The Logic of Hereditary Rule:
Theory and Evidence[*]

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Abstract

Hereditary leadership has been an important feature of the political landscape throughout history. This paper argues that hereditary leadership is like a relational contract which improves policy incentives. We assemble a unique dataset on leaders between 1874 and 2004 in which we classify them as hereditary leaders based on their family history. The core empirical finding is that economic growth is higher in polities with hereditary leaders but only if executive constraints are weak. Moreover, this holds across of a range of specifications. The finding is also mirrored in policy outcomes which affect growth. In addition, we find that hereditary leadership is more likely to come to an end when the growth performance under the incumbent leader is poor.

Key words: Growth, Hereditary Institutions, Political Agency; JEL Codes: O11, H11, N40.

"There are many ways to wish a king well; but the king's subjects, .. have more reason to be sincere when they say "long live the king." If the king anticipates and values dynastic succession, that further lengthens the planning horizon and is good for his subjects." (Mancur Olson, 1993 page 571).

"To the evil of monarchy we have added that of hereditary succession; and as the first is a degradation and lessening of ourselves, so the second, claimed as a matter of right, is an insult and imposition on posterity." (Thomas Paine, 1776)

1   Introduction

Over the sweep of human history, some form of autocratic rule has been the normal state of affairs. Only in the past two hundred years have alternatives cemented themselves in which leaders are subject to formal contests for power and subject to executive constraints imposed by independent courts and legislatures. Hereditary rule in the form of monarchy or dynastic dictatorship are important examples of autocratic rule. Moreover, throughout history, the utility of hereditary rule has been much debated. Olson (1993), as the quote above illustrates, argued that hereditary rule could create an incentive for good governance. But others, most notably Paine (1776) who is also quoted, argued strongly against it as a form of government.

This paper uses a new and unique data set to look at the consequences of hereditary rule among leaders who were in power between 1874 and 2004. We test a specific theoretical prediction based on a simple agency model whose key insight is that the correlation between having an hereditary leader in power and economic performance should differ depending on whether executive constraints which limit incumbent discretion are in place. Consistent with this prediction, we find that growth is indeed stronger in countries with hereditary leaders only if executive constraints are weak. However, with strong executive constraints in place, there is no growth dividend from having an hereditary leader in office. This corroborates the idea that strong executive constraints do indeed serve as an alternative to dynastic reputation formation as a means of controlling leaders. The sign and significance of the core correlation that we uncover is robust to wide range of specifications.

The argument that we develop to motivate a role for hereditary rule exploits the insights from classic political agency models such as that of Barro (1973).[1] The core idea in that literature is that leader "reputations" can be used to control moral hazard problems in politics. This parallels the arguments in the extensive literature on relational contracts in industrial organization (see, for example, Malcomson, 2013). In a political economy setting, Myerson (2008, 2010) has developed similar theoretical arguments and formalizes the notion that political leadership is held in trust with the control of moral hazard being central to good leadership. He also emphasizes the role of a selectorate in enforcing implicit "contracts" forged between citizens and leaders by controlling access

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[1]See Besley (2006) for a review of the political agency literature.

to power.

The paper is also related to an emerging literature on political dynasties. Blood ties between politicians of different generations are common in both autocratic and democratic systems. In the data introduced below, we find that 6.4% of all leaders since the mid-nineteenth century have come from a hereditary dynasty; this percentage falls to 3.1% in democracies.[2] Dal Bo, Dal Bo and Snyder (2009) document historic and geographic patterns in the evolution and profile of political dynasties in the U.S. since 1789. Using a regression discontinuity design, they argue that dynastic political power is self-perpetuating with a positive exogenous shock to a person's political power having persistent effects on holding political power. Querubin (2010) looks at political dynasties in the Philippines using a similar approach and finds an even stronger effect of a political advantage through a family connection on holding power. Querubin (2011) finds that there is no effect of introducing a term limit on the persistence of family power.

Interest in hereditary rule is part of a wider interest in the role of elites in acquiring and maintaining political power in different settings. Perhaps the most famous statement on this issue is the celebrated work by Mosca (1939) and Pareto (1901). Tullock (1987) argued that hereditary transitions of power were part of a wider strategy for sustaining elite control in autocracies since it provides a means of insulating the elite from potentially destabilizing power struggles. Brownlee (2007) studies transitions of power in a sample of 258 post-war autocratic leaders who rule for at least three years. He argues that hereditary succession tends to be accepted by ruling elites when there are no formal party structures to regulate transitions of power.

The paper raises similar issues to those discussed in the extensive literature on dynastic control in firms and whether firms suffer from being controlled by family members – see, for example, Benedsen et al. (2007), Bloom and VanReenen (2007), Burkhart et al. (2003). These studies have tended to find that family-owned businesses perform worse than other firms. However, we are not aware of studies that have investigated whether there is heterogeneity in the performance of family-run firms depending on the governance arrangements in place, for example differences in the power of outside investors.

The remainder of the paper is organized as follows. In the next section, we introduce the data and explore some background facts about hereditary rule in the raw data. Here, we contrast the personal characteristics of hereditary and non-hereditary rule. Section three discusses the theoretical framework which motivates a specific test and underpins the interpretation of the empirical findings. Section four presents some evidence on how hereditary leaders affect policy and growth. It also shows that low growth increases the chances of hereditary leadership coming to an end. Section five concludes.[3]

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[2]This increases to 9% and 11% respectively if we use a broader definition of dynastic leader.

[3]An on-line Appendix contains some additional results.

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2 Background Facts

The empirical results in the paper are based on a new data set on world leaders and their background characteristics that we have put together. To identify the leader in each country and year, we use the Archigos dataset which covers the period between 1874 and 2004.[4] To this, we add measures to capture the family political connections of the head of the state. A leader is classified as being hereditary if they had either a parent or grandparent who had also been head of state. For each leader, we have also assembled a wider picture of family connections, which we will use as a robustness check. This uses information on whether a leader's parents, grandparents, uncle, brother, cousin, spouse, or brother-in-law has held a political position where the latter is defined to include high office holders such as being a Prime Minister, President or King along with lesser positions such as being a Member of Parliament or Mayor. In a small number of cases, we also a leader's relationship to Clan Chiefs, Religious Leaders or Samurai.

This information comes mainly from the *Encyclopedia of Heads of States and Governments, Oxford Political Biography: Who is Who in the Twentieth Century World Politics, Encyclopedia Britannica*, other online sources, and biographies contained in *Lexis-Nexis*. Using these sources, we obtain a core sample of leaders in 197 countries between 1874 and 2004 out of a potential sample of 227 countries. Picking one leader per year this gives us a total of 2097 leaders, and a total of 2484 leader-spells in office.[5]

We find that 6.4% of the leaders in our sample are classified as hereditary according to our core definition. We begin by looking at the prevalence of hereditary leaders and how it has changed over time. Hereditary leadership has been in decline in countries that were already independent before 1900; around 8.3% of leaders between 1874 and 1900 are classified as being hereditary compared to 4.2% for the period between 1950 and 2004.[6] Among newer countries, i.e. those which appear in the dataset later than 1900, around 7.7% have hereditary leaders. There is no significant correlation between the year in which a leader comes to power and whether he is classified as being hereditary.[7]

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[4]Archigos has two datasets: one which gives information on leader, year and country, and one which gives information only on leader and country. In the latter there are 95 leader-country observations that do not appear in the former. In our analysis, we include these 95 observations which are for the following countries: Barbados, Bahamas, Belize, Brunei, Cape Verde, Iceland, Luxemburg, Maldives, Malta, Montenegro, Solomon Islands, Suriname, Tiber, Transvaal, Zanzibar. We extend the data back to 1848 for a few countries. Many countries have more than one "head of state". The Archigos dataset identifies the actual effective ruler based on a judgement about the particularities of each country. Two rules are generally followed: (i) in Parliamentary regimes, the prime minister is coded as the ruler, while in Presidential systems it is the president; (ii) in communist states the Chairman of the Party is coded as the effective ruler.

