estimates refer to GMM estimation without instrument for household budget.

A.2.8 Results including interaction terms of renter dummy with indicators for households with children and post-policy

Table A.21: Joint test of significance of coefficients of interaction terms

	(1)	(2)
Slope and level term (a_m, a_f and b_f)		
Chi-square test statistic	6.76	6.87
p-value	*0.34*	*0.33*
Errors	Cluster	Cluster
Instrument of log household expenditure	Yes	No

Table A.22: Reduced form estimates of constant and slope of budget share

	IV estimates		OLS estimates	
	(1) female	(2) male	(3) female	(4) male
a($\mathbf{z}=0$)	0.020***	0.015***	0.023***	0.016***
	(0.002)	(0.002)	(0.002)	(0.001)
b($\mathbf{z}=0$)	0.036***	0.011	0.024***	0.012***
	(0.005)	(0.005)	(0.002)	(0.002)
Instrument for log of budget	Yes (with log of income)		No	

Standard errors clustered at province, the number of children, year and month in parentheses
*** p<0.01, ** p<0.05, * p<0.1.
IV estimates refer to GMM estimation instrumenting household budget/expenditure with income. OLS estimates refer to GMM estimation without instrument for household budget.

Table A.23: Reduced form estimates: Treatment effect

	IV estimates			OLS estimates			
	(1) female	(2) male	(3) diff	(4) female	(5) male	(6) diff	(7) H-stat
Homeowner: Treatment effect on level (a)	0.002*	-0.001	0.003*	0.001	0.000	0.001	3.926
	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	
Renter: : Treatment effect on level (a)	-0.001	-0.003	0.002	-0.005	0.000	-0.005	4.664
	(0.004)	(0.003)	(0.006)	(0.004)	(0.003)	(0.004)	
Homeowner: Treatment effect on slope (b)	0.011***	-0.011***		0.005**	-0.005**		2.963
	(0.004)	(0.004)		(0.002)	(0.002)		
Renter: Treatment effect on slope (b)	-0.009	0.009		-0.017***	0.017***		0.496
	(0.012)	(0.012)		(0.005)	(0.005)		
Instrument for log of budget	Yes (with log of income)			No			

Standard errors clustered at province, the number of children, year and month in parentheses *** p<0.01, ** p<0.05, * p<0.1.
IV estimates refer to GMM estimation instrumenting household budget/expenditure with income. OLS estimates refer to GMM estimation without instrument for household budget.

Table A.24: Parameter estimates

	IV estimates			OLS estimates			
	(1) female	(2) male	(3) diff	(4) female	(5) male	(6) diff	(7) H-stat
Homeowner: α_i (at $z = 0$)	0.062***	0.063***	-0.001	0.054***	0.064***	-0.010	0.767
	(0.012)	(0.012)	(0.023)	(0.008)	(0.009)	(0.015)	
Renter: α_i (at $z = 0$)	0.096*	0.063**	0.033	0.038***	0.178*	-0.139	1.266
	(0.052)	(0.029)	(0.080)	(0.008)	(0.101)	(0.108)	
Homeowner: Treatment Effect on α_i (at z=0)	-0.024**	0.051**	-0.076**	-0.013*	0.029**	-0.041**	1.423
	(0.012)	(0.020)	(0.030)	(0.007)	(0.012)	(0.019)	
Renter: Treatment Effect on α_i (at z=0)	-0.006	-0.002	-0.004	0.033***	-0.114	0.146	0.466
	(0.057)	(0.032)	(0.089)	(0.012)	(0.100)	(0.109)	
Homeowner: η_i	0.481***	0.519***	-0.037	0.536***	0.464***	0.073	1.196
	(0.075)	(0.075)	(0.150)	(0.056)	(0.056)	(0.111)	
Renter: η_i	0.396*	0.604***	-0.209	0.833***	0.167	0.666***	5.086
	(0.227)	(0.227)	(0.454)	(0.118)	(0.118)	(0.236)	
Homeowner:Treatment Effect on η_i	0.232***			0.141**			2.387
	(0.086)			(0.062)			
Renters:Treatment Effect on η_i	0.033			-0.331***			2.855
	(0.251)			(0.128)			
Treatment Effect on η_i: Homeowner vs Renters	0.199			0.472***			
	(0.267)			(0.146)			
Hansen's J statistic (dof=9)		15.333			36.072		
p-value		*0.168*			*0.000*		
Test for exclusion on slope		35.967			23.793		
p-value		*0.175*			*0.739*		
Test for linear restriction		15.550			26.238		
p-value		*0.159*			*0.006*		
Instrument for log of budget		Yes (with log of income)			No		

Robust standard errors clustered at province, the number of children, year and month in parentheses *** p<0.01, ** p<0.05, * p<0.1.
IV estimates refer to GMM estimation instrumenting household budget/expenditure with income. OLS estimates refer to GMM estimation without instrument for household budget.

Appendix B

A Theory of Illiberal Democracy and Political Transitions

B.1 Mathematical Appendix

B.1.1 Payoff Ordering

Given Assumption 1, we can see clearly from η_N that since no weight is given to their preferences, citizens receive the lowest payoff in regime N compared to either D or $\tilde{D}$. Elites on the other hand benefit most as they receive the maximum utility possible. Furthermore, by Assumption 2, we have that any influence by the elites will make citizen group 2 worse off relative to when $\epsilon = 0$. Hence, in a straightforward manner, we have

$$\begin{aligned} \text{Elites:} \quad & u_{0D} \leq u_{0\tilde{D}} \leq u_{0N} \\ \text{Citizen 2:} \quad & u_{2N} \leq u_{2\tilde{D}} \leq u_{2D} \end{aligned}$$

Finally, we are left to determine the payoff ordering of citizen 1. Due to the preference alignment with both citizen 2 and elites, let us first define the payoff for citizen 1 in the illiberal democracy regime by plugging the optimal policy in Equation 2.5.

$$\begin{aligned} u_{1\tilde{D}}(\varepsilon, \rho) &= -\sum_k (\theta^*_{1k} - \epsilon \cdot \theta^*_{0k} - \rho \cdot (1-\varepsilon) \cdot \theta^*_{1k} - (1-\rho) \cdot (1-\varepsilon) \cdot \theta^*_{2k})^2 \\ &= -\sum_k (\varepsilon \cdot (\theta^*_{1k} - \theta^*_{\eta_N k}) + (1-\varepsilon) \cdot (\theta^*_{1k} - \theta^*_{\eta_D k}))^2 \\ &= -\sum_k (\varepsilon \cdot (\theta^*_{1k} - \theta^*_{0k}) - (1-\varepsilon) \cdot (1-\rho) \cdot (\theta^*_{2k} - \theta^*_{1k}))^2 \\ &= -\sum_k \Theta_k(\varepsilon, \rho)^2. \end{aligned} \tag{B.1}$$

Here, we have $\frac{du_{1\tilde{D}}}{d\varepsilon} > 0$ for $\varepsilon \in [0, \bar{\varepsilon}_k]$ where

$$\bar{\varepsilon}_k \equiv \frac{(1-\rho) \cdot (\theta^*_{2k} - \theta^*_{1k})}{(1-\rho) \cdot (\theta^*_{2k} - \theta^*_{1k}) + (\theta^*_{1k} - \theta^*_{0k})}. \tag{B.2}$$

This shows that citizen 1 benefits from *some* level of elite involvement. However, if elite's influence is too large, then citizen 1 would no longer benefit from elite involvement as policy would resemble that of a non-democracy. Thus, from Assumption 3, we have that ϵ lies within the above range. Furthermore, we get $\sum_k \Theta_k(0,\rho)^2 > \sum_k \Theta_k(\varepsilon,\rho)^2$ as long as $\theta^*_{1k} - \theta^*_{0k} \neq 0$ for some k. Thus, the payoff ordering for citizen 1 is:

$$\text{Citizen 1:} \quad u_{1N} \leq u_{1D} \leq u_{1\tilde{D}} \tag{B.3}$$

B.1.2 Equilibrium

Proof of Proposition 1

Given $\{V_{\mathbf{D}}, V_{\mathbf{N}}\}$, r_1^* is optimal if for all $p_{\mathbf{D}} \in [\alpha_{\mathbf{D}} \cdot (1-\rho), \alpha_{\mathbf{D}}]$ we have:

$$V_{\mathbf{D}} \geq p_{\mathbf{D}} \cdot u_{D1} + (1 - p_{\mathbf{D}}) \cdot u_{\tilde{D}1} + \beta \cdot [(1 - (1 - p_{\mathbf{D}}) \cdot \delta_{\mathbf{D}}) \cdot V_{\mathbf{D}} + (1 - p_{\mathbf{D}}) \cdot \delta_{\mathbf{D}} \cdot V_{\mathbf{N}}]$$

which is

$$[\alpha_{\mathbf{D}} \cdot \rho \cdot (r_1^* - r_1)] \cdot [-(u_{\tilde{D}1} - u_{D1}) + \beta\delta_{\mathbf{D}} \cdot (V_{\mathbf{D}} - V_{\mathbf{N}})] \geq 0 \quad \forall r_1 \in [0,1].$$

Let $\pi_{\mathbf{N}} = 1 - \alpha_{\mathbf{N}} \cdot (1 - \delta_{\mathbf{N}})$. Since $\alpha_{\mathbf{D}} \cdot \rho$ is positive, the incentive constraint simplifies to[1]:

$$(r_1^* - r_1) \cdot [\beta \cdot \delta_{\mathbf{D}} \cdot (u_{\tilde{D}1} - u_{N1}) - (1 + \beta \cdot [\delta_{\mathbf{D}} - \pi_{\mathbf{N}}]) \cdot (u_{\tilde{D}1} - u_{D1})] \geq 0 \quad \forall r_1 \in [0,1].$$

This gives two Markov Perfect equilibria - one with $r_1^* = 1$ and one with $r_1^* = 0$.

Hence, a symmetric Markov Perfect Equilibrium exists for $r_1^* \in \{0,1\}$. An illiberal democracy equilibrium exists if and only if

$$-(u_{i\tilde{D}} - u_{iD}) + \Gamma(\delta_{\mathbf{D}}, \delta_{\mathbf{N}}, \alpha_{\mathbf{N}}, \beta) \cdot (u_{i\tilde{D}} - u_{iN}) \leq 0 \tag{B.4}$$

$$\Gamma(\delta_{\mathbf{D}}, \delta_{\mathbf{N}}, \alpha_{\mathbf{N}}, \beta) \cdot \leq \frac{u_{1\tilde{D}} - u_{1D}}{u_{1\tilde{D}} - u_{1N}} \tag{B.5}$$

A Liberal Democracy equilibrium exists iff

$$-(u_{i\tilde{D}} - u_{iD}) + \Gamma(\delta_{\mathbf{D}}, \delta_{\mathbf{N}}, \alpha_{\mathbf{N}}, \beta) \cdot (u_{i\tilde{D}} - u_{iN}) \geq 0 \tag{B.6}$$

$$\Gamma(\delta_{\mathbf{D}}, \delta_{\mathbf{N}}, \alpha_{\mathbf{N}}, \beta) \cdot \geq \frac{u_{1\tilde{D}} - u_{1D}}{u_{1\tilde{D}} - u_{1N}} \tag{B.7}$$

Plugging in the optimal policy and simplifying from B.1, we have

$$\Lambda \equiv \frac{u_{1\tilde{D}} - u_{1D}}{u_{1\tilde{D}} - u_{1N}} \tag{B.8}$$

$$\Lambda(\varepsilon,\rho) = \frac{\sum_k \Theta_k(0,\rho)^2 - \Theta_k(\varepsilon,\rho)^2}{\sum_k \Theta_k(1,\rho)^2 - \Theta_k(\varepsilon,\rho)^2} \tag{B.9}$$

[1]Since the denominator $1 + \beta \cdot [(1 - p^*_{\mathbf{D}}) \cdot \delta_{\mathbf{D}} - \pi_{\mathbf{N}}]$ is positive, it can be factored out.

and from solving 2.9 and 2.10 we have

$$\Gamma(\delta_{\mathbf{D}}, \delta_{\mathbf{N}}, \alpha_{\mathbf{N}}, \beta) \equiv \frac{\beta \cdot \delta_{\mathbf{D}}}{\beta \cdot \delta_{\mathbf{D}} + (1-\beta) + \beta \cdot \alpha_{\mathbf{N}} \cdot (1-\delta_{\mathbf{N}})} \tag{B.10}$$

Together, these give us Proposition 1.

