Natural Polarization, Sorting, and Gridlock in a Federal System*

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Abstract

This paper presents a theory of policymaking at the federal and state levels where individuals locate in states based on state policies. Individuals have a productivity and an ideology that represents the strength of preferences for redistribution and social policy. States and the federal government choose a tax rate, spending on redistribution or a public good, and social policy. Individuals choose how much to work and in which state to reside. States and individuals separate with a high tax state that redistributes attracting individuals with lower productivity and stronger ideology and a low tax state that provide the public good and attracts individuals with higher productivity and weaker ideology. Polarization is thus natural and originates in the states. Sorting implies that states are politically noncompetitive. The federal government is divided and bargains over a tax rate, spending, and social policy. A new form of gridlock emerges as the federal government declines enacting a social policy, allowing each state to enact its own policy. Gridlock reinforces the sorting among the states and amplifies polarization. Gridlock is welfare-enhancing but divisive. Gridlock does not occur on economic policy. Recent Supreme Court cases increased the space for social policy gridlock.

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1 Introduction

The premise of this paper is that the states are and in the future will be more important in U.S. policy making. The paper provides a theory in which people with economic and ideological preferences sort among states based on endogenous state tax rates, spending on redistribution or a public good, and social policies.[1] Polarization results from individuals sorting between the states, so polarization originates in the states and is natural. It does not impede legislating. The theory identifies a new source of gridlock at the federal level that allows states to enact their own policies. Gridlock occurs on social policy and not economic policy. Gridlock increases the separation of state policies, amplifies sorting and polarization, and increases well-being. Recent Supreme Court decisions have expanded the gridlock space.

The model provides a framework for reasoning about state and federal policymaking when people have both economic and ideological preferences and locate in their preferred political jurisdiction. The model endogenizes political polarization, the separation of policies among the states, and state and federal policymaking, including a new form of gridlock. The model captures features of the U.S. institutional structure, but it abstracts from details that are important in practice. Individuals choose a state in which to reside. Federal representation reflects state populations and determines how much support from the minority is needed to enact legislation. Courts are not included in the model but play a role in determining the size of the social policy bargaining space.

In an equilibrium each individual takes state and federal policies as given and locates in the state yielding the higher utility. Each state chooses a tax rate, spending, and social policy taking individual locations and federal policy as given. The federal government chooses a tax rate, spending, and social policy taking state policies and individual locations as given. Federal policy applies in all states and hence affects location choices only indirectly. State policy has the primary effect on location choices. Because of sorting states are politically noncompetitive and act decisively. State policies separate, which reinforces sorting. Representation in the federal government reflects the composition of state populations, so federal governance is politically competitive and bargaining with the minority is required to enact legislation.

If people can freely locate, well-being can be improved by states separating with different tax rates, spending priorities, and social policies. Sorting based on economic and social policy, results in polarization in representation at the federal level. This endogenous polarization can be preferred by the residents of each state. It can also lead to gridlock at the federal level. Gridlock devolves policy choice to the states and is well-being enhancing, but it is divisive because it strengthens the incentive for policy separation and for individuals to sort among the states. Polarization in the model is not an impediment to legislation provided it does not give rise to bargaining costs, as possibly in the case of affective polarization. Polarization is natural in the sense that if federal representatives are chosen at random from among the residents of a

[1] In 2019 state and local governments spent $4.0 trillion, while federal spending was $4.5 trillion including defense spending (Duggan and Hou (2022)). Federal spending increased substantially during the Covid and post-Covid years.

state, the federal legislature is polarized because of the sorting of individuals based on their ideology and productivity. This polarization is neither strategic nor competitive nor does it involve selection.

States including Arizona, Florida, and Texas have gained representation, and states including Illinois, New York, and California have lost representation. A number of other states have had an influx of new residents including Idaho, Tennessee, and Utah. Location choices are influenced by state policies, among a myriad of other factors. Duggan and Hou (2022) detail differences in the policies of Florida and New York that affect population movements for the two states. As they point out, since the 1980s New York has lost 8 seats in Congress and Florida has gained 9 seats.

The Constitution identifies policies on which the federal government can act and policies that are reserved for the states. Article I grants Congress the authority "to regulate Commerce with foreign Nations, and among the several states, and with the Indian Tribes." Amendment X states, "The powers not delegated to the United States by the Constitution, nor prohibited by it to the states, are reserved to the States respectively, or to the people." States choose both economic and social policies. State social policies pertain to abortion access, school choice and curricula, criminal justice standards, intra-state environmental policy, redistribution, homelessness, drug use, gun regulations and open carry, bail, sanctuary, stand your ground, and so on. Federal social policy pertains to abortion rights, immigration, gun rights, interstate law enforcement, environmental policy, health care standards, redistribution, discrimination, disability access, employee rights, religious accommodation, and so on.

There are also policy spaces for which the Constitution is silent or ambiguous. This unreserved space can be occupied by federal policy if Congress enacts a law. If Congress does not act, the states occupy that space with their own policies.[2] A federal government that enacts a policy in the unreserved space imposes that policy on all states. It is the unreserved policy space that is the locus of gridlock.

The unreserved space has been expanded by recent court decisions limiting federal power. *Dobbs* (*Dobbs v. Jackson Women's Health Organization*, No. 19-1392, 597 U.S. (2022)) eliminated previously-identified abortion rights, and *EPA* (*West Virginia v. Environmental Protection Agency*, 597 U.S. (2022)) limited the authority of administrative agencies, holding that the major questions doctrine places responsibility for policy on Congress and not on administrative agencies unless there is clear delegation by Congress. In *Sackett v. Environmental Protection Agency*, No. 21-454, 2023, the Supreme Court ruled that in its regulation of wetlands the EPA exceeded the authority granted in the Clean Water Act. The decision eliminated the "significant nexus" standard created by the Court seventeen years earlier. The Court called for a "clear standard" from Congress. *Chevron* deference holds that when there is ambiguity in the meaning of a law the courts are to look to the cognizant administrative agency for interpretation.[3] *Chevron* is on the current Supreme Court docket, and if it is overturned, the power of administrative agencies will be further reduced,

[2] On some issues both the federal and state governments can enact a law. For example, both the federal and California governments have an endangered species act with the California law the more restrictive.

[3] *Chevron U.S.A., Inc. v. Natural Resources Defense Council, Inc.*, 468 U.S. 837 (1984).

expanding the unoccupied space and placing greater responsibility on Congress.

Brady and Volden (2006. p. 49) define ""gridlock" as a situation in which the status quo cannot be changed despite majority support in the country or the Congress for a specific policy change." This orthodox gridlock occurs in a divided government when a government on the left cannot move policy in its desired direction because, for example, the party on the right filibusters any such attempt. The party on the right cannot move policy to the right because any move would be vetoed and not overridden. The gridlock interval then is the set of status quos for which both conditions hold (Krehbiel (1998)). Gridlock theory is one dimensional, and extension to more policy dimensions is problematic. Moreover, concessions on other policy dimensions or offers of pork to obtain the votes needed to move the status quo are not considered. The theory presented here allows both policy concessions on other policy dimensions and pork, although pork is limited. Despite policy concessions and pork, a new form of gridlock results because of state policymaking. Gridlock occurs on social but not on economic policy.

The federal government is assumed to be divided because of bicameralism, the veto, and a supermajority hurdle. A divided government requires support from the minority to enact legislation.[4] Gridlock in the unreserved space occurs when the head of the government does not propose a policy to change the status quo even though a compromise policy is available. Bargaining results in compromise on taxes and spending as well as on social policy in the federal reserved space but not on social policy in the unreserved space. In the absence of a federal policy on issues such as abortion and gun control, states adopt their own policies. If people locate based in part on ideology, states can be politically noncompetitive with the resulting state policies separated. When state policies separate, the incentives for sorting are strengthened, and the resulting sorting amplifies polarization in the federal government.

Gridlock in the unreserved space results because the residents of states do not want their state social policy to be replaced by a compromise federal policy.[5] The cause of this gridlock is not supermajority requirements or hurdles, but instead is multiple state policies in the unreserved space that differ because people sort among the states based on their economic and ideological preferences. This gridlock provides an explanation for the federal government not acting on issues such as abortion, immigration, gun control, and many others. The consequent state policies separate, which strengthens the incentives to sort. Because of sorting, most states are politically noncompetitive, so gridlock is not present at the state level.

State policies depend on who resides in the state. In the model state tax policies separate with a low tax state providing a public good and attracting people with high productivity and weak redistributive ideology. People with strong ideology are attracted to a state with a high tax rate that redistributes and chooses an extensive social policy. High productivity and weak ideology residents prefer a lower tax rate and the provision of a public good, whereas low productivity and strong ideology residents prefer a higher tax rate

[4]Baron (2021) presents a bargaining model that includes both economic and social policies as well as executive action and court review.

[5]Compromise occurs in the federal reserved space because states cannot enact their own policies in that space.

and redistribution.

The federal government could occupy part of the unreserved region for a number of reasons. One is to address an externality that affects everyone, as in the case of climate change. A second is to require every state to abide by a single policy to avoid conflicts among state laws that impede federal governance. A third, which is considered here, is to force states to abide by a policy they otherwise would not choose. This could be based on a belief that all individuals are entitled to something that the states and the private sector do not adequately provide. Section 8 examines alternative specifications of government objectives.

Much of the empirical literature on partisan sorting focuses on movement within a state.[6] Partisan clustering has increased dramatically within states as Kaplan, Spenkuch, and Sullivan (2022) show. They conclude "Current partisan cleavages across states are as high as at any time in the last 50 years, ...(p. 9)". They also find that "the American electorate continues to be more diverse within than across states." (p. 1) Part of the political divide is between rural and urban residents, which is also reflected across states (Mettler and Brown (2022)). Democrats tend to cluster in cities, whereas Republicans are more dispersed in suburban and rural areas.

Location and representation have a dynamic with new groups of people entering and others departing. Brown, et al. (2022) write "increasing partisan segregation is areas that are growing more Democratic is primarily driven by generational change – from new voters who are predominately Democrats entering the electorate in these areas. In areas trending Republican, the change is mostly driven by voters changing their partisanship to Republican. (p. 5)"[7] Couture and Handbury (2023) study downtown gentrification and find that young college graduates increasingly locate in downtown areas, although they caution that this may be changing. The clustering of partisans in cities can result in what Chen and Rodden (2013) call unintentional gerrymandering. They provide evidence of this sorting using data from 20 states and provide a detailed analysis of Florida. Jia, et al. (2023) survey the literature on internal migration in the United States with an emphasis on the incentives to migrate, including housing and labor market effects. They note that 40% of Americans reside in a state different from their birth state.

Bertrand and Kamenica (2023) examine over an extended period measures of cultural distance, income, education, gender, race, and political ideology between groups using machine learning to identify categories. They conclude that the measures have been broadly stable for forty years. Cultural distance has been stable over time using measures such as a respondent's media diet. Using the respondents' "stated social attitudes," however, reveals greater divergence between liberals and conservatives. This suggest a difference between expressed and actual differences. This paper views the characteristics of the population as stable and provides an explanation for divergence in governance based on behavior rather than on expression.

[6] Most empirical research on partisan sorting is based on data from the 30 states that list party affiliation on voter registration rolls. An exception is Brown and Enos (2021) who study partisan segregation at the neighborhood level for 180 million voters in all states. Many voters are not registered with a party, so researchers use imputation methods to assign party affiliation to them.

[7] Martin and Webster (2018) study voters who move within a state (Florida) and re-register to vote.

Cain and Heymeyer (2023) report survey results on the reasons people move to and from Arizona, California, and Texas. Two-thirds of respondents agreed that the "political situation" did not affect their movement, but one quarter stated that it was very or somewhat important. Sixteen percent of those moving to and 40 percent of those leaving California thought it was very or somewhat important. The authors state (p. 6) "21 percent of those moving to Texas call themselves liberal or very liberal versus 44 percent of people moving out of Texas." The authors comment that the California commitment to deep decarbonization including the electric vehicle mandate (p. 7) "could be rough, and with more population and commercial outflows." Brady et. al (2023) use the survey data to identify attitudes toward abortion in the three states.

