ESSAYS IN STATE AND FEDERAL POLITICS

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Abstract

This project explores how state and national policy-makers interact with their constituencies in three separate essays focusing on different aspect of policy-making in the shadow of a federation. In the first essay, *National Commerce*, I explore how commercial desires inspired and supported by the development of the railroad, influenced Republicans' support for a strong national judiciary in the lead-up to and after the United States Civil War, culminating in the Jurisdiction and Removal Act of 1875. In the second essay, *Outside Options*, I build on a model inspired by the first essay to explain how local policy-makers may come to support moderate policies even when demographic arguments would call for much more extreme positions. Focusing on the the household foreclosure market, I demonstrate how the presence of outside options can both shield minorities from the full effects of harmful policies and also reduce the potential benefits accruing to majorities as a result of those policies, thereby inducing moderation on the part of lawmakers. Finally, the third essay, *Preempting Preemption*, develops a model of policy-making in a federal system which explores how local jurisdictions might strategically choose local policies in order to induce the central government to either preempt or refrain from preempting local authority. I support this model with a case study of legislation governing genetically-modified products in the United States.

Dedication

This dissertation is dedicated to my grandparents:

MERLIN, ANTOINETTE, DARL,

and especially LOLA

Acknowledgements

For all of their assistance in this project, I would like to sincerely thank the outstanding efforts of several individuals who pushed me to develop the most rigorous product possible.

The first of these individuals include Dr. John Londregan and Dr. Kristopher Ramsay, as well as Dr. Nolan McCarty and Dr. Jonathan Kastellec, whose unmatched advising ensured that I would find success. Thank you too, to Dr. Matias Iaryczower, whose inspiration pushed me toward an academic career in political science.

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Essays in State and Federal Politics

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Chapter 1

National Commerce, Local Interest, and the Judiciary Act of 1875

Abstract

In the early years of the United States, the national judiciary was exceedingly weak, hearing only a small range of cases. During the 19th century, though, the power of the federal judiciary expanded greatly, especially after the Civil War. This paper develops a model which incorporates the Federalist founders' concerns about local biases in judicial proceedings and shows that this fear incentivized Whigs and later Republicans to increasingly support a strong centralized judiciary over the course of the century in line with the development of a national economy, that began out of the Northeast. In contrast, the more agrarian Southern and Western states resisted these changes which prevented them from repudiating debt in the lead-up to and aftermath of the Civil War. Throughout this period, Northeastern states experienced relatively better access to interstate and international credit than their southern neighbors, as predicted by the model. I support this model with data on railroad development and a roll call on the Jurisdiction and Removal Act of 1875, demonstrating a link between access to interstate markets and support for expanded access to the national courts via diversity jurisdiction.

1.1 Introduction

A wide array of judicial structures incorporate aspects of federalism to varying degrees, guided by little more than convenience and legal or constitutional claims. Often judges, in determining the extent to which a case should be heard in local or federal courts—or both—cite laws or constitutional provisions; however, there is neither strong theory nor evidence to suggest that there is any benefit to maintaining such structures as opposed to a single unified judicial system. Why should judges on a national court be restricted in their ability to hear any case that arises within the nation, and conversely, why should the same court be able to remove cases from local courts? What is the justification for maintaining dual judicial systems and who is empowered to impose this structure? These are theoretical questions that have been left largely untouched, with only passing mention in the legal literature (Dodson, 2011; Glenn, 1994; Issacharoff and Sharkey, 2006) and almost nonexistent analysis in the political and economic literature (Cameron, 2005; Kastellec, 2017). My project initiates just such an analysis by examining the development of the federal judicial system of the United States during the 19th century in light of earlier research focusing on judicial behavior and separation of powers (Clark, 2009; Segal, 1997) to make an economic argument in favor of federalism and justify the observed outcomes under such structures in light of the self-interested preferences and biases of individual actors, especially those of legislators and local judges. In particular, I offer answers to the following questions: *Why did the United States expand access to the Federal Courts through diversity jurisdiction, and why did this occur when it did, with the Jurisdiction and Removal Act of 1875?*

I propose a model in which state actors–viewed here as judges but potentially representing other bureaucrats–are tasked with enforcing a Coasean policy when a representative member of theirs or any other state makes an investment within the jurisdiction. In a neutral setting, these actors would impartially apply the rule evenly to all other actors. However, each judge is also able to choose a level of bias or tax to impose on these trans-

actions, which benefits only her own state and by extension her constituents. This can be viewed as an effort by the judge to pander to local constituencies to whom she must answer to maintain her position and introduces an inefficient externality to the system which harms the other parties. To remedy this problem, the states may turn to a national judiciary for relief and establish a legal system that is responsive to the whole nation rather than individual states, federating the judiciary.

This resulting federal system that allows cases to be removed up to the Federal Courts differs from traditional models of hierarchical judicial decision-making in two areas. First, there is an explicit legislative component affecting the capacity of the national court to resolve cases according to a national policy. This stands in contrast to traditional models which consider legislative involvement only in the context of the national judiciary, ignoring the effects of state judicial outcomes. Second, this model does not depend on particular ideological preferences of the relevant actors, and is in fact agnostic as to whether policies in question are even consistent across states.

The remainder of the paper is organized as follows: First I describe the literature which this project draws on. I then build on the work of Loeper (2013) and Donaldson and Hornbeck (2016) to develop a simple model of the economic environment in which judges are operating, followed by a short federation game examining the politics of federation. Following the models, I place the development of the American judicial system in the context of these models using a historical analysis of the growth of diversity jurisdiction, including the Senate roll call to implement diversity jurisdiction as part of the Jurisdiction and Removal Act of 1875.

1.2 Federal Judicial Politics

Judicial rulings have a major impact across many areas of life. By interpreting statutes and developing common law, judges affect the economy, conceptions of human rights, crimi-

nal liabilities, and many other issues. It is very important, then, to understand how these decisions are made and how the resulting doctrine is likely to affect future outcomes and behavior. This task is sufficiently complicated within a single unified government, but in a dual system of government that results under federalism, it is even more challenging. Not only does it become important to understand how individual judicial bodies will make substantive decisions, but also how those bodies will allocate decisions between themselves. These challenges draw primarily on two broad strands of literature examining the decision-making processes of courts and on the behavior of self-interested actors in federal systems.

The literature on courts has explored many aspects of judicial behavior which are relevant to federated judicial structures. Hierarchical courts use their vertical alignment to better allocate resources between easy and hard cases, allowing trial courts and lower appeals courts to resolve most controversies while reserving the Supreme Court for more difficult cases. Higher courts have also been shown to use information gathered by lower courts–through such devices as appellate opinions and circuit splits–to make more-informed decisions on challenging questions (Clark and Kastellec, 2013). On the other hand, lower courts have been shown to take advantage of the limited capacity of high courts to try to stretch doctrine to fit the preferences of local regions or of individual judges (Kastellec, 2011). Each of these problems arises in a federal system which is comprised of a number of local courts and a (potentially) superior national court.

On the other hand, these hierarchical models do not fully capture the relationship between local and national courts in a federated system, since there is not an assumption of dual sovereignty that exists under federalism. Whereas in a single hierarchical system, all cases are subject to review by the higher court, a federated system restricts the ability of the higher court to intervene, limiting it to hearing a certain subset of cases on the basis of the legal issues under consideration. These restrictions on jurisdiction may even go further by disallowing lower courts from hearing cases in those nationalized areas of the law, creating

a complete dichotomy between the systems. Among issues that remain the providence of local courts, then, varying judicial rulings on policies may not simply reflect an effort by local judges to dodge the rules of a superior court, but instead they may represent rulings over explicitly different policies than those which are enacted in neighboring jurisdictions. This paper fills a portion of this hole that has been left largely unexplored in the formal and empirical literature. One exception which addresses these problem is Kastellec (2017), which empirically explores the representation offered by state courts in a federal system relative to their national peers.

Importantly, the existing literature has also explored many aspects of the relationship between courts and other departments, particularly the legislature, with often conflicting conclusions (Bergara, Richman, and Spiller, 2003; Clark, 2009; Curry, 2007; Ferejohn, 1999; Ramseyer, 1994; Vanberg, 2001). Both the reaches and the limits of judicial independence are explored in depth, largely with an eye to constitutional questions over federal law. In a federal system, this relationship becomes even more important, as legislators' preferences are not only manifested in the laws that are passed at the federal level, but also in local laws that represent outside options in the absence of a supreme national law. Indeed, a legislature in conflict with the court over the disposition of the federal courts not only has the ability to rewrite the laws that the court is tasked with interpreting, but also to restrict the court's very ability to interpret and rule on the laws in the first place. With respect to federal courts, these are particularly powerful tools that allow local actors to exert a dual-threat influence over the judiciary and its decisions. This is especially true when veto players in the legislative body (or bodies) adhere to a unified ideology and may credibly threaten to curb the authority of the court. For a broad discussion of these capabilities, see McNollGast (1995). Indeed, this is also the focus of Gillman (2002), focusing on the post-bellum period during which the young Republican majority imposed much of the modern structure of the federal courts. Conversely, a divided legislative branch leaves more room

for the judiciary to impose its own will or to otherwise resolve cases in a manner that falls outside of any clear mandate (Graber, 1993).

Much of the literature in federalism, on the other hand, has emphasized fiscal problems and the allocation of taxing and spending authority between local and national institutions (Besley and Coate, 2003; Dixit and Londregan, 1998; Cremer and Palfrey, 2000; Gordon and Cullen, 2011; Oates, 1972). In a more recent series of papers, several authors have increasingly begun to emphasize the role of externalities and technology spillovers in setting national policies from a legislative perspective (Cremer and Palfrey, 2006; Loeper, 2013), however, these projects do not address these effects with respect to the judiciary and to law more generally. From a legal perspective, Burk (2006); Cooter (2000) and Ribstein and Kobayashi (1996) take on some of these challenges, exploring the value of uniformity in state laws in the context of legislative policy. Dodson (2011); Issacharoff and Sharkey (2006); Lemley and McGowan (1998); Subrin (1989) and Williams (2005) provide evidence supporting the court's role in these decisions, both over the short-term and over the long term as new issues arise. On the other hand, O'Connor (1981) and Qian and Weingast (1997) discuss the potential for states and legislators to resist or support the federation or nationalization of courts.

This paper begins to address the gap between the judicial and federalism literatures, arguing that federal judicial systems, along with other federated bureaucracies, may arise out of similar economic considerations to those described in the literature on fiscal federalism, and that it is indeed economic considerations that have the greatest impact on federal judicial structures during the 19th century. I extend the analysis of Gillman (2002) and Cameron (2005) beyond party politics in the legislature to demonstrate the origins of legislators' and parties' preferences that led to the adoption of much looser access to the Federal Courts in the 19th century. Insofar as judges have a bureaucratic role as adjudicators of the law, as opposed to determining the content of the law, economic considerations drove much

of the growth of the national judiciary during this period and, as modeled here, virtually all of the growth in diversity jurisdiction granted through Congress. Indeed, it was only in debates surrounding the Civil Rights Act of 1875 that non-economic motivations were seriously considered for expanding diversity jurisdiction (Wiecek, 1969). Moreover, in parallel with Kastellec (2017), I demonstrate that it is in fact local preferences which drove national action on diversity in the late 19th century. In the remainder of this article, I develop an model that demonstrates how these economic forces contributed first to widespread opposition to diversity jurisdiction but ultimately came to drive the adoption of that same policy over the course of 80 years preceding the Judiciary Act of 1875. I support this with an empirical analysis of roll call voting leading up to the passage of the Jurisdiction and Removal Act of 1875 that demonstrates—in line with recent work by Donaldson and Hornbeck (2016)—the link between massive economic growth driven by the transportation sector and interstate commerce in the North and representative legislators' support for expanded access to the Federal Judiciary.

1.3 The Economic Model

The economic environment in which the above questions play out takes on characteristics that are applicable to a wide array of problems beyond judicial politics. In particular, there are clear applications to models of international political economy and to relationships between states at the international level rather than simply at the national and subnational level. Indeed, in the absence of any intervention by a central government, the states are analogous to independent nations on the world stage. Even where the laws governing each state are identical, without any central authority to interpret and enforce those laws, there is no inherent reason to suppose that the states will interpret those laws uniformly or consistently.

Furthermore, the decision-makers in this model—the judges—may be interpreted broadly

as bureaucrats implementing a policy handed to them by an arbitrary policy-maker—the legislature. This could be a judge ruling on cases before the court, an economic official establishing trade policy for her country, or any number of other similar actors. Below, I use the term, *bias*, to refer to the rents that these actors extract from other players, recognizing that this may or may not be a deterministic fee such as a tariff. It may equally well represent a reduced probability of winning legal disputes or other challenges to the activity of a particular party that might benefit the bureaucratic agent tasked with enforcing the rule in question. I go into further detail on this point in Appendix 1.A, where I offer a model of judicial incentives that motivate such a bias. The model here particularly focuses on the relationship between state decision-makers, residents of that state, and residents of other states.

1.3.1 A Simple Model with Two States

There are $N = 2$ states, each of which control a single divisible unit of capital that a representative investor—the same one presented above—may choose to invest locally in her own representative citizen or in any other state and its citizen. For purposes of this section, these investment decisions may be equivalently thought of as a state investing in itself or in neighboring states, and for that reason, I will typically refer to state i investing in state j rather than to the specific parties within each state. The returns on these investments are characterized in two dimensions of value, which may vary from state to state due to differences in legal regimes, existing resources and infrastructure, or chance, so that some states may be able to obtain high returns on investment whereas others will be relegated to lower returns. First, investors gain some positive value from their capital investment. On the other hand, the party that receives the capital investment also values the product of that capital. These benefits may be asymmetrical, but are assumed to be known and positive for both parties. I assume that these types are independently and exogenously determined by

nature for each state.

Besides choosing investment levels, however, each state may also choose how large a bias to impose on transactions across state lines. This bias may be thought of in several ways. It may take the form of a standard monetary bias such as a tariff, (for which a local judge would find it difficult to deviate from the state statute), but it may also come in many indirect forms, such as through legal rules and policies that restrict non-residents from participating in the economy and legal system or through judicial proceedings in which justices pander to local constituencies. That is, the state chooses a local bias, $b_i > 0$, which it imposes on investors, whether that be through policy (i.e. trade barriers) or the judiciary (i.e. biased proceedings) and which favors local residents. Within the judiciary, this bias may reflect the selection of biased judges, procedural hurdles that disproportionately harm alien litigants, or juries that are predisposed to vote against outsiders—such as one composed of small town farmers in a foreclosure case to which an outside financier is a party. Within the policy realm, this bias may come in the form of tariffs, licensing barriers, and residency requirements, among myriad other obstacles. This level of bias is the first choice made by the state. In particular, it is conceptualized here as a judicial ruling which favors local constituencies irrespective of the law as it is written as modeled in Appendix 1.A, which presents the microfoundations of this bias.

Each state then chooses a level of investment, $x_{ij} \in [0, 1]$, in commerce with every state, j, subject to a budget constraint, $\sum_j^N x_{ij} \leq 1$, which may be thought of as the capital reserve of state i or its citizens. Each state earns a boost in utility proportional to the level of investment in the local economy and the economy of other states, as well as a boost from any bias against other states, also proportional to the level of investment. However, each states' welfare is reduced by an amount proportional to other states' biases. In particular, I consider an environment where the bias demanded by the state takes the form of a proportional bias on investments in the amount of $b_i x$, but the investor earns

returns on investments within her own state in the amount of $\alpha_i \log(x)$ for $\alpha_i > 0$ and $\beta_i \log(x)$ for $\beta_i > 0$ for her own investments. This yields the payoff function on interstate trade,

$$U_i(b_i, \mathbf{x_i}|b_{-i}, \mathbf{x_{-i}}) = \sum_j^N (\alpha_i \log(x_{ji}) + b_i x_{ji} + \beta_i \log(x_{ij}) - b_j x_{ij}) \tag{1.1}$$

This is a standard Cobb-Douglas production function with a linear modifier. Here, I leave open the possibility that states reap different benefits based on individual parameters, α_i and β_i. Furthermore, note that the biases a state imposes on itself cancel out, as the benefits of those biases are rolled back into the local economy. Also, note that if we have only two states, we can rewrite the problem in terms of how much each state chooses to invest in the other. This returns,

$$U_i(b_i, x_{ij}|b_j, x_{ji}) = (\alpha_i + \beta_i) \log(1 - x_{ij}) + \alpha_i \log(x_{ji}) + b_i x_{ji} + \beta_i \log(x_{ij}) - b_j x_{ij} \tag{1.2}$$

For the remainder of this section, this is assumed to be the appropriate utility function. In Appendix 1.C, a more general version of the model is described with arbitrary capital reserves and many states.

1.3.2 States' Reaction Functions

Taking states' decisions on biases as fixed, the investment decisions for state i solve

$$\text{argmax}_{x_j} U_i(b_i, x_{ij}|b_j, x_{ji}) \tag{1.3}$$

This yields the FOC,

$$0 = \mathrm{d}_{x_{ij}} U_i(b_i, x^*_{ij}|b_j, x_{ji}) = -\frac{\alpha_i + \beta_i}{1 - x^*_{ij}} + \frac{\beta_i}{x^*_{ij}} - b_j \tag{1.4}$$

which implies

$$x_{ij}^* = \frac{1}{2b_j}\left(2\beta_i + \alpha_i + b_j - \sqrt{4\beta_i^2 + \alpha_i^2 + b_j^2 + 2\alpha_i(2\beta_i + b_j)}\right) \tag{1.5}$$

Solving for x_{ij}^* yields two potential equilibria—one with a positive radical and one with a negative radical—however, noting that when $\alpha_i = \beta_i$, the maximum value of x_j that state i will choose is $\frac{1}{2}$, even when there is no bias. As a result, it becomes clear that the equilibrium we are concerned with is the lower-valued one presented.

Here, x_{ij}^* is intuitively decreasing in α_i, since a state that offers strong returns on local investments will have an incentive to allocate more resources toward those in-state investments. Conversely, x_{ij}^* is increasing in β_i, since there are diminishing returns to scale on investments in each location. Finally, x_{ij}^* is decreasing in b_j, which follows straightforwardly, as investors are less likely to invest outside their own jurisdiction when those investments are likely to be expropriated or heavily biased. Also note that in order for the first order condition to be satisfied subject to the budget constraint with a finite bias, we must have $x_{ij} \in (0, 1)$.

Proposition 1. *States will invest more in other states when they place a high value on those investments as a result of diminishing returns to scale. They will invest less whenever they place a high value on local investments or when other states place a high bias on investments from out-of-state.*[1]

Now we can consider the optimal bias that this induces for the states, conditioning on x_i and x_j. Taking the FOC with respect to b_i,

$$\begin{aligned} 0 &= \mathrm{d}_{b_i} U_i(b_i^*, x_{ij}^* | b_j^*, x_{ji}^*) \\ &= \left(-\frac{\alpha_i + \beta_i}{1 - x_{ij}^*} + \frac{\beta_i}{x_{ij}^*} - b_j\right)\mathrm{d}_{b_i} x_{ij}^* + \left(\frac{\alpha_i}{x_{ji}^*} + b_i\right)\mathrm{d}_{b_i} x_{ji}^* + x_{ji}^* \end{aligned} \tag{1.6}$$

[1] All proofs for this section are in Appendix 1.B.

Letting $q_i \equiv \sqrt{\alpha_i^2 + 4\beta_i^2 + b_j^2 + 2\alpha_i(2\beta_i + b_j)}$ we have

$$\mathrm{d}_{b_i} x_{ji}^* = -\frac{1}{2b_i^2}\left(\alpha_j + 2\beta_j - q_j + \frac{b_i\alpha_j + b_i^2}{q_j}\right) \tag{1.7a}$$

$$\mathrm{d}_{b_i} x_{ij}^* = 0 \tag{1.7b}$$

And so the preceding equations reduce to

$$0 = \left(\frac{\alpha_i}{x_{ji}^*} + b_i^*\right)\mathrm{d}_{b_i} x_{ji}^* + x_{ji}^* \tag{1.8}$$

Solving for b_i yields

$$b_i^* = \frac{1}{2\alpha_i}\left(\alpha_j\beta_j + \beta_j^2 - \alpha_j\alpha_i + \beta_j\alpha_i \pm (\beta_j - \alpha_i)p_i\right) \tag{1.9}$$

where $p_i = \sqrt{(\alpha_j + \beta_j)(\alpha_j + \beta_j + 4\alpha_i)}$. Noting that a large α_i should decrease incentives to impose a bias, it is clear that we are interested in the larger of the two solutions,

$$b_i^* = \frac{1}{2\alpha_i}\left(\alpha_j\beta_j + \beta_j^2 - \alpha_j\alpha_i + \beta_j\alpha_i + (\beta_j - \alpha_i)p_i\right) \tag{1.10}$$

With this solution, we can make several observations. First, b_i^* is decreasing in α_i. Intuitively, as a state values receiving more investments, it is in the state's interest to improve the environment in a manner conducive to bring in those investments. Second, b_i^* is increasing in β_j for all $\beta_j > 0$.

Proposition 2. *States impose a low bias rate when they place a high value on receiving investments locally. They may also impose a low bias rate when other states place a sufficiently low value on out-of-state investments relative to local investments. However, they will impose a high bias rate whenever other states place a high value on out-of-state investments.*

This result suggests that as alien investors increasingly value making investments outside their state, local officials will impose greater biases on those investments, as the alien investors will be less-willing to pull their investments out. Finally, b_i^* is increasing in α_j when $\beta_j > \alpha_i$, constant when $\beta_j = \alpha_i$, and decreasing when $\beta_j < \alpha_i$. This condition follows similar logic to the preceding one, examining the problem from the perspective of the value to alien investors keeping their resources in their own states. Wherever states place a sufficiently low value on receiving investments from out of state, they will raise biases on those investments that they do receive. States that place a high value on receiving investments, however, will establish lower bias rates to incentivize such investments.

1.4 Political Implications

With the preceding equilibrium in mind, we can now begin to consider the political choices that are likely to result. While it should be unsurprising that the states have identical preferences when their economic parameters, α_i and β_i, are identical, it is not clear what exactly those preferences amount to politically or what happens to those preferences as the parameters begin to change, both absolutely and relatively. First, consider the welfare implications of a bias in the two states.

1.4.1 Welfare Considerations

We wish to determine whether the option to impose a bias on activity can or does benefit the states. To do this, we will compare the welfare induced by the equilibrium above to that of a similar regime in which the states do not have the option of introducing the bias. First, consider the welfare of states in an environment where the states can commit to not imposing any bias against outside investors. In this environment, the utility function for

state i reduces to

$$U_i^\dagger(b_i, x_{ij}|b_j, x_{ji}) = (\alpha_i + \beta_i)\log(1 - x_{ij}) + \alpha_i \log(x_{ji}) + \beta_i \log(x_{ij}) \tag{1.11}$$

Taking the FOC with respect to x_{ij} yields,

$$0 = \mathrm{d}_{x_{ij}} U_i^\dagger(b_i, x_{ij}^\dagger|x_{ji}) = -\frac{\alpha_i + \beta_i}{1 - x_{ij}^\dagger} + \frac{\beta_i}{x_{ij}^\dagger} \tag{1.12}$$

which implies

$$x_{ij}^\dagger = \frac{\beta_i}{\alpha_i + 2\beta_i} \tag{1.13}$$

This is indeed the limit of x_{ij}^* calculated above as $b_j \to 0$.

Proposition 3. *Total social welfare is decreasing in the magnitude of bias imposed by any state. Whenever biases are positive in any state, there will be at least one state which suffers a welfare loss.*

Plugging this back into the utility function, each state's total utility becomes

$$\begin{aligned} U_i^\dagger(x_{ij}^\dagger|x_{ji}^\dagger) &= (\alpha_i + \beta_i)\log(1 - x_{ij}^\dagger) + \alpha_i \log(x_{ji}^\dagger) + \beta_i \log(x_{ij}^\dagger) \\ &= (\alpha_i + \beta_i)\log\left(\frac{\alpha_i}{\alpha_i + 2\beta_i}\right) \\ &\qquad + \alpha_i \log\left(\frac{\beta_j}{\alpha_j + 2\beta_j}\right) + \beta_i \log\left(\frac{\beta_i}{\alpha_i + 2\beta_i}\right) \\ &= (\alpha_i + \beta_i)\log(\alpha_i) + \beta_i \log(\beta_i) - (\alpha_i + 2\beta_i)\log(\alpha_i + 2\beta_i) \\ &\qquad + \alpha_i \log(\beta_j) - \alpha_i \log(\alpha_j + 2\beta_j) \end{aligned} \tag{1.14}$$

This will serve as our baseline welfare. Now consider what happens when there is bias. Using the values identified above, we have

$$U_i(b_i^*, x_{ij}^*|b_j^*, x_{ji}^*) = (\alpha_i + \beta_i)\log(1 - x_{ij}^*) + \alpha_i \log(x_{ji}^*) + b_i^* x_{ji}^* + \beta_i^* \log(x_{ij}^*) - b_j^* x_{ij}^* \tag{1.15}$$

To compare the two, define

$$\Delta U_i(b_i^*, x_{ij}^*, x_{ij}^\dagger | b_j^*, x_{ji}^*, x_{ji}^\dagger) \equiv U_i(b_i^*, x_{ij}^* | b_j^*, x_{ji}^*) - U_i^\dagger(x_{ij}^\dagger | x_{ji}^\dagger) \tag{1.16}$$

Any state for which the difference, ΔU_i, is positive benefits from the availability of the bias term, whereas in any state that has $\Delta U_i < 0$, there is a loss of utility as a result of that term. Note too that the total social welfare must decrease when a bias is introduced, as the transfers due to bias are zero-sum but introduce distortions which induce states to invest more than the efficient level of resources into the local economy to avoid suffering losses due to the bias of other states. As a result, at least one state must suffer a net loss of utility whenever there is positive bias. This effect is exemplified in Figures 1.1 and 1.2. Whenever a state has a sufficiently weak valuation on local investments relative to that on out-of-state investments or when the total value of investment returns is small, the state may be able to improve its welfare by introducing high biases on other state's investments. However, as can be seen graphically in the images, there is always a region (white in the graphic) where neither state benefits under a regime which allows bias relative to the baseline of a regime that prevents such activity.

To interpret these images, we may consider low measures of α and β to be indicative of generally inefficient states where there are low returns on capital. In particular, the product of the two, $\alpha\beta$, serves as a crude measure of the overall efficiency of the state's economy. Alternatively, the dividend of the two, α/β, may broadly measure the level of saturation in the states local economy relative to other states', so that a high ratio is indicative of ample opportunities locally, while a small ratio is indicative of opportunity to be had in other states. With this interpretation, states are most likely to benefit from a decentralized regime that allows individual states to implement policy when those states are generally inefficient ($\alpha\beta < 1$)and have particularly low levels of saturation ($\alpha/\beta > 1$), so that they are predisposed to keep their own capital at home where it is not exposed to other

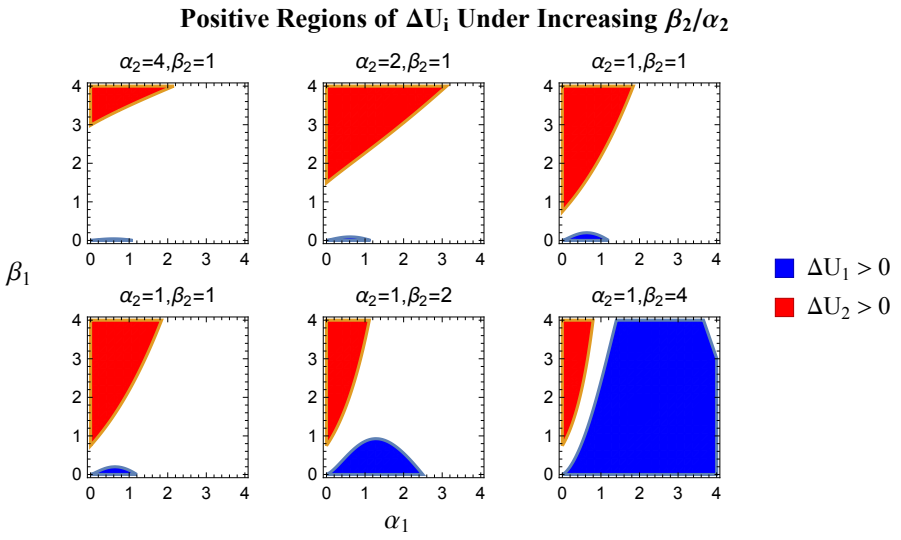


Figure 1.1: Colored regions represent conditions under which one state is better-off under a dispersed enforcement. White regions represent areas where every state is better-off under a centralized enforcement regime with no bias. Both states benefit more under the bias regime when they place a low value on receiving investments relative to making their own outside investments

states. In this environment, they can still extract rents from other states' investment without significantly being harmed themselves. Further, while there is necessarily a net loss of total utility, states are most likely to suffer disproportionately when they are saturated locally ($\alpha/\beta < 1$), so that the most valuable investments are out-of-state.

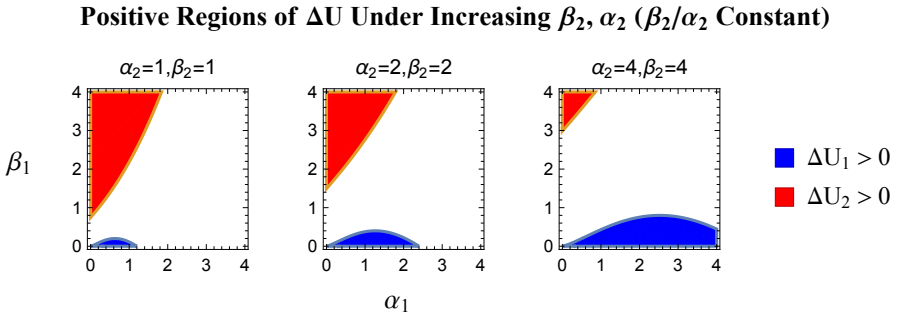
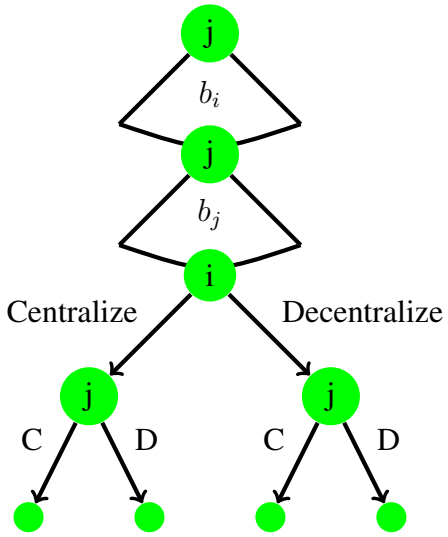


Figure 1.2: Colored regions represent conditions under which one state is better-off under a dispersed enforcement. White regions represent areas where every state is better-off under a centralized enforcement regime with no bias. Both states are more likely to benefit from a centralized regime when they place a high value on investments relative to bias revenue.

1.4.2 Political Outcomes

Figure 1.3: Political Game Tree



With the above welfare considerations in mind, we now consider the political implications of this model. In the simple case examined above, assume each state is represented in a national legislature that has the opportunity to vote over policy, and without loss of generality, assume that state i represents the 'majority' while state j represents the 'minority.' The legislature may choose to maintain either a centralized or decentralized regime with respect to the judiciary. In the former option, an judge is assigned at the national level, responsible to the legislature as a whole and all of its members equally so that it does not have an incentive to impose a bias on the citizens of one state over another and the states reap the benefits of the unbiased regime. In the latter option, the states are permitted to administer policy themselves, including the imposition of any biases desired and outcomes are realized accordingly.

If the states vote according to simple majority rule, with the 'majority' state serving as a tiebreaker in the event of a tie, then for the duration of that period, the majority state will implement its preferred policy choice, either local or national control. It is straightforward to see that when that majority is better-off under the decentralized regime, $\Delta U_i > 0$, it

Table 1.1: Possible outcomes with two-states voting by majority rule and probabilistic tiebreaker.