Proof of Proposition 2

The illiberal democracy equilibrium more readily arises as mentioned in Proposition 2 when

- The elites are weak since $\Gamma_{\delta_{\mathbf{D}}} > 0$, $\Gamma_{\delta_{\mathbf{N}}} > 0$, and $\Gamma_{\alpha_{\mathbf{N}}} < 0$.
- Citizens are impatient as $\Gamma_{\beta} > 0$
- Citizen 1 plays a smaller role in determining citizens' power, that is, for a lower ρ as $\Lambda_{\rho} \leq 0$. To see this, let $D_{21k} = \sum_k (\theta^*_{2k} - \theta^*_{1k})^2$, $D_{10k} = \sum_k (\theta^*_{1k} - \theta^*_{0k})^2$ and $d_k = \sum_k (\theta^*_{2k} - \theta^*_{1k})(\theta^*_{1k} - \theta^*_{0k})$. For any k, we have,

$$\frac{d\Lambda}{d\rho} = -\frac{\Big(4\varepsilon(1-\rho)D_{21k}D_{10k} + 2\varepsilon D_{10k}d_k + 2\varepsilon(1-\rho)^2 D_{21k}d_k\Big)}{(1-\varepsilon)\Big((1+\varepsilon)D_{10k} + 2\varepsilon(1-\rho)d_k - (1-\varepsilon)(1-\rho)^2 D_{21k}\Big)^2}$$

  Thus, $\frac{d\Lambda}{d\rho} \leq 0$ since all the terms in the numerator and the denominator are positive given the parameters.

Proof of Proposition 3

First of all, the FOC from the elites' optimization problem 2.15 is:

$$\beta \cdot [E_{\mathbf{N}} - E_{\mathbf{D}}] = c'(\delta^*) \tag{B.11}$$

This clearly shows that optimal investment in δ^* is independent of state.

The difference in $E_{\mathbf{D}}$ and $E_{\mathbf{N}}$ from 2.16 and 2.17 simplifies to

$$E_{\mathbf{N}} - E_{\mathbf{D}} = \frac{v_0 + [1 - p^*_{\mathbf{D}} - p^*_{\mathbf{N}}] \cdot c(\delta^*)}{1 - \beta \cdot (1 - p^*_{\mathbf{N}}) + \beta \cdot [1 - p^*_{\mathbf{D}} - p^*_{\mathbf{N}}] \cdot \delta^*}$$

Plugging this into the above FOC yields:

$$\beta \cdot v_0 = [1 - \beta \cdot (1 - p^*_{\mathbf{N}})] \cdot c'(\delta^*) + \beta \cdot [1 - p^*_{\mathbf{D}} - p^*_{\mathbf{N}}] \cdot [c'(\delta^*) \cdot \delta^* - c(\delta^*)]. \tag{B.12}$$

where $v_0 \equiv u_{N0} - (p^*_{\mathbf{D}} \cdot u_{D0} + (1 - p^*_{\mathbf{D}}) \cdot u_{\tilde{D}0})$ which is independent of δ^* . The right side starts at zero and is strictly increasing and goes to infinity as δ^* goes to one. Thus, there exists a unique value of δ^* which solves this condition and is interior. To make meaningful

connections to the equilibrium discussed in Proposition 1, Equation B.12 clearly shows that higher values of $p^*_{\mathbf{D}}$ lower the right hand side and raise the left hand side and therefore raise δ^*.

B.1.3 Mobility

The citizens' value function is as follows:

$$\mathbf{V} = A\mathbf{u} + \beta \cdot B\mathbf{V}$$

where

$$\mathbf{V} \equiv \begin{bmatrix} V_{D1} \\ V_{D2} \\ V_{N1} \\ V_{N2} \end{bmatrix}, A \equiv \begin{bmatrix} p_{\mathbf{D}} & 0 & 1-p_{\mathbf{D}} & 0 & 0 & 0 \\ 0 & p_{\mathbf{D}} & 0 & 1-p_{\mathbf{D}} & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 \end{bmatrix}, \mathbf{u} \equiv \begin{bmatrix} u_{D1} \\ u_{D2} \\ u_{\tilde{D}1} \\ u_{\tilde{D}2} \\ u_{N1} \\ u_{N2} \end{bmatrix}$$

and

$$B \equiv \begin{bmatrix} \pi_{11} \cdot [1-(1-p_{\mathbf{D}}) \cdot \delta_{\mathbf{D}}] & \pi_{12} \cdot [1-(1-p_{\mathbf{D}}) \cdot \delta_{\mathbf{D}}] & \pi_{11} \cdot [(1-p_{\mathbf{D}}) \cdot \delta_{\mathbf{D}}] & \pi_{12} \cdot [(1-p_{\mathbf{D}}) \cdot \delta_{\mathbf{D}}] \\ \pi_{21} \cdot [1-(1-p_{\mathbf{D}}) \cdot \delta_{\mathbf{D}}] & \pi_{22} \cdot [1-(1-p_{\mathbf{D}}) \cdot \delta_{\mathbf{D}}] & \pi_{21} \cdot [(1-p_{\mathbf{D}}) \cdot \delta_{\mathbf{D}}] & \pi_{22} \cdot [(1-p_{\mathbf{D}}) \cdot \delta_{\mathbf{D}}] \\ \pi_{11} \cdot [p_{\mathbf{N}} \cdot (1-\delta_{\mathbf{N}})] & \pi_{12} \cdot [p_{\mathbf{N}} \cdot (1-\delta_{\mathbf{N}})] & \pi_{11} \cdot [1-p_{\mathbf{N}} \cdot (1-\delta_{\mathbf{N}})] & \pi_{12} \cdot [1-p_{\mathbf{N}} \cdot (1-\delta_{\mathbf{N}})] \\ \pi_{21} \cdot [p_{\mathbf{N}} \cdot (1-\delta_{\mathbf{N}})] & \pi_{22} \cdot [p_{\mathbf{N}} \cdot (1-\delta_{\mathbf{N}})] & \pi_{21} \cdot [1-p_{\mathbf{N}} \cdot (1-\delta_{\mathbf{N}})] & \pi_{22} \cdot [1-p_{\mathbf{N}} \cdot (1-\delta_{\mathbf{N}})] \end{bmatrix}$$

where $p_{\mathbf{D}}$ and $p_{\mathbf{N}}$ are defined as before. As mentioned earlier, each element in matrix B denotes the associated probability of receiving the relevant equilibrium values of matrix $\mathbf{V}$. For instance, the first element in row 1 of matrix B is the probability that citizen 1 remains so in the next period, and the state continues to be a democracy; the fourth element of the first row, $\pi_{12} \cdot [(1-p_{\mathbf{D}}) \cdot \delta_{\mathbf{D}}]$, is the probability that an individual in citizen 1 becomes affiliated to citizen 2, and the state becomes a non-democracy, and so on.

Thus, the value functions are given by

$$\mathbf{V} = [I - \beta \cdot B]^{-1} A\mathbf{u}$$

where I is the identity matrix where $\mathbf{V} = \mathbf{V}(r^*_{D1}, r^*_{D2}, r^*_{N1}, r^*_{N2})$. Let $X_{[i]}$ denote the i^{th} row of matrix X.

Strategies (r^*_{D1}, r^*_{D2}) are part of an equilibrium if

$$\mathbf{V}_{[i]}(r^*_{D1}, r^*_{D2}) \geq A_{[i]}(r_{Di}, r^*_{D,-i})\mathbf{u} + \beta \cdot B_{[i]}(r_{Di}, r^*_{D,-i})\mathbf{V}(r^*_{D1}, r^*_{D2}, 1, 1).$$

Incentive constraint for strategies (r^*_{D1}, r^*_{D2}):

$$\left[A_{[i]}(r^*_{Di}, r^*_{D,-i}) - A_{[i]}(r_{Di}, r^*_{D,-i})\right]\mathbf{u} + \beta \cdot \left[B_{[i]}(r^*_{Di}, r^*_{D,-i}) - B_{[i]}(r_{Di}, r^*_{D,-i})\right]\mathbf{V}(r^*_{D1}, r^*_{D2}, 1, 1) \geq 0.$$

Notice that for $i = 1$ this is:

$$\left[A_{[1]}(r^*_{D1}, r^*_{D2}) - A_{[1]}(r_{D1}, r^*_{D2})\right] = \alpha_{\mathbf{D}} \cdot \rho \cdot (r^*_{D1} - r_{D1}) \cdot [1, 0, -1, 0, 0, 0]$$

and

$$\left[B_{[1]}(r^*_{D1}, r^*_{D2}) - B_{[1]}(r_{D1}, r^*_{D2})\right] = \alpha_{\mathbf{D}} \cdot \rho \cdot (r^*_{D1} - r_{D1}) \cdot \delta_{\mathbf{D}} \cdot [\pi_{11}, \pi_{12}, -\pi_{11}, -\pi_{12}]$$

Thus $\alpha_{\mathbf{D}} \cdot \rho$ can be factored out and dropped (since $\alpha_{\mathbf{D}} \cdot \rho > 0$). Hence, for $i = 1$, we have the incentive constraint:

$$(r^*_{D1} - r_{D1}) \cdot \{u_{D1} - u_{\tilde{D}1} + \beta \cdot \delta_{\mathbf{D}} \cdot [\pi_{11} \cdot (V_{D1} - V_{N1}) + \pi_{12} \cdot (V_{D2} - V_{N2})]\} \geq 0. \quad \text{(B.13)}$$

and for $i = 2$, it is:

$$(r^*_{D2} - r_{D2}) \cdot \{u_{D2} - u_{\tilde{D}2} + \beta \cdot \delta_{\mathbf{D}} \cdot [\pi_{21} \cdot (V_{D1} - V_{N1}) + \pi_{22} \cdot (V_{D2} - V_{N2})]\} \geq 0. \quad \text{(B.14)}$$

Given Equation 2.8, in Equation B.14, the term in braces is always positive which implies that citizen 2 still always prefers to resist in all states. As before, the analysis boils down to determining the strategy of citizen 1 in the democracy state.

The main object of interest in B.13 is the sign of the following:

$$-\{u_{\tilde{D}1} - u_{D1}\} + \beta \cdot \delta_{\mathbf{D}} \cdot [\pi_{11} \cdot (V_{D1} - V_{N1}) + \pi_{12} \cdot (V_{D2} - V_{N2})] \quad \text{(B.15)}$$

To simplify, set $\delta_{\mathbf{D}} = \delta_{\mathbf{N}} = \delta$:

$$V_{D1} - V_{N1} = \xi_1 \cdot \Delta_{u_1} + \xi_2 \cdot \Delta_{u_2} \quad \text{(B.16)}$$
$$V_{D2} - V_{N2} = \xi_3 \cdot \Delta_{u_1} + \xi_4 \cdot \Delta_{u_2} \quad \text{(B.17)}$$

where

$$\xi_1 \equiv \frac{1 - \tilde{\beta} \cdot \pi_{22}}{Z} \quad \text{(B.18)}$$
$$\xi_2 \equiv \frac{\tilde{\beta} \cdot \pi_{12}}{Z} \quad \text{(B.19)}$$
$$\xi_3 \equiv \frac{\tilde{\beta} \cdot \pi_{21}}{Z} \quad \text{(B.20)}$$
$$\xi_4 \equiv \frac{1 - \tilde{\beta} \cdot \pi_{11}}{Z} \quad \text{(B.21)}$$
$$Z \equiv [\pi_{11} + \pi_{22} - 1] \cdot \tilde{\beta}^2 - [\pi_{11} + \pi_{22}] \cdot \tilde{\beta} + 1 \quad \text{(B.22)}$$
$$= (1 - \tilde{\beta}) \cdot (1 - (\pi_{11} + \pi_{22} - 1) \cdot \tilde{\beta}) \quad \text{(B.23)}$$
$$\tilde{\beta} \equiv \beta \cdot [1 - (1 - p_{\mathbf{D}}) \cdot \delta - \alpha_{\mathbf{N}} \cdot (1 - \delta)]. \quad \text{(B.24)}$$

The main condition (B.15) thus becomes

$$-\{u_{\tilde{D}1} - u_{D1}\} + \beta \cdot \delta \cdot [\pi_{11} \cdot [\xi_1 \cdot \Delta_{u_1} + \xi_2 \cdot \Delta_{u_2}] + \pi_{12} \cdot [\xi_3 \cdot \Delta_{u_1} + \xi_4 \cdot \Delta_{u_2}]] \quad \text{(B.25)}$$

Use $\pi_{12} = 1 - \pi_{11}$ and simplify to get

$$-\{u_{\tilde{D}1} - u_{D1}\} + \beta \cdot \delta \cdot [\pi_{11} \cdot [[\xi_1 - \xi_3] \cdot \Delta_{u_1} + [\xi_2 - \xi_4] \cdot \Delta_{u_2}] + [\xi_2 \cdot \Delta_{u_1} + \xi_4 \cdot \Delta_{u_2}]] \tag{B.26}$$

which is

$$-\{u_{\tilde{D}1} - u_{D1}\} + \beta \cdot \delta \cdot \left[\left(\frac{\pi_{11} \cdot (1-\tilde{\beta}) + \tilde{\beta} \cdot (1-\pi_{22})}{Z}\right) \cdot \Delta_{u_1} + \left(\frac{1-\pi_{11}}{Z}\right) \cdot \Delta_{u_2}\right] \tag{B.27}$$