This paper does not speak directly to the literature on partisan sorting because parties are not included in the model. The paper focuses on the causes of sorting. The causes considered are economic – state taxes and spending – and social preferences based on ideology. There is no affective polarization in the model but instead polarization results from economic and ideological sorting. As the partisan sorting literature suggests, states are becoming more politically homogeneous which supports viewing them as politically noncompetitive. The states in the model are diverse in income and ideology, but one has disproportionately higher income residents and the other disproportionately residents with a strong ideology corresponding to a preference for redistribution and extensive social regulation.

2 The Model

The model includes a continuum of mass N individuals each of whom has two characteristics, a productivity $\theta \in [0, \bar{\theta}]$ and an ideology $\gamma \in [0.\bar{\gamma}]$ that are statistically independent with respective distribution functions $F(\theta)$ and $G(\gamma)$. Both $F(\theta)$ and $G(\gamma)$ are assumed to be uniform to avoid imposed clustering. Ideology refers to the strength of preferences for redistribution and correspondingly for extensive social policy. Each individual receives satisfaction γ per dollar spent on redistribution by the federal and state governments, and $y(\gamma)$ denotes the ideal social policy of an individual with ideology γ, where $y(\gamma)$ is assumed to be increasing in γ. An individual who prefers redistribution also prefers more extensive social regulation. An individual with higher (lower) γ is said to have stronger (weaker) ideology.

The model includes three institutions – a federal government F and two state (L and R) governments. There are no elections, instead individuals vote with their feet in choosing a state in which to reside. Elections are not needed because sorting yields politically noncompetitive states, and federal representatives can be thought of as draws from the state populations. States send representatives to the federal legislature, and those federal representatives serve their constituents. Parties are not modeled, and state governments are assumed to serve the interests of their residents.

Individuals have two actions. One is in which state to reside, and the other is how much to work w_j when residing in state $j \in \{L, R\}$. Income θw_j is the product of productivity and work, where work has a

cost or disutility $\frac{1}{2}w_j^2$. Income is taxed at a rate t by the federal government and by τ_j by the state j in which the individual resides, so after-tax income is $\theta w_j(1-t-\tau_j)$. The tax rates are assumed to be such that $1-t-\tau_j > 0$. Individuals consume their after-tax income plus any redistribution received.

As in Meltzer and Richard (1981) redistribution provides a lump-sum payment to everyone in the jurisdiction, funded by taxes on income.[8] Individuals with high productivity have an incentive to work harder than those with lower productivity, so income is a strictly convex function of productivity. High productivity individuals provide a disproportionate share of tax revenue, and similarly those with low productivity receive more than they pay in taxes. Redistribution thus is from high productivity individuals to low productivity individuals even though tax rates are flat.[9] Both federal and state governments can redistribute.

Federal tax revenue T_F is allocated between redistribution D_F and spending $T_F - D_F$ on a federal public good that provides benefits of b per person per dollar allocated. Federal redistribution provides an income supplement of $\frac{D_F}{N}$ for each person. Individuals also receive ideological satisfaction γ per dollar redistributed, so federal redistribution provides well-being $\gamma_F^o = \gamma + \frac{D_F}{N}$ for each individual for each dollar D_F redistributed. Redistribution is non-taxable. The benefits b are assumed to be such that $b < \gamma_F^o$ for some individuals and $b \geq \gamma_F^o$ for others.

Each state chooses a tax rate and allocates its tax revenue $T_j, j \in \{L, R\}$, between state redistribution D_j and spending $T_j - D_j$ on a state public good, which provides benefits β per dollar per state resident. State redistribution parallels federal redistribution with a lump-sum payment $r_j = \frac{D_j}{N_j}$ to each resident, where N_j is the population in state j and $N_L + N_R = N$. State redistribution provides an individual with ideology γ with well-being $\gamma_j^o = \gamma + \frac{D_j}{N_j}$ per dollar redistributed. The public good benefit β and the distribution of satisfaction γ are assumed to be such that some individuals pay more in taxes than the value received from state spending and others receive more than they pay in taxes. A dollar of tax revenue allocated to the public good provides aggregate benefits $N_j\beta$, and a dollar allocated to redistribution provides aggregate value $N_j\gamma_j^o$.

In addition to their own fiscal authority states have authority over a portion of the social policy space. The social policy space is composed of policies reserved for the federal government, including those identified in the Bill of Rights, and policies reserved for the states, where the remaining space is referred to as unreserved. The unreserved space can result from court decisions as well as from new social issues, issues that historically have been the responsibility of the private sector or of individuals as in the cases of religion and mobility. The federal government can enact a law and occupy a portion of the unreserved space or leave it unoccupied and thus open to the states to govern. An example is abortion policy. The federal government can enact a law that applies to all states, but if it does not do so, abortion policy is chosen by each state.

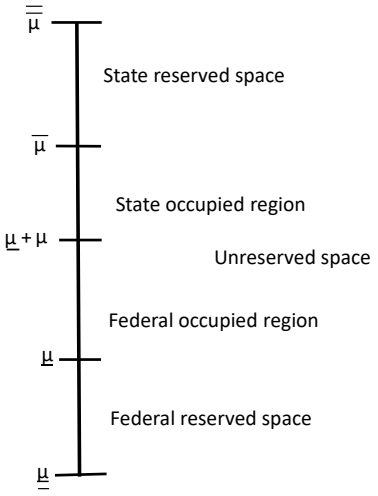
The social policy space is of size $\bar{\bar{\mu}} - \underline{\underline{\mu}}$ and is composed of the federal reserved space $[\underline{\underline{\mu}}, \underline{\mu}]$, the state

[8] Appendix A presents a means test redistribution model in which residents receive redistribution proportional to the difference between a target income and their actual income.

[9] In contrast to Meltzer and Richard (1981) all people work even if they have low productivity.

reserved space $[\bar{\mu}, \bar{\bar{\mu}}]$, and the unreserved space $[\underline{\mu}, \bar{\mu}]$. The federal government chooses the portion $\mu \in [0, \bar{\mu} - \underline{\mu}]$ of the unreserved space to occupy with a federal social policy, where $\bar{\mu} - \mu - \underline{\mu}$ is the portion that is unoccupied and open for the states to enact policy. Figure 1 depicts the components of the social policy space. Denote the social policy of the federal government by y_F, and the social policy of state j by y_j. An individual with an ideal social policy $y(\gamma)$ who resides in state j has social policy disutility $-(\mu + \underline{\mu} - \underline{\underline{\mu}})(y_F - y(\gamma))^2 - (\bar{\bar{\mu}} - \mu - \underline{\mu})(y_j - y(\gamma))^2, j = L, R$. Higher $y(\gamma)$ means a preference for more extensive social regulation, such as the number of weeks of pregnancy during which an abortion is allowed, the stringency of gun control, and more restrictive land use policy.

Figure 1
Social Policy Space



Individuals locate in state L or state R, where state L is conjectured to have the higher tax rate and to redistribute and state R is conjectured to have a lower tax rate and to provide the public good. Locating is assumed to be costless. Sorting results in states populated by people with similar preferences. Few states are electorally competitive, and in most one party holds the governorship and a majority in the legislature. *The New York Times*, June 4, 2023 reports that 39 of the 50 states are under the control of one party, and subsequently Louisiana joined the list.[10] Parties are not explicitly modeled but could be thought of as representing the residents of the noncompetitive states. A noncompetitive state can act decisively and is assumed to maximize the aggregate utility of state residents.[11]

An individual (θ, γ) has preferences for consumption, the benefits from government redistribution or

[10] Jordan and Bowling (2016) report that in 2013-2014 36 states had one party controlling the governor and both chambers of the legislature.

[11] Unlike the federal Senate, states are required to have equal sized senate districts. States typically do not have a filibuster, and although some have supermajority provisions for certain policies, state governments primarily govern under simple majority rule, which is the assumption made here.

public good provision, and social policy. The utility $U_R^L(\theta,\gamma)$ of an individual (θ,γ) in state R with a federal government (L) that redistributes is

$$U_R^L(\theta,\gamma) = \theta w_R(1-t-\tau_R) - \frac{1}{2}w_R^2 + \gamma_F^o T_F + \beta T_R - (\mu + \underline{\mu} - \underline{\underline{\mu}}))(y_F - y(\gamma))^2 - (\bar{\bar{\mu}} - \mu - \underline{\mu})(y_R - y(\gamma))^2, \quad (1)$$

where federal tax revenue is $T_F = t\int_{\Theta_R}\int_{\Gamma_R(\tilde{\theta})}\tilde{\theta}w_R(\tilde{\theta},\tilde{\gamma})dG(\tilde{\gamma})dF(\tilde{\theta}) + t\int_{\Theta_L}\int_{\Gamma_L(\tilde{\theta})}\tilde{\theta}w_L(\tilde{\theta},\tilde{\gamma})dG(\tilde{\gamma})dF(\tilde{\theta})$ and state R tax revenue is $T_R = \tau_R\int_{\Theta_j}\int_{\Gamma_j(\tilde{\theta})}\tilde{\theta}w_j(\tilde{\theta},\tilde{\gamma})dG(\tilde{\gamma})dF(\tilde{\theta})$, where Θ_j is the set of productivities and $\Gamma_j(\theta)$ is the set of ideologies of individuals with productivity θ who reside in state j, and work $w_j(\theta,\gamma)$ is an individual's work in state $j \in \{L,R\}$. The sets Θ_R and $\Gamma_R(\theta)$ identify the productivity and ideology of the residents of state R as determined by their location choices. The utility $U_L^L(\theta,\gamma)$ of a resident of state L is defined analogously to (1).

In their choice of work individuals are assumed to take into account the utility they receive from the taxes they pay, so work in state R is $\hat{w}_R(\theta,\gamma) = \theta(1-(1-\gamma_F^o)t-(1-\beta)\tau_R)$ when the federal government allocates all tax revenue to redistribution and state R allocates all state tax revenue to the provision of the public good. An individual works less the higher a tax rate and works more the stronger their ideology and the greater the benefits from the public good. Using $\hat{w}_R(\theta,\gamma)$ the utility $U_R^L(\theta,\gamma)$ in (1) can be written as

$$\begin{aligned} U_R^L(\theta,\gamma) &= \frac{1}{2}\theta^2\left(1-2t-2\tau_R+2(1-\beta\gamma_F^o)t\tau_R+(1-(\gamma_F^o)^2)t^2+(1-\beta^2)\tau_R^2\right) \\ &+ \gamma_F^o T_F + \beta T_R - (\mu+\underline{\mu}-\underline{\underline{\mu}})(y_F-y(\gamma))^2 - (\bar{\bar{\mu}}-\mu-\underline{\mu})(y_R-y(\gamma))^2. \end{aligned} \quad (2)$$

The utility $U_R^L(\theta,\gamma)$ for the individual with productivity θ and ideology γ is strictly increasing in θ, as is the utility of a resident of state L. Stronger ideology reduces the utility from work, but the satisfaction from federal and state redistribution is greater. A more beneficial public good also reduces the utility from work but the public good is more beneficial.

The utility of an individual in R or L is increasing in their ideology unless possibly if γ is very high $(y(\gamma) > y_L)$ or very low $(y(\gamma) < y_R)$.[12] The maintained assumption here is that the utility of the individual is increasing on γ when a government redistributes.

The federal government is assumed to be headed by the representatives of the more populous state and to be divided, so support from the minority representatives of the other state is needed to enact legislation. The government has a limited amount $\bar{z}$ of pork available, and allocates $z \leq \bar{z}$ to the representatives of the

[12] That is,

$$\frac{dU_R^L(\theta,\gamma)}{d\gamma} = -\theta^2(\beta t\hat{\tau}_R^L + \gamma_F^o t^2) + T_F + 2y'(\gamma)(\mu+\underline{\mu}-\underline{\underline{\mu}})(y_F-y(\gamma)) + (\bar{\bar{\mu}}-\mu-\underline{\mu})(y_R-y(\gamma))$$

and

$$\frac{dU_L^L(\theta,\gamma)}{d\gamma} = -\theta^2((\gamma_F^o+\gamma_L^o)t\hat{\tau}_L^L + 2\gamma_F^o t^2) + T_F + T_L + 2y'(\gamma)(\mu+\underline{\mu}-\underline{\underline{\mu}})(y_F-y(\gamma)) + (\bar{\bar{\mu}}-\mu-\underline{\mu})(y_L-y(\gamma)).$$

The individual's maximum income θ^2 is small relative to T_F (and $T_L + T_F$).

minority. Pork is consumed within the legislature and not distributed to the states or to individuals. The federal legislative process involves the government making a legislative proposal (t, y_F, μ, z) to the minority representatives. If the minority representatives accept the proposal, policy is enacted and z is distributed. If the minority rejects, the status quo (t^o, y_F^o, μ^o, z^o) continues. Bargaining costs are assumed to be zero.