	$\Delta U_2 < 0$	$\Delta U_2 \geq 0$
$\Delta U_1 < 0$	Always Centralize	Possibly Decentralize
$\Delta U_1 \geq 0$	Possibly Decentralize	Never Occurs

will vote in favor of decentralization and such a regime will prevail, and vice-versa when the state is better-off under a centralized regime, $\Delta U_i > 0$. Similarly, when the minority is better-off under the decentralized regime, $\Delta U_j > 0$, it will vote in favor of decentralization, and vice-versa when better-off under a centralized regime, $\Delta U_j > 0$. When $\Delta U_i = 0$ (or equivalently $\Delta U_j = 0$), the state will be indifferent and may choose any mixing strategy when voting over the two regimes. Of course, when both states agree on a regime (necessarily the centralized regime), there is unanimity and the chosen regime prevails, while if the states disagree, the majority serves as the tiebreaker and implements its preferred regime. Table 1.1 displays the three possible (and one impossible) scenarios in the two-state model.

As discussed above, the majority is most likely to prefer a decentralized regime in an undeveloped, inefficient economy and when there is little opportunity in for investments in the remaining state, j. This is especially true when the remaining state has a large β and is therefore very eager to participate in the majority's economy, making the cost of imposing the bias relatively low. Nonetheless, there are conditions, even in very inefficient states, where the majority may prefer a centralized regime, and even be in agreement with the other state that such a regime should prevail. The two states will never simultaneously agree to a decentralized regime. Moreover, if the economies develop over time, so that $\dot{\alpha}$ and $\dot{\beta}$ are positive, the likelihood of the two states coming together in agreement will

increase, and for sufficiently similar states, will eventually reach 1.

Of course, this model does not yet address one key challenge to this arrangement, namely that of federal capture. If one state (presumably the majority) is able to capture control of the administrator at the national level, that state may then exert authority over the remaining state in a way that reimposes the bias against the other state, but does not allow that state the opportunity to impose a bias on the dictatorial one. In this scenario, the majority state is able obtain her optimal rents as under the biased regime without paying the costs associated with the other state's rents in that regime.

1.5 The Model in American Judicial Development

One of the central themes of the literature on federalism is the role of different levels of government in choosing and administering policies. In his analysis of fiscal federalism, Oates (1972, 1991) notes the advantages of allowing national administration of tax policy while using intergovernmental grants to implement spending according to local preferences. When the policies in question are not so clearly separable, however, as in the case of most legal rules, this duality becomes much more difficult to implement.

In the case of judicial administration, there are arguments for local judicial interpretation of rules, but also for national interpretation. Local courts are well-situated to hear cases arising under local law in a way that national courts are not, since the judges of national courts would have to learn and comprehend the laws of all local jurisdictions in order to be prepared to resolve any case that might come before them. On the other hand, national laws are likely to be best-interpreted by national courts that are unswayed by local preferences. Local courts that are responsive to their own constituencies are likely to attempt to twist the interpretation of these various rules to fit the preferences of their constituents, potentially at the expense of alien litigants. This model concentrates on the latter scenario, and the development of the national courts in response is discussed below. I begin with a discus-

sion of the Founders' reasoning behind the establishment of diversity jurisdiction in the Early Republic and the initially successful efforts to restrict that jurisdiction. I then address the changes, especially the development of railroads and broader interstate commerce, that drove Northern states to ultimately shift in favor of a more centralized legal enforcement regime and the adoption of more relaxed diversity jurisdiction after establishing a robust majority in the post-bellum era.

1.5.1 Economic Development and Diversity Jurisdiction in the Early 19th Century

There is a large literature focused on the growth of the federal state in American politics during the post-bellum period, both with respect to the regulatory state and the judiciary. After the Republicans solidified their majority in the years following the Civil War, they quickly turned their attention from slavery and reconstruction to the expansion of the economic union and associated federal powers. However, this was not done in a vacuum and indeed many of the foundations on which the regulatory state was developed, especially the judiciary, were themselves quietly built up over the course of several decades prior, beginning in small steps during the latter years of the Marshall Court and accelerating sharply under Taney as the Democratic majority of the first half of the century weakened and ultimately crumbled.

From the outset, America's founders, particularly the Federalists, were concerned with the potential effects of permitting locally-selected judges to rule over economic matters that involved out-of-state actors. In determining which courts were best-suited to administer different aspect of the law, they noted that while in a locally-administered system of courts, the judges benefit from familiarity with local law and custom, making them well-suited to tailor its decisions to local conditions. However, the same local court suffers from several constraints. It is constrained by local constituencies and the associated politics,

possibly making it difficult to render unbiased decisions when non-residents are before the court and preventing the court from internalizing any externalities that may be associated with local administration of the law, and even if judges avoid intentional efforts to conduct themselves in this way, their own socialization may lead to biased outcomes, a problem that continues to present itself in the modern era (Rush, 2014). These state judges then, responsive to their own constituents, were viewed as being unlikely to be able to commit to fairly and uniformly interpreting some legal rules and avoid pandering to their constituents whenever there might be a case before them in which only one party is a member of their constituency. In particular, the founders' worries focused on the manners in which economic development could be hampered by populist laws and juries that over-expropriate speculators and lenders, and the local courts' powerlessness to prevent as much. This matter was addressed directly in the Early Republic by both Alexander Hamilton in Federalist 80 and Chief Justice Marshall in his opinion in *Bank of the United States v. Deveaux* (1809). In Hamilton's words,

> The reasonableness of the agency of the national courts in cases in which the State tribunals cannot be supposed to be impartial, speaks for itself. No man ought certainly to be a judge in his own cause, or in any cause in respect to which he has the least interest or bias. This principle has no inconsiderable weight in designating the federal courts as the proper tribunals for the determination of controversies between different States and their citizens. And it ought to have the same operation in regard to some cases between citizens of the same State. Claims to land under grants of different States, founded upon adverse pretensions of boundary, are of this description. The courts of neither of the granting States could be expected to be unbiased. The laws may have even prejudged the question, and tied the courts down to decisions in favor of the grants of the State to which they belonged. And even where this had not

> been done, it would be natural that the judges, as men, should feel a strong predilection to the claims of their own government. Hamilton (1788)

Perhaps the most glaring example of this effect—or rather the consequences to judges when they did not behave in this manner—appears in a case in which the justices of the court did not bias their decisions in favor of local litigants. In the first decades after the ratification of the Constitution, much of the country remained relatively isolated, with relatively little interstate commerce. The major interstate activities that did exist were largely in the form of land speculation and financing, especially financing of state expenditures, but even these endeavors were limited to the extent that they affected relatively few individuals, and these individuals were disproportionately concentrated in coastal areas and Northern States where international trade made mercantilistic practices more profitable. This gave local legislatures, especially in the South, ample opportunity to pander to their constituencies by passing laws granting wide-ranging options for debtors to obtain bankruptcy protection and other relief, as well as granting extensive rights for land tenants over title holders. Such laws were widely popular among many voters and largely harmed non-residents, who were left with little recourse in state courts. Moreover, because the population of people harmed by these conditions was so small across the entire Republic, there was little effort by any state or the national government to remedy the problem from a legislative perspective. Rather, when such efforts to abet the financiers and speculators did occur, they typically faced a very strong backlash as occurred after the Supreme Court ruled against a debtor state in *Chisholm v. Georgia* (1793).

In *Mississippi v. Johnson* though, the Mississippi Supreme Court not only made the rare decision to allow the state to be sued, waiving sovereign immunity, but subsequently ruled in favor of non-resident bondholders. In particular, the state had authorized the sale of 15 million dollars worth of bonds to finance a state bank. A large portion of these bonds having been sold to a Philadelphia financier, the state subsequently refused to honor the

debt, even going so far as to attempt to write legislation barring the repayment of the debt. Having lost in lower courts, the state subsequently appealed to the High Court of Errors and Appeals, then the court of last resort in the state, where three justices, Chief Coatesworth Smith, Judge William Yerger, and Judge Ephraim Fisher, ruled in favor of the bondholder.[2]

The immediate response to this decision was an active campaign during subsequent elections that not only installed a governor who was openly opposed to obeying the ruling, but also saw the responsible justices, among the first high-court members to be elected in the United States, removed from office as their terms ended and replaced with judges more sympathetic to local interests. The first of these judges to be defeated was Judge William Yerger, who was replaced by William Handy following elections in November of 1853. Subsequently, Judge Ephraim Fisher would also resign before completing his term of office, and Chief Coatesworth Smith died in office (Mississippi, 1898, 1904).

The fallout of this incident extended well beyond the immediate case, though, and the elections which followed. Subsequent efforts by the state to secure funding for major infrastructure projects, in particular a massive railroad improvement, were severely hampered by the ruling (Shortell, 2008). Creditors, especially those from other states and countries, saw the state's response to the ruling and the defeat of the justices responsible as an indicator that the state was unwilling or unable to commit to honoring the debts it was seeking, resulting in a chilling effect on the state's credit line.

Of course, while the particular example was one which largely turned on a question of state law, this scenario can apply to cases turning on either local or national law, with judges being equally biased against alien litigants in both cases. Indeed, it was the justices'

[2]The opinion relied heavily on *Green v. Biddle*, (21 U.S. 1, 1823), noting that while Kentucky guaranteed rights and privileges inherited from Virginia, these rights were subsequently eroded over the period between 1789 and 1823 until the United States Supreme Court restored those rights. Graber (2000) complements this discussion with an analysis of the federal court's ultimate ability to overrule many comparable land transfers (as exemplified by *Polk's Lessee*,*Percheman*, and *Pollard's Lessee* when both parties were constituents of the court and thus equally empowered to influence the court. In these cases, although the court seemingly rejected the will of Congress, repercussions were minimal.

consideration of national law and their refusal to ignore the law of contract that led them to rule in favor of the bondholders and to ignore the efforts by state actors to nullify their commitment.

In a second possibility, which was touched on by the judges in *Johnson* with their response to the state's position, populist legislatures may pass legislation making it difficult for alien litigants to gain access to redress in local courts.[3] This also introduces a bias against fair implementation of national rules which taxes nonresidents in individual states. At the same time that Mississippi was rebuking justices unwilling to pander to local constituencies, Arkansas took this approach. While litigation was pending in *Beers v. Arkansas* (1854)—again relating to the delinquent payments to non-resident creditors—the Arkansas legislature passed laws which compelled the bondholders to relinquish their original bonds to the state prior to any litigation being accepted by the courts. As this forced the creditors to hand over all evidence against the state prior to litigation proceeding, it placed an excessive burden on the financier and biased the court's proceedings in favor of the state and local constituents without directly rejecting the Contract Clause (Shortell, 2008). This strategy had the particularly attractive effect of solving the problem even before it reached the justices, as many bondholders were unwilling to give up their bonds to have their cases heard in the first place.

In both of these environments, the states' efforts represented an assault on actors that were politically weak within the state, in particular non-resident creditors. The legislature

[3]With regards to the state's position that the state was not bound by its commitments and could subsequently deny those commitments with new legislation, Chief Smith had the following to say in *Johnson*, "You can evade the constitution, but you cannot violate it. True, the courts hold that an evasion of law is equal to its violation; not so with constitutions; they are mere abstractions; avoid their dead letter and you may evade their living spirit, when and how you choose; although Chief Justice Sharkey has vaguely imagined 'that the spirit of a constitution was entitled to a higher degree of respect than that of a law, being the paramount law couched in general terms, and this respect it must receive from the courts whenever they are called on to enforce contracts which so palpably conflict with the constitution.' The end here is not called on to justify the means, but the means is held to sanctify the end. Strange reasoning; the last product of the doctrine of implied power; a doctrine which is never so true to itself as when it is false to the constitution." (25 Miss. 673, 1853)

in Arkansas and newly elected judges in Mississippi both put effort into visibly pandering to their constituencies which would otherwise be required to suffer an greater tax bill to finance the repayment of those bonds issued by the state. Moreover, as the creditors were primarily non-residents, those taxes would subsequently leave the state rather than provide new tangible future benefits to the residents. In other cases as recently as *Felder v. Casey* (1988) and *Haywood v. Drown* (2009), the United States Supreme Court also ruled in cases under which state statutes in Wisconsin and New York explicitly limited the ability of state courts to resolve cases arising under national law after local courts affirmed the states' positions. In both of these cases, moreover, the target was not simply out-of-state residents, but more generally politically-unfavored groups that might seek relief under 42 U.S.C. § 1983.

Finally, juries themselves in the trial courts, composed of local citizens, may be loathe to hand down rulings which harm their friends, neighbors, and peers while protecting the interests of aliens. As such, the distribution of cases is likely to be taxed in favor of local residents, even when there is ostensibly a single national rule. Again in the context of debt, financiers owed money by states and even individual landowners might face an uphill climb to obtain relief from juries that would be on the hook as taxpayers or as potential debtors themselves for paying after ruling in favor of those financiers. Of course, as in the first case, this scenario need not be restricted to cases in which the law in question is a national one; juries may exhibit biases that tax alien litigants whether the legal question is one of local or national law.

In each of these scenarios, actions by local constituencies interfered with the courts in such a way as to induce a tax against alien parties before the court. The result of such activities throughout much of the 19th century was not only a reduction in access to debt markets for those states that were guilty of such actions, but also a reduction in the ability and willingness of corporations to expand across state lines (see McGurdy (1978)). No-

tably, after refusing to honor the ruling in *Johnson*, Mississippi failed in 1859 to secure funding for its massive railroad improvement projects the state. In many instances, though, the perceived short-term benefits of local courts allowing moratoria on debt outweighed the long-term damage caused to local commerce, making them tolerant of such action in an effort to secure reelection. This, however, did not account for the externalities imposed on neighboring states, whose financiers and manufacturers would suffer in losing the gains from trade that would accrue in the absence of the threat of default.

In American jurisprudence, the primary doctrine aimed at overcoming the challenge of these local biases in the courts became that of diversity jurisdiction. Hamilton and the Federalists ensured that litigants from different states would have the opportunity to have their cases heard in a national tribunal that was perceived, rightly or wrongly, to be more neutral than state courts. Indeed, in many cases, especially those relating to financial concerns, the national courts and juries were viewed as predisposed to favor the claims of alien parties, forcing debtors to honor their debts. The Chief Justice's comments in *Deveaux*, while more generous to the goals and integrity of his fellow justices that Hamilton, acknowledged a broad view of the necessity of the doctrine, arguing that the mere perception of bias is sufficient to justify diversity consideration:

> However true the fact may be, that the tribunals of the states will administer justice as impartially as those of the nation, to parties of every description, it is not less true that the constitution itself either entertains apprehensions on this subject, or views with such indulgence the possible fears and apprehensions of suits, that it has established national tribunals for the decision of controversies between aliens and a citizen, or between citizens of different states.

In both examples, the statesmen addressed the concern that local judges in the United States are selected and serve at the pleasure of local constituencies. Wherever there is an imbalance in the distribution of types within a local jurisdiction, the local courts are likely to

be biased in favor of the dominant local constituency and against the alien type in general. In particular cases, this effect will be smaller due to the presence of local residents who take on the alien type—such as local creditors; however, judges and juries will nonetheless be inclined to rule against non-residents whenever such actors come before the court. This problem was only exacerbated in the Early Republic by the inclination of many voters to view themselves more-strongly as citizens of their individual states rather than of the nation as a whole.

By allocating decisions over matters where such asymmetries exist to the national courts, though, the justices—now presiding over a nationwide constituency—were able to free themselves from local pressures and also internalize the costs of the biases introduced in the states. This is what ultimately occurred in both *Felder* and *Haywood*. The benefits to this are twofold. First, following Cremer and Palfrey (2006) and Loeper (2013), the use of national courts can serve as a means of restricting local courts' abilities to introduce costly externalities by unfairly taxing aliens in their decision-making process. Second, a majority of states with strong commercial sectors and correspondingly greater gains from trade that might be willing to commit to not imposing taxes themselves could impose fair proceedings on less-commercial states that open markets which would otherwise be inaccessible due to the threat of biased proceedings.

Yet although diversity jurisdiction at the national level was granted in Article 3 of the Constitution and reaffirmed in the Judiciary Act of 1789, it remained, as with most other sources of jurisdiction, difficult to secure in the Early Republic. Following the strong rebuke against national intervention in the States after *Chisholm*, the national courts exhibited little willingness to impose their authority over state courts. Rather, in the first decades of the Republic, the national courts hewed as closely to the legislative line as it could. In this environment, with a relatively undeveloped national economy and few salient benefits accruing to most people as a result of large-scale interstate activity, there was not the political

support in Congress to push for a stronger national judiciary, and there certainly was not enough to support an effort by the national courts to unilaterally assert authority.[4] Indeed, of the states in the Union at the time of the passage of the 11th Amendment, only the relatively commercial states of Pennsylvania and New Jersey failed to take action on and ratify the change. In the context of the model presented above, this is consistent with both of these states operating with relatively large βs and a high reliance on interstate commerce, while the remaining states, especially in the South, operated under a regime with greater αs relative to their respective βs. Of course, beyond this distinction, there was a further distinction in that the Northern States in general had stronger economies, making them still less-inclined to favor a dispersed regime.

This was particularly apparent in matters of corporate diversity that characterized many of the early cases on debt or land rights. In 1809, the United States Supreme Court under Marshall ruled in *Deveaux* that corporations could only use diversity claims to access national courts when there was complete diversity of citizenship between all of the natural persons associated with the parties in the case, so that corporations were required to demonstrate complete diversity with respect to all of their shareholders. This case was affirmed in two companion cases, *Hope Insurance Company of Providence v. Boardman* (1809) and *Maryland Insurance Company v. Woods* (1810), and occurred despite the Chief Justice's acknowledgment of the Founders' goals with respect to diversity. The threat of a legislative response curbing the still nascent court was sufficient during this period to act as a restraint on the justices willingness to assert their authority to rule on diversity cases except in the most exceptional circumstances.

In the subsequent years, especially after the decline of the Federalists and the fading of Revolutionary War debts from the face of politics, states were left with relatively wide latitude to adopt protectionist and mercantilistic laws which imposed costs on transactions

[4]This relates very closely to the cost term associated with the Supreme Court asserting authority in Cameron (2005).

across state lines. They were granted wide latitude to interpret the limits of their power under the United States Constitution, but also to impose structures which made access to local remedies difficult for non-residents. Particularly in the most agrarian and isolated states, populist legislatures often pursued policies granting short-term benefits to key constituencies at the expense of other interests. Land speculators were routinely expropriated in favor of local actors and debtor were granted wide relief against alien financiers, who were largely unable to respond effectively due to the structure of local laws and courts.

The original view of diversity was relaxed, however, as economic conditions and parallel political conditions shifted in favor of integration after the 1820s. In particular, the expansion of canals and introduction of the railroad opened many new industries to interstate activity and made that activity much more profitable, especially in Northern States where the beginnings of the Industrial Revolution increased the value of commerce and drove manufacturers to seek out markets beyond their local towns and cities. These changes led to increasing pressure on the national courts, consistent with increasing ratios, β/α, to reinterpret the diversity requirements established in *Deveaux*, especially from manufacturing regions where interstate commerce was becoming most important. For the Supreme Court, the pivotal moment came in 1844 with *Louisville, Cincinnati, & Charleston Railroad v. Letson*, which ruled that, for purposes of diversity, corporations should be viewed as citizens of the state in which they are incorporated. This case offered two changes to the standing doctrine. The first, smaller one addressed a loophole in earlier doctrine which suggested that corporate shareholders must all be residents of the same state that was not the same state of which any opposing litigant was a citizen. The second, important change rejected New Yorker Letson's claim against diversity on the basis that one shareholder in a corporation that owned shares in the railroad was in fact also a citizen of New York. Instead the court introduced the corporate fiction, which deemed the railroad to be a citizen of South Carolina where it was incorporated.

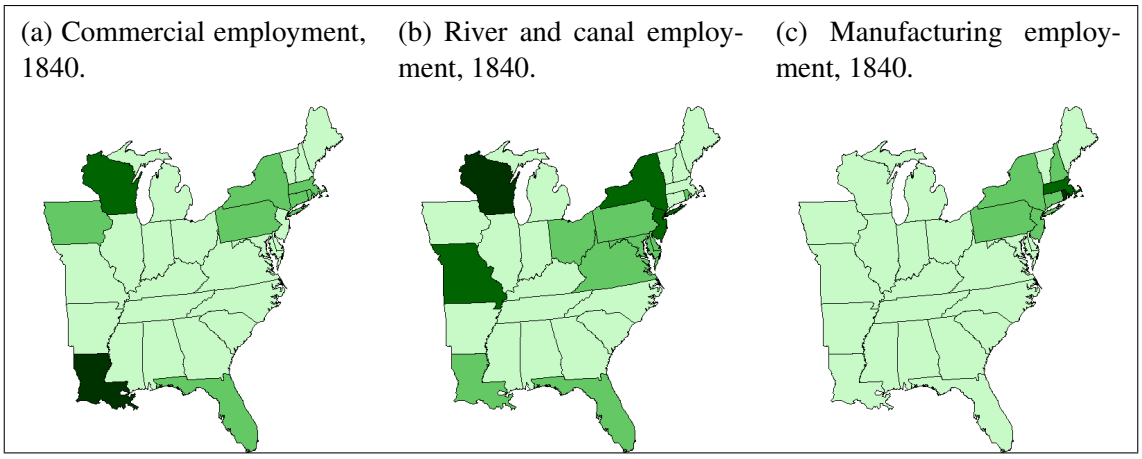
This event also coincided with another significant case in *Swift v. Tyson* (1842) two years prior, which established the existence of federal common law.[5] Thus, not only did Letson give corporations access to national courts, but it gave them access to a legal environment that was much less predisposed to rule against them. Moreover, 12 years later the court, in *Dodge v. Woolsey* (1856), further expressed a willingness to allow corporations access under diversity when it ruled that a shareholder could sue his own corporation in national courts provided he was a citizen of a state other than that in which the corporation was incorporated. Echoing Marshall's earlier words, the court declared, .

> It is to make the people think and feel, though residing in different States of the Union, that their relations to each other were protected by the strictest justice, administered in courts independent of all local control or connection with the subject-matter of the controversy between the parties to a suit.

Of course, these rulings by the court were only as strong as the support they secured from legislative and executive actors at the national level. Without support from the other branches, the court was powerless to enforce its rulings, especially when those rulings were against states, which were particularly strong during this period. Indeed, this difficulty was demonstrated with very real clarity in the aftermath of *Johnson* where the state justices were not only unable to protect the creditors, but were themselves removed for their efforts. At the national level, the 11th Amendment also provides a glaring example of how legislative opposition could interfere with the court's decisions. By passing the amendment (and subsequently seeing the states ratify it), Congress, saturated with legislators still skeptical of a strong national authority, swiftly stripped the court of its ability under the law to rule on a broad class of cases. Moreover, the Democratic-Republicans, running on a platform of

[5]This ruling was aimed directly at efforts by states to enact jurisprudence which favored local interests at the expense of economic activity. At the time of the ruling, the justices hoped that the case would help to consolidate widely varying state law toward a uniform national jurisprudence; however, this did not occur an the ruling was reversed by *Erie v. Tompkins* during the New Deal. The latter ruling, though, did not address diversity jurisdiction *per se*, as in this model, only the underlying law that was to be used in such cases.

Figure 1.4: Employment by industry, with darker shades representing greater employment.



(a) Commercial employment, 1840.

(b) River and canal employment, 1840.

(c) Manufacturing employment, 1840.

local self-determination, secured strong majorities that controlled the government for the following two decades, beginning with the election of Thomas Jefferson. Indeed, in the immediate aftermath of the amendment's ratification, the Supreme Court ordered dropped all pending litigation arising under its earlier *Chisholm* ruling with *Hollingsworth v. Virginia* (1798). With the threat of more curbing, the court under Marshall made very little effort to roll back states' authority prior to the election of John Quincy Adams, and even then the steps were very limited.

By the time of *Letson*, however, the growth of the industrial sector and interstate commerce had changed the political landscape, so that when populist legislators attempted to strip the court of its newly-asserted jurisdiction, especially in the rural South, they were unable to do so over objections by the growing strength of pro-economic union parties in the North, characterized primarily by the Whigs and later Republicans. The timing of this is particularly striking in light of the Whigs' takeover of the Senate only a few years previously and their subsequent efforts to block curbing legislation out of the House which, following Graber (1993), provided an opening for a farsighted court to act. Ultimately, despite several attempts to pass such curbing legislation over the half-century following the ruling, none were successful. Immediately prior to the Civil War, even some Southerners

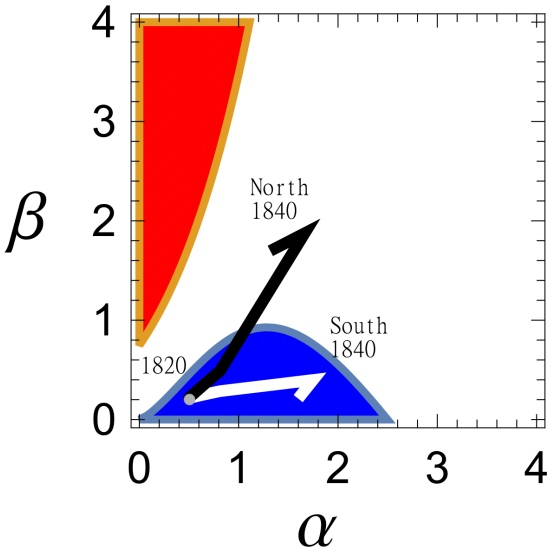
were willing to accept some expansion of Federal jurisdiction in light of the increasingly-common practice in the North of seizing slaves of traveling Southerners, culminating in the *Dred Scott v. Sandford* (1857). In arguing for curbing legislation at the end of the century, lawyer Seymour Thompson acknowledged the political constraints that were so successful in preventing Congress from acting,

> [T]he rule was established in the beginning of the era of railroad building, in the case of a railroad company, at a time when public opinion ran strongly in favor of railroad companies...[The decision] had behind it money, power, and respectability... [W]ith the success of Northern arms came a strong feeling in favor of strengthening the national authority (Thompson, 1895).

That is, the corporate fiction that the Supreme Court established in *Letson* and related cases was established at a time when the selectorate in many Northern States and, after the Civil War, the national level operated under the assumption of a high reliance on interstate commerce and correspondingly large β. Moreover, the increasing scale of the economy nationwide made the welfare losses associated with biased courts becoming more and more costly irrespective of the relative value of local and interstate commerce.

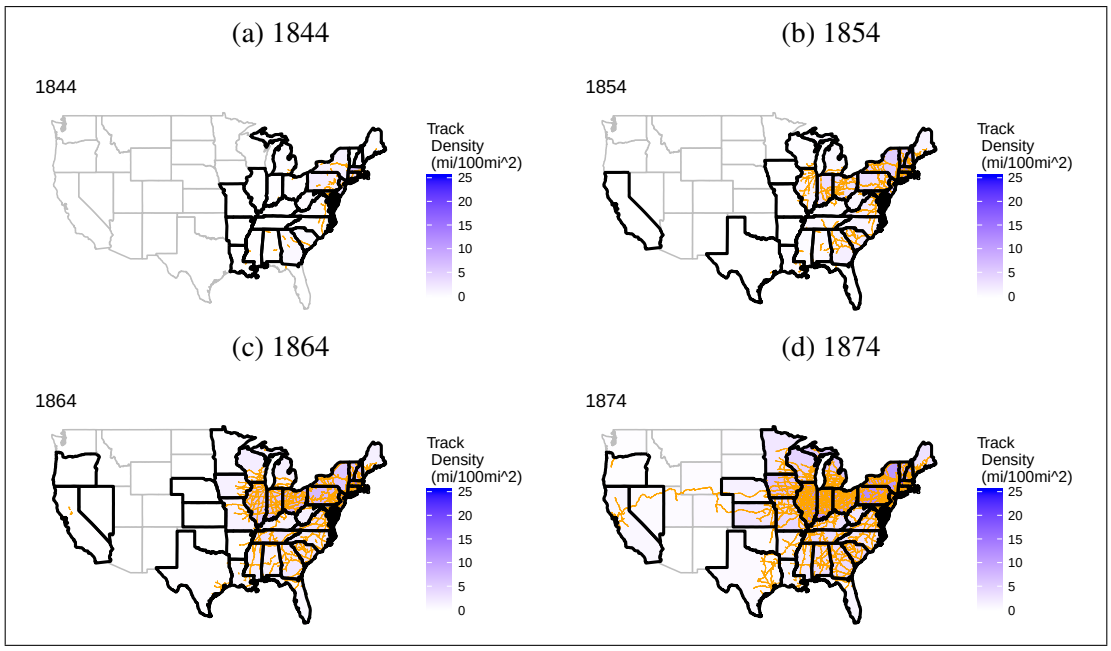
Figure 1.4 provides an indicator of how distinctly the North had come to differ from the South in the lead-up to this period beginning in 1840. While the South remained relatively undeveloped and maintained an economy that was nearly universally reliant on agriculture and slave labor, the North developed a more commercialized economy based on manufacture and trade. By 1840, not only were Northerners much more likely to be engaged in commerce, but they were much more likely to be engaged in manufacturing and trade, as well as in transportation and communication, than their Southern counterparts. As manufacturing improved, then, so did the relative efficiency of the local economy. Local workers were becoming much more productive, while the establishment of railroads and canals made interstate transactions much easier and safer, opening more opportunities for

Figure 1.5: Shifting weight of α and β in both the North and South during the Early 19th Century.



interstate commerce, which in turn increased the weight of Northern states' βs relative to their αs. This had the effect of pushing the North to increasingly oppose local control of the judiciary on most issues, with the exception of slavery, a feat at which the the states in question were quite successful once they gained control of the national legislature. The Southern states, on the other hand, saw the weight of their αs increase much faster relative to their βs, leaving them to favor local control and the ability to expropriate non-residents. Both of these trends are visualized in Figure 1.5. The single glaring exception to this rule was Louisiana, which relied heavily on the commerce and trade that ran through the Mississippi River and New Orleans and which represented a major portion of the economy in the Western United States. These motivations led to a rapid shift away from the earlier arguments in favor of local courts and a weak national court toward a strong national judiciary tasked with enforcing property rights of creditors and other wealthy actors in their dealings across state lines.

Figure 1.6: Miles of railroad track per 100 square miles, with darker regions exhibiting greater density. Bold states are represented in Congress in the given year, and tracks are marked in yellow.



1.5.2 The Post-Bellum Period and the Judiciary Act of 1875

Subsequent to the Civil War and the collapse of slavery—the single institution on which the southern states supported a strong national judiciary—the Republican majority put extensive efforts into solidifying the pre-war jurisprudence of the Supreme Court and further expanding its jurisdiction. After minor efforts in the 1860s to change the nature of diversity jurisdiction, Congress used the Judiciary Act of 1875, passed out of conference in the waning hours of the 49th Congress, to statutorily entrench a definition of diversity aligned with the Supreme Court's ruling in *Letson* three decades earlier. The final driver of this legislation came when the Supreme Court cited and amendment to the the previous decade's Separable Cases Act, the *Local Prejudices Act*, in refusing to allow removal of *The Sewing Machine Company Cases* under diversity in 1874, despite the fact that two of the three defendant firms satisfied the diversity requirement. Prior to this, the growing political clout of the West had already pushed railroad interests and major farm creditors to clamor for sup-

port from Congress to counter the growing threat of the Granges, who by 1871 had not only forced the Illinois legislature to adopt strict new regulatory burdens against the railroads, but also had managed to secure almost complete control of the local judiciary. Indeed, in local elections that year, Republicans were only able to even muster candidates in four of 31 judicial districts (Sundquist, 1983), resulting in a grave threat to out-of-state railroads in particular and other corporate interests more widely and which specifically affected interests in the Northeast and Great Lakes regions where much of the new commerce was concentrated. Figure 1.6 offers a visual representation of this growth in the Northeast—and noticeable lack of growth in other regions—measuring the density of railroad tracks operating throughout the United States.

