Legislatures and Growth

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Abstract

This paper documents a nonlinear relationship between control of the legislature and economic growth. The share of seats held by governing politicians provides a measure of their ability to stay in power. The vast majority of countries have a legislature, even those without open elections. I show greater control of the legislature reduces the probability of losing power. The motivating model predicts an intermediate share would enhance growth, as governing politicians would limit current rents to keep power for future rents. I confirm empirically that intermediate shares enhance growth with a dynamic panel model. Across political systems, I find a significant boost to growth from shifting control of legislature towards an intermediate share. This suggests a balance of power between governing politicians and citizens enhances growth.

Keywords: Economic growth, political strength, legislatures, governing politicians

JEL codes: O11, O43, P48

1 Introduction

In 1188, King Alfonso IX of Leon inherited a kingdom in trouble, faced with hostilities from neighboring Portugal and Castille and the crown's resources depleted by his father's profligacy. The king decided to summon the *curia regis*, a medieval organization of aristocrats and bishops, to address the problem. In addition to the traditional elites, Alfonso IX called for representatives from all the towns throughout Leon. O'Callaghan (1969) states the king's "summons to the townsmen was an attempt... to use their support... to establish himself firmly in power." This gathering is the earliest known representation of the European parliamentary system. An important outcome of this *cortes* for urban entrepreneurs was a guarantee of property rights and the crown's justice in return for certain taxes. Since this time, parliaments and legislatures have served many functions but continually have given a signal of political support for governing politicians.

This paper examines whether control of the legislature affects economic growth. The mechanism I investigate is how control of the legislature affects governing politicians' hold on power. The probability of retaining power shapes politicians' time horizon and willingness to limit current rents for future rents. Across political systems, governing politicians with more legislative seats are more likely to retain power. With a dynamic panel model, I find an intermediate share of seats boosts economic growth. This implies a greater balance of power between governing politicians and citizens enhances growth.

Acemoglu (2005) develops a model of economic growth predicting intermediate political strength maximizes output. In the model, governing politicians can either consume rents today or spend on future productive capacity. Governing politicians face a probability of replacement decreasing in their political strength. Intermediate political strength enhances growth as governing politicians limit current rents in order to consume future rents. This in turn leads to greater investment from private citizens as productive government spending is higher while rents are limited.

This paper uses the share of legislative seats held by governing politicians as a proxy for political strength. Control of the legislature signals political strength for governing politicians across regimes. The composition of legislatures in democracies represents the support of different party platforms from citizens, while legislatures in autocracies show control over the political system in limiting opposition voices. Some legislatures in mixed systems and autocracies include both members elected by popular vote and others appointed by a powerful interest group such as the executive or military.

With a panel of 185 countries over a forty year period, I test whether control of the leg-

islature has a nonlinear relationship with economic growth. As governing politicians control more of the legislature, the probability of replacement by other politicians decreases. Controlling for the dynamics of the GDP process, I find an intermediate share of the legislature controlled by governing politicians enhances economic growth.

These results show that a greater balance of power between governing politicians and citizens enhances growth. Increasing control of the legislature from a low share increases governing politicians' time horizon, while reducing control of the legislature from a high share limits current rents. Intermediate levels of political strength discourage excessive rents today without removing the incentive for productive spending that raises future rents. I also find evidence that intermediate political strength lowers government consumption and raises investment rates.

The rest of the paper proceeds as follows: section 2 discusses how political systems affect economic growth, section 3 presents the primary data and sources, section 4 presents the results for the probability of replacement, section 5 presents the results for economic growth, and section 6 concludes.

2 Politics and Growth

For over two thousand years, philosophers and social scientists have questioned which form of government would be most beneficial for economic development. Economic models have produced arguments favoring both the freedom of citizens under democracies in enhancing growth and the authority of leaders under autocracies to stimulate growth. A theoretical model that does not specify an underlying form of government, only the probability of replacement that governing politicians face, predicts that political strength has a non-linear effect on economic growth.

The merits and drawbacks of different political regimes have been debated by philosophers and social scientists since the time of Aristotle and Plato. Theories about the effect of democracy on economic growth suggest a number of competing hypotheses. Democracies may be better at protecting property rights compared to a predatory dictatorship, however, autocrats with long time horizons could potentially be more suited towards enacting costly short-term policies for long-term benefit (Olson (1993)). Democracy may result in more redistribution (Alesina and Rodrik (1994), Persson and Tabellini (1994)) slowing economic growth, while, alternatively, democracies could prevent entry barriers from stifling productivity growth (Acemoglu (2008)). These competing hypotheses argue for different channels

on how democracy would affect growth, while early empirical research initially focused on the aggregate effect of democracy, recent work has sought to untangle specific channels democracy could affect growth.

Empirical research about the relationship between forms of government and economic development began with Lipset (1959) finding that richer countries tend to be democratic, while also noting that rising incomes may stimulate democratic reforms. Early empirical attempts to uncover the effect on growth such as Barro (1996) found a weakly negative effect of democracy on economic growth when controlling for common determinants of growth such as initial incomes and investment in human capital. Although, Barro finds countries with intermediate levels of democracy may grow faster. Tavares and Wacziarg (2001) confirmed an overall weakly negative effect of democracy by investigating the channels through which it affects growth, lowering inequality and raising human capital but at the cost of discouraging investment. However, Minier (1998) finds countries that undergo democratizations grow faster than *a priori* similar countries and democratic reversals resulted in significantly slower growth.

More recent empirical work takes advantage of econometric tools to estimate the effect of democracy on economic performance while controlling for the endogenous relationship between political institutions and economic development. Persson and Tabellini (2007) estimate the effect of democratic transitions and reversals non-parametrically by accounting for the propensity to democratize, finding a significant decrease in growth of around 2 percentage points for transitions away from democracy. Acemoglu et al. (2014) estimate the effect of democracy with an Arellano-Bond estimator to control for the dynamics of GDP leading up to democratizations. They find a significant increase in growth of slightly under 1 percentage point from democratization leading to the long-run level of GDP per capita increasing by around 20%. In a smaller sample of countries, Murtin and Wacziarg (2014) use both Arellano-Bond and Blundell-Bond estimators to find that increases in income and education levels lead to democratic reforms, but find no evidence of the reverse.

This empirical work is motivated by a theoretical model of economic growth and political strength from Acemoglu (2005). The motivating model predicts that the relationship between the level of output and political strength is nonlinear. Political strength determines whether governing politicians remain in power given tax rates and productive government spending. If political strength is too low, then governing politicians are discouraged from productive government spending because they are unsure about whether they will hold power in the future to consume political rents. Under high political strength, governing politicians

are less worried that high tax rates will lower their chance of retaining control to consume future political rents. The model predicts that political strength is a fundamental determinant of both investment by private economic agents and productive government spending, thus determining total output.

There are few papers that empirically test different measures of political strength on growth. Bizzarro et al. (2018) use cross-country data on national political parties such as permanent national party organizations, permanent local party branches, centralized mechanisms of candidate selection, and legislative cohesion to construct an index of "party rule" which they find is strongly positively associated with growth. Bellettini et al. (2013) look at a sample of fully democratic to somewhat democratic countries and find that long tenured politicians are negatively associated with growth. Neither of these papers examine the concept of political strength described in the theoretical model that determines the probability of replacement for the governing politicians.