B.2 Transitions across Political Regimes

Table B.1: Transition probability and frequency matrix with time period breakdown

VDem Measure												
	1900-2020			1918-1945			1946-1991			1992-2020		
Probabilities	ND	ED	LD	ND	ED	LD	ND	ED	LD	ND	ED	LD
ND	0.99	0.01	0.00	0.99	0.01	0.00	1.00	0.00	0.00	0.99	0.01	0.00
ED	0.04	0.95	0.01	0.05	0.94	0.01	0.13	0.87	0.00	0.02	0.95	0.02
LD	0.00	0.01	0.99	0.00	0.00	1.00	0.04	0.02	0.93	0.00	0.00	1.00
Frequencies	ND	ED	LD	ND	ED	LD	ND	ED	LD	ND	ED	LD
ND	13719	161	14	2431	15	3	800	0	0	5426	57	5
ED	90	2331	36	11	207	2	4	26	0	16	618	14
LD	3	18	2262	0	0	173	2	1	42	0	0	885
Polity Measure												
	1900-2020			1918-1945			1946-1991			1992-2020		
Probabilities	ND	ED	LD	ND	ED	LD	ND	ED	LD	ND	ED	LD
ND	0.98	0.02	0.00	0.98	0.01	0.00	0.98	0.02	0.00	0.96	0.04	0.00
ED	0.03	0.96	0.01	0.04	0.94	0.01	0.06	0.93	0.01	0.02	0.98	0.00
LD	0.00	0.01	0.99	0.01	0.01	0.98	0.00	0.00	0.99	0.00	0.01	0.99
Frequencies	ND	ED	LD	ND	ED	LD	ND	ED	LD	ND	ED	LD
ND	6144	137	16	984	11	4	2986	64	7	1398	52	0
ED	109	3361	23	15	340	5	62	986	10	29	1799	8
LD	6	14	2319	2	4	345	2	4	948	1	5	891

Using Regimes of the World (RoW) classification of the VDem dataset (Coppedge et al., 2018) and regimes constructed from PolityV concept variables[2], Table B.1 shows the transition probability matrix across regimes, along with frequencies. The first block provides the transition matrix for the period 1900-2020 and the next three blocks are constructed for different time periods in history. The rows reflect the initial regime, and the columns represent the final regime. For instance, from the first row in the first block, the probabilities show that each year, starting from a non-democracy, the probability of remaining a non-democracy is 99%, the probability of transitioning to an electoral democracy is 1% and

[2]From the Polity dataset, regimes are classified based on combination of executive selection score (exrec) and political competition (polcomp). A regimes is defined as high in electoral category if they score at least second highest score in exrec, and highest in polcomp. A country is defined as liberal democracy if a nation sores highest in both category and electoral democracy if high only in electoral category and non democracy if low in both categories. This classification allows for the most overlap with VDem RoW classification.

there is 0 probability of transitioning to a liberal democracy. The frequencies show the total number of transitions within regimes across the relevant sample.

Appendix C

Are Elections Enough?

C.1 Data Description

Political Regime classification

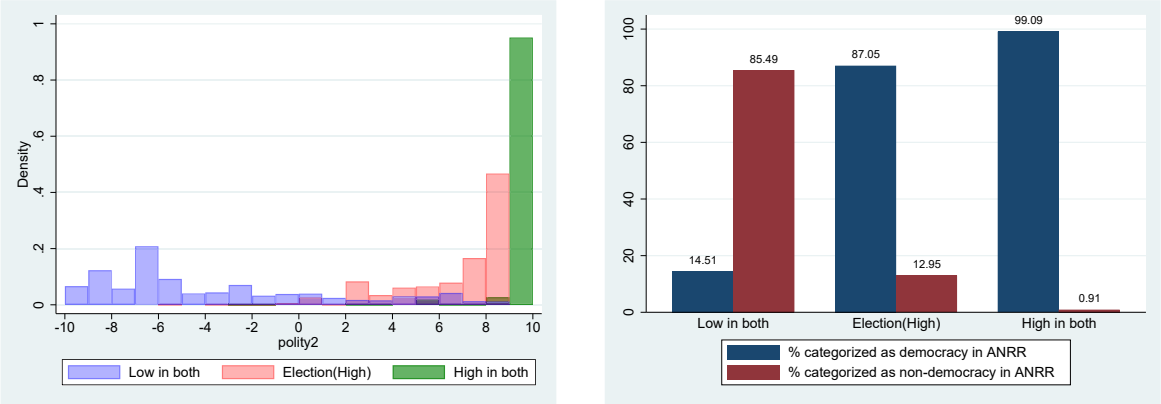

Figure C.1: Comparing regimes with other democracy measures

The first plot of Figure C.1 shows that the measures of electoral and liberal component can be combined into regimes that are aligned with the composite Polity IV score. Most of the countries ranked low in both components have a score below -6, most countries categorized as having only competitive elections have a score above zero but below 10 and almost all the countries categorized as scoring high in both components have a score of 10. However, the overlaps of the regimes and the polity score also highlight that our measure captures details beyond the composite score because countries with the same Polity score may have differences in their political institutions. Comparing our measure with the binary democracy measure of Acemoglu et al. (2019), as shown in the second plot of Figure C.1, 99.09% of observations ranking high in both components, 87% of observations ranking high only in election components and only 13.12% of observations ranking low in both using our classification is coded as a democracy in ANRR. This allows most of the observations that are categorized as democracies in ANRR to be classified as at least ranking high in

elections so that the results are not driven mostly by nations that could potentially be a non-democracy under a binary measure.

The particular cutoffs allow us to meaningfully distinguish between the components. For example, it would be unusual in the real world context to observe a regime where there are no competitive elections and political leaders are chosen through succession, but the degree of liberalism is high. The cutoffs used to define the ranking of the components ensure that such conceptually unlikely combinations are rare in the sample and are recoded as such.

Other variables

Additional variables include measures of social unrest and index of economic reforms from Acemoglu et al. (2019), net foreign assets as a share of GDP from Lane and Milesi-Ferretti (2017) and total factor productivity data from Bergeaud et al. (2016). Data for regions is based on the World Bank classification where regions include Africa (AFR), East Asia and the Pacific (EAP), Eastern Europe and Central Asia (ECA), Western Europe and other developed countries (INL), Latin America and the Caribbean (LAC), the Middle East and the North of Africa (MNA), and South Asia(SAS). Data on demographic structure, particularly population and the share of population below 14 and share between 15 and 64 is included from the World Bank Development Indicators. Additional variables of urbanisation, health equality, infant mortality rate, distribution of economic power resources, pluralism and clientelism index, regime duration, political stability, civil war, coup, internal and international armed conflict are added from V-Dem dataset (Coppedge et al., 2018).

C.2 Historical Trends

Trend in Dimension Score Switches

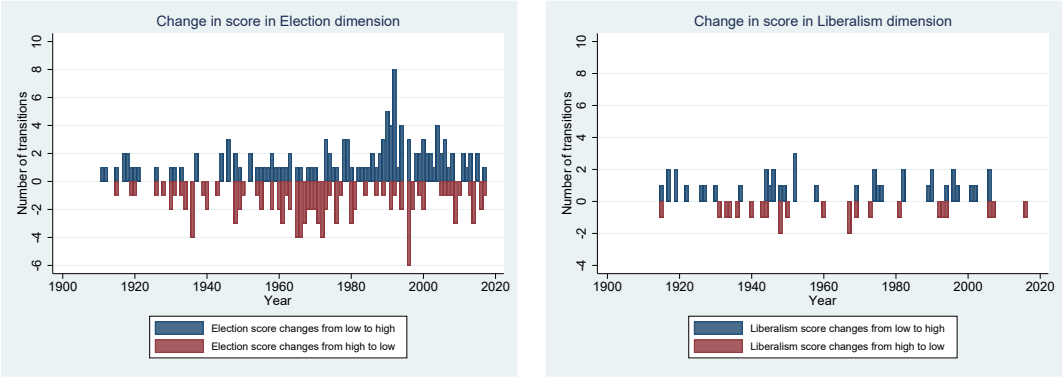

Figure C.2: Change in scores in the two dimensions between 1900 and 2017

Figure C.2 shows the changes in the scores of election and liberalism dimension over time. In accordance with Figure 3.1, it can be seen clearly that the third wave of democratization was dominated by countries introducing elections, but not paired with increased liberalism. Across the entire time period, the score for election dimension has been quite volatile, especally after the 1960s. The score for liberalism has been relatively more persistent with not more than three transitions in any year.

C.3 Income trend around transitions

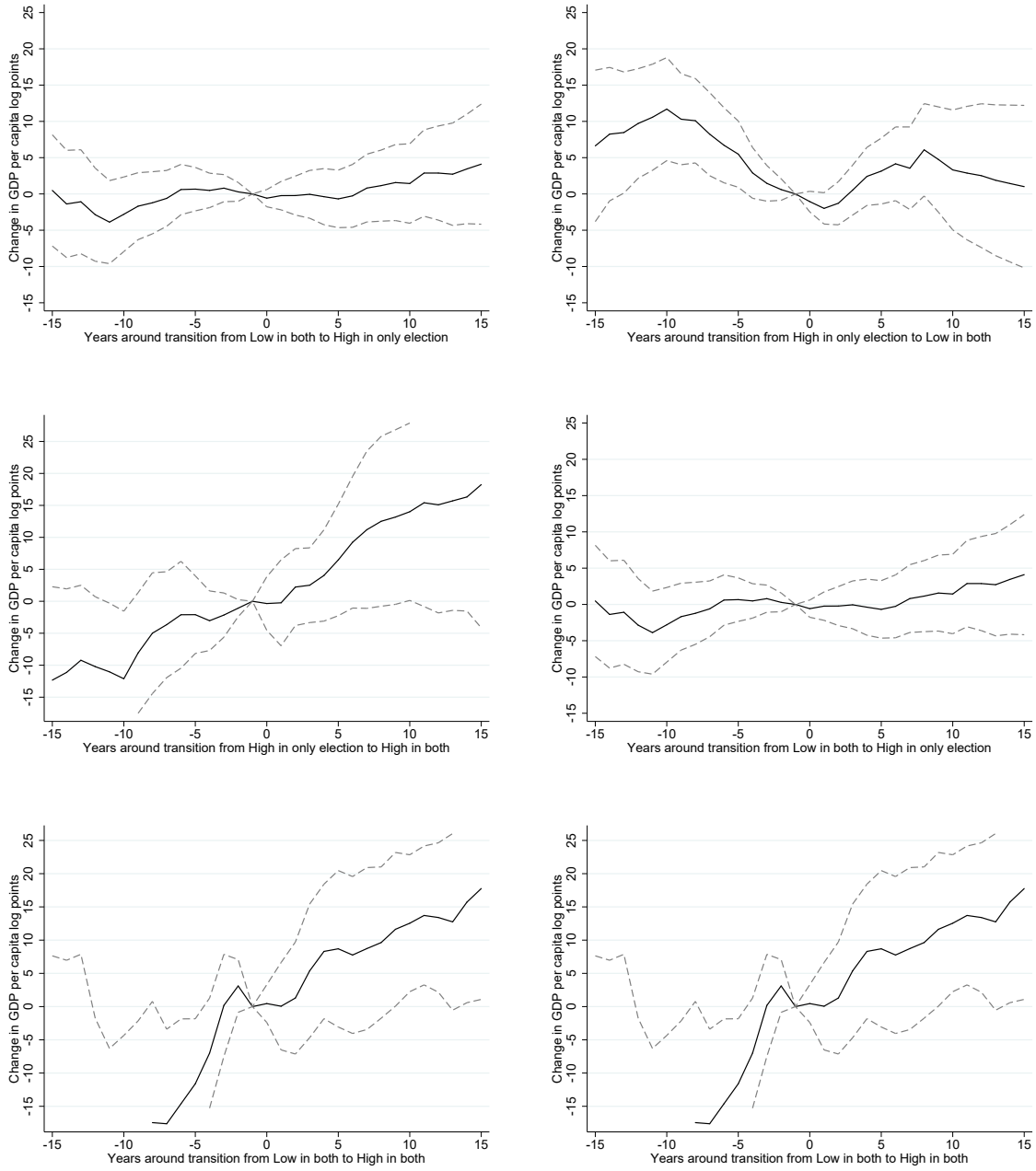

Figure C.3: Trend in GDP per capita 15 years before and after transition

The figures plot GDP per capita 15 years before and after transition between regimes scoring low in both, high in only election and high in both. It is noticeable that in the years preceding a transition, a drop in the GDP per capita documented in earlier papers (Acemoglu et al. (2019), Papaioannou and Siourounis (2008)) are not visible for all transitions but there are increases or dips preceding transitions and thus, it is useful to control for GDP dynamics using the lags of GDP. We use four lags as suggested in ANRR as the preferred specification.

