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Political Competition, Policy and Growth: Theory and Evidence from the US

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This paper develops a simple model to analyse how a lack of political competition may lead to policies that hinder economic growth. We test the predictions of the model on panel data for the US states. In these data, we find robust evidence that lack of political competition in a state is associated with anti-growth policies: higher taxes, lower capital spending, and a reduced likelihood of using right-to-work laws. We also document a strong link between low political competition and low income growth.

1. INTRODUCTION

One of the most cherished propositions in economics is that, by and large, monopoly is bad and market competition between firms raises the welfare of consumers. Whether competition between political parties has similarly virtuous consequences is far less discussed,¹ despite the long-term monopoly on power by a dominant party observed in a number of existing democracies.² Moreover, few empirical studies speak to the question of whether political competition matters for economic outcomes.³

1. The Chicago School of political economy makes a strong argument as to the efficiency of political competition (Stigler, 1972; Wittman, 1989, 1995), but has not studied the detailed institutional underpinnings of this argument. Polo (1998) and Svensson (1998) provide early formal analyses of how lopsided political competition may lead to excessive rent-seeking or inefficient provision of government services. Lizzeri and Persico (2005) is another example.

2. A large literature in political science discusses the dominant-party systems in countries such as Japan (the Liberal Democratic Party), Malaysia (the United Malays National Organization), Mexico (the Institutional Revolutionary Party), Paraguay (the Colorado Party), and South Africa (the African National Congress), focusing on their political effects (see e.g. the contributions in Pempel, 1990).

3. Besley and Case (2003) discusses some evidence from studies using US data.

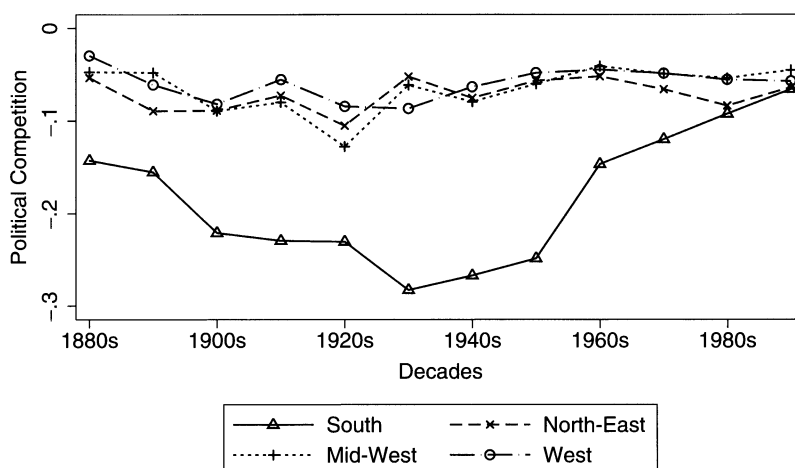


FIGURE 1

Political competition by decades

Notes: Each observation is a 10-year average of our main measure of political competition which ranges from -0.5 to 0 , with larger values indicating more competition. See text for further details.

This paper develops a simple theoretical model to think through these issues. This model illustrates how a positive effect of political competition may come about by inducing political parties to implement growth-promoting policies rather than special-interest policies. The underlying mechanism is that swing voters, whose voting decision is based on parties' economic policy choices, only start to gain electoral influence if political competition exceeds a critical threshold. When investigating the empirical contents of this prediction, our theoretical model guides both the measurement of political competition and the empirical approach.

Our application exploits the substantial variation in political competition across US states and time to explore the relationship between political competition, economic policy, and economic performance. Figure 1 illustrates some of the variation in our main measure of political competition—detailed below—which uses a dataset originating in the work of Ansolabehere and Snyder (2002). This figure displays 10-year averages of political competition for the four main census regions. The most striking deviation from competitive elections in the figure is the well-known decline in political competition in the US South after the 1880s that lasts until the 1960s. In our empirical work, we exploit the variation between different regions of the US and, in particular, the substantial variation in political competition within each region.

A consistent picture emerges. Higher political competition is associated with a change in the policy mix towards policies that are widely believed to be pro-business and growth promoting—lower tax revenue as a share of income, higher infrastructure spending measured by the share of capital outlays in total state government expenditure, and the presence of right-to-work laws. These results are robust across a number of specifications. First, we show that our results hold when we include separate year-dummy variables for the South to capture other changes in economic and cultural trends that are peculiar to the South. Second, our results are also robust when we instrument for political competition to meet legitimate concerns about potential reverse causation. Third, to check that our results are due to political competition and not to political partisanship, we control in a variety of ways for party strength and control of the state legislature and governorship. While the party control variables have the expected sign, the effect of political competition on policy choices remains virtually unchanged. Fourth, we show

that the effect of political competition on policy choices appears non-linear as suggested by the theoretical model. At very low and very high levels of political competition, changes in political competition have smaller impacts on policy compared to intermediate levels. Finally, we show that the results hold in the US South and the US North (more precisely all non-southern states) separately.

We then investigate whether these changes in economic policy are reflected in overall state economic performance by estimating reduced-form growth regressions with political competition as an explanatory variable. We find that over the period after 1929 (from when official state personal income estimates are available), political competition is strongly associated with higher economic growth rates. This finding is again robust to the wide variety of specifications that we check for in the policy regressions. Finally, we obtain very similar results using Easterlin's (1960) estimates of state personal income for 1880, 1900, and 1920. These lend further credence to the conclusion that the association between political competition and growth is not peculiar to the post-1929 period. Taken together, our results provide robust evidence that political competition benefited economic development by inducing parties to pursue growth-promoting policies rather than their private agendas.

In the following, Section 2 develops our theoretical model. Section 3 provides some background on the history of political competition in the US and describes our data. Section 4 presents our empirical strategy and results, while Section 5 concludes.

2. THEORY

Our model illustrates why political competition may promote pro-business economic policy and growth, although this is not the only possibility (see the end of the section for further discussion). We choose a specific model which captures some of the basic features of the empirical application. Two parties compete by picking electoral platforms. To fix ideas, we focus on a single policy which distorts economic decisions and lowers overall income, but transfers resources to one group of citizens. Lack of political competition is defined as an electoral advantage of one of two political parties. This advantage arises from a surplus of committed voters, due to the parties' non-pliable stance on a non-economic issue. The electoral advantage gives a dominant party less incentive to appeal to swing voters, who are not committed to one party and are prepared to vote against candidates pursuing distorted policies.

At a first stage in the model, each of the parties picks a policy platform under uncertainty about a popularity shock. Second, this shock is realized as voters cast their ballot. Finally, private economic choices are made in the light of realized policy. The next subsections deal with these choices in reverse order.

2.1. *The economic model*

We use a reduced-form model of economic decisions.⁴ There are two time periods and a (size one) continuum of citizens, each of whom invests one unit of capital. The first-period return is normalized at unity, while the second-period return is $q(\tau) \geq 1$, where $\tau \in [0, 1]$ is an economic policy. We assume that $q_\tau(\tau) < 0$, so an increase in τ reduces second-period income. However, the policy also creates benefits to a fraction $\alpha < 1$ of the citizens, who receive a

4. In a previous version of the paper (Besley, Persson and Sturm, 2006), the model was given micro-economic foundations, along the lines in Persson and Tabellini (2000, section 14.3). This extended model has two sectors—one traditional, one new—and two time periods. It pivots around quasi-rents earned by owners of traditional factors, and their incentives to protect these rents at the expense of economic growth.

rent of $r(\tau)$, where $r(0) = 0$ and r is an increasing function. Using the policy τ to redistribute income reduces the overall surplus, but creates a net benefit for the recipients of the rent r , which implies that

$$\frac{r_\tau(\tau)}{\alpha} > -q_\tau(\tau) > r_\tau(\tau) > 0.$$

This assumption creates a conflict of interest over policy in a very simple way: it is optimal for the group that benefits from the policy to set $\tau = 1$, but average income *per capita* is higher when $\tau = 0$. The growth rate of the economy

$$G(\tau) = q(\tau) + r(\tau) - 1 \quad (1)$$

is a decreasing function of τ , i.e. growth is higher when τ is closer to zero.