More research has examined the effect of political competition on economic performance. In Besley et al. (2010), the authors use variation in independent voters across US states to examine the effect of political competition on economic performance. They find a nonlinear effect of political competition on growth which matches the predictions from their model. Two closely related papers, Ashworth et al. (2006) and Padovano and Ricciuti (2009), examine the effect of political competition on economic performance in Flemish and Italian regions, respectively. Padovano and Ricciuti use the 1995 reforms to Italian regional elections as an exogenous source of variation in political competition and confirm the results of BPS for the regions of Italy. Ashworth et. al examine the efficiency of government spending on public goods and find that an increased number of parties contesting an election leads to greater efficiency.

So far, a paper has yet to examine the effect of political strength as measured by control of the legislature. In the next section, I discuss the primary data sources and how control of the legislature varies across political openness. I then show that political strength has a large effect on the probability of replacement even when controlling for economic conditions. With these measures of political strength predicting replacement, I confirm that political strength has a nonlinear effect on economic growth when controlling for the dynamics of the GDP process.

3 Measuring Political Strength

Control of the legislature is used as a proxy for political strength that corresponds to the probability of replacement in the theoretical model. I measure control of the legislature, $Strength_{i,t}$, by the share of seats held by the governing coalition in the lower house of the legislature in country i at time t. The governing coalition includes parties that form the government in parliamentary systems and the party of the president and allies in presidential systems. These data come from the Database of Political Institutions (DPI), originally constructed by researchers at the World Bank and recently updated by researchers at the Inter-American Development Bank (Cesi Cruz (2016)). I added a number of countries to this data set using a series of reference books by Nohlen and co-authors (Nohlen et al. (1999, 2001a, 2001b), Nohlen (2005a, 2005b), and Nohlen and Stöver (2010)) which present election results world-wide. Data were cross-referenced against official government websites where available to ensure accuracy.

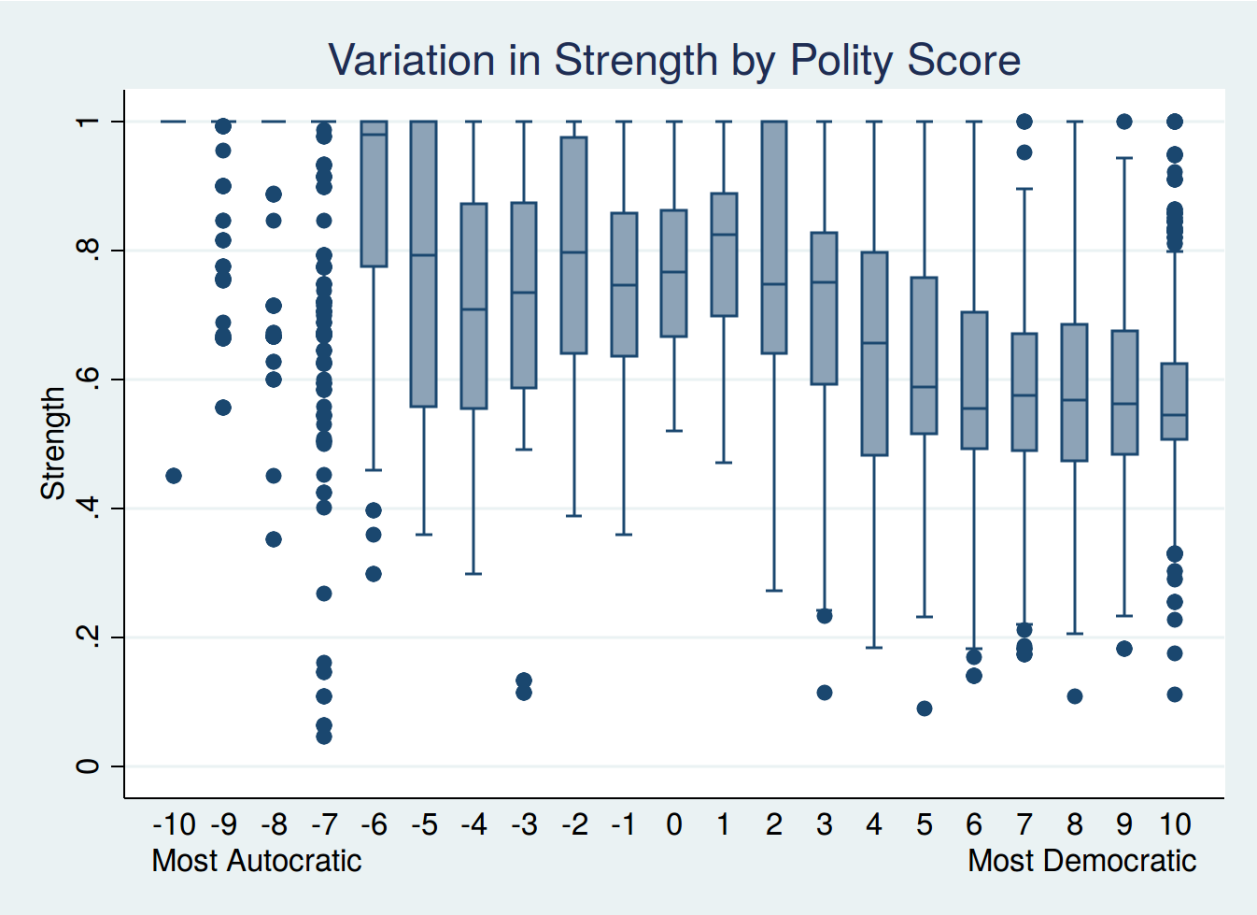
Summary statistics for control of the legislature and other variables used are provided in Table 1 below. As is standard in growth regressions, the economic variables come from the latest edition of the Penn World Tables from Feenstra et al. (2015). Additionally, I also include measures of autocracy and democracy from Marshall and Jaggers (2002) to determine whether *Strength* is capturing information other than the degree of political openness.

Table 1: Summary Statistics

Variable	**Mean**	**Std. Dev.**	**Obs.**	**Countries**
Strength	0.683	0.211	5914	185
Log GDP pc	8.824	1.212	5914	185
Growth	0.023	0.085	5914	185
Investment Rate	0.226	0.239	5914	185
Government Size	0.207	0.171	5914	185
Population Growth	0.016	0.016	5914	185
Polity Score	2.807	7.021	4848	154
Autocracy Score	2.405	3.18	4848	154
Democracy Score	5.212	4.05	4848	154

Figure 1 shows how the distribution of *Strength* changes with the Polity score, which is the degree of democracy less the degree of autocracy ranging from -10 to 10. The center line in each box gives the median *Strength* while the box represents the middle 50% of the

Figure 1: **Strength and Openness**



This figure illustrates how the distribution of *Strength* varies across Polity score. The box provides the middle 50 percent of the distribution with the line in the center indicating the median.

distribution. Although there is a downward trend in median *Strength* as the Polity score increases, there is substantial variation in *Strength* at each Polity Score. This suggests that although a country may have a more open political system (higher Polity score) the share of seats held by the governing coalition may be high, and, conversely governing politicians in closed political systems (low Polity score) may only control an intermediate share of the legislature.