Table 1.2: Judiciary Act of 1875, roll call by party and region.

		N. East	Lakes	West	Border	South	Total
GOP	Yea	11	9	6	1	6	33
	Nay	2	1	1	0	2	6
	NV	(4)	(2)	(3)	(1)	(5)	
DEM	Yea	0	0	0	1	0	1
	Nay	1	1	2	6	6	16
	NV	(0)	(1)	(0)	(1)	(0)	
TOT	Yea	11	9	6	2	6	34
	Nay	3	2	3	6	8	22

**One seat in Louisiana was vacant at this time.*
Nonvoting senators are indicated in parentheses.
Source: Congressional Record, 1886

Northeastern legislators, keen to continue developing a strong economic union driven by railroads and interstate commerce, proposed a series of reforms to enhance the power of the Federal Courts (Gillman, 2002; de Figueredo and Tiller, 1996). Among these reforms, the final bill backed away from the strict language of earlier Judiciary Acts that required complete diversity and allowed for partially-diverse parties to gain access to the federal courts. While this had little practical effect in many cases involving corporations,

which already had access to the national courts in most diversity scenarios, this statutory change affirmed the Supreme Court's earlier ruling on such matters and also provided the same benefits to other litigants, regardless of whether they had economic interests or were organized as a single corporation. In conjunction with the relaxation of several other jurisdictional restrains on the Court, especially with respect to federal questions, this aimed to greatly expand statutory access to the national courts for economic claims. In proposing an amendment to adopt what would become the final language of the bill, Senator Matt Carpenter of Wisconsin noted,

> This bill gives precisely the power which the Constitution confers—nothing more, nothing less. The Senator from California proposes to limit the constitutional jurisdiction and restrict it because it was restricted in 1789. In that day to find a man two or three hundred miles or in two or three States away from his home and sue him was a hardship. It has ceased to be a hardship now, because we are nearly always away from home, we are roving and changing and traveling. The whole circumstances of the case are different, and the time has now arrived it seems to me when Congress ought to what the Supreme Court said more than 40 years ago it was its duty to do, vest the power which the Constitution confers in some court of original jurisdiction.

Although not convincing his peers from California–one abstained and one opposed the final bill—his argument ultimately garnered the support of 34 senators, with 17 more abstentions and 22 opposing the bill on final passage. As demonstrated in Table 1.2, these votes were drawn almost entirely from the Northeast and Great Lakes regions, as well as a subset of Republicans in the South remaining in office due to the efforts of reconstruction. Notably, however, even a majority of these Republicans eventually did not support the bill.

To further emphasize the role of industry and commerce on the success of the Judiciary Act of 1875, Table 1.3 provides the results of a logit analysis of the final roll call on

Table 1.3: Logistic Regression on Voting Outcomes

	Yea Votes			
	(1)	(2)	(3)	(4)
GOP	3.688***	3.868***	4.010***	3.944***
	(0.745)	(0.774)	(0.798)	(0.788)
Local RR	0.027		−0.079	0.112
	(0.042)		(0.067)	(0.162)
Neighbor RR		0.117*	0.221*	0.331**
		(0.069)	(0.115)	(0.145)
Local*Neighbor				−0.024
				(0.018)
Observations	56	56	56	56
Note:				*p<0.1; **p<0.05; ***p<0.01
				RR: miles of track per 100 miles^2

Senator Carpenter's amendment. Using data derived from the United States Census and Poor's Manual of Railroads (Adams, 1894), a variable, (Neighbor RR), was generated to measure the regional density of railroads with respect to land area in the year preceding the vote. Specifically, the measure was generated as the density of railroad tracks in neighboring states, measured as miles of rail per 100 square miles of land area and weighted by the length of shared border between the states. This measure has a strong positive correlation with senators' decision to support the bill on final passage. These results are robust to both party affiliation and state populations during the same period. Strikingly, using intrastate railroad density (Local RR) rather than regional density, does not demonstrate the same effects, suggesting that it is indeed the *interstate* nature of commerce rather than the *intrastate* level of commerce that has a major effect. This is consistent with the lack of support observed from the senators from California who, while relatively invested in transportation infrastructure, were nonetheless isolated from much of the rest of the country at

the time due to the sheer distances involved in interstate commerce.

These actions to expand the jurisdiction and the resources of the national judiciary had twofold benefits. In the first, straightforward case, granting the national courts the ability to decide cases they previous had not had access to gave the ability to rule on interstate commerce cases without the specter of bias hanging over the decision. Moreover, under the then-existing *Swift* doctrine, the national courts were able to establish uniform legal rules across the Union. Second, the expansion of the courts allowed the those courts to reduce the administrative and procedural costs of securing remedies under national law. Whereas prior to the 1875 Act federal questions were in general initially answered by state courts, leaving them open to potential bias, the new legislation allowed litigants to take the case directly to the national courts. This Act allowed would-be litigants that might suffer at the hand of such bias in local courts to avoid litigating first in state courts which would only lead costly and uncertain efforts to appeal for a fair ruling in national courts. While this did not directly touch many aspects of interstate commerce, it was an invaluable tool for commercial enterprises in general, who could now seek relief in national courts that were established and manned by individuals more sympathetic to their interests than populist local courts. In hand, this provided the necessary legal support for an increasing number of corporations to expand into the national market in what ultimately became a strong feedback loop of increasing federal protections against state-level regulatory attacks (McGurdy, 1978).

In this environment, no Democratic majority was able to push through significant legislation stripping the court of its jurisdiction in this area or other areas gained in the Judiciary Act of 1875. Reentering national politics in the aftermath of Reconstruction, Southern legislators such as Representative Charles Crisp noted, "The East is the creditor and the South and West the debtor; the East is the money-lender and the South and West the money-borrower" (Congress, 1886). With this, he and a number of allies in the West—including

some Western Republicans—made a push to undo some of the nationalization that had occurred during and after the Civil War (Freyer, 1979; Sundquist, 1983). The most notable pieces of legislation in this period which came up for floor votes include H.R. 4219 in 1880, and H.R. 5461 in 1885. In the former case, Democratic legislators successfully brought a bill to the floor with the aim of stripping jurisdiction and defeated a Senate amendment eliminating that language regarding jurisdiction by a vote of 25 to 23. However, the bill was defeated on final passage later that day by a vote of 23-28. In the latter case, Democrats attempted to add language to a bill regulating railroads, however these amendments were soundly defeated, 7 to 38 and 3 to 45. Meanwhile, numerous other bills during this period were also pushed by Southern and Western legislators which never received votes on the floor.

Still, the Republican interests in the Northeast held fast and ensured that litigants would have access to the federal courts under increasingly broad terms designed to protect business interests, a condition which lasted until New Deal majorities garnered the support to roll back some of these advances, albeit largely through changes in the underlying law (as in the case of *Erie*) rather than in access to national courts. Yet even including this period, there have only been six instances of successful court curbing with respect to diversity jurisdiction, most of which were framed not as curbing efforts, but rather relief efforts designed to reduce the federal caseload (Curry, 2007). Still, despite the apparent reduction of the national courts' authority in *Erie*, the expansion of national statutory law more than made up for any such reductions in the national courts' authority by giving potential litigants still more pathways to the federal courts under federal question jurisdiction as opposed to the more restrictive diversity pathway.

1.5.3 Political Capture

These structural choices, though, are nonetheless subject to political capture. introduction of a national judicial system adds a layer of politics into the courts as actors–whether judges or legislators–are forced to assign which cases belong in which system. Powerful national interests that are weaker at the local level may try to institute rules which favor the national courts independent of efficiency grounds, but rather to simply see their policy preferences enacted. Conversely, local interests, especially populist ones, may try to keep cases away from national courts where they cannot exploit externalities. Thus, the policy question falls to one in which there is not only a question of what laws should be in place, but also who should interpret those laws. If litigants are able to make these decisions on a case-by-case basis, moreover, the costs are likely to grow further as forum shopping fosters the development of uneven and potentially low-quality law. This suggests not only the need for a clear rule to be established governing which court should rule on each issue, but also a clear rule regarding who should decide which laws are to be implemented.

The model presented here supposes that there is no inherent value associated with any one policy over any other policy—that the legal rules are Coasean in nature. Moreover, every state and every market participant within each state have an equal impact on the political process at the national level. As a result, there is no value to imposing a particular policy at the national level, and no state or type of state can impose an excessively-biased judiciary on the market. However, this is often not the case in practice. Indeed, problems associated with forum shopping contributed in no small part to the Supreme Court's decision to overturn *Swift* in 1938 with *Swift v. Tyson*. These, problems, however, have effects which are largely orthogonal to the model presented here.

1.6 Conclusion

Federal systems always face trade-offs between yielding to local preferences and cooperating in the national interest. This is particularly true on matters of law and judicial policy, where the choice of venue can have a major impact on the outcome of cases, even in the absence of differences across states in terms of written policy. This project aims to assess one dimension of this challenge that has concerned lawyers, judges, and politicians alike since the founding of the American Republic. Namely, why—and under what conditions—should a federation allow a national court to rule on policies that might otherwise be adjudicated locally, even perhaps, under local law.

Whereas much of the research in federalism to date has focused on the challenges of reconciling policy differences across states, whether they induce externalities or otherwise. This paper has considered the problem from a different perspective that more-closely aligns with a club mentality in which the benefits associated with certain activities accrue to insiders differently than they do to outsiders. This model allows states to extract rents from each other not through externalities associated with policies themselves, but by manipulating the implementation of those policies according to the identity of the parties involved. In particular, it has allowed states to be biased against other states in the implementation of economic policy and in disputes over that policy, as feared by Hamilton and many in the legal profession over the past two centuries. In many instances, this has induced a race-to-the-bottom driven by judges, legislators, and juries alike which has threatened to harm the ability of states to borrow and participate in a national or international economy.

The model has demonstrated conditions under which states, especially when they are underdeveloped, may choose to impose burdens on actors from other states attempting to conduct business across state lines. Furthermore, it has shown that while some states may be individually better-off in this scenario, the net result will be to reduce social welfare across the nation by inducing states to invest capital suboptimally across the federation,

meaning that at least one state will suffer an overall loss despite drawing some rents from its neighbors.

This model was placed in the context of the development of the United States Judiciary over the course of the 19th century. While beginning the century relatively undeveloped and isolated, Industrialization and the growth of manufacturing and general commerce in the Northeast drove the union away from its early efforts to restrict federal jurisdiction in the courts towards an expansion of that power, particularly after the Civil War, when Republicans that dominated the commercial regions of the country came to also dominate the legislative and executive branches of the federal government for several generations. This continued into the 20th century, until the New Deal, when concerns about capture at the national level gave way to a more nuanced approach to federal judicial power.

The paper also leaves room for an extended analysis of the political economy of railroad and other transportation networks in the Early United States, as well as analogous studies of modern federations. Specifically, it suggests an opportunity to develop more detailed analyses of interstate commerce, including specific products and volumes of transport as opposed to merely the opportunity to engage in such endeavors. Meanwhile, the results derived here may also be used to generate an understanding of developing federal systems today, such as that of the European Union, in which there are still myriad questions regarding the structure and jurisdiction of central judiciaries.

May 2, 2018

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The Sewing Machine Company Cases, 18 Wall. 553 (U.S., 1874)

United States v. Percheman, 32 U.S. 51 (1832)

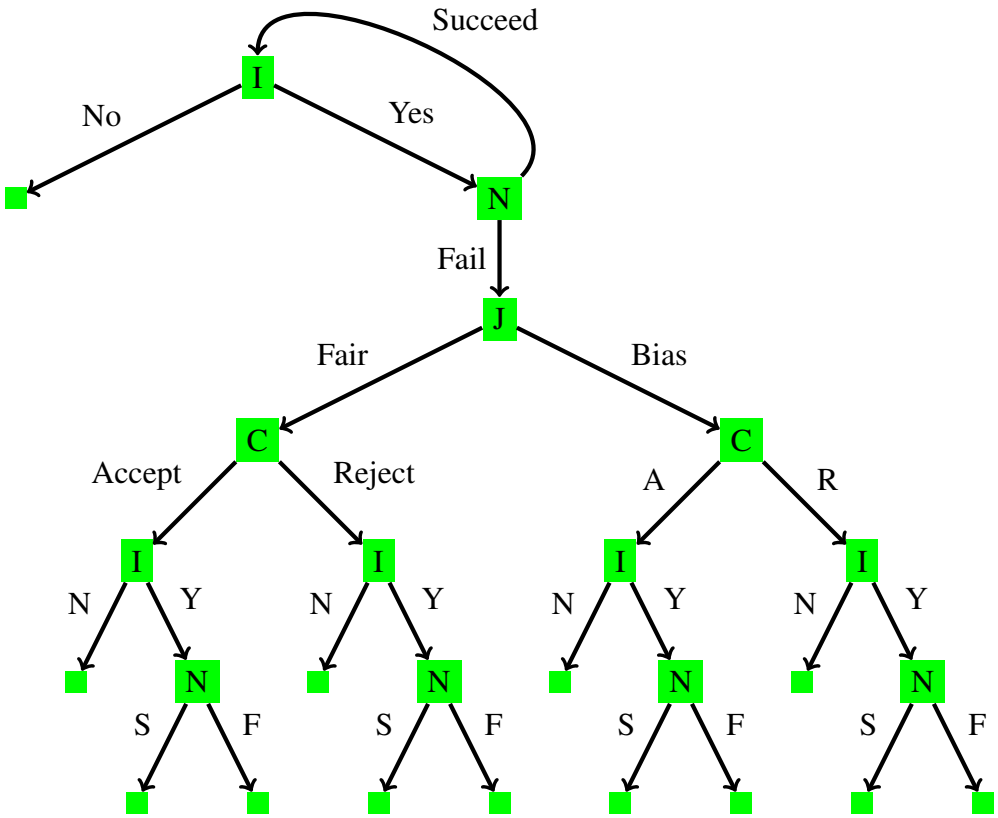
1.A Judicial Incentives

This section offers a simple model of judicial bias when one party before the court has disproportionate power to sanction the judge or remove her from office. The bias term, b, presented here represents a simplified version of the same bias term presented in the main model in Section 1.3 without the nuance that allows the judge to optimize the term for multiple constituencies, however the intuition remains the same. The actors here are modeled after a nonresident investor and a local citizen entrepreneur who probabilistically come before a judge to resolve a dispute. The judge rules on the merits of the case while also facing a reelection or sanctioning decision from the citizen. Throughout this model, the bias term should be interpreted broadly as the judge's ability to influence case around the margins through such methods as scheduling, evidence requirements, and interpretations of vague law—whether statutory or judge-made—and thereby influence the likelihood of a preferred party winning the case in question.

Consider a model of conflict resolution in which there are three actors: a representative investor, a representative citizen, and a judge. The investor has an opportunity to invest capital in a mutually beneficial transaction with the citizen, but the payoff from this transaction is not guaranteed. The transaction may result in costly failure in some scenarios. When this failure occurs, the two parties come before a judge to resolve the dispute, and this judge may either make an unbiased ruling or a biased ruling in favor of one party over the other, specifically a bias in favor of the citizen. The citizen must then decide whether to affirm or reverse this decision (alternatively whether to reelect the judge or not). First period payoffs are then realized, and the investor has one more opportunity to invest in a second transaction, with the judge now bound by the first-period ruling. The remainder of this section formalizes this model.

1.A.1 Model Specification

Figure 1.7: Game Tree. The Investor (I) makes decisions over whether to invest or not. Nature (N) chooses whether the venture succeeds or fails. The Judge (J) decides whether to adopt a fair or biased ruling. The Citizen (C) chooses whether to accept or reject the ruling.



There are three players: an Investor, I, a Citizen, C, and a Judge, J. The investor, I, may be thought of as a capital source such as a bank or wealthy financier searching for an investment. Her actions, $a_I \in \{0, 1\}$, represent a choice of investment levels in a small business operated by citizen, C, which, when successful, yields a return in the form of a period payoff of 2 units and a return of 0 otherwise. The business will be successful with probability, $p \in [\frac{1}{2}, 1]$, which ensures that the Investor will choose to invest absent any other considerations. In the event of receiving an investment and succeeding, the Citizen earns a period payoff in the amount of the investment, a_I. After such a success, the game repeats.

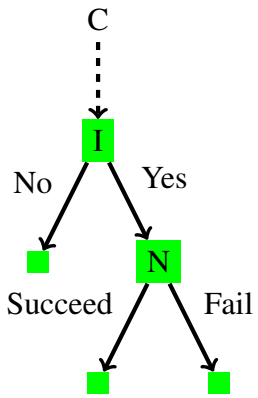
If the Citizen's business fails, both parties to the transaction earn 0, but they also sue each other. Their case is heard by the Judge, who chooses $a_J \in \{-1, 1\}$, where $a_J = -1$ represents a biased outcome and $a_J = 1$ represents a fair outcome. In a fair outcome, the Citizen pays an amount, $b \in [0, 1]$ to the Investor to settle the claim. In the biased outcome, the Investor must pay b to the Citizen. The citizen may then either accept, $a_C = 1$, or reject, $a_C = -1$, this judgment before the outcome is realized. This step is analogous to a judge facing reelection or legislative sanction as a result of her decision. In the case that the Citizen accepts the Judge's decision, the outcome reflects that chosen by the Judge, and the Judge earns 1 unit of utility. In the case that the Citizen rejects the Judge's decision, the outcome is the opposite of that chosen by the Judge and the Judge loses 1 unit of utility. Note that I do not allow the Investor to sanction the Judge n a manner analogous to the scenario faced by nonresident investors in state courts.

In the final stage of the game, the Investor must once again choose whether to invest a unit of capital in the Citizen's business, where the business again succeeds with probability, p. Here, however, if the business fails, the outcome of the case after the Citizen's input in the preceding period determines the outcome of the case in this stage. If the Investor ever rejects an opportunity to invest, the game ends.

1.A.2 Equilibrium

I solve this game using backward induction. To begin, consider the final investment subgame. The payoff for the Investor in the second period after a judicial ruling is

Figure 1.8: Subgame Tree



$$\pi_{I2} = a_{I2}(-1 + 2p + (1-p)ba_J a_C)$$

$$= \begin{cases} -1 + 2p + (1-p)b & \text{if } a_{I2} = 1,\ a_J = 1,\ \& \ a_C = 1 \\ & \text{or } a_{I2} = 1,\ a_J = -1,\ \& \ a_C = -1 \\ -1 + 2p - (1-p)b & \text{if } a_{I2} = 1,\ a_J = 1,\ \& \ a_C = -1 \\ & \text{or } a_{I2} = 1,\ a_J = -1,\ \& \ a_C = 1 \\ 0 & \text{otherwise} \end{cases} \tag{1.17}$$

Since $p \geq \frac{1}{2}$, the investor is better-off making an investment whenever the outcome in the preceding period was fair, irrespective of the value of b. If, on the other hand, the preceding outcome was biased, she is better-off accepting the investment if and only if

$$\begin{aligned} -1 + 2p - (1-p)b &\geq 0 \\ \frac{2p-1}{1-p} &\geq b \end{aligned} \tag{1.18}$$

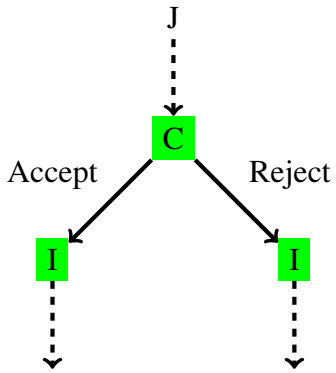
or alternatively when

$$p \geq \frac{b+1}{b+2} \tag{1.19}$$

Thus, the best response is

$$a^*_{I2} = \begin{cases} 1 & \text{if } a_J a_C = 1 \text{ or } a_J a_C = -1 \ \& \ p \geq \frac{b+1}{b+2} \\ 0 & \text{otherwise} \end{cases} \tag{1.20}$$

Figure 1.9: Subgame Tree



This investment decision also sets the payoffs for the Citizen in the second period. Her decision is somewhat more complex, however, since her decision over whether to accept or reject the Judge's decision affects her payoffs in both the first and second period of the game, her total payoff, conditional on reaching the history in which her decision matters, is as follows:

$$\begin{aligned} \pi_C &= p - (1-p)ba_J a_C + a_{I2}(p - (1-p)ba_J a_C) \\ &= \begin{cases} 2p - (1-p)2b & \text{if } a_{I2} = 1,\ a_J = 1,\ \& \ a_C = 1 \\ & \text{or } a_{I2} = 1,\ a_J = -1,\ \& \ a_C = -1 \\ 2p + (1-p)2b & \text{if } p \geq \frac{b+1}{b+2},\ a_J = 1,\ \& \ a_C = -1 \\ & \text{or } p \geq \frac{b+1}{b+2},\ a_J = -1,\ \& \ a_C = 1 \\ p + (1-p)b & \text{if } p < \frac{b+1}{b+2},\ a_J = 1,\ \& \ a_C = -1 \\ & \text{or } p < \frac{b+1}{b+2},\ a_J = -1,\ \& \ a_C = 1 \end{cases} \end{aligned} \tag{1.21}$$

Since the Investor will invest regardless of the judicial outcome if $p \geq \frac{b+1}{b+2}$, the Citizen will always prefer to see a biased regime implemented under such circumstances. If $p < \frac{b+1}{b+2}$, then the Citizen will prefer to see a biased regime implemented if and only if

$$\begin{aligned} p + (1-p)b &\geq 2p - (1-p)2b \\ b &\geq \frac{p}{3(1-p)} \end{aligned} \tag{1.22}$$

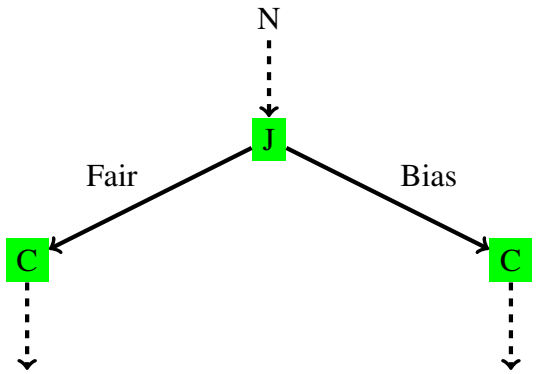
or alternatively if

$$\frac{3b}{1+3b} \geq p \tag{1.23}$$

Recalling that the judicial outcome is determined by the product, $a_J a_C$, the best response for the Citizen where her decision matters is

$$a_C^* = \begin{cases} 1 & \text{if } a_J = -1,\ p \geq \frac{b+1}{b+2} \\ & \text{or } a_J = -1,\ p < \frac{b+1}{b+2},\ \& \ p \leq \frac{3b}{1+3b} \\ & \text{or } a_J = 1,\ p < \frac{b+1}{b+2},\ \& \ p > \frac{3b}{1+3b} \\ -1 & \text{otherwise} \end{cases} \tag{1.24}$$

Figure 1.10: Subgame Tree



The Judge's decision is relatively straightforward then, since she only cares about not

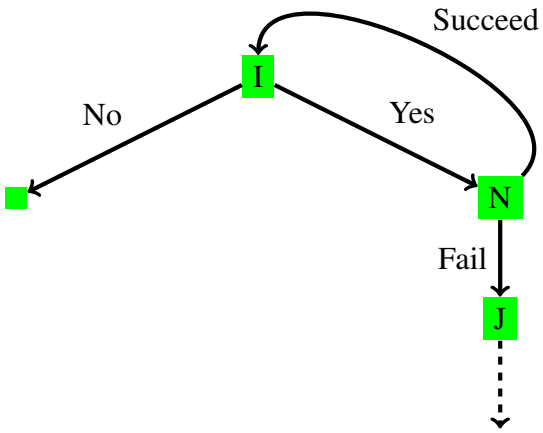
being reversed,

$$\pi_J = \begin{cases} 1 & \text{if } a_C = 1 \\ 0 & \text{otherwise} \end{cases} \tag{1.25}$$

Drawing from the best response of the Citizen, her best response is then,

$$a_J^* = \begin{cases} 1 & \text{if } p < \frac{b+1}{b+2}, \ \& \ p > \frac{3b}{1+3b} \\ -1 & \text{otherwise} \end{cases} \tag{1.26}$$

Figure 1.11: Game Tree



To complete the analysis, consider the decision-making process of the Investor in the first period. Here, the investor's payoff is determined by both her own decision over whether to invest and the decisions of the Judge and Citizen that occur in the event of a

bad outcome in the investment. The full payoff function is

$$
\begin{aligned}
\pi_I &= a_{I1}\left[-1 + p(2+\pi_I) + (1-p)(ba_Ja_C + \pi_{I2})\right] \\
&= a_{I1}\left[p(1+\pi_I) + (1-p)\left(ba_Ja_C + a_{I2}(-1+2p+(1-p)ba_Ja_C)\right)\right] \\
&= a_{I1}p\pi_I + a_{I1}p + a_{I1}(1-p)\left(ba_Ja_C(1+a_{I2}(1-p)) + 2pa_{I2} - a_{I2}\right) \\
&= \begin{cases} \frac{p}{1-p} + ba_Ja_C(1+a_{I2}(1-p)) + 2pa_{I2} - a_{I2} & \text{if } a_{I1}=1 \\ 0 & \text{otherwise} \end{cases} \\
&= \begin{cases} \frac{p}{1-p} + b(2-p) + 2p - 1 & \text{if } a_{I1}=1,\ a_{I2}=1,\ a_J=1,\ \&\ a_C=1 \\ & \text{or } a_{I1}=1,\ a_{I2}=1,\ a_J=-1,\ \&\ a_C=-1 \\ \frac{p}{1-p} - b(2-p) + 2p - 1 & \text{if } a_{I1}=1,\ a_{I2}=1,\ a_J=1,\ \&\ a_C=-1 \\ & \text{or } a_{I1}=1,\ a_{I2}=1,\ a_J=-1,\ \&\ a_C=1 \\ \frac{p}{1-p} + b & \text{if } a_{I1}=1,\ a_{I2}=0,\ a_J=1,\ \&\ a_C=1 \\ & \text{or } a_{I1}=1,\ a_{I2}=0,\ a_J=-1,\ \&\ a_C=-1 \\ \frac{p}{1-p} - b & \text{if } a_{I1}=1,\ a_{I2}=0,\ a_J=1,\ \&\ a_C=-1 \\ & \text{or } a_{I1}=1,\ a_{I2}=0,\ a_J=-1,\ \&\ a_C=1 \\ 0 & \text{otherwise} \end{cases}
\end{aligned}
\tag{1.27}
$$

Knowing that in equilibrium, $a_C = 1$ and applying her best response in period two in conjunction with the best response of the Judge, the payoff function can be reduced to

$$
\pi_I = \begin{cases} \frac{p}{1-p} + b(2-p) + 2p - 1 & \text{if } a_{I1}=1,\ a_{I2}=1,\ p < \frac{b+1}{b+2},\ \&\ p > \frac{3b}{1+3b} \\ \frac{p}{1-p} - b(2-p) + 2p - 1 & \text{if } a_{I1}=1,\ \&\ p \geq \frac{b+1}{b+2} \\ \frac{p}{1-p} - b & \text{if } a_{I1}=1,\ a_{I2}=0,\ p < \frac{b+1}{b+2},\ \&\ p \leq \frac{3b}{1+3b} \\ 0 & \text{otherwise} \end{cases}
\tag{1.28}
$$

There are three conditions to analyze test for the Investor's best response. First, consider the condition in which $p \geq \frac{b+1}{b+2}$ $\left(\text{alternatively, } b \leq \frac{2p-1}{1-p}\right)$. The Investor will invest if

$$\begin{aligned} \frac{p}{1-p} - b(2-p) + 2p - 1 &\geq 0 \\ \frac{-2p^2 + 4p - 1}{p^2 - 3p + 2} &\geq b \end{aligned} \tag{1.29}$$

Noting that

$$\frac{-2p^2 + 4p - 1}{p^2 - 3p + 2} \geq \frac{(2p-1)}{(1-p)} \geq b \tag{1.30}$$

the best response for this condition is $a_{I1} = 1$. Now consider the case in which $p < \frac{b+1}{b+2}$ and $p \leq \frac{3b}{1+3b}$. Here, the relevant condition for investment is

$$\begin{aligned} \frac{p}{1-p} - b &\geq 0 \\ p &\geq \frac{b}{1+b} \end{aligned} \tag{1.31}$$

Since this condition holds for all $b \in [0,1]$ for $p \geq \frac{1}{2}$, the best response in this region is $a_{I1} = 1$. Finally, consider the case where $p < \frac{b+1}{b+2}$ and $p > \frac{3b}{1+3b}$. In this case, the condition for investment is

$$\frac{p}{1-p} + b(2-p) + 2p - 1 \geq 0 \tag{1.32}$$

which holds for all $p \geq \frac{1}{2}$ and $b \in [0,1]$, so that once again, the optimal strategy is to play $a_{I1} = 1$. This yields the full best response,

$$a_{I1}^* = 1 \tag{1.33}$$

This completes the full set of equilibrium strategies:

$$
\begin{aligned}
a^*_{I1} &= 1 \\
a^*_J &= \begin{cases} 1 & \text{if } p < \frac{b+1}{b+2},\ \&\ p > \frac{3b}{1+3b} \\ -1 & \text{otherwise} \end{cases} \\
a^*_C &= \begin{cases} 1 & \text{if } a_J = -1,\ p \geq \frac{b+1}{b+2} \\ & \text{or } a_J = -1,\ p < \frac{b+1}{b+2},\ \&\ p \leq \frac{3b}{1+3b} \\ & \text{or } a_J = 1,\ p < \frac{b+1}{b+2},\ \&\ p > \frac{3b}{1+3b} \\ -1 & \text{otherwise} \end{cases} \\
a^*_{I2} &= \begin{cases} 1 & \text{if } a_J a_C = 1 \text{ or } a_J a_C = -1\ \&\ p \geq \frac{b+1}{b+2} \\ 0 & \text{otherwise} \end{cases}
\end{aligned}
\tag{1.34}
$$

Notably, this model predicts that there will be a bias introduced in most scenarios as the judge panders to her constituent citizens. This arises even without a particularly rich discussion of the structure of the bias. Of course, expanding the discussion of this bias to allow judges to fine-tune the term to satisfy multiple constituencies provides motivation for the term as it is introduced in the primary model presented in Section 1.3. Significantly, if the model is adapted slightly such that the Investor also has a right to affirm or reject the judge's decision—such as when she is simply another citizen—the Judge trivially faces symmetric outcomes as a result of favoring either party and the incentive to impose a bias is negated. This difference exemplifies the key concerns of the Founders regarding diverse parties before the court and motivates the decisions of states to unfairly judge conflicts arising between residents and these investors.

1.B Proofs

Proposition 1 *States will invest more in other states when they place a high value on those investments as a result of diminishing returns to scale. They will invest less whenever they place a high value on local investments or when other states place a high tax on investments from out-of-state.*

Proof. Recall that the state's best response with respect to taxation is

$$x_{ij}^{*} = \frac{1}{2t_j}\left(2\beta_i + \alpha_i + t_j - \sqrt{4\beta_i^2 + \alpha_i^2 + t_j^2 + 2\alpha_i(2\beta_i + t_j)}\right) \tag{1.35}$$

There are three parts to this proof, associated with each of the three variables which are relevant to the state's response. First, consider the effect of the state's preference for local investments. Taking the derivative with respect to α_i yields,

$$\mathrm{d}_{\alpha_i} x_{ij}^{*} = \frac{1}{2t_j}\left(1 - \frac{\alpha_i + 2\beta_i + t_j}{q_i}\right) \tag{1.36}$$

where

$$q_i = \sqrt{\alpha_i^2 + 4\beta_i^2 + t_j^2 + 2\alpha_i(2\beta_i + t_j)} \tag{1.37}$$

Since the tax cannot be negative (under this model), I need only show that $\alpha_i + 2\beta_i + t_j > q_i$. Squaring both sides, we wish to show

$$\begin{aligned}(\alpha_i + 2\beta_i + t_j)^2 &= \alpha_i^2 + 4\alpha_i\beta_i + 4\beta_i^2 + 2\alpha_i t_j + 4\beta_i t_j + t_j^2 \\ &> \alpha_i^2 + 4\beta_i^2 + t_j^2 + 2\alpha_i(2\beta_i + t_j)\end{aligned} \tag{1.38}$$

Subtracting appropriate terms from the squared term, we are left with

$$\begin{aligned}4\alpha_i\beta_i + 2\alpha_i t_j + 4\beta_i t_j &> 2\alpha_i(2\beta_i + t_j) \\ 4\beta_i t_j &> 0\end{aligned} \tag{1.39}$$

which holds for any positive tax.