2.2. The political model

There are three types of voters: Democrats, Republicans, and Independents, denoted by $P \in \{D, R, 0\}$. Partisan voters (Democrats and Republicans) make up a fraction $1 - \sigma$ of the population. Only Democrats and Republicans are organized in parties, which are denoted by $p \in \{D, R\}$. Let $\delta(P, p)\Delta$ be the utility gain of a partisan voter P from having her preferred political party p in office. We assume that $\delta(D, R) = \delta(R, D) = 0$ and $\delta(R, R) = \delta(D, D) = 1$.

We assume that the partisan types D and R prefer their respective party because of non-economic issues, i.e. their utility gain Δ dominates any economic concern. Of these committed voters, a fraction $(1 + \lambda)/2$ prefers party D . For example, in an application to the US South, Δ could be the electoral salience of race. The sign of λ can be positive or negative, but to fix ideas in the model presentation we let the Democrats have the edge among committed voters ($\lambda > 0$).

Independent voters ($P = 0$) vote primarily on economic issues and become swing voters. Specifically, their economic payoff of having party p in office depends on the policy choice τ_p of this party and is $v_p = q(\tau_p)$. Independents also care about the identity of parties, but less so than partisans. Their political payoff is ω , for or against party D 's stance on non-economic issues, with $\omega \leq 0$ distributed among the voters. Thus, a swing-voter casts her ballot for party D whenever

$$\eta + \omega + v_D - v_R > 0,$$

where η is an aggregate popularity shock in favour of the Democratic Party. We assume that ω is uniform on $[-(1/2\phi), (1/2\phi)]$, with $\frac{1}{2\phi} < \Delta$.

Using this parameterization, the condition for a Democratic electoral victory, assuming an interior solution, is:

$$\sigma\phi[v_D - v_R + \eta] + (1 - \sigma)\frac{\lambda}{2} > 0.$$

This condition can be rewritten as $\eta > \kappa - (v_D - v_R)$, where

$$\kappa = -\frac{1 - \sigma}{\sigma} \cdot \frac{\lambda}{2\phi}$$

is our indicator of the state of political competition, the measurement of which we discuss in Section 3.

We assume that parties compete by committing themselves to policy platforms $\{\tau_D, \tau_R\}$. Moreover, when parties pick their platforms, they know the distributions of ω and η , but not the realization of η . To further simplify the algebra, let η be uniform on $[-(1/2\xi), (1/2\xi)]$. In this case, the probability of a Democratic win simplifies to:

$$P_D(v_D - v_R - \kappa) = \begin{cases} 1 & \text{if } \xi [v_D - v_R - \kappa] \geq \frac{1}{2} \\ \frac{1}{2} + \xi [v_D - v_R - \kappa] & \\ 0 & \text{if } \xi [v_D - v_R - \kappa] \leq -\frac{1}{2} . \end{cases} \quad (2)$$

Evidently, the model predicts the Democrats' electoral success to depend on two factors, namely the (endogenous) utility difference $v_D - v_R$, and the (exogenous) electoral advantage parameter κ .

The model gives insight into the factors that make political competition stiffer, which corresponds to values of κ closer to zero. Political competition increases as λ approaches zero, i.e. when the advantage of either the Democratic or Republican Party among partisan voters declines. Political competition is also stiffer when σ is large—swing voters make up a larger fraction of the voting population. Lower salience of non-economic issues among the swing voters—a higher ϕ —also raises political competition, as does a more ideologically neutral set of swing voters.⁵

For simplicity, we assume that all policy rents $r(\tau)$ accrue to the winning party, which makes up a share α of the population. While extreme, this assumption clearly illustrates why parties may wish to implement anti-growth policies.⁶ Average utility of a party member is $r(\tau)/\alpha + q(\tau)$. To map the rents into swing-voter utility, define $T(v) = [r(q^{-1}(v))]/\alpha$ as the rents enjoyed by the party when the swing voters' utility is v . (T is a decreasing function.) Let \bar{v} be the swing voters' preferred utility level (with $T(\bar{v}) = 0$) and let $1 + T_v(\underline{v}) = 0$ define the level of swing-voter utility that maximizes party utility with $q^{-1}(\underline{v}) \in (0, 1)$.

Electoral competition can now be modelled as parties choosing $\{v_D, v_R\}$ rather than the underlying policies $\{\tau_D, \tau_R\}$. The expected payoff of the Democratic Party is:

$$v_R + P_D(v_D - v_R - \kappa) [\Delta + T(v_D) + v_D - v_R] , \quad (3)$$

while the Republican Party payoff is:

$$\Delta + T(v_R) + v_R - P_D(v_D - v_R - \kappa) [\Delta + T(v_R) + v_R - v_D] . \quad (4)$$

The interesting difference between these payoffs is captured by κ , our measure of political competition. As we will see, because $\kappa < 0$ the Democratic Party—or, more generally, the party with an electoral advantage—is less pro-growth. The tradeoff facing parties is quite simple: offering a higher utility to swing voters increases a party's chance of winning, but reduces the rents (T) captured if winning.

2.3. Equilibrium

What does our model predict about the effects of political competition, as measured by κ ? Formally, we can represent an equilibrium of the model by a pair of utility levels $\{v_D, v_R\} \in [\underline{v}, \bar{v}]$,

5. Our assumption that ω is uniformly distributed is made for analytical convenience. If, instead, ω had a smooth unimodal distribution, a shift of the mass in this distribution towards the middle would raise the probability distribution function (p.d.f.) g_ω in that range. An increase in the density ϕ of our assumed uniform can be thought of as approximating such a shift towards a more ideologically neutral electorate.

6. In Besley, Persson and Sturm (2006), our political setup had explicit micro-political foundations. In that model, a rent-seeking motive arises as a result of lobbying of the incumbent party by a group of vested interests in the population.

which forms a Nash equilibrium in the pre-election game between the two parties, given the equilibrium behaviour of voters. As above, we illustrate the results in the case where $\kappa < 0$, i.e. the electorate is biased towards the Democrats.

We study an equilibrium where two assumptions hold:

Assumption 1.

$$2 + T_v(\bar{v}) < 0,$$

the party reaction functions slope upwards in a neighbourhood of \bar{v} , and

Assumption 2.

$$\frac{(1 + T_v(\bar{v}))}{2} + \xi \Delta < 0,$$

the party's marginal cost of foregone rents exceeds the marginal benefit of ideological stance, at the point of undistorted policy. Under these conditions, dominant parties will tend to pick an outcome where $v_p < \bar{v}$. Note that Assumptions 1 and 2 hold if α is close enough to zero, i.e. if rents are sufficiently concentrated.

The key result linking policy and political competition (proof in Appendix A) is:

Proposition 1. *If Assumptions 1 and 2 hold, an equilibrium exists and the effect of political competition on economic outcomes has three ranges:*

1. *For κ below a lower threshold (κ_L) the Democrats pursue their own preferred (anti-growth) policy and win for sure.*
2. *For κ in an intermediate range below a higher threshold (κ_H), the Republicans pick more pro-growth policies than the Democrats. As competition increases, the probability that the Republicans win increases and the Democrats move towards pro-growth policies.*
3. *For κ close enough to zero, the party ranking and the effect of political competition on policy and economic growth are ambiguous.*

These results give way naturally to an empirical approach. First, the model guides our measurement of the key parameter κ gauging the degree of political competition. Second, we test the main prediction in Proposition 1—that greater political competition improves economic policy. Third, we can also test the prediction that the effect of κ arises from political competition rather than the party in power.

A more specific prediction is that the effect of κ should be non-linear, reflecting the three cases in Proposition 1. At low levels of political competition, the dominant party is unassailable, picks its preferred outcome, and leaves swing voters with utility \underline{v} . Thus, a further deterioration in political competition has no effect on policy. The effect of political competition is at its largest in an intermediate interval (between κ_L and κ_H), where two forces create pro-growth policies as competition increases. The dominant party adapts its policies towards the preferences for growth of swing voters, and the lagging party, which pursues a maximum-growth policy ($v_R = \bar{v}$), increases its chances of winning. When competition becomes more intense (above κ_H), the pro-growth forces are again weaker. As the lagging party raises its chances of winning, it obtains more scope to pursue a policy of rent-seeking rather than growth.

