

Local Rail Innovations: Antebellum States and Policy

Diffusion

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The American experience with railroads began in 1827, when the charter for the Baltimore and Ohio Railroad was approved by the Maryland state legislature. The Baltimore and Ohio was intended to run from Baltimore west to the Ohio River. Initially, the railroad was supported solely by private capital, along with a grant from the city of Baltimore. However, in 1828, the state of Maryland acquiesced to requests for state aid and provided support through subscribing to \$500,000 of stock in the rail company. By doing so, Maryland became one of the first states to directly support local railroad development, behind only the state of Pennsylvania and its support for the Mainline. Eventually, this small contribution would increase and the state would end up becoming one of the major stockholders in the company.

At first, the Baltimore and Ohio was not particularly impressive. Construction on the route was slow, and by 1830 only thirteen miles were completed. Further, travel on the route was not particularly swift since the train was originally powered by horses, and then later by a sail. At the time, the railroad was primarily used for passenger traffic, essentially linking suburban Baltimore with the city's center. However, before long, the railroad grew into a considerably more formidable enterprise. Just a few short years later in 1836, the

Baltimore and Ohio boasted a complete route to Washington D.C., revenues of \$260,000 a year, seven locomotives, over a thousand freight cars, and forty-four passenger cars. Freight demand for on the railroad was so high, the company was actually unable to keep up with demand (Stover 1997; Goodrich 1960; MacGill 1917; Riegel 1926). With the benefit of assistance from the state of Maryland, America's first railroad was an overwhelming success.

The story of the Baltimore and Ohio Railroad, with local rail development encouraged by state governments' action, was common in the antebellum period. State governments were involved in promoting turnpikes, canals, and eventually railroads as part of encouraging local economic development. While private capital was also central to American infrastructure development, including railroads, state support often provided a needed boost to jump start local infrastructure growth. With respect to railways, states subsidized and directed local rail development in several ways. First, states directly supported railroads by providing funds to railroad companies or by actually building railroads themselves. For instance, in Georgia, rail construction was actually undertaken by state agencies as a means to fill gaps in the local rail network that private capital was not meeting. Second, states provided indirect railroad aid by granting banking rights to railroad companies or through helping railroad companies obtain credit (Million 1896). For the states that engaged in such policies, rail promotion was a powerful tool for enhancing the local transportation network.¹

¹To illustrate states' rail promotion policies positive impact on local rail growth, Table 1 summarizes an ordinary least squares (OLS) regression demonstrating the relationship between state rail promotion policies and local railroad vitality. The dependent variable is the number of railroad miles in a state in 1860. The dependent variables are 1850 economic, political, and geographic factors, all obtained from historical census data (Haines 2005). The data are lagged a decade to allow for prior conditions to impact future events. The particular relationship of interest is rail support in the state, and its impact on miles of track. The value for rail support is ordinal, ranging from one to three. At the minimum, states offered no support for local railroads. At the maximum, states offered direct, robust assistance, such as direct grants to companies. The median value describes states that provided indirect support, such as utilizing state credit to assist private railroad companies in attaining capital. Notably, states with rail promotion programs also possessed more

In fact, during the antebellum period, it was state, rather than federal, support that fostered the growth of the American infrastructure network. Until the 1850s, the U.S. federal government played a minimal role in developing national internal improvements, including the emerging railroad network. Federal support was limited to post roads, engineering assistance in planning canals and railroads, as well as the clearing of harbors and rivers (John 1995; Hill 1957; Maass 1951). Outside of these minimal acts, the federal state was largely absent in the arena of transportation infrastructure. The numerous Congressional attempts to develop and construct a national system of canals and roads were largely thwarted by regional competition among states, whose elected officials feared an unequal distribution of federal infrastructure aid would supply greater benefits to rivals. Without federal leadership, state governments were compelled to address the problem of conquering antebellum American space. Thus, analyzing how American spatial development impacted future state building first requires examining how local rail promotion programs affected the burgeoning railroad network.