C.4 Semi-parametric Approach

C.4.1 Methodology

The first method (regression adjustment) requires specifying a potential outcome model, which is used to estimate counterfactual growth levels for countries that experience a change in the political characteristics, had they not experienced the change. The outcome model specified is a linear regression of changes in log GDP per capita s years after the transition on year fixed effects and four lags of GDP. The estimation is done separately for each of the s years which allows non-linearity of the growth process. More formally, the following model is specified:

$$\mathbf{E}(\Delta y_{ct}^{s}(0)|Xct, O_{ct} = 1, O_{ct-1} = 1) = X_{ct}'\pi^{s}$$

Using this model for the OLS estimate, $\hat{\pi}^{s}$, the effect of a change in the dimension scores on growth is determined as:

$$\beta^{s} = \hat{\mathbf{E}}(\Delta y_{ct}^{s}(OD)|D_{ct} = 1, O_{ct-1} = 1) - \hat{\mathbf{E}}(X_{ct}'|D_{ct} = 1, O_{ct-1} = 1)\hat{\pi}^{s}$$

where the second term on the left hand side stands for the predicted counterfactual growth of countries that transitioned from regime O to D.

The second approach (Inverse probability weighting) uses weighted averages of the observed GDP to estimate the counterfactuals. First, using a probit model, the propensity score of the probability of transitioning from regime O to regime D with differing scores in either or both dimensions is estimated. The weights given to each observation are then determined using this propensity score where greater weight is given to GDP observed for countries that remain in regime O but follow similar GDP path as countries that have a change in the dimension score. This enhances the comparability between the treatment and control group.

The third approach is called a 'doubly robust estimator' which uses a combination of the two approaches mentioned above, and is consistent as long as either the linear potential outcome model or the probit model for estimating propensity score of transitioning is specified correctly (StataCorp, 2015).

C.4.2 Effects of Reverse Transition

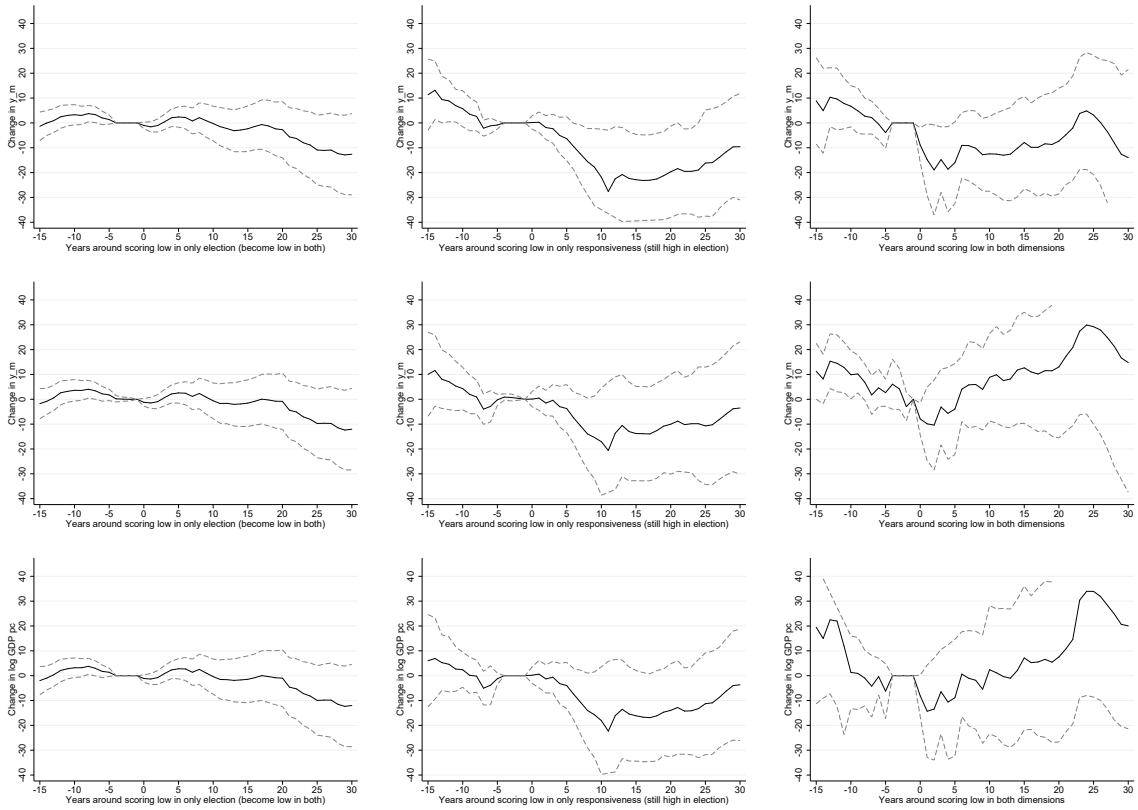

Figure C.4: Effect on GDP per capita of changes in dimensions of democracy using Regression Adjustment, Inverse Propensity Weighting Doubly Robust estimator

Figure C.4 illustrates the estimated semiparametric effect of changes in the score in a dimension from high to low. Transition from a regime with high score in only competitive elections but low score in liberalism to a regime scoring low in both does not have a significant effect on economic growth. Transitioning from a regime scoring high in both dimensions to a regime scoring low in liberalism and high in election dampens growth significantly between 5 to 20 years after the transition. Scores changing from high in both dimensions to low in both has a significant dampening effect on GDP per capita immediately after transition, but no significant effect afterwards. In the latter two cases, there are only 13 and 10 such transitions observed while 91 cases of transition from only scoring high in election to low in both and thus, the standard errors are large in for the latter analysis. This illustrates that the effect of the dimensions on growth are symmetric (moving upward or downward).

C.5 Robustness Checks

C.5.1 Arellano Bond and HHK Results

Table C.1: Effect of dimensions of political regimes on GDP per capita

	Within estimates	AB GMM	HHK
	(1)	(2)	(3)
Election	0.177	0.182	0.057
	(0.199)	(0.560)	(0.244)
Liberalism	1.225***	0.808	0.935*
Long-run effect of election	5.499	1.501	4.005
	(6.015)	(4.574)	(17.821)
Effect of elections after 25 years	3.693	1.480	1.534
	(4.102)	(4.511)	(6.668)
Long-run effect of liberalism	38.020***	6.650	65.994**
	(9.602)	(7.121)	(31.170)
Effect of liberalism after 25 years	25.531***	6.555	25.279*
	(6.504)	(7.024)	(15.014)
Persistence of GDP process	0.968***	0.878***	0.986***
	(0.003)	(0.010)	(0.003)
AR2 test p-value		0.38	
Observations	10077	9909	9719
Countries in sample	155	155	155

Robust standard errors clustered at country level in parentheses *** p<0.01, ** p<0.05, * p<0.1.
Column 2 uses until the 15th lag of levels of GDP as instrument for the differenced lags of GDP. The AR2 p-value reports the test result for serial correlation in the residuals of the GDP series.
Standard errors computed using five bootstrap repetitions are reported for the HHK estimates in column 3

The Arellano Bond GMM results show an insignificant association between both election and liberalism and economic growth. However, note that given the extensive time period, the specification suffers from a "too many instruments" problem which leads to overfitting bias. This can be seen clearly for the Arellano Bond estimation as the Hansen's test statistic has a p-value=1.00. For the Arellano Bond GMM estimation, despite restricting the number of lags to 15, the number of instruments is 3540 which is extremely large relative to number of observations (9909).[1]

Using the HHK estimator, the results from the baseline analysis hold at the 10% significance level. The estimates for the immediate effect of liberalism on growth and the effect after 25 years are also similar in magnitude, but the magnitude of the long term effect is much larger. This gives us further confidence on the finding that it is the liberalism aspect alongside elections that enhance growth and not elections alone [2].

[1]Results remain qualitatively same for different restrictions on lags.

[2]Given the long time period from 1900 to 2016 with low number of observations pre-1960, and two variables of interest, the estimation limits the number of lags at 18 in order to prevent number of instruments from exceeding number of observations.

C.5.2 Including Control Variables: Binary measure of Democracy

Table C.2: Effect of redefined democracy types on GDP per capita(with controls)

Covariates include		GDP in 2000 quantiles x year effects	Soviet dummies	Lags of unrest	Lags of trade	Lags of financial flows	Lags of demographic structure	Region x regime x year effects	Region x Lags of income
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Democracy (if Polity>0)									
Democracy	0.623***	0.480*	0.682***	0.392	0.428*	0.656**	0.299	0.493*	0.488***
	(0.226)	(0.259)	(0.228)	(0.293)	(0.238)	(0.292)	(0.303)	(0.261)	(0.156)
Long-run effect	21.271***	15.909*	23.685***	10.715	10.821*	15.164**	7.544		
	(7.631)	(8.574)	(7.857)	(7.992)	(6.431)	(7.307)	(7.692)		
after 25 years	13.595***	10.239*	14.965***	7.985	8.310*	11.781**	6.081		
	(4.718)	(5.373)	(4.759)	(5.798)	(4.691)	(5.268)	(6.071)		
Persistence of GDP process	0.971***	0.970***	0.971***	0.963***	0.960***	0.957***	0.960***		
	(0.003)	(0.004)	(0.003)	(0.005)	(0.005)	(0.006)	(0.005)		
Observations	10024	9898	10017	5712	5901	5406	7041	10024	10024
Countries in sample	155	151	154	147	145	149	149	155	155
Democracy (if Polity>5)									
Democracy	0.568**	0.517**	0.622***	0.439	0.541*	0.762***	0.417	0.671***	0.529***
	(0.232)	(0.255)	(0.231)	(0.287)	(0.276)	(0.275)	(0.292)	(0.254)	(0.165)
Long-run effect	19.430**	17.100**	21.600***	11.973	13.646**	17.365***	10.527		
	(7.641)	(7.994)	(7.741)	(7.554)	(6.829)	(6.443)	(7.099)		
after 25 years	12.422**	11.024**	13.655***	8.943	10.492**	13.587***	8.489		
	(4.936)	(5.241)	(4.926)	(5.658)	(5.285)	(4.717)	(5.722)		
Persistence of GDP process	0.971***	0.970***	0.971***	0.963***	0.960***	0.956***	0.960***		
	(0.003)	(0.004)	(0.003)	(0.005)	(0.005)	(0.006)	(0.005)		
Observations	10024	9898	10017	5712	5901	5406	7041	10024	10024
Countries in sample	155	151	154	147	145	149	149	155	155
Democracy (ANRR)									
Democracy	0.431*	0.346	0.519**	0.444*	0.382	0.345	0.304	0.388	0.672***
	(0.251)	(0.283)	(0.257)	(0.244)	(0.278)	(0.252)	(0.266)	(0.296)	(0.195)
Long-run effect	11.867*	9.244	14.403**	11.002*	8.641	7.101	6.785		
	(6.783)	(7.257)	(6.885)	(5.766)	(6.212)	(5.534)	(5.734)		
after 25 years	9.192*	7.214	11.081**	8.522*	7.106	5.818	5.750		
	(5.217)	(5.708)	(5.275)	(4.478)	(5.168)	(4.401)	(4.873)		
Persistence of GDP process	0.964***	0.963***	0.964***	0.960***	0.956***	0.951***	0.955***		
	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)	(0.009)	(0.006)		
Observations	6861	6861	6861	5613	5089	4559	6497	6861	6861
Countries in sample	150	150	150	147	144	147	149	150	150

Robust standard errors clustered at country level in parentheses *** p<0.01, ** p<0.05, * p<0.1. Long run effects for column (8) & (9) not estimated due to time intensive methods and results varying with left out region.

C.5.3 Instrumental Variable Approach

Methodology

A two stage least squares approach is also used to estimate the effect of the dimensions on growth. Regional waves of changes in the score of each dimension is constructed as instruments. Waves of democratization have often been concentrated regionally (e.g., with the case of the fall of the Soviet Union, democratizations in Africa, etc.). Thus, ANRR uses regional waves of democracy as an instrument for democratization. With similar reasoning, we use regional changes in the adoption of political characteristics (election and liberalism) as instruments. The instruments are constructed by averaging the dimension scores across countries within the same region, and with the same score in the respective dimension at the beginning of sample or at independence, whichever comes first. The following specification is estimated:

$$y_{ct} = \beta_1 \widehat{Election}_{ct} + \beta_2 \widehat{Responsiveness}_{ct} + \mathbf{X_{ct}}\eta + \alpha_c + \delta_t + \epsilon_{ct}$$

where

$$\widehat{Election}_{ct} = \sum_{j=1}^{4} \pi_j^e Z_{ct-j}^e + \sum_{j=1}^{4} \pi_j^r Z_{ct-j}^r + \mathbf{X_{ct}}\theta + \sigma_c^e + \tau_t^e + v_{ct}$$

and

$$\widehat{Responsiveness}_{ct} = \sum_{j=1}^{4} \pi_j^e Z_{ct-j}^e + \sum_{j=1}^{4} \pi_j^r Z_{ct-j}^r + \mathbf{X_{ct}}\theta + \sigma_c^r + \tau_t^r + u_{ct}$$

Here, Z^e denotes the regional waves of introduction of competitive elections and Z^r denotes the regional waves of adoption of liberalism in democracies. The vector of control variables include four lags of GDP per capita in all specifications alongside robustness checks with other factors that may influence both the instrumental variables and GDP per capita.