For the second part, consider the effect of β_i. Taking the derivative yields,

$$\mathrm{d}_{\beta_i} x_{ij}^* = \frac{1}{t_j}\left(1 - \frac{\alpha_i + 2\beta_i}{q_i}\right) \tag{1.40}$$

Again, since taxes are always positive, we may ignore the multiplicative term so that we need only show that

$$\alpha_i + 2\beta_i < q_i \tag{1.41}$$

Squaring as before yields

$$(\alpha_i + 2\beta_i)^2 = \alpha_i^2 + 4\alpha_i\beta_i + 4\beta_i^2 \tag{1.42}$$

which is straightforwardly less that q_i^2 when taxes are positive:

$$\begin{aligned} \alpha_i^2 + 4\alpha_i\beta_i + 4\beta_i^2 &< \alpha_i^2 + 4\beta_i^2 + t_j^2 + 2\alpha_i(2\beta_i + t_j) \\ 4\alpha_i\beta_i &< t_j^2 + 2\alpha_i(2\beta_i + t_j) \\ 0 &< t_j^2 + 2\alpha_i t_j \end{aligned} \tag{1.43}$$

For the third part, we wish to show that the derivative with respect to t_j is negative. Recalling the derivative,

$$\mathrm{d}_{t_j} x_{ij}^* = -\frac{1}{2t_j^2}\left(\alpha_i + 2\beta_i + t_j - q_i - t_j\left(1 - \frac{\alpha_i + t_j}{q_i}\right)\right) \tag{1.44}$$

Once again, we may ignore the outer t_j term, and we need only show that

$$\begin{aligned}
\alpha_i + 2\beta_i + t_j - q_i - t_j\left(1 - \frac{\alpha_i + t_j}{q_i}\right) &> 0 \\
\alpha_i + 2\beta_i - q_i + \frac{t_j}{q_i}\left(\alpha_i + t_j\right) &> 0 \\
\left(\alpha_i + 2\beta_i\right) q_i - q_i^2 + t_j(\alpha_i + t_j) &> 0 \\
\left(\alpha_i + 2\beta_i\right) q_i - \alpha_i^2 - 4\beta_i^2 - t_j^2 - 2\alpha_i(2\beta_i + t_j) + t_j(\alpha_i + t_j) &> 0 \\
\left(\alpha_i + 2\beta_i\right) q_i - \alpha_i^2 - 4\beta_i^2 - 4\alpha_i\beta_i - t_j\alpha_i &> 0 \\
\frac{\alpha_i^2 + 4\beta_i^2 + 4\alpha_i\beta_i + t_j\alpha_i}{\alpha_i + 2\beta_i} &< q_i
\end{aligned} \tag{1.45}$$

Squaring both sides, we require

$$\frac{(\alpha_i^2 + 4\beta_i^2 + 4\alpha_i\beta_i + t_j\alpha_i)^2}{\alpha_i^2 + 4\alpha_i\beta_i + 4\beta_i^2} < \alpha_i^2 + 4\beta_i^2 + t_j^2 + 2\alpha_i(2\beta_i + t_j) \tag{1.46}$$

Let $\upsilon_i = \alpha_i^2 + 4\alpha_i\beta_i + 4\beta_i^2$ so that this becomes

$$\begin{aligned}
\frac{(\upsilon_i + t_j\alpha_i)^2}{\upsilon_i} &< \upsilon_i + t_j^2 + 2\alpha_i t_j \\
\upsilon_i^2 + 2t_j\alpha_i\upsilon_i + t_j^2\alpha_i^2 &< \upsilon_i^2 + t_j^2\upsilon_i + 2\alpha_i t_j\upsilon_i \\
\alpha_i^2 &< \upsilon_i \\
0 &< 4\alpha_i\beta_i + 4\beta_i^2
\end{aligned} \tag{1.47}$$

which always holds. □

Proposition 2 *States impose a low bias rate when they place a high value on receiving investments locally. They may also impose a low bias rate when other states place a sufficiently low value on out-of-state investments relative to local investments. However, they will impose a high bias rate whenever other states place a high value on out-of-state investments.*

Proof. First consider the derivative of t_i^* with respect to α_i:

$$\mathrm{d}_{\alpha_i} t_i^* = -\frac{(\alpha_j + \beta_j)(\alpha_j\beta_j + \beta_j^2 + 2\alpha_i^2 + \beta_j(2\alpha_i + p_i))}{2\alpha_i p_i} < 0 \tag{1.48}$$

where

$$p_i = \sqrt{(\alpha_j + \beta_j)(\alpha_j + \beta_j + 4\alpha_i)} \tag{1.49}$$

Here, every term in the fraction is positive, so that the leading negative is sufficient to show that the derivative is negative.

The subsequent claims in the proposition are less straightforward. Consider the derivative with respect to β_i,

$$\mathrm{d}_{\beta_j} t_i^* = \frac{1}{2\alpha_i}\left(\alpha_j + 2\beta_j + \alpha_i - p_i - \frac{(\beta_j - \alpha_i)(\alpha_j + \beta_j + 2\alpha_i)}{p_i}\right) \tag{1.50}$$

Dropping the $\frac{1}{2\alpha_i}$ term, we will look at the condition for a positive derivative.

$$\begin{aligned} \alpha_j + 2\beta_j + \alpha_i - p_i - \frac{(\beta_j - \alpha_i)(\alpha_j + \beta_j + 2\alpha_i)}{p_i} &> 0 \\ \alpha_j p_i + 2\beta_j p_i + \alpha_i p_i - p_i^2 - (\beta_j - \alpha_i)(\alpha_j + \beta_j + 2\alpha_i) &> 0 \end{aligned} \tag{1.51}$$

Rearranging yields

$$\begin{aligned} (\alpha_j + 2\beta_j + \alpha_i)\, p_i &> p_i^2 + (\beta_j - \alpha_i)(\alpha_j + \beta_j + 2\alpha_i) \\ (\alpha_j + 2\beta_j + \alpha_i)\, p_i &> (\alpha_j + \beta_j)(\alpha_j + \beta_j + 4\alpha_i) + (\beta_j - \alpha_i)(\alpha_j + \beta_j + 2\alpha_i) \\ (\alpha_j + 2\beta_j + \alpha_i)\, p_i &> \alpha_j^2 + 3\alpha_j\beta_j + 3\alpha_j\alpha_i + 2\beta_j^2 + 5\beta_j\alpha_i - 2\alpha_i^2 \end{aligned} \tag{1.52}$$

Here, if the RHS is negative, then the statement holds trivially, since the LHS is strictly positive. This is the the case whenever

$$\beta_j < \frac{-1}{4}\left(5\alpha_i + 3\alpha_j - \sqrt{41\alpha_i^2 + 6\alpha_i\alpha_j + \alpha_j^2}\right) \tag{1.53}$$

This solution is only positive when $\alpha_i < \frac{\alpha_j(3+\sqrt{17})}{4}$. When both sides of equation (1.52) are positive, we can approach this problem as in the preceding proof. Let $\nu_i = (\alpha_j + 2\beta_j + \alpha_i)$ and square both sides of the equation to obtain the condition,

$$\begin{aligned}
\nu_i^2 p_i^2 &> \left(\alpha_j^2 + 3\alpha_j\beta_j + 3\alpha_j\alpha_i + 2\beta_j^2 + 5\beta_j\alpha_i - 2\alpha_i^2\right)^2 \\
\nu_i^2 p_i^2 &> \left(\nu_i^2 - \alpha_j\beta_j + \alpha_j\alpha_i - 2\beta_j^2 + \beta_j\alpha_i - 3\alpha_i^2\right)^2 \\
\nu_i^2 p_i^2 &> \nu_i^4 + 2\nu_i^2\left(\alpha_j\alpha_i - \alpha_j\beta_j - 2\beta_j^2 + \beta_j\alpha_i - 3\alpha_i^2\right) \\
&\qquad + \left(\alpha_j\alpha_i - \alpha_j\beta_j - 2\beta_j^2 + \beta_j\alpha_i - 3\alpha_i^2\right)^2 \qquad (1.54) \\
0 &> \nu_i^4 + \nu_i^2\left(-6\alpha_i^2 - 2\alpha_i\left(\alpha_j - 3\beta_j\right) + \alpha_j^2 - 3\beta_j^2\right) \\
&\qquad + \left(\alpha_j\alpha_i - \alpha_j\beta_j - 2\beta_j^2 + \beta_j\alpha_i - 3\alpha_i^2\right)^2 \\
0 &> -4\alpha_i^2\left(-\alpha_i^2 + \alpha_i\left(4\alpha_j + 6\beta_j\right) + \alpha_j\left(\alpha_j + 2\beta_j\right)\right)
\end{aligned}$$

Here, we can ignore the $4\alpha_i^2$ term, leaving

$$\begin{aligned}
-\alpha_i^2 + \alpha_i\left(4\alpha_j + 6\beta_j\right) + \alpha_j\left(\alpha_j + 2\beta_j\right) &> 0 \\
6\alpha_i\beta_j + 2\alpha_j\beta_j &> \alpha_i^2 - 4\alpha_i\alpha_j - \alpha_j^2 \qquad (1.55) \\
\beta_j &> \frac{\alpha_i^2 - 4\alpha_i\alpha_j - \alpha_j^2}{2\left(3\alpha_i + \alpha_j\right)}
\end{aligned}$$

There is a positive solution to this equation whenever $\alpha_i > \left(2+\sqrt{5}\right)\alpha_j$.Recalling the preceding condition from equation (1.53), we can see that there is a small interval of parameter values, $\alpha_i \in \left(\frac{\alpha_j(3+\sqrt{17})}{4}, \alpha_j\left(2+\sqrt{5}\right)\right)$, for which there is a region in which imposed tax rates, t_i^* are decreasing in β_j. Comparing the two conditions we have identified, however, we note that the critical value on β_j induced in equation (1.55) is less than that of equation (1.53), indicating that there is no value for which the derivative of the equilibrium tax rate

with respect to β_j is negative:

$$\begin{aligned}
\frac{-1}{4}\left(5\alpha_i + 3\alpha_j - \sqrt{41\alpha_i^2 + 6\alpha_i\alpha_j + \alpha_j^2}\right) &> \frac{\alpha_i^2 - 4\alpha_i\alpha_j - \alpha_j^2}{2\left(3\alpha_i + \alpha_j\right)} \\
\left(3\alpha_i + \alpha_j\right)\left(\sqrt{41\alpha_i^2 + 6\alpha_i\alpha_j + \alpha_j^2} - 5\alpha_i - 3\alpha_j\right) &> 2\left(\alpha_i^2 - 4\alpha_i\alpha_j - \alpha_j^2\right) \\
\left(\alpha_j + 3\alpha_i\right)\sqrt{41\alpha_i^2 + 6\alpha_i\alpha_j + \alpha_j^2} & \\
-15\alpha_i^2 - 14\alpha_i\alpha_j - 3\alpha_j^2 &> 2\alpha_i^2 - 8\alpha_i\alpha_j - 2\alpha_j^2 \\
\left(\alpha_j + 3\alpha_i\right)\sqrt{41\alpha_i^2 + 6\alpha_i\alpha_j + \alpha_j^2} &> 17\alpha_i^2 + 6\alpha_i\alpha_j + \alpha_j^2
\end{aligned} \tag{1.56}$$

Squaring both sides yields

$$\begin{aligned}
369\alpha_i^4 + 300\alpha_i^3\alpha_j + 86\alpha_i^2\alpha_j^2 + 12\alpha_i\alpha_j^3 + \alpha_j^4 &> 289\alpha_i^4 + 204\alpha_i^3\alpha_j + 70\alpha_i^2\alpha_j^2 + 12\alpha_i\alpha_j^3 + \alpha_j^4 \\
80\alpha_i^4 + 96\alpha_i^3\alpha_j + 16\alpha_i^2\alpha_j^2 &> 0
\end{aligned} \tag{1.57}$$

As both α_i and α_j are positive, this is straightforwardly true, so $\mathrm{d}_{\beta_j} t_i^* > 0$ for all $\beta_j > 0$.

Finally, consider the derivative with respect to α_j.

$$\mathrm{d}_{\alpha_j} t_i^* = \frac{\left(\beta_j - \alpha_i\right)\left(\alpha_j + \beta_j + 2\alpha_i + p_i\right)}{2\alpha_i p_i} \tag{1.58}$$

This term is positive whenever $\beta_j > \alpha_i$, and negative otherwise. □

Proposition 3 *Total social welfare is decreasing in the magnitude of tax imposed by any state. Whenever taxes are positive in any state, there will be at least one state which suffers a welfare loss.*

Proof. Consider the utility functions of the state actors:

$$U_i(t_i, \mathbf{x_i} | b_{-i}, \mathbf{x_{-i}}) = \sum_j^N \left(\alpha_i \log(x_{ji}) + t_i x_{ji} + \beta_i \log(x_{ij}) - t_j x_{ij}\right) \tag{1.59}$$

Summing across the entire federation and noting that $\sum_i^N \sum_j^N (t_i x_{ji} - t_j x_{ij})$, the total social welfare becomes

$$\begin{aligned} U_{Total}(t_i, \mathbf{x_i} | i \in \{1, \ldots, N\}) &= \sum_i^N \sum_j^N (\alpha_i \log(x_{ji}) + t_i x_{ji} + \beta_i \log(x_{ij}) - t_j x_{ij}) \\ &= \sum_i^N \sum_j^N (\alpha_i \log(x_{ji}) + \beta_i \log(x_{ij})) \end{aligned} \tag{1.60}$$

Note that this welfare function is identical whether the states are using a centralized or decentralized enforcement regime, since taxes are zero-sum across the federation. Furthermore, since efficient investments by each state are independent of investments by any other state, the socially-optimal investment is that which maximizes the welfare of a single state in the absence of taxes; that is the one which solves

$$\mathbf{X}^* = \text{argmax}_{\mathbf{X}} \left\{ \sum_j^N (\alpha_i \log(x_{ji}) + \beta_i \log(x_{ij})) \, | i \in \{1, \ldots, N\} \right\} \tag{1.61}$$

for two states, this is the tensor, $\mathbf{X}$, which satisfies

$$\mathbf{X}^* = \text{argmax}_{\mathbf{x_1}, \mathbf{x_2}} \left\{ \sum_j^N (\alpha_i \log(x_{ji}) + \beta_i \log(x_{ij})) \right\} \tag{1.62}$$

This is simply the solution we identified for the states' investments in the absence of any taxes, which was identified in Section 1.4. Recall we had for each state individually,

$$x_{ij}^\dagger = \frac{\beta_i}{\alpha_i + 2\beta_i} \tag{1.63}$$

Any deviation from this allocation makes the states individually worse-off in the absence of taxes and so reduces the social welfare of the federation as a whole. Since states do allocate their capital differently under taxation, the federation as a whole is straightforwardly worse-off under a regime which allows states to individually impose taxes on economic activity.

Moreover, since the total welfare of the federation is reduced, there must be at least one state that is individually made worse-off under such a regime. □

1.C Arbitrarily Many States with Variable Capital

In this section, the model is solved for a more general system of N states with arbitrary capital constraints. First, I consider the case of arbitrary capital with two states, and then I relax the number of states in the following subsection.

1.C.1 Arbitrary Capital Reserves

To begin this analysis, revisit the problem for two states, but instead of allowing the investor a single unit of capital, let the investors have k_i units available. The utility function then takes the form,

$$U_i(t_i, x_{ij}|t_j, x_{ji}) = (\alpha_i+\beta_i)\log(k_i-x_{ij})+\alpha_i\log(x_{ji})+t_i x_{ji}+\beta_i\log(x_{ij})-t_j x_{ij} \quad (1.64)$$

Taking states' decisions on taxes as fixed, the investment decisions for state i solve

$$\text{argmax}_{x_j} U_i(t_i, x_{ij}|t_j, x_{ji}) \quad (1.65)$$

This yields the FOC,

$$0 = \mathrm{d}_{x_{ij}} U_i(t_i, x^*_{ij}|t_j, x_{ji}) = -\frac{\alpha_i+\beta_i}{k_i-x^*_{ij}} + \frac{\beta_i}{x^*_{ij}} - t_j \quad (1.66)$$

which implies

$$x^*_{ij} = \frac{1}{2t_j}\left(2\beta_i+\alpha_i+k_i t_j - \sqrt{4\beta_i^2+\alpha_i^2+k_i^2 t_j^2+2\alpha_i(2\beta_i+k_i t_j)}\right) \quad (1.67)$$

The comparative statics on this solution are identical to those in the original case with unit investment.

Now we can consider the optimal tax that this induces for the states, conditioning on $\mathbf{x}_i$ and $\mathbf{x}_j$. Taking the FOC with respect to t_i,

$$\begin{aligned} 0 &= \mathrm{d}_{t_i} U_i(t_i^*, x_{ij}^* | t_j^*, x_{ji}^*) \\ &= \left(-\frac{\alpha_i + \beta_i}{k_i - x_{ij}^*} + \frac{\beta_i}{x_{ij}^*} - t_j \right) \mathrm{d}_{t_i} x_{ij}^* + \left(\frac{\alpha_i}{x_{ji}^*} + t_i \right) \mathrm{d}_{t_i} x_{ji}^* + x_{ji}^* \end{aligned} \tag{1.68}$$

Letting $q_i \equiv \sqrt{\alpha_i^2 + 4\beta_i^2 + k_i^2 t_j^2 + 2\alpha_i(2\beta_i + k_i t_j)}$ we have

$$\mathrm{d}_{t_i} x_{ji}^* = -\frac{1}{2t_i^2} \left(\alpha_j + 2\beta_j - q_j + \frac{k_j t_i \alpha_j + k_j^2 t_i^2}{q_j} \right) \tag{1.69a}$$

$$\mathrm{d}_{t_i} x_{ij}^* = 0 \tag{1.69b}$$

And so the preceding equations become

$$0 = \left(\frac{\alpha_i}{x_{ji}^*} + t_i^* \right) \mathrm{d}_{t_i} x_{ji}^* + x_{ji}^* \tag{1.70}$$

Solving for t_i yields

$$t_i^* = \frac{1}{2\alpha_i k_j} \left(\alpha_j \beta_j + \beta_j^2 - \alpha_j \alpha_i + \beta_j \alpha_i + (\beta_j - \alpha_i) p_i \right) \tag{1.71}$$

where $p_i = \sqrt{(\alpha_j + \beta_j)(\alpha_j + \beta_j + 4\alpha_i)}$. This is once again identical to the example with a single unit of capital with the exception of the scaling factor, k_j.

Strictly Positive Returns

The equilibrium just defined may likewise be reinterpreted to ensure positive returns on investments. Throughout this model, the use of $\log(x)$ to measure returns on investment,

especially with a unit capital reserve, has ensured that the returns on investments (prior to tax transfers) are strictly negative. To account for this, consider the alternative model where the use of $\log(1+x)$ replaces $\log(x)$, ensuring positive returns when x is restricted to positive values. This is, however, also equivalent to an environment in which the total capital available to states is $1+N$, and the equilibrium investment induced by the tax regime is $x_{ij} > 1$ for every pair of states, i and j, with tax receipts of the form, $t(1-x)$.

Of course, in many instances, this will not be the case, as states will be induced to raise taxes in excess of the levels which would induce strictly positive investment in every state, in which case the offending states would receive no outside investments from the states which suffers as a result of those taxes. In large federations, this may range from a single state withdrawing all investments to every state doing so.

In the case where there are two states, this constraint is binding if and only if

$$k_i \leq \frac{\alpha_i + 2\beta_i}{\beta_i} \quad \text{or} \quad t_j \geq \frac{k_i\beta_i - \alpha_i - 2\beta_i}{k_i - 1} \tag{1.72}$$

It is straightforward to see that whenever any state which is so-constrained under a regime allowing taxation will make its trading partner worse-off under that regime than under one which eliminates taxation. By reallocating all of its capital locally, state i prevents state j from accruing any benefits that would arise in the form of both taxes and economic output. Meanwhile, state j also suffers losses due to the taxation imposed by state i in such a regime, necessarily making them worse-off than they would be under an efficient no-tax regime. State i, on the other hand, may nonetheless benefit from from a regime allowing taxation, provided α_i and β_j are sufficiently large relative to β_i.

1.C.2 Arbitrary N

Let each of N states choose a tax rate, t_i and a level of investment, $x_{ij} \in [0, k_i]$, in commerce with each other state, j, subject to a budget constraint, $0 \leq \sum_j^N x_{ij} \leq k_i$. Also, let the payoff function for each state follow the same form as in the two-state model so that

$$U_i(t_i, \mathbf{x_i}|b_{-i}, \mathbf{x_{-i}}) = \sum_j^I (\alpha_i \log(x_{ij}) - t_j x_{ij} + \beta_i \log(x_{ji}) + t_i x_{ji}) \tag{1.73}$$

Taking states' decisions on tax as fixed, the investment decisions for state i solve

$$\text{argmax}_{\mathbf{x_i}} U_i(t_i, \mathbf{x_i}|b_{-i}, \mathbf{x_{-i}}) \text{ subject to } \sum_j^I x_{ij} \leq k_i \tag{1.74}$$

Taking the Lagrangian with respect to $\mathbf{x_i}$,

$$\mathcal{L}_i(\mathbf{x_i}, \lambda_i) = \lambda_i \left(k_i - \sum_j^I x_{ij} \right) + \sum_j^I (\alpha_i \log(x_{ij}) - t_j x_{ij} + \beta_i \log(x_{ji}) + t_i x_{ji}) \tag{1.75}$$

we are left with the following FOC:

$$0 = \frac{\alpha_i}{x_{ij}^*} - t_j - \lambda_i^* \; \forall \; j \neq i \tag{1.76a}$$

$$0 = \frac{\alpha_i + \beta_i}{x_{ii}^*} - \lambda_i^* \tag{1.76b}$$

$$0 = k_i - \sum_j^I x_{ij}^* \tag{1.76c}$$

So we have

$$x^*_{ij} = \frac{\alpha_i}{t_j + \lambda^*_i} = \frac{\alpha_i x^*_{ii}}{t_j x^*_{ii} + \alpha_i + \beta_i} \quad \forall \quad j \neq i \tag{1.77a}$$

$$x^*_{ii} = k_i - \sum_{j \neq i}^{I} x^*_{ij} = k_i - \sum_{j \neq i}^{I} \frac{\alpha_i x^*_{ii}}{t_j x^*_{ii} + \alpha_i + \beta_i} \tag{1.77b}$$

$$\lambda^*_i = \frac{\alpha_i + \beta_i}{x^*_{ii}} \tag{1.77c}$$

Applying these results to the states' utility functions, we have

$$U_i(t_i, \mathbf{x}^*_\mathbf{i} | b_{-i}, \mathbf{x}^*_{-\mathbf{i}}) = \sum_j^I \left(\alpha_i \log\left(x^*_{ij}\right) - t_j x^*_{ij} + \beta_i \log\left(x^*_{ji}\right) + t_i x^*_{ji} \right) \tag{1.78}$$

where (1.77a) makes it apparent that whenever x^*_{ii} is positive, so is every x^*_{ij}. As it is straightforwardly optimal for the states to make at least one positive investment, it is also optimal for them to make positive investments in every state. Furthermore, whenever a state prefers to reallocate some measure of capital away from any other state, the optimal reallocation of that capital will be spread over every remaining state, including itself. Thus, $\mathrm{d}x_{ij} \propto -\mathrm{d}x_{ik}$ for all $k \neq j$.

Now we can take the derivative with respect to t_i to identify the appropriate first order condition on taxation,

$$\begin{aligned} &\frac{\mathrm{d}}{\mathrm{d}t_i} U_i(t_i, \mathbf{x}^*_\mathbf{i} | b_{-i}, \mathbf{x}^*_{-\mathbf{i}}) \\ &\qquad = \frac{\alpha_i + \beta_i}{x^*_{ii}} \frac{\mathrm{d}x^*_{ii}}{\mathrm{d}t_i} + \sum_{j \neq i}^{I} \left(\left(\frac{\alpha_i}{x^*_{ij}} - t_j \right) \frac{\mathrm{d}x^*_{ij}}{\mathrm{d}t_i} + \left(\frac{\beta_i}{x^*_{ji}} + t_i \right) \frac{\mathrm{d}x^*_{ji}}{\mathrm{d}t_i} + x^*_{ji} \right) \end{aligned} \tag{1.79}$$

We can note here that a state's own investment decisions never depend on the local tax

rate, so that we have $\frac{\mathrm{d}x_{ii}^*}{\mathrm{d}t_i} = \frac{\mathrm{d}x_{ij}^*}{\mathrm{d}t_i} = 0$ and the first order condition becomes

$$0 = \sum_{j \neq i}^{I} \left(\left(\frac{\beta_i}{x_{ji}^*} + t_i^* \right) \frac{\mathrm{d}x_{ji}^*}{\mathrm{d}t_i^*} + x_{ji}^* \right) \tag{1.80}$$

which is part of a system of N coupled differential equations. In particular, we have

$$\frac{\mathrm{d}}{\mathrm{d}t_i} U_i(t_i | \mathbf{x}_\mathbf{i}^*, b_{-i}, \mathbf{x}_{-\mathbf{i}}^*) = f(t_i, \mathbf{t}_{-i}) \; \forall \; i \tag{1.81}$$

Solving (1.80) for t_i^* yields

$$t_i^* = -\frac{\sum_{j \neq i}^{I} \left(\frac{\beta_i}{x_{ji}^*} \frac{\mathrm{d}x_{ji}^*}{\mathrm{d}t_i^*} + x_{ji}^* \right)}{\sum_{j \neq i}^{I} \frac{\mathrm{d}x_{ji}^*}{\mathrm{d}t_i^*}} \tag{1.82}$$

which can be characterized in part by noting that we have

$$\begin{aligned} \frac{\mathrm{d}x_{ji}^*}{\mathrm{d}t_i^*} &= \frac{\alpha_j \left((t_i x_{jj}^* + \alpha_j + \beta_j) \frac{\mathrm{d}x_{jj}^*}{\mathrm{d}t_i} - x_{jj}^* \left(x_{jj}^* + t_i \frac{\mathrm{d}x_{jj}^*}{\mathrm{d}t_i} \right) \right)}{(t_i x_{jj}^* + \alpha_j + \beta_j)^2} \\ &= \frac{\alpha_j \left((\alpha_j + \beta_j) \frac{\mathrm{d}x_{jj}^*}{\mathrm{d}t_i} - x_{jj}^{*2} \right)}{(t_i x_{jj}^* + \alpha_j + \beta_j)^2} \\ &= \frac{x_{ji}^{*2} \left((\alpha_j + \beta_j) \frac{\mathrm{d}x_{jj}^*}{\mathrm{d}t_i} - x_{jj}^{*2} \right)}{\alpha_j x_{jj}^{*2}} \\ &= \frac{1}{\alpha_j} \left(\frac{x_{ji}^{*2} (\alpha_j + \beta_j)}{x_{jj}^{*2}} \frac{\mathrm{d}x_{jj}^*}{\mathrm{d}t_i} - 1 \right) \end{aligned} \tag{1.83}$$

Since $\mathrm{sgn}[\mathrm{d}_{t_i^*} x_{ji}^*] = \mathrm{sgn}[-\mathrm{d}_{t_i^*} x_{jj}^*]$, if $\mathrm{d}_{t_i^*} x_{ji}^* > 0$, then $\mathrm{d}_{t_i^*} x_{jj}^* < 0$, and

$$\frac{x_{ji}^{*2} (\alpha_j + \beta_j)}{x_{jj}^{*2}} \frac{\mathrm{d}x_{jj}^*}{\mathrm{d}t_i} - 1 > 0 \tag{1.84}$$

But this in turn implies

$$\frac{x_{ji}^{*2} (\alpha_j + \beta_j)}{x_{jj}^{*2}} < \frac{\mathrm{d}t_i}{\mathrm{d}x_{jj}^*} < 0 \tag{1.85}$$

which is an impossibility. Also, if $\mathrm{d}_{t_i^*} x_{ji}^* = 0$, then $\mathrm{d}_{t_i^*} x_{jj}^* = 0$, and we have $-\frac{1}{\alpha_j} = 0$, another impossibility. Thus $\mathrm{d}_{t_i^*} x_{ji}^* < 0$ and $\mathrm{d}_{t_i^*} x_{jj}^* > 0$ for every state.

Chapter 2

Policy Bias with Outside Options

Abstract

When analyzing voting behavior, most analyses focus on policy preferences of individuals who are bound by the policies implemented by the electorate of those politicians that win office. In many policy realms, however, the constituent voters are subjected to the implemented policy only if they choose to engage in certain activities. This project focuses on one such policy area: foreclosure law. While elected politicians enact relevant policies, only those voters that choose to participate in the mortgage market are directly affected by those policies. Individuals that do not wish to participate in the mortgage market may instead choose to rent their homes, pay cash, or live with other family members and thereby avoid falling subject to foreclosure law. This paper develops a formal model and empirical analysis of policy-making in such environments, and offers a simple empirical analysis of home ownership in the United States as affected by both foreclosure policy and the workforce demographics of the region. I identify a clear nonmonotonic relationship between the number of debtor protections in place and the home ownership rate within a state, offering support for moderate policies despite a clear majority of the population being in a position to favor unbounded protections under traditional voting models.

2.1 Introduction

Voting models in most contexts assume that voters are directly subjected to the policies that are implemented as a result of their collective voting decisions. What happens, however, when voters have outside options that allow them to avoid the policies that are implemented? What happens when voters can choose to bypass the laws that are implement? This is an important caveat in many policy areas where the laws only directly affect those who choose to participate in particular voluntary activities. These areas include such common activities as driving, running a business, and—following the focus of this paper—buying a house.

Furthermore, most voting models assume that voters' behavior is independent. Voters' effects on each other are nonexistent, or at least limited. At the very least, each individual's effect on others is minuscule and falls back to an aggregate effect on society at large. What happens when one voter's decision has a direct and identifiable effect on another's?

This paper addresses some of these questions by analyzing the behavior of different actors in the housing market with respect to local rules in places governing the foreclosure process in the event of a mortgage default. While some states offer relatively strong protections to creditors by instituting nonjudicial proceedings, limiting notice, and permitting large deficiency judgments, other states offer many more protections to debtors, such as judicial proceedings, redemption and reinstatement periods, and outright bans in foreclosing under certain circumstances. In every state, it is clear that the majority of residents—and more particularly voting residents—are more likely to find themselves as debtors and so should prefer those policies, yet their implementation is limited to a few environments.

I argue that the availability of an outside option for both parties—alternative investments for the lender and renting for the borrower—together with the interdependence of the lender and the creditor drive this moderation by demonstrating that if the policy too-strongly favors one party in the transaction over the other, the disfavored party will drop out

of the market, forcing her would-be trading partner to either drop out herself or renegotiate with a different partner in the resulting more-competitive market. I develop a simple formal model to demonstrate the induced policy outcomes, and I subsequently test the model empirically by analyzing home ownership against the backdrop existing foreclosure policies across the United States.