2.4. Discussion

Our model captures a very simple mechanism which arguably resonates well with why we think competition may be beneficial in other fields. The model provides a useful way to structure our thinking about what may be driving the empirical results we present below in the context of US states. However, we are certainly not claiming that the finding in Proposition 1 represents a general proposition relating policy and growth to political competition. Moreover, the existing literature offers some reasons to be circumspect.

The conclusion that competition enhances policies conducive to growth may, for example, be overturned in a model that highlighted dynamic incentives along the lines of Acemoglu and Robinson (2006). In their world, more competition could intensify political instability, which in turn might diminish the incentive for incumbents to implement growth-enhancing reforms rather than seeking short-term rents.

Nor does our model offer any clear-cut welfare implication of increasing political competition. Even if growth increases, there can be gainers and losers such that, e.g. a Utilitarian measure of welfare could rise or fall. This possibility is consistent with the broader literature on political competition. For example, Lizzeri and Persico (2005) argues that competition, as measured by the number of parties, may reduce welfare. The mechanism behind this result is that proliferation in parties can channel resources into targeted transfers rather than general-interest public goods. Similar results would also hold in models in which intensified political competition resulted in increased reliance of wasteful campaign contributions.⁷

3. HISTORICAL BACKGROUND AND DATA

3.1. Historical background

While the US has been a vibrant democracy since its foundation, it has experienced substantial variation in the degree of political competition. During our period of interest, many states have seen long periods of substantial Republican majorities in elections. Vermont, for example, was dominated by the Republican Party for over a century until the 1960s. In this period, Republicans controlled virtually all state-wide offices and were frequently elected with over 70% of the vote.

However, the most dramatic departure from competitive elections was a virtual monopoly of the Democratic Party in many states of the US South for much of the period from the 1900s until the mid-1960s.⁸ In the remainder of this subsection, we discuss the changes in political competition in the South and how they can be seen through the lens of our model.

After the end of the civil war in 1865, blacks for the first time enjoyed both civil rights and voting rights. The 14th amendments to the constitution (ratified in 1868) formalized civil rights irrespective of race and the 15th amendment (ratified in 1870) stipulated

“the right of citizens of the US to vote shall not be denied or abridged by the US or by any State on account of race, colour, or previous condition of servitude.”

With the withdrawal of the last northern troops in 1877, however, the southern states quickly eroded the newly gained rights of blacks. The passage of the so-called Jim Crow laws imposed

7. However, the precise micro-foundations for campaign finance would be important for this conclusion since, in a model along the lines of Coate (2004), some campaign contributions can increase welfare.

8. See, *inter alia*, Wright (1987, 1999), Key (1950) and Davidson and Grofman (1994) for an extensive analysis of the US South.

racial segregation on many aspects of public life ranging from schools, over parks and public libraries, to burial grounds. Kousser (1974) documents how the vigorous political competition in the US South in the 1870s started to decline throughout the 1880s and 1890s. While the Democratic Party had gained control of all state governments in the south by the 1880s, effective opposition to the Democratic Party ended with the introduction of various voting restrictions, notably literacy tests and poll taxes, during the second half of the 1890s and early 1900s. These restrictions immediately and sharply reduced election turnout of black and poor white voters—which constituted the power base of southern Republicans all the way up to the 1960s—and effectively eliminated any serious opposition to the Democratic Party. The sharp downturn in political competition in the south around this time is clearly visible in our specific measure of political competition in Figure 1.

The Democratic Party's monopoly on power in the US South went essentially unchallenged until the 1960s. The civil rights movement of the 1950s and 1960s culminated in the Civil Rights Act of 1964. On the other hand, the 1965 Voting Rights Act (VRA) came much more as a surprise. For example, it was not even mentioned in Lyndon Johnson's 1965 State of the Union Address, which otherwise contained a record-long legislative agenda for his new term. Political conditions changed very quickly, however, in response to the graphic media coverage of brutal crackdowns on 7 March 1965, by state troopers on protesters against political discrimination, who were marching from Selma, AL, to the state capital of Montgomery. Johnson could collect enough support from congressional Republicans to pass the VRA into law by the summer, despite the opposition of southern Democrats.⁹

The 1965 VRA reintroduced political competition in the US South. It gave the Attorney General authority to appoint federal examiners to oversee voter registration in states, or counties, using literacy or qualification tests and where less than 50% of the voting age population had voted in the 1964 presidential election. He could also seek legal action against poll taxes as a prerequisite for voting in state elections, and the Supreme Court ruled such usage illegal in a 1966 decision, which became directly binding on Alabama, Mississippi, Texas and Virginia.¹⁰ The elimination of voting rights restrictions induced a sharp increase in turnout and triggered a steep increase in political competition, which is clearly visible in Figure 1.¹¹

The set of political changes that took place in the South over this period are quite complex. In our simple model, we can interpret these changes through the derived parameter κ , which is determined by voter preferences and the composition of the electorate into partisans and swing voters.¹² It is a non-trivial task to validate such changes from independent sources. The best source is probably the data in the biannual National Election Studies (NES), available from 1952 to 2002.¹³ The number of respondents in each NES cross section is quite small, at most 1500 in total, so it does not allow us to reliably single out voters in individual states, let alone subdivide by race. With this caveat, Figure 2 graphs an estimate of political competition κ for

9. See Mackaman (2005) for a concise historical account of the political events that led to the passing of the 1965 VRA.

10. *Harper v. Virginia State Board of Elections* (1966). South and North Carolina, Louisiana, Georgia, Florida, Arkansas, and Tennessee had abolished their poll taxes at an earlier date.

11. Davidson and Grofman (1994), Black and Black (2003), and Valley (2004) give detailed accounts of how the VRA changed southern politics with regards to minority representation and the Democratic stronghold on power.

12. This contrasts with a view that sees changes in party preferences as the prime driving force of political change over the period.

13. See <http://www.umich.edu/~nes/>

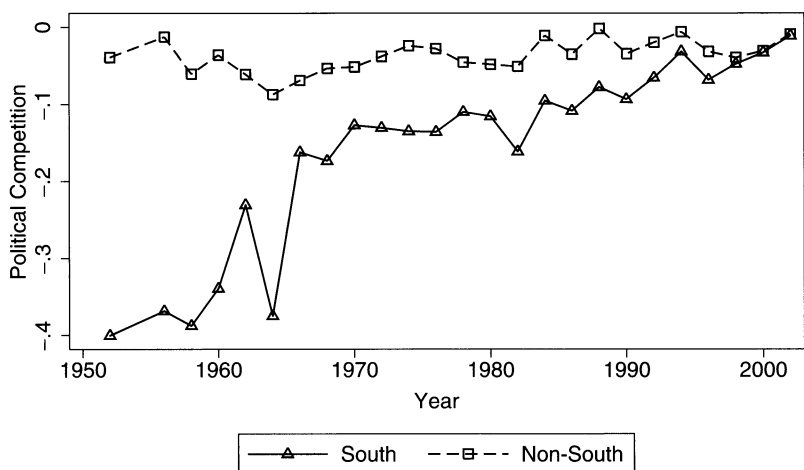


FIGURE 2

Political competition calibrated from NES surveys

Notes: The graph displays the results of a calibration of our theoretical measure of political competition for states in the US South and North using the biannual NES data. See text for details about the calibration.

the South and non-South over the 50 years of available surveys.¹⁴ The change of κ in the South is particularly pronounced during and after the 1960s. This change is, in part, due to a rise in the share of swing voters (σ in the model), as well as a fall in the share of partisan Democrats less partisan Republicans (λ in the model). The value of κ estimated from the NES is thus fully consistent with the claim that southern competition increased drastically from the 1960s. Most importantly, the pattern of political competition that emerges from the calibration is very similar to our main empirical measure of political competition that we graph in Figure 1 and define in the next subsection.