Choices by individuals and governments occur simultaneously based on conjectures about the choices of others. Each state chooses its tax rate, spending, and social policy for the state reserved and the unoccupied social policy spaces. Each individual chooses the state in which to locate and how much to work. Their location choices determine which state representatives head government. The federal government chooses (t, y_F, μ, z) through bargaining, which determines the federal tax rate, federal social policy, the portion of the unreserved space to occupy, and the allocation of pork. An equilibrium requires that the conjectures be fulfilled. The equilibrium concept is Nash.

2.1 Representation

States send representatives to the federal legislature. The representatives are assumed to reflect the distribution of preferences in their state, as in a random draw from among the residents. In a divided federal government neither state L nor state R has sufficient representation for the head of the federal government to govern without obtaining votes from the representatives of the other state.

3 Individual Policy Preferences

Although the ideal state tax rates of individuals play no role in the determination of state tax rates, it is useful for the characterization of sorting to identify individual preferences. The ideal tax rate $\hat{\tau}_R(\theta, \gamma)$ of a resident of state R when the federal government redistributes and the state provides the public good maximizes (2) and is[13]

$$\hat{\tau}_R(\theta, \gamma) = \frac{-\theta^2(1-(1-\beta\gamma_F^o)t) - (1-\beta)\gamma_F^o t I_R + \beta \int_{\Theta_R} \int_{\Gamma_R(\tilde{\theta})} \tilde{\theta}^2(1-(1-\tilde{\gamma}_F^o)t) dG(\tilde{\gamma}) dF(\tilde{\theta})}{-(1-\beta^2)\theta^2 + 2\beta(1-\beta) I_R}, \qquad (3)$$

where $I_R = \int_{\Theta_R} \int_{\Gamma_R(\tilde{\theta})} \tilde{\theta}^2 dG(\tilde{\gamma}) dF(\tilde{\theta})$ is aggregate potential income of the residents of state R. The second-order condition when $\hat{\tau}_R(\theta, \gamma) > 0$ is

$$(1-\beta^2)\theta^2 - 2\beta(1-\beta) I_R < 0.$$

A necessary condition for the ideal tax rate to be positive is that $\beta \int_{\Theta_R} \int_{\Gamma_R(\tilde{\theta})} \tilde{\theta}^2(1-(1-\tilde{\gamma}_F^o)t - 2(1-\beta)\hat{\tau}_R) dG(\tilde{\gamma}) dF(\tilde{\theta}) > 0$, i.e., the tax rate is on the increasing portion of the state Laffer curve. A resident of

[13] Appendix B presents the ideal taxes for the residents of state R when state R representatives head the federal government and for the residents of state L when the federal government is headed by representatives of state L and of state R.

state R has an ideal tax rate of zero if

$$\theta \geq \bar{\theta}_R(\gamma) \equiv \left(\frac{\beta \int_{\Theta_R} \int_{\Gamma_R(\tilde{\theta})} \tilde{\theta}^2 (1 - (1 - \tilde{\gamma}_F^o)t) dG(\tilde{\gamma}) dF(\tilde{\theta}) - (1 - \beta)\gamma_F^o t I_R}{1 - (1 - \beta\gamma_F^o)t} \right)^{\frac{1}{2}}.$$

The bound $\bar{\theta}_R(\gamma)$ is decreasing in γ, so more residents prefer a zero state tax rate the stronger is their ideology. The state tax reduces work and hence the federal tax revenue available for redistribution, and stronger ideology amplifies the effect, so the bound is decreasing in γ.

The properties of an individual's ideal tax rate are identified in the following proposition.

Proposition 1. *(A) When the federal government redistributes and state R provides the public good, the ideal tax rate $\hat{\tau}_R(\theta, \gamma)$ when positive is (i) strictly decreasing in θ, (ii) strictly decreasing in γ, and (iii) strictly increasing in β. If $\theta \geq \bar{\theta}_R(\gamma)$, the ideal tax rate is zero. (B) If the federal government provides the public good rather than redistributes, the ideal tax rate when positive is decreasing in θ, constant in γ, and increasing in β. (Appendix B.)*

When positive the ideal tax rate is strictly decreasing in productivity θ of individual (θ, γ) because

$$\frac{\partial^2 U_R^L(\theta, \gamma)}{\partial \tau_R \partial \theta} = -2\theta(1 - \beta)(1 - (1 - \gamma_F^o)t - (1 - \beta)\hat{\tau}_R(\theta, \gamma)) < 0, \tag{4}$$

so higher productivity individuals prefer a lower state tax rate. The ideal tax rate is decreasing in θ because work and income are distorted more by taxes the higher is the individual's productivity.

The ideal state R tax rate is strictly decreasing in the ideology γ of the individual (θ, γ) as

$$\frac{\partial^2 U_R(\theta, \gamma)}{\partial \tau_R \partial \gamma} = -(1 - \beta)t I_R < 0.$$

A stronger ideology of individual (θ, γ) means greater satisfaction from federal redistribution but the distortion to income from the state tax then is greater. The individual prefers a lower state tax rate.

The state R tax funds the public good, and a higher β means every individual in R benefits more from the public good, which favors a higher tax rate. A higher β results in more work and higher income, so the distortion from the state tax is greater for the individual. The aggregate benefits from a more valuable public good, however, outweigh the negative effect on the individual's income. More formally,

$$\frac{\partial^2 U_R^L(\theta, \gamma)}{\partial \tau_R \partial \beta} = (\gamma_F^o t + 2\beta\hat{\tau}_R(\theta, \gamma))(-\theta^2 + I_R) + \int_{\Theta_R} \int_{\Gamma_R(\tilde{\theta})} \tilde{\theta}^2 (1 - (1 - \gamma_F^o)t - 2(1 - \beta)\hat{\tau}_R(\theta, \gamma)) dG(\tilde{\gamma}) dF(\tilde{\theta}) > 0,$$

where the first term is positive because the individual's maximum potential income (θ^2) is small relative to state potential income I_R.

A higher federal tax rate results in less work and lower income, so the distortion from the state tax is

lower, which favors a higher ideal tax rate. A higher federal tax rate also decreases the distortion from the state tax rate on federal redistribution and on the provision of the public good, which favors a lower ideal tax rate. The effect is given by

$$\frac{\partial^2 U_R^L(\theta,\gamma)}{\partial\tau_R\partial t} = \theta^2(1-\beta\gamma_F^o) - (1-\beta)\gamma_F^o I_R - \beta\int_{\Theta_R}\int_{\Gamma_R(\tilde{\theta})}\tilde{\theta}^2(1-\tilde{\gamma}_F^o)dG(\tilde{\gamma})dF(\tilde{\theta}),$$

which is greater the higher the individual's productivity.

The properties of a individual's ideal tax rate suggest that high productivity individuals prefer to locate in a low tax rate state. Among those who do so, those with a stronger ideology have a stronger preference for a low tax rate so that there is less distortion to income which allows greater federal redistribution. Those with strong ideology, however, can prefer the high tax rate state that redistributes.

4 States

4.1 State Tax Rate

States maximize the well-being of their residents with respect to the state tax rate, spending, and social policy. Using (2) aggregate well-being $AU_R^L(t, y_F, \mu, z)$ in state R when the federal government redistributes is[14]

$$\begin{aligned} AU_R^L(t,y_F,\mu,z) &= \frac{1}{2}\int_{\Theta_R}\int_{\Gamma_R(\tilde{\theta})}\tilde{\theta}^2\left(1-2t-2\tau_R+2(1-\beta\tilde{\gamma}_F^o)t\tau_R+(1-(\tilde{\gamma}_F^o)^2)t^2+(1-\beta^2)\tau_R^2\right)dG(\tilde{\gamma})dF(\tilde{\theta}) \\ &+ N_R\bar{\gamma}_F^o T_F + N_R\beta T_R \\ &- \int_{\Theta_R}\int_{\Gamma_R(\tilde{\theta})}((\mu+\underline{\mu}-\underline{\underline{\mu}})(y_F-y(\tilde{\gamma}))^2+(\bar{\bar{\mu}}-\mu-\underline{\mu})(y_R-y(\tilde{\gamma}))^2)dG(\tilde{\gamma})dF(\tilde{\theta}), \end{aligned} \tag{5}$$

[14]The state R tax rate when the federal government allocates all tax revenue to providing the public good is presented in Appendix C.

where $\bar{\gamma}_F^o = \frac{1}{N_R}\int_{\Theta_R}\int_{\Gamma_R(\tilde{\theta})}\tilde{\gamma}_F^o dG(\tilde{\gamma})dF(\tilde{\theta})$ is the mean valuation by the residents of R of a dollar of federal redistribution. The optimal state R tax rate $\hat{\tau}_R^L$ is[15]

$$\hat{\tau}_R^L = \frac{\int_{\Theta_R}\int_{\Gamma_R(\tilde{\theta})}\tilde{\theta}^2\left(-\left(1-(1-\beta\tilde{\gamma}_j^o)t\right)-(1-\beta)N_R\tilde{\gamma}_F^o t+\beta N_R\left(1-(1-\tilde{\gamma}_F^o)t\right)\right)dG(\tilde{\gamma})dF(\tilde{\theta})}{\int_{\Theta_R}\int_{\Gamma_R(\tilde{\theta})}\tilde{\theta}^2\left(-(1-\beta^2)+2N_R\beta(1-\beta)\right)dG(\tilde{\gamma})dF(\tilde{\theta})}. \tag{6}$$

A positive tax rate requires that the value of the state public good be sufficiently high. The optimal tax rate $\hat{\tau}_L^L$ for state L when the federal government redistributes is

$$\hat{\tau}_L^L = \frac{\int_{\Theta_L}\int_{\Gamma_L(\tilde{\theta})}\tilde{\theta}^2\left(-(1-(1-\tilde{\gamma}_F^o\tilde{\gamma}_L^o)t)-N_L\bar{\gamma}_F^o t(1-\tilde{\gamma}_L^o)+N_L\bar{\gamma}_L^o(1-(1-\tilde{\gamma}_F^o)t)\right)dG(\tilde{\gamma})dF(\tilde{\theta})}{\int_{\Theta_L}\int_{\Gamma_L(\tilde{\theta})}\tilde{\theta}^2\left(-(1-(\tilde{\gamma}_L^o)^2)+2N_L\bar{\gamma}_L^o(1-\tilde{\gamma}_L^o)\right)dG(\tilde{\gamma})dF(\tilde{\theta})}. \tag{7}$$

4.2 State Spending

The allocation of state tax revenue between redistribution and the public good is determined by the aggregate ideology of the residents of the state relative to the value of the public good. State j allocates spending D_j on redistribution to maximize $\int_{\Theta_j}\int_{\Gamma_j(\tilde{\theta})}\left(\tilde{\gamma}_j^o D_j+\beta(T_j-D_j)\right)dG(\tilde{\gamma})dF(\tilde{\theta})$, which is linear in D_j so the state allocates all tax revenue to either redistribution or the public good. State j chooses $D_j = 0\,(T_j) \iff N_j\bar{\gamma}_j^o \leq (>)N_j\beta$, where $\bar{\gamma}_j^o$ is the mean ideological valuation of residents of state j of a dollar allocated to redistribution. A state whose residents have relatively weak ideology allocates tax revenue to the public good, and a state whose residents have relatively strong ideology allocates tax revenue to redistribution.

4.3 State Social Policy

An individual's ideal social policy $y(\gamma)$ pertains to both the state and federal reserved spaces and to the unreserved space. States choose social policy in the state reserved and the unoccupied region of the unreserved social policy space, and in an noncompetitive state, policy is chosen to maximizes aggregate state well-being. State j social policy is

$$\hat{y}_j = \frac{1}{N_j}\int_{\Theta_j}\int_{\Gamma_j(\tilde{\theta})} y(\tilde{\gamma})dG(\tilde{\gamma})dF(\tilde{\theta}), j = L, R, \tag{8}$$

which is the mean ideal social policy of residents. State social policy is based on ideology and is independent of productivity, tax rates, and spending but depends on the location choices of individuals.