4 Political Strength and Replacement

I confirm that control of the legislature captures the motivating model's probability of replacement using linear probability (LPM) and logit models. I estimate regressions of the following form:

$$Replacement_{i,t} = f(\eta Strength_{i,t} + X'_{i,t}\beta + \phi_i + \psi_t + \epsilon_{i,t})$$

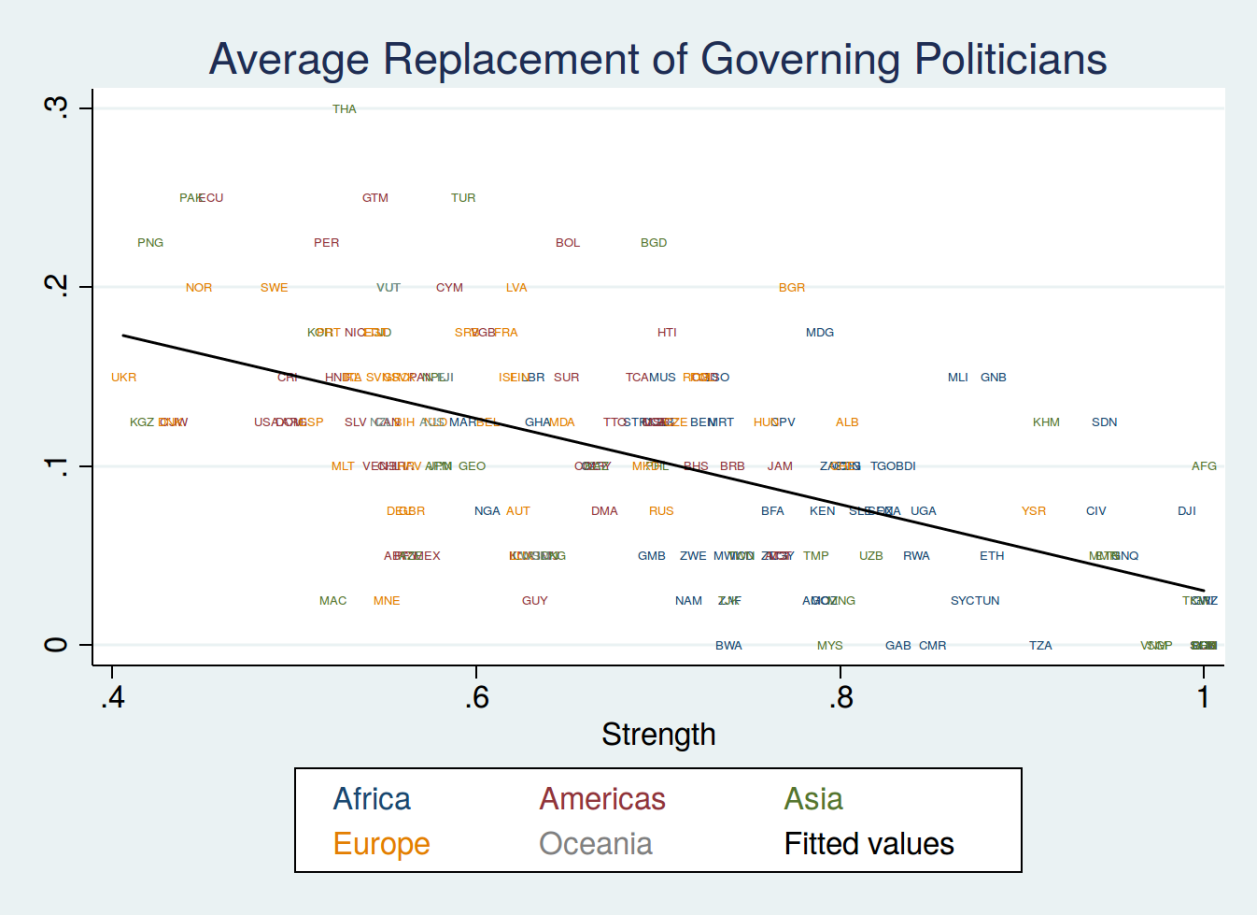
where $Replacement_{i,t}$ is an indicator variable for whether there are new governing politicians relative to the previous year, $X_{i,t}$ controls for level of GDP per capita and growth rate. I find *Strength* significantly reduces the probability of replacement across both a linear probability (LPM) and Logit model in Table 2 below.

At a first brush, Figure 2 shows the relationship between the average *Strength* for each country and the average replacement rate. As average *Strength* increases, the average probability of replacement decreases. This pattern holds across geographic regions as well, suggesting it is not only a American or European phenomenon, but also holds in Africa and Asia.

The magnitude of the effect of *Strength* on replacement is remarkably consistent and statistically significant across both specifications. The LPM in Table 2 estimates that increasing *Strength* by one within-country standard deviation (15 percentage points) reduces the probability of replacement by 19.46% from the mean replacement rate of 11%. In the Logit model, I lose nineteen countries from the sample because over the sample period there are no observed changes in the governing politicians. A within-country standard deviation increase in *Strength* is estimated to reduce the probability of replacement by 19.15% in the Logit model. This is a substantial decrease in the probability of replacement for governing politicians as *Strength* increases.

Economic conditions would have to alter drastically to have a similar effect as a within-country standard deviation increase in *Strength*. Both income levels and growth are esti-

Figure 2: **Strength and Replacement**



This figure plots the average replacement rate by country against the average *Strength* by country.

Table 2: Political Strength and Replacement

	LPM	Logit
Strength	-0.143***	-1.272***
	(0.032)	(0.297)
Log GDP per capita	-0.015	-0.246
	(0.011)	(0.159)
GDP per capita growth	-0.091**	-0.883*
	(0.045)	(0.472)
Observations	5,914	5,343
Countries	185	166
Time Trend	Yes	Yes
Fixed Effects	Yes	Yes

Robust standard errors reported in the parentheses are clustered at the country level for Linear Probability Model and bootstrapped for Logit. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

mated to decrease the probability of replacement, however, log GDP per capita is not found to be significant at standard levels. The LPM estimates that a 143.5% increase in GDP per capita is estimated to have the same effect as increasing *Strength* one within-country standard deviation, while the Logit model estimates a 77.8% increase would have a similar effect as the increase in *Strength*. Although long-run income levels do not have a significant effect on replacement, growth in the short run is estimated to significantly reduce replacement, marginally under the Logit model. Under the LPM, a 23.7 percentage point increase in growth is estimated to have the same effect as a within-country standard deviation increase in *Strength*. The Logit model estimates that it would take a 21.7 percentage point increase in growth to reduce the probability of replacement by a similar amount as the increase in *Strength*.

These results confirm that control of the legislature is an appropriate proxy in capturing the probability of replacement in the motivating model. While economic conditions do affect the probability of replacement, *Strength* is a major determinant that is observed by governing politicians and citizens in real time. In the next section, I go onto test whether there is a nonlinear relationship between *Strength* and economic growth.