3.2. Data and measurement

Our key explanatory variable is a measure of political competition in each of the continental US states over time. To construct that measure, we use a dataset originating in the work of Ansolabehere and Snyder (2002), who collected election results for a broad set of directly

14. The parameter κ is estimated as follows. Respondents in the NES are classified as Republican if variable VCF0301 (“Generally speaking, do you usually think of yourself as a Republican, a Democrat, an Independent, or what?”) is 6 (weak Republican) or 7 (strong Republican), as Democrat if 1 (strong Democrat) or 2 (weak Democrat), or as swing voters if 3 (Independent closer to the Democratic Party), 4 (Independent closer to neither party), or 5 (Independent closer to the Republican Party). We calculate the proportion of each type in every state and year as the ratio of the number of Republicans/Democrats/swing voters to the total number of respondents (excluding those with a missing value) each year (the sum of the three percentage points is not equal to one hundred, as some respondents are categorized as apolitical (their variable VCF0301 is 9)). Our estimate of $\kappa = -\frac{(1-\sigma)\lambda}{2\sigma\phi}$ is then computed as follows. We take the proportion of Democrats less the proportion of Republicans, i.e. $(1 - \sigma)\lambda$, and divide by the proportion of swing voters, i.e. σ . We then calibrate ϕ to a constant which implies a 1952 winning probability of 90% for the Democrats in the South, i.e.

$$\frac{1}{2} - \kappa = 0.9,$$

which implicitly normalizes $\xi = 1$.

elected state executive offices, ranging from US representatives, over the governorship, to down-ballot officers, such as Lieutenant Governor, Secretary of State, Attorney General, etc.¹⁵ The dataset reports the average vote share of the Democrats in all state-wide races in state s at time t , which we denote d_{st} .

Our theory suggests that we should measure (the lack of) political competition by the dominance of either the Democratic or Republican Party in state-wide elections.¹⁶ We thus define κ_{st} as the party-neutral measure

$$\kappa_{st} = -|d_{st} - 0.5|. \quad (5)$$

Because of the minus sign, higher values of this variable correspond to states and periods with more political competition. The variable κ_{st} has a distribution heavily skewed to the right: while we have about 160 state-year observations with political competition lower than -0.4 , we have about 2400 observations with competition between -0.1 and 0 .¹⁷ The spirit of our model is to capture the effect of long-term shifts in political competition, whereas our empirical measure mixes up short-term and long-term shifts. In the empirical section, we emphasize the long-term shifts in two ways: we instrument for political competition (see below), and average the data over longer periods.

To measure the policy stance of the state government (τ in the model), we use three main variables: total state tax revenue as a percentage of state personal income, state infrastructure spending measured by the percentage share of capital outlays in total state government expenditure, and an indicator variable of whether or not a state has a right-to-work law. Increases in the share of capital expenditure at the expense of current expenditure and reductions in the total tax burden are policies which are widely believed to be conducive to economic development. Right-to-work laws make it illegal to demand that employees join a union, or to automatically deduct union fees from wages. Holmes (1998) documents that right-to-work laws appear to have strong effects on the location choices of business across US state borders.

To explore whether political competition not only affects policy choices, but also economic growth (as in the model), we use the growth rate of state personal income as an alternative dependent variable.¹⁸ Closely related is the share of non-farm income in total personal income of the state, as a measure of structural change. To investigate whether our results are indeed due to changes in political competition rather than policy differences between the Democratic and Republican Party, we use an indicator variable of the governor's party affiliation and the party composition of the state upper and lower houses to create indicator variables whether any one party controls both chambers of the state legislature.¹⁹ As a further proxy for state policy preferences, we also control, linearly, for the democratic votes share (d_{st}) that enters our measure of political competition.

As discussed further below, our measure of political competition is not necessarily exogenous to the outcome variables. We therefore use the federal intervention in the US South via

15. We are very grateful to Jim Snyder for sharing an updated and expanded version of this dataset with us.

16. We note that the rates of name recognition of the candidates for the down-ballot offices is typically very low among voters. This makes it more likely that our measure of political competition—to a substantial degree—is driven by party attachment of voters rather than the popularity of individual politicians.

17. Most states have state-wide elections in every other year or every 4 years. We linearly interpolate our index of political competition for years in which no state-wide elections take place.

18. As gross domestic product (GDP) data at the state level is available only from 1963 onwards, we follow the US state literature (see e.g. Barro and Sala-i-Martin, 2004) and use state personal income as our measure of state output.

19. These data were previously used in Dal Bó *et al.* (2007) and we are grateful to Ernesto Dal Bó for sharing the data with us.

TABLE 1
Means and standard deviations

	All states			Southern states			Northern states		
	Observed (1)	Mean (2)	S.D. (3)	Observed (4)	Mean (5)	S.D. (6)	Observed (7)	Mean (8)	S.D. (9)
Political competition	3504	−0.097	0.111	1168	−0.172	0.153	2336	−0.060	0.052
Democratic governor	3467	0.574	0.495	1167	0.791	0.407	2300	0.464	0.499
Democrats control state house and senate	3504	0.489	0.500	1168	0.918	0.275	2336	0.275	0.447
Republicans control state house and senate	3504	0.311	0.463	1168	0.031	0.173	2336	0.451	0.498
Democratic vote share	3504	0.550	0.139	1168	0.658	0.168	2336	0.497	0.079
State income growth rate	3456	0.022	0.067	1152	0.025	0.063	2304	0.020	0.069
Total tax revenue as a % of state personal income	2496	5.74	1.438	832	6.08	1.215	1664	5.57	1.509
Infrastructure spending as a % of state government expenditure	2496	14.49	7.406	832	15.01	6.671	1664	14.23	7.737
Right-to-work laws	3504	0.274	0.446	1168	0.417	0.493	2336	0.203	0.402
Non-farm income as a share of total income	3456	0.934	0.081	1152	0.931	0.075	2304	0.935	0.084

Notes: The table reports means and standard deviations both for all 48 continental US states and for southern and northern (i.e. non-southern) states separately. Our measure of political competition varies from −0.5 to 0, with larger values indicating more completion. Our measure of infrastructure spending is the percentage share of capital outlays in total state government expenditure. See the text for a full definition of all variables and Appendix B for sources.

the 1965 VRA as an additional source of exogenous variation. For this purpose, we construct a variable, which is equal to the share of the state population subject to either a literacy test or a poll tax (or both) that attracted the attention of the 1965 VRA. Prior to 1965, this variable is equal to 1.0 in Alabama, Georgia, Louisiana, Mississippi, South Carolina, Texas, and Virginia and equal to 0.4 and 0.034 in North Carolina and Arizona, respectively.²⁰ As mentioned above, these voting rights restrictions were introduced at the beginning of the 20th century. Appendix B provides detailed sources for each of our variables. Table 1 reports (conditional) means and standard deviations for the variables we use to establish the empirical results in the next section.

4. EMPIRICAL STRATEGY AND RESULTS

We discuss the empirical results in two steps. We first look for a link between political competition and policy choices. In a second step, we investigate whether there is also a reduced-form link between political competition and growth.

4.1. Policy

The crucial mechanism highlighted by Proposition 1 is that political competition changes the incentives of politicians to implement growth-promoting policies. In particular, our theoretical

20. A similar strategy has previously been used by Husted and Kenny (1997).

model suggests that increases in political competition should make policy choices more pro-business. To examine this link empirically, we estimate regressions of the form

$$\tau_{st} = \theta_s + \nu_t + \delta\kappa_{st} + \varepsilon_{st}, \quad (6)$$

where τ_{st} is a measure of the policy stance in state s at time t and θ_s and ν_t are state and year fixed effects, respectively. We estimate robust standard errors adjusted for clustering at the state level. As mentioned in the data section, we consider three different measures for τ_{st} : total state tax revenue as a percentage of state personal income, state infrastructure spending measured by the percentage share of capital outlays in total state government expenditure, and whether a state has a right-to-work law. Below we also consider specifications which add a number of additional control variables to equation (6) and instrument for political competition.

Columns (1), (4), and (7) of Table 2 contain estimates of the basic specification in equation (6) for our three policy measures. We find that strong political competition is indeed associated with pro-business policy choices. In particular, increases in political competition reduce state tax revenue as a share of state personal income, increase our measure of infrastructure spending, and also increase the probability that a state has a right-to-work law.