2.2 Literature

There is a large literature dating back to Black (1948) and Downs (1957) which considers how legislators make decisions over which policies to implement. Perhaps the most well-known of these is the median voter theorem, which suggests that the policy which is ultimately implemented will be the one most-preferred by the median voter, and the politician elected will be the one whose platform is closest to that of the median voter. This models, however, comes with several strict condition, particularly when placed in multiple dimensions. Even in one-dimension, however, the model is not foolproof. voters must satisfy appropriate single-crossing conditions to prevent cycling in voting outcomes. Moreover, unrelated outside options should not affect the policies favored by individuals. This paper addresses the outcome when these conditions are not strictly satisfied, focusing on the effect that one outside option—renting—can have on the choices of voters and politicians in a particular policy area—foreclosure law.

Foreclosure procedures vary significantly across the United States. Each state has slightly different procedures and laws governing how mortgagees may take transfer or take possession of the houses held as collateral for the debts owed by mortgagors. In many cases, these laws further vary within different cities and counties within individual states as politicians pander to their respective bases and the industry groups that inform them. This is useful from an empirical perspective, as it allows for the variation that makes my analysis viable, but it also makes it more difficult to gain an understanding of the precise rules that

govern any single mortgage, Bucks and Pence (2008) considers how this plays into individuals' ability to understand the terms of their own mortgages and the tools available to them under the law. Deng and van Order (2000) and Campbell and Cocco (2003) also give conditions under which different tools available to actors under the terms of a mortgage may be implemented. Most importantly from the perspective of this analysis, however, Mian, Sufi, and Trebbi (2014), provides a detailed look at the role of judicial foreclosure rules on the pricing and demand for housing across jurisdictional boundaries from the state level down to the zip code level. This paper builds on this analysis to explore not only how policies such as judicial foreclosure requirements affect home ownership and pricing, but also how the demographics within a region affect whether or not such policies are implemented.

Several more analyses focus on the determinants of failure in mortgages, both due to applications being denied—as in the case of Munnell et al. (1996)—and due to default and eventual foreclosure—as in the case of Mayer, Pence, and Sherlund (2009) and Deng, Quigley, and Robert Van Order (1996). Each of these focuses primarily on the determinants of failure from the mortgagor's side. Meanwhile, the decisions of the mortgagee, which have an equally-large if not bigger effect on the level of credit available in a market relate closely to a number of classical industrial economics concerns such as those addressed by Olley and Pakes (1996) and Hopenhayn (1992). These classic empirical exercises inspire relevant questions as to the conditions under which lending firms are likely to enter into a market or a particular transaction with a potential mortgagor at any given time. LaCour-Little and Zhang (2017) also provides an analysis of adverse selection in the mortgage market with respect to the structure of mortgage-backed securities that speaks to how policies governing lending are likely to affect market participation and the ability of borrowers and lenders to come to terms. In line with this literature, there are numerous analyses of the economic consequences of overly restrictive and, more recently, overly loose credit leading to inefficient levels of spending on home equity. Some recent projects

focusing on these outcomes include Cooper (2009); Mian and Sufi (2009), and Mian and Sufi (2011).

Overshadowing each of these concerns, though, are politicians own decisions dictating what actions are or are not allowed by either party to a mortgage transaction. While relatively little relief has been provided to most mortgagors in recent years—contrary to what would be expected under many traditional median voter models—there has been a long history of debt relief in the united states during the 19th Century and in the 1930s (Rucker and Alston, 1987). This project attempts to motivate the reasoning behind the lack of such relief in the current era.

The legislator, keeping in mind her connection to the selectorate, may decide to implement populist policies aimed at pleasing debtors, but she does so at the risk of damaging relations with creditors and possibly driving them out of the market or individual segments thereof. Concerns about the effects of these actions—and the alternative of no action in extreme conditions—is the focus of Renuart (2013), as well as Cordell and Lambie-Hanson (2015). In a similar vein, Bolton and Rosenthal (2002) address a similar question from the perspective of the electorate in popular referendums, demonstrating the conditions under which debtors—in this case farmers—are likely to support debt a moratorium to avoid foreclosure. This particular model applies many of the same characteristics as the one presented below but which focuses on *ex post* intervention by the government, whereas the model presented here focuses on *ex ante* policy interventions.

2.3 Model

Let there be a population of *citizens*, K, with mass one, consisting of individuals that are indexed in two dimensions. First, they are indexed by one of two economic types, $\tau \in \{c, d\}$, where c refers to *creditors* and d refers to *debtors*. Second, each citizen is indexed by her value type, $j \in \mathbb{R}^{++}$, representing the value she places on a debt transaction.

This can be interpreted as a measure of efficiency or need that characterizes the actor, such that a wealthy financier may be able to offer diversified, safe loans that are highly profitable, while a small town manager of a savings and loan can finance little more than local home mortgages that are highly tied into the local economy. Similarly, a wealthy entrepreneur may be able to obtain extensive leverage at relatively low cost, while an overextended blue-collar laborer may only be able to obtain expensive payday loans. Denoting the marginal mass of each type $k_{\tau j}$, we have

$$\int_0^\infty (k_{cj} + k_{dj})\,\mathrm{d}j = |K| = 1 \tag{2.1}$$

Also, define $K_\tau = \int_0^\infty k_{\tau_j} dj$, measuring the proportion of the population belonging to each type, so that $K_c + K_d = 1$. Denote the minimum and maximum value types, j, for each economic type as $\underline{j}_\tau$ and $\overline{j}_\tau$, respectively.

In this environment, any two citizens of different types may meet and engage in a debt transaction whereby the creditor provides a loan to the debtor and the two individuals realize returns,

$$r_{\tau_j}(\tilde{\tau}_i) \tag{2.2}$$

on the transaction.

Since creditors are often institutional, I also allow creditors to engage with multiple debtors. Specifically, each creditor may conduct transactions with up to $N \in \mathbb{R}^{++}$ debtors, and let the set of debtors with whom she engages be denoted by $\tilde{k}_{c_j}$. Conversely, denote the set of creditors that debtor i engages with be denoted $\tilde{k}_{d_i}$. Formally, define $\tilde{k}_{\tau_j}$ to be the set of values, i, such that τ_j is partnered with $\tilde{\tau}_i$, subject to the constraint that $|\tilde{k}_{c_j}| \leq N$ for every j. Also, assume this constraint is exactly binding so that $K_d \geq NK_c$ so that the total

profit realized by each citizen becomes,

$$\pi_{c_j} = \sum_{i \in \tilde{k}_{c_j}} r_{c_j}(d_i) t_{c_j d_i} \tag{2.3a}$$

$$\pi_{d_i} = r_{d_i}(c_j) t_{d_i c_j} \tag{2.3b}$$

for creditors and debtors, respectively, where $t_{\tau_j \tilde{\tau}_i} \in \{0, 1\}$ is an indicator variable determining whether a transaction takes place between citizens $\tilde{\tau}_i$ and τ_j.[1] If this assumption does not hold, so that there is either a surplus or deficit of creditors, those players which are excluded from the market will earn a constant payoff of zero; however, it is not unreasonable that they may reenter the market by competing on price, saturating the market exactly. Of course, if a citizen does not participate in any transactions voluntarily, she earns a baseline payoff of zero. In practical terms, the creditors and debtors in the population saturate the market for debt exactly under this assumption, earning payoffs as an increasing function of all of the transactions in which they participate.

Specifically, let the payoff function, r_{τ_j}, take the following form:

$$r_{\tau_j}(\tilde{\tau}_i) = f(\tilde{\tau}_i, \tau_j) - (-\epsilon)^{\top(\tau = d)} p \tag{2.4}$$

where $f(\tilde{\tau}_i, \tau_j)$ is a non-decreasing function of τ_j and $\tilde{\tau}_i$, $\epsilon \in \mathbb{R}^{++}$ is a measure of efficiency, and $p \in \mathbb{R}$ denotes a policy chosen by a politician, and $\top(\tau = d)$ is an indicator variable taking the value, 1, whenever $\tau = d$. The policy takes the form of a lump-sum transfer between the parties in a transaction and may be thought of as rules limiting debt collection, restrictions on interest rates, and other similar rules. Wherever $p > 0$, the policy favors

[1] Note that since both parties must participate for a transaction to occur, we must have $t_{\tau_j \tilde{\tau}_i} = t_{\tilde{\tau}_i \tau_j}$.

debtors, and when $p < 0$, it favors creditors. When $p = 0$, the policy is neutral.[2] [3] Thus, debt transactions yield increasing payoffs with respect to the type of the debtors and creditors participating, but these payoffs may be negated by the imposition of a nonzero policy. Moreover, the first-order value of this policy is zero sum—policies that favor debtors harm creditors and vice versa.

Within this environment, the politician is chosen by a selectorate, $S \subseteq K$, in a competitive election between an incumbent, I, and an opposition candidate, O. In the lead-up to the election, the incumbent first commits to a policy platform, $p_I \in \mathbb{R}$, and then the opposition counters with her own platform, $p_O \in \mathbb{R}$. Members of the selectorate then vote according to simple majority rule on the basis of these platforms to maximize their own utility. Both candidates are assumed to be purely office-motivated and are able to commit to enacting their proposed platforms.[4] [5] Also, whenever voters are indifferent between candidates, they are assumed to vote for the incumbent.[6] Electoral ties are also decided in favor of the incumbent. Define the set of all voters' choices as V, with individual elements, $v_{\tau j} \in \{0, 1\}$ representing votes for the incumbent ($v_{\tau j} = 1$) and for the opposition ($v_{\tau j} = 0$). Also define v_P to be the number of votes for candidate $P \in \{I, O\}$ so that $v_I + v_O = |V| = |S|$, and let $w = \top(v_I \geq v_O)$. As a result of the electoral process, this leaves

$$p = wp_I + (1 - w)p_O \tag{2.5}$$

[2]Consider a version where individualized efficiency of transfer replaces the zero-sum example used here, i.e. where there is a difference between what is taken from one and given to the other, and the difference represents the various costs associated with the policy exemplified by court costs and fees often associated with debt transactions. Make sure to consider the politician's budget constraint. If the politician can extract private rents, he may take a slice of the pie for himself.

[3]Also consider adding a linear term to the policy, i.e. $p = Af(\tilde{\tau}_i, \tau_j) + B$. Note that it is not immediately obvious that this is a valuable extension, since it merely stretches the as-now arbitrary distribution of types, i and j.

[4]In the case of the incumbent, this policy may be viewed as a *status quo* rule that is in place prior to the election.

[5]The results obtained under this structure are identical to those that would result when the policy is chosen directly by a committee of the whole under open amendment procedures.

[6]This assumption is not necessary on a continuum, but is required to obtain a pure strategy equilibrium in certain cases where there is a discrete selectorate.

Finally, define the choice to make a transaction by the parameter, $t_{\tau_j} \in \{0, 1\}$, where $t_{\tau_j} = 1$ denotes the decision to participate and $t_{\tau_j} = 0$ denotes the decision to decline a transaction. Since both parties must volunteer their participation for a transaction to take place, we get

$$t_{\tilde{\tau}_i \tau_j} = t_{\tau_j \tilde{\tau}_i} = t_{\tilde{\tau}_i} t_{\tau_j} \tag{2.6}$$

Denote the set of all such decisions T. Utility is now realized as in equation (2.3), the full profit function for a citizen, τ_j paired with all other available citizens, $\tilde{\tau}_i \; \forall \; i \in k_{\tilde{\tau}}$:

$$\pi_{c_j} = \sum_{i \in \tilde{k}_{c_j}} r_{c_j}(d_i) t_{c_j d_i} \tag{2.7a}$$

$$\pi_{d_i} = r_{d_i}(c_j) t_{d_i c_j} \tag{2.7b}$$

In long form, this is

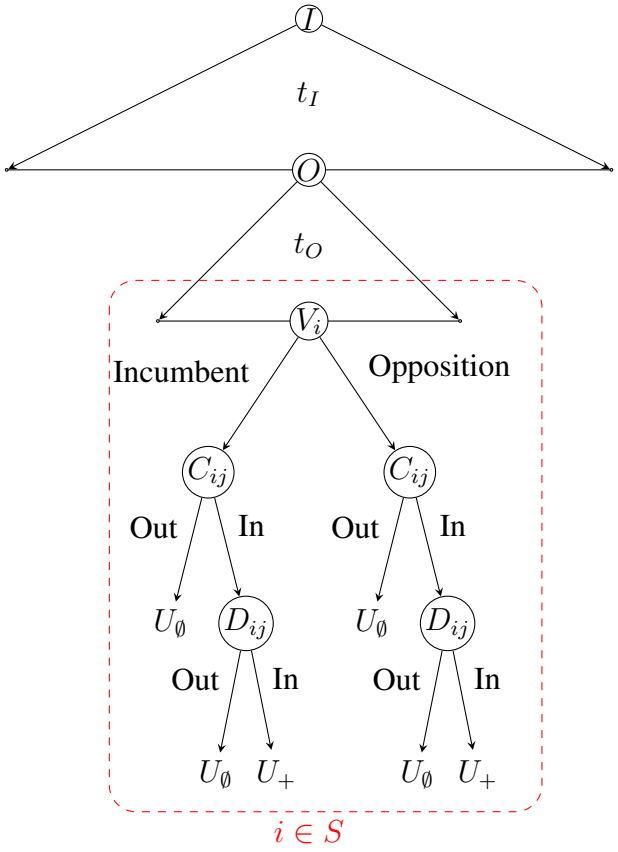
$$\pi_{c_j} = \sum_{i \in \tilde{k}_{c_j}} t_{c_j d_i} \left(f(d_i, c_j) - (w p_I + (1 - w) p_O) \right) \tag{2.8a}$$

$$\pi_{d_i} = t_{d_i c_j} \left(f(c_j, d_i) + \epsilon \left(w p_I + (1 - w) p_O \right) \right) \tag{2.8b}$$

Figure 2.1 demonstrates the game tree describing this environment which, to recap, proceeds as follows:

1. The incumbent offers a platform.
2. The opposition offers a platform.
3. The selectorate votes.
4. Creditors decide whether to offer loans.
5. Debtors decide whether to accept loans if offered.

Figure 2.1: Game tree. Here, the action of the voters, V, is the action preferred by the voters according to a preference aggregation procedure (Simple majority rule in this analysis).



6. Outcomes are realized.

2.4 Equilibrium Behavior

2.4.1 Universal Voting

This section identifies a Subgame Perfect Equilibrium of the game described above under various conditions. First I analyze the simplest case of a selectorate that coincides perfectly with the set of citizens so that $S = K$ and has an equal number of citizens of each type so that $k_c = k_d$ and $N = 1$. Furthermore, I assume that $f(\tilde{\tau}_i, \tau_j) = j$ so that each transaction is uniform with respect to its value to the participating actors. This will serve as a baseline

analysis.

Baseline

Using backward induction, debtors only accept offers of loans whenever they are better-off doing so than they are when they do not participate in any transaction; that is whenever

$$j + p \geq 0 \ \rightarrow \ j \geq -p \tag{2.9}$$

Similarly, creditors only offer loans whenever

$$j - p \geq 0 \ \rightarrow \ j \geq p \tag{2.10}$$

At this stage, consider the preferences of each voter. Voters (indeed, all citizens) earn a payoff of 0 whenever they do not participate in a transaction, regardless of whether they or their potential partner rejected the transaction. Whenever they do engage in a transaction, the debtor, d_i, earns $i + p$, and the creditor, c_j, earns $j - p$. Thus, the debtor is willing to engage in a transaction whenever $i \geq -p$. Similarly, the creditor will agree to a transaction whenever $j \geq p$. As a result, the transaction in question will occur whenever $-i \leq p \leq j$. For simplicity, assume that the most productive citizens of each type are paired with each other so that citizen $\overline{c}$ is paired with $\overline{d}$ and the debtors holding the next $N - 1$ highest indexes, i.[7] Since there is a continuous distribution of citizens of each type, we can reduce each $\tilde{k}_{c_j}$ to a single index, i_j, which describes the pairs. This can also be reversed for the

[7]This pairing allows the pairs to remain unchanged in the event that there is a price shift affecting the value of the transaction to either type of party. This is also supported by pricing changes such as those observed in Mian, Sufi, and Trebbi (2014). (Also, the ϵ is important for pricing argument.)

opposite perspective, j_i.[8] Applying this to the profit functions of the voters, we obtain

$$\pi_{c_j} = \begin{cases} N\left(j - p\right) & : i_j \leq p \leq j \\ 0 & : \text{otherwise} \end{cases} \tag{2.11a}$$

$$\pi_{d_i} = \begin{cases} \left(i + \epsilon p\right) & : -i \leq p \leq j_i \\ 0 & : \text{otherwise} \end{cases} \tag{2.11b}$$

Any voter will support a candidate that offers a policy which induces both her and her economic partner—the other party in the debt transaction—to participate in the market whenever the other candidate offers a policy proposal that does not induce this type of behavior. This implies that given any platform, $p \in (-i, j_i]$, a debtor will support that policy against any alternative, $p^{'} \notin (-i, j_i]$. Furthermore, provided any viable platform, $p^{''} \in (-i, \hat{p})$, that debtor will prefer any alternative platform, $p \in [\hat{p}, j_i]$, so that her most-preferred platform is $p_i^* = j_i$. Mirroring this logic, a creditor will prefer any $p \in [-i_j, j)$ to any $p^{'} \notin [-i_j, j)$ and will prefer any p such that $p \in [-i_j, \hat{p}]$ to any $p^{''} \in (\hat{p}, j)$. That creditor's most-preferred policy is $p_j^* = -i_j$. As there is only one round of voting, there are never incentives to vote strategically, so these preferences are consistent for all members of the selectorate and the electoral outcome, w, is determined by the sincere votes of these actors over the two proposals.

Now consider the choice of the opposition candidate. Since she is office-motivated, her goal is simply to get more than half of the available votes. Again, we begin with an selectorate with a one-to-one pairing between creditors and debtors, all of whom are voters. First consider the case where the incumbent has proposed $p_I < -\underline{d}$ so that the debtor type which least-values the transaction will reject any loan offers. Any creditors matched with those debtors, $i \in (p_I, -\underline{d}]$, will likewise be excluded from the market under such a policy.

[8] The relationship between j and i can be described by the simple ODE, $\frac{di_j}{dj_i} = N(k_{c_{j_i}} - k_{d_{i_j}})$ subject to the initial condition, $(\overline{c}, \overline{d})$.

The opposition candidate may then offer $p_O = 0$. This proposal makes any creditors who would otherwise be engaged in the market worse-off as a result of the reduced benefits due to a biased policy. However, all of the debtors who would otherwise participate in the market are made better off by the opposition's proposal. Moreover, with $p = 0$, all of the creditors and all of the debtors are better-off if they participate in the transaction than they would be if they did not participate. As a result, any debtors that would decline an offer under p_I are better-off if they can instead accept an offer under p_O and so they will prefer the opposition candidate. Similarly, the creditors that would be forced out of the market under p_I prefer to accept the reduced benefits of bias in exchange for the opportunity to participate in the market. This then suggests that all debtors prefer p_O to p_I and a strictly positive mass of creditors also prefers the opposition candidate's platform. Since $k_d = \frac{1}{2}$, this implies that a strict majority will vote for the opposition candidate, giving her the office. As there is no possible higher payoff for the opposition candidate than winning the office, choosing $p_O = 0$ is thus a (generally non-unique) best response to any $p_I < -\underline{d}$. Mirroring the logic applied to this case demonstrates that the same strategy is a best response to any $p_I > \underline{c}$. Indeed, for $p_I \notin [-\underline{d}, \underline{c}]$, any $p_O \in (-\underline{d}, \underline{c})$ is a best response for the opposition.[9]

If the incumbent proposes $p_I \in [-\underline{d}, \underline{c}]$, there are two possibilities for the opposition, $p_O \notin [-\underline{d}, \underline{c}]$ and $p_O \in [-\underline{d}, \underline{c}]$. In the former case, the voters simply reverse their preferences as compared to the case where the incumbent offers a proposal beyond the minimal cutpoints. In such a scenario, the opposition cannot secure a majority and thus loses the election. Suppose instead the opposition candidate chooses a proposal, $p_O \in [-\underline{d}, \underline{c}]$. In this case, every voter participates in a transaction. If p_O is to the left of p_I, the creditors all prefer the opposition proposal. However, the incumbent gains the support of every debtor in this condition so that there is a tie in the final voting outcome and the incumbent wins the election. If the opposition proposes a p_O to the right of p_I, the electoral support is flipped

[9]This range may be larger if the magnitude of p_I is sufficiently large.

between the candidates and again the incumbent wins. Finally, if $p_O = p_I$, the voters are all indifferent between the two candidates and so the incumbent wins the full support of the electorate. Thus, for $p_I \in [-\underline{d}, \underline{c}]$, the opposition can never win the election and any choice of p_O is a best response to the incumbent.

This discussion also illuminated the optimal strategy for the incumbent. If she chooses $p_I \notin [-\underline{d}, \underline{c}]$, the challenger can choose any $p_O \in [-\underline{d}, \underline{c}]$ and the incumbent will lose. On the other hand, if the incumbent chooses $p_I \in [-\underline{d}, \underline{c}]$, then she will always defeat the opposition. Thus, this is a best response for the incumbent. This establishes the last piece of the equilibrium.

Moving down the game tree, the players' equilibrium strategies are as follows. The incumbent offers

$$p_I^* \in [-\underline{d}, \underline{c}] \tag{2.12}$$

The opposition offers

$$p_O^* \in \begin{cases} \mathbb{R} & \text{if } p_I \in [-\underline{d}, \underline{c}] \\ (-\underline{d}, \underline{c}) & \text{otherwise} \end{cases} \tag{2.13}$$

For each τ and j, voter τ_j votes

$$v_{\tau_j}^* = \begin{cases} 0 & \text{if } \tau = c \ \wedge \ p_I \notin [-i_j, j] \ \wedge \ p_O \in (-i_j, j) \\ & \text{or if } \tau = c \ \wedge \ p_I \in (-i_j, j] \ \wedge \ p_O \in [-i_j, p_I) \\ & \text{or if } \tau = d \ \wedge \ p_I \notin [-i, j_i] \ \wedge \ p_O \in (-i, j_i) \\ & \text{or if } \tau = d \ \wedge \ p_I \in [-i, j_i) \ \wedge \ p_O \in (p_O, j_i] \\ 1 & \text{otherwise} \end{cases} \tag{2.14}$$

creditors make the following decisions on offers:

$$t^*_{c_j} = \begin{cases} 0 & \text{if } p > j \\ 1 & \text{otherwise} \end{cases} \tag{2.15}$$

and debtors make the following decisions on whether to accept any offers made by creditors:

$$t^*_{d_i} = \begin{cases} 0 & \text{if } p < -i \\ 1 & \text{otherwise} \end{cases} \tag{2.16}$$

In this equilibrium, the incumbent wins every election with either 50 percent of the selectorate in the case of a moderate opposition candidate and progressively higher percentages for more extreme opposition candidates. Every creditor offers credit under the resulting policy, and finally every debtor accepts the offer that she receives.

Preponderance of debtors

Now consider the case where there is a preponderance of debtors relative to creditors, so that each creditor is assigned to $N > 1$ debtors (reflective of an $N : 1$ ratio). In this case, the equilibrium will shift in favor of debtors generally, but that shift will come at the cost of driving some creditors—and the corresponding debtors—out of the market.

Consider the equilibrium choice of the incumbent in the baseline scenario. If she offers any $p_I \in [-\underline{d}, \underline{c})$, then the opposition can offer $p_O = \underline{c}$ and gain the support of every debtor, which for $N > 1$ represents more than half of the selectorate when every citizen votes. This results in the incumbent losing the race. Moreover, provided there is a sufficiently small mass of creditors at $i = \underline{c}$, even if the incumbent offers $p_I = \underline{c}$, the opposition can offer $p_O = \underline{c} + \varepsilon$ and still win the election. Thus, we must identify a different equilibrium.

The incentives of the individual citizens remain unchanged in this environments, so we

need only consider the behavior of the candidates. Define $\underline{c}_N$ and $\overline{c}_N$ respectively to be the minimum and maximum values of $\hat{j}$ satisfying

$$\int_0^\infty k_{d_i}\mathrm{d}i - N\int_0^{\hat{j}} k_{c_j}\mathrm{d}j = \frac{N}{N+1} - N\int_0^{j} k_{c_j}\mathrm{d}j = \frac{1}{2} \tag{2.17}$$

which can be rewritten as

$$\int_0^{\hat{j}} k_{cj}\mathrm{d}j = \frac{N-1}{2N(N+1)} \tag{2.18}$$

Suppose the incumbent offers $p_I < \underline{c}_N$. The opposition candidate can then offer any $p_O \in (p_I, \underline{c}_N)$ and gain the support of all of the debtors who are not excluded from the market. From the definition of $\underline{c}_N$, this constitutes a strict majority of the selectorate and therefore lets the opposition candidate win. On the other hand, suppose the incumbent offers $p_I > \overline{c}_N$. The opposition can then offer $p_O \in (-\underline{d}, \underline{c})$ and thereby gain the support of every creditor, as well as any debtor excluded from the market under the incumbent's proposal. This earns the opposition the support of a total of $\frac{1}{N+1} + N\int_0^{p_I} k_{c_j}\mathrm{d}j > \frac{1}{2}$ of the selectorate and an electoral victory. The opposition can also offer any $p_O \in [\underline{c}, c^*)$, where c^* is the minimal value which satisfies

$$\int_{c^*}^\infty k_{c_j}\mathrm{d}j + N\int_{c^*}^{p_I} k_{c_j}\mathrm{d}j \leq \frac{1}{2} \tag{2.19}$$

Finally, if the incumbent offers $p_I \in [\underline{c}_N, \overline{c}_N]$, any choice by the opposition will fail to gain the support of more than $\frac{1}{2}$ of the selectorate and the incumbent will win the election.

The equilibrium behavior by the candidates is then described by

$$p_I^* \in [\underline{c}_N, \overline{c}_N] \tag{2.20a}$$

$$p_O^* \in \begin{cases} (-\underline{d}, c^*) & \text{if } p_I > \overline{c}_N \\ (p_I, \underline{c}_N) & \text{if } p_I < \underline{c}_N \\ \mathbb{R} & \text{if } p_I \in [\underline{c}_N, \overline{c}_N] \end{cases} \tag{2.20b}$$

In this equilibrium, as before, the incumbent wins the election with at least 50 percent of the vote.

If the scenario is reversed and $N < 1$ so that creditors outnumber debtors, the equilibrium is simply reversed so that we have

$$p_I^* \in [-\overline{d}_N, -\underline{d}_N] \tag{2.21a}$$

$$p_O^* \in \begin{cases} (-d^*, \underline{c}) & \text{if } p_I < -\overline{d}_N \\ (-\underline{d}_N, p_I) & \text{if } p_I > -\underline{d}_N \\ \mathbb{R} & \text{if } p_I \in [-\overline{d}_N, -\underline{d}_N] \end{cases} \tag{2.21b}$$

using appropriate analogs for the critical debtors.

2.4.2 Nonvoting citizens

So far the analysis has focus on the case where the selectorate is identical to the population so that $S = K$. In many environments, however, this is not the case. For example, while the branch staff of a bank are likely to be residents of the jurisdiction in which they work, many stakeholders interested in the bank's fate will not be. Stockholders and directors will be located in different regions and unable to vote in local elections despite still having clear policy concerns locally. This subsection and the following ones focus on cases where the

selectorate is a strict subset of the population, $S \subset K$. Here we begin with the case where $N = 1$ so that there are equal numbers of creditors and debtors in the citizenry but in which only a proportion, $\gamma_\tau \in [0, 1]$ are eligible to vote for each economic type. The total mass of voters in this condition is $\gamma_d \frac{N}{N+1} + \gamma_c \frac{1}{N+1} < 1$, and the incumbent can therefore win with the support of $\frac{\gamma_d N + \gamma_c}{2N+2}$ citizens who constitute half of the selectorate. This can be done by choosing p_I such that it satisfies

$$\gamma_d N \int_{p_I}^{\infty} k_{c_j} \mathrm{d}j = \frac{\gamma_d N + \gamma_c}{2N + 2} \tag{2.22}$$

Nonvoting Minority

Begin with the case where $\gamma_d = 1$ so that every debtor votes. Further assume that the citizens who are ineligible to vote are distributed randomly throughout the population of a given type, and again let the initial ratio of debtors to creditors be $N : 1$ with $N \geq 1$. The equilibrium policy proposal by the incumbent then reduces to

$$N \int_{p_I}^{\infty} k_{c_j} \mathrm{d}j = \frac{N + \gamma_c}{2N + 2} \tag{2.23}$$

Nonvoting Majority

If, on the other hand, the nonvoting citizens are disproportionately members of the majority economic type, the calculus may change for the candidates. In particular, if a sufficiently large proportion of the debtors are nonvoting citizens, the directional incentives of the candidates may be reversed so that they are incentivized to pander to the creditors who, despite representing a popular minority, nonetheless represent a voting majority. This occurs whenever $\gamma_d < \frac{\gamma_c}{N}$ and incentivizes the incumbent to choose

$$\frac{\gamma_c}{N} \int_{p_I}^{\infty} k_{d_i} \mathrm{d}i = \frac{\gamma_d N + \gamma_c}{2N + 2} \tag{2.24}$$

2.4.3 A Simple Example

Consider a simple case where there are six voters, three creditors and three debtors matched one-to-one with each other. Assume that the citizens are distributed with $j = 1, 2, 3$ for both economic types, so that the relevant cutpoints in policy space are -3, -2, -1, 1, 2, and 3. Assume citizens are matched according to their value type, so that creditor $i = 1$ is matched with debtor $i = 1$. First assume every citizen votes. If the incumbent proposes $p_I \in [-1, 1]$, then every citizen prefers to participate in the economy under that proposal. However, if the opposition offers $p_O \in (p_I, 1]$, then every debtor would prefer and vote for the opposition candidate. On the other hand, every creditor would prefer the incumbent's more-moderate offer and vote accordingly. In this case there is a tie, which is won by the incumbent by assumption. Conversely, if the opposition offers $p_O \in [-1, p_I)$, the debtors prefer the incumbent and the creditors prefer the opposition. There remains a tie, however, and the incumbent still wins. If the opposition chooses to offer $p_O = p_I$, then voters are indifferent between the two proposals and the incumbent receives all votes, again by assumption. Finally, if the opposition offers any $p_O > 1$, then all of the creditors support the incumbent, and at least one debtor supports the incumbent to avoid being forced out of the market when her creditor drop out under the opposition candidate's proposal. This gives the incumbent a strict majority. The logic of the voter behavior here is reversed under a scenario where the opposition offers $p_O < -1$, and again the incumbent wins with a strict majority.

If only the debtors are voting so that $\gamma_d = 1$ and $\gamma_c = 0$, then the situation changes. A moderate proposal by the incumbent, $p_I \in [-1, 1]$ could then be defeated by any $p_O \in (p_I, 2]$, since such an opposition proposal would, at minimum, gain the support of the two higher-value debtors, $i = 2, 3$ without any electoral push-back from the creditors. This would hold even if the opposition proposal was sufficiently extreme to drive the low value debtor and creditor out of the market. Instead, in equilibrium, the incumbent would choose

$p_I = 2$. Any $p_O > 2$ would then gain the support of the highest value debtor who would remain in the market with the high value creditor, but it would cost the support of the middle debtor who would be forced out of the market. The low value creditor, who is forced out of the market under both proposals is indifferent and supports the incumbent by assumption, yielding a majority for the incumbent. If the opposition offers $p_O \in (1, 2] \cup (-\infty, -1]$, she gains no support, since the proposal is weakly worse for both of the higher value debtors and offers no change to the low value creditor. Finally, if the opposition offers $p_O \in (-1, 1]$, then she gains the support of the low value debtor, who has access to the market under that proposal, but by offering lower levels of bias in favor of the debtors, she loses the support of the higher value debtors who already had market access under the incumbent's proposal. Thus, $p_I = 2$ is a winning proposal for the incumbent.