[5]In cases where more than one leader is in office in a given year, we focus on the leader who has been in office for the longest time period during the year.

[6]This broadly similar to the findings for the U.S Congress where Dal Bo et al (2009) find that the 8.7% of new entrants have a previous political connection using data between 1789 and 1996. They also find that this proportion has not fallen much over time.

[7]It is interesting to relate whether a politician is dynastic to opportunities to replace leaders as captured by three PolityIV variables: (i) the extent of institutionalization – or regulation – of executive transfers (XRREG), (ii) the competitiveness of executive selection (XRCOMP), and (iii) the openness of executive recruitment (XROPEN). This

The strength of executive constraints plays a key role in the theoretical framework and our core measure of this comes from the Polity IV database. We use the variable *xconst* which captures how leaders are bound by institutional constraints on a scale between 1 and 7. Limits on the chief executive may, for example, be imposed by any "accountability group" in the polity. In many democracies these constraints are imposed by the legislative and judicial branches of government. Other kinds of accountability groups are the ruling party in a one-party system, a council of nobles or powerful advisors in monarchies, and the military in coup-prone polities. We classify a country as having strong executive constraints using a dummy variable which is equal to one if *xconst* is equal to 7, the highest possible score. The fraction of leaders who are hereditary is 8.8% in weak executive constraints countries and 3.3% in those countries with strong executive constraints.

Table 1 uses data from Besley and Reynal-Querol (2011) to look at some characteristics of hereditary and non-hereditary leaders; we also disaggregate this according to whether executive constraints are strong or weak. Hereditary leaders are less educated, being less likely to have a college degree and graduate qualification. This is mainly driven by those who take office in countries when executive constraints are weak. In countries with strong executive constraints, hereditary leaders are more likely to have studied abroad. Hereditary leaders come to office on average when they are younger (42 years old versus 53) and they also tend to serve for longer in office, 11.5 years in office compared to 5 for non-hereditary leaders. This corroborates Olson's idea that hereditary leaders may have longer time horizons. This difference in tenure is largest for those leaders who take office when executive constraints are weak. Table 1 also shows that hereditary leaders are more likely to have served in the military, are less likely to have been elected, and unsurprisingly, are more likely to belong to royal families. In terms of careers, hereditary leaders are less likely than non-hereditary leaders to have had careers as lawyers, professors/scientists and are also less likely to come from a business background.

In our sample of leaders, 46% of leader spells fall under strong executive constraints. This increases modestly over our sample period from around 40% in the nineteenth century to a little over 50% for the last twenty-five years of the sample. This reflects the fact that countries that enter our database in later years tend not to have strong executive constraints. Indeed, the *proportion* of countries in our sample with strong executive constraints falls in the period after World War II compared to the inter-war period.

Figure 1 further illustrates the time-series pattern of hereditary leadership in our data. The red line is drawn for all leaders and shows a general downward trend. However, once again, it should be borne in mind that there is a change over time in the sample of countries represented in this figure as more independent countries enter the dataset. The green and blue lines show the trend over

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summary variable takes values between 1 and 8, with 8 being the most open and competitive method of selection. This variable is strongly correlated with our measure of whether a politician belongs to a political dynasty. Around 3% of leaders are from dynasties in the political systems where the value of this dummy variable is 8 compared to 10% for the sample where the value of this variable is less than 8.

time for countries that have weak and strong executive constraints respectively. At the beginning of the sample period, there are more hereditary leaders in countries with strong executive constraints. However, this pattern is reversed by the end of the nineteenth century and throughout the twentieth century, there are fewer hereditary leaders in countries with strong executive constraints.

Finally, we look at some raw facts about growth. Table 2 compares the average growth performance in countries depending on whether the country has a hereditary leader and whether it has strong or weak executive constraints. A clear pattern emerges with growth being lowest when there is neither a hereditary leader nor strong executive constraints, in which case the average growth rate is 0.89%. This contrasts with a growth rate of around 2% for all other combinations of executive constraints and hereditary rule. Moreover, an F-test (F=4.42, p-value 0.03) reveals that we can reject the null hypothesis that the mean growth rates are equal for the sample of hereditary and non-hereditary leaders in countries with weak executive constraints. Also, we cannot reject the hypothesis that the average growth rates are the same when we compare countries with and without hereditary leaders among those with strong executive constraints (F-test (F=0.86, p-value 0.35)).

3 Theory

In this section, we develop a model where hereditary rule emerges as a political equilibrium in the spirit of Olson (1993) and induces better performance from leaders who care that their offspring will follow them in office. We show that this is valuable to whomever maintains the leader in power only if executive constraints are unable solve moral hazard problems in government.[8]

Policy Making and Institutions Time is infinite and each period is denoted by t. Citizens are infinitely lived and in period t have a payoff, u_t, which depends two things (i) policy $\delta_t \in \{0, \Delta\}$ where $\Delta > 0$ and (ii) the leader's popularity $a_t \in \{-A, A\}$ where $A > 0$, i.e.

$$u_t = \delta_t + a_t$$

The policy payoff depends on a binary policy choice $e_t \in \{0, 1\}$. For the sake of concreteness, think of this as making a decision which affects the enforcement of property rights or a decision to invest in worthwhile infrastructure. In each period nature determines a "state of the world", $s_t \in \{0, 1\}$ and $\delta_t = \Delta$ if and only $e_t = s_t$. We assume that both states are equally likely and that generating a payoff $\delta_t = \Delta$ requires a leader to incur a private cost of c.

The popularity component of citizens' payoffs is a attached to a specific leader. Ex ante, we assume that a randomly selected leader is popular with probability ρ. Let $\bar{A}(\rho) = [2\rho - 1]A$ be the expected popularity of a randomly chosen leader.

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[8]See Besley and Mueller (2015) for a model along these lines.

Leaders are drawn from a countably infinite pool of families denoted by $f = 1, ...$. Each leader lives for only one period and has a single offspring. To create a dynastic motive, we suppose that there is payoff of B if an incumbent's offspring succeeds him/her. For simplicity, we suppose that this payoff is like a "warm-glow" bequest which is independent of the actual value of holding office. We also assume that $B > c$, so that an incumbent leader would, in principle, be willing to generate a payoff of Δ for the citizens if having his offspring succeed him is made conditional on this.