The remaining columns of Table 2 consider two alternative econometric specifications. The large-scale changes in political competition in the US South have clearly been associated with other important changes in the southern economy and society which could be correlated with policy choices. To capture these wider changes in a non-parametric way, we include interactions between the time dummies and an indicator variable for the 16 southern states as defined by the US Census. Columns (2), (5), and (8) show that our estimates are very similar in this alternative specification, which allows for different trends in the US North and South in a flexible (non-parametric) way.

The final set of regressions in Table 2 address the possibility of reverse causation from policy choices to the degree of political competition. To minimize such endogeneity, which would plausibly bias our estimates downwards, we instrument political competition with the exogenous intervention of the federal government in southern politics through the 1965 VRA as discussed in Section 3.2 above. In particular, we instrument political competition with a variable which is equal to the share of the state population subject to either a literacy test or a poll tax (or both) that attracted the attention of the 1965 VRA and zero after 1965.²¹ Columns (3), (6), and (9) of Table 2 show that the IV estimates are indeed somewhat larger than our OLS estimates and highly statistically significant.

Our estimates are not only statistically significant but also economically important. The OLS estimate of the impact of political competition on taxes in Column (1) of Table 2, for example, suggests that an increase in political competition by about 0.3—a typical variation in political competition in many southern states over the last century—reduces state tax revenue as a share of state personal income by about 1 percentage point relative to a sample mean of 5.7%. Similarly, the OLS estimate in Column (4) implies that such an increase in political competition increases state infrastructure spending measured by the share of capital spending in total state expenditure by about 1.5 percentage points relative to a sample mean of 14.5%.

Table 3 investigates three additional implications of our theoretical model. Our model predicts that policy choices are shaped by the degree of political competition rather than by

21. The IV strategy also addresses another possible bias in the estimate of δ . Our empirical measure of political competition fluctuates substantially from one election to the next and these short-run fluctuations will poorly approximate the underlying degree of political competition, which our model emphasizes. The IV strategy relying on once-and-for-all removals of voting restrictions would remove the downward bias associated with such measurement error.

TABLE 2
Political competition and policy: basic results

	Tax revenue as a % of state income (1)	Tax revenue as a % of state income (2)	Tax revenue as a % of state income (3)	Infrastructure spending as a % of state government expenditure (4)	Infrastructure spending as a % of state government expenditure (5)	Infrastructure spending as a % of state government expenditure (6)	Right-to-work laws (7)	Right-to-work laws (8)	Right-to-work laws (9)
Political competition	-3.036*** (0.590)	-2.362*** (0.662)	-4.718*** (1.366)	4.975*** (1.651)	5.070** (2.449)	8.459** (3.770)	0.973*** (0.221)	0.817*** (0.242)	1.504*** (0.315)
South × year interactions	No	Yes	No	No	Yes	No	No	Yes	No
Method	OLS	OLS	IV	OLS	OLS	IV	OLS	OLS	IV
Sample	1950–2001	1950–2001	1950–2001	1950–2001	1950–2001	1950–2001	1929–2001	1929–2001	1929–2001
First stage <i>F</i> -statistic			36.16			36.16			68.44
Observations	2496	2496	2496	2496	2496	2496	3504	3504	3504
<i>R</i> -squared	0.828	0.837		0.836	0.843		0.722	0.730	

Notes: All regressions include state and year fixed effects as additional control variables. Our measure of infrastructure spending is capital outlays as a percentage of total state government expenditure. In parentheses are standard errors which are robust against heteroskedasticity and adjusted for clustering at the state level. *, **, ***, and ****, Significance at the 10%, 5%, and 1% level, respectively.

party preferences. While our results so far are consistent with this view, an obvious alternative explanation of our findings could be different policy preferences between Democrats and Republicans. In particular, the period of increasing political competition in the US South was also a period of increased Republican representation among state governors and legislators.

To address this possibility, Columns (1), (5), and (9) of Table 3 include our measures of the party affiliation of the governor and indicators for which party controls both houses of the state legislature.²² Whereas these control variables have point estimates which are consistent with commonly held views about the Democratic and Republican Party, our estimates of the impact of political competition are quantitatively very similar to our previous estimates and remain statistically significant. In Columns (2), (6), and (10), we also include the share of the Democratic vote as a further control variable.²³ While it is less plausible to treat this variable as exogenous (due to its direct dependence on v_D and v_R) than the party control variables, our results are broadly robust to this further control. The results on taxation and capital spending are very similar, but the coefficient on competition for the right-to-work laws is now smaller in size and not significant.²⁴

The second and related implication of our theoretical model is that both parties change their policy stance in the same way if they are the dominant party. To examine this property of the model, we create separate variables for the impact of political competition on Democratic and Republican governors, which are included in Columns (3), (7), and (11) of Table 3. While the point estimates for the impact of political competition are the same for Democratic and Republican governors with the exception of the right-to-work laws, we find that the impact on Democratic governors is estimated substantially more precisely and is quantitatively more important.

Third, we take seriously the prediction of our model that political competition has a non-linear effect. According to Proposition 1, we should see small effects on policy at both very low and very high levels of competition. Instead, the main impact should occur at intermediate levels of political competition, when the dominant party starts improving its policy stance. Columns (4), (8), and (12) of Table 3 explore this issue. Specifically, we create binary indicators for values of political competition larger than -0.10 , -0.25 , and -0.4 , respectively, and include these, rather than the continuous measure of political competition, in our standard specification. Thus, the estimated effect of a change in political competition from below -0.4 into the range -0.10 to -0.25 , for example, is the *sum* of the coefficients on the last two indicator variables. The results show that the effect of political competition indeed appears to be non-linear. Quantitatively, the largest policy changes due to greater competition typically come about when competition exceeds -0.25 .²⁵

Table 4 presents two further robustness checks of our results. The first six columns in this table re-estimate the specifications in Columns (1), (5), and (9) of Table 3 separately for the states in the US South and US North. The results show that with the exception of right-to-work laws, which seem to be mainly driven by the variation in the US South, the estimates on

22. We drop the small number of observations with independent governors from these regressions.

23. Note that we can include both the Democratic vote share (d_{st}) and our measure of political competition ($-|d_{st} - 0.5|$) in the regression because of the kink in our measure of competition when the Democratic vote share reaches 50%. However, it would not be possible to separately identify these two variables if we allowed for an arbitrary break in the marginal effect of the Democratic vote share at 50%.

24. As a further robustness test, we have also interacted our measures of party control and the share of the Democratic vote share with the indicator for the 16 southern states. However, also with these additional regressors (results not shown) the effect of political competition on policy choices remains very similar.

25. The results of this specification are also very similar if one excludes our set of party control variables from these regressions.

TABLE 3
Political competition and policy: party effects and non-linearities

	Tax revenue as % of state income (1)	Tax revenue as % of state income (2)	Tax revenue as % of state income (3)	Tax revenue as % of state income (4)	Infrastructure spending as a % of state government expenditure (5)	Infrastructure spending as a % of state government expenditure (6)	Infrastructure spending as a % of state government expenditure (7)	Infrastructure spending as a % of state government expenditure (8)	Right-to- work laws (9)	Right-to- work laws (10)	Right-to- work laws (11)	Right-to- work laws (12)
Political competition	-2.312** (0.669)	-1.527** (0.582)			4.889* (2.463)	4.783** (2.198)			0.760** (0.238)	0.289 (0.238)		
Political competition × Democratic governor			-2.853*** (0.830)				5.910** (2.829)				1.071*** (0.247)	
Political competition × Republican governor			-0.413 (0.585)				1.310 (2.935)				-0.287 (0.277)	
Political competition > -0.10				-0.128** (0.055)				0.401* (0.237)				0.010 (0.023)
Political competition > -0.25				-0.368* (0.217)				1.107 (0.857)				0.150* (0.077)
Political competition > -0.40				-0.226 (0.269)				1.049 (0.788)				0.016 (0.098)
Democratic governor	0.024 (0.055)	-0.002 (0.060)	-0.119* (0.063)	0.000 (0.060)	-0.240 (0.213)	-0.237 (0.228)	0.028 (0.325)	-0.248 (0.226)	-0.022 (0.015)	0.003 (0.014)	0.060** (0.024)	0.001 (0.013)
Democrats control state house and senate	0.167** (0.080)	0.171** (0.079)	0.176** (0.078)	0.178** (0.078)	-0.586* (0.312)	-0.586* (0.312)	-0.604* (0.312)	-0.611* (0.311)	-0.080*** (0.029)	-0.073** (0.028)	-0.083*** (0.030)	-0.078*** (0.027)
Republicans control state house and senate	-0.117 (0.091)	-0.073 (0.088)	-0.111 (0.091)	-0.072 (0.089)	0.075 (0.460)	0.070 (0.467)	0.064 (0.461)	0.075 (0.469)	0.088** (0.033)	0.055** (0.025)	0.084*** (0.031)	0.057** (0.025)
Democratic vote share		1.225** (0.513)		1.182** (0.500)		-0.166 (1.926)		0.174 (1.933)		-0.813*** (0.192)		-0.731*** (0.181)
South × year interactions	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year sample	1950–2001	1950–2001	1950–2001	1950–2001	1950–2001	1950–2001	1950–2001	1950–2001	1929–2001	1929–2001	1929–2001	1929–2001
Method	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Observations	2478	2478	2478	2478	2478	2478	2478	2478	3467	3467	3467	3467
R-squared	0.839	0.842	0.841	0.842	0.843	0.843	0.843	0.843	0.742	0.754	0.749	0.756