5 Political Strength and Growth

Section 4 produced results showing *Strength* has a significant large effect on reducing the probability of replacement. From the motivating model, an intermediate level of *Strength* would enhance economic growth, while high and low levels would slow growth. In this section, I examine the relationship between *Strength* and growth, controlling for the potential endogenous relationship with a dynamic panel model and instrumental variables strategy.

Exogenous variation in *Strength* is identified by lagged indicators of the voting system for the legislature. I instrument for the linear and squared terms of *Strength* with the lags of *Strength* and indicators for proportional representation and plurality voting. Proportional representation voting is a system where there are nationwide elections between political parties and each political party is allocated seats in the legislature according to the share of votes received nationwide. This system allows smaller political parties to enter parliament leading to lower *Strength* (corr. $= -0.2926$, $p < 0.001$). Plurality voting is a system where a number of politicians compete to represent the same constituency and the politician that receives the most votes gains the seat. This system limits the entry of smaller political parties to enter the legislature leading to higher *Strength* (corr. $= 0.0991$, $p < 0.001$). The tables below provide tests of both under and over identification of *Strength*. The Anderson LR statistic consistently rejects the null of under identification at a 1% level, providing evidence of strong correlation between the instruments and current *Strength*. Additionally, when enough lags of GDP per capita are included, I do not find evidence of over identification as the instruments are not significantly correlated with the error term. In the main results, the Hansen J-statistic provides evidence that the instruments are correctly excluded from the estimated equation.

The regression equation takes the following form:

$$y_{i,t} = \sum_{s=1}^{T} \rho_s y_{i,t-s} + X'_{i,t}\beta + \gamma_1 Strength_{i,t} + \gamma_2 Strength^2_{i,t} + u_i + u_t + \epsilon_{i,t}$$

where $y_{i,t}$ is log GDP per capita in country i and year t, $X_{i,t}$ controls for investment in physical capital, population growth, the share of government consumption in GDP. $Strength_{i,t}$ is the share of seats held by governing politicians which was shown to predict the probability of replacement in the previous section. u_i controls for country fixed effects, u_t controls for year fixed effects, and $\epsilon_{i,t}$ represents the random error term.

Table 3 presents the main results for this paper by estimating the effect of *Strength* with a two-state least squares dynamic panel estimator controlling for up to four lags of GDP

Table 3: Political Strength and Economic Growth

	(1)	(2)	(3)	(4)
Strength	0.770***	0.681***	0.656***	0.611**
	(0.251)	(0.247)	(0.245)	(0.243)
$Strength^2$	-0.588***	-0.520***	-0.505***	-0.468***
	(0.186)	(0.183)	(0.183)	(0.181)
Investment	0.043***	0.039***	0.031***	0.032***
	(0.011)	(0.011)	(0.011)	(0.011)
Government Size	-0.075***	-0.069***	-0.054***	-0.055***
	(0.020)	(0.020)	(0.019)	(0.019)
Population growth	0.055	0.010	-0.026	-0.014
	(0.191)	(0.191)	(0.194)	(0.201)
Log GDP pc $(t-1)$	0.947***	1.087***	1.091***	1.086***
	(0.008)	(0.033)	(0.031)	(0.032)
Log GDP pc $(t-2)$		-0.145***	-0.077*	-0.086*
		(0.032)	(0.044)	(0.046)
Log GDP pc $(t-3)$			-0.070***	-0.005
			(0.026)	(0.037)
Log GDP pc $(t-4)$				-0.053**
				(0.022)
Optimal *Strength*	0.655	0.654	0.650	0.653
	[0.634,0.676]	[0.631,0.677]	[0.624,0.675]	[0.627,0.678]
Observations	5770.0	5666.0	5543.0	5416.0
Countries	185.0	185.0	185.0	185.0
Anderson LR-stat	213.919	213.365	216.200	219.533
p-value	0.000	0.000	0.000	0.000
Hansen J-stat	2.809	2.027	2.357	2.212
p-value	0.094	0.155	0.125	0.137

Country and year fixed effects included in all regressions. Robust standard errors reported in the parentheses are clustered at the country level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Optimal *Strength* levels are calculated with the Delta method and 95% confidence interval presented in brackets. The null for the Anderson test is that the first-stage regressions are under identified, i.e. instruments are not correlated with the endogenous regressors. The null for the Hansen test is that the excluded instruments are uncorrelated with the error term, i.e. instruments are exogenous.

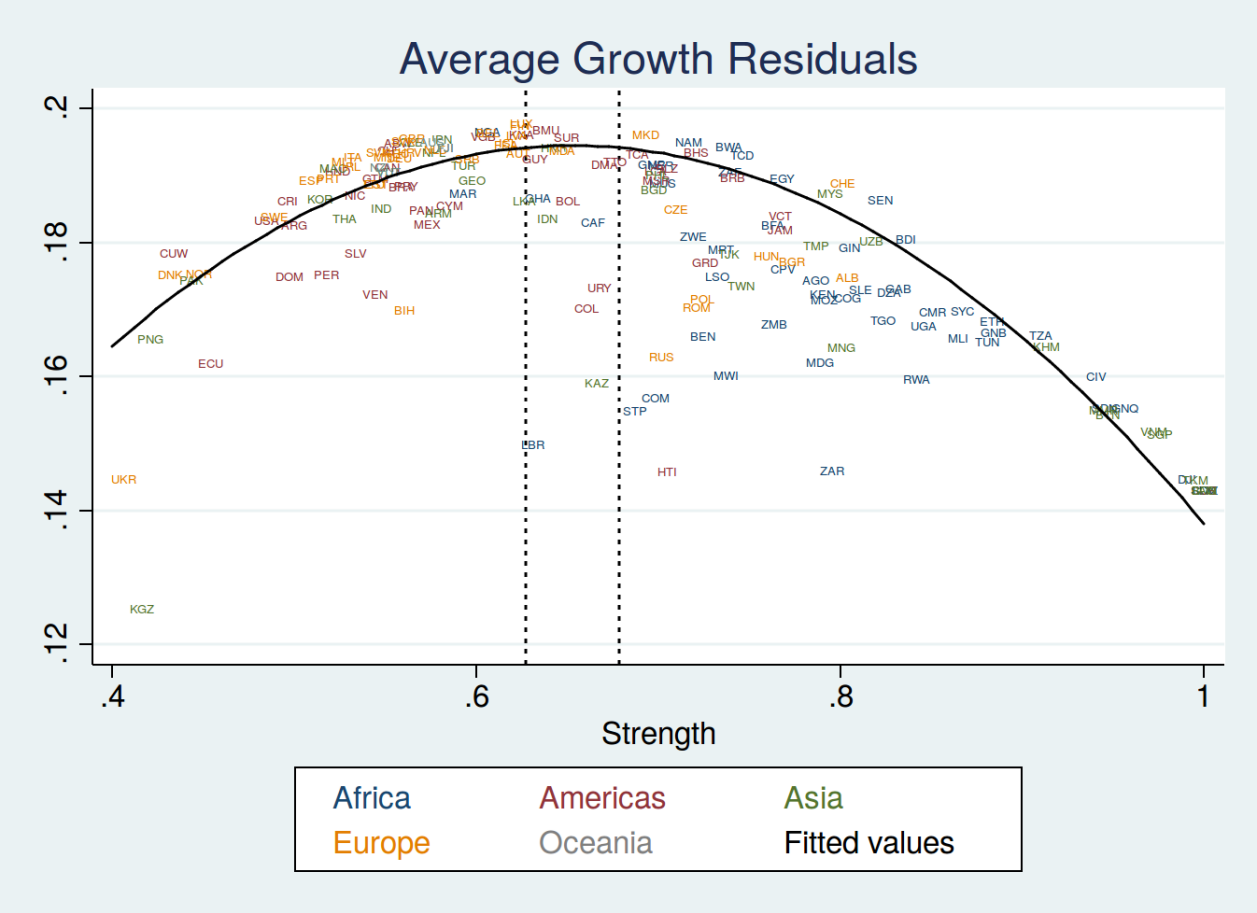
per capita. The estimated relationship between *Strength* and economic growth matches the motivating model as both the coefficients on the linear and squared term are statistically significant at a 1% level (5% for the linear coefficient in specification 4). Intermediate levels of *Strength* are estimated to enhance growth given the underlying political regime, while high and low levels of *Strength* would slow growth.