2.5 Housing Market

The housing market readily fits this model. Heads of household have the option of buying a house—almost always taking out a mortgage to do so—or they may forgo that market and rent instead. By choosing the latter, they avoid the high-stakes potential of entering into a conflict with their creditors with their house at stake. On the other hand, their creditors, such as banks, may choose to offer mortgages on easy terms or to restrict access to mortgages, especially for high-risk buyers. If either the head-of-household or the bank chooses to forgo the purchasing transaction, no transaction takes place and both parties lose out on the benefits of that transaction—a personal home and interest, respectively—but they also avoid the potential for an adversarial foreclosure process.

This foreclosure process varies across states in a number of ways and at several stages. However, the most prominent differences between states in the United States lies in the distinction between judicial and non-judicial states. Those states which impose judicial foreclosure laws require all such actions to be supervised by a judge and thereby impose

significant costs on creditors when their debtors fall into arrears. These costs come in many forms, from temporal delays to legal fees to attempted foreclosures being outright rejected. In turn, this gives debtors in those states extra time to live in their homes and potentially avoid foreclosure altogether. Judicial foreclosure also incentivizes lenders to enhance their efforts to find solutions for delinquent debtors that are less-extreme than foreclosure, since the process of moving through the courts adds a new layer of time and costly legal expenses. These alternatives, though, may remain less-than-optimal for creditors in the long term.

Even under nonjudicial processes, other tools are available to legislators to complicate the foreclosure process for delinquent homeowners. They may implement laws giving delinquent mortgagors greater abilities to reinstate their mortgages, or to redeem their homes after a foreclosure sale. Homeowners may be protected from eviction until after the foreclosure process is complete, and even then be protected until separate legal proceedings are completed, or they may also receive specialized protections such as those which exist in many jurisdictions for high-cost mortgages or service members. Indeed, the unpredictability of many of these latter policy options can make them significantly more troublesome from the perspective of creditors.

Hypothesis 1. *Debtor protections, including reinstatement, servicemember protections, and protections for high-cost borrowers are less likely in states that have larger financial sectors. Longer redemption period and notice of sale requirements will be affected similarly.*

On the other hand, areas with strong financial institutions may implement protections that favor mortgagees to counter these policies. They may allow for deficiency judgments to recover the balance of debts on underwater homes, and they may secure limits to the protections available to debtors under bankruptcy. While the breadth of these policies is somewhat limited by the political reality that homeowners are a major constituency, they do provide a partial counter to those policies designed to protect mortgagors.

Hypothesis 2. *Deficiency judgments are much more likely to be permitted where the financial sector is strongest.*

2.5.1 Home Ownership Rates

The primary policy tools that this paper will focus on include seven policies that are commonly perceived to favor mortgagors and one that favors mortgagees during the foreclosure process. The first of these—and the most theoretically straightforward—is the use of judicial foreclosure. As discussed above, judicial foreclosure is a lengthy process with many of the attendant difficulties associated with any legal proceeding. However, it is not obvious how mortgagees are likely to respond to this type of policy. While on the face they may be incentivized to scale back their lending, especially to those most-likely to default, these same mortgagors are the most likely to lack the resources to take full advantage of the judicial process in the face of a large institutional mortgagee. Moreover, despite the extra expense, the nature of the process is, for most lenders, relatively predictable. This allows them to incorporate the extra cost of processing potential foreclosures into the price of the mortgage. This is likely to primarily have the effect of driving down the value of homes which individual mortgagors are able to afford and only drive those nearest the bottom of the distribution out of the market. On the other hand, it may be the very protections that are built-in to the judicial process that make a mortgage viable for those individuals in the first place. This does indeed seem to be supported by Mian, Sufi, and Trebbi (2014), which identifies an increase in demand for home ownership as measured by prices in districts with judicial foreclosure. In light of this, I propose the following hypothesis:

Hypothesis 3. *Home ownership weakly increases in states with judicial foreclosure.*

The second and third protections favoring debtors are two that elongate the foreclosure process. Indeed, these represent a broader generalization of one particular feature of the judicial foreclosure process that make it attractive to mortgagors. Lengthy notice periods

during the foreclosure process, including (a) those that prevent the mortgagee from initiating and completing the foreclosure process and (b) those preventing a quick and quiet sale of the property, prevent creditors from extracting themselves from the relationship quickly and tie up resources and cash that might otherwise be available for outside activities. In moderation, both types of delays can help debtors hold on to their properties for longer periods after a default and potentially identify and alternative to losing the house through mediation or redemption.

Hypothesis 4. *Delays, whether incurred while processing the foreclosure or in the lead-up to sale, provide a weak benefit to the mortgagor, increasing home ownership initially, but extensive delays lead to a drop-off in that same ownership.*

This leads directly into the fourth policy choice, reinstatement. States may choose to allow reinstatement during the foreclosure process and in the lead-up to any sale under which a mortgagor that is able to pay off their immediate debt is entitled to halt the foreclosure. While this is ostensibly the action preferred by the mortgagee, it generally does not provide full relief for the costs in time and money incurred by the lender during the foreclosure process. It also introduces uncertainty that comes with less-reliable borrowers who may or may not honor their commitments on a consistent basis. To mitigate this last challenge, some states to moderate the reinstatement process somewhat by restricting the length of time during which it available and the number of times it may be used by a mortgagor. Moreover, while only a subset of mortgagors will default on their loans, it is a still-smaller subset that will both default and have the resources to reinstate after a foreclosure is initiated, so that while the potential costs are imposed on lenders, very few borrowers are likely to be willing to pay extra for the benefit as they were in the case of judicial proceedings, so the lender is unlikely to be able to find room for associated price increases and will instead have a stronger incentive to reduce the number of transactions and cut potential home buyers out of the market.

Hypothesis 5. *Reinstatement reduces the rate of home ownership.*

Taking this a step further, some states provide a statutory right of redemption after the sale which permits debtors to redeem their property if they pay off the value of their mortgage after foreclosure. These rules, despite being promoted as a tool to ensure fair bids are made at sale, have a two-pronged effect on the mortgagees welfare. First, if the bid is too low, the mortgagee will not be able to secure the full value of the loan while the mortgagor is able to use the device to maintain the property without paying the initially-agreed amount, a scenario that is especially likely when homeowners are underwater. Second, the threat of redemption may have an adverse effect on bidding itself, as potential buyers consider the likelihood that they will never be able to take possession of the foreclosed property.

Hypothesis 6. *Statutory redemption has a chilling effect on home ownership.*

Finally, the last two types of pro-debtor policies analyzed here focus on special protections that some states provide for servicemen and women and for those mortgagors that take out high-cost loans. Both of these policies target particular populations that are least-likely to be able to keep up with their mortgage payments. In the former case, the policy is likely to have a relatively narrow reach, as such protections are typically limited to active-duty soldiers serving in combat or overseas. On the other hand, those protections aimed at high-cost mortgages are likely to affect the relatively large pool of potential home buyers that have marginal incomes to support such mortgages. Besides representing a relatively large class of potential buyers, these buyers are also the most sensitive to prices among the universe of households, as they may be willing to stretch pennies for a house at one price, but quickly revert to the rental market at a slightly higher price. At the same time, the instability of their financial condition makes potential mortgagees particularly wary of transactions with those individuals. Indeed, as the protections afforded to high-cost borrowers specifically kick in as prices increase, these protections are likely to be the most damaging to a creditor's willingness to complete a transaction.

Hypothesis 7. *Protections for servicemembers have a small, negative effect on home ownership. Protections for high-cost borrowers, on the other hand have a large deleterious effect.*

Lastly, I consider the effect of one type of policy which states may implement favoring the mortgagee. Where they are available, deficiency judgments allow creditors to recoup from borrowers all or part of the difference between the sale price of the foreclosed property and the outstanding debt. This not only allows the mortgagee to maintain a fallback against any declines in property values, but it also incentivizes the mortgagor to seek a solution short of foreclosure, as the latter will fail to eliminate the debt.

Hypothesis 8. *Deficiency judgments expand the willingness of financiers to lend and correspondingly increase home ownership.*

2.6 Empirical Support

I derive data on foreclosure laws across the states from summaries provided from a number of sources, including *Nolo*, *Foreclosurelaw.org*, and *RealtyTrac.com*, as well as readings of individual laws themselves. Binary indicators code for the presence of a judicial foreclosure regime, reinstatement allowances, access to deficiency judgments, and of protections for members of the armed services and high-cost borrowers. Continuous values measure the length of time required for processing and publishing notice of sale, as well as the period during which redemption is allowed after sale. In the case of the processing period, I use the typical processing time as reported by *Foreclosurelaw.com* rather than the minimum legal processing time allowable under the law. While this measure loses the clarity of precise legal values in the data, it more accurately reflects the challenges presented to lenders in recovering delinquent accounts, and correspondingly the procedural protections available to borrowers.

Table 2.1: Summary Statistics For State Data

Statistic	Mean	St. Dev.	Min	Max
Home Ownership	68.630	5.961	41.530	81.330
Judicial	0.471	0.490	0.000	1.000
Processing Period	136.020	83.267	27	445
Sale Notice	24.196	26.359	0	120
Redemption Period	86.176	156.323	0	730
Reinstatement	0.588	0.493	0	1
High Cost	0.314	0.464	0	1
Servicemember	0.745	0.436	0	1
Deficiency	0.765	0.425	0	1
N Protections	2.686	1.181	0	5
Construction	6.950	1.361	2.480	12.160
Finance	6.482	1.298	3.720	11.290

Across all states, home ownership rates are roughly 68% throughout the period analyzed, extending from 2005 through 2014 for the state-level analysis. Notably, this includes the recent foreclosure crisis and subsequent adjustments in lending behavior imposed by the financial industry as housing prices collapsed and many borrowers faced increasing doubts about their financial stability. Roughly half of the states have judicial foreclosure requirements statewide, while a clear majority, roughly 75% offer protections for servicemembers and deficiency judgments. Fewer than $\frac{1}{3}$ of the states offer protections for high-cost borrowers, while reinstatement must be an option in a majority. The average notice of sale required, reported in days, is just under one month, however many states have requirements of 28 days or one month exactly. The typical redemption period that is required is approximately three months, although two years is permitted in Tennessee, lending significant risk to any earlier purchase. Typically, the entire processing period comes in at slightly over four months. As an extra measure, I have also recorded how many of the clear mortgagor-protections are present in each state—the number of statutory protections. I count any of the following toward this measure of the number of protections: a statutory requirement to allow reinstatement, protections for high-cost mortgages, protections for

servicemembers, a notice-of-sale requirement, or a required redemption period. Ido not include statutory processing periods, since these may be conflated with other processing requirements. Also, I do not include judicial foreclosure since it is not unambiguously beneficial to mortgagors.

In this section, I analyze the link between these policies and both home ownership characteristics, including both the home ownership rate and the price-to-rent ration for home owners across the United States and the relative size of major industries in terms of employment, including the financial industry, the manufacturing industry, and the construction industry. I obtain industry characteristics from the United States Census and pricing information from Zillow.

Remaining variables on demographics and population characteristics forming a standard battery of control variables on race, income, and housing stock are derived from the United States Census and American Communities Survey (ACS) between the years 2005 and 2014, inclusive, for state-level analyses. As the ACS does not provide full data on ZIP codes in non-census years, the full analysis of ZIP codes is only available for the year, 2010. However, Analyses for remaining years is included without the full battery of demographic controls. In all analyses, I use linear models to analyze all continuous variables and logistic models for binary dependent variables.

2.6.1 State Home-Ownership

The first analysis I conduct is a baseline model at the state level, focusing on demographic characteristics at the state level. I consider two demographics in particular as my independent variable: the proportion of the population employed in finance and the proportion of the population employed in construction. Each of these industries are closely tied to home ownership, as construction crews' employment depends heavily on new construction and the financial industry likewise depends on healthy debt activity, particularly in the form of

Table 2.2: State Level Demographic Effects on Policy

	Judicial	Log Process Period	Log Sale Notice
	logistic	*OLS*	*OLS*
Construction	-0.471^{***}	-0.169^{***}	0.299^{***}
	(0.128)	(0.028)	(0.080)
Finance	0.352^{***}	0.099^{***}	-0.102
	(0.119)	(0.025)	(0.072)
Adjusted R^2		0.238	0.189
Akaike Inf. Crit.	578.496		

	Log Redemption	Reinstatement	High Cost
	OLS	*logistic*	*logistic*
Construction	-0.528^{***}	-0.421^{***}	-0.596^{***}
	(0.112)	(0.135)	(0.158)
Finance	-0.215^{**}	-0.791^{***}	-0.604^{***}
	(0.100)	(0.140)	(0.170)
Adjusted R^2	0.245		
Akaike Inf. Crit.		589.263	445.871

	Servicemember	Deficiency	N Protections
	logistic	*logistic*	*OLS*
Construction	-0.161	-0.386^{***}	-0.227^{***}
	(0.163)	(0.143)	(0.053)
Finance	-0.765^{***}	-0.109	-0.273^{***}
	(0.142)	(0.132)	(0.047)
Adjusted R^2			0.249
Akaike Inf. Crit.	454.398	485.729	
Controls	Y	Y	Y
Observations	510	510	510
Note:			*p<0.1; **p<0.05; ***p<0.01

mortgages as made clear during the housing crisis in the mid 2000s.

As the policy variables, I use those described above, including the presence of a judicial foreclosure regime, reinstatement allowances, access to deficiency judgments, and of protections for members of the armed services and high-cost borrowers. Continuous values measure the length of time required for processing and publishing notice of sale, as well as the period during which redemption is allowed after sale. Both the demographic and policy variables affect home ownership outcomes—in the first case through wealth and similar attributes affecting the ability to purchase a home and in the second through the resulting restrictions on mortgage lending that may discourage marginal buyers from entering the market. This forms the basis of the first mediation analysis.

Basic linear and logistic regressions, as appropriate to each policy variable, generate strong relationships between both the construction and Financial industries across all policy areas measured with the exception of the construction industry on the likelihood of service member protections and the financial industry on the likelihood of deficiency judgments. In the former case, finance remains a significant predictor of service member protections in the correct direction—negative—and in the latter, a robust construction industry reduces the likelihood of deficiency judgment is significantly reduced.

The likelihood of reinstatement and high-cost borrowing protections both decrease as employment in either industry grows, while the redemption period and total number of borrower protections are similarly decreased with such an increase in employment within these two industries that both rely on a strong housing market. In the case of financial employment, the effect is notably larger in magnitude for reinstatement, high-cost, and the total number of protections.

For the remaining three policies, judicial foreclosure, notice of sale, and total processing period, the two industries have opposing significant effects, with finance increasing the likelihood of judicial foreclosure and stretching out the processing period while reduc-

ing requirements for notice of sale. On the other hand, the construction industry reduces the likelihood of judicial foreclosure, reduces the processing period, and increases notice requirements for any sale.

These results largely conform to the predictions presented in the preceding section (Hypotheses 1 and 2), as those policies which clearly favor the debtor—longer redemption periods, reinstatement, high-cost protections, service member protections, and the total number of debtor protections—are all less likely or smaller in states with greater financial sectors. On the other hand, the one measure that clearly protects creditors—deficiency judgments—are more likely to appear in states with large financial sectors.

Transitioning to the effects of policies on home ownership in the states likewise yields results that are largely consistent with the hypotheses presented above. Without accounting for the total number of debtor protections, servicemember protections, reinstatement and redemption periods increase home ownership, with all significant when including quadratic terms for continuous variables. In the absence of these quadratic terms, the redemption period remains positive, but loses significance, which is consistent (albeit not necessary) with a nonlinear relationship. This counters the prediction of Hypothesis 6, though I address the nonlinear term further below. The positive effect of servicemember protections also counters Hypothesis 7, and The coefficient on reinstatement counters Hypothesis 5, although these effects become correctly negative once accounting for the total number of protections as discussed below.

Notice of sale and high cost protections—in line with Hypothesis 7—meanwhile have a deleterious effect on home ownership, although again, notice of sale in not significant across all models, losing significance when quadratic terms are included. The processing period remains significant, but inconsistent in these models. Deficiency judgment, meanwhile is highly significant and positive for home ownership, offering a two to three percent increase in home ownership rates as the lenders are provided with an explicit tool to recover

Table 2.3: State Level Policy Effects on Home Ownership

	Home Ownership			
Judicial	0.819	0.940	2.584***	1.173*
	(0.577)	(0.614)	(0.594)	(0.660)
Log Process Period	−2.339***	15.438***	−2.597***	13.394***
	(0.421)	(4.229)	(0.400)	(4.438)
Log Sale Notice	−0.362***	−0.039	−2.260***	−2.518
	(0.118)	(0.597)	(0.274)	(1.968)
Log Redemption	0.044	2.356***	−1.508***	0.319
	(0.075)	(0.387)	(0.217)	(1.620)
Reinstatement	1.459***	1.631***	−5.730***	−2.979
	(0.379)	(0.365)	(1.014)	(3.495)
High Cost	−1.135**	−0.865*	−9.119***	−5.657
	(0.451)	(0.451)	(1.136)	(3.626)
Servicemember	0.840**	0.934**	−7.181***	−3.695
	(0.412)	(0.412)	(1.127)	(3.553)
Deficiency	2.485***	2.231***	1.949***	2.111***
	(0.426)	(0.416)	(0.409)	(0.424)
N Protections			7.558***	4.142
			(0.997)	(3.511)
Processing Period Squared		−1.924***		0.228
		(0.444)		(0.289)
Sale Notice Squared		−0.108		−0.208
		(0.146)		(0.177)
Redemption Period Squared		−0.416***		0.088
		(0.067)		(0.098)
N Protections Squared				−1.715***
				(0.465)
Controls	Y	Y	Y	Y
Observations	510	510	510	510
Adjusted R^2	0.689	0.733	0.721	0.733

Note: *p<0.1; **p<0.05; ***p<0.01

losses beyond the value of the collateral under the mortgage. This is by far the largest and most robust effect of those measured and falls squarely in line with the incentives of the creditors to minimize risky lending as per Hypothesis 8. Judicial foreclosure is positive but insignificant.

Beyond the straightforward linear analysis, I also explore higher-order relations between policies and home ownership rates in the states. Specifically, I explore the quadratic relationship between continuous policies such as the redemption period and notice of sale requirements, as well as the total number of debtor protections, and home ownership. In line with the theory, the relationship between these variables should be non-monotonic, as initial gains by debtors in the form of greater protections give way to eventual decisions by lenders to scale back in markets that offer too many protections to debtors. All three of the continuous protections, processing period, redemption period, and notice of sale, exhibit a negative quadratic relationship in line with the theory above predicting moderate debtor protections offer maximal market participation (Hypothesis 4). The first two of these protections are highly significant.

Accounting for the total number of debtor protections, each of the debtor protections generates a large, significant and negative effect; however this is washed out when adding a quadratic term for the total number of protections, which leaves only the processing period significant among debtor protections. While not providing meaningful support for the hypotheses above, these coefficient do not provide strong evidence against the hypotheses either. In both models with the number of protections accounted, deficiency judgment remains a strong positive predictor of home ownership rates. Also losing significance and dramatically falling in magnitude, the continuous policies do not, on their own, exhibit a significant effect when accounting for the squared number of protections. This suggests that the varied protections may in fact be substitutes to some degree, with the presence of one offsetting the lack of another. Moreover, the significant negative coeffi-

cient on the quadratic term for the number of predictions also suggests a moderate number of policies will maximize ownership. Taking the first order condition with respect to the number of protections, the empirical model predicts home ownership to be maximized at (N Protections) $= \frac{4.142}{1.715} \approx 2.4$. That is; below roughly 2.4 protections, each additional protection makes home ownership more attractive and accessible to buyer, while above 2.4 unique protections, that trend is reversed.

In this model, judicial foreclosure becomes significant as well, yielding a slight increase in home ownership rates, which may be a result of the confidence-building effect of the judicial process. While judicial foreclosures are more time consuming and costly to lenders on the front end, they also offer greater procedural oversight and reduce the likelihood of even more costly legal action that might arise after a contested nonjudicial foreclosure. In this way, judicial foreclosure can build confidence and reduce risk for both parties in the debt transaction, yielding more transactions and higher ownership rates consistent with Hypothesis 3.

Value to Income Ratios

Lending further support to the argument that price shocks absorb much of the effect of the various policies, especially with respect to debtor protections, a second analysis reveals the pattern of shifts in home value to income ratios as a result of those policies. Judicial foreclosure requirements cause a significant decrease in the proportion of houses with a high value-to-income ration, as does reinstatement and, to a lesser extent, extended redemption periods and deficiency judgments. On the other hand, extended notice of sale and processing times have a strong positive effect on the value-to-income ratio, while service member protections have a somewhat smaller effect in the same direction.

The effects of notice of sale and redemption periods are likely relics of the interests of buyers who bid higher in more competitive auctions and who likewise bid higher when

Table 2.4

Concentration of Value:Income Ratio		
	< 2	> 4
Judicial	0.295**	-0.281**
	(0.100)	(0.103)
Reinstatement	0.247***	-0.296***
	(0.070)	(0.072)
High-Cost	-0.043	0.015
	(0.087)	(0.090)
Servicemember	-0.239**	0.123
	(0.079)	(0.082)
Deficiency	0.226**	-0.167
	(0.083)	(0.086)
Processing Period	-0.236***	0.345***
	(0.043)	(0.045)
Sale Notice	-0.208***	0.283***
	(0.038)	(0.039)
Redemption Period	0.066	-0.080*
	(0.035)	(0.036)
Controls	Y	Y
Adj. R^2	0.566	0.536
N	510	510

their investment is most secure. Deficiency judgments here show a deleterious effect on home values, reducing the proportion of people in homes that significantly outpace their income in part due to the possibility that they may be held liable for outstanding balances in the event of a default, while high-cost protections and protections for service members marginally increase the concentration of mortgagors living in homes values well above their income as the protections make home-buying less risky for those particular borrowers. These results are displayed in Table 2.4.

2.6.2 ZIP Code Level Home-Ownership

In a second econometric model, I conduct a similar analysis focusing on ZIP code level data for metropolitan areas that cross state lines. These 27 metropolitan areas form 60 state-metro pairings across 31 unique states. While subject to greater concern regarding Tiebout sorting than the state data, this allows me to focus on higher resolution data and eliminates unobserved variation that occurs within states between rural and urban environments.

These results are largely consistent in direction with the results from the state level analysis of policy. However, the demographic effects on policies fall dramatically across the board. Moreover, the effects of finance on on redemption periods, reinstatement, and high-cost protection, as well as the total number of protections all flip signs and maintain significance—even with substantively smaller magnitudes—indicating a correlation between a large financial industry and greater debtor protections in these areas. The sign is also flipped on the construction coefficient for redemption periods but is insignificant. Moreover, the effects on the first three measures of protection are not surprisingly correlated with the effects on the total number of protections in the last measure.

These deviations from the state analysis, particularly the latter ones regarding the financial industry, leave open the suggestion that there is indeed a measure of sorting occurring within the metro areas as professional industries, especially the financial industry, congre-

Table 2.5: ZIP Level Demographic Effects on Policy

	Judicial	Log Process Period	Log Sale Notice
	logistic	*OLS*	*OLS*
Construction	-0.102^{***}	-0.038^{***}	0.061^{***}
	(0.016)	(0.005)	(0.011)
Finance	0.053^{***}	0.049^{***}	-0.097^{***}
	(0.014)	(0.004)	(0.009)
Adjusted R^2		0.209	0.120
Akaike Inf. Crit.	3,628.534		

	Log Redemption	Reinstatement	High Cost
	OLS	*logistic*	*logistic*
Construction	0.018	-0.144^{***}	-0.125^{***}
	(0.015)	(0.018)	(0.016)
Finance	0.126^{***}	0.059^{***}	0.098^{***}
	(0.012)	(0.015)	(0.014)
Adjusted R^2	0.181		
Akaike Inf. Crit.		3,007.705	3,928.410

	Servicemember	Deficiency	N Protections
	logistic	*logistic*	*OLS*
Construction	-0.162^{***}	-0.005	-0.040^{***}
	(0.023)	(0.022)	(0.006)
Finance	-0.008	-0.051^{***}	0.026^{***}
	(0.020)	(0.017)	(0.005)
Adjusted R^2			0.140
Akaike Inf. Crit.	1,758.989	2,187.731	
Controls	Y	Y	Y
Observations	3,330	3,330	3,330

Note: *p<0.1; **p<0.05; ***p<0.01

gate in urban areas. This opens the likely possibility that there is a nontrivial rural-urban divide in which non-urban voters compete with—and in this area often win against—their urban counterparts where the financial industry is too concentrated in a single area. This matches an intuitive view of rural-urban politics exemplified in such cases as the well publicized conflicts that regularly arise between New York City and New York State, where a large urban population competes with a rural counterpart. The effects are even less surprising when considering that as the financial industry becomes increasingly concentrated in a few districts, it is less likely to prevail in other districts in a republican form of government, so that a large financial sector in one urban center might ultimately be less-supported in its legislature than a more dispersed financial sector.

As with the first-stage effects, many of the policy coefficients on home ownership in the ZIP code level analysis have signs that are flipped relative to the state-level analysis. In line with the same sorting arguments above, the driving force behind these results is enigmatic, but unsurprising, since those same forces driving the counterintuitive results on policy outcomes are likely to drive equally counterintuitive results in ownership outcomes. That is; the net effects on ownership are likely to translate through policy (and directly) from demographic sorting. Also of note, while losing significance, the quadratic term on the number of protections remains negative in this analysis, as do both quadratics on the processing period and the highly significant coefficient on notice of sale.

Table 2.6: ZIP Level Policy Effects on Home Ownership

	Home Ownership			
Judicial	-1.356^{**}	-2.410^{***}	-2.013^{***}	-3.344^{***}
	(0.600)	(0.762)	(0.627)	(0.781)
Log Process Period	1.863^{***}	6.575	1.338^{***}	6.876
	(0.386)	(4.935)	(0.413)	(5.011)
Log Sale Notice	0.136	-1.813^{*}	0.650^{***}	3.767^{***}
	(0.159)	(0.949)	(0.215)	(1.426)
Log Redemption	0.206^{***}	-0.395	0.825^{***}	5.014^{***}
	(0.078)	(0.391)	(0.191)	(1.121)
Reinstatement	-0.658	-0.255	2.914^{***}	10.327^{***}
	(0.511)	(0.552)	(1.129)	(2.108)
High Cost	0.778^{**}	0.843^{*}	3.979^{***}	11.502^{***}
	(0.382)	(0.441)	(0.979)	(2.107)
Servicemember	-0.259	-0.334	2.831^{***}	9.955^{***}
	(0.541)	(0.544)	(1.024)	(2.053)
Deficiency	-2.132^{***}	-2.005^{***}	-2.189^{***}	-1.569^{**}
	(0.605)	(0.646)	(0.604)	(0.654)
N Protections			-3.099^{***}	-11.433^{***}
			(0.873)	(2.293)
Processing Period Squared		-0.551		-0.330
		(0.501)		(0.255)
Sale Notice Squared		0.413^{*}		-0.503^{***}
		(0.212)		(0.138)
Redemption Period Squared		0.113^{*}		0.157
		(0.068)		(0.184)
N Protections Squared				-0.594
				(0.513)
Controls	Y	Y	Y	Y
Observations	3,330	3,330	3,330	3,330
Adjusted R^2	0.809	0.809	0.809	0.810

Note: *p<0.1; **p<0.05; ***p<0.01

2.7 Conclusion

This paper has developed a new model to describe how voters interact with policy-makers when there are outside options for the voters which may shield them from the effects of a given policy. This model has shown that where individuals have the opportunity to cease participating in activities subject to a given policy, they can leverage that option in two ways. First, they can shield themselves from harm under the policy if a harsh policy is implemented. Second, they can in many cases impose a burden on others with their departure. I tested this model empirically by exploiting the variation in housing foreclosure policies across the United States, which allowed me to identify particular policies that mediated the preferences of particular demographics—especially the financial industry—with respect to their decision to enter the market. In particular, I identified the non-monotonic role of the total number of debtor protections in first drawing more individuals into home ownership but ultimately reducing the number of home owners if they became too numerous. While small in magnitude, changing home ownership rates by only a few percentage points, this is consistent with the primary result of the model which predicts moderate policies even if there is a large majority of potential debtors relative to the number of creditors and moreover predicts that market participation will peak with such moderate policies as both creditors and debtors will find that participation to be profitable. Indeed, with home ownership around 68% on average compared to a maximum of 11% of the workforce in the financial industry—and large overlap—this policy moderation is striking, especially in light of the effects of the housing crisis beginning in 2006 and 2007, during which time there was widespread popular support more pro-debtor action that nonetheless failed to materialize into hard policy change.

Also, while this model has been applied to the United States mortgage market and foreclosure policies here, it remains sufficiently flexible to be applied to a wide range of similar policies. In particular, the model is relevant to any transactional policy area in

which selection into the market affected by the policy is voluntary and where the payoff to one party depends on the participation of another party. Such flexibility leaves room for numerous extensions analysis market participation in a wide range of contexts, but especially with respect to interstate or international trade policy in which local jurisdictions are able to set policy unilaterally according to the demands of their local constituencies but may nonetheless suffer if outside parties choose not to participate in local markets as a result of those policies.

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Chapter 3

Preempting Preemption in Federal Systems

Abstract

This paper develops a formal model of rule making in federal systems where uniform rules are desirable, but resisted by ideologically diverse states. While individual states initially set their own rules, they do so under the threat of preemption by a national legislature that is able to impose a uniform standard nationwide whenever variation across states becomes too large. As this is costly to extreme states from an ideological perspective, those states can unilaterally decide to partially moderate their own rules relative to the rest of the federation in an effort to disincentivize such a legislative act and thereby preempt the preemption. I analyze these rule making outcomes in both a single-shot format and repeated play where the legislature acts probabilistically, with individual and social welfare implications for both.

3.1 Introduction

On May 8, 2014, Governor Peter Shumlin of Vermont signed into law legislation strictly governing the labeling of products derived from genetically modified organisms (GMOs). This marked one of the first successful efforts to specifically target the use of such products in the United States despite many attempts by activists nationwide, and as such, supporters hoped that the legislation would not only serve the interests of activists in Vermont, but also provide a basis for model legislation nationwide or—even better—initiate a move by Congress to adopt similarly strict standards at the federal level.

Specifically, the legislation was expected to have two effects. First, it was expected to serve as model legislation that could serve the interests of activists across the country, especially in liberal states, and help usher in a general movement in favor of strictly labeling GMOs. Second, it was expected to impose such significant externalities on surrounding states that those states would ask Congress to intervene by preempting state regulations on the matter and that these regulations would favor the preferences of Vermont. Scott Faber, Vice President for Government Affairs at the anti-GMO Environmental Working Group explained the strategy, "They are using July 1 to try to force congressional action," (Doering, June 16, 2016).

This paper will focus on both of these anticipated effects, but primarily on the latter, generating a formal model to motivate the decision by Vermont to adopt an extreme policy which was likely to both move state policy in a favorable direction, but which was even more likely to catalyze federal action to preempt the newly-formed state policy. I begin with a short discussion of the existing literature in federal lawmaking and preemption of state laws, followed by a short discussion of the legislative history of Vermont Act 120 and the subsequent National Bioengineered Food Disclosure Standard passed by the United States Congress. I then proceed to develop a simple model of lawmaking in a federal system where local jurisdictions may have their policies preempted by a democratically-

driven central government.

3.2 Background and Literature

The nature of federal preemption of state law has been a subject of concern from the foundation of the United States. The Constitution itself entertains these concerns throughout the document, but most explicitly in the Supremacy Clause and the Tenth Amendment, where it both defines the areas where the national government is unable to assert its authority and specifies that where it does assert its authority that it is the supreme authority. Despite this clarity, the growth of the federal government over the course of the 20th century has driven a massive buildup of competing laws that have reinvigorated the debate over preemption in many policy areas, but particularly with respect to the economy.

The major turning point in the modern debate over federal policy-making came in the Supreme Court's decisions in *West Coast Hotel Co. v. Parrish* (1937) and *Wickard v. Filburn* (1942), which first established a concurrent state right to regulate commerce and then established a broad reach of federal authority under the Commerce Clause to provide a vehicle for a massive new regulatory state governed by both state and national authorities. Within these new structures, policy areas that had previously been perceived as specifically under the purview of either the states or the national government suddenly fell under the potential authority of both regimes, forcing legislators, particularly at the national level to consider not only the implications of particularly policy choices, but also of having any policy at all.