[15]The first-order condition for the state tax rate $\hat{\tau}_R^L$ is

$$\begin{aligned}\frac{\partial AU_R^L(\theta,\gamma)}{\partial\tau_R} &= -\int_{\Theta_R}\int_{\Gamma_R(\tilde{\theta})}\tilde{\theta}^2(1-(1-\beta\tilde{\gamma}_F^o)t-(1-\beta^2)\hat{\tau}_R^L)dG(\tilde{\gamma})dF(\tilde{\theta})-N_R\bar{\gamma}_F^o(1-\beta)tI_R \\ &+ N_R\beta\int_{\Theta_R}\int_{\Gamma_R(\tilde{\theta})}\tilde{\theta}^2(1-(1-\tilde{\gamma}_F^o)t-2(1-\beta)\hat{\tau}_R^L)dG(\tilde{\gamma})dF(\tilde{\theta})=0.\end{aligned}$$

The first term is the effect of the tax rate on the aggregate after-tax utility from work, the second term is the effect on the satisfaction from federal redistribution, and the third term is the effect on the aggregate benefits from the state R public good. The second-order condition is

$$(1-\beta^2)I_R - 2\beta N_R(1-\beta)I_R < 0.$$

A first-degree stochastic dominance shift in the distribution $G(\gamma)$ of ideological preferences of residents results in greater social regulation, so a state that attracts individuals with stronger ideology has the more extensive social regulation. If state R has residents with weaker ideology on average than state L, then $\hat{y}_R < \hat{y}_L$.

5 Location

5.1 Sorting

Federal policy is national policy, so it is the same in both states. Sorting depends primarily on the policy differences between the states on tax rates, spending, and social policies. Sorting depends indirectly on federal policy because both the federal and state governments tax income and because the size of the unoccupied space depends on the choice of μ by the federal government.

Individuals choose their locations based on conjectures about the equilibrium tax rates, spending, social policies, and the location choices of others. This section analyzes location choice by examining the incentives to locate in the two states. Baron (2022) presents a related sorting model but incudes neither social policy nor a federal government that taxes, spends, and regulates social policy.

The conjectures in the model are guided by data on existing state policies and the associated movement of people. Duggan and Hou (2022) report New York has a higher income tax, sales tax, and property taxes than Florida.[16] Per capita government spending in 2019 was $19,288 in New York and $9,267 in Florida.[17]

For an individual (θ, γ) the utility difference $\Delta U^L(\theta,\gamma) = U_L^L(\theta,\gamma) - U_R^L(\theta,\gamma)$ between locating in state L and locating in state R when the federal government is headed by representatives from state L is

$$\begin{aligned}\Delta U^L(\theta,\gamma) &= \frac{1}{2}\theta^2\left(-(\hat{\tau}_L^L - \hat{\tau}_R^L)(2(1-t) - \hat{\tau}_L^L - \hat{\tau}_R^L) - (\gamma_L^o\hat{\tau}_L^L - \beta\hat{\tau}_R^L)(2\gamma_F^o t + \gamma_L^o\hat{\tau}_L^L + \beta\hat{\tau}_R^L)\right) \\ &+ \gamma_L^o T_L - \beta T_R - (\bar{\mu} - \mu - \underline{\mu})\left((\hat{y}_L - y(\gamma))^2 - (\hat{y}_R - y(\gamma))^2\right). \qquad (9)\end{aligned}$$

A sufficient condition for the difference $\Delta U^L(\theta,\gamma)$ to be strictly decreasing in θ is $\gamma_L^o\hat{\tau}_L^L \geq \beta\hat{\tau}_R^L$, so an individual with $\gamma_L^o \geq \beta\frac{\hat{\tau}_R^L}{\hat{\tau}_L^L}$ has an economic incentive to locate in state R. Individual with strong ideology, however, also have an incentive to locate in state L to gain from the redistribution.

To identify the sorting between the states, define $\gamma^*(\theta)$ by $\Delta U^L(\theta,\gamma^*(\theta)) \equiv 0$, where it exists, as the

[16]The SALT provision of the 2017 Tax Cuts and Jobs Act limited the federal deductions for state and local taxes, which substantially increased the effective tax rate in New York.

[17]Duggan and Hou (2022) report that the largest differences in state spending are on welfare and education. The former is primarily a result of Florida not participating in the expansion of Medicaid through the ACA. Thirty-two percent of New York residents are on Medicaid versus 18% in Florida. Life expectancy is the same in both states, and Florida has a higher infant mortality rate. Per capita income growth is the same in the two states, and the percent living in poverty is the same. Florida has a higher high school graduation rate, and eighth grade reading and math proficiency are the same in the two states. New York has higher SAT and ACT scores, and Florida is better for students with "limited English proficiency." Home ownership is higher in Florida than in New York, and homelessness is 3.5 times greater in New York. New York spends more on police, and the incarceration rate is twice as high in Florida.

ideology of the individual with productivity θ who is indifferent between locating in state L or state R. The indifference line between states L and R then is $(\theta, \gamma^*(\theta)), \theta \in \Theta = [0, \bar{\theta}]$. Sorting responds to three incentives. The first is after-tax utility from work, which depends on both productivity and ideology. The second is state spending, which funds either redistribution or the public good and depends on both productivity and ideology. The third is social policy, which depends on ideology.

Consider an individual with productivity $\theta = 0$ and ideology γ. If γ is very low ($\gamma \approx 0$), the individual locates in R to benefit from the public good. When γ is low, $y(\gamma)$ is small relative to $\frac{1}{2}(\hat{y}_L + \hat{y}_R)$, so the social policy difference between the states supports locating in R. That is, the difference in social policy utility is $-(\hat{y}_L - y(\gamma))^2 + (\hat{y}_R - y(\gamma))^2 = -2(\hat{y}_L - \hat{y}_R)(\frac{1}{2}(\hat{y}_L + \hat{y}_R) - y(\gamma))$, so individuals with ideology $y(\gamma) < \frac{1}{2}(\hat{y}_L + \hat{y}_R)$ have a social policy incentive to locate in R and those with $y(\gamma) > \frac{1}{2}(\hat{y}_L + \hat{y}_R)$ have a social policy incentive to locate in L. Because $y(\gamma)$ is increasing in γ, individuals with stronger ideology have an incentive to locate in state L with the more extensive social regulation. State L has more extensive social regulation because its residents have stronger ideology than the residents of state R, so location choices reflect a synergy.

The individual with the highest ideology $\gamma^*(0)$ who is indifferent between locating in L or R is illustrated in Figure 2. Individuals with $\gamma > \gamma^*(0)$ prefer to locate in L. Consider the individuals with $\gamma = \gamma^*(0)$. Those with productivity $\theta > 0$ prefer to locate in R. The same properties are present for all points on the indifference line (except weakly at the boundaries).

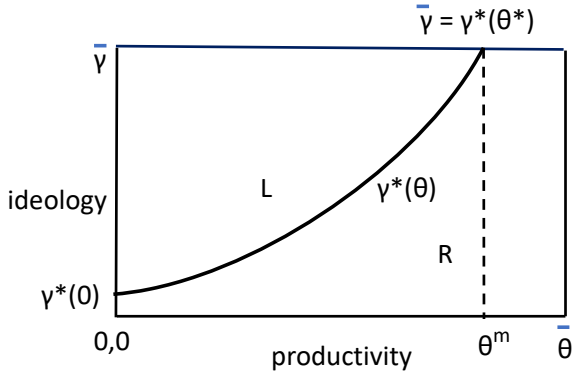
In characterizing the indifference line each individual takes as given the policies of the states and the federal government and the location choices of other individuals, but consistent with the analysis in earlier sections individuals take into account the result of their work if they locate in state L or in state R. The following shows that the indifference line is locally (using implicit differentiation) increasing in θ except possibly for very low γ.

Proposition 2. *Given the conjecture $\hat{\tau}_L^L > \hat{\tau}_R^L$, the indifference line is increasing in θ, i.e., $\frac{d\gamma^*(\theta)}{d\theta} > 0$, if $\gamma^*(\theta) \geq \gamma^-(\theta)$ where $\gamma^-(\theta) < \beta \frac{\hat{\tau}_R^L}{\hat{\tau}_L^L}$ is defined in* (D.3) *in Appendix D. If $\max_{\theta \in \Theta} \gamma^*(\theta) > \bar{\gamma}$, the indifference line is constant at $\gamma^*(\theta) = \bar{\gamma}$.*[18]

[18] For an individual with maximum ideology $\bar{\gamma}$, define θ^* by $\gamma^*(\theta^*) \equiv \bar{\gamma}$, which is the highest productivity individual with ideology $\bar{\gamma}$ who is indifferent between locating in L and locating in R. When $\theta < \theta^*$ and γ is high, $y(\gamma)$ is greater than $\frac{1}{2}(\hat{y}_L + \hat{y}_R)$, so the difference in social policies supports locating in L. For the illustration in the figure the maximum productivity $\bar{\theta}$ is assumed to be at least as great as θ^*.

The proof is presented in Appendix D. Figure 2 illustrates the location choices.

Figure 2
Sorting



Relative to an individual $(\theta, \gamma^*(\theta))$ indifferent between locating in L or R, (i) individuals with higher productivity prefer to locate in R and individuals with lower productivity prefer to locate in L and (ii) individuals with stronger ideology γ prefer to locate in L and individuals with weaker ideology prefer to locate in R. These preferences support the conjecture that residents of state L have on average stronger ideology and lower productivity than the residents of state R. For two individuals with the same productivity θ, the one with $\gamma > \gamma^*(\theta)$ locates in L and the one with ideology $\gamma < \gamma^*(\theta)$ locates in R. State R then is populated with people with higher productivity and weaker ideology than is state L.

The effect of social policy on location depends on both the size $\bar{\bar{\mu}} - \bar{\mu}$ of the state reserved space and the size of the unoccupied region $\bar{\mu} - \mu - \underline{\mu}$ of the unreserved space, which depends on the choice of μ by the federal government. If $\mu = \bar{\mu} - \underline{\mu}$, states do not have the opportunity to choose a social policy in the unreserved space, and only their policies in the state reserved space affect location.

The Supreme Court decisions in *Dobbs*, *EPA*, *Sackett*, and possibly *Chevron* increase the size of the unreserved social policy space represented by $\bar{\mu} - \underline{\mu}$, so state policies apply to the $\bar{\bar{\mu}} - \mu - \underline{\mu}$ portion of the social policy space. The difference in state social policies amplifies the incentives to sort and separate. A federal social policy in the unreserved space eliminates the difference and the effect on sorting.

An equilibrium in which the federal government and state L redistribute and state R provides the public good requires that $N_L \geq N_R$, so that representatives from state L head the federal government. An equilibrium also requires from Section 4.2 that $\bar{\gamma}_L^o \geq \beta$ and $\bar{\gamma}_R^o < \beta$ so that L redistributes and R provides the public good.

5.2 Qualitative Change

The model is static and cannot speak directly to changing circumstances, but it can provide insight. For example, Figure 2 and its variants can be used to examine generational changes in the population of individuals. Brown, et al. (2022) find that generational change consists primarily of "new voters who are predominately Democrats" and existing "voters changing their partisanship to Republican." Suppose an increment $\delta\bar{\gamma}$ of new individuals with strong ideology, as perhaps in the form of new college graduates, enter the population with a layer of prior individuals departing such that the resulting distribution of γ remains uniform. The population remains at N with the generational change. Also assume that those entering have the same distribution of productivity as those departing. The distribution of ideology is uniform on an interval $[0, \bar{\gamma} + \delta\gamma]$, so the new population has stronger ideology in the sense of first-order stochastic dominance. The distribution of productivity remains uniform on $[0, \bar{\theta}]$.

Sorting in (9) is affected by the generational change. The entry of strong ideologues in L raises the distribution of γ which strengthens the preferences for a higher state tax rate and greater redistribution as well as for more extensive social regulation $\hat{y}_L$. The more extensive social regulation could include criminal justice policy as in California of reclassifying some felonies to misdemeanors, reduced cash bail, lighter sentencing, and less incarceration. The higher taxes and more expansive social policy cause some former residents of L, particularly those with lower γ or higher productivity, to relocate to state R for the less expansive social policy and lower taxes. Some individuals with higher γ may relocate to L because of the greater redistribution. Those with relatively high θ who relocate in R prefer a lower tax rate, which provides a stronger incentive for the former L residents to relocate in R. The indifference line likely moves upward.