We consider two institutional possibilities. With strong executive constraints, we assume that $e_t = s_t$ is ensured so that citizens always get $\delta_t = \Delta$. We have in mind having an effective legislator which is able to "force" the leader to act in the interests of citizens. A perfect constraint is of course, the most extreme assumption, but having this happen probabilistically would yield broadly similar results. With weak executive constraints, the incumbent has full discretion over the choice e_t. We expect $e_t = s_t$ only if it is in the leader's private interest to do so.

Retention and Selection The retention of leaders lies in the hands of a sub-group of citizens (the *selectorate*). The term selectorate, coined by Bueno de Mesquita et al. (2003) could represent a variety of institutional settings. In democracies retention decisions rest with voters although party elites and insiders can also play an important role in who stands for office. In non-democracies the selectorate could comprise senior army officers in military dictatorships or influential aristocrats in monarchies. They could also be members of a party hierarchy as in a communist system like in China. Members of the selectorate decide whether to select the policy maker from the ruling family or to install a new ruling family. An hereditary dynasty is created when the selectorate chooses the offspring of the incumbent to take power. We suppose that the selectorate has a discount factor $\beta < 1$ and that they observe the popularity of the leader's offspring before deciding whether to appoint him/her as leader.

Timing The timing of the model with each period t is as follows:

1. There is an incumbent leader in office for $t - 1$.

2. Nature determines the popularity of the leader's offspring $\hat{a}_{t-1} \in \{-A, A\}$.

3. The selectorate chooses between the leader's offspring and picking a new ruling family from the available pool.

4. If the incumbent's offspring is maintained then $a_t = \hat{a}_{t-1}$. Otherwise $a_t = A$ with probability ρ.

5. Nature chooses s_t.

6. The incumbent leader chooses $e_t \in \{0, 1\}$

7. Payoffs are realized.

We will look for a stationary sub-game perfect equilibrium of the model where the selectorate and incumbents optimize in their policy and retention decisions.

3.1 Equilibrium

We first show what happens with strong executive constraints. The main analysis is for the case of at weak executive constraints where we focus on two possible equilibria. In the first of these, only popular incumbents are retained and incumbents never produce good policy. In the second, an hereditary dynasty emerges where the leader's offspring is retained whether or not she is popular provided that her predecessor has generated Δ while in office.

Strong Executive Constraints With strong executive constraints, $e_t = s_t$ always by assumption. Then popularity is all that matters to the selectorate. Since this is observed before appointing the offspring then only popular offspring are appointed since $A > \bar{A}(\rho)$. Thus, consistent with the data, hereditary rule is possible even with strong executive constraints. However, this will happen purely on the basis of popularity rather than performance in office. More generally, we expect hereditary leadership to emerge only if there is indeed an information advantage about popularity for dynasties.

Weak Executive Constraints We begin with the following benchmark result where hereditary succession plays no role. The following result is proven in the Appendix.

Proposition 1 *There is always an equilibrium where only popular incumbents are retained and $e_t \neq s_t$ for all t.*

The logic is straightforward. Since all incumbents set $e_t \neq s_t$, then only popularity matters to the selectorate. Hence if the leader's offspring is popular, she will be chosen otherwise it is worthwhile picking a fresh family from the pool of potential rulers. Since incumbents believe that retention is only popularity-based, it is never worthwhile for the leader to set $e_t = s_t$ since doing is costly.

This equilibrium is the mirror image of strong executive constraints case except for the policy performance of the leader. The frequency of incumbent turnover is driven purely by ρ, the probability that an incumbent's offspring is popular and we expect a dynastic leader to emerge with equal frequency in this equilibrium regardless of whether executive constraints are strong or weak. This equilibrium exists for all parameter values since it only relies on the the out of equilibrium belief that any leader who deviates to $e_t = s_t$ will not thereby bequeath the leadership to their offspring.

We now consider a different equilibrium in which the offspring of *all* incumbents are retained under weak executive constraints regardless of their popularity as long as their predecessor has produced a good policy outcome for the citizens. The following Proposition, whose proof is in the Appendix, gives sufficient conditions for this to emerge:

Proposition 2 *Suppose that $\Delta \geq 2\rho \left[1 - \rho\beta\right] A$ and $(1 - \rho) B > c$, then there is an equilibrium in which the offspring of all incumbents are retained and $e_t = s_t$ in each period.*

This kind of equilibrium can emerge as long as the incumbent believes that his offspring will be appointed as leader after she has paid c to generate Δ for the citizens. This requires that A be small enough and/or Δ is large enough so that the selectorate are willing to pick an unpopular leader when they believe that the dynastic equilibrium will break down if they fail to appoint the next member of the dynasty. This equilibrium also requires that the bequest motive be strong enough so make paying the cost c worthwhile. The condition for hereditary rule to be an equilibrium depends on ρ. It is hardest to satisfy when ρ is close to one since it is highly likely that the unpopular offspring of a leader will be replaced by a popular leader if she is not allowed to succeed her parent.

This equilibrium can be thought of as a relational contract between the dynasty in power and the selectorate along the lines envisaged in the opening quote from Olson (1993). The hereditary dynasty delivers good policy outcomes in exchange for an assurance that unpopular members of the dynasty are selected to hold office conditional on their predecessor having set $e_t = s_t$. This is supported by the belief that if the hereditary system were to break down (specifically if an unpopular member of the dynasty were removed) then a non-hereditary equilibrium would follow in which all subsequent incumbents perform poorly and only their popular offspring are retained. Thus, our equilibrium illustrates the idea that hereditary rule arises not out of intrinsic popularity but because incumbents who are part of the dynasty perform well.

Although we have applied this idea to a hereditary system, this could also be a model of a long-lived party system like the communist party in China where economic growth is "exchanged" for continuity in power regardless of whether leaders are intrinsically popular. This is a focal point of the system which creates political stability and good economic performance. Such systems only make sense in a setting of weak executive constraints, like China, where there are no direct means of enforcing good policy.

Predictions Proposition 2 gives conditions for there to be an equilibrium with good policy without strong executive constraints. Thus citizens can get good policy ($e_t = s_t$) in two cases: (i) if there are strong executive constraints and (ii) if there is a hereditary equilibrium under weak executive constraints. There will be bad policy outcomes (with $e_t \neq s_t$) for citizens when then is no hereditary equilibrium with weak executive constraints.

Since there can be multiple equilibria, the model does not fully explain how some polities can coordinate on hereditary equilibria. For the core empirical results, we suppose that this coordination is uncorrelated with factors which shape economic performance. Neither does the model explain why all polities do not choose to have strong executive constraints, particularly those which cannot organize hereditary equilibria. This could be explained by adding additional features to the model by which bad policies generate rents for some agents who therefore have a vested interest in maintaining

bad government.[9]

Comments on the Model   The model that we have presented is deliberately simple in order to focus on the nature of the exchange between the selectorate and the leaders. It could be complicated in a variety of ways which would make it more realistic while retaining the essence of the argument that we have developed for why hereditary rule can improve performance.   For example, the assumption that strong executive constraints always improve performance is not needed for the broad thrust of the prediction to hold that strong executive constraints only improve things under weak executive constraints.   To see this, suppose that under strong executive constraints, then $e_t = s_t$ with probability ξ. Then the expected policy payoff of voters is $\xi\Delta$. It is still optimal in this world to select solely on the basis of popularity with strong constraints.   The two equilibria described in Propositions 1 and 2 continue to exist.   While the non-dynastic equilibrium of Proposition 1 is less good for voters than strong executive constraints, the dynastic equilibrium now out-performs strong executive constraints.[10]

We could also introduce an element of selection into the model whereby some leaders are more or less competent with growth providing a signal of competence.   If competence is transmitted intergenerationally, this would provide an additional argument for hereditary selection.