Results

The results from instrumental variable regression are qualitatively similar to those in Section 3.5. They are somewhat less robust due to weak instruments arising from the multiple dimensions and the nature of the variable such that strong instruments are hard to identify in a cross-country setting, these results alone should not take away from the main findings. The instruments are relevant within the historical panel we use from 1900-2016. Exogeneity requires such regional waves to not be correlated with income trends through channels other than the political dimensions. Column (8) of Table 3.8 provides some evidence towards this where, controlling for regional trends across nations with similar political institutions initially, the results are similar to that of the baseline. Furthermore, we control for other variables through which, regional changes in political characteristics and growth might be correlated as shown in Table C.3.

Column (1) uses one lag of the regional changes in election and liberalism to instrument for the two dimensions of democracy, and the rest of the table uses four lags. Column (3) controls for income trends across nations within the same GDP quantile in 2000, column (4) controls for Soviet union and satellite post 1989-1992 dummies, column (5) controls for regional trends. The results are similar across all these specifications with a positive significant effect of liberalism on growth. Panels B and C show the first stage regression which shows that regional waves of election is correlated with election dimension and waves of liberalism is correlated with liberalism dimension. However, the instruments are not relevant for the other dimension which could be contibuting towards the low F-stats. Column (6) controls for regional changes in GDP and trade across nations with similar initial political institutions (constructed similarly as the instrument) and column (7) further adds regional changes in unrest. Here, the effect of liberalism becomes insignificant. Note that the data for these variables are only available from 1960 onwards. The regional waves of liberalism no longer perform as a relevant instrument as can be seen in Panel C of Table C.3.

Column (8) and (9) control for spatial correlations of GDP per capita and spatial shocks. Column (8) includes spatial lags of GDP per capita constructed as the inverse distance weighted average of GDP per capita in other countries instrumented with four lags of the variable. Column (9) adds controls for spatial lags of all independent variables instrumented with their first four lags. This basically allows for the shocks to GDP in other countries to be correlated with a country's GDP based on the distance between the two countries. This is highly possible as trade, migration, foreign investment, tourism and many other variables

plausibly depend on distance between countries. The effect of liberalism on GDP per capita continues to be positive and significant.

The results using this approach are relatively weaker due to the low F-stats and cases where the Hansen p-value suggests that the overidentifying restrictions are not valid. The weak instrument problem arises here since it is quite possible that while democracy in neighboring countries with similar political history can influence a country's political regime as a whole, it is unlikely that the more nuanced characteristics play such a similar role. Elections perform as more relevant instruments, potentially because of the visibility of the procedure, whereas liberalism is a more subtle characteristics that might not be visible to neighboring countries in the region and hence, not as influential. Despite the weak instruments issue, under most specifications, results are qualitatively similar to those in the previous approaches and thus, should not take away from the main findings.

Table C.3: IV estimate of the effect of components of democracy on GDP per capita

Covariates include			GDP in 2000 quantiles x year effects	Soviet dummies	Regional trends	Regional GDP & trade	Regional GDP, unrest & trade	Spatial lag of GDP	Spatial lag of GDP & dimensions
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: *2SLS Second stage*									
Election	1.147	1.328	1.381	1.419	2.017*	2.031	2.970*	0.238	0.546
	(0.978)	(0.975)	(1.480)	(0.993)	(1.162)	(2.820)	(1.768)	(0.889)	(1.639)
Liberalism	4.221***	4.506***	4.501**	4.225***	3.941**	10.618	-4.913	5.106***	5.202**
	(1.377)	(1.392)	(1.873)	(1.353)	(1.886)	(18.156)	(10.806)	(1.333)	(2.131)
Long-run: Election	30.534	34.786	37.228	38.066	43.880*	38.060	79.278	6.429	13.941
	(25.431)	(24.948)	(39.414)	(26.037)	(25.570)	(60.507)	(56.324)	(23.930)	(41.439)
after 25 years: Election	22.352	25.680	26.740	27.701	35.296*	35.092	63.064	4.541	10.071
	(18.878)	(18.652)	(28.485)	(19.198)	(20.525)	(53.259)	(39.667)	(16.962)	(30.092)
Long-run: Liberalism	112.308***	117.987***	121.331**	113.345***	85.741**	198.968	-131.170	137.923***	132.939**
	(35.192)	(34.699)	(48.996)	(34.522)	(39.255)	(277.437)	(328.095)	(33.889)	(55.573)
after 25 years: Liberalism	82.213***	87.102***	87.147**	82.482***	68.967**	183.451	-104.344	97.426***	96.032**
	(25.803)	(25.752)	(35.139)	(25.303)	(31.719)	(273.957)	(244.786)	(23.684)	(39.502)
Persistence of GDP process	0.962***	0.962***	0.963***	0.963***	0.954***	0.947***	0.963***	0.963***	0.961***
	(0.004)	(0.004)	(0.005)	(0.004)	(0.005)	(0.020)	(0.013)	(0.005)	(0.005)
Hansen p-value		0.01	0.14	0.01	0.01	0.00	0.02	0.28	0.26
Observations	10077	10077	9951	10070	10077	6170	6165	8701	8541
Countries in sample	155	155	151	154	155	150	150	150	150
Exc. Instruments F-stat.	6.2	2.7	1.6	2.6	2.1	0.8	0.5	2.2	2.1
Panel B: *First stage results for Election*									
Election wave t-1	0.581***	0.237***	0.152**	0.201***	0.188***	0.177***	0.124*	0.207***	0.218***
	(0.071)	(0.066)	(0.064)	(0.060)	(0.066)	(0.067)	(0.070)	(0.066)	(0.067)
Election wave t-2		0.084***	0.076***	0.085***	0.081***	0.076*	0.058	0.123***	0.093***
		(0.027)	(0.027)	(0.029)	(0.026)	(0.045)	(0.043)	(0.027)	(0.029)
Election wave t-3		0.066**	0.072***	0.065**	0.059*	0.032	0.038	0.070**	0.081**
		(0.031)	(0.027)	(0.032)	(0.031)	(0.046)	(0.047)	(0.035)	(0.036)
Election wave t-4		0.252***	0.184***	0.252***	0.228***	0.202***	0.202***	0.194***	0.189***
		(0.062)	(0.057)	(0.063)	(0.064)	(0.069)	(0.068)	(0.067)	(0.066)
Liberalism wave t-1	0.041	0.101	0.138	0.090	0.148*	0.215**	0.175	0.103	0.108
	(0.087)	(0.094)	(0.094)	(0.089)	(0.089)	(0.102)	(0.116)	(0.096)	(0.096)
Liberalism wave t-2		0.068*	0.072*	0.075*	0.076*	0.038	0.045	0.052	0.087*
		(0.040)	(0.038)	(0.043)	(0.043)	(0.045)	(0.052)	(0.046)	(0.051)
Liberalism wave t-3		0.021	0.055	0.024	0.025	0.078	0.081	0.056	0.027
		(0.093)	(0.094)	(0.092)	(0.092)	(0.150)	(0.185)	(0.098)	(0.113)
Liberalism wave t-4		-0.195**	-0.156*	-0.168**	-0.148*	-0.184	-0.221*	-0.231**	-0.243**
		(0.084)	(0.081)	(0.084)	(0.075)	(0.120)	(0.129)	(0.096)	(0.095)
Panel C: *First stage results for Liberalism*									
Election wave t-1	0.056	0.023	-0.000	0.012	0.052*	0.022	0.021	0.018	0.015
	(0.060)	(0.033)	(0.031)	(0.033)	(0.029)	(0.039)	(0.043)	(0.035)	(0.034)
Election wave t-2		-0.009	-0.011	-0.013	-0.011	-0.020	-0.024	-0.007	-0.010
		(0.009)	(0.009)	(0.011)	(0.009)	(0.018)	(0.018)	(0.011)	(0.009)
Election wave t-3		0.018	0.020	0.016	0.019	0.011	0.016	0.009	0.014
		(0.013)	(0.015)	(0.013)	(0.013)	(0.022)	(0.022)	(0.013)	(0.016)
Election wave t-4		0.033	0.009	0.033	0.035	0.033	0.022	0.031	0.030
		(0.048)	(0.044)	(0.048)	(0.040)	(0.056)	(0.055)	(0.048)	(0.048)
Liberalism wave t-1	0.438***	0.197***	0.074	0.197***	0.156**	0.069	0.061	0.170**	0.166**
	(0.124)	(0.070)	(0.066)	(0.071)	(0.070)	(0.063)	(0.074)	(0.070)	(0.070)
Liberalism wave t-2		0.099	0.098	0.097	0.101	0.010	0.009	0.075**	0.058**
		(0.072)	(0.087)	(0.073)	(0.068)	(0.014)	(0.017)	(0.034)	(0.028)
Liberalism wave t-3		-0.006	0.015	-0.004	-0.007	0.037	0.004	-0.002	0.019
		(0.014)	(0.018)	(0.014)	(0.014)	(0.040)	(0.023)	(0.014)	(0.025)
Liberalism wave t-4		0.158*	0.171*	0.171*	0.097	-0.105	-0.088	0.206**	0.197**
		(0.090)	(0.093)	(0.090)	(0.084)	(0.075)	(0.075)	(0.084)	(0.082)

Robust standard errors clustered at country level in parentheses *** p<0.01, ** p<0.05, * p<0.1.

Potential Mechanisms using 2SLS estimation

Table C.4: Effect of Dimensions on Potential Mechanisms (2SLS estimates)

	Log TFP	Market reforms	Distribution of economic power resources	Pluralism	Clientelism	Health equality	Infant Mortality rate
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Election	4.109	7.146	0.155	-0.009	0.010**	0.002	-1.279*
	(3.072)	(4.684)	(0.111)	(0.015)	(0.005)	(0.031)	(0.776)
Liberalism	-13.109	-24.708	0.254**	0.026	-0.014	0.090*	0.224
	(11.403)	(22.412)	(0.129)	(0.018)	(0.009)	(0.049)	(2.800)
Long-run effect: Election	75.489	67.181	13.490	-0.110	0.181**	0.031	-36.739*
	(59.627)	(48.894)	(9.626)	(0.199)	(0.082)	(0.475)	(21.204)
after 25 years: Election	62.218	62.105	14.406	-0.094	0.144**	0.027	-19.105*
	(48.588)	(42.936)	(10.076)	(0.169)	(0.067)	(0.403)	(11.363)
Long-run effect: Liberalism	-240.824	-232.293	22.174**	0.340	-0.247	1.398**	6.419
	(216.147)	(248.012)	(10.857)	(0.235)	(0.161)	(0.685)	(80.709)
after 25 years: Liberalism	-198.488	-214.741	23.679**	0.291	-0.197	1.187**	3.338
	(177.611)	(218.400)	(11.755)	(0.200)	(0.125)	(0.603)	(41.876)
Persistence of outcome process	0.946***	0.894***	0.989***	0.922***	0.944***	0.936***	0.965***
	(0.012)	(0.033)	(0.001)	(0.010)	(0.007)	(0.008)	(0.005)
Exc. instruments F-stat.	0.4	0.9	4.0	1.6	3.2	2.2	2.0
Hansen p-value	0.01	0.34	0.49	0.55	0.28	0.25	0.62
Observations	3930	4762	6099	6981	9745	9627	8413
Countries in sample	102	136	126	143	149	149	148

	Likelihood of unrest	Coups	Likelihood of Civil War	Internal armed conflict	International armed conflict	Political Stability	Regime duration
	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Election	-62.995	-0.033	-0.051**	-0.078**	0.074*	0.238	-1.840
	(57.040)	(0.029)	(0.020)	(0.038)	(0.039)	(0.687)	(1.652)
Liberalism	301.351	0.001	-0.014	0.025	-0.211***	2.235	4.862**
	(319.002)	(0.030)	(0.028)	(0.053)	(0.052)	(17.037)	(2.417)
Long-run effect: Election	-119.285	-0.035	-0.202**	-0.309**	0.178*	0.796	-44.746
	(123.630)	(0.030)	(0.081)	(0.155)	(0.101)	(2.054)	(34.372)
after 25 years: Election	-119.271	-0.035	-0.202**	-0.308**	0.178*	0.796	-29.128
	(123.581)	(0.030)	(0.081)	(0.154)	(0.101)	(2.054)	(24.543)
Long-run effect: Liberalism	570.629	0.001	-0.055	0.101	-0.509***	7.483	118.255**
	(739.935)	(0.032)	(0.110)	(0.212)	(0.132)	(60.063)	(59.551)
after 25 years: Liberalism	570.561	0.001	-0.055	0.100	-0.508***	7.483	76.980**
	(739.605)	(0.032)	(0.110)	(0.211)	(0.132)	(60.063)	(37.853)
Persistence of outcome process	0.472***	0.055	0.746***	0.748***	0.586***	0.701***	0.959***
	(0.145)	(0.047)	(0.020)	(0.023)	(0.041)	(0.130)	(0.006)
Exc. instruments F-stat.	0.6	4.9	3.7	6.6	4.6	0.2	3.7
Hansen p-value	0.94	0.73	0.34	0.33	0.03	0.97	0.64
Observations	5604	7104	7903	7328	7328	1637	9374
Countries in sample	147	147	145	149	149	149	148

Robust standard errors, clustered at country level, in parentheses *** p<0.01, ** p<0.05, * p<0.1. All specifications control for four lags of GDP and four lags of the outcome process.