Though states were the primary source of antebellum railroad support, not all states were rail boosters. In fact, by 1860, only fifteen out of thirty-three states possessed railroad support projects of any kind. The large number of states forgoing public support for railroads is surprising, when farmers, industrialists, and military leaders were demanding improved infrastructure but national support was in short supply. Given that state support could significantly improve a state's rail network and that railroads were a key piece of economic development, state inaction on railroads is unexpected. Public choice theories would predict that successful rail promotion programs in some states would lead to

miles of track than their neighbors without such programs. Though the relationship between rail promotion and miles of track is not statistically significant, the finding is not inconsequential. Given the small sample size ($N = 31$) and the controls for other economic, political, and geographic conditions, the findings suggest that states with active rail support developed considerably more robust transportation networks than states that chose to forgo railroad promotion.

widespread rail adoption by neighboring states, as a means of keeping pace with competitors. Therefore, the first puzzle of how federalism shaped American spatial development is why, despite interstate competition and the lack of any railroad support from the central state, some states engaged in rail promotion and others did not. Further, given the large number of states who declined to engage in rail promotion, the case of antebellum railroad development offers a new perspective on both local policy adoptions as well as on the institutional capacity of the American republic before the Civil War.

Contrary to other policy areas, such as redistributive welfare programs, a state's decision to support railroads was not driven by policy choices in neighboring states. Rather, since rail development had high costs and long-term consequences, states generally decided to support railroads based on internal conditions. Specifically, states supported railroads when there was a shortage of local manufacturing capital, thereby utilizing state resources to compensate for local shortcomings. For the most part, antebellum rail development by states relied on practical considerations of local needs, rather than the demands of ideology or overzealous competition. The exception to this trend was when states had pre-existing economic rivalries with one another, and then competition among elites fosters limited policy diffusion between states. This process of policy development suggests that competition among neighbors was not a general phenomenon for all states. The implication is that states do not merely view their neighbors as economic rivals. Instead, interactions among states vary depending on the policy arena, and cannot simply be universally described as competitive. This variance in the degree to which states are competing with one another, dependent on policy arena, suggests that antebellum national state capacity could be both decentralized and capable, despite the absence of a strong central state.

1 Diffusion and State Railroad Policy

When state legislatures adopt new policy initiatives, their inspiration regularly comes from policy proposals in neighboring states. Yet, though a plausible causal mechanism, diffusion was not a major factor in American states' adoption of railroad promotion policies. In policy diffusion, states observe new programs in other states, notably their contiguous neighbors and states that are policy leaders in a given realm. When other states adopt successful programs or policies that improve local competitive advantage, observing states follow suit with similar policies of their own as a means to strengthen their own administrative capacity and economic vitality. Among states, diffusion is a common event, influencing state policy innovations from taxes to welfare policy (Walker 1969; Gray 1973). Due to diffusion, new policies move across the country in a piecemeal manner, becoming more prevalent as one state after another adopts policies in light of their neighbors' actions. However, while diffusion might be anticipated for rail promotion policies, it was not a major factor in state legislatures' decisions on their own rail development agendas.

As initial evidence that neighbors' rail policies did not impact state legislatures' own decisions with regards to railroad promotion, Figure 1 presents decennial maps of state rail policies for 1840-1860. The maps are coded according to state rail policy, according to a three point ordinal scale. At the lowest end are states that offered no support of any kind to local railroads. The median position indicates states that offered indirect rail support, such as banking rights or assistance in obtaining credit. Finally, at the highest end of the scale are states that offered direct assistance. These states built their own railroads, or provided funds directly to railroads. In Figure 1, states are coded on the type of railroad assistance provided at any point in the prior decade.