The model has focused exclusively on an upside of dynastic rule. But dynastic rule could result in self-enrichment via violation of property rights. Absolutist monarchs in history were famous for seizing land and property.   The scope for doing this without facing opposition would be larger if hereditary rules also generate other benefits of the kind highlighted in Proposition 2.   The bequest motive, represented by B would likely be higher where rents accruing to leaders are larger as in the model of Myerson (2010). If rent extraction which creates these returns is also inefficient, this would weaken the value of hereditary rule.   In the end, it will therefore be an empirical question whether such cases of hereditary rule are good or bad for growth.

The model has focused on hereditary rather than dynastic selection in general. However, similar theoretical forces could also explain how families/clans could develop reputations which would be relevant in periodic contests for power.   This would depend on the selectorate using the history of all past members of a dynasty and factoring this into their decisions and could explain period re-emergence of members of dynasties.[11]

Growth Implications   We will apply the ideas above to aggregate measures of economic performance when specific leaders are in power.   We shall suppose that the realization Δ_t affects

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[9]See Besley et al (2016) for discussion of theory and evidence on selecting strong execitive constraints.

[10]That said, if ξ get's low enough so that executive constraints are highly ineffective, then it is possible that a dynastic equilibrium could emerge even when there are strong executive constraints.

[11]The on-line Appendix shows that dynastic leadership is reinforced by natural disasters suggesting that there are times when citizens crave familiarity among their leadership.

productivity so that aggregate output, Y_t, is given by the production function:

$$Y_t = e^{\theta_t} \left[K_t^{1-\alpha} L^{\alpha} \right]$$

where productivity depends on policy: $\theta_t = [1 + \Delta_t] \theta_{t-1}$ and there is a fixed supply of labor, L. We shall suppose that aggregate capital $K_t = sY_{t-1}$ where s is the savings propensity. This implies that growth is given by:

$$g_t = \log\left(\frac{Y_t}{L}\right) - \log\left(\frac{Y_{t-1}}{L}\right) = [1 + \Delta_t]\theta_{t-1} - \alpha \log\left(\frac{Y_{t-1}}{L}\right).$$

This forges a link between policy making as it is affected by institutions and behavior, and economic growth.

This very simple model, combined with the discussion of political equilibria, give us the following prediction about growth:

Core Growth Prediction *Growth will be higher in a hereditary equilibrium only if executive constraints are weak.*

We examine this prediction by looking at economic growth during the spell of leader ℓ in country c who takes office in year t. Specifically, let $g_{c\ell t}$ be the average growth rate during the leader spell. We then run regressions of the form:

$$g_{\ell ct} = \alpha_c + \alpha_t + \lambda y_{\ell ct} + \beta_1 \delta_{\ell ct} + \beta_2 \sigma_{\ell ct} + \beta_3 \left(\delta_{\ell ct} \times \sigma_{\ell ct} \right) + \varepsilon_{\ell ct} \tag{1}$$

where α_c are country dummies, α_t are dummies for the years in which leaders take office, $y_{\ell ct}$ is the level of income per capita in the year that leader ℓ's spell in office begins, $\delta_{\ell ct}$ is a dummy variable which is equal to one if leader ℓ is a hereditary leader, and $\sigma_{\ell ct}$ is a dummy variable which is equal to one if a country has strong executive constraints when the leader comes to power. We cluster the standard errors at the country level.[12]

According to the core prediction of the theory, we should expect $\beta_1 > 0$, $\beta_2 > 0$ and $\beta_3 < 0$ with a core implication of the theory being that $\beta_1 + \beta_3 = 0$, i.e. having a dynastic leader generates better performance only when executive constraints are weak.

The regression in (1) cannot be given a causal interpretation; our exercise is to study a specific and non-trivial prediction for the data motivated by theory. By including year and country fixed effects in each regression, the conditional correlation that we uncover controls for a range of country characteristics and general global trends which could confound the argument that the theory focuses on. And it is notable that we find that estimates of β_2 in equation (1) are not significantly different

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[12]This specification is fairly standard for a growth regression in panel data. The long time series (an average of 11 observations, i.e., leaders per country) means that the standard dynamic bias from including lagged income should not be an issue.

from zero in all of our specifications after including country fixed effects. This does suggest that fixed country characteristics may be doing a decent job in conditioning out the relevant unobserved heterogeneity associated with institutional differences. But we caution against interpreting our results as causal effects.[13]

4   Evidence

We begin by presenting the core results on growth. We then assess their robustness and look at supporting evidence from policy outcomes. We then look at whether growth affects the probability that countries stick with hereditary leaders.

Core Results   The core results are in Table 3.

In column (1) we analyze the relationship between growth and having a hereditary leader in office using a specification which excludes lagged income as well as year and country dummies. This shows a positive correlation between the growth rate and having a hereditary leader in office, but only if there are weak executive constraints. The F-test reported in the seventh row of the table, tests the hypothesis that there is no effect on growth from having a hereditary leader when executive constraints are strong, i.e. $\beta_1 + \beta_3 = 0$ in (1). It shows that we cannot reject the hypothesis that there is no positive correlation with growth when a hereditary leader takes office with strong executive constraints. The size of the coefficient suggests that in a country with weak executive constraints, going from a non-hereditary leader to a hereditary leader increases the annual average economic growth of the country by 1.03 percentage points per year. This is consistent with what we saw in the raw data presented in Table 2.

In column (2) we allow for convergence by including the log of per capita income in the year before a leader's spell begins. The positive correlation between growth and having a hereditary leader in office remains. The implied long-run effect is similar in magnitude to the coefficient in column (1). Our core finding is also present in column (3) where we include year dummy variables to capture global macro-economic shocks and trends. Column (4) adds country dummies which allow us to control for time-invariant country characteristics. The size of the coefficient on being a hereditary leader is now larger and more strongly significant. It is interesting to observe that the coefficient on strong executive constraints is not significant once we include country dummies suggesting that fixed country characteristics account for much of the variation that determines institutional differences.

In columns (5) and (6), we look at separate sub-samples according to the strength of executive constraints. This allows separate year and country dummies to be estimated for each subgroup.

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[13]The on-line Appendix reports the results of an empirical exercise where the gender composition of first-born children is used to predict successful hereditary transitions in monarchies. Since all monarchies have weak executive constraints, this has a more limited link to the theory. The results show that whether the first born is male is indeed correlated with a successful hereditary transition.

The finding is in line with the findings of the previous columns with the only significant correlation being for hereditary leaders.