The table includes both the test-statistics for the Anderson test of under identification and Hansen test of over identification. I consistently reject the null of under identification at $p < 0.001$ providing evidence that the instruments explain a significant amount of variation in current *Strength*. In specification 1 of Table 3, I reject the null of the Hansen test at $p < 0.1$ signifying that the instruments are somewhat correlated with the error term, however, as more lags of GDP per capita are included the p-value increases. This suggests that after including enough lags of GDP per capita, the instruments provide a source of exogenous variation in *Strength*. I believe this is due to more lags of GDP per capita accounting for how economic performance between election cycles affects *Strength*.

Optimal *Strength* for boosting economic growth is consistently estimated across all four specifications of Table 3 at 65% of seats held by governing politicians. The 95% confidence interval for *Strength* is estimated to be between 62% and 68% of the legislature held by governing politicians. Shifting control of the legislature to optimal *Strength* by a within-country standard deviation (15 percentage points) is estimated to increase GDP per capita growth by 1.03 percentage points in my preferred specification including four lags of GDP per capita. This is my preferred specification as it controls for the economic performance between the average election cycle and how that may affect *Strength*. A permanent shift in *Strength* to the optimal level is estimated to increase GDP per capita by 17.74% in the long run ($\frac{1.03}{\sum_{s=1}^{T} \widehat{\rho_s}}$) accounting for persistence in the GDP process. These results are broadly in line with the effect of democratization estimated by Acemoglu et al. (2014).

Figure 3 shows the average amount of residual growth explained by a country's average *Strength*. The vertical axis is the average amount of growth after controlling for all other covariates, including country and year fixed effects, besides *Strength* from specification 4 of Table 2. While there is variation across all levels of *Strength*, the nonlinear relationship is evident. Countries that have averaged low or high *Strength* have underperformed relative to intermediate *Strength* controlling for other determinants of economic growth. This relationship holds across regions as well. Many countries in the Americas and Europe have average *Strength* approaching the estimated optimal level, while neighboring countries at much higher levels have worse growth performances. Most countries in Africa have average

Figure 3: **Political Strength and Growth**



This figure plots the average residual by country from specification 4 of Table 2 after controlling for all covariates besides *Strength* against the average *Strength* by country. The dashed lines provide the 95% confidence interval for optimal *Strength*.

Strength exceeding the optimal, but those in the region of the optimal level have had better growth performances. The variation in average *Strength* across Asian countries shows the overall nonlinear relationship. The countries in Asia with high average *Strength* and the few with low average *Strength* both underperformed their neighbors with intermediate *Strength*.

The effect of *Strength* is robust to controlling for the autocratic or democratic nature of the regime. Table 4 presents results when including the measures of autocracy and democracy from Marshall and Jaggers (2002) as additional endogenous regressors. Lags of the measures for autocracy and democracy are used as an additional instrument in these regressions. The main results are largely unchanged by including measures of political openness so that intermediate levels of *Strength* enhance growth. Throughout Table 3, I consistently find that the endogenous variables are not under identified. However, introducing measures of autocracy and democracy leads to the endogenous variables being correlated with the error term. This suggests that lags of autocracy and democracy are not strictly exogenous from current economic performance.

Specification 1 of Table 4 introduces the autocracy score from Polity IV. The nonlinear relationship between *Strength* and growth is still significantly significant with coefficient estimates even larger in magnitude than the preferred specification from Table 3. The estimated optimal *Strength* is estimated at 63.3% of the legislature with a 95% confidence interval from 61.3% to 65.4%. I find the effect of greater autocracy to be significant and positive increasing the estimated growth rate by 0.7 percentage points for each one point increase, although this only will somewhat offset the likely associated increase in *Strength* away from the optimal level. Shifting control of the legislature to optimal *Strength* by a within-country standard deviation is estimated to increase growth by 1.65 percentage points and a long-run increase of 29.38% in GDP per capita.

I next introduce the democracy score from Polity IV in specification 2. The estimated coefficients on the linear and squared *Strength* terms are more in line with my preferred specification from Table 3. Additionally, the optimal *Strength* is estimated close to the level from the preferred specification at 64.5% and a 95% confidence interval ranging from 62.2% to 66.8%. The effect of greater democracy is estimated to be negative at a one point increase decreasing the estimated growth rate by 0.3 percentage points. Shifting control of the legislature by one within-country standard deviation to optimal *Strength* is estimated to increase growth by 1.33 percentage points and a long-run increase in GDP per capita of 23.73%.

Table 4: Political Strength and Degrees of Autocracy and Democracy

	(1)	(2)	(3)	(4)
Strength	0.918***	0.764***	0.885***	0.852***
	(0.291)	(0.245)	(0.286)	(0.269)
$Strength^2$	-0.725***	-0.593***	-0.697***	-0.668***
	(0.224)	(0.186)	(0.220)	(0.207)
Autocracy Score	0.007***		0.011***	
	(0.002)		(0.003)	
Democracy Score		-0.003**	0.004**	
		(0.001)	(0.002)	
Polity Score				-0.003***
				(0.001)
Log GDP pc $(t-1)$	1.079***	1.081***	1.080***	1.080***
	(0.038)	(0.038)	(0.038)	(0.038)
Log GDP pc $(t-2)$	-0.083	-0.081	-0.083	-0.083
	(0.053)	(0.053)	(0.053)	(0.053)
Log GDP pc $(t-3)$	0.036	0.033	0.035	0.035
	(0.045)	(0.045)	(0.045)	(0.045)
Log GDP pc $(t-4)$	-0.088***	-0.084***	-0.091***	-0.085***
	(0.026)	(0.026)	(0.026)	(0.026)
Optimal *Strength*	0.633	0.645	0.635	0.638
	[0.613,0.654]	[0.622,0.668]	[0.613,0.656]	[0.616,0.659]
Observations	4406	4406	4406	4406
Countries	154	154	154	154
Anderson LR-stat	103.217	145.122	103.012	121.082
p-value	0.000	0.000	0.000	0.000
Hansen J-stat	4.018	3.174	4.971	3.353
p-value	0.045	0.075	0.026	0.067

Country and year fixed effects included in all regressions. Additional covariates include government consumption, investment rates, and population growth. Optimal *Strength* levels are calculated with the Delta method and 95% confidence interval presented in brackets. Robust standard errors reported in the parentheses are clustered at the country level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. The null for the Anderson test is that the first-stage regressions are under identified, i.e. instruments are not correlated with the endogenous regressors. The null for the Hansen test is that the excluded instruments are uncorrelated with the error term, i.e. instruments are exogenous.