Notes: All regressions include state and year fixed effects as additional control variables. Our measure of infrastructure spending is capital outlays as a percentage of total state government expenditure. In parentheses are standard errors which are robust against heteroskedasticity and adjusted for clustering at the state level. *, **, ***, Significance at the 10%, 5%, and 1% level, respectively.

both sub-samples are surprisingly similar. The final three columns in Table 4 look at the lower frequency variation in the data, so as to emphasize the longer term shifts in political competition, by estimating on 5-year averages. The results are very similar in this alternative specification as well. These results further strengthen the conclusion that the association between political competition and economic policies is not an artefact of any particular estimation method and a specific historical episode, but is a robust result across a number of different identification approaches and samples.

Taken together, these results support our core theoretical proposition that increased political competition has substantial effects on policy choices and promotes the implementation of policies that are widely believed to promote economic growth.

4.2. Growth

We now turn to the question whether the effects of political competition on state policies extend to measurable changes in economic performance. Absent a fully structural model, which would allow us to identify the impact of a range of policies on economic performance, we take the more modest approach of exploring whether there is a reduced-form relationship between economic growth and political competition.

Following equations (1) and (6), we estimate the relationship between political competition and economic growth with a standard growth regression of the form²⁶

$$g_{st} = \theta_s + v_t + \beta y_{st-1} + \delta \kappa_{st} + \varepsilon_{st}, \quad (7)$$

where g_{st} is the annual growth rate of personal income in state s at time t , θ_s and v_t are state and year fixed effects, and where y_{st-1} is the usual convergence term allowing for Solow-style convergence of *per capita* income with $\beta < 0$ indicating income convergence.²⁷ Our key regressor of interest is again our measure of political competition κ_{st} and we want to test whether $\delta > 0$, i.e. stiffer political competition raises the growth rate of state personal income.

Column (1) of Table 5 reports the results of OLS estimates of equation (7) on our basic dataset which runs from 1929, the first year for which Census estimates of state personal income are available, to 2001. Consistent with the model predictions, we find a positive association between political competition and growth, which is statistically significant at conventional levels. These results hold when we include south-year interactions in Column (2) and when we instrument political competition with the federal interventions to eliminate voting restrictions in Columns (3) and (4). Again, the effect we find is not only statistically significant, but quantitatively important. The estimate in Column (1) implies, for example, that an increase in political competition from -0.3 to zero, which would be typical for many southern US states over the last century, raised long-run personal income *per capita* by about 15%.²⁸

Table 6 collects a number of additional results on the link between political competition and growth. Columns (1) through (4) show that—as in Table 3—the effect of political competition is robust to controlling for party representation and non-linear as suggested by our theory. Column (3) also suggests that the effect of competition on Democratic and Republican governors is much more similar in this context than in the policy regressions. It might be tempting to

26. For an early discussion of panel growth regressions see Caselli *et al.* (1996).

27. There are well-known econometric issues with dynamic panels that include state fixed effects, but the large number of time periods (in most specifications 72) makes us confident that any such bias is of small order. We return to this issue below.

28. Note that the long-run effect of political competition on income implied by the estimates obtained from equation (7), is given by: $-\delta/\beta$.

TABLE 4
Political competition and policy: further robustness

	Tax revenue as % of state income (1)	Infrastructure spending as a % of state government expenditure (2)	Right-to- work laws (3)	Tax revenue as % of state income (4)	Infrastructure spending as a % of state government expenditure (5)	Right-to- work laws (6)	Tax revenue as % of state income (7)	Infrastructure spending as a % of state government expenditure (8)	Right-to- work laws (9)
Political competition	-2.656** (0.911)	4.994 (3.745)	1.165*** (0.287)	-1.219** (0.571)	3.874* (2.205)	-0.046 (0.333)	-3.295*** (0.961)	6.767* (3.520)	1.011*** (0.311)
Democratic governor	0.142** (0.062)	-0.514 (0.546)	-0.032 (0.029)	-0.027 (0.074)	-0.138 (0.237)	-0.007 (0.017)	0.017 (0.088)	-0.352 (0.330)	-0.024 (0.025)
Democrats control state house and senate	-0.142 (0.205)	-0.032 (0.633)	-0.137** (0.062)	0.231*** (0.081)	-0.682* (0.358)	-0.087** (0.033)	0.220 (0.142)	-0.632 (0.506)	-0.103** (0.050)
Republicans control state house and senate	-0.405** (0.166)	0.710 (0.504)	0.116** (0.052)	-0.087 (0.094)	0.023 (0.490)	0.084** (0.032)	-0.193 (0.183)	0.124 (0.697)	0.129** (0.062)
South × year interactions	N/A	N/A	N/A	N/A	N/A	N/A	Yes	Yes	Yes
Method	OLS	OLS	OLS	OLS	OLS	OLS	5-year averages 1950–1999	5-year averages 1950–1999	5-year averages 1929–2001
Year sample	1950–2001	1950–2001	1929–2001	1950–2001	1950–2001	1929–2001	1950–1999	1950–1999	1929–2001
States in sample	Southern 832	Southern 832	Southern 1167	Northern 1646	Northern 1646	Northern 2300	All 479	All 479	All 671
Observations	832	832	1167	1646	1646	2300	479	479	671
R-squared	0.807	0.805	0.759	0.847	0.857	0.719	0.872	0.898	0.768

Notes: All regressions include state and year fixed effects as additional control variables. Our measure of infrastructure expenditure is capital outlays as a percentage of total state government expenditure. In parentheses are standard errors which are robust against heteroskedasticity and adjusted for clustering at the state level. **, ***, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

TABLE 5
Political competition and economic growth: basic results

	Growth of personal income (1)	Growth of personal income (2)	Growth of personal income (3)	Growth of personal income (4)
Political competition	0.045*** (0.013)	0.028** (0.013)	0.082*** (0.021)	0.051** (0.023)
Lagged personal income	−0.095*** (0.014)	−0.104*** (0.015)	−0.105*** (0.015)	−0.108*** (0.014)
South × year interactions	No	Yes	No	Yes
First stage <i>F</i> -statistic			50.49	25.03
Method	OLS	OLS	IV	IV
Sample	1929–2001	1929–2001	1929–2001	1929–2001
Observations	3456	3456	3456	3456
<i>R</i> -squared	0.651	0.677	0.649	0.676

Notes: All regressions include state and year fixed effects as additional explanatory variables. In parentheses are standard errors which are robust against heteroskedasticity and adjusted for clustering at the state level. *, **, ***, Significance at the 10%, 5%, and 1% level, respectively.

suspect that the growth effect is identified exclusively from variation in the southern states. In Columns (5) and (6) of Table 6, we also estimate the growth regressions separately for the states in the US North and US South. While the estimates are too imprecise to reach statistical significance at conventional levels, the effect of political competition is again positive and of similar magnitude in both sub-samples.