In column (7), we respond modestly to the concern that the process determining institutional change in our data could be playing a direct role in the results. We have 87 institutional transitions between strong and weak executive constraints in our data. In column (7), we drop the leaders that come to office following an institutional change, specifically if there has been an institutional change in the two years prior to them coming into office. And we also those exclude where there was an institutional change in the two years after they come into office. This amounts to dropping 148 leaders and excludes the possibility that such "reformist" leaders are different in terms of their capacity to generate growth. The results in column (7), which use the same specification as column (4), estimated on this more restricted sample, confirm that dropping such "reformist" leaders does not affect the results.

Overall the correlations uncovered are consistent with the idea that if there are weak constraints on the executive, then hereditary leaders tend to out-perform non-hereditary leaders. This is in line with our core theoretical prediction which sees hereditary rule in this case as a manifestation of an implicit relational contract.

Robustness In Table 4, we assess the robustness of these results to a variety of alternative specifications and ways of looking at the data.

We first assess whether the results in Table 3 are sensitive to the exact measure of hereditary leadership that we use, considering broader and narrower alternatives. Column (1) focuses only on leaders whose father was head of state, the most narrow definition of hereditary leadership. The core results hold up in this case. Column (2) uses a less restrictive definition of hereditary leadership, also classifying as hereditary those leaders whose uncle, brother, cousin, spouse, or brother-in-law had been head of state. The coefficient is somewhat smaller but still positive and significant for the case of weak executive constraints. Column (3) widens the core definition of hereditary leadership in a different way by classifying leaders as hereditary if their parents or grandparents had held *any* political position, not just being head of state. Again, the core results hold up.

In column (4) of Table 4, we include the age and tenure (in years) of leaders as additional controls. This deals with a possible concern that hereditary leaders are different in other ways which is driving their performance. Moreover, we have already seen from Table 2 that hereditary leaders tend to spend a longer time in office and are younger when they enter. There is a positive and significant correlation between the tenure of a leader and average economic growth during the leader's spell in office. However, there is no significant correlation with the age at which the leader is selected. In column (5), we include an interaction terms for age and tenure and also find that the main finding is robust.

Throughout Table 4, the core results from Table 3 remain the same with hereditary leaders being associated with higher growth but only with weak executive constraints. But institutions such as

executive constraints could be correlated with other variables which affect economic performance. One powerful and important hypothesis concerns the role of human capital in making democracy sustainable. Indeed, it is sometimes argued that correlations between institutions and performance are suspect when human capital levels are controlled for (Glaeser et al, 2007). Thus it is interesting to explore this in our case. Due to the difficulty of obtaining reliable data on education at country level for longer periods of time and a wide range of countries, we now focus on the period after 1960. Column (6) in Table 4 establishes that the core results are robust when we focus on the period 1960 onwards, although the correlation between growth and having a hereditary leader is somewhat smaller. Column (7) includes the average years of education in the population over age 25 from the Barro and Lee (2001) dataset as regressor. The coefficient on education is not significant (principally due to the inclusion of country fixed effects). In all cases, the core finding of the paper is the same; growth is higher when a hereditary leader holds office and executive constraints are weak.

In Table 5, we show that the results are robust if we use time-invariant measures of executive constraints. Specifically, we show that the results are robust if we use the year in which the country enters the sample (columns (1) through (3)) or the average level of executive constraints over the whole time period for which the country is in the sample (columns (4) through (6)). This means that time-varying shocks which drive institutional change are not driving the main finding. In column (7) of Table 5, we use only the balanced sample of countries which are in the sample post 1965 and use the average level of their executive constraints over this period as our time invariant measure. The core finding from column (3) is also robust to this.

Policy Since we are positing that leaders affect growth, we would expect leadership to matter via affecting the policies that are implemented during a leader's spell in power. In Table 6, we explore this directly by focusing on some policies that could plausibly be thought to affect growth.

One possibility is that productivity-enhancing investment decisions depend on the enforcement of contracts and support for markets. If these are important for growth, as, for example, argued by Hall and Jones (1999), we should expect a similar pattern of results when we use this as a dependent variable. To investigate this, we look at the composite index of government anti-diversion policies (GADP) as created from the International Country Risk Guide Date (ICRG) by Hall and Jones (1999) and Knack and Keefer (1995) who use five averages of these variables. We use an equally-weighted average of five variables: law and order, bureaucratic quality, corruption, risk of expropriation, and government repudiation of contracts, which is available between 1982 and 1997.[14]

The empirical specification that we use is:

$$GADP_{\ell ct} = \alpha_c + \alpha_t + \beta_1 \delta_{\ell ct} + \beta_2 \sigma_{\ell ct} + \beta_3 \left(\delta_{\ell ct} \times \sigma_{\ell ct} \right) + \varepsilon_{\ell ct} \tag{2}$$

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[14]We normalize the variable to lie between zero and one with higher values representing more effective policies to support markets.

for leader ℓ in country c beginning at date t, where: α_c are country dummies and α_t are year dummies. To capture the leader's performance, we measure $GADP_{\ell ct}$ in the last year of the leader's time in office.[15] As above, we cluster the standard errors by country.

The results are reported in Columns (1) and (2) in Table 6. In column (1) we include year and country dummies, and in column (2) country dummies are replaced by region dummies. As with the core results, there is a positive correlation between $GADP_{\ell ct}$ and a hereditary leader being in power with weak executive constraints but there is no significant correlation when executive constraints are strong. Hence the pattern found for government anti-diversion policies parallels that found in data on growth.[16]

Our second policy measure is intended to capture infrastructure quality using the data from the Business Environment Risk Intelligence (BERI) which are available between 1972 and 1990. Knack and Keefer (1995) have shown that the BERI measures are strongly correlated with investment and growth. The variable that we use tries to capture the quality of available facilities affecting communication and transportation in a country.[17]

The empirical specification that we use is:

$$IQ_{\ell ct} = \alpha_c + \alpha_t + \beta_1 \delta_{\ell ct} + \beta_2 \sigma_{\ell ct} + \beta_3 \left(\delta_{\ell ct} \times \sigma_{\ell ct} \right) + \varepsilon_{\ell ct} \tag{3}$$

for leader ℓ in country c beginning at date t, where: α_c are country dummies and α_t are year dummies. We measure $IQ_{\ell ct}$, the BERI infrastructure quality variable, during the last year of the leader's spell in office.[18] We continue to cluster the standard errors by country.

The results are reported in columns (3) and (4) of Table 6. In column (3) we show that with country and time dummy variables, there is a positive and significant correlation between having an hereditary leader in office and infrastructure quality, but only when executive constraints are weak. As with growth, we cannot reject the hypothesis that there is no correlation between $IQ_{\ell ct}$ when executive constraints are strong. The findings are broadly similar in column (4) of Table 6 where we exploit only within-region variation.[19]

Does the survival of hereditary leaders depend on growth? We now test one dimension of the mechanism emphasized by the theory, namely that hereditary power is dependent on good

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[15] We chose this criterion so that we do not lose leaders whose spell in office ends after 1995.

[16] We also attempted to update this variable to 2008. However, some of the variables in the original ICRG are no longer reported. However, we can construct something which is fairly close; specifically we take the average of corruption, law and order, quality of bureaucracy and investment profile, normalized to lie between zero and one. Expropriation risk and repudiation of contracts have been replaced in the later data by a new investment profile variable. If we repeat the specifications of columns (1) through (2) of Table 6, the results with country dummies are weak, but with regional dummy variables, the results are similar to those in columns (1) and (2).