Figure 1 reveals that state rail policies often varied greatly from their contiguous neighbors. In effect, state rail promotion policies did not diffuse from state to state. The absence

of diffusion is especially noticeable in states such as Ohio. Ohio had a history of heavy investment in transportation infrastructure, supporting canal construction in the early 19th century. At the same time, Ohio's port cities, including Cincinnati, were engaged in competition with commercial cities in other states, notable Chicago and St. Louis. Yet, despite this history as well as strong economic and geographic similarities to neighboring states, Ohio's state legislature nonetheless decided against rail promotion policies, even as surrounding states adopted their own rail promotion programs. A similar lack of diffusion is present in much of New England, despite the rail promotion actions of Mid-Atlantic states. Further, the southern Gulf states also avoided rail promotion, despite the active rail policies of states such as Georgia and Arkansas. Thus, the mere presence of active rail policies in surrounding states does not lead a neighboring state to automatically engage in rail promotion.

The fact that rail promotion policies did not diffuse across contiguous states is especially surprising given the role competition serves in policy diffusion. Competitive diffusion is produced by the porousness of American federalism. State governments have no real control over their own borders, allowing people and capital to flow easily between states (Gray 1973; Peterson 1981; Hwang and Gray 1991). The result is as states compete with one another for capital and population, legislatures assume policies similar to their neighbors in order to maintain a competitive advantage and thereby maintain the interest of investors (Rom, Peterson, and Scheve 1998; Figlio, Kolpin, and Reid 1999; Bailey and Rom 2004).

Given their role in fostering a state's economic development, from a public choice perspective, local competition would be expected to play a major role in a state legislature's decision on railroad promotion policies. Business interests within states considered infrastructure policy as a vital part of economic growth, since infrastructure networks connected markets together. For example, after New York state funded the Erie Canal, Maryland

and Pennsylvania responded with their own internal improvements endeavors. Shipping interests in the urban centers of all three states had an intense interest in strengthening connections with the frontier, in order to further their own economic growth as major port cities (Burgess and Kennedy 1949; Pierce 1953). Additionally, there is abundant anecdotal evidence that suggests state rail development was often competitive across states. States regularly adopted different track gauges than their contiguous neighbors, and in one case the Pennsylvania legislature used its influence over railroad charters to discourage internal railroads from connecting with New York rail systems (Burgess and Kennedy 1949). Since railroads' contributed so significantly to local economic development, competitive diffusion driven by states attempting to keep pace with their rivals is a plausible explanation for the adoption of state rail promotion policies.

Further, in order for competitive diffusion to occur, legislators must be aware of policies in other states. Thus, there must be some mechanism for legislators to learn about neighboring states' programs, as well as the costs and benefits of those programs (Foster 1978; Mooney 2001; Berry and Berry 1990; Mintrom and Vergari 1998). Through such communication, social learning occurs. Effectively, these social learning observations allow state legislators to determine whether a new policy in another state is necessary in their own locale. Further, if the new policy would be beneficial in their home state, social learning allows state legislators to determine what the optimal size, funding system, and management structure of the new policy would be for their own constituents. State legislatures gain their information about other states' policies from numerous sources, notably social networks. Specifically, state legislators are connected to each other across state borders through professional associations, partisan ties, or even personal relationships. Through such connections, legislators can share information about local policies with distant actors in other states.

During the antebellum period, network connections allowing communication about railroads across state lines was common and surprisingly easy. Numerous national merchant journals, such as Debow's Review, provided information on railroad development in other states. Additionally, there were many national and regional railroad conferences, which brought together investors and elected officials to discuss railroading (Heath 1954). With these conditions, there was ample opportunity for railroad policies to spread through social learning. However, despite the role of railroads in economic growth and many channels of communication for state leaders to share their experiences with rail promotion policies, diffusion did not drive states' railroad programs. In particular, the many states who decided against antebellum railroad promotion underscore the absence of diffusion's effects on railroad promotion policies.

Despite both expectations and opportunities, rail promotion policies resisted diffusion for two reasons. First, since railroad development projects were large-scale projects with long-term consequences for the local economy, state legislatures engaged in them only after considering the costs and benefits for the local economy. Railroad projects could produce a great deal of wealth, or lead a state nearly to bankruptcy. Therefore, rail projects were not undertaken lightly, simply because other states were attempting active railroad promotion.