Several models have analyzed the normative implications of federal intervention in economic matters, primarily from a normative perspective. Oates (1972), as well as Oates (1991) and Dixit and Londregan (1998), provide the seminal bases for this line of analysis. These analyses study the individual and social welfare obtained in different regimes of policy making, focusing on the fiscal effects of federalism and the ability of different gov-

erning bodies to efficiently redistribute wealth. Still more models explore policy areas such as environmental and economic policies that impose interstate externalities due to negative side effects—as in the case of environmental regulation—or due simply to coordination failures—as in the case of many economic policies. Some of the economic models that address these policies from a federalism perspective include Besley and Coate (2003); Case and Hines (1993), and focusing on federal mandates, Cremer and Palfrey (2000).

The latter of these provides a particularly valuable assessment of policymaking in a federal system as it begins to consider the potential for the national government to actively choose the limits that it places on the choices of states. In this environment, the central government does not decide directly whether to preempt state law, but instead must choose how much to preempt the states, placing a bound on the level of variation and the level of externalities that can be imposed by individual states. With a broad or weak mandate, the states are given wide latitude to enact whatever policies they prefer, while with a narrow or strong mandate, the national government largely defines the policies that must be adopted by the states. Loeper (2011) and Loeper (2013) offer two particularly good assessments of these types of policies and demonstrates that where mandates are possible, there is always a mandate that is majority-preferred to decentralization when central policymakers can choose both the position and the breadth of the mandate. Sometimes, however, this level of flexibility is not available to policymakers. When establishing procedural rules or coordinating economic standards, the costs may come from the simple existence of variation rather than the extent of the variation—as with the case of railroad gauge measurements in 19th Century America or even 20th Century Europe. On other occasions, two policies that were developed independently may come into conflict as a result of new technologies, forcing one standard to be adopted without recourse to a more general mandate.

This paper will address these latter scenarios, where a broad mandate is either not possible or not desirable, but the central government—supported by the representatives of a

majority of states—may nonetheless wish to adopt a single uniform policy which preempts state policies. How do states react to such a threat? Is the central government ultimately able to get its way? I focus on how states with more extreme policy preferences that are likely to get rolled in majoritarian voting at the national level may choose to moderate their state policies relative to their true preferences in order to placate states with somewhat less extreme preferences that might otherwise vote to support a centralized policy, in effect implementing a self-enforcing mandate that leaves policy choices in the hands of the states while nonetheless reducing variation across the nation. Several authors have examined this effect in an assortment of scenarios ranging from constitutional interpretation (Williams, 2005) to economic policy (Ribstein and Kobayashi, 1996; Qian and Weingast, 1997) to legal procedure (Subrin, 1989; O'Connor, 1981; Cooter, 2000), but each of these analyses has largely taken the choice of venue as fixed, that is to say, the venue at which the policy choices were made was fixed *a priori*. Where the central government has authority to act, these projects largely revolve around how states with diverging preferences are able to circumvent that authority, while those projects focusing on cases where the central government does not have authority to act have focused primarily on external forces, drawn from the externalities imposed by coordination failures, drive local policies to converge completely or in part.

In this analysis, I consider an environment where the ultimate choice of venue is endogenous to the chosen policies, limited only by the assumption, consistent with the United States Constitution, that when the central government does act to implement a nationwide policy, the resulting law supersedes all local policies. Several particular areas of the law have stood out as subject to this type of preemption or the threat of it. Many of these policy areas in particular fall under the general penumbra of torts within the United States.

In one example, laws governing product labeling and resulting liability standards have been subjected to a mix of local and central laws, depending on the specific nature of

the product in question. In a specific example, two United States Supreme Court cases, *Wyeth v. Levine* (2009) and *PLIVA v. Mensing* (2011), affirmed different outcomes in cases concerning warning labels attached to medical prescriptions. In these cases, a name-brand product was found liable for side effects under a state statute, while a generic product was protected from state statutes governing such liability on the basis of a narrow preemption provided for under federal law that blocked the application of such policies at the state level as a means of facilitating the production of generic products and enhancing competition.

This issue has also arisen dramatically in the area of intellectual property (Nelson, 2000; Rice, 1991). While states have traditionally been given wide latitude to offer protections to holders of trade secrets, the federal government has established a separate regime of patent law that is enshrined not only in judicial precedent, but in the United States Constitution and in the United States Code under Title 35. These two separate regimes came into conflict with each other when the states, using the latitude afforded to them on trade secrets, began using those protections to ensure firms and individuals the exclusive rights to goods for periods well beyond those established by federal legislation for patents. As these protections became increasingly large, firms and individuals alike, concerned that these actions would threaten the goals of patent legislation, encouraged the federal government to assert that those uses of trade secret litigation ran counter to the goals of patent protections and were thus preempted by that legislation at the federal level.

Likewise, the federal government has seen fit to preempt state-level causes of action in many financial arenas (Painter, 1998). The 1995 Securities Litigation Reform Act in particular reversed existing legislation to explicitly block most state causes of action where the previous legal regime had explicitly permitted such causes. The reasoning attributed to this switch largely revolved around a perceived deviation from the position of the young Republican majority in Congress by several states toward legal regimes that favored plaintiffs in financial cases, especially class action suits. Indeed, this legislation was striking at the

time as it came during a period where the lion's share of effort was directed at reigning In the powers asserted by the federal government, culminating in the passage of the Federalism Act of 1999. Nonetheless, the importance of securities law and the interstate nature of the parties affected by the law motivated the legislators to act to block the forum shopping that was perceived to be threatening firms engaged in nationwide activity.

Finally, there is one area that has been the subject of preemption by the national government but which falls outside the broad reaches of economic regulation, namely that of immigration law (Cortez, 2008). While immigration law has always been determined primarily by the national government, there have been several instances in which local and state authorities have attempted to clarify certain policies towards migrants, with mixed success. Controversial practices in multiple states have led to very different outcomes based on how those practices are viewed by the national majority. Efforts by the state of Arizona, and particular cities and counties in the state have been the subject of concerted efforts by the federal government to preempt state actions aimed at enforcing immigration law. On the other hand, many municipalities across the country have been permitted to take their own course of action in rejecting the national immigration standards that are ostensibly set forth by the federal government. In these cases, most notably in San Francisco, the federal government, including Congress, has failed to preempt the choices of civic leaders to enact policies at odds with the uniform enforcement of immigration law.

Each of these cases provides a slightly different basis on which to view the national government's choice of whether to assert its authority to preempt state law. In some cases, such as the development of sanctuary cities and proprietary drug labeling, the federal government has chosen not to act, while in others, the federal government has chosen to act. What sets apart those cases where the government chose to act, however, is the growth of extreme policies in the states that deviated too far from the perceived national norm. Where the states limited the extent to which they pushed the boundaries of policy locally,

imposing costly externalities on other states, the federal government entered, preempting the states and imposing uniform standards nationwide, as where it restricted the reach of state level trade secret protections that deviated too far from the national norms regarding patent protections and general intellectual property. The rest of the paper develops a formal model of this behavior, demonstrating both how even the threat of preemption can have a powerful moderating effect on the policies chosen by states in a small, three-state federation and how individual states can exploit their policy positions *vis-à-vis* other states to try to counter this moderation and induce the central legislature to act.

This model does not address the myriad legal ways that preemption can be effected in the modern regulatory state. While in many cases, state and national laws can coexists wherever they do not conflict, I do not consider how the text of any national policy might itself establish a level of preemption. I instead make the assumption that the national proposal, if passed, necessitates the preemption of state law to be effective in alignment with the reasoning behind the preemption of state trade secret protections that conflict with the goals of federal patent legislation.

3.3 Vermont Act 120 and Senate Bill 764

There is a long history of GMOs dating back to the earliest days of agriculture, during which selective breeding was used to preserve desirable traits in a wide array of domesticated plants and animals. Dogs, for example, were bred to assist in herding and hunting, while a handful of plant species from the genus, *Brassica*—containing the mustard plant—were cultivated into many of the leafy greens and salad ingredients commonly used across the world today, including cabbage, broccoli, and turnips among many others. The resulting evolution from such selective breeding was slow and incremental but ultimately produced many of the plant and animal products we use today.

In the past 30 years, however, and especially in the past 10, new techniques were de-

veloped to create transgenic organisms by directly implanting foreign genes into existing species through the use of recombinant deoxyribonucleic acid (rDNA). Most recently, techniques such as those exploiting Clustered Regularly Interspaced Short Palindromic Repeats (CRISPR) have allowed scientists and agricultural firms to change the timeline of these changes by editing the genetic sequences of plants and animals directly, not only developing products that exhibit the most desirable traits from among those already present in the species, but even developing products exhibiting fully new traits. They can quickly produce plants that are highly resistant to strains of disease or pesticides, as Monsanto has famously done with many of the seeds it sells. Similarly, they can add or modify genes to allow fish to grow more quickly in less favorable conditions, as in the case of the AquaAdvantage salmon, which takes genes from other species, including the Arctic pout.

The advent of these new techniques has brought with it extensive controversy, however, as critics question the safety of these advanced techniques. These critiques, moreover, falls across several dimensions ranging from the long term effects on biodiversity and the ecosystem to direct health effects that such products are likely to have on individuals consuming the modified plants and animals. To that end, opponents of these techniques have targeted these GMOs as a potential threat and constituted numerous policy campaigns worldwide aimed at curtailing their use or banning their development outright. This opposition, moreover, has only been heating up despite a growing body of evidence favoring the use of GMOs, with the European Union taking the lead by banning the the sale or use of most GMOs within much of its jurisdiction. For a deeper discussion of this debate, see Nicolia et al. (2014); Tagliabue (2016); Gaskell et al. (1999) and Hino (2002).

Within the United States, the debate has been much more favorable toward GMOs than in much of the world. Indeed, most of the cotton, corn, and soybeans grown in the country, along with many other cereals, are genetically modified variants (Fernandez-Cornejo et al., 2014). Nonetheless, majorities in several states, including many in the Northeast

and Pacific Coast regions, remain skeptical of the products and have pressed their legislators counter Congressional inaction and to enact local regulations governing the use of GMOs within local jurisdictions. Some of the earliest such efforts have included moves by several states to require labeling of very particular products, making only minor demands affecting small corners of the market such as Alaska did with Salmon in 2005. By 2012, these movements had become more ambitious and determined to adopt across the board standards requiring labeling of all GMO products. An electoral initiative in California was only narrowly defeated that year, while shortly after, both Maine and Connecticut passed bills through the legislative process requiring labeling that included triggering mechanisms that allowed the laws to go into effect only if enough other states adopted similar legislation so as to avoid disrupting the economy.

Vermont made the next jump with Act 120, sponsored by State Representative Kate Webb. This legislation, signed into law by Governor Pete Shumlin on May 8, 2014, required any product "offered for retail sale in Vermont and entirely or partially produced with genetic engineering" to adhere to strict labeling requirements by July 1, 2016. The law's stated purposes included informing consumers about the products they were purchasing, supporting religious freedom, and protecting human and environmental health. Yet supporters also saw the legislation as an opportunity to lead the country in establishing a new national standard and forcing Democrats in Congress to pass their own legislation—ideally modeled closely after Vermont's. Indeed, in signing Act 120 into law, Governor Shumlin announced, "I am proud that we're leading the way in the United States to require labeling of genetically engineered food," (Hopkinson, March 17, 2016) optimistically anticipating any subsequent congressional action, especially with a politically aligned Senate and President, would be modeled after his state's legislation.

As a result, the food industry, along with its allies were faced with a costly variation in state policies. On one hand, while they would be free to leave their products unlabeled

and forgo sales in Vermont, doing so would eliminate a sizable portion of their market. They could instead choose to label products destined for Vermont and leave other products unlabeled, Yet this was also unsatisfactory as it would require costly modifications to production processes and distribution networks while not eliminating the possibility that errant unlabeled products might nonetheless end up in Vermont where they would bring stiff and costly penalties. Finally, they could choose to label all their products, in essence allowing Vermont to dictate their preferences toward all consumers. However, given the continuing controversial nature of GMOs, this too was unsatisfactory to many food groups for fear that it would lead to needlessly lower sales in states without labeling requirements where the product might face competition from other identical goods that did not exhibit a warning label. As a final concern for many firms, there was the question of whether this legislation would induce a backlash in other states which might attempt to adopt a standard which disallowed labeling, creating the worst-case scenario of a patchwork of explicit requirements nationwide. Combined with allegations that the state of Vermont was actively attempting to sow confusion with respect to the law—Karen Batra of the Biotechnology Innovation Organization noted that "Food Companies don't know how to comply, or if they are covered by the law. The Vermont attorney general stopped taking calls from food producers who were trying to figure the law out." (Farquhar, September, 2016)—making it still harder to meet the stated requirements, these affected groups turned their focus to Congress.

With a two-year window to establish a national standard before Vermont's law went into effect, the food industry and its allies first targeted the United States House of Representatives, successfully pushing for the passage of H.R. 1599, The Safe and Accurate Food Labeling Act of 2015. This legislation, also known by supporters of labeling requirements as the Deny Americans the Right to Know (DARK) Act, was structured to achieve two ends. Firstly, it eliminating any national labeling requirement, but secondly and more importantly, it preempted any state regulations and established a uniform national standard

governing the labeling of GMOs. This bill, however, died in the Senate with the support of only 48 Senators.

However, by March of 2016, a growing sense of urgency led the Senate to reopen the matter with two competing pieces of legislation. First, S. 2621, the Biotechnology Food Labeling Uniformity Act, sponsored by Senators Merkley, Leahy, Tester, Feinstein, and Sanders, was proposed to establish strict labeling requirements nationwide in accordance with the goals of Act 120, supporting the motivations of supporters of the earlier Act. Second, S. 761, the National Bioengineered Food Disclosure Standard, sponsored by Senators Roberts and Stabenow offered a compromise in which the Food and Drug Administration (FDA) would be directed to formulate regulations requiring limited labeling of certain products but leave untouched the majority of goods such as those that were produced using GMOs but which do not themselves contain any GMOs. In a result that was unusually consistent with the traditional median voter theorem, this latter bill ultimately mustered enough votes to pass on July 7 as the Vermont law went into effect despite misgivings on both sides driven by the necessity to avoid the costs imposed by Vermont's law. "'I don't think it's the best bill that we could have, but it's the best bill we could pass,' [according to] Richard Wilkins, a Delaware Farmer who is President of the American Soybean Association... Congress was forced into this compromise by Vermont" (Charles, July 14, 2016).

The result has been a moderate policy in which some products have become subject to labeling requirements, and yet those requirements remain much weaker than those originally sought by the state of Vermont. Nonetheless, the resulting national policy did move the status quo from one in which GMOs were only required to be labeled under very specific circumstances in a few states to one in which many were subject to limited labeling nationwide, mildly vindicating Vermont's position. Scott Faber noted, "It's not an insignificant achievement that a Republican Congress has decided to mandate a national GMO

disclosure" (Charles, July 14, 2016).

The following section builds on the motivation inspired by this legislative activity to develop a model of federalism in which states with local policy preferences—as represented here by Vermont—may exploit externalities caused by policy variation within a federation to induce neighboring states to support the adoption of a nationwide policy on one hand, or in which they may use their ability to shift local policies strategically to disincentivize neighboring states to support nationwide legislation that would be unfavorable.

3.4 General Model

Consider a model with three states, $i \in \{1, 2, 3\}$, each described by a type, $\theta_i \in \mathbb{R}$. Without loss of generality, normalize $\theta_1 \leq \theta_2 = 0 \leq \theta_3$ so that state 1 may be considered the leftist state, state 2 is the moderate state, and state 3 the rightist states. Each state's utility is described by quadratic preferences over local policies, peaking at their respective ideal points, as well as an externality term that is due to variation across states. This externality may be thought of as the utility lost by states when they engage in interstate activities such as commerce or environmental regulation, where the actions of a single state can harm the welfare of another state either by polluting across borders or by requiring costly efforts to adapt products or services to fit the preferences of nearby states. In particular, I focus on the case where the externality arises as the result of a coordination failure. Each state prefers a particular policy outcome, but also prefers to implement the same policy as every other state. The stage j utility function takes the form,

$$V_i^j(\mathbf{x}) = -(x_i - \theta_i)^2 - \beta \sum_{j \in I} (x_i - x_j)^2 \tag{3.1}$$

where $\mathbf{x} = \{x_1, x_2, x_3\}$ represents the set of policies chosen by the states, and $\beta \in \mathbb{R}^{++}$ is a measure of the weight of any externalities that arises due to policy differences across the

federation.

In this environment, β is primarily a measure of the weight of coordination externalities that might arise for any number of reasons, but which are often discussed in economic terms. At the most mundane level, these may simply be measurement standards that everyone would prefer be consistent across the federation. Highway speed limits should be set in either kilometers per hour or miles per hour, but not both, for example. Alternatively, railroads should all have a consistent gauge to prevent economic losses that accrue when shippers are forced to transition between trains at borders simply for crossing those borders. Indeed, this was a major concern in the mid-19th century that eventually culminated in a massive two-day effort to regauge the Southern railways and bring them into alignment with Northern standards.

I consider a two-stage game in which the states:

1. Choose policies in the first stage,
2. Realize stage payoffs as a result of those policies,
3. Vote over whether to centralize,
4. Choose a central policy, $\chi = \{x_1, x_2, x_3\}$ for some $x_1 = x_2 = x_3$ (conditional on voting in favor of centralization),
5. Realize a second stage payoff.

The total payoff for each state is then,

$$U_i(\mathbf{x}, \chi) = \begin{cases} 2V_i(\mathbf{x}) & \text{if } v_m = d \\ V_i(\mathbf{x}) + V_i(\chi) & \text{if } v_m = c \end{cases} \tag{3.2}$$

where $v_m \in \{c, d\}$ is the majority-preferred vote choice over whether to centralize (c) or not (d).

I now turn identifying subgame perfect equilibria to this game in several different forms. In the first, I consider the fully decentralized equilibrium in which the states are constrained from voting to centralize policy. This removes steps three and four from the above game form and sets the total utility to the condition where $v_m = d$. In the second, I constrain the states to a centralized equilibrium, which also removes step three from the above game form and sets the total utility to the condition where $v_m = c$. Next I consider the equilibrium behavior when step two is moved after step four, and finally, I consider the equilibrium in the full game form as written.

Fully Decentralized Equilibrium

The first example considers a game form that is applicable to a weak confederation in which the states are only loosely connected but in which there is little national authority to act, perhaps due to an earlier constitution or similar compact preserving relevant policy areas to the states. Here, only the states may set policy, while the legislature is restrained from enacting a preemptive policy. After nature endows preferences, the states merely select their policies subject to their own preferences and the policies selected by their neighbors, and outcomes are realized. I call this the *Fully Decentralized* or *Weak Confederation* equilibrium.

Figure 3.1: Fully Decentralized Game Form

In such a decentralized environment, states choose individual policies which optimize their welfare by solving the first order condition over their locally-implemented policy,

yielding the best response function,

$$0 = -4\left((1+N\beta)x_i^* - \theta_i - \beta\sum_{i\in I} x_j\right) \quad \rightarrow \quad x_i^+ = \frac{\theta_i + \sum_{j\in I\setminus i} x_j}{1+\beta(N-1)} \tag{3.3}$$

for any number, N, of states where the full set of best responses is denoted,

$$\mathbf{x}^+ = \mathcal{B}(\mathbf{x}) \tag{3.4}$$

For a Nash equilibrium, solve $\mathbf{x}^* = \mathcal{B}(\mathbf{x}^*)$, which yields

$$x_i^* = \frac{\theta_i + \beta\sum_{j\in I}\theta_j}{N\beta+1} = \frac{\theta_i + N\beta\overline{\theta}_1}{N\beta+1} \tag{3.5}$$

where $\overline{\theta}_n$ denotes the nth moment on θ. Denote the full set of equilibrium strategies given θ as

$$\mathbf{x}^* = \mathcal{E}(\theta) \tag{3.6}$$

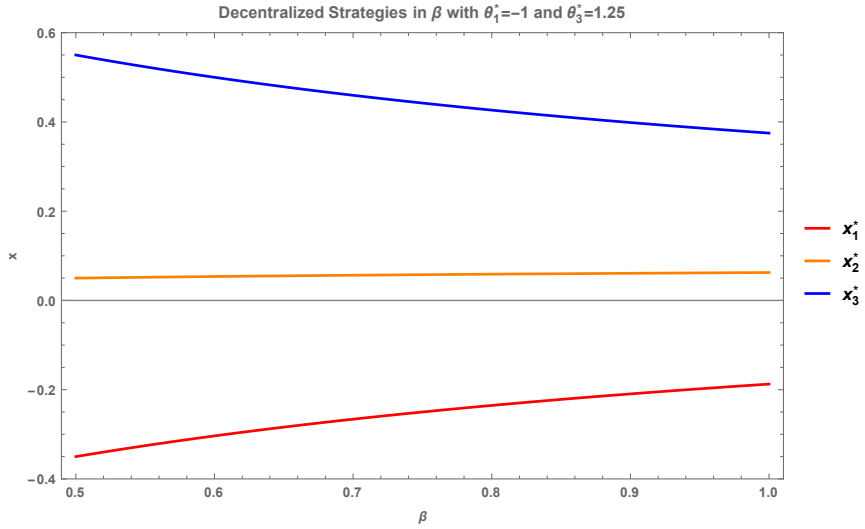
This solution is simply a weighted average of local preferences and the preferences of each other state, with the mean policy preference of the coalition being represented by $\overline{\theta}_1$. Moreover, the equation demonstrates the attraction of the 'consensus' policy at $\overline{\theta}_1$, which comes to dominate the decision of the individual states as N or β grows large. This yields a utility of

$$\begin{aligned} U_i(\mathbf{x}^*, \chi^*) &= -\frac{2N\beta}{(1+N\beta)^2}\left(N\beta(\theta_i - \overline{\theta}_1)^2 + \frac{1}{N}\sum_{j\in I}(\theta_i - \theta j)^2\right) \\ &= -\frac{2N\beta}{(1+N\beta)^2}\left((1+N\beta)(\theta_i^2 - 2\theta_i\overline{\theta}_1) + N\beta\overline{\theta}_1^2 + \overline{\theta}_2\right) \end{aligned} \tag{3.7}$$

Applying the preferences of the three states in the baseline model yields the equilibrium strategies

$$x_i^* = \frac{\theta_i + \beta(\theta_1+\theta_2+\theta_3)}{3\beta+1} = \frac{\theta_i + \beta(\theta_1+\theta_3)}{3\beta+1} \tag{3.8}$$

Figure 3.2: Equilibrium policies for three states in a fully decentralized policy regime.



Proposition 4. *As the number of states increases, the local policies enacted in a decentralized equilibrium approach the mean ideal point,* $\overline{\theta}_1 = \frac{1}{N}\sum_{i \in I} \theta_i$. *As* β *increases, the policies chosen in the local equilibrium also approach* $\overline{\theta}_1$.

Proof. Taking the appropriate limits, we have

$$\lim_{N \to \infty} x_i^* = \frac{\lim_{N \to \infty} \frac{\partial}{\partial N}(\theta_i + N\beta\overline{\theta}_1)}{\lim_{N \to \infty} \frac{\partial}{\partial N}(1 + N\beta)} = \frac{\beta\overline{\theta}_1}{\beta} = \overline{\theta}_1 \tag{3.9}$$

$$\lim_{\beta \to \infty} x_i^* = \frac{\lim_{\beta \to \infty} \frac{\partial}{\partial \beta}(\theta_i + N\beta\overline{\theta}_1)}{\lim_{\beta \to \infty} \frac{\partial}{\partial \beta}(1 + N\beta)} = \frac{N\overline{\theta}_1}{N} = \overline{\theta}_1 \tag{3.10}$$

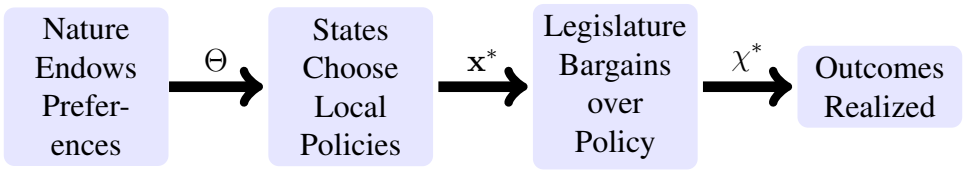
□

Fully Centralized Equilibrium

In the second case, the legislature is obliged to act, enforcing a uniform national standard in the second period. While the states may still choose policies independently in the first period, they are necessarily preempted in the second period and do not realize a second payoff from their local policy. Note that the resulting equilibrium in this environment does not substantially change in the event that the state policy-making process is entirely

eliminated, since the subsequent decision of the legislature is not determined on the basis of that outcome. I call this the *Fully Centralized* or *Strong Federation* equilibrium.

Figure 3.3: Game Form



If the states are bound to centralize policy and adopt a single national policy, χ such that $x_i = \chi \forall i$ in the second stage, the externality term goes to zero in that stage and they are left with utilities,

$$U_i(\mathbf{x}, \chi) = V_i(\mathbf{x}) - (\chi - \theta_i)^2 \tag{3.11}$$

Assuming an open amendment rule after the states choose to adopt a national policy, the median state's most-preferred policy, $\chi = \theta_m$ will be selected, following the standard median voter theorem. As a result, the preceding utility reduces to

$$U_i(\mathbf{x}^*, \chi_m^* | c) = V_i(\mathbf{x}^*) - (\theta_i - \theta_m)^2 \tag{3.12}$$

where, upon acceptance of a national rule, the moderate state's preferences are implemented in equilibrium. In Step 1, where the states choose the local policies for the first stage payoff, the equilibrium analysis is identical to the analysis for the decentralized equilibrium and yields the same equilibrium strategies, x_i^*.

Proposition 5. *In a centralized equilibrium, the states, through congress, select the median state's ideal policy, θ_m.*

Proof. The equilibrium follows directly from the standard Median Voter Theorem and Proposition 4. □

Applying the ideal points for the three-state model so that $\theta_m = \theta_2 = 0$, yields the

result,

$$U_i(\mathbf{x}^*, 0) = V_i(\mathbf{x}^*) - \theta_i^2 \tag{3.13}$$

In an extension of the model, I will consider the role of veto players in a legislature that might be able to restrict the movement of this policy and thereby change the equilibrium outcomes within such an environment.

Note that in this scenario, while the states may choose policies in the first period for purposes of payoffs, those policies will never survive to the second stage and the choice of policy will not affect the outcome in the second period. As such, states simply choose their ideal policies subject to the constraints described in the previous section as their local policies.

Voting Over Centralization

This introduces a new straightforward calculation for each of the states—namely whether to support centralization and obtain the moderate state's optimal national rule or to support decentralization and obtain that outcome. Let $\tau_i \in \{c, d\}$ denote state i's vote over whether to centralize the policy or not. Where states act naively, without considering the effect of their policies on the votes of other states, this reduces to

$$\tau_i = \begin{cases} c & \text{if } U_i(\mathbf{x}, \chi|d) < U_i(\mathbf{x}, \chi|c) \\ d & \text{if } U_i(\mathbf{x}, \chi|d) \geq U_i(\mathbf{x}, \chi|c) \end{cases} \tag{3.14}$$

and the majority preferred choice of venue, denoted τ_m becomes

$$\tau_m = \begin{cases} c & \text{if } |\{\tau_i|\tau_i = c\}| \geq M = 2 \\ d & \text{if } |\{\tau_i|\tau_i = c\}| < M = 2 \end{cases} \tag{3.15}$$

In subsequent sections, I consider the choices of strategic states that select policies to influence the voting behavior of other states.

Proposition 6. *In three parts:*

1. *The median state, denoted $i = m$, always prefers centralization, $\tau_m = c$, whenever there is at least one state with a different local policy.*

2. *Without loss of generality, let state N be the most extreme state relative to $\overline{\theta}_1$ so that $\theta_N - \overline{\theta}_1 > \overline{\theta}_1 - \theta_1$. If all states play their decentralized equilibrium strategies, the most extreme state always prefers decentralization, $\tau_N = d$, when $\overline{\theta}_1 \in [\theta_N, \theta_m]$. More generally, for any state, i^*,*

$$\overline{\theta}_1 \in [\min\{\theta_{i^*}, \theta_m\}, \max\{\theta_{i^*}, \theta_m\}] \tag{3.16}$$

   there will be no incentive to centralize.

3. *For all other states such that $\theta_i \neq \theta_m$, there is a critical value, $\beta_i^*(\mathbf{x})$, such that for $\beta > \beta_i^*$, state i prefers centralization. β_i^* is increasing in the distance of state i's ideal point from θ_m.*

Proof. Each part of the proof corresponds to the equivalent part of the proposition:

1. The median state's choice is straightforward. We have

$$\begin{aligned} U_m(\mathbf{x}, \chi|d) &< U_m(\mathbf{x}, \chi|c) \\ 2V_m(\mathbf{x}) &< V_m(\mathbf{x}) \\ V_m(\mathbf{x}) &< 0 \end{aligned} \tag{3.17}$$

   If there is any variation in $\mathbf{x}$, $V_i(\mathbf{x}) < 0$, and the condition holds, so m prefers centralization.

2. If the states are all playing their decentralized equilibrium strategies, we have

$$\begin{aligned} U_e(\mathbf{x}^*, \chi|d) &\geq U_e(\mathbf{x}^*, \chi|c) \\ 2V_e(\mathbf{x}^*) &\geq V_e(\mathbf{x}^*) - (\theta_e - \theta_m)^2 \\ -\frac{N\beta}{(1+N\beta)^2}\left((1+N\beta)(\theta_e^2 - 2\theta_e\overline{\theta}_1) + N\beta\overline{\theta}_1^2 + \overline{\theta}_2\right) &\geq -(\theta_e - \theta_m)^2 \end{aligned} \tag{3.18}$$

Under the assumption that N is the most extreme state, we can then simplify the preceding equation to

$$\begin{aligned} 0 \geq & -\theta_N^2(1+\beta(1+N)+\beta^2(2N-1)) \\ & - 2\beta\theta_N(1+\beta(N-1))\sum_{i\in I\setminus N}\theta_i + \beta^2\left(\sum_{i\in I\setminus N}\theta_i\right)^2 + \beta\sum_{i\in I\setminus N}\theta_i^2 \\ \geq & -\theta_N^2(1+\beta+\beta^2(2N-1)) - \left(N\beta\theta_N^2 - \beta\sum_{i\in I\setminus N}\theta_i^2\right) \\ & - \left(\theta_N(2+\beta(N-2)) + \left(N\beta\theta_N - \beta\sum_{i\in I\setminus N}\theta_i\right)\right)\beta\sum_{i\in I\setminus N}\theta_i \end{aligned} \tag{3.19}$$

Note that as N is the most extreme state by assumption, we must have $\frac{1}{N}\sum_{i\in I\setminus N}\theta_i \in (-\theta_N, \theta_N)$ and $\frac{1}{N}\sum_{i\in I\setminus N}\theta_i^2 < \theta_N^2$. Each term in parentheses must then be weakly positive (strictly positive hen states vary in their preferences) so the right-hand expression as a whole must be negative for any $\sum_{i\in I\setminus N}\theta_i \propto \frac{1}{N}\sum_{i\in I\setminus N}\theta_i > 0$ and the condition is satisfied.