[17] We normalize the measure to lie between zero and one with higher values representing better quality infrastructure.

[18] We chose this criterion so as not to lose from the sample those leaders whose spell in office ends after 1990.

[19] Table A1, A2 and A3 in the appendix report results based on a range of different policy outcome varibles. However, we do not find significant effects of heteridary leadership.

economic performance.[20] For this purpose, we define a regime in year t, r_t, to be hereditary ($r_t = 1$) if a hereditary leader is in power in t and non-hereditary, ($r_t = 0$) otherwise. We then estimate the probability of an exit from a hereditary regime into a non-hereditary regime.

The empirical model that we use is as follows:

$$\text{Prob}\,(r_t = 0 : r_{t-1} = 1) = \Phi(\theta_c + \theta_t + \kappa_1 \bar{g}_{ct} + \kappa_2 z_{ct}) \text{ if } r_{t-1} = 1 \tag{4}$$

where $\Phi\,(.)$ is a standard normal distribution function, (θ_c, θ_t) are country and year dummies, $\bar{g}_{ct}$ is the average growth rate over the previous five years, and z_{ct} are other determinants of hereditary leadership which we outline below. If growth affects the probability of a succession, the coefficient on growth, κ_1, will be negative. It makes sense to study this using annual data since, unlike the theoretical model, there is no fixed date at which a leader's term comes to an end.   In effect, this approach is modeling the hazard function associated with being in a hereditary regime and the probability of exiting that regime.

Table 7 presents the results.   Column (1) reports a negative association between the survival of the hereditary regime and growth performance.   The magnitude of this effect suggests that a 1 percentage point increase in growth during the past five years is associated with a 2.6 percentage point fall in the probability of hereditary leadership coming to an end in any year.   Since the unconditional probability of this happening is 4.7%, this says that the probability of the hereditary regime coming to an end in any given year increases by 50% when growth falls by 1 percentage point. Column (2) confirms that this finding is driven by countries that have weak executive constraints; we cannot reject that there is no relationship between the end of a hereditary regime and poor growth performance for countries with strong executive constraints.   The size of the effect is marginally larger in column (2) with a 2% increase in growth being associated with a 4.4% reduction in the probability of a hereditary regime come to an end.

These results give credence to the idea that there is a performance-related component built into the survival of hereditary regimes when executive constraints are weak.   And this lines up with what the theory postulates where continuity is predicated on good performance.[21]

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[20]Our model does not predict when this might come to an end even if a country is in the hereditary equilibrium of Proposition 2.   However, it would be difficult to modify the theory to have this possibility. One device would be to invoke some kind of "trembling hand" in equilibrium play with some leaders failing to deliver to choose good policies even when it is in their interest to do so.   Another possibility would to invoke competence shocks which impair the ability of some hereditary leaders to deliver.   In such cases, there will be low growth according to our model and hereditary leaders will not succeed in passing on the office to their offspring.

[21]Our model of hereditary leadership has multiple equilibria.   Hence whether a hereditary leader emerges with weak executive constraints is an equilibrium selection issue.   In this world social conventions can play a coordinating role and could plausibly be orthogonal to other factors which affect growth, particularly once country fixed-effects are included. In the on line Appendix, we report results based on two different IV approaches aimed at addressing the concern that there are systematic factors which could affect whether dynastic selection persists.   The first is to look at exogenous shocks from natural disasters showing that these are correlated with dynastic selection.   Second, we exploit primogeniture conventions in monarchies.   In both cases, we get robust results.

5   Concluding Comments

This paper has looked at the role of hereditary rule in improving economic performance when other controls – executive constrains – on incumbents are absent. The logic that we have exploited is essentially that put forward in Olson (1993) who emphasized that hereditary rule can provide a means improving inter-temporal incentives in government. The centre piece of our paper is bringing into use a new and unique dataset which identifies whether leaders in countries between 1874 and 2004 were hereditary. In line with the core prediction of the theory, hereditary rule increases growth but only when executive constraints are weak. Although we cannot be sure that this is a casual effect, it is a non-trivial prediction from a theoretical model and the finding holds up in the face of a variety of robustness checks. Moreover the logic of the argument which has been developed by Olson others, including Myerson (2008, 2010), has never, to our knowledge, been tested previously.

More generally, the analysis here contributes to our understanding of the heterogeneity of arrangements which can sustain economic policy. Establishing hereditary succession is generally part of the informal institutional arrangements relying on norms and conventions as much as formal constitutional rules. It emphasizes the importance of drilling down into such details when looking at the workings of political systems and how they relate to economic performance.

Although we have tried to understand the logic of hereditary rule, we do not regard the findings of the paper as necessarily making a case in favor of it. There are many arguments against such rule, going back at least to Paine (1776). Such systems may well be inherently unjust by making birthright a basis for inheriting political privileges. The fact that many polities around the world have put an end to hereditary rule and establish strong executive constraints is no accident since this is arguably a much more robust way to control leaders than relying on the chance that succession incentives will safeguard the public interest. Moreover, if there are indeed multiple equilibria, then what happens through this route could be a matter of a chance. By collecting a unique dataset on the pattern of hereditary rule, we are able to go beyond the theory and illustrate empirically the practical role of such intertemporal arrangements in circumventing the deficiencies in formal institutional arrangements.

Conflict of Interest Statement

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Proof of Proposition 1:. Consider the first case and suppose that $\hat{e}(s) \neq s$, and all unpopular leaders are removed from office after one period. The value to the selectorate along the equilibrium path is $\frac{\rho A + (1-\rho)\bar{A}(\rho) + \Delta}{1-\beta}$. Let

$$W(x) = x + \beta \left[\frac{\rho A + (1-\rho)\bar{A}(\rho) + \Delta}{1-\beta} \right].$$

Retaining popular incumbent yields $W(A)$. Deviating by removing such an incumbent makes the selectorate worse off since $W(A) > W(\bar{A}(\rho))$. Now consider whether there could be a worthwhile deviation by retaining an unpopular incumbent rather than picking a new incumbent at random. This will not be the case either since $W(-A) < W(\bar{A}(\rho))$. Hence there is no worthwhile one-shot deviation for the selectorate. Since the probability that an incumbent is retained is independent of δ, it is optimal for all incumbents to set $e \neq s$ for all $c > 0$. ∎

Proof of Proposition 2:. We first show that it is optimal for the selectorate in such cases to retain the offspring of leaders in this case if they produce Δ when the out-of-equilibrium beliefs are that if the leader choose $e \neq s$, then there is an infinite reversion to playing the benchmark equilibrium where $e \neq s$ for all leaders and only popular leaders are retained. In the benchmark equilibrium, the payoff along the equilibrium is

$$\frac{\rho A + (1-\rho)\bar{A}(\rho)}{1-\beta}.$$

In the proposed hereditary equilibrium, the payoff is:

$$\frac{\bar{A}(\rho) + \Delta}{1-\beta}.$$

Suppose now that the incumbent leader has an unpopular offspring then retaining that individual is optimal if

$$-A + \Delta + \beta \left[\frac{\bar{A}(\rho) + \Delta}{1-\beta} \right] \geq \bar{A}(\rho) + \beta \left[\frac{\rho A + (1-\rho)\bar{A}(\rho)}{1-\beta} \right]$$

which reduces to the condition above. Clearly, if this condition holds, it will hold a fortiori if the incumbent's offspring is popular. This equilibrium exists as long as $(1-\rho)B \geq c$. This is because if the incumbent deviates to $e \neq s$, then his incumbent will be retained in office with probability ρ. However, if he chooses $e = s$, then his offspring will hold office for sure. ∎