In partisan terms, the generational change with the location in L of individuals with strong ideology in L corresponds to the new Democrats in Brown, et. al (2022). The relocation of some former residents of L to state R corresponds to people transitioning to Republican, particularly if there is an assimilation effect from new neighbors.

5.3 State Populations

Define θ^+ by $\theta^+ = \min\{\theta^*, \bar{\theta}\}$ where θ^* is defined by $\gamma^*(\theta^*) \equiv \bar{\gamma}$, and define $\theta^- = \max\{\theta^0, 0\}$, where θ^0 is defined by $0 \equiv \gamma^*(\theta^0)$. Define $\gamma^- \equiv \max\{0, \gamma^*(\theta^-)\}$. The population in state R is $N_R = N \int_{\Theta_R} \int_{\Gamma_R(\theta)} dG(\gamma)dF(\theta)$, where $\Theta_R = [\theta^-, \theta^+] \subset [0, \bar{\theta}]$ is the domain of productivities in R and $\Gamma_R(\theta) = [\gamma^-, \gamma^*(\theta)] \subset [0, \bar{\gamma}]$ is the domain of ideologies of residents of R with productivity $\theta \in \Theta_R$. The population N_R is

$$N_R = N \int_{\theta^-}^{\theta^+} \int_{\gamma^-}^{\gamma^*(\tilde{\theta})} dG(\tilde{\gamma})dF(\tilde{\theta}),$$

and the population of state L is $N_L = N - N_R$. The maintained hypothesis in the previous sections is that $N_L \geq N_R$, and if $N_L < N_R$, the conjectured choices are not an equilibrium.

5.4 Polarization

Location choices are motivated by individual preferences and by the policies states adopt in serving the interests of their residents. These preferences are reflected in federal representation as well as in state policies. Sorting is thus natural as is polarization. Sorting results in policy separation at the state level which amplifies polarization across the states as Duggan and Hou (2022) document for Florida and New York. New York spends twice as much per capita as Florida and has higher tax rates with Florida having no personal income tax. Per capita income is the same, however. New York also spends much more on redistribution in the form of Medicaid and much more on education with little difference in outcomes. Economic and social preferences are reflected in state policies, and they are also reflected in sorting with people leaving New York and people moving to Florida.

The differences in preferences and policies among the states are reflected in representation, so polarization in the federal government is both natural and expected. Polarization in Congress has increased substantially in the past few decades. Part of this increase could be due to continued sorting as in the case of generational change, and part may be due to the within state selection of representatives. Most states are politically noncompetitive with a dominant party, and that party may influence the selection of candidates and result in greater polarization.[19] Despite the polarization, policy is not extreme provided that the government is divided. When governance requires votes from minority representatives, bargaining results in compromise and more centrist policies.

6 Federal Governance

The federal government is assumed to be divided because, for example, of bicameralism, a filibuster, veto override hurdle, or other supermajority hurdle. Federal policy is the result of bargaining that takes into account the interests of the residents of the two states. Federal representatives are a reflection of the residents of the states, so federal legislators in the model have preferences that represent those of their state. The representatives of the more populous state head the government and maximize the aggregate utility of the residents of their state. The minority representatives represent the interests of the residents of state R, and they have bargaining power because they must accept a proposal for it to be enacted. The representatives of state R are the minority and act as a block.[20] In the bargaining the proposer holds the minority to its reservation value. The reservation value and the weight given to the interests of the minority are greater the closer is the status quo to the ideal policy of the minority. The maintained conjecture is that sorting results in state L residents having an on average stronger ideology and lower productivity than the residents of state R, as illustrated, for example, in Figure 2.

[19] Hall (2019) provides empirical evidence that who chooses to run for office contributes significantly to polarization and in recent years incentives have strengthened resulting in more extreme candidates running.

[20] Appendix E considers representatives from R who act individually.

The policies over which bargaining takes place are the federal tax rate t, federal social policy y_F, and the portion μ of the unreserved space on which federal policy governs. The federal government also allocates a small amount $z \leq \bar{z}$ of pork to the minority legislators. Pork is to be understood as grease used to facilitate federal bargaining and cannot be transferred to a state or to residents. The pork z received and $\bar{z}-z$ retained by the head of government are used for internal governance purposes.

The federal government maximizes the aggregate well-being $AU_L^L(t, y_F, \mu, z)$ in (10) of the residents of state L with respect to (t, y_F, μ, z), taking as given the conjectured equilibrium policies of the states and the location choices of individuals, where[21]

$$\begin{aligned} AU_L^L(t, y_F, \mu, z) &= \int_{\Theta_L} \int_{\Gamma_L(\theta)} \left(\frac{1}{2}\tilde{\theta}^2 (1-(1-\tilde{\gamma}_F^o)t - (1-\tilde{\gamma}_L^o)\hat{\tau}_L^L)(1-(1+\tilde{\gamma}_F^o)t - (1+\tilde{\gamma}_L^o)\hat{\tau}_L^L) \right) dG(\tilde{\gamma}) dF(\tilde{\theta}) \\ &+ N_L \bar{\gamma}_F^o T_F + N_L \bar{\gamma}_L^o T_L \qquad (10) \\ &- \int_{\Theta_L} \int_{\Gamma_L(\theta)} \left((\underline{\mu} + \mu - \underline{\underline{\mu}})(y_F - y(\tilde{\gamma}))^2 + (\bar{\mu} - \mu - \underline{\mu})(\hat{y}_L - y(\tilde{\gamma}))^2 \right) dG(\tilde{\gamma}) dF(\tilde{\theta}) + \bar{z} - z. \end{aligned}$$

The representatives from state R accept the proposal if $AU_R^L(t, y_F, \mu, z) \geq AU_R^L(t^o, y_F^o, \mu^o, z^o)$, where $AU_R^L(t, y_F, \mu, z)$ is given in (5).

Necessary conditions for a bargaining equilibrium are obtained from the maximization of the Lagrangian $\mathcal{L}_R^L = AU_L^L(t, y_F, \mu, z) + \lambda_R^L \left(AU_R^L(t, y_F, \mu, z) - AU_R(t^o, y_F^o, \mu^o, z^o) \right)$, where λ_R^L is the nonnegative multiplier associated with the acceptance constraint. The necessary conditions for the equilibrium bargain $(\hat{t}_R^L, \hat{y}_F, \hat{\mu}, \hat{z})$ and $\hat{\lambda}_R^L$ are[22]

$$\begin{aligned} \frac{\partial \mathcal{L}_R^L}{\partial t} &= \int_{\Theta_L} \int_{\Gamma_L(\tilde{\theta})} \left(\tilde{\theta}^2 \left(-1 + (1-(\tilde{\gamma}_F^o)^2)\hat{t}_R^L + (1-\tilde{\gamma}_L^o\tilde{\gamma}_F^o)\hat{\tau}_L^L \right) + \tilde{\gamma}_F^o \frac{\partial T_F}{\partial t} + \tilde{\gamma}_L^o \frac{\partial T_L}{\partial t} \right) dG(\tilde{\gamma}) dF(\tilde{\theta}) \\ &+ \hat{\lambda}_R^L \int_{\Theta_R} \int_{\Gamma_R(\tilde{\theta})} \left(\tilde{\theta}^2 \left(-1 + (1-(\tilde{\gamma}_F^o)^2)\hat{t}_R^L + (1-\beta\tilde{\gamma}_F^o)\hat{\tau}_R^L \right) + \tilde{\gamma}_F^o \frac{\partial T_F}{\partial t} + \beta \frac{\partial T_R}{\partial t} \right) dG(\tilde{\gamma}) dF(\tilde{\theta}) = 0, \qquad (11) \end{aligned}$$

$$\frac{\partial \mathcal{L}_R^L}{\partial y_F} = -2(\hat{\mu} + \underline{\mu} - \underline{\underline{\mu}}) \int_{\Theta_L} \int_{\Gamma_L(\tilde{\theta})} (\hat{y}_F - y(\tilde{\gamma})) dG(\tilde{\gamma}) dF(\tilde{\theta}) - 2\hat{\lambda}_R^L (\hat{\mu} + \underline{\mu} - \underline{\underline{\mu}}) \int_{\Theta_R} \int_{\Gamma_R(\tilde{\theta})} (\hat{y}_F - y(\tilde{\gamma})) dG(\tilde{\gamma}) dF(\tilde{\theta}) = 0. \qquad (12)$$

$$\begin{aligned} \frac{\partial \mathcal{L}_R^L}{\partial \mu} &= \int_{\Theta_L} \int_{\Gamma_L(\tilde{\theta})} \left(-(\hat{y}_F - y(\tilde{\gamma}))^2 + (\hat{y}_L - y(\tilde{\gamma}))^2 \right) dG(\tilde{\gamma}) dF(\tilde{\theta}) \\ &+ \hat{\lambda}_R^L \int_{\Theta_R} \int_{\Gamma_R(\tilde{\theta})} \left(-(\hat{y}_F - y(\tilde{\gamma}))^2 + (\hat{y}_R - y(\tilde{\gamma}))^2 \right) dG(\tilde{\gamma}) dF(\tilde{\theta}) \leq 0; \;\; \frac{\partial \mathcal{L}_R^L}{\partial \mu} \hat{\mu} = 0. \qquad (13) \end{aligned}$$

$$\frac{\partial \mathcal{L}_R^L}{\partial z} = -1 + \hat{\lambda}_R^L \leq 0 \;\; if \; \hat{z} < \bar{z}; \;\; \frac{\partial \mathcal{L}_R^L}{\partial z} \hat{z} = 0. \qquad (14)$$

$$\frac{\partial \mathcal{L}_R^L}{\partial \lambda_R^L} = AU_R(\hat{t}, \hat{y}_F, \hat{\mu}, \hat{z}) - AU_R(t^o, y_F^o, \mu^o, z^o) \leq 0; \;\; \frac{\partial \mathcal{L}_R^L}{\partial \lambda_R^L} \hat{\lambda}_R^L = 0. \qquad (15)$$

[21] The spending allocations of the federal and state governments are taken as given to simplify the notation.

[22] The constraints $t \in [0,1]$, $y_F \geq 0$, $z \in [0, \bar{z}]$, and $\mu \in [0, \bar{\mu} - \underline{\mu}]$ are not included in the Lagrangian to simplify the notation.

Appendix F presents the federal tax rate $\hat{t}_R^L$ from (11) which weights the interests of the residents of state L with the interests of the residents of state R, where the weight $\hat{\lambda}_R^L$ reflects the tightness of the acceptance constraint. The federal tax rate is a compromise. For each state the compromise takes into account the distortion to income from the federal tax, the effect on ideological satisfaction from federal redistribution and from state redistribution in L and the benefits from the public good in R. A higher federal tax rate reduces after-tax income in both states but increases federal redistribution which is valued more highly in L than in R. A higher federal tax rate decreases state redistribution in L and the provision of the public good in R. There is no gridlock on the federal tax rate or on spending.[23]

Federal social policy $\hat{y}_F$ from (12) is a population weighted average of the interests of the residents of the states given by[24]

$$\hat{y}_F = \frac{N_L \hat{y}_L + \hat{\lambda}_R^L N_R \hat{y}_R}{N_L + \hat{\lambda}_R^L N_R}. \tag{16}$$

The policy $\hat{y}_F$ applies in the federal reserved space and in a portion of the unreserved space when $\hat{\mu} > 0$. Like the federal tax rate federal social policy is a compromise, where the compromise favors the residents of state L (R) when the multiplier $\hat{\lambda}_R^L < (>)1$.[25]

If pork is scarce so that $\hat{z} = \bar{z}$, $\hat{\lambda}_R^L > 1$. If no pork is allocated to state R legislators, $\hat{\lambda}_R^L < 1$, and if $\hat{z} \in (0, \bar{z})$, $\hat{\lambda}_R^L = 1$. The multiplier is greater the more favorable the status quo is to the interests of the residents of state R. The multiplier $\hat{\lambda}_R^L$ is determined by substituting the equilibrium policies into the binding acceptance constraint in (15).

7 Gridlock

In an equilibrium gridlock occurs when the federal government does not act even though compromises are available. There is no gridlock on economic policy – taxes and spending – nor on social policy in the federal reserved space. The federal social policy $\hat{y}_F$ is a compromise that balances the preferences of the residents of states L and R and is proposed by the government and accepted by the state R representatives. The compromise can also be implemented in the unreserved space, but any compromise makes the residents of both states worse off in the aggregate than allowing the states to choose their own policies. The federal government then leaves the unreserved space to the states. Gridlock of federal social policy in the unreserved space results regardless of which state delegation heads the government.