For three states, this condition will always be satisfied, requiring

$$\begin{aligned} 0 &< V_3(x_3^*|\mathbf{x}_{-3}) - V_3(\chi = 0) \\ &< \frac{-\beta(\beta+1)\theta_1^2 + 2\beta(2\beta+1)\theta_1\theta_3 + (5\beta^2+4\beta+1)\,\theta_3^2}{(3\beta+1)^2} \end{aligned} \tag{3.20}$$

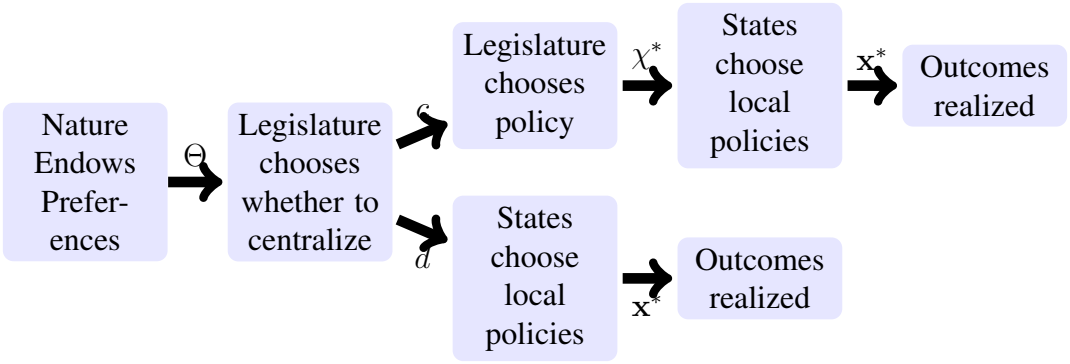
which always holds for the normalization, $\theta_3 > -\theta_1 > \theta_2 = 0$.

3. This proof follows whenever the conditions arising in Part 2 are not satisfied. Note that in Equation (3.19), only the terms related to the first moment, $\sum_{i \in I \setminus N} \theta_i$, are positive. These terms are increasing in both β and $-\sum_{i \in I \setminus N} \theta_i$ and take the initial value of 0 for either $\beta = 0$ or $-\sum_{i \in I \setminus N} \theta_i = 0$, so that for any mutually non-zero state there must be some threshold above which the state is incentivized to support centralization.

□

First-Moving Legislature

Figure 3.4: Game Form



In this section, I consider behavior when the legislature acts first, followed by the states. In this scenario, we might think of the legislative decision as a constitutional one in which the legislature must decide whether to tie its hands to prevent future attempts to assert

policy-making authority or to adopt a centralized regime outright without observing the alternative state policies that will be implemented in the absence of centralization. Thus, once preferences are endowed, the states must first decide through their legislature whether to enact a national policy. In the event that they do vote to enact a national policy, they choose that policy as above (once again selecting the median). If they do not choose to adopt a national standard, no such policy is enacted and the states are free to choose their policies as in the *Fully Decentralized* case. I call this the *First-Moving Legislature* or *Constitutional* equilibrium. Note that if the legislature were to have the option of leaving open the window for asserting centralized authority, the game is substantively identical to that of the following section with first-moving states.

Clearly, as she will obtain her ideal policy in a centralized environment, the moderate state will be strictly better-off choosing to centralize whenever it is not the case that $x_i^* = 0 \,\forall\, i$, which only occurs for $\theta_i = 0 \,\forall\, i$. When that state does arise, she is indifferent between either venue, as the resulting policies are observationally identical. Of course, when this condition is satisfied, both other states are likewise indifferent over policy venues. For the rest of the analysis, then, I assume that there is at least one state such that $x_i \neq 0$.

In this event, the choices of the actors may change. As before, the moderate state will always prefer to centralize, but now the remaining states may prefer not to do so. Indeed, it may be the case that no extreme state prefers to centralize and instead prefers to retain a decentralized equilibrium. Now consider the conditions under which a state will support centralization. She will do so whenever

$$\begin{aligned} -\frac{N\beta}{(1+N\beta)^2}\left((1+N\beta)(\theta_i^{*2}-2\theta_i^*\overline{\theta}_1^*)+N\beta\overline{\theta}_1^{*2}+\overline{\theta}_2^*\right) &< -(\theta_i^*-\theta_M^*)^2 \\ N\beta\left((1+N\beta)(\theta_i^{*2}-2\theta_i^*\overline{\theta}_1^*)+N\beta\overline{\theta}_1^{*2}+\overline{\theta}_2^*\right) &> (1+N\beta)^2\theta_i^{*2} \end{aligned} \tag{3.21}$$

Solving for θi yields the condition on the state's support for centralization,

$$\begin{aligned} N\beta\overline{\theta}_1^* + \sqrt{\frac{N^2\beta^2\overline{\theta}_1^{*2}(2+N\beta) + N\beta\overline{\theta}_2^*}{1+N\beta}} \\ > -\theta_i^* \\ > N\beta\overline{\theta}_1^* - \sqrt{\frac{N^2\beta^2\overline{\theta}_1^{*2}(2+N\beta) + N\beta\overline{\theta}_2^*}{1+N\beta}} \\ -N\beta\left(\overline{\theta}_1^* + \sqrt{\overline{\theta}_1^{*2} + \frac{N\beta\overline{\theta}_1^{*2} + \overline{\theta}_2^*}{N\beta(1+N\beta)}}\right) \\ < \theta_i^* \\ < -N\beta\left(\overline{\theta}_1^* - \sqrt{\overline{\theta}_1^{*2} + \frac{N\beta\overline{\theta}_1^{*2} + \overline{\theta}_2^*}{N\beta(1+N\beta)}}\right) \end{aligned} \tag{3.22}$$

Applying the ideal points of the three states of the simple model yields

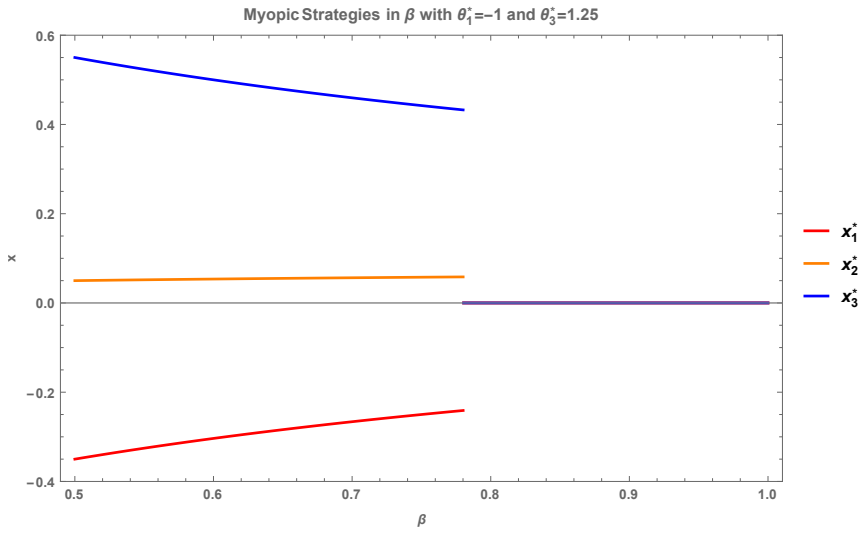
$$\begin{aligned} -\beta\left(\theta_1+\theta_3+\sqrt{(\theta_1+\theta_3)^2 + \frac{\beta(\theta_1+\theta_3)^2 + (\theta_1^2+\theta_3^2)}{\beta(1+3\beta)}}\right) \\ < \theta_i^* < -\beta\left(\theta_1+\theta_3-\sqrt{(\theta_1+\theta_3)^2 + \frac{\beta(\theta_1+\theta_3)^2 + (\theta_1^2+\theta_3^2)}{\beta(1+3\beta)}}\right) \end{aligned} \tag{3.23}$$

Proposition 7. *For a first-moving legislator, there is no incentive for states to act strategically and the nation centralizes whenever the externality term, β, is greater than the pivotal state's critical threshold such that $\beta > \beta_p^*$.*

Proof. Suppose the legislature votes to centralize. Then the states can only affect the first-term payoff by choosing local policies. The value of this payoff does not depend directly on the voting outcome, so the states need only maximize the payoff from their local policy which is done by adapting $x_i = x_i^*$.

Suppose instead that the legislature votes to remain decentralized. Now the total payoff

Figure 3.5: Equilibrium policies for three states with a first-moving legislature that is able to choose whether to commit to not preempting state policies.

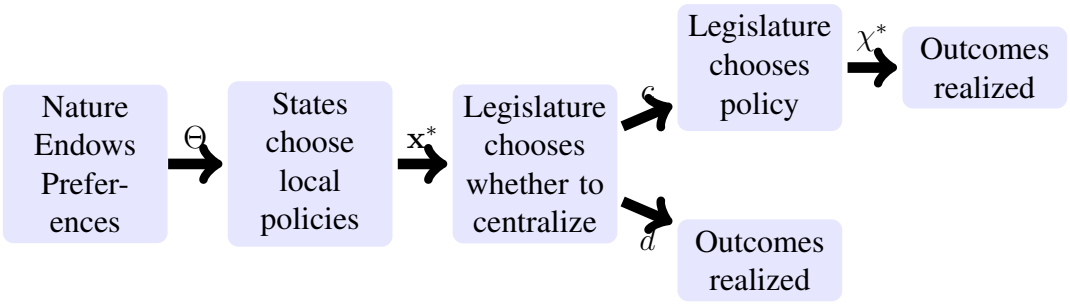


is simply twice the single period payoff, which again cannot be affected by any subsequent action. Again, the states optimal policy choices satisfy $x_i = x_i^*$. □

First-Moving States

Now consider the full version of the game in which the states first choose policies, then the legislature convenes to determine whether to adopt a centralized policy and if so what that policy should be. This form is represented in Figure 3.6 and provides the most interesting results. In this case, once preferences are endowed, the states choose local policies. The legislature then observes the chosen policies and decides whether to centralize on the basis of those policies. If the legislature chooses to centralize, it democratically chooses a preemptive national standard and outcomes are realized. If the legislature declines to adopt a national standard, outcomes are realized on the basis of state policies. Such a scenario opens and indeed incentivizes the possibility of strategic action by the states in which states close to the median attempt to trigger the adoption of a national standard while extreme states attempt to divert such an outcome. I call this the *First-Moving States* or *Unconstrained* equilibrium

Figure 3.6: Game Form



I consider the equilibrium that results when the legislature cannot bind itself to refrain from acting after the states. That is, the legislature moves after the states select their policies. If the states naively selected their optimal choices from the decentralized subgame above, the equilibrium would look exactly as the previous one with the first-moving legislature. However, by strategically adopting a more moderate policy—at a slight cost—under a decentralized regime, an extreme state or coalition of states may be able to 'buy off' the vote of those borderline states supporting centralization. Conversely, a moderate state can establish a more extreme policy than it otherwise would in an effort to induce a borderline state to vote in support of centralization where it otherwise would not.

To solve for the equilibria in this game, we will focus on one player at a time from out three-state country. Without loss of generality, let $\theta_1 \leq \theta_2 = 0 \leq -\theta_1 \leq \theta_3$. In this environment, state 2, the moderate state, will always weakly prefer a centralized equilibrium, since it would obtain its ideal point with zero coordination externalities in the second stage at such an equilibrium. On the other hand, whenever at least one state prefers to maintain a decentralized equilibrium, the more extreme state, 3, will prefer a decentralized equilibrium.

First, note that state 1, the less extreme state, will always choose to play its baseline best response, $x_\dagger = x_1^*$, and will vote for decentralization whenever this strategy yields a higher payoff than $\chi = 0$ in the second-stage payoff. This follows from the fact that they will always be pivotal when there is any state that prefers decentralization, and whenever a

state is not pivotal, that state should play its baseline best response.

Now consider the optimal strategy of player 2, the moderate state. Since it always prefers a centralized regime that sets the nationwide policy, $\chi = 0$, it will choose, $x_2^\dagger$, the highest-paying local policy that induces a majority to support centralization where such a policy satisfies $V_2(x_2^+|\mathbf{x}_{-2}) - V_2(x_2^\dagger|\mathbf{x}_{-2}) < V_2(\chi = 0) - V_2(x_2^+|\mathbf{x}_{-2})$ or else it plays the baseline best response, x_2^+. That is, the policy,

$$x_2^\dagger = \begin{cases} \arg\max_{x_2}\{V_2(\mathbf{x})|v_1 = c\} & : V_2(x_2^+|\mathbf{x}_{-2}) - V_2(x_2^\dagger|\mathbf{x}_{-2}) \\ & \qquad < V_2(\chi = 0) - V_2(x_2^+|\mathbf{x}_{-2}) \\ x_2^+ & : \text{otherwise} \end{cases} \tag{3.24}$$

Finally, turn to the optimal strategy of state 3, the extreme state. Recalling that this state always prefers a decentralized regime, the best response follows the logic mirroring that of state 2, yielding

$$x_3^\dagger = \begin{cases} \arg\max_{x_3}\{V_3(\mathbf{x})|v_1 = c\} & : V_3(x_3^+|\mathbf{x}_{-3}) - V_3(x_3^\dagger|\mathbf{x}_{-3}) \\ & \qquad < V_3(x_3^+|\mathbf{x}_{-3}) - V_3(\chi = 0) \\ x_3^+ & \text{otherwise} \end{cases} \tag{3.25}$$

Proposition 8. *In a three-state model, there is no non-sincere pure-strategy equilibrium that results in a centralized regime. A pure strategy equilibrium in which states play* $\mathbf{x}^*$ *exists if and only if* $\beta > \beta_c$.

Proof. Consider the optimal policies that are chosen in any equilibrium where $v_m = c$.

Here the equilibrium strategies must satisfy

$$x_1^\dagger = x_1^+ \tag{3.26a}$$

$$x_2^\dagger = \arg\max_{x_2}\{V_2(\mathbf{x})|v_1 = c\} \tag{3.26b}$$

$$x_3^\dagger = x_3^+ \tag{3.26c}$$

$$V_1(\mathbf{x}^\dagger) < V_1(\chi = 0) \tag{3.26d}$$

$$V_3(x_3^+|\mathbf{x}_{-3}) - V_3(x_3^s|\mathbf{x}_{-3}) > V_3(x_3^s|\mathbf{x}_{-3}) - V_3(\chi = 0) \tag{3.26e}$$

Where x_3^s satisfies $V_1(x_1, x_2, x_3^s) = V_1(\chi = 0)$. First recall that whenever all three states are playing their best response for a decentralized equilibrium, state 3 always prefers decentralization. Thus, the fifth condition must be satisfied in order to make it infeasible for the extreme state to buy off the pivotal state by moderating its policy unilaterally. With this in mind, note that in order for the fifth condition to be satisfied, the fourth condition regarding the incentives of the pivotal state cannot be binding, as such a binding result would allow state 3 to choose a policy that is ϵ closer to x_1 and incentivize the latter state to vote in favor of decentralization. Note that this is guaranteed to be a profitable deviation since from Proposition 6, state 3 strictly prefers decentralization whenever the states have different ideal points.

However, in the case that the fifth condition is binding so that the first and third conditions are binding, the third condition can only be satisfied if either $x_2^\dagger = x_2^+$ or the fourth condition is binding exactly. In the latter case, a contradiction arises as a result of the first part of this proof. In the former case, the states simply play their one-shot Nash equilibrium strategies, $\mathbf{x}^*$ and, provided β is sufficiently large, a pure-strategy equilibrium may arise if and only if there is no incentive for state 3 to strategically moderate its policy to placate state 2. That is, there is a pure strategy equilibrium in which all states play their Nash equilibrium strategies ad a majority supports centralization if and only if $\beta > \beta_c$.

When all states are playing their one-shot Nash equilibrium strategies, there is a profitable deviation for state 3 if and only if

$$V_3(x_3^+|\mathbf{x}_{-3}) - V_3(x_3^s|\mathbf{x}_{-3}) \leq V_3(x_3^s|\mathbf{x}_{-3}) - V_3(\chi = 0) \tag{3.27}$$

This allows state 3 to strategically moderate its policy and induce a favorable vote from state 1. Plugging in the appropriate values and noting that the proposed equilibrium strategies are the one-shot Nash equilibrium strategies, this expression can be reduced to

$$\begin{aligned} V_3(x_3^*|\mathbf{x}_{-3}) - 2V_3(x_3^s|\mathbf{x}_{-3}) + V_3(\chi = 0) \leq 0 \\ (4\beta + 2)x_3^{s2} - 4\left(\theta_3 + \beta x_1^* + \beta x_2^*\right) x_3^s \\ -(2\beta + 1)x_3^{*2} + \beta\left(x_1^{*2} + 2x_3^* x_1^* + x_2^{*2} + 2x_2^* x_3^*\right) + 2\theta_3 x_3^* \leq 0 \end{aligned} \tag{3.28}$$

Noting that only the lesser root is binding, this yields the solution,

$$\begin{aligned} x_3^s \geq \frac{\theta_3 + \beta x_1^* + \beta x_2^*}{2\beta + 1} \\ - \frac{1}{4(2\beta + 1)} \sqrt{\begin{array}{l} 16\left(\theta_3 + \beta x_1^* + \beta x_2^*\right)^2 + 8(2\beta + 1)^2 x_3^{*2} \\ \qquad -8(2\beta + 1)\left(\beta\left(x_1^{*2} + 2x_3^* x_1^* + x_2^{*2} + 2x_2^* x_3^*\right) + 2\theta_3 x_3^*\right) \end{array}} \end{aligned} \tag{3.29}$$

To determine whether there is any sufficient x_3^s, consider the solution to

$$\begin{aligned} V_1(x_1^*, x_2^*, x_3^s) - V_1(\chi = 0) \geq 0 \\ -\beta x_3^{s2} + 2\beta x_1^* x_3^s - 2\beta x_1^{*2} + 2\beta x_2^* x_1^* - \beta x_2^{*2} + 2\theta_1 x_1^* + x_1^{*2} \geq 0 \end{aligned} \tag{3.30}$$

subject to maximizing V_3, which yields,

$$\begin{aligned} x_3^s &= x_1^* + \sqrt{\frac{1}{\beta}(2\theta_1 x_1^* - x_1^{*2}) - (x_1^* - x_2^*)^2} \\ &= \frac{1}{\beta(1+3\beta)} \\ &\qquad \times \left((1+\beta)\beta\theta_1 + \beta^2\theta_3 + \sqrt{\beta(1+5\beta+5\beta^2)\theta_1^2 + 4\beta^3\theta_1\theta_3 - \beta^3\theta_3^2} \right) \end{aligned} \tag{3.31}$$

This expression has a real solution if and only if $\frac{2\theta_1 x_1^*}{\beta}$ is sufficiently large or equivalently if

$$\beta \leq \frac{-5\theta_1^2 + \sqrt{5\theta_1^4 - 16\theta_3\theta_1^3 + 4\theta_3^2\theta_1^2}}{2\left(5\theta_1^2 + 4\theta_3\theta_1 - \theta_3^2\right)} \tag{3.32}$$

If and only if there is a real solution to

$$\begin{aligned} &x_1^* + \sqrt{\frac{1}{\beta}(2\theta_1 x_1^* - x_1^{*2}) - (x_1^* - x_2^*)^2} \\ &\qquad \geq \frac{\theta_3 + \beta x_1^* + \beta x_2^*}{2\beta + 1} + \frac{1}{4(2\beta+1)} \\ &\qquad\qquad \times \sqrt{\begin{array}{l} 16\left(\theta_3 + \beta x_1^* + \beta x_2^*\right)^2 + 8(2\beta+1)^2 x_3^{*2} \\ \qquad -8(2\beta+1)\left(\beta\left(x_1^{*2} + 2x_3^* x_1^* + x_2^{*2} + 2x_2^* x_3^*\right) + 2\theta_3 x_3^*\right) \end{array}} \end{aligned} \tag{3.33}$$

□

Proposition 9. *In a three-state model, there is a pure-strategy equilibrium that results in a decentralized regime for sufficiently small β. There exists a β_d such that for $\beta > \beta_d$, there is no pure-strategy policy equilibrium that induces decentralization.*

Proof. For $v_m = d$, the policy equilibrium will satisfy

$$x_1^\dagger = x_1^+ \tag{3.34a}$$

$$x_2^\dagger = x_2^+ \tag{3.34b}$$

$$x_3^\dagger = \arg\max_{x_3}\{V_3(\mathbf{x})|v_1 = d\} \tag{3.34c}$$

$$V_1(\mathbf{x}) \geq V_1(\chi = 0) \tag{3.34d}$$

$$V_2(x_2^+|\mathbf{x}_{-2}) - V_2(x_2^s|\mathbf{x}_{-2}) \leq V_2(\chi = 0) - V_2(x_2^+|\mathbf{x}_{-2}) \tag{3.34e}$$

where again, the fourth condition cannot be binding if the fifth is satisfied (using identical logic to the proof for the centralized equilibrium), and x_2^s is the value of x_2 which sets $V_1(\mathbf{x}) = V_1(\chi = 0)$ subject to $V_3(x_3^+|\mathbf{x}_{-3}) - V_3(x_3^\dagger|\mathbf{x}_{-3}) < V_3(x_3^\dagger|\mathbf{x}_{-3}) - V_3(\chi = 0)$. However, if and only if $x_3^\dagger = x_3^+$ the third condition is satisfied when the fourth condition is not binding, resulting in an equilibrium. If $\mathbf{x}^\dagger \neq \mathbf{x}^*$, there cannot be a pure-strategy equilibrium. □

Applying this logic, for sufficiently low β, there is no incentive for the extreme state to moderate policy in order to buy the vote of the less-extreme opposing party, as the moderate state cannot profitably offer any counter bid that would induce the less-extreme state to vote for centralization. For higher values of β, the more extreme state will moderate its own policy unilaterally to a point that not only incentivizes the less-extreme state to support decentralization, but to a point that makes decentralization sufficiently attractive to prevent any strategic policy choices by the moderate state to disincentivize decentralization. At that point, the moderate state, state 2, is best-off simply playing its decentralized best response; however the extreme state, state 3, is in turn best-off reverting to the most extreme policy not more extreme than its own ideal policy that induces the pivotal state to vote in favor of decentralization. That reintroduces the incentive for the moderate state to strategically adopt more extreme policies and restarts the cycle.

Corollary 0.1. *In a three-state model, the moderate state can never strategically offer a pure strategy equilibrium policy in the first period that will incentivize the pivotal state to vote in favor of centralization.*

Proof. If there is such a policy, it implies that the extreme state is playing a policy which does not induce a decentralized voting equilibrium, contradicting Proposition 8. □

Corollary 0.2. *Provided states have unique ideal points, in a three-state model the pivotal state is strictly better-off when the moderate state poses a strategic threat to the extreme state.*

Proof. The extreme state maximizes its utility by playing the most extreme strategy that induces a decentralized voting equilibrium. If this strategy merely makes the pivotal state indifferent between voting for decentralization and voting for centralization, the moderate state can profitably adopt a policy that is $\epsilon > 0$ more extreme than here period-maximizing strategy and induce the pivotal state to vote in favor of centralization. Thus, in order to ensure a decentralized equilibrium, the extreme state must adopt a policy that is sufficiently moderate as to make the moderate state indifferent between playing its decentralized best response and strategically adopting a policy to induce centralization. This induces both the extreme and moderate states to adopt policies that are closer to the ideal point of the pivotal state. □

3.5 Discussion

This paper has developed a model of policy-making in a federal system in which local jurisdictions—states—may determine local policies independently of each other or they may democratically select a national policy that applies uniformly across all states. While states may have widely divergent policy preferences and thus prefer to set policy locally according to those preferences, policy variation across the federation leads to costly welfare

losses and incentivizes the states to moderate their policies in two ways: First, it incentivizes them to move their policies slightly closer to the national mean, with more extreme states moderating their policies more. Second, where the states' preferred policies are too divergent, those states that are closest to the national median may vote to enact a national policy preempting state policies. To the extent that legislative institutions provide for it, such approaches are likely to lead to the implementation of more moderate policies than would be enacted by most states if allowed to act independently. Moreover, these national policies have the effect of completely eliminating costly policy variation across the states.

The paper discusses four different scenarios and their resulting equilibria. In the first case, the *Fully Decentralized* or *Weak Confederation* condition, states do not face a threat from the national legislature and so determine their policies solely on the basis of local preferences and the externalities that arise under nationwide policy variation. As a result, policies vary across the states proportionally to the heterogeneity in state preferences, but this variation is tempered proportionally to the cost of the externality so that when externalities are very costly, state policies converge toward the national mean—even if this mean differs from the national median. This environment is analogous to the early United States under the Articles of Confederation in which the federal government was severely restricted with respect to its legislative power and was left to rely on the states to handle externalities associated with policy variations across the states.

In the second case, the *Fully Centralized* or *Strong Federation* environment, the national legislature is constrained to preempt state policies. In this scenario, while the states still prefer the same policies as the first case, those policies are blocked in favor of the median state's most-preferred policy, regardless of any costs associated with the divergence of that policy from those preferred by extreme states. This scenario is analogous to the structure of many nations' governments in which the primary governing authority is the national government and local jurisdictions have relatively little authority on many matters.

The third case, that with the *First-Moving Legislature* or *Constitutional* structure, the legislature may choose whether or not to act, but must do so before seeing the policies chosen by the states. Where the externalities associated with policy variation are weak, the legislature will decline to act, allowing the states to select their own policies as in the first case. However, when the externalities are sufficiently costly, a coalition of moderate states may find it preferable to adopt a national policy at the median's ideal point rather than allow extreme states to retain their locally-preferred policies. In such a case, the moderate coalition will support action and subsequently see a national policy implemented. In this scenario, the legislature serves as a strategic actor determining whether or not to allow the states to act, and may be thought of in a manner similar to the Constitutional Convention that wrote the Constitution that ultimately replaced the Articles of Confederation. In writing the Constitution, the representatives of the states at the convention used their document to determine many policy areas that the national government was either expressly denied access to or solely authorized to set policy.

Finally, the last case, that of the *First-Moving States* or *Unconstrained* environment, allows the states to choose policies first and leaves it open to the legislature to decide whether to accept those policies or adopt a national standard to preempt them. Acting naively, the states would choose policies as in each of the preceding conditions and the legislature would act in the same scenarios with costly externalities that it did in the *Constitutional* condition. Under certain conditions, this incentivizes two groups to strategically choose policies that would be inefficient in the earlier case as part of an attempt to influence those legislators and states with semi-moderate preferences. These are the states that do not have the most extreme policy preferences, nor the most moderate preferences—neither the traditional extreme liberal and conservative states nor the swing states—and these states are pivotal in determining whther or not national preemption occurs.

Where these pivotal states are indifferent between adopting local preferences and elimi-

nating externalities with a national policy, the most extreme states may choose to moderate their own policies in an attempt to reduce the costs borne by the pivotal states and thereby incentivize them to support decentralization. On the other hand, the most moderate states that would benefit greatly from national preemption but still obtain a policy near their ideal point will be incentivized in turn to announce policies that are less-moderate—more extreme relative to the pivotal states—to push the pivotal state into supporting centralization. Moreover, these two efforts are likely to occur simultaneously, leading to a scenario where states setting their own policies must consider a trade-off between adopting inefficient policies in the first period that yield lower than necessary payoffs against the possibility that such inefficiency will lead to a much greater payoff in the decision of the legislature in the second period.

It is this last environment which provides the richest level of complexity and the widest range of possible outcomes in equilibrium. This is the condition under which many new policy areas are born and developed and under which there is both room for states to explore and experiment with policies according to local preferences before such policies are captured by the national government. As a prime example, I consider the ongoing case of GMOs which is pitting environmental and natural food advocacy groups against scientists and corporations while leaving farmers split. The resulting tug-of-war has seen some variation develop among the states both in terms of polling support for GMOs and in terms of the policies that have been enacting regarding those policies. I focus on one specific niche of this policy regime—that of GMO labeling—and demonstrate how Vermont's actions in that realm induced legislative action. More to the point, I my model explains how Vermont's action not only induced Congress to act, but did so despite continued widespread preference divergence over the nature of the national policy.

In the lead-up to Vermont's action, there was very little policy variation on the question of GMO labeling. In particular, there was very little policy at all, if only because the default

policy was one that did not require labeling, a position held by many states as evidenced by the defeat of numerous bills on the topic over the preceding decades. However, the in the years leading up to Vermont's passage of Act 120 in 2014, several states had made small steps to suggest a coming divergence among local preferences and a corresponding shift in polices across states. While some states, such as Alaska, provided highly-limited labeling requirements, others, such as Connecticut and Maine established laws demanding much stricter labeling—subject only to the constraint that the laws would not be enforced until sufficiently many nearby states also enacted similar laws. These policies, in a nod to concerns about policy variation and the associated costs to manufacturers and food providers, did not significantly move the observed policies of the states, but they did offer a signal that those states had preferences that diverged significantly from more conservative states that were simultaneously pushing to block labeling requirements elsewhere in the country. In conjunction with expected legislative gains in coming congressional elections, these developments served as a signal to Vermont in two ways: First, they signaled the coming maturation of the policy area in the United States and corresponding divergence of both preferences and policies among the states. With this, Vermont saw the coming costs associated with manufacturers working around this myriad of regulations. Second, the developments signaled that there was likely to be a favorable legislative environment at the national level controlled by an allied President and at least one allied chamber of Congress that would be willing to pass legislation similar to Vermont's in the absence of organized opposition in the House. These signals together induced many supporters of strict labeling requirements to support Vermont in its attempt to trigger costly externalities on interstate commerce through the adoption of an extreme policy and thereby force Congress to preempt the states lagging behind with less-strict labeling requirements.

Notably, while the initial goal of forcing Congress to act did come to fruition with the passage of the National Bioengineered Food Disclosure Standard establishing a uniform

national standard that preempted local state policies, the passage of time that occurred during the intervening period shifted the resulting contents of the legislation away from the median sought by the activists driving the legislation in Vermont. Instead, a notably bipartisan coalition of 22 of 44 Democrats and 47 of 54 Republicans (along with zero of two Independents) in the Senate joined 205 of 246 Republicans and 101 of 187 Democrats in the House and a Democratic President to pass standalone legislation which offered some labeling concessions to activists while only demanding limited concessions from opponents of mandatory labeling. Nonetheless, the national policy was established by the congressional action triggered by Vermont's move, and, in requiring labeling of any measure, it did move the national policy closer to Vermont's ideal point than it otherwise would have been.

Of course, in the opposing direction it is not inconceivable that, given time, policymakers in Vermont might well have recognized the prevailing congressional headwinds and attempted moderating its own policies again in an attempt to bring the region into more alignment and thereby reduce the costs of varying labeling requirements on manufacturers in the region. Alternatively, neighboring liberal states such as Maine and Connecticut might have passed legislation moderating their own policies and signaling support for limited heterogeneity among the states to reduce the burden of various labeling requirements. Such action, as demonstrated by the model, may well have slowed the need for legislative action at the national level and preserved the opportunity for Northeast states to maintain their strong stance against GMOs without interference. Such an action preempting preemption by Congress could then allow the states to maintain their unique preferences in the face of opposition from more conservative states elsewhere in the country.

This basic model also leaves several avenues for improvement that may be used to enrich the environment. While preferences here remain static across periods, lawmaking is a lengthy process fraught with roadblocks that slow down the introduction of new legisla-

tion. Individual states operate on different legislative schedules and do so in view of their neighbors, allowing those neighbors to anticipate policies that have not arrived yet and respond accordingly. Even where laws are successfully passed, legal challenges and practical roadblocks preventing immediate implementation may allow opportunities for other states to respond even where the national government does not. Incorporating these constraints into a more sophisticated model addressing the probability of a response. Moreover, these delays open the player to potential changes in state preferences as experienced by Vermont, when the United States Senate flipped to Republican control after the 2014 elections, eliminating an ideologically-aligned ally at the national level.

In the same vein, adding a temporal consideration to the model would allow for repeated games that are likely to support an eventual transition to federal control consistent with the predictions offered in Oates (1972). In the *Unconstrained* case, recall that whenever there is an incentive to act strategically, the states do so using mixed strategies which will probabilistically lead to centralization. Given that there is no mechanism in the model to reverse centralization, this would predict eventual centralization in a repeated game environment. Of course, allowing decentralization is a potential extension in its own right which can provide clarity on the trade-off between attempting to shift policy at the national level and removing national policies altogether.

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