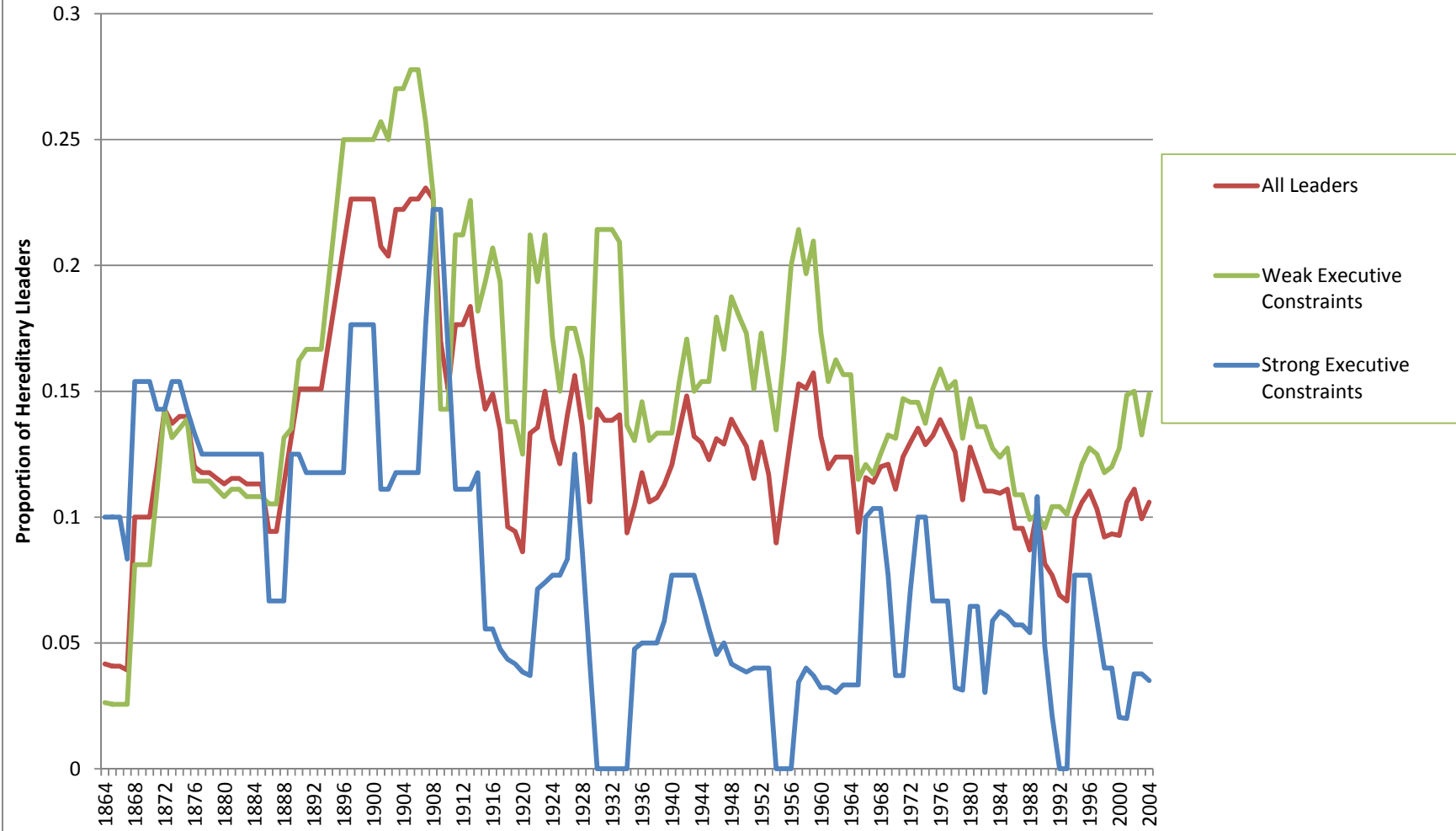Figure 1. Proportion of Hereditary Leaders

Table 1: Leader Characteristics

	Hereditary leader	Non- hereditary leader	Hereditary leader with weak executive constraints	Non- hereditary leader with weak executive constraints	Hereditary leader with strong executive constraints	Non- Hereditary leader with strong executive constraints
Education (graduate)	0.20	0.28	0.17	0.23	0.30	0.38
Education (college)	0.47	0.73	0.45	0.67	0.65	0.83
Studied abroad	0.32	0.25	0.27	0.26	0.43	0.20
Age in first year holding office	42	53	42.3	51.52	44.88	55.??
Length of Tenure	11.5	4.8	11.7	5.7	7.21	3.35
Served in Military	0.016	0.22	0.024	0.34	0	0.06
Elected/selected under democracy	0.35	0.58	0.19	0.31	1	0.99
Monarch	0.61	0.02	0.66	0.03	0.36	0
Career as Lawyer	0.04	0.26	0.012	0.21	0.12	0.32
Career as Professor and/or scientist	0.008	0.12	0	0.11	0	0.12
Career in Business	0.016	0.05	0.024	0.04	0	0.08

Notes: A leader is dynastic leader if a leader's father, gradfather or mother held an elected position. Education (graduate) is a dummy that is equal to one if the leader has a graduate degree; Education (college) is a dummy that is equal to one if the leader has a college degree; Studied abroad is a dummy equal to 1 if the leader studied abroad; Served in Military is a dummy equal to 1 if the leader was a military professional before holding office; Monarch is a dummy equal to 1 if the leader is a monarch. Career as Lawyer is a dummy equal to 1 if the leader was a lawyer before holding office. Career as a Professor and/or Scientist is a dummy that is equal to 1 if the leader was a Professor or Scientist before holding office. Career in business is a dummy that is equal to 1 if the leader was in business before holding office.

Table 2: Mean Differences in Growth

	Weak Executive Constraints	Strong Executive Constraints
Non-hereditary leader	0.89	1.94
	(0.17)	(0.16)
Hereditary dynasty	1.92	1.50
	(0.56)	(0.90)

Notes: The value shows the average growth performance of countries depending on whether the country has an hereditary leader and whether it has strong or weak executive constraints (defined by xconst being equal to 7 in the Polity IV data base).   A leader is classified as hereditary if his/her father, gradfather or mother was leader.