Proposition 3. *Gridlock: The federal government chooses $\hat{\mu} = 0$, leaving the unreserved space unoccupied and available for the states. The states choose their ideal social policies in the unoccupied portion of the*

[23] Orthodox gridlock on economic policy is identified in numerous theoretical and empirical studies. Gridlock can result in a one-dimensional policy space, but in a multi-dimensional policy space compromises are present. Those compromises could be affected, however, by bargaining costs, which are assumed to be zero.

[24] The same social policy results if the federal government chooses a policy y_f in the unreserved space and y_F in the federal reserved apace. That is, $\hat{y}_f = \hat{y}_F$.

[25] Federal social policy is independent of the size of the reserved and unreserved spaces.

unreserved social policy space. Gridlock makes the residents in both states better off than with any federal policy.

To show the proposition, rewrite the necessary condition in (13) as[26]

$$\begin{aligned}\frac{\partial \mathcal{L}_R^L}{\partial \mu} &= -\int_{\Theta_L}\int_{\Gamma_L(\tilde{\theta})}(\hat{y}_F-\hat{y}_L)(\hat{y}_F+\hat{y}_L-2y(\tilde{\gamma}))dG(\tilde{\gamma})dF(\tilde{\theta}) \\ &- \hat{\lambda}_R^L\int_{\Theta_R}\int_{\Gamma_R(\tilde{\theta})}(\hat{y}_F-\hat{y}_R)(\hat{y}_F+\hat{y}_R-2y(\tilde{\gamma}))dG(\tilde{\gamma})dF(\tilde{\theta})\leq 0. \qquad (17)\end{aligned}$$

Using the state social policies in (8) to evaluate (17) yields

$$\frac{\partial \mathcal{L}_R^L}{\partial \mu} = -N_L(\hat{y}_F-\hat{y}_L)^2-\hat{\lambda}_R^L N_R(\hat{y}_F-\hat{y}_R)^2<0. \qquad (18)$$

The first term in (18) is the loss to the residents of state L from the compromise federal policy $\hat{y}_F$, and the second term is the corresponding loss to the residents of state R weighted by the multiplier. The federal government chooses $\hat{\mu}=0$, so gridlock results on federal social policy in the unreserved space.

Gridlock is due to the two state ideal policies. Any proposal by the federal government to occupy part of the unreserved policy space makes the residents of both states worse off. State R could be compensated through concessions on economic policy by, for example, lowering the federal tax rate, but doing so makes the residents of L worse off. There is no proposal that can make both states, each of which is represented in the federal legislature, better off than leaving the unreserved space unoccupied. The politically noncompetitive states act decisively to enact their own policies in that space.

If the federal government implements a compromise federal social policy, such as $\hat{y}_F$ or the ideal social policy $\hat{y}_L$ of the government majority, state R is worse off than with $\hat{y}_R$, so the acceptance constraint is tighter. The equilibrium multiplier then is greater, so greater weight is given to the interest of the residents of state R in the bargaining. This is costly to the residents of state L and hence to the federal government.[27] It is better to forego the compromise and leave the unreserved space to the states. Gridlock increases the well-being of the residents of both states relative to a federal policy, but it is divisive. The difference between the state policies $\hat{y}_L$ and $\hat{y}_R$ strengthens the incentive to sort, which amplifies polarization in the federal government.

Brady, et. al (2023) report the mean preferences for abortion access, which corresponds to $\hat{y}_j$, of survey respondents in California, Arizona, and Texas. The mean response in California is 24 weeks, which is the same as the state policy and essentially the same as the policy prior to *Dobbs*. The mean preference in

[26]Gridlock also results if the federal government chooses a policy y_f on the unreserved space.

[27]Informally, the necessary condition in (11) is $\frac{dAU_L^L}{dt}+\hat{\lambda}_R^L\frac{dAU_R^L}{dt}=0$, where $\frac{dAU_L^L}{dt}>0$ and $\frac{d\Delta_R^L}{dt}<0$ are consistent with the conjectures for the state taxes. Then viewing $\hat{\lambda}_R^L$ as a parameter $\frac{d\hat{t}_R^L}{d\hat{\lambda}_R^L}=-\frac{1}{SOC}\frac{dAU_R^L}{dt}<0$, where SOC is the (negative) second-order condition. Implementing $\hat{y}_F$ or $\hat{y}_L$ then requires a lower tax rate that makes the residents of L and their representatives worse off.

Arizona is 15 weeks, which is the same as the state policy enacted post-*Dobbs*. The policy in Texas is 0 weeks, with an exemption only to save the life of the woman, whereas the mean survey response is 6 weeks. The authors observe that the state policy is closer to the mean of 6 weeks than to the policy prior to *Dobbs*. The opportunity to choose a state policy has improved the well-being of Arizona and Texas residents without affecting California residents. The state policies are quite different, however, and the separation can affect location choices. The survey results for those entering and leaving California and Texas illustrates the difference.

The Supreme Court cases mentioned in the Introduction have substantially expanded the unreserved and unoccupied social policy spaces. *Dobbs* eliminated a long-standing ruling, and states have responded with a variety of laws establishing abortion rights or restricting abortion access. *EPA* and *Sackett* have restricted the authority of the EPA to regulate power plant emissions and wetlands, respectively, giving states the opportunity to establish their own policies. Perhaps as importantly, these two decisions serve as a warning to other federal agencies not to expand the scope of their policies without clear assignment from Congress. The current challenge to *Chevron* deference could restrict or eliminate deference to agencies as a path to the expansion of federal policies. These court cases place additional responsibility on Congress to provide specific guidance on the nature and scope of social policy or to leave the policy to the states. The space for federal gridlock has correspondingly expanded.

8 Extensions

8.1 Federal Government Preferences

Gridlock results because states are able to choose social policies that serve the interests of their residents. This result is robust to alternative specifications of the preferences of the federal government. This section considers a federal L government that maximizes national well-being.

Suppose the federal government seeks "consensus" policies that maximize $AU_L^L(t, y_F, \mu, z)+AU_R^L(t, y_F, \mu, z)$ subject to acceptance by the representatives of state R. The resulting bargain gives more weight to the interests of state R, and sorting between the states is affected. The compromise federal social policy $\bar{y}_F$ in the federal reserved and occupied social policy spaces is

$$\bar{y}_F = \frac{\bar{N}_L \bar{y}_L + \bar{N}_R \bar{y}_R (1 + \bar{\lambda}_R^F)}{\bar{N}_L + \bar{N}_R (1 + \bar{\lambda}_R^F)}, \tag{19}$$

where $\bar{y}_j, j = L, R$, is the ideal state j social policy in the unreserved social policy space, $\bar{N}_j$ is the population in state $j \in \{L, R\}$, and $\bar{\lambda}_R^F$ is the multiplier associated with the acceptance constraint.

The necessary condition corresponding to (13) for the portion of the unreserved social policy space that

the federal government occupies is

$$\begin{aligned}\frac{\partial \mathcal{L}_R^L}{\partial \mu} &= \int_{\bar{\Theta}_L}\int_{\bar{\Gamma}_L(\tilde{\theta})}\left(-(\bar{y}_F - y(\tilde{\gamma}))^2 + (\bar{y}_L - y(\tilde{\gamma}))^2\right) dG(\tilde{\gamma})dF(\tilde{\theta}) \\ &+ (1+\bar{\lambda}_R^L)\int_{\bar{\Theta}_R}\int_{\bar{\Gamma}_R(\tilde{\theta})}\left(-(\bar{y}_F - y(\tilde{\gamma}))^2 + (\bar{y}_R - y(\tilde{\gamma}))^2\right) dG(\tilde{\gamma})dF(\tilde{\theta}) \leq 0;\ \ \frac{\partial \mathcal{L}_R^L}{\partial \mu}\mu^+ = 0,\end{aligned}$$

where $\mathcal{L}_R^L$ is the Lagrangian, μ^+ is the equilibrium policy, and $\bar{\Theta}_j$ and $\bar{\Gamma}_j(\theta)$ are the productivities and ideologies of the residents of state $j = L, R$. Proceeding as in (17) and (18) shows that $\frac{\partial \mathcal{L}_R^L}{\partial \mu}$ is negative, so gridlock is present.[28]

In an equilibrium, state R welcomes the compromise tax rate and federal social policy in the federal reserved social policy space but continues to require that its residents be at least as well off as with the status quo and the state social policy in the unreserved space. The set of individuals locating in state L or R responds to the compromise in (19) as in Section 5.

8.2 Imposing Preferences

People in one state can be concerned with the policies in another state. As an example, a California law has banned state funds from being used for travel to states with policies to which it objects. In 2023, 26 states were on the off-limits list. In the 2023 NCAA men's basketball championship San Diego State University qualified for the final four but was unable to pay for travel to the tournament site in Texas. Private funds and the NCAA covered the cost.

Attempting to impose one's preferences or ideology on others comes at a cost. A movement began in the California legislature to repeal the law because it has had no effect on the policies of other states, and some states had retaliated by, for example, not traveling to California or withdrawing conventions from the state. The law was repealed in September 2023. In the model the California law corresponds to attempting to impose a federal policy on a state. The extent of the concessions on other policy dimensions needed to do so is determined by the tightness of the acceptance constraint as measured by the multiplier.

Suppose the L government seeks to impose a policy y_c on state R in the unreserved space and counts as a gain the utility difference $(y_c - y(\gamma))^2 - (y_R - y(\gamma))^2$ for each resident of R. The equilibrium policy $\hat{\hat{y}}_c$ when positive is

$$\hat{\hat{y}}_c = \frac{\hat{\hat{N}}_L\hat{\hat{y}}_L + \hat{\hat{N}}_R\hat{\hat{y}}_R(\hat{\hat{\lambda}}_R^L - 1)}{\hat{\hat{N}}_L + \hat{\hat{N}}_R(\hat{\hat{\lambda}}_R^L - 1)},$$

where $\hat{\hat{N}}_j$ is the population in state $j \in \{L, R\}$. The second-order condition is $-\hat{\hat{N}}_L - \hat{\hat{N}}_R(\hat{\hat{\lambda}}_R^L - 1) < 0$, which is satisfied when $\hat{\hat{N}}_L > \hat{\hat{N}}_R$ under the maintained conjecture. The multiplier $\hat{\hat{\lambda}}_R^L$ differs from $\hat{\lambda}_R^L$ and sorting is affected, so a direct comparison of the federal social policies is not possible.

[28] The same result obtains if state R has national preferences.

If the federal government counts the gain in state R, the condition in (13) for the portion of the unreserved space occupied by the federal government is

$$\begin{aligned}\frac{\partial \mathcal{L}_R^L}{\partial \mu} &= \int_{\Theta_L}\int_{\Gamma_L(\tilde{\theta})}\left(-(\hat{\hat{y}}_c - y(\tilde{\gamma}))^2 + (\hat{y}_L - y(\tilde{\gamma}))^2\right) dG(\tilde{\gamma})dF(\tilde{\theta}) \\ &+ (1+\hat{\hat{\lambda}}_R^L)\int_{\Theta_R}\int_{\Gamma_R(\tilde{\theta})}\left(-(\hat{\hat{y}}_c - y(\tilde{\gamma}))^2 + (\hat{\hat{y}}_R - y(\tilde{\gamma}))^2\right) dG(\tilde{\gamma})dF(\tilde{\theta}).\end{aligned}$$

Evaluating as in (17) and (18) yields

$$\frac{\partial \mathcal{L}_R^L}{\partial \mu} = -N_L(\hat{\hat{y}}_c - \hat{\hat{y}}_L)^2 - (\hat{\hat{\lambda}}_R^L - 1)N_R(\hat{\hat{y}}_c - \hat{\hat{y}}_R)^2.$$

Gridlock results if $\hat{\hat{\lambda}}_R^L \geq 1 - \frac{N_L(\hat{\hat{y}}_c - \hat{\hat{y}}_L)^2}{N_R(\hat{\hat{y}}_c - \hat{\hat{y}}_R)^2}$. Unless the acceptance constraint is very loose so that $\hat{\hat{\lambda}}_R^L$ is small, this condition is satisfied and gridlock results.