C.5.4 Randomization tests

Following the approach in Hsiang and Jina (2014) to check that the results are not spurious findings, we carry out a randomization test. The sample is randomized using either election or liberalism as a treatment variable to generate placebo datasets and the baseline model is re-estimated. A distribution of these estimated coefficients is constructed by repeating the randomization and estimation procedure 10,000 times. The distributions are illustrated in Figure C.5 and the coefficients from the baseline estimate using real data are shown as vertical lines with exact p-values (constructed as the proportion of estimates that are larger

than the coefficient estimate from baseline regression in absolute terms). The randomization is carried out separately for election and liberalism dimension in three different ways:

- Total randomization: Each observation of the dimension is randomly reassigned. This mainly checks for spurious findings.
- Block randomization: Here, the observations of the dimension for a particular country is reassigned to another country while preserving the order of the dimension with the years. As this maintains the time structure of the data, while randomizing the dimension scores across countries, this tests whether global or regional trends are resulting in biased estimates.
- Within randomization: The dimension score over time is randomly re-ordered within the years available for each country. This changes the time structure of the data and thus tests whether time invariant cross sectional trends are generating the estimates.

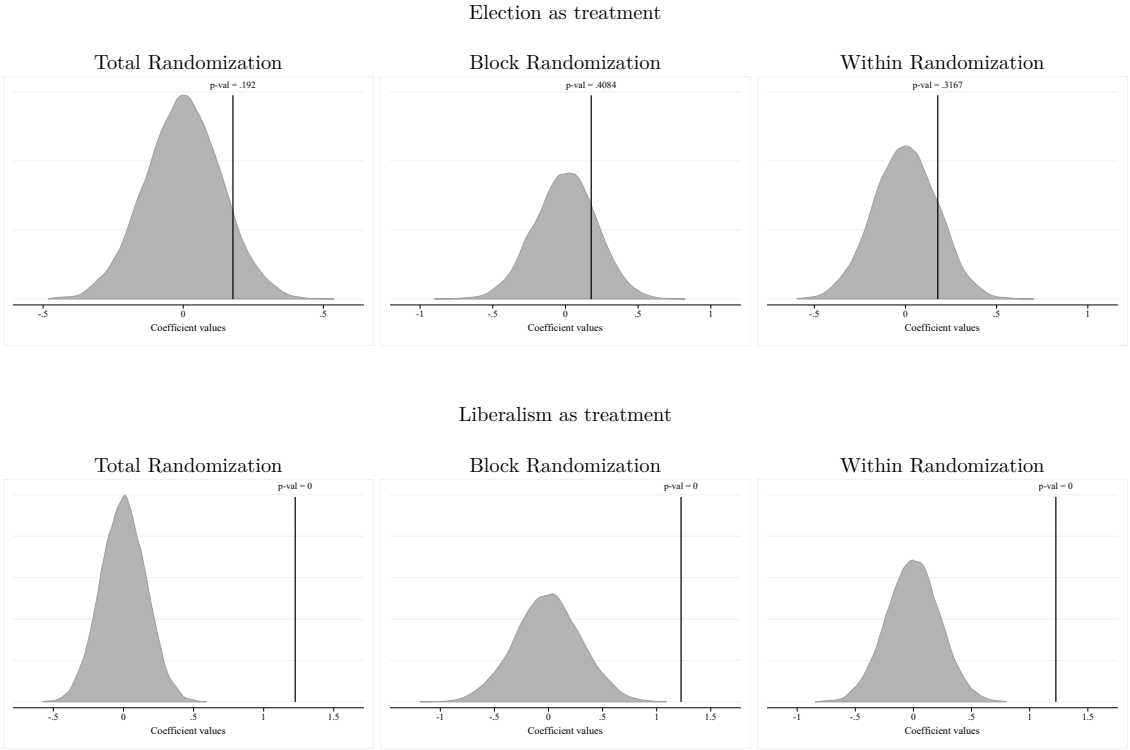

Figure C.5: Distribution of point estimates from re-estimation using randomized placebo datasets.

As can be observed in Figure C.5, using the randomization tests to randomly re-assign election scores over the whole sample, across countries while preserving the time structure, and within countries, the distribution of estimates are centered at zero as should be expected from randomized estimations. However, the coefficient of election dimension from the baseline model is not significantly different from zero and the p-values exceed 0.1 for all tests. On the other hand, the p-value is zero when carrying out the tests by randomizing

the liberalism dimension under all three randomization tests suggesting that it is highly unlikely for the estimated effect of liberalism to be observed by chance.

C.5.5 Potential Mechanisms: Binary measure

Table C.5: Effect of Binary Measure of Democracy on Potential Mechanisms (Within estimates)

	Log TFP	Market reforms	Distribution of economic power resources	Pluralism	Clientelism	Health equality	Infant Mortality rate
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Democracy (ANRR)	-0.240	0.561	0.051*	0.041***	0.006**	0.036***	-0.313***
	(0.322)	(0.344)	(0.029)	(0.012)	(0.003)	(0.012)	(0.105)
Long-run effect	-3.879	4.618	3.010*	0.376***	0.072**	0.385***	-14.627***
	(5.176)	(2.947)	(1.746)	(0.097)	(0.032)	(0.135)	(3.844)
after 25 years	-3.301	4.407	3.616*	0.354***	0.065**	0.363***	-10.414***
	(4.377)	(2.782)	(2.080)	(0.092)	(0.030)	(0.125)	(2.633)
Persistence of outcome process	0.938***	0.879***	0.983***	0.890***	0.923***	0.906***	0.979***
	(0.010)	(0.014)	(0.001)	(0.013)	(0.010)	(0.013)	(0.004)
Observations	3929	4761	3889	4884	6458	6458	6241
Countries in sample	102	136	126	143	149	149	148
Democracy (Polity>4)	-0.327	0.917**	0.069***	0.027***	0.007***	0.027***	-0.540**
	(0.323)	(0.394)	(0.021)	(0.007)	(0.002)	(0.007)	(0.208)
Long-run effect:	-5.525	7.407**	6.998***	0.323***	0.117***	0.466***	-16.493***
	(5.521)	(3.185)	(2.230)	(0.086)	(0.029)	(0.127)	(6.051)
after 25 years:	-4.697	7.095**	6.969***	0.283***	0.095***	0.381***	-8.157***
	(4.627)	(3.022)	(2.118)	(0.074)	(0.024)	(0.099)	(3.077)
Persistence of outcome process	0.941***	0.876***	0.990***	0.916***	0.942***	0.941***	0.967***
	(0.010)	(0.015)	(0.001)	(0.009)	(0.007)	(0.007)	(0.004)
Observations	3921	4736	6028	6948	9547	9528	8323
Countries in sample	102	136	126	143	149	149	148

	Likelihood of unrest	Coups	Likelihood of Civil War	Internal armed conflict	International armed conflict	Political Stability	Regime duration
	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Democracy (ANRR)	-5.933***	-0.091***	-0.009	-0.034**	-0.004	0.066	-4.409***
	(2.140)	(0.015)	(0.010)	(0.014)	(0.013)	(0.075)	(0.969)
Long-run effect:	-9.384***	-0.096***	-0.035	-0.131**	-0.008	0.094	-51.781***
	(3.387)	(0.017)	(0.037)	(0.054)	(0.026)	(0.109)	(10.192)
after 25 years:	-9.384***	-0.096***	-0.035	-0.130**	-0.008	0.094	-46.665***
	(3.387)	(0.017)	(0.037)	(0.054)	(0.026)	(0.109)	(9.039)
Persistence of outcome process	0.368***	0.043	0.738***	0.741***	0.489***	0.300***	0.915***
	(0.030)	(0.063)	(0.023)	(0.025)	(0.059)	(0.072)	(0.011)
Observations	5604	4804	5590	4931	4931	745	6274
Countries in sample	147	147	145	149	149	149	148
Democracy (Polity>4)	-8.395***	-0.045***	-0.006	-0.021*	-0.013	0.109*	-3.807***
	(2.219)	(0.009)	(0.007)	(0.011)	(0.012)	(0.057)	(0.738)
Long-run effect: Democracy	-12.881***	-0.047***	-0.024	-0.082*	-0.033	0.388*	-70.379***
	(3.349)	(0.010)	(0.028)	(0.046)	(0.035)	(0.216)	(10.053)
after 25 years:Democracy	-12.881***	-0.047***	-0.024	-0.082*	-0.033	0.388*	-52.938***
	(3.349)	(0.010)	(0.028)	(0.045)	(0.035)	(0.216)	(8.601)
Persistence of outcome process	0.348***	0.061	0.740***	0.745***	0.621***	0.718***	0.946***
	(0.029)	(0.049)	(0.020)	(0.023)	(0.042)	(0.037)	(0.005)
Observations	5560	6938	7721	7253	7253	1625	9178
Countries in sample	147	147	145	149	149	149	148

Robust standard errors, clustered at country level, in parentheses *** p<0.01, ** p<0.05, * p<0.1. All specifications control for four lags of GDP and four lags of the outcome process.

C.5.6 Results using Regimes of the World Classification

Data

Table C.6: Political Regimes using V-Dem classification

Regime	V-Dem	
	Times observed	Number of countries
Non-Democracy	5946	133
Electoral Democracy	1645	91
Liberal Democracy	2080	44

A Look at the Political Regimes: Historical Trend of Political Regimes

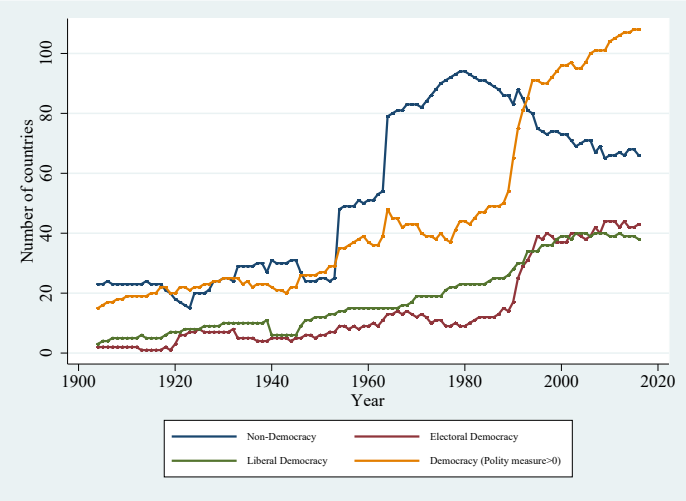

Figure C.6: Number of countries in each regime from 1960 to 2010

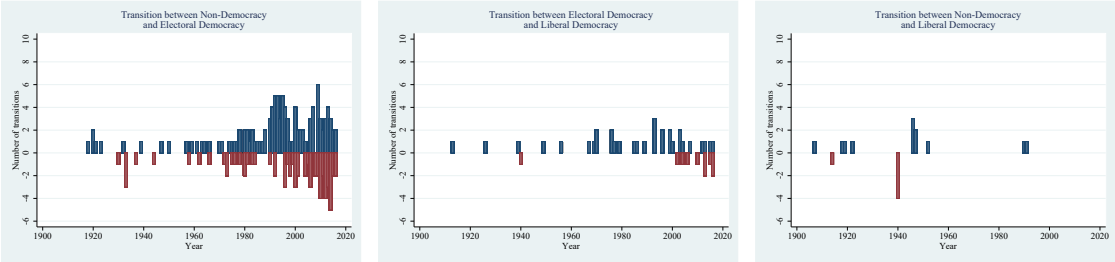

Figure C.7: Transitions between regimes from 1960 to 2010

Beliefs

Table C.7: Effect of dimensions on beliefs about country's elections in democracies

	How often in country's elections (Not at all often - Very)				
	(1)	(2)	(3)	(4)	(5)
	Votes are counted fairly	Election officials are fair	Opposition candidates prevented from running	Voters are threatened with violence at polls	Voters are offered a genuine choice
Liberal Democracy	0.305***	0.267***	-0.187***	-0.251***	0.079
	(0.044)	(0.035)	(0.028)	(0.069)	(0.051)
Observations	24694	24095	23272	23702	24358
R-squared	0.187	0.165	0.110	0.166	0.046

Robust standard error clustered at country level in parentheses *** p<0.01, ** p<0.05, * p<0.1. Controls for gender, age, marital status, highest education level, employment status, income scale and ethnic group are included.