Specification 3 of Table 4 includes both measures of autocracy and democracy. Here the coefficient estimates are both positive and significant suggesting that more consolidated autocracies and democracies experience faster growth than regimes in flux. A one point increase in autocracy is estimated to increase growth by 1.1 percentage points, while a one point increase in democracy is estimated to increase 0.4 percentage points. The estimated optimal *Strength* remains remarkably close to the preferred specification at 63.5% with a 95% confidence interval ranging from 61.3% to 65.6%. Shifting control of the legislature a within-country standard deviation to optimal *Strength* is estimated to increase growth by 1.58 percentage points and a long-run increase of 26.27% in GDP per capita.

The last specification of Table 4 includes the Polity score which is the democracy score less autocracy score. Here, I find that a greater degree of political openness is estimated to decrease growth at 0.3 percentage points for each one point increase in the Polity score. Estimated optimal *Strength* is nearly unchanged at 63.8% with a 95% confidence interval ranging form 61.6% to 65.9%. A within-country standard deviation shift in control of the legislature to optimal *Strength* is estimated to increase growth by 1.51 percentage points and a long-run increase of 28.45% in GDP per capita.

The effect of *Strength* is also robust to controlling for the organization of the legislative and executive branches of government. Table 5 presents results when including an indicator for bicameral legislatures and presidential systems. The main results are unchanged by including indicators for how the legislature and executive are organized so that intermediate levels of *Strength* enhance growth.

Specification 1 of Table 5 introduces an indicator for bicameral legislatures which is instrumented with a lagged indicator for bicameral legislatures. The effect of a bicameral legislature is estimated to significantly reduce growth by 4.5 percentage points, however, it should be noted that this is estimated from only two countries in the sample (Peru and Venezuela) moving from a bicameral to unicameral legislature. The coefficients on *Strength* are consistently estimated near the preferred specification from Table 3. Optimal *Strength* is estimated at 65.1% of the legislature held by governing politicians with a 95% confidence interval ranging from 62.6% to 67.6%. Shifting control of the legislature by a within-country standard deviation to optimal *Strength* is estimated to increase growth by 1.05 percentage points and a long-run increase of 18.17% in GDP per capita.

In specification 2 of Table 5, I introduce an indicator for presidential systems which is instrumented with a lagged indicator for presidential systems. I observe more variation in the organization of the executive as there are more countries that switch between parliamentary

Table 5: Political Strength and Organization of the Executive and Legislature

	(1)	(2)	(3)
Strength	0.640***	0.616**	0.646***
	(0.247)	(0.243)	(0.248)
$Strength^2$	-0.492***	-0.472***	-0.496***
	(0.184)	(0.181)	(0.185)
Bicameral	-0.045**		-0.045**
	(0.022)		(0.022)
Presidential		0.001	0.001
		(0.009)	(0.009)
Log GDP pc $(t-1)$	1.086***	1.086***	1.086***
	(0.032)	(0.032)	(0.032)
Log GDP pc $(t-2)$	-0.086*	-0.086*	-0.087*
	(0.046)	(0.046)	(0.046)
Log GDP pc $(t-3)$	-0.005	-0.005	-0.005
	(0.037)	(0.038)	(0.038)
Log GDP pc $(t-4)$	-0.052**	-0.053**	-0.052**
	(0.022)	(0.022)	(0.022)
Optimal *Strength*	0.651	0.653	0.651
	[0.626,0.676]	[0.628,0.678]	[0.627,0.676]
Observations	5416	5416	5416
Countries	185	185	185
Anderson LR stat	209.220	216.603	210.783
p-value	0.000	0.000	0.000
Hansen J-stat	2.119	2.245	2.151
p-value	0.146	0.134	0.143

Country and year fixed effects included in all regressions. Additional covariates include government consumption, investment rates, and population growth. Optimal *Strength* levels are calculated with the Delta method and 95% confidence interval presented in brackets. Robust standard errors reported in the parentheses are clustered at the country level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. The null for the Anderson test is that the first-stage regressions are under identified, i.e. instruments are not correlated with the endogenous regressors. The null for the Hansen test is that the excluded instruments are uncorrelated with the error term, i.e. instruments are exogenous.

and presidential systems than countries that switch between unicameral and bicameral legislatures. However, I do not find any significant effect from presidential systems on growth. The coefficients on *Strength* are estimated near the preferred specification from Table 3. Optimal *Strength* is estimated at 65.3% of the legislature held by governing politicians with a 95% confidence interval ranging from 62.8% to 67.8%. Shifting control of the legislature by a within-country standard deviation to optimal *Strength* is estimated to increase growth by 1.06 percentage points and a long-run increase of 18.33% in GDP per capita. Specification 3 controls for both bicameral and presidential systems and the estimated coefficients and optimal *Strength* are in line with the previous two specifications.

5.1 Legislative Authority

Parliaments vary in their level of authority around the world, ranging from the strong parliaments seen in Western Europe to so-called "rubber-stamp" congresses of one-party states or monarchies. Fish and Kroenig (2009) developed a Parliamentary Power Index (PPI) that measures the number of potential functions a legislature could hold such as checks on the executive, influence over policy, and institutional autonomy. Using the PPI to separate countries between strong and weak parliaments, I find intermediate levels of political strength enhance growth in legislatures that are not relatively limited in their powers.

The PPI ranks the legislative branches for over 150 countries on the legislature's specific powers in a few broad categories. The thirty-two indicators for legislative powers fall into the categories of influence over the executive, specified powers over policy, and institutional autonomy and capacity. Legislatures with greater influence over the executive are able to replace the executive and confirm appointments to ministerial posts. When the parliament has authority over judicial or central bank appointments, as well as the authority to declare war and ratify treaties, then it has greater specified powers over policy. Institutional autonomy and capacity relates to the legislature's ability to enact laws and appropriate funds without executive approval and whether the legislature is regularly in session with experienced legislators.