8.3 Exercisable Rights

People claim that they have, or should have, rights that are not formally established, as in the case of unrestricted abortion access, access to shelter, open carry, parental rights, and school choice. A claimed right can be thought of as a claim about the size of the federal reserved or the federally occupied space of social policy. Expanding the space could correspond to assured abortion access or guaranteed shelter, and it could correspond to removing some federal policies and allowing states to establish a parental right to information about their children. Exercisable rights can be the subject of bargained legislation in addition to court action. Exercisable and legislated rights both contribute to sorting and polarization.

An alternative approach to social policy is to create exercisable rights that allow individuals with particular preferences or conditions to avoid harm. An exercisable right is available, but only those qualifying can exercise it. For example, an exercisable right could allow in Texas an abortion in the case of rape or incest, an ADA requirement could be waived if it imposed an unaffordable burden on a business, the discharge of a firearm could be allowed in the defense of an occupied home, and an exemption could be granted to an anti-discrimination policy to protect religious liberty.

An exercisable right allows qualifying individuals to choose either the federal or the state policy. The federal policy y_e could be created by an L federal government because residents of L with strong ideology value both the availability and the exercise of the policy in R. The social policy preferences of state L then are represented by $-\int_{\Theta_L}\int_{\Gamma_L(\tilde{\theta})}(y_F - y(\gamma))^2 dG(\tilde{\gamma})dF(\tilde{\theta}) + \int_{\Theta_R^o}\int_{\Gamma_R^o(\tilde{\theta})}((y_e - y(\gamma))^2 dG(\tilde{\gamma})dF(\tilde{\theta}) - \int_{\Theta_R^-}\int_{\Gamma_R^-(\tilde{\theta})}(y_R - y(\gamma))^2)dG(\tilde{\gamma})dF(\tilde{\theta})$, where Θ_R^o and $\Gamma_R^o(\theta)$ are the characteristics of the residents in R who choose y_e over y_R and θ_R^- and $\Gamma_R^-(\theta)$ are the individuals that choose y_R, where $\Theta_R^- \cup \Theta_R^o = \Theta_R$ and $\Gamma_R^-(\theta) \cup \Gamma_R^o(\theta) = \Gamma_R(\theta)$. For example, those exercising the right could be those who chose to reside in R because of their high productivity but who otherwise prefer an extensive social policy. Those in R who select y_e have $y(\gamma) > \frac{1}{2}(y_e + y_R)$. The

expression in (13) then is

$$\begin{aligned}\frac{\partial \mathcal{L}_R^L}{\partial \mu} &= -N_L(\hat{y}_F - \hat{y}_L)^2 + \int_{\Theta_R^o}\int_{\Gamma_R^o(\tilde{\theta})} \left((\hat{y}_e - y(\gamma))^2 - (\hat{y}_R^- - y(\gamma))^2\right) dG(\tilde{\gamma})dF(\tilde{\theta}) \\ &+ (1+\hat{\lambda}_R^e)\left(-\int_{\Theta_R^o}\int_{\Gamma_R^o(\tilde{\theta})} (\hat{y}_e - y(\gamma))^2 dG(\tilde{\gamma})dF(\tilde{\theta}) - \int_{\Theta_R^-}\int_{\Gamma_R^-(\tilde{\theta})} (\hat{y}_R^- - y(\gamma))^2 dG(\tilde{\gamma})dF(\tilde{\theta})\right),\end{aligned}$$

where $\hat{y}_R^-$ maximizes the social policy utility of those choosing the state R policy, $\hat{y}_e$ is the federal policy taking into account those in R selecting it, and $\hat{\lambda}_R^e$ is the multiplier on the acceptance constraint. The availability of a federal exercisable right makes state R a more attractive location for individuals with strong ideology.

If many residents exercise the right, gridlock is avoided. When administrations change and R heads government, it can enact its own exercisable right. The result could be a collection of differing policies. Federal policy then resembles state rather than national policy.

9 Conclusions

Location choices depend on the characteristics of individuals and the policies of states, along with a myriad of other factors. Individuals have a productivity that along with tax and spending policies of governments determine how much they work and their income. Individuals also have an ideology that supports redistribution and social regulation. Because of differences in state economic and social policies individuals sort with lower productivity and stronger ideology individuals locating in a high tax state that redistributes, and those with higher productivity and weaker ideology locating in a low tax state that provides a public good. Polarization results from the location choices, and the resulting state policy differences reinforce the sorting. Polarization is thus natural in that it arises from location choices made by individuals in light of state economic and social policies. Polarization, however, does not impede federal legislation.

Polarization has increased in recent decades, and a static model cannot explain the increase. Sorting could have increased over time in response to the policy choices of states, and those policy choices may have provided stronger incentives to sort. The greater explanatory power found by Bertrand and Kamenica (2023) for differences in expressed rather than revealed social attitudes suggests a possible stronger role for ideology in sorting. Recent Supreme Court decisions have upended federal policies and placed greater responsibility on Congress either to enact laws directly or clearly assign administrative or regulatory responsibility to agencies.

Sorting means that states can become politically noncompetitive and can act decisively to serve the interests of their residents. Sorting also suggests that in a bicameral representative democracy the federal government can be divided with compromise required to enact policy. If it is divided, the federal government must obtain votes from the minority to enact policy. Federal governance then involves bargaining and

compromise. The multidimensional bargaining considered here ignores committee jurisdictions, which if tightly respected could narrow the bargaining. In recent years, however, federal policy proposals seem to be made by the government leadership, often by-passing the formal committee stage. This is particularly the case when policymaking is governed by reconciliation, as it has been in the last three administrations. The Inflation Reduction Act (Build Back Better) of 2022, for example, was enacted under reconciliation and largely bypassed the committee stage of the legislative process.

The Constitution assigns some policy space to the states and some to the federal government. Other policy spaces are not reserved for either state or federal governments. The federal government can enact a compromise policy in this unreserved space as it does in the federal reserved space, but it chooses not to do so, which allows the states to choose their own social policies. Federal inaction on social policy results. This form of gridlock reinforces the incentives to sort which amplifies polarization. Responsibility for this gridlock is shared with the federal government not making a proposal and the minority preferring its own state policy. Gridlock does not occur on economic policy as the government and the minority compromise.

Gridlock that devolves policy choice to the states increases well-being. Devolving policy choice to the states is reminiscent of local sorting (Tiebout (1956)), but gridlock is divisive in the sense that it strengthens the incentive for individuals to sort among the states. This increases polarization, but polarization in the model is not an impediment to legislative compromise, provided it does not give rise to bargaining costs as possibly in the case of affective polarization.

The theory presented here does not incorporate parties and hence is silent about partisanship. In the model parties could emerge in the states, and those parties would be supported by residents with preferences that can differ significantly between the states. Federal legislators come from among those residents, so parties would be composed of representatives from states that have sorted similarly along economic and social lines. If parties form to represent the interests of a subset of residents, policy divergence between the states could increase further.

Appendix A

Means Test Redistribution

Suppose every individual receives redistribution $\alpha(\bar{\theta}^2 - \theta w), \alpha \in (0,1)$, where $\bar{\theta}^2$ is the maximal untaxed income for eligibility and θw is actual income. Work is $\hat{w}_R(\theta,\gamma) = \theta(1-\alpha-(1-\gamma)t-(1-\beta)\tau_R)$ for a resident of state R, where redistribution reduces work by $\alpha\theta$. Utility is

$$\begin{aligned} U_R^L(\theta,\gamma) &= \frac{1}{2}\theta^2\left((1-\alpha-(1-\gamma)t-(1-\beta)\tau_R)(1-\alpha-(1+\gamma)t-(1+\beta)\tau_R)\right)+\gamma T_F+\beta T_R \\ &- (\mu+\underline{\mu}-\underline{\underline{\mu}})(y_F-y(\gamma))^2-(\bar{\bar{\mu}}-\mu-\underline{\mu})(y_R-y(\gamma))^2. \end{aligned}$$

The ideal tax rate $\hat{\tau}_R^L(\theta,\gamma)$ of the resident when positive is

$$\hat{\tau}_R^L(\theta,\gamma) = \frac{-\theta^2(1-\alpha+(1-\beta\gamma)t)-(1-\beta)\gamma t I_R+\beta\int_{\Theta_R}\int_{\Gamma_R(\tilde{\theta})}\tilde{\theta}^2(1-\alpha-(1-\tilde{\gamma})t)dG(\tilde{\gamma})dF(\tilde{\theta})}{-(1-\beta^2)\theta^2+2\beta(1-\beta)I_R}.$$

The comparative statics properties of $\hat{\tau}_R^L$ are analogous to those with lump-sum redistribution.

The parameter α of the redistribution system equates the aggregate redistribution to the tax revenue T_F.

Appendix B

Ideal State Tax Rates

If the federal government allocates all tax revenue to the public good, the ideal tax rate $\hat{\tau}_R^R(\theta,\gamma)$ of a resident of state R, when positive, is

$$\hat{\tau}_R^R(\theta,\gamma) = \frac{-\theta^2(1-(1-b\beta)t)-(1-\beta)btI_R+\beta(1-(1-b)t)I_R}{-(1-\beta^2)\theta^2+2\beta(1-\beta)I_R}.$$

The ideal tax rate $\hat{\tau}_R^R(\theta,\gamma)$ is decreasing in θ, constant in γ, and increasing in β and b when θ^2 is small relative to I_R.

If the federal government allocates all tax revenue to redistribution, the ideal tax rate $\hat{\tau}_L^L(\theta,\gamma)$ of a resident of L is

$$\hat{\tau}_L^L(\theta,\gamma) = \frac{-\theta^2(1-(1-\gamma_L^o\gamma_F^o)t)-\gamma_F^o t\int_{\Theta_L}\int_{\Gamma_L(\tilde{\theta})}\tilde{\theta}^2(1-\tilde{\gamma}_L^o)dG(\tilde{\gamma})dF(\tilde{\theta})+\gamma_L^o\int_{\Theta_L}\int_{\Gamma_L(\tilde{\theta})}\tilde{\theta}^2(1-(1-\tilde{\gamma}_F^o)t)dG(\tilde{\gamma})dF(\tilde{\theta})}{-(1-(\gamma_L^o)^2)\theta^2+2\gamma_L^o\int_{\Theta_L}\int_{\Gamma_L(\tilde{\theta})}\tilde{\theta}^2(1-\tilde{\gamma}_L^o)dG(\tilde{\gamma})dF(\tilde{\theta})}.$$

The ideal tax rate is decreasing in θ.

If the federal government allocates all tax revenue to the public good, the ideal tax rate $\hat{\tau}_L^R(\theta,\gamma)$ when positive of a resident of state L is

$$\hat{\tau}_L^R(\theta,\gamma)=\frac{-\theta^2(1-(1-b)t)-bt\int_{\Theta_L}\int_{\Gamma_L(\tilde{\theta})}\tilde{\theta}^2(1-\tilde{\gamma}_L^o)dG(\tilde{\gamma})dF(\tilde{\theta})+\gamma_L^o(1-(1-b)t)I_L}{-(1-(\gamma_L^o)^2)\theta^2+2\gamma_L^o\int_{\Theta_L}\int_{\Gamma_L(\tilde{\theta})}\tilde{\theta}^2(1-\tilde{\gamma}_L^o)dG(\tilde{\gamma})dF(\tilde{\theta})}.$$

The ideal tax rate is decreasing in θ.

Appendix C

State R Tax Rate When Federal Government Provides the Public Good

The aggregate well-being of the residents of state R when the federal government provides the federal public good is

$$\begin{aligned}AU_R^R(t,y_F,\mu,z) &= \frac{1}{2}\int_{\Theta_R}\int_{\Gamma_R(\tilde{\theta})}\tilde{\theta}^2\left(1-2t-2\tau_R+2t\tau_R(1-\beta b)+(1-b^2)t^2+(1-\beta^2)\tau_R^2\right)dG(\tilde{\gamma})dF(\tilde{\theta})\\ &+ bNT_F+\beta N_RT_R-\int_{\Theta_R}\int_{\Gamma_R(\tilde{\theta})}((\mu+\underline{\mu}-\underline{\underline{\mu}})(y_F-y(\tilde{\gamma}))^2+(\bar{\bar{\mu}}-\mu-\underline{\mu})(y_R-y(\tilde{\gamma}))^2)dG(\tilde{\gamma})dF(\tilde{\theta}).\end{aligned}$$

The state R tax rate $\hat{\tau}_R^R$ is

$$\hat{\tau}_R^R=\frac{-\left(1-(1-\beta b)t\right)I_R-(1-\beta)btN_RI_R+\beta N_RI_R(1-(1-\beta)t)}{-(1-\beta^2)I_R+2\beta(1-\beta)N_RI_R}.$$

The tax rate $\hat{\tau}_R^R$ is strictly increasing in β if the tax rate is on the increasing portion of the Laffer curve, and it is strictly decreasing in b.