Table C.8: Effect of dimensions on beliefs about democratic characteristics in democracies

	Democratic Characteristic (Not Essential - Essential)					
	(1)	(2)	(3)	(4)	(5)	(6)
	People choose leaders in free election	People obey their rulers	Civil rights protect people's liberty	Army takes over when govt. is incompetent	Religious authorities interpret law	Economy is prospering
Liberal Democracy	0.051**	-0.091	-0.017	-0.189***	-0.122***	-0.064
	(0.021)	(0.070)	(0.033)	(0.021)	(0.033)	(0.050)
Observations	69604	37331	67777	67768	67265	31253
R-squared	0.040	0.079	0.036	0.115	0.097	0.017

Robust standard errors clustered at country level in parentheses *** p<0.01, ** p<0.05, * p<0.1. Controls for gender, age, marital status, highest education level, employment status, income scale and ethnic group are included.

Table C.9: Effect of dimensions on opinions about political system in democracies

	Democracies (Disagree strongly-Agree)			
	(1)	(2)	(3)	(4)
	have economic systems that runs badly	have indecisiveness & too much squabbling	are not good at maintaining order	may have problems but is better
Electoral Democracy	0.091***	0.081**	0.028	0.037
	(0.027)	(0.033)	(0.026)	(0.035)
Liberal Democracy	0.000	0.017	-0.027	0.032
	(0.025)	(0.026)	(0.026)	(0.029)
Observations	58854	59176	59264	60270
R-squared	0.042	0.039	0.025	0.025

Robust standard errors clustered at country level in parentheses *** p<0.01, ** p<0.05, * p<0.1. Controls for gender, age, marital status, highest education level, employment status, income scale and ethnic group are included.

Table C.10: Effect of dimensions on beliefs about political systems

	(Political system (Very Bad- Very Good))			
	(1)	(2)	(3)	(4)
	Having strong leader (autocratic)	Having experts, not government, make decisions	Having army rule	Having democractic system
Electoral Democracy	0.091***	0.046**	0.056*	-0.024
	(0.031)	(0.022)	(0.030)	(0.020)
Liberal Democracy	-0.120***	-0.060***	-0.134***	0.015
	(0.032)	(0.021)	(0.022)	(0.021)
Observations	171978	168905	169811	174037
R-squared	0.074	0.036	0.116	0.020

Robust standard errors clustered at country level in parentheses *** p<0.01, ** p<0.05, * p<0.1. Controls for gender, age, marital status, highest education level, employment status, income scale and ethnic group are included. The questions rating from very bad to very good political systems for column 1 is: Having a strong leader who does not have to bother with parliament and elections, column(2) is having experts, not government, make decisions according to what they think is best for the country.

Baseline Results

Table C.11: Effect of dimensions of political regimes on GDP per capita

	Within estimates				
			Binary measures		
	V-Dem		Polity>0	Polity>4	ANRR
	(1)	(2)	(3)	(4)	(5)
Electoral Democracy	-0.493	-0.089			
	(3.909)	(0.262)			
Liberal Democracy	27.273***	1.223***			
	(6.762)	(0.429)			
Democracy			0.603**	0.509**	0.739***
			(0.235)	(0.235)	(0.264)
Long-run effect: Electoral		-2.721			
		(8.041)			
Effect after 25 years: Electoral		-1.845			
	(5.450)				
Long-run effect: Liberal		37.486***			
		(12.333)			
Effect after 25 years: Liberal		25.419***			
		(8.515)			
Long-run effect of democracy			20.238***	17.098**	23.974***
			(7.844)	(7.640)	(8.218)
Effect of democracy after 25 years			13.147***	11.115**	16.334***
			(4.915)	(5.015)	(5.624)
Persistence of GDP process		0.967***	0.970***	0.970***	0.969***
		(0.004)	(0.003)	(0.003)	(0.004)
Observations	9671.00	9671.00	9573.00	9573.00	8324.00
Countries in sample	149	149	149	149	149
Controls (Income lags)	No	Yes	Yes	Yes	Yes

Robust standard errors clustered at country level in parentheses *** p<0.01, ** p<0.05, * p<0.1.
Column 4 & 5 uses Democracy measure from Polity IV (democracy if polity score>0 & polity score>4 respectively) & Column 6 uses democracy measure from ANRR (2019). Column 6 uses continuous measures of Electoral Democracy Index and the adjusted Liberal Democracy Index.

Robustness Check: Including Control Variables

Table C.12: Effect of redefined democracy types on GDP per capita(with controls)

Covariates include		GDP in 2000 quantiles x year effects	Soviet dummies	Lags of unrest	Lags of trade	Lags of financial flows	Lags of demographic structure	Region x regime x year effects	Region x Lags of income
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Electoral Democracy	-0.089	-0.252	-0.067	0.042	-0.071	0.197	-0.338	0.163	0.160
	(0.262)	(0.296)	(0.266)	(0.232)	(0.287)	(0.270)	(0.293)	(0.292)	(0.243)
Liberal Democracy	1.223***	1.020**	1.185***	0.681	0.371	0.935	0.409	1.029**	1.531***
	(0.429)	(0.459)	(0.424)	(0.501)	(0.423)	(0.569)	(0.494)	(0.453)	(0.416)
Long-run effect: Electoral	-2.721	-7.688	-2.076	1.040	-1.760	4.346	-8.230		
	(8.041)	(9.226)	(8.276)	(5.755)	(7.050)	(6.012)	(7.316)		
after 25 years: Electoral	-1.845	-5.159	-1.394	0.802	-1.366	3.423	-6.655		
	(5.450)	(6.110)	(5.554)	(4.449)	(5.465)	(4.726)	(5.821)		
Long-run effect: Liberal	37.486***	31.102**	36.882***	17.001	9.163	20.584*	9.962		
	(12.333)	(13.033)	(12.408)	(11.897)	(10.269)	(12.486)	(11.846)		
after 25 years: Liberal	25.419***	20.870**	24.755***	13.113	7.111	16.210*	8.056		
	(8.515)	(8.931)	(8.481)	(9.388)	(8.061)	(9.813)	(9.632)		
Persistence of GDP process	0.967***	0.967***	0.968***	0.960***	0.959***	0.955***	0.959***		
	(0.004)	(0.004)	(0.004)	(0.006)	(0.005)	(0.007)	(0.006)		
Observations	9671	9671	9671	5716	5932	5382	7089	9671	9671
Countries in sample	149	149	149	146	145	146	149	149	149

Robust standard errors clustered at country level in parentheses *** p<0.01, ** p<0.05, * p<0.1.
Long run effects for column (8) & (9) not estimated due to time intensive methods and results varying with left out region.

Robustness Check: Semiparametric approach

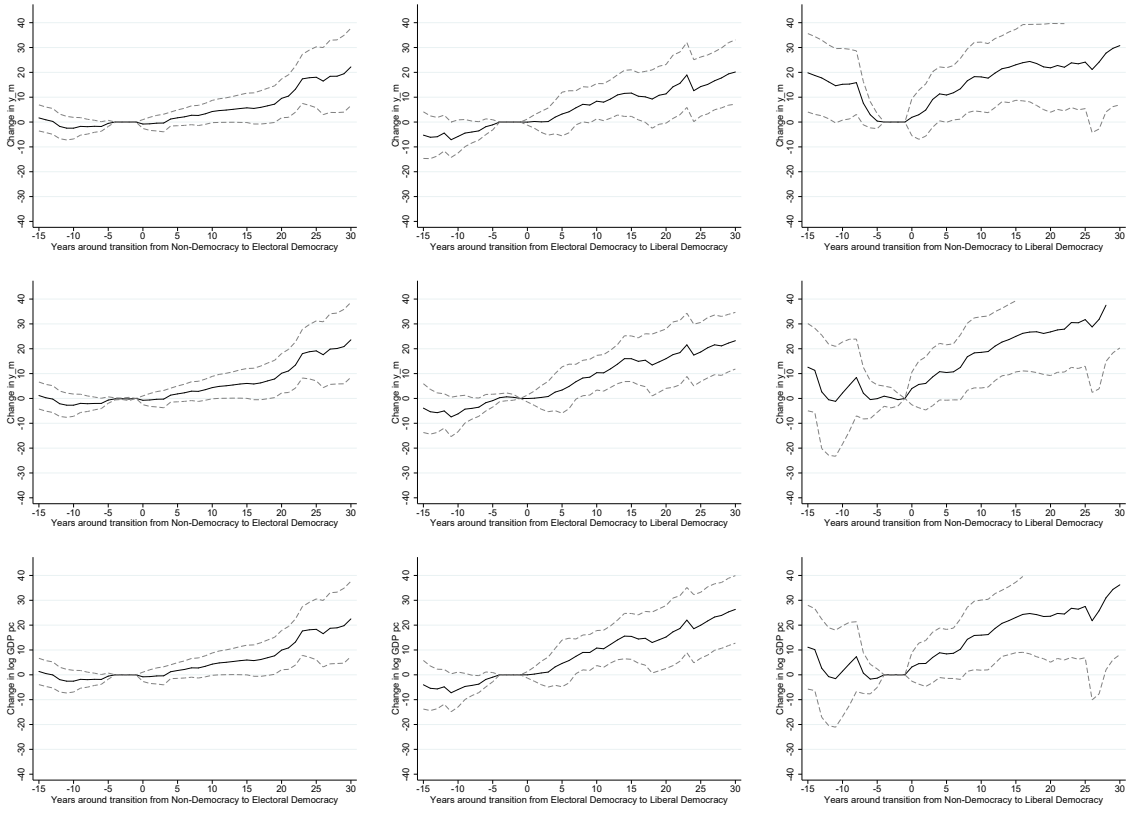

Figure C.8: Effect on GDP per capita of changes in dimensions of democracy using Regression Adjustment, Inverse Propensity Weighting and Doubly Robust estimator

Table C.13: Semiparametric effects of transitions on changes in log GDP per capita

Average effects on log GDP per capita of transition to	-5 to -1 years (1)	0 to 4 years (2)	5 to 9 years (3)	10 to 14 years (4)	15 to 19 years (5)	20 to 24 years (6)	25 to 29 years (7)
			Panel A: Regression Adjustment approach				
Electoral Democracy	-0.108	-0.228	2.504***	4.849***	6.177***	13.690***	18.168***
(from non-democracy)	(0.126)	(0.650)	(0.859)	(1.142)	(1.526)	(2.144)	(3.222)
Liberal Democracy	-0.223	0.486	5.416***	9.629***	10.452***	14.534***	16.636***
(from electoral democracy)	(0.209)	(1.027)	(1.761)	(1.818)	(2.409)	(2.862)	(2.742)
Liberal Democracy	0.076	6.027***	14.192***	19.820***	23.420***	22.783***	25.364***
(from non-democracy)	(0.308)	(2.295)	(2.784)	(3.162)	(3.658)	(4.088)	(5.430)
			Panel B: Inverse propensity weighted estimator				
Electoral Democracy	-0.235	-0.129	2.680***	5.105***	6.607***	14.291***	19.516***
(from non-democracy)	(0.157)	(0.641)	(0.859)	(1.160)	(1.549)	(2.141)	(3.147)
Liberal Democracy	0.103	0.757	6.346***	12.481***	14.899***	18.223***	20.822***
(from electoral democracy)	(0.368)	(1.143)	(1.823)	(1.785)	(2.481)	(2.888)	(2.714)
Liberal Democracy	0.125	7.025***	13.753***	20.979***	26.185***	28.647***	34.124***
(from non-democracy)	(0.857)	(2.302)	(2.894)	(3.206)	(3.572)	(4.032)	(5.440)
			Panel C: Doubly-robust estimator				
Electoral Democracy	-0.105	-0.226	2.582***	5.039***	6.483***	13.951***	18.460***
(from non-democracy)	(0.127)	(0.666)	(0.856)	(1.154)	(1.541)	(2.143)	(3.173)
Liberal Democracy	-0.188	1.065	7.159***	12.627***	14.341***	18.350***	22.827***
(from electoral democracy)	(0.190)	(1.133)	(1.824)	(1.792)	(2.505)	(3.027)	(3.066)
Liberal Democracy	-0.268	5.623***	11.506***	18.682***	23.961***	25.194***	28.098***
(from non-democracy)	(0.382)	(2.014)	(2.708)	(3.167)	(3.643)	(4.341)	(6.616)

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

Robustness Check: Instrumental Variable approach

Table C.14: IV estimate of the effect of components of democracy from **V-Dem** on GDP per capita