At the same time, the intensive evaluation of whether a rail promotion policy was necessary produced internal conflict within a state. States are not monolithic entities, and there is often intense competition within a state for finite local resources. Unlike many other state policies, such as regulatory schemes, railroads distribute benefits in a geographically specific manner. Thus, some areas of a state will be connected by state-sponsored railroads while other regions will be largely left out. For example, while Illinois was able to eventually launch a rail promotion program, this type of internal conflict over the state-built railroad's route resulted in the state attempting to build a line that was

over a thousand miles long. The railroad's cost was too great for a relatively resource-poor state such as Illinois, and that ultimately doomed the project to failure (Corliss 1950). In the case of railroads, the cost and conflict associated with railroad development hindered the diffusion of state rail promotion policies throughout the Union.

The exception to this absence of diffusion in railroad policies is when two or more states are direct economic rivals, with heavily overlapping economic interests in commercial shipping. In this case, states are driven by competition among elite business interests to keep pace with competitors in other states. Linked by professional associations, business elites are aware of rail policies in other states that enhance their competitors' shipping capacity. To maintain a competitive advantage, local elites lobby for similar rail promotion policies in their home state. Given a large enough threat to the local economy, intrastate rivalries are overcome and the successful diffusion of railroad promotion follows. However, diffusion of this type is a fairly rare occurrence, and does not account for the majority of state rail promotion plans.

2 Internal Conditions and State Adoption of Rail Promotion Policies

Instead of diffusion, states' internal political, economic, and geographic conditions determined their railroad promotion policies. Internal factors, such as local resources like tax revenue, the presence of policy entrepreneurs, or the size of local obstacles, regularly direct local policy decisions (Mohr 1969). Internal state characteristics are especially relevant for state policy decisions in areas of technology and infrastructure, including highway regulation and electricity commissions (Menzel and Feller 1977; Ka and Teske 2002). With their similarity to other technology and infrastructure policies, it is not surprising that

railroad promotion policies also arose dependent on a state's internal conditions, rather than through diffusion.

Internal conditions are important for state legislatures' decision to support technological developments, such as railroads, due to their centrality to local economic growth. Citizens demand state investment in rail projects only when there is no other means of developing local routes. Otherwise, citizens prefer to invest state resources in other economic projects, or even to lower the state's tax burden, as a means of maintaining a competitive edge over other states. Thus, given both the costs of rail projects and their central role in economic development, citizens and their state legislatures evaluate rail promotion projects based on local needs and the potential benefits of the program, rather than merely being pushed into action by rivals' programs.

Given this, states supported railroad developmental projects as a means to fill shortcomings in their economic infrastructure. Thus, I predict that agricultural states and states with small populations will utilize government action to compensate for significant infrastructure gaps that local private capital failed to meet. In agricultural states, there is insufficient private manufacturing capacity and capital to construct railroads through the entirety of the state. Yet, these states' economic success, both in terms of exporting cash crops and importing necessary goods, still requires a dense railroad network. Therefore, agricultural states turn to state action to supplement private railroad development. For instance, frontier states, including Missouri and Illinois, utilized rail promotion as a means to increase the speed of local railroad development. Though there may still be conflict over the railroad route, necessity will encourage compromise on rail policy rather than internal conflict over route determination leading to the demise of rail promotion programs.

In contrast, I predict that manufacturing states will be less likely to engage in rail promotion practices, since they possess sufficient industrial capital for infrastructure develop-

ment. In those states, railroads are already effectively provided through private actors, as occurred in Massachusetts. Since private capital is already building a capable rail network, there will be less public demand for state action on railroads. The result is that proposals for state railroad before the legislatures of manufacturing states will fail. Instead, the legislature could redirect the funds that would be spent on rail promotion to other policy areas, or else decide to simply maintain lower taxes. In sum, state aid is primarily utilized by states short in private resources to overcome the lack of local manufacturing capital, thereby providing the necessary infrastructure for future economic growth.