Table 6 presents the results when considering the sample of countries separated by PPI scores. Specification 1 includes the entire PPI sample and the nonlinear relationship is still estimated, although the coefficients are not statistically significant at standard levels. I still find the estimated optimal *Strength* within the same range as the preferred specification at 65.4% of the legislature with a 95% confidence interval ranging from 61.5% to 69.4%. The effect of shifting control of the legislature by a within-country standard deviation to optimal

Table 6: Political Strength and Legislative Authority

	Entire PPI	Low PPI	Middle PPI	High PPI
	(1)	(2)	(3)	(4)
Strength	0.388	-0.108	0.271	1.193***
	(0.255)	(0.297)	(0.263)	(0.425)
$Strength^2$	-0.297	0.076	-0.212	-0.918***
	(0.191)	(0.223)	(0.198)	(0.321)
Log GDP pc $(t-1)$	1.095***	1.051***	1.098***	1.116***
	(0.033)	(0.036)	(0.037)	(0.064)
Log GDP pc $(t-2)$	-0.107**	-0.031	-0.112**	-0.204**
	(0.049)	(0.050)	(0.053)	(0.091)
Log GDP pc $(t-3)$	0.000	-0.001	0.009	0.022
	(0.037)	(0.040)	(0.041)	(0.067)
Log GDP pc $(t-4)$	-0.057***	-0.086***	-0.065***	-0.028
	(0.021)	(0.025)	(0.023)	(0.036)
Optimal *Strength*	0.654	NA	0.640	0.650
	[0.615,0.694]	NA	[0.571,0.708]	[0.630,0.670]
Observations	4491	2180	3861	2541
Countries	154	81	128	81
Anderson LR-stat	184.340	144.547	168.190	60.126
p-value	0.000	0.000	0.000	0.000
Hansen J-stat	0.511	0.589	0.064	3.621
p-value	0.475	0.443	0.801	0.057

Country and year fixed effects included in all regressions. Additional covariates include government consumption, investment rates, and population growth. Robust standard errors reported in the parentheses are clustered at the country level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Optimal *Strength* levels are calculated with the Delta method and 95% confidence interval presented in brackets. The null for the Anderson test is that the first-stage regressions are under identified, i.e. instruments are not correlated with the endogenous regressors. The null for the Hansen test is that the excluded instruments are uncorrelated with the error term, i.e. instruments are exogenous.

Strength is estimated to increase growth by 0.67 percentage points with a long-run increase of 9.65% in GDP per capita. Specification 2 of Table 6 only includes the sample of countries where legislatures have half or less of the specified powers in the PPI. I do not find the same nonlinear relationship as the preferred specification, likely due to the lack of variation at the low end of *Strength* for these legislatures.

Specification 3 of Table 6 only includes the sample of legislatures that have between one-quarter and three-quarters of the specified powers by the PPI. The nonlinear relationship between *Strength* and growth reappears, although the coefficients are not statistically significant at standard levels. The 95% confidence interval for optimal *Strength* is somewhat wider from 57.1% to 70.8%, but the point estimate for optimal *Strength* is remarkably close to the preferred specification at 64% of the legislature. Shifting control of the legislature by a within-country standard deviation to optimal *Strength* is estimated to increase growth by 0.47 percentage points and a long-run increase of 6.78% in GDP per capita.

The final specification of Table 6 only includes legislatures that have half or more of the specified powers of the PPI. I find the coefficients on *Strength* significant and much larger in magnitude. It should be noted that Hansen J statistic marginally rejects that the instruments are exogenous, potentially indicating citizens place more blame for poor economic performance on legislatures with more authority. Optimal *Strength* is again estimated near the preferred specification at 65% of the legislature with a narrow confidence interval ranging from 63% to 67%. A within-country standard deviation shift to optimal *Strength* is estimated to increase growth by 2.07 percentage points and a long run increase of 22.06% in GDP per capita. The results from splitting the sample by parliamentary power suggest that the effect of *Strength* may only hold in legislatures with some relative authority, while control of the legislature may not provide a strong enough signal of political support for governing politicians when it lacks authority.

5.2 Autocracies, Democracies, and Mixed Systems

Across political systems, governing politicians face varying probabilities of replacement, as well as potential to regain power in the future. More open political systems lower the cost of replacing governing politicians, while closed political systems raise this cost. We may expect the effect of *Strength* to differ across regimes as Minier (2007) finds empirical evidence that different regime types may have different aggregate production functions. Separating the sample between democratic, autocratic, and mixed systems, I continue find intermediate *Strength* enhances growth.

Table 7: Political Strength and Regime Type

	All Polity	Autocracies	Mixed Systems	Democracies
	(1)	(2)	(3)	(4)
Strength	0.697***	0.594	0.690	1.374*
	(0.217)	(2.242)	(0.680)	(0.706)
$Strength^2$	-0.531***	-0.409	-0.517	-1.143**
	(0.161)	(1.543)	(0.503)	(0.575)
Log GDP pc $(t-1)$	1.079***	0.967***	0.911***	1.218***
	(0.037)	(0.060)	(0.061)	(0.038)
Log GDP pc $(t-2)$	-0.075	-0.009	0.013	-0.309***
	(0.053)	(0.079)	(0.075)	(0.060)
Log GDP pc $(t-3)$	0.027	0.024	0.039	0.083
	(0.045)	(0.077)	(0.060)	(0.066)
Log GDP pc $(t-4)$	-0.082***	-0.063	-0.060	-0.062
	(0.026)	(0.046)	(0.045)	(0.042)
Optimal *Strength*	0.656	0.727	0.667	0.601
	[0.635,0.678]	[0.628,0.827]	[0.616,0.718]	[0.578,0.624]
Observations	4444	992	1032	2404
Countries	154	74	84	101
Anderson LR-stat	184.288	8.028	21.511	14.506
p-value	0.000	0.018	0.000	0.001
Hansen J-stat	3.618	2.997	0.206	1.193
p-value	0.057	0.083	0.650	0.275

Country and year fixed effects included in all regressions. Additional covariates include government consumption, investment rates, and population growth. Robust standard errors reported in the parentheses are clustered at the country level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Optimal *Strength* levels are calculated with the Delta method and 95% confidence interval presented in brackets. The null for the Anderson test is that the first-stage regressions are under identified, i.e. instruments are not correlated with the endogenous regressors. The null for the Hansen test is that the excluded instruments are uncorrelated with the error term, i.e. instruments are exogenous.

Table 7 presents the results with the sample limited to country-year observations with a Polity score. Specification 1 includes the entire Polity sample and is consistent with the main results. The estimated optimal *Strength* is 65.6% of seats held by governing politicians with a 95% confidence interval ranging from 63.5% to 67.8%. Shifting control of the legislature by a within-country standard deviation to optimal *Strength* is estimated to increase growth by 1.21 percentage points and a long-run increase of 23.69% in GDP per capita. Again, it should be noted that the Hansen J-statistic marginally rejects that the instruments are exogenous. Specification 2 only includes the sample of autocratic country-years (Polity score ≤ -6) and the nonlinear relationship between *Strength* and growth still holds, although the standard errors on the coefficients are quite large likely due to a much smaller sample. However, the 95% confidence interval for optimal *Strength* 62.8% to 82.7% contains the estimated optimal levels from the preferred specification. Shifting control of the legislature by a within-country standard deviation to optimal *Strength* is estimated to increase growth by 0.92 percentage points and a long-run increase of 11.31% in GDP per capita.