In Column (7), we look at 5-year averages of growth, which allows us not only to emphasize the long-term shifts in political competition but also to smooth out some of the short-term volatility in income. The results are broadly robust with higher growth, again being associated with greater political competition. Column (8) investigates the possible bias of estimating these 5-year growth rates with state-fixed effects in the presence of a lagged dependent variable. Here, we use the Arellano and Bond GMM 1st difference estimator, as recommended by Caselli, Esquivel and Lefort (1996). The specification uses one additional lag of state personal income as an instrument for the lagged dependent variable. We again find very similar results.

The theory is based on the idea that greater political competition changes policy so as to allocate resources away from the traditional sector. A reasonable interpretation of the identity of the traditional sector, particularly in the US South, is agriculture. To test this prediction, we thus use the share of non-farm income in state personal income as the left-hand side variable. Column (9) in Table 6 shows that political competition is indeed strongly positively associated with the share of non-farm income in total income.

While 1929 is the first year when census estimates of state personal income are available, there are widely used estimates of state personal income by Easterlin (1960) for the years 1880, 1900, and 1920.²⁹ As illustrated in Figure 1, this was a period in which political competition in the US South declined sharply. A key attraction of the 1880–1920 period is that potentially important omitted variables that may confound our growth estimates for the 1929–2001 period are unlikely to be relevant during this period. For example, the spread of air conditioning from

29. The methodology and data sources behind these estimates differ from the modern estimates and it is therefore not sensible to pool these early income estimates with the later census estimates.

TABLE 6
Political competition and growth: additional results

	Growth of personal income (1)	Growth of personal income (2)	Growth of personal income (3)	Growth of personal income (4)	Growth of personal income (5)	Growth of personal income (6)	Growth of personal income (7)	Growth of personal income (8)	Share of non-farm income (9)
Political competition	0.028** (0.013)	0.032* (0.016)			0.021 (0.012)	0.013 (0.024)	0.076** (0.035)	0.165** (0.078)	0.109*** (0.035)
Political competition × Democratic governor			0.029** (0.014)						
Political competition × Republican governor			0.024 (0.036)						
Political competition > −0.10				0.000 (0.002)					
Political competition > −0.25				0.010* (0.005)					
Political competition > −0.40				0.008 (0.006)					
Democratic governor	0.002 (0.001)	0.001 (0.001)	0.002 (0.002)	0.001 (0.001)	0.001 (0.002)	0.002 (0.002)	0.014*** (0.005)	0.005 (0.005)	0.001 (0.003)
Democrats control state house and senate	0.002 (0.002)	0.002 (0.002)	0.002 (0.002)	0.002 (0.002)	−0.000 (0.002)	0.002 (0.002)	0.021*** (0.007)	0.010 (0.006)	−0.012* (0.007)
Republicans control state house and senate	0.003 (0.002)	0.003 (0.002)	0.003 (0.002)	0.003 (0.002)	0.014** (0.006)	0.002 (0.002)	0.005 (0.009)	0.009 (0.008)	0.010* (0.006)
Democratic vote share		0.006 (0.013)		0.011 (0.013)					
Lagged personal income	−0.102*** (0.015)	−0.101*** (0.015)	−0.102*** (0.014)	−0.101*** (0.015)	−0.067*** (0.012)	−0.123*** (0.016)	−0.340*** (0.039)	−0.874 (0.042)	
South × year interactions	Yes	Yes	Yes	Yes	N/A	N/A	Yes	Yes	Yes
Method	OLS	OLS	OLS	OLS	OLS	OLS	5-Year averages 1930–1999	Arellano–Bond 1930–1999	OLS
Year sample	1929–2001	1929–2001	1929–2001	1929–2001	1929–2001	1929–2001	All 1930–1999	All 1930–1999	1929–2000
States in sample	All	All	All	All	Southern	Northern	All	All	All
Observations	3420	3420	3420	3420	1152	2268	623	527	3421
R-squared	0.675	0.675	0.675	0.676	0.815	0.616	0.882		0.882

Notes: All regressions include state and year fixed effects as additional control variables. The regressions in Columns (7) and (8) use 5-year averages of our data. Column (7) uses OLS while Column (8) uses the Arellano–Bond first difference estimator. In parentheses are standard errors which are robust against heteroskedasticity and adjusted for clustering at the state level. *, **, ***, Significance at the 10%, 5%, and 1% level, respectively.

the early 1920s until the 1960s and rapid technical progress in southern agriculture are likely to have contributed to economic growth after 1920 and could be correlated with political competition.³⁰ Similarly, while the improvement in race relations after the civil rights movement may have directly contributed to economic development, race relations were relatively unchanged over much of the period from 1880 to 1920.³¹

Table 7 displays our estimation results from this early period. We regress average annual growth in state personal income over the two 20-year periods against the same covariates as in Tables 5 and 6 (measured as averages over each period). In this extremely short panel, we are unable to include state-fixed effects, as this would substantially bias the results in the presence of a lagged dependent variable. Column (1) shows that the correlation between political competition and economic growth reported in Tables 5 and 6 holds up in the early sample. In Column (2), we find that the same is true when we include a dummy for the southern states and south-year interactions. Columns (3), (4), and (5) show that in this case as well the effect of political competition is distinct from that of party representation. Columns (6) and (7) show that the results hold when we look separately at southern and northern states.

Taken together, these results suggest that changes in political competition not only change state policies but also have a quantitatively important impact on economic growth. The striking similarity between the results in the growth regressions and the policy regressions adds further support to the view that the mechanism driving our results is indeed that political competition induces a shift towards pro-growth policies.

5. CONCLUDING COMMENTS

This paper develops a simple model to illustrate how greater political competition might lead to the adoption of pro-growth policies. We also present evidence to substantiate this proposition using data on US states. Using a measure of competition suggested by the theory, we show that increases in political competition are associated with lower tax revenue as a share of state personal income, a higher level of infrastructure spending by state governments, and a higher probability that a state uses a right-to-work law. These results are robust across a variety of specifications and sub-samples of our data. Moreover, the relationship appears to be non-linear, with the largest effects at intermediate levels of political competition, as the model implies. The policy changes we document also seem to affect overall state economic performance with greater political competition being associated with higher growth rates of state personal income *per capita*.

While our evidence is for a specific country and time period, it supports a common theme in political economics. Throughout our sample period, the US states were well-functioning democracies. But lopsided competition in particular states and sub-periods meant that policies could be tailored to vested interests rather than the entire population, resulting in stagnant growth. Whether breakdowns of monopoly power in politics have significant consequences for policy and growth in other settings cannot be inferred from these results, and we have

30. See, for example, Arsenault (1984) for a historical account of the spread of air conditioning and Mitchener and McLean (2003) for an assessment of the importance of air conditioning for southern productivity relative to other factors. Caselli and Coleman (2001) document the importance of technological progress in the agricultural sector for the convergence of the US South.

31. Logan (1954) analyses the rise in open racism in the US South after the end of the reconstruction and argues that the turn of the last century was probably the low point of race relations in the US South.