Appendix D

Proof of Proposition 2

Proof. The utility difference in (9) can be written as

$$\begin{aligned}\Delta U^L(\theta,\gamma^*(\theta)) &= \frac{1}{2}\theta^2\left(-(\hat{\tau}_L^L-\hat{\tau}_R^L)(2(1-t)-\hat{\tau}_L^L-\hat{\tau}_R^L)-(\gamma_L^*(\theta)\hat{\tau}_L^L-\beta\hat{\tau}_R^L)(2\gamma_F^*(\theta)t+\gamma_L^*(\theta)\hat{\tau}_L^L+\beta\hat{\tau}_R^L)\right)\\ &+ \gamma_L^*(\theta)\hat{T}_L-\beta\hat{T}_R-(\bar{\bar{\mu}}-\underline{\mu}-\mu)(\hat{y}_L-\hat{y}_R)\left(\hat{y}_L+\hat{y}_R-2y(\gamma^*(\theta))\right)\equiv 0,\end{aligned}$$

where $\gamma_L^*(\theta)=\gamma^*(\theta)+\frac{1}{N_L}$, $\gamma_F^*(\theta)=\gamma^*(\theta)+\frac{1}{N}$, $\hat{T}_L=\hat{\tau}_L^L\int_{\Theta_L}\int_{\Gamma_L(\tilde{\theta})}\tilde{\theta}^2(1-(1-\tilde{\gamma}_F^o)t-(1-\tilde{\gamma}_L^o)\hat{\tau}_L^L)dG(\tilde{\gamma})dF(\tilde{\theta})$, and $\hat{T}_R=\hat{\tau}_R^L\int_{\Theta_R}\int_{\Gamma_R(\tilde{\theta})}\tilde{\theta}^2(1-(1-\tilde{\gamma}_F^o)t-(1-\beta)\hat{\tau}_R^L)dG(\tilde{\gamma})dF(\tilde{\theta})$.

Differentiating $\Delta U^L(\theta, \gamma^*(\theta)) \equiv 0$ with respect to θ yields

$$\frac{d\Delta U^L(\theta,\gamma^*(\theta))}{d\theta} = \frac{\partial \Delta U^L(\theta,\gamma^*(\theta))}{\partial \theta} + \frac{\partial \Delta U^L(\theta,\gamma^*(\theta))}{\partial \gamma^*(\theta)} \frac{d\gamma^*(\theta)}{d\theta} = 0. \tag{D.1}$$

The first term in (D.1) is

$$\begin{aligned} \frac{\partial \Delta U^L(\theta,\gamma^*(\theta))}{\partial \theta} &= \theta \left(-(\hat{\tau}_L^L - \hat{\tau}_R^L)(2(1-t) - \hat{\tau}_L^L - \hat{\tau}_R^L) \right. \\ &- \left. (\gamma_L^*(\theta)\hat{\tau}_L^L - \beta\hat{\tau}_R^L)(2\gamma_F^*(\theta)t + \gamma_L^*(\theta)\hat{\tau}_L^L + \beta\hat{\tau}_R^L) \right), \end{aligned} \tag{D.2}$$

which is negative for $\gamma_L^*(\theta) \geq \beta \frac{\hat{\tau}_R^L}{\hat{\tau}_L^L}$. The derivative in (D.2) is negative for all $\gamma^*(\theta)$ that satisfy

$$\beta\hat{\tau}_R^L > \frac{(\hat{\tau}_L^L - \hat{\tau}_R^L)(2(1-t) - \hat{\tau}_L^L - \hat{\tau}_R^L)}{2\gamma_F^*(\theta)t + \gamma_L^*(\theta)\hat{\tau}_L^L + \beta\hat{\tau}_R^L} + \gamma_L^*(\theta)\hat{\tau}_L^L, \tag{D.3}$$

which includes low $\gamma^*(\theta)$. Let $\gamma^-(\theta)$ be defined by the maximum of 0 and the minimum $\gamma^*(\theta)$ that satisfies (D.3).

The partial derivative of $\Delta U^L(\theta, \gamma^*(\theta))$ with respect to $\gamma^*(\theta)$ is

$$\begin{aligned} \frac{\partial \Delta U^L(\theta,\gamma^*(\theta))}{\partial \gamma^*(\theta)} &= \frac{1}{2}\theta^2 \left(-\hat{\tau}_L^L 2\gamma_F^*(\theta)t + \gamma_L^*(\theta)\hat{\tau}_L^L + \beta\hat{\tau}_R^L - (2t + \hat{\tau}_L^L)(\gamma_L^*(\theta)\hat{\tau}_L^L - \beta\hat{\tau}_R^L) \right) + T_L \\ &+ 2(\bar{\mu} - \mu - \underline{\mu})(\hat{y}_L - \hat{y}_R) y'(\gamma^*(\theta)). \end{aligned} \tag{D.4}$$

The first term in (D.4) is the effect of higher $\gamma^*(\theta)$ on the difference in the utility from work in the two states, the second term is the redistribution in state L, and the third term is the effect of stronger ideology on the disutility of social policy in the state reserved and the unoccupied portion of the unreserved space. Stronger ideology corresponds to an ideal social policy that is increasing in $\gamma^*(\theta)$, so the social policy effect favors state L. The first term for the individual is small relative to state tax revenue, so the indifference line $(\theta, \gamma^*(\theta))$ is increasing in θ for $\gamma^*(\theta) \geq \gamma^-(\theta)$. ■

Appendix E

Federal Governance with State Delegations without Cohesion

Suppose that state R federal representatives are not cohesive and instead of acting as a block act individually based on their own preferences and support a proposal only if it satisfies their individual acceptance constraints. The government then makes a proposal to the least "costly" decisive set of R representatives. The number n^* of R representatives needed could be, for example, the minimum required to overcome a filibuster. The types of the representatives is common knowledge, so the proposer can select among all the sets S of n^* legislators.

The proposer maximizes $AU_L^L(t, y_F, \mu, z)$ subject to n^* acceptance constraints and selects the optimal set S^* of n^* representatives. The proposer can allocate pork $z_i \geq 0$ to member i of that set, where $\sum_{i \in S^*} z_i \leq \bar{z}$. The Lagrangian $\mathcal{L}_R^*$ is

$$\mathcal{L}_R^* = AU_L^L(t, y_F, \mu, z_1, \ldots, z_{n^*}) + \sum_{i \in S^*} \lambda_R^i \left(U_R^i(t, y_F, \mu, z_i) - U_R^i(t^*, y_F^*, \mu^*, z_i^*) \right),$$

where λ_R^i is the multiplier associated with the acceptance constraint of $i \in S^*$, $U_R^i(t, y_F, \mu, z_i)$ is the utility of $i \in S^*$, and the proposer selects S^* from among the set of decisive sets.

The necessary optimality conditions are analogous to (11)-(15) and are not presented here. The policies in the bargain are different from those characterized in Section 6 because only the preferences of the representatives in S^* are taken into account and the acceptance constraints reflect only their preferences. The tax rate is a weighted average of the preferences of the residents of state L and the preferences of the representatives of state R in S^*. For example, the federal social policy is $\hat{y}_F^S = \frac{N_L \hat{y}_L + \sum_{i \in S^*} \hat{\lambda}_R^i \hat{y}_R^i(\gamma^i)}{N_L + \sum_{i \in S^*} \hat{\lambda}_R^i}$, where $\hat{y}_R^i(\gamma^i)$ is the ideal social policy of $i \in S^*$ and γ^i is i's ideology.

Gridlock results in the absence of cohesion. The first-order condition analogous to (13) can be written as

$$\begin{aligned} \frac{\partial \mathcal{L}_{\mathcal{R}}^*}{\partial \mu} &= -\int_{\Theta_L} \int_{\Gamma_L(\tilde{\theta})} (\hat{y}_F^{S^*} - \hat{y}_L) \left(\hat{y}_F^{S^*} + \hat{y}_L - 2y(\tilde{\gamma}_i) \right) dG(\tilde{\gamma}) dF(\tilde{\theta}) \\ &- \sum_{i \in S^*} \hat{\lambda}_R^i (\hat{y}_F^{S^*} - \hat{y}_R) \left(\hat{y}_F^{S^*} + \hat{y}_R - 2y(\gamma_i) \right), \end{aligned} \tag{E.1}$$

where $\hat{y}_F^* S$ is the federal social policy. Proceeding as in (17) and (18) shows that (E.1) is negative.

Appendix F

Federal Tax Rate

The federal tax rate $\hat{t}_R^L$ is given by

$$\begin{aligned} \hat{t}_R^L &= -\frac{1}{M} \left(\int_{\Theta_L} \int_{\Gamma_L(\tilde{\theta})} \tilde{\theta}^2 \left(\left(-1 + (1 - \tilde{\gamma}_L^o \tilde{\gamma}_F^o) \hat{\tau}_L^L \right) - N_L \bar{\gamma}_{FL}^o (1 - (1 - \tilde{\gamma}_L^o) \hat{\tau}_L^L) - N_L \hat{\tau}_L (1 - (1 - \tau_L^o) \hat{\tau}_L^L) \right) dG(\tilde{\gamma}) dF(\tilde{\theta}) \right. \\ &+ N_L \bar{\gamma}_{FL}^o \int_{\Theta_R} \int_{\Gamma_R(\tilde{\theta})} \tilde{\theta}^2 \left(1 - (1 - \beta) \hat{\tau}_R^L \right) dG(\tilde{\gamma}) dF(\tilde{\theta}) \\ &+ \hat{\lambda}_R^L \left[\int_{\Theta_R} \int_{\Gamma_R(\tilde{\theta})} \tilde{\theta}^2 \left((-1 + (1 - \beta \tilde{\gamma}_F^o) \hat{\tau}_R^L) + N_R \bar{\gamma}_F^o (1 - (1 - \beta) \hat{\tau}_R^L) \right) - N_R \beta \hat{\tau}_R^L (1 - \tilde{\gamma}_F^o) dG(\tilde{\gamma}) dF(\tilde{\theta}) \right. \\ &\left. \left. - N_R \bar{\gamma}_{FR}^o \int_{\Theta_L} \int_{\Gamma_L(\tilde{\theta})} \tilde{\theta}^2 (1 - (1 - \tilde{\gamma}_L^o) \hat{\tau}_L^L) dG(\tilde{\gamma}) dF(\tilde{\theta}) \right] \right) \end{aligned}$$

where M is the negative of the second-order condition and is given by

$$\begin{aligned} M &= \int_{\Theta_L}\int_{\Gamma_L(\tilde{\theta})} \tilde{\theta}^2 \left((1-(\tilde{\gamma}_F^o)^2) - N_L \bar{\gamma}_{FL}^o 2(1-\tilde{\gamma}_F^o)\right) dG(\tilde{\gamma}) dF(\tilde{\theta}) \\ &- \int_{\Theta_R}\int_{\Gamma_R(\tilde{\theta})} \tilde{\theta}^2 \left(N_R \bar{\gamma}_{FR}^o 2(1-\tilde{\gamma}_F^o)\right) dG(\tilde{\gamma}) dF(\tilde{\theta}) \\ &+ \hat{\lambda}_R^L \left[\int_{\Theta_R}\int_{\Gamma_R(\tilde{\theta})} \tilde{\theta}^2 \left((1-(\tilde{\gamma}_F^o)^2) - N_R \bar{\gamma}_{FR}^o 2(1-\tilde{\gamma}_F^o)\right) dG(\tilde{\gamma}) dF(\tilde{\theta}) \right. \\ &- \left. N_R \bar{\gamma}_{FR}^o \int_{\Theta_L}\int_{\Gamma_L(\tilde{\theta})} \tilde{\theta}^2 2(1-\tilde{\gamma}_F^o) dG(\tilde{\gamma}) dF(\tilde{\theta}) \right] \end{aligned}$$

and $\bar{\gamma}_{Fj}^o = \int_{\Theta_j}\int_{\Gamma_j(\tilde{\theta})} \tilde{\gamma}_F^o dG(\tilde{\gamma}) dF(\tilde{\theta}), j = L, R.$

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