	(1)	(2)	(3)	(4)	Weak Executive Constraints (5)	Strong Executive Constraints (6)	(7)
VARIABLES							
Hereditary Leader	1.025**	0.853**	0.966**	1.758***	1.985**	-0.304	1.985***
	(0.432)	(0.413)	(0.488)	(0.569)	(0.760)	(0.566)	(0.637)
Log(GDP) lagged		-0.142	-0.133	-2.881***	-2.950***	-4.459***	-3.528***
		(0.135)	(0.158)	(0.604)	(1.081)	(1.071)	(0.615)
Strong Executive	1.053***	1.247***	1.529***	0.651			0.606
Constraints	(0.264)	(0.315)	(0.322)	(0.470)			(0.535)
Interaction	-1.471**	-1.285**	-1.582**	-2.057**			-2.237**
	(0.592)	(0.600)	(0.655)	(0.926)			(1.120)
Year FE			Yes	Yes	Yes	Yes	Yes
Country FE				Yes	Yes	Yes	Yes
Observations	1,681	1,637	1,637	1,637	774	863	1,471
R-squared	0.012	0.014	0.220	0.351	0.448	0.435	0.377
F-test	0.965	0.801	1.464	0.147			0.0752
Prob>F	0.328	0.372	0.228	0.702			0.784

Notes: The outcome measure is the average growth rate during a leader's spell in office. All specifications include country and year fixed-effects. Robust standard errors (clustered at the country level) in parentheses (* significant at 10%; **significant at 5%; ***significant at 1%). Column (5) is based on the restricted sample of Weak Executive Constraints and column (6) is based on the restricted sample of Strong Executive Constraints. In column (7), we drop 148 reformist leaders as described in the text.

Table 4: Robustness

Specification	(1) Father only	(2) Any relative	(3) Father/grandfather held any position	(4) With tenure and age	(5) With tenure and age and interactions	(6) Post 1960	(7) Post 1960 with education as a control
Hereditary Leader	1.836***	1.398**	1.744***	1.538***	1.581***	0.949**	0.917*
	(0.582)	(0.563)	(0.576)	(0.571)	(0.574)	(0.479)	(0.486)
Strong Executive	0.653	0.667	0.635(	0.667	2.529	-0.154	-0.167
Constraints	(0.470)	(0.468)	0.471)	(0.466)	(1.637)	(0.524)	(0.520)
Interaction	-2.095**	-1.933**	-1.415**	-1.951**	-2.082**	-1.782**	-1.733**
	(0.966)	(0.923)	(0.714)	(0.925)	(0.953)	(0.693)	(0.700)
Lgdpcapl	-2.880***	-2.859***	-2.846***	-2.871***	-2.843***	-2.314**	-2.632***
	(0.603)	(0.597)	(0.595)	(0.614)	(0.610)	(1.013)	(0.982)
Tenure (years)				0.056**	0.067**		
				(0.027)	(0.032)		
Interaction tenure*Strong xconst					-0.026		
					(0.063)		
Age (years)				-0.011	0.005		
				(0.017)	(0.020)		
Interaction age* Strong xconst					-0.031		
					(0.025)		
Average years of education							0.254
							(0.231)
Observations	1,637	1,637	1,637	1,634	1,634	753	753
R-squared	0.352	0.351	0.352	0.351	0.352	0.424	0.426
F-test	0.0989	0.501	0.418	0.268	1.313	3.268	3.143
Prob>F	0.754	0.480	0.519	0.605	0.254	0.0733	0.0789

Notes: The outcome measure is the average growth rate during a leader's spell in office. In columns (1) through (3) the upper row indicates the definition of

hereditary leader we use that we describe in detail in the text. In column (4) and (5) we include as additional controls the tenure and age of the leader as we describe in the text and in column (5) we also include the interaction of these variables with strong executive constraints. In columns (6) and (7) we restrict to the post 1960 sample. In column (7) we include the education of the population as we describe in the text. All specifications include country and year fixed-effects. Robust standard errors (clustered at the country level) in parentheses (* significant at 10%; **significant at 5%; ***significant at 1%)

Table 5: Time invariant executive constraints

VARIABLES	(1)	(2) (Weak Executive Constraints)	(3) (Strong Executive Constraints)	(4)	(5) (Weak Executive Constraints)	(6) (Strong Executive Constraints)	(7) (Balanced post 1965 sample)
Hereditary Leader	1.599***	1.711***	-0.481	1.202**	1.187**	-0.280	1.221**
	(0.574)	(0.641)	(1.023)	(0.537)	(0.593)	(0.883)	(0.607)
Log(GDP) lagged	-2.772***	-3.189***	-1.646	-2.625**	-2.411*	-4.169*	-3.077***
	(0.780)	(0.886)	(1.212)	(1.007)	(1.225)	(2.093)	(1.081)
Strong constraints at accession	0.873						
	(0.711)						
Interaction	-2.354**						
	(1.024)						
Mean of strong constraints				3.794***			
				(1.370)			
Interaction				-1.934***			
				(0.723)			
Strong Executive Constraints							0.109
							(0.566)
Interaction							-1.730*
							(0.981)
Observations	1,713	1,253	460	995	691	304	675
R-squared	0.289	0.330	0.452	0.375	0.457	0.509	0.427
F-test	0.781			1.622			
Prob>F	0.378			0.206			

Notes: The outcome variable is the average growth rate during a leader's spell in office. All specifications include country and year fixed-effects. Robust standard errors are in parentheses (* significant at 10%; **significant at 5%; ***significant at 1%). In columns (1) through (3), executive constraints are measured in the first year in which the country enters the sample. Columns (4) through (7) use the average of executive constraints over the entire sample period. Columns (2) and (5) are based on the restricted sample of Weak Executive Constraints and columns (3) and (6) are based on the restricted sample of Strong Executive Constraints. In column (7), the sample period is defined as post 1965.

Table 6 Government Anti-Diversion Policy and Infrastructure Quality

VARIABLES	(1)	(2)	(3)	(4)
Hereditary Leader	0.131**	0.107***	0.047**	0.086*
	(0.062)	(0.039)	(0.021)	(0.044)
Strong Executive Constraints	0.048*	0.162***	-0.007	0.206***
	(0.027)	(0.031)	(0.019)	(0.039)
Interaction	-0.186**	-0.212***	-0.033	-0.164**
	(0.086)	(0.074)	(0.035)	(0.072)
Country dummies	Yes		Yes	
Región dummies		Yes		Yes
Observations	355	355	274	274
R-squared	0.934	0.596	0.954	0.552
F-test	1.058	2.889	0.286	2.173
Prob>F	0.306	0.0919	0.595	0.146

Notes: All specifications include year fixed-effects. Robust standard errors (clustered at the country level) in parentheses (* significant at 10%; **significant at 5%; ***significant at 1%).   In columns (1) and (2) the dependent variables is government anti-diversion policies (GADP) from ICRG, and in columns (3) and (4) the dependent variable is infrastructure quality from BERI, as we describe in the text.

Table 7: The end of dynasties

VARIABLES	End of Dynasty (1)	End of Dynasty (2)
Average growth rate in last 5 years	-20.599***	-20.575***
	(5.925)	(7.906)
Strong executive constraints		-0.035
		(0.589)
Interaction		12.808
		(9.076)
Chi square		1.69
P value		(0.1936)
Observations	470	409

Notes: The left hand side variable is the probability that a dynasty comes to an end given that the country is in a dynastic regime.We model the hazard function associated with being in a hereditary regime and the probability of exiting that regime. Robust standard errors in parentheses (* significant at 10%; **significant at 5%; ***significant at 1%)