While economic conditions are the primary driving force behind the presence of state rail promotion policies, state politics and topography could also affect state legislatures' actions on railroads. Therefore, first, I expect that local political conditions determined whether there was an opportunity for state action on railroads, regardless of economic necessity. If the local political climate is not predisposed to state intervention in the economy, then state rail promotion policies are less likely. While demand for infrastructure was bipartisan in the antebellum period, Whigs (and later Republicans) were particularly insistent in advocating an active government, especially in internal improvements such as railroads (Holt 1999). Therefore, I predict that states with Republican and Whig governors are more likely to pass railroad promotion programs than states with Democratic political leaders.

Beyond local partisanship, the age of a state may also be relevant for whether states adopted a rail promotion policy. States that joined the Union later were wary of large infrastructure projects, after witnessing the damage large debt burdens accrued through infrastructure projects exerted on other states. For instance, in the 1830s many frontier states, such as Michigan and the territory of Florida, invested heavily in infrastructure projects. In the Panic of 1837, state assets lost value and infrastructure projects were not

yet returning sufficient tolls to sustain themselves. The result was financial hardship for many states (Larson 1984; Rodden 2004). Observing and responding to these events, many “younger” states, such as Iowa, passed state constitutions that explicitly restricted state investment in large public works projects such as canals, turnpikes, and railroads (Larson 1984; Hofsommer 2005b; Hofsommer 2005a). As a result, more recent additions to the Union are expected to be significantly less likely to engage in railroad promotion.

Finally, I anticipate that local geography impacts state legislatures’ evaluation of whether government action on railroad is necessary. Much as with local economic conditions, local geography directly informs how great the need for state railroad promotion actually is. States with significant geographic barriers are more likely to engage in rail promotion, in order to efficiently overcome the costs produced by local terrain and maintain their competitive advantage vis-à-vis other states. Therefore, large states with a great deal of area to be transversed, such as New York, are more likely to engage in rail promotion. Conversely, states with a great deal of water access, such as Louisiana or Ohio, are less likely to engage in rail promotion. When states possess numerous waterways, local connectedness was already high. Therefore, the state legislature would consider it unnecessary to spend resources on additional infrastructure. In addition, states with high water access have high costs in maintaining water routes, as well as vested interests that challenge aid for new, competing infrastructure projects. In light of these conditions, I anticipate that both large states and those states with poor water access will choose to engage in rail promotion schemes.

Rather than mirroring the decisions of their neighbors, rail policy will be determined by local physical and social conditions. Given that railroads were central to state economic growth, state legislatures might be expected to adopt rail promotion programs when their contiguous neighbors do so, as a consequence of interstate competition. However, unlike

policy areas such as education reform or welfare policy, rail promotion programs resulted from local conditions rather than neighboring states' policies. Specifically, state railroad policies were utilized to enhance the lagging aspects of the state infrastructure network. This lack of diffusion results from internal conflict within states over the structure of rail promotion projects, especially the potential route of state-supported railroads. This conflict, combined with the large cost of infrastructure programs, results in state legislatures relying on local needs rather than rivals' actions when formulating their state internal improvements agenda.

3 Ascertaining State Rail Strategies

To analyze the political conditions that led some state legislature's to adopt rail promotion policies, I utilized statistical models, geographical analyses, and historical accounts. The period analyzed is 1821-1862. The time frame analyzed captures the period just prior to the first state rail promotion legislation, which was Pennsylvania in 1827, up until the year when the transcontinental railroad project was undertaken by the federal government. With the advent of federal intervention, rail promotion shifted from a local into a national issue.

The analysis is built around an event history model, which estimates which factors led a state to "fail" and adopt a railroad promotion program. Specifically, a Cox proportional hazards model was estimated, with clustering by state. Unlike other event history functions, such as the Weibull or log-logistic models, there is no underlying assumption about the data's hazard rate in Cox models (Blossfeld, Glosch, and Rohwer 2007). This flexibility makes the Cox proportional hazard model the ideal function for the estimation.