TABLE 7

Political competition and economic growth between 1880 and 1920

	Growth of personal income (1)	Growth of personal income (2)	Growth of personal income (3)	Growth of personal income (4)	Growth of personal income (5)	Growth of personal income (6)	Growth of personal income (7)
Political competition	0.016** (0.007)	0.020*** (0.007)	0.021*** (0.007)	0.027** (0.011)		0.020* (0.010)	0.049** (0.021)
Political competition × Democratic governor					0.017* (0.009)		
Political competition × Republican governor					0.036* (0.021)		
Governor is a Democrat			−0.001 (0.004)	−0.002 (0.005)	−0.003 (0.005)	0.031** (0.013)	−0.004 (0.005)
Democrats control state house and senate			0.004 (0.008)	0.004 (0.008)	0.004 (0.008)	−0.029** (0.012)	0.005 (0.009)
Republicans control state house and senate			0.008 (0.006)	0.010 (0.006)	0.008 (0.006)	−0.006 (0.024)	0.009 (0.006)
Democratic vote share				0.009 (0.012)			
Lagged personal income	−0.015*** (0.002)	−0.017*** (0.002)	−0.016*** (0.002)	−0.016*** (0.002)	−0.016*** (0.002)	−0.009** (0.004)	−0.017*** (0.003)
South × year interactions	No	Yes	Yes	Yes	Yes	No	No
Method	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Year sample	1880, 1900, 1920	1880, 1900, 1920	1880, 1900, 1920	1880, 1900, 1920	1880, 1900, 1920	1880, 1900, 1920	1880, 1900, 1920
States in sample	All	All	All	All	All	Southern	Northern
Observations	93	93	93	93	93	31	62
R-squared	0.480	0.613	0.640	0.642	0.643	0.611	0.619

Notes: All regressions include year fixed effects as additional explanatory variables. The regressions in Columns (2), (3), (4), and (5) also include an indicator for the US South and an interaction between this indicator and the time dummies as additional regressors. In parentheses are standard errors which are robust against heteroskedasticity and adjusted for clustering at the state level. *, **, ***, Significance at the 10%, 5%, and 1% level, respectively.

emphasized that there is no general theoretical presumption that this is the case. Nonetheless, whether similar results can be found in other contexts is ripe for investigation.

APPENDIX A

A.1. Proof of Proposition 1

We begin by proving:

Lemma A1. *An equilibrium exists.*

Proof. If $-\kappa \geq \frac{1}{2\xi} + \bar{v} - \underline{v}$, then $1 + T_v(v_D^*) = 0$ or $v_D^* = \underline{v}$ and existence is trivial. Hence, suppose that $-\kappa < \frac{1}{2\xi} + \bar{v} - \underline{v}$. Define $f(x)$ for $x \in [\underline{v}, \bar{v}]$ from:

$$-\left[\frac{1}{2} - \xi[-\kappa + x - f(x)]\right](1 + T_x(f(x))) + \xi[\Delta + (f(x) + T(f(x))) - x] = 0.$$

Observe that $f(x) > \underline{v}$ for all $x \in [\underline{v}, \bar{v}]$ since $1 + T_v(\underline{v}) = 0$. Now, let:

$$v_R(x) = \begin{cases} \bar{v} & \text{if } f(x) > \bar{v} \\ f(x) & \text{for } f(x) \in (\underline{v}, \bar{v}]. \end{cases}$$

As $v_R(x)$ is everywhere continuous on $[\underline{v}, \bar{v}]$, so is:

$$H(x) = \left[\frac{1}{2} + \xi[-\kappa + x - v_R(x)]\right](1 + T_x(x)) + \xi[\Delta + (x + T(x)) - v_R(x)].$$

It is straightforward to check that $H(\underline{v}) > 0$. Now, consider:

$$\begin{aligned} H(\bar{v}) &= \left[\frac{1}{2} + \xi[-\kappa + \bar{v} - v_R(\bar{v})]\right](1 + T_v(\bar{v})) + \xi[\Delta + \bar{v} - v_R(\bar{v})] \\ &\leq \left[\frac{1}{2} - \xi\kappa\right](1 + T_v(\bar{v})) + \xi\Delta && \text{by Assumption 1} \\ &< 0 && \text{by Assumption 2 if } -\kappa > 0. \end{aligned}$$

Since $H(\cdot)$ is continuous, there exists (by the intermediate value theorem) a v_D^* such that $H(v_D^*) = 0$.

Define

$$-\kappa_L = \frac{1}{2\xi} + \bar{v} - \underline{v}$$

as the level of κ which guarantees victory to the Democrats in this circumstance.

Lemma A2. *If $\kappa \leq \kappa_L$ the Democratic Party wins for sure and picks $\tau = 1$ and $v_D^* = \underline{v}$.*

Proof. This follows by observing that for $\kappa \leq \kappa_L$, the Democrats win for sure and hence pick their ideal policy.

Now define:

$$-\kappa_H = -\kappa_L + \frac{\Delta}{(1 + T_v(\bar{v}))}.$$

Lemma A3. *For $\kappa \in (\kappa_L, \kappa_H)$, $\underline{v} < v_D^* < \bar{v} = v_R^*$.*

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Proof. First, we show for all $\kappa < \kappa_H$, the Republicans will pick $v_R = \bar{v}$. To see this, observe that at $v_R = \bar{v}$ and $v_D = \underline{v}$, the change in the payoff of the Republican Party from a small increase in v is:

$$\left[\frac{1}{2} - \xi [-\kappa + \underline{v} - \bar{v}] \right] (1 + T_v(\bar{v})) + \xi [\Delta + \bar{v} - \underline{v}] > \left[\frac{1}{2} - \xi [-\kappa_H + \underline{v} - \bar{v}] \right] (1 + T_v(\bar{v})) + \xi \Delta = 0$$

from the definition of κ_L . Moreover, Assumption 1 implies that this inequality holds for all $v_D > \underline{v}$.

Second, we show that it is optimal for the Democrats to pick $v_D^* < \bar{v}$. Suppose not, such that $v_D = \bar{v}$. Then, a small increase in v_D alters the Democratic payoff by:

$$\left[\frac{1}{2} - \xi \kappa \right] (1 + T_v(\bar{v})) + \xi \Delta < \frac{(1 + T_v(\bar{v}))}{2} + \xi \Delta < 0,$$

where the last inequality follows from Assumption 2. Thus, the best response for the Democrats must be $v_D < \bar{v}$. To see that $v_D > \underline{v}$, observe that $1 + T_v(\underline{v}) = 0$. To prove the last statement, observe that $v_D(\bar{v})$ is defined from:

$$-\left[\frac{1}{2} + \xi [\kappa + v_D(\bar{v}, \kappa) - \bar{v}] \right] ((1 + T_v(v_D(\bar{v}, \kappa)))) \tag{A1}$$

$$= \xi [\Delta + v_D(\bar{v}, \kappa) + T(v_D(\bar{v}, \kappa)) - \bar{v}]. \tag{A2}$$

At any point where this equality holds, $((1 + T_v(v_D(\bar{v}, \kappa)))) < 0$. Moreover, a maximum exists on $[\underline{v}, \bar{v}]$. Elementary arguments now show that, at any point satisfying (A1), $v_D(\bar{v}, \kappa)$ is increasing in κ .

Lemma A4. *There exists $\kappa > \kappa_H$, for which we have an interior equilibrium with $v_p^* \in (\underline{v}, \bar{v})$ for $p \in \{D, R\}$.*

Proof. For $\kappa = 0$, Assumption 2 implies that both parties will pick $v_p^* < \bar{v}$ for $p \in \{D, R\}$. Moreover, since strategies are continuous in κ , this holds for some $\kappa < 0$.

Collecting the results in Lemmas A1 through A4 above, we obtain the comparative statics as stated in Proposition 1.

APPENDIX B

Political competition: The vote share data underlying this variable was obtained from Ansolabehere and Snyder (2002), and a recent update of this data was kindly supplied by Jim Snyder in electronic form.

Taxation and capital outlays as a share of total state government spending: These variables were supplied by the Bureau of the Census in electronic format and were originally published in the annual census publication *State Government Finances*.

Right-to-work laws: The spread of right-to-work laws is documented by the National Right to Work Legal Defence Foundation at <http://www.nrtw.org/>.

Total personal income and the share of non-farm income: Estimates of state personal income and its components are available from the Bureau of Economic Analysis for the period after 1929. For the period before 1929, we use the state personal income data for 1880, 1900, and 1920 from Easterlin (1960).

Party affiliation of the governor: This information was obtained from the National Governors Association at www.nga.org. Our indicator variable for the party affiliation of the governor is equal to 1 if the governor is a Democrat, equal to zero if he is a Republican, and missing in the case of Independents.

Composition of state legislatures: Information on the composition of the state upper and lower house was taken from Dal Bó *et al.* (2007) and was kindly provided by Ernesto Dal Bo in electronic form. The data cover the period from 1880 to 2001 for most states.

Voting Rights Act: Information on the history of the VRA, the timing of the introduction, and removal of literacy tests and poll taxes was obtained from Davidson and Grofman (1994) and Ogden (1958).

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