Covariates include			GDP in 2000 quantiles x year effects	Soviet dummies	Regional trends	Regional GDP & trade	Regional GDP, unrest & trade	Spatial lag of GDP	Spatial lag of GDP & dimensions
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: *2SLS Second stage*									
Electoral Democracy	1.734	2.362**	2.568	2.857**	-2.155	2.771	2.299	1.184	2.194
	(1.321)	(1.133)	(1.828)	(1.310)	(5.202)	(2.529)	(2.696)	(1.077)	(2.217)
Liberal Democracy	6.949***	6.519***	5.777**	6.763***	10.754	10.024	8.457	6.014***	7.554**
	(2.191)	(1.992)	(2.292)	(2.167)	(6.934)	(6.495)	(6.494)	(1.743)	(3.565)
Long-run effect: Electoral	45.153	67.827**	78.366	83.385**	-45.059	53.857	46.606	31.389	41.704
	(34.090)	(32.054)	(54.954)	(37.577)	(103.343)	(50.815)	(57.508)	(28.679)	(38.608)
after 25 years: Electoral	33.422	46.934**	51.724	57.024**	-36.348	48.207	41.120	22.685	33.934
	(25.358)	(22.255)	(36.351)	(25.806)	(85.008)	(44.609)	(49.511)	(20.702)	(31.872)
Long-run effect: Liberal	180.949***	187.172***	176.256***	197.399***	224.893**	194.850**	171.440	159.360***	143.588***
	(48.980)	(49.431)	(65.314)	(55.401)	(111.187)	(96.960)	(104.744)	(39.693)	(48.121)
after 25 years: Liberal	133.936***	129.516***	116.336***	134.994***	181.415*	174.408*	151.258	115.170***	116.836***
	(38.778)	(36.278)	(43.687)	(40.001)	(100.193)	(93.529)	(99.802)	(30.252)	(41.959)
Persistence of GDP process	0.962***	0.965***	0.967***	0.966***	0.952***	0.949***	0.951***	0.962***	0.947***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.010)	(0.013)	(0.012)	(0.005)	(0.018)
Hansen p-value		0.05	0.13	0.07	0.03	0.04	0.08	0.09	0.67
Observations	9661	9594	9594	9594	9594	6115	6088	8702	8562
Countries in sample	149	149	149	149	149	149	149	149	149
Exc. Instruments F-stat.	18.1	5.0	1.6	5.0	1.4	1.5	0.9	4.3	0.2
Panel B	2SLS First stage: Dependent variable- Electoral Democracy								
Electoral wave t-1	0.531***	0.238***	0.106	0.222***	0.121	0.285***	0.275**	0.272***	0.297***
	(0.103)	(0.077)	(0.085)	(0.076)	(0.077)	(0.106)	(0.118)	(0.093)	(0.091)
Electoral wave t-2		-0.008	-0.010	-0.005	-0.027	-0.057	-0.057	-0.002	-0.025
		(0.044)	(0.043)	(0.042)	(0.044)	(0.073)	(0.077)	(0.053)	(0.056)
Electoral wave t-3		0.102*	0.078	0.072	0.061	0.125*	0.091	0.115**	0.101**
		(0.054)	(0.057)	(0.052)	(0.056)	(0.068)	(0.056)	(0.053)	(0.051)
Electoral wave t-4		0.230***	0.165**	0.243***	0.109	0.108	0.068	0.223**	0.231**
		(0.073)	(0.080)	(0.075)	(0.075)	(0.097)	(0.104)	(0.088)	(0.091)
Liberalism wave t-1	-0.236**	0.003	0.102	-0.032	0.159	0.609***	0.545**	0.035	0.015
	(0.102)	(0.102)	(0.143)	(0.096)	(0.125)	(0.213)	(0.230)	(0.113)	(0.107)
Liberalism wave t-2		-0.022	-0.026	0.015	0.004	-0.096	-0.079	-0.036	-0.027
		(0.040)	(0.041)	(0.041)	(0.040)	(0.111)	(0.114)	(0.042)	(0.041)
Liberalism wave t-3		0.032	0.085	0.019	0.054	-0.019	-0.011	-0.017	-0.044
		(0.045)	(0.054)	(0.044)	(0.049)	(0.115)	(0.114)	(0.043)	(0.048)
Liberalism wave t-4		-0.264**	-0.160	-0.262**	-0.152	-0.217	-0.282*	-0.189*	-0.151
		(0.118)	(0.120)	(0.115)	(0.100)	(0.163)	(0.162)	(0.102)	(0.095)
Panel C	2SLS First stage: Dependent variable- Liberal Democracy								
Electoral wave t-1	-0.034	0.015	-0.002	0.004	0.073	0.049	0.086	0.030	0.033
	(0.079)	(0.047)	(0.054)	(0.045)	(0.049)	(0.051)	(0.054)	(0.053)	(0.054)
Electoral wave t-2		0.024	0.036	0.013	0.035	0.039	0.052	0.025	0.012
		(0.024)	(0.022)	(0.020)	(0.024)	(0.028)	(0.032)	(0.030)	(0.030)
Electoral wave t-3		0.013	0.017	0.007	0.030*	0.013	0.031	0.006	0.012
		(0.018)	(0.019)	(0.018)	(0.016)	(0.017)	(0.025)	(0.016)	(0.016)
Electoral wave t-4		-0.082	-0.061	-0.088	-0.016	-0.092	-0.076	-0.086	-0.079
		(0.054)	(0.065)	(0.056)	(0.052)	(0.063)	(0.069)	(0.067)	(0.069)
Liberalism wave t-1	0.527***	0.238***	-0.022	0.244***	0.135*	0.079	0.109	0.220***	0.203**
	(0.105)	(0.076)	(0.098)	(0.079)	(0.073)	(0.125)	(0.128)	(0.080)	(0.080)
Liberalism wave t-2		-0.005	-0.003	-0.016	-0.017	-0.002	-0.013	-0.003	0.032
		(0.024)	(0.025)	(0.025)	(0.024)	(0.052)	(0.052)	(0.025)	(0.020)
Liberalism wave t-3		0.011	-0.005	0.010	-0.007	0.085	0.096	0.064**	0.038
		(0.028)	(0.030)	(0.028)	(0.030)	(0.064)	(0.065)	(0.032)	(0.033)
Liberalism wave t-4		0.310***	0.444***	0.306***	0.171**	0.105	0.045	0.263***	0.259***
		(0.061)	(0.084)	(0.061)	(0.080)	(0.086)	(0.088)	(0.065)	(0.068)

Robust standard errors clustered at country level in parentheses *** p<0.01, ** p<0.05, * p<0.1.

Robustness Check: Randomization tests

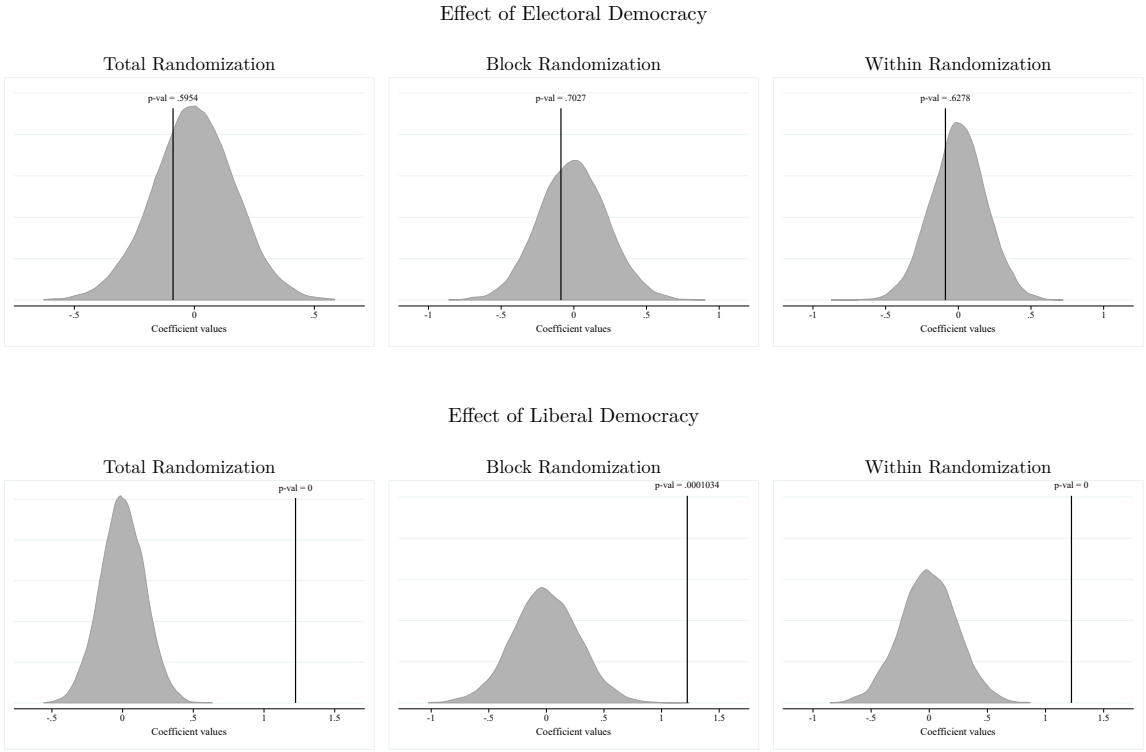

Figure C.9: Distribution of point estimates from re-estimation using randomized placebo datasets.

Potential Mechanisms

Table C.15: Effect of Dimensions on Potential Mechanisms (Within estimates)

	Log TFP	Market reforms	Distribution of economic power resources	Pluralism	Clientelism	Regime duration
	(1)	(2)	(3)	(4)	(5)	(6)
Electoral democracy	-1.008***	1.017**	0.056***	0.017***	0.006***	-1.074*
	(0.312)	(0.418)	(0.020)	(0.005)	(0.002)	(0.592)
Liberal democracy	-0.603	1.473**	0.140***	0.019**	0.008***	0.157
	(0.496)	(0.631)	(0.042)	(0.009)	(0.002)	(0.845)
Long-run effect: Electoral	-16.374***	8.102**	5.340***	0.205***	0.110***	-25.390**
	(5.000)	(3.278)	(1.944)	(0.066)	(0.033)	(12.747)
after 25 years: Electoral	-13.804***	7.774**	5.571***	0.178***	0.090***	-16.872*
	(4.002)	(3.124)	(1.989)	(0.056)	(0.027)	(8.956)
Long-run effect: Liberal	-9.790	11.729**	13.348***	0.232**	0.128***	3.718
	(8.326)	(5.412)	(3.898)	(0.111)	(0.036)	(20.076)
after 25 years: Liberal	-8.254	11.253**	13.924***	0.202**	0.104***	2.471
	(6.914)	(5.093)	(4.040)	(0.095)	(0.030)	(13.295)
Persistence of outcome process	0.938***	0.874***	0.990***	0.919***	0.941***	0.958***
	(0.010)	(0.015)	(0.001)	(0.010)	(0.007)	(0.004)
Observations	3881	4717	6071	6956	9614	9245
Countries in sample	101	135	126	143	149	148

	Health equality	Infant Mortality rate	Likelihood of unrest	Coups	Likelihood of Civil War	International armed conflict
	(7)	(8)	(9)	(10)	(11)	(12)
Electoral democracy	0.015**	-0.758***	-5.722**	-0.063***	0.005	-0.021
	(0.007)	(0.178)	(2.404)	(0.010)	(0.008)	(0.013)
Liberal democracy	0.040***	-0.376	-20.194***	-0.040***	-0.005	-0.074***
	(0.012)	(0.306)	(3.572)	(0.013)	(0.008)	(0.020)
Long-run effect: Electoral	0.250**	-21.644***	-8.895**	-0.066***	0.020	-0.054
	(0.115)	(4.562)	(3.721)	(0.011)	(0.032)	(0.033)
after 25 years: Electoral	0.208**	-11.234***	-8.895**	-0.066***	0.020	-0.054
	(0.095)	(2.381)	(3.721)	(0.011)	(0.032)	(0.033)
Long-run effect: Liberal	0.654***	-10.738	-31.390***	-0.042***	-0.018	-0.187***
	(0.191)	(8.323)	(5.743)	(0.014)	(0.031)	(0.052)
after 25 years: Liberal	0.543***	-5.574	-31.390***	-0.042***	-0.018	-0.187***
	(0.156)	(4.450)	(5.743)	(0.014)	(0.031)	(0.052)
Persistence of outcome process	0.939***	0.965***	0.357***	0.046	0.745***	0.606***
	(0.007)	(0.004)	(0.029)	(0.048)	(0.020)	(0.044)
Observations	9595	8359	5564	6971	7778	7189
Countries in sample	149	148	146	147	145	149

Robust standard errors, clustered at country level, in parentheses *** p<0.01, ** p<0.05, * p<0.1. All specifications control for four lags of GDP and four lags of the outcome process.