Specification 3 limits the sample to country-years under mixed systems ($-5 \leq$ Polity score ≤ 5) and I continue to find the nonlinear relationship between *Strength* and growth. Optimal *Strength* is close to the preferred specification, estimated at 66.7% of the legislature with a 95% confidence interval ranging from 61.6% to 71.8%. Shifting control of the legislature by a within-country standard deviation to optimal *Strength* is estimated to increase growth by 1.18 percentage points and a long-run increase of 12.13% in GDP per capita. In specification 4 I limit the sample to democratic country-years (Polity score ≥ 6 and find the coefficients on *Strength* statistically significant but much larger in magnitude than the preferred specification. The boost to growth is estimated at 2.59 percentage points when shifting control of the legislature to optimal *Strength* and a permanent shift is estimated to increase GDP per capita by 37.02% in the long-run. If intermediate *Strength* has such a large effect on average income levels, we would expect voters that only care about economic performance to push control of the legislature towards an intermediate share. However, voters may also value the ability to replace politicians and worry that politicians with intermediate *Strength* may be able to consolidate power. This could be why there is a large cluster of countries in Figure 3 below but approaching optimal *Strength*.

5.3 Mechanisms

The effect of *Strength* on economic growth could operate through a number of mechanisms. I find that intermediate levels of *Strength* are associated with lower shares of government

consumption in GDP and greater investment rates. This presents two channels through which intermediate levels of *Strength* enhance growth.

In examining which channels *Strength* could affect growth other than through aggregate productivity, I estimate regressions of the following form:

$$m_{i,t} = \sum_{s=1}^{T} \rho_s m_{i,t-s} + X'_{i,t}\beta + \gamma_1 Strength_{i,t} + \gamma_2 Strength^2_{i,t} + u_i + v_t + \epsilon_{i,t}$$

where $m_{i,t}$ is a potential mechanism through which *Strength* could affect growth in country i and period t. The mechanisms I examine are government consumption share of GDP and investment rates. Lags of the mechanism are included to account for any persistence in government consumption or investment rates. Although not specified by the motivating model, I find a nonlinear relationship between *Strength* and each mechanism. Country fixed effects and a time trend are also included to account for any country-specific factors or overall global trend.

Table 8 reports the effect of *Strength* on investment rates. I find the same nonlinear relationship between investment rates and *Strength*, although the coefficients are only marginally significant as more lags of the investment rate are included. Specification 1 estimates optimal *Strength* at 59.5% with a 95% confidence interval ranging from 47.8% to 71.1%. Shifting control of the legislature by a within-country standard deviation to optimal *Strength* is estimated to increase investment rates by 0.61 percentage points. As more lags of investment rate are included, the estimated optimal *Strength* decreases slightly to 57.9% in specification 4 with a wider 95% confidence interval ranging from 44.2% to 71.6%. The effect of shifting to optimal *Strength* is also somewhat mitigated at an estimated at 0.53 percentage point increase in investment rate. Since investment rates experience less persistence than GDP, the long-run increase in investment rate is only 0.78% for a permanent within-country standard deviation shift to optimal *Strength*.

Table 9 reports the effect of *Strength* on government consumption share of GDP. Here, I find a nonlinear relationship between government consumption and *Strength*, though intermediate *Strength* now is estimated to reduce government consumption. In specification 1 optimal *Strength* is estimated at 59.1% with a 95% confidence interval ranging from 46.4% to 71.7%. Shifting control of the legislature by a within-country standard deviation to optimal *Strength* is estimated to reduce government consumption by 0.40 percentage points. As more lags of government consumption are included, the estimated optimal *Strength* decreases to 55.4% in specification 4 with a much wider 95% confidence interval ranging from 34.6% to 76.3%. The lower level of optimal *Strength* is consistent with more political com-

Table 8: Political Strength and Investment Rates

	(1)	(2)	(3)	(4)
Strength	0.319**	0.294*	0.279*	0.270*
	(0.151)	(0.151)	(0.151)	(0.151)
$Strength^2$	-0.268**	-0.249**	-0.239**	-0.233*
	(0.121)	(0.121)	(0.120)	(0.120)
Investment Rate $(t-1)$	0.114*	0.108**	0.100**	0.095**
	(0.059)	(0.051)	(0.045)	(0.043)
Investment Rate $(t-2)$		0.099**	0.094**	0.090**
		(0.048)	(0.043)	(0.040)
Investment Rate $(t-3)$			0.092***	0.090***
			(0.024)	(0.023)
Investment Rate $(t-4)$				0.049***
				(0.016)
Optimal *Strength*	0.595	0.589	0.583	0.579
	[0.478,0.711]	[0.465,0.714]	[0.452,0.713]	[0.442,0.716]
Observations	5922	5796	5666	5526
Countries	186	185	185	185

Country and year fixed effects included in all regressions. Robust standard errors reported in the parentheses are clustered at the country level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Optimal *Strength* levels are calculated with the Delta method and 95% confidence interval presented in brackets.

Table 9: Political Strength and Government Size

	(1)	(2)	(3)	(4)
Strength	-0.204**	-0.153*	-0.127	-0.108
	(0.097)	(0.089)	(0.087)	(0.085)
$Strength^2$	0.172**	0.132*	0.112	0.097
	(0.077)	(0.072)	(0.070)	(0.068)
Government Size $(t-1)$	0.189	0.164*	0.141*	0.127*
	(0.133)	(0.097)	(0.079)	(0.072)
Government Size $(t-2)$		0.181**	0.168**	0.148**
		(0.088)	(0.077)	(0.065)
Government Size $(t-3)$			0.099**	0.091**
			(0.049)	(0.041)
Government Size $(t-4)$				0.104***
				(0.034)
Optimal *Strength*	0.591	0.580	0.565	0.554
	[0.464,0.717]	[0.429,0.731]	[0.389,0.741]	[0.346,0.763]
Observations	5923	5798	5669	5529
Countries	186	185	185	185

Country and year fixed effects included in all regressions. Robust standard errors reported in the parentheses are clustered at the country level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Optimal *Strength* levels are calculated with the Delta method and 95% confidence interval presented in brackets.

petition resulting in less distortionary taxation. The effect of shifting to optimal *Strength* is reduced to an estimated at 0.23 percentage point decrease in investment rate. Again as the persistence in government consumption is much smaller than GDP per capita, the long-run decrease in government consumption is only 0.37% for a permanent within-country standard deviation shift to optimal *Strength*.

6 Conclusion

This paper provides empirical evidence that control of the legislature has a nonlinear relationship with economic growth. Control of the legislature provides a measure of political strength regarding the probability of replacement for governing politicians. As the probability of replacement decreases, governing politicians discount the future less although political rents increase. I find a robust nonlinear relationship between political strength and economic growth when controlling for the dynamics of the GDP per capita. The estimated effect of shifting control of the legislature towards intermediate is around a 1 percentage point increase in growth rates and a long-run increase in GDP per capita of 20%.

This research extends the literature about the effect of political systems on growth, illustrating a potential reason why the effect of democracy has been found to be mixed. Although decreasing with higher levels of democracy, political strength has considerable variation across regimes. These results suggest that a balance of power between the politicians controlling the state and private economic agents affects economic performance.

This balance of power between governing politicians and private economic agents shapes their incentives. At high political strength, governing politicians have no incentive to limit rents as they are unlikely to be replaced, while governing politicians with low political strength will not invest in productive spending as they unlikely to see the returns. Governing politicians with intermediate political strength understand to reduce their probability of replacement they can limit current political rents. As governing politicians reduce rents, private economic agents will invest more in the future. This paper provides empirical evidence that intermediate political strength enhances economic growth.

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