The model estimates state i 's railroad policy in time t , as determined by political and economic conditions at time $t-1$ as well as geographic conditions at time t . The time frame

utilized is year. The dependent variable is a binary measure of whether or not states provided support for railroads in that year. Utilizing secondary historical sources, each state was coded according whether it possessed any type of rail promotion strategy for each year between 1821-1862 (Million 1896; Goodrich 1960; MacGill 1917; Hull 1969). Railroad promotion aid specifically refers to any support granted to a railroad, including banking rights, direct monetary grants, or the actual construction of a railroad by the state. The model assumes a single destination, and all rail support policies were treated as moving towards the same status, regardless of the type of aid provided. Once a state adopts a rail policy, it is removed from the population and cannot move between positions of supporting and not supporting railroads.²

$$\begin{aligned}
\text{RailPolicy}_{t,i} = & \alpha + \beta_1 \text{Neighbors}_{t-1,i} + \beta_2 \text{ManufacturingCapital}_{t-1,i} + \\
& \beta_3 \text{AgriculturalOutput}_{t-1,i} + \beta_4 \text{Population}_{t-1,i} + \beta_5 \text{Joined}_{t,i} + \beta_6 \text{Governor}_{t-1,i} \\
& + \beta_7 \text{Area}_{t,i} + \beta_8 \text{WaterAccess}_{t,i} + \epsilon
\end{aligned}
\tag{1}$$

In order to measure whether railroad policies diffused across states, the influence of other states policies on local rail promotion programs are measured. Neighbors are defined as all contiguous states sharing a border with the state. As is commonly done in policy innovation studies, and similar to the variables of economic conditions and political factors, the diffusion measures were lagged by one year, allowing for prior conditions to influence future policy decisions. Neighbors' rail policies were measured in three ways, and the model

²In offering rail support, states may have only given a single grant to one railroad or they may have engaged in a long-term rail promotion program. Regardless of which route a state pursued, once the state gave aid, it was considered as having “failed.” The data is structured in this way because states often intermittently provided rail support. For example, Missouri provided rail support in a series of discrete projects over many years. Tracking these small actions is difficult, and states were instead treated as simply either providing rail support or not.

was estimated three times: once for each measure of diffusion. The first two diffusion instruments measure neighboring states' rail policies, and weight all neighbors identically. First, a simple count of the number of border states with a rail policy was included. This measure is merely a simple total of how many of a state's neighbors have any type of a rail promotion policy.

Second, in order to account for the fact that some states possess longer borders with more neighbors, the average value of neighbor's rail policies was calculated. For the average rail policy measure, neighboring policies were coded on a three-point ordinal scale. States at the lowest end possessed no rail policy, while those in the middle offered indirect rail support, such as banking rights or assistance in obtaining credit. Finally, those states on the highest end of the scale offered direct support to railroads, such as direct grants of aid to railroad companies or state-built railroads. By coding the intensity of neighbors' rail policies, it is possible to ascertain whether states with bolder rail programs were more likely to push contiguous states to also adopt rail development schemes. It is plausible that states with especially ambitious rail programs, such as those that built entirely state-funded routes, would be seen as a particular economic threat. This greater threat might be more likely to encourage neighbors to assume a rail promotion program of their own, even if the program was less robust. As a measure of nearby states' policies, the count and average value variables offer insight into whether states adopted policies as a means of keeping pace with their closest rivals.

In addition to the first two measures, a third measure of neighbors' policies was developed by taking the average of neighbors' rail policies and weighting them by travel time between the states. By weighting the averages, space and communication are more directly incorporated into the model. The weighted value accounts for the role communication with political actors in other states served in local railroad policy development, thereby mea-

asuring how social learning from other localities influenced rail promotion decisions within states. If social learning from other states influenced railroad diffusion, states that are more closely connected would be more likely to imitate their neighbor's railroad policy, since higher connectivity would enhance both the flow of information between states along with the potential competitive pressure among states.

The averages were weighted by the travel times between states along existing transportation routes in each decade. To determine the weights, a closest facility network analysis was performed in ArcMap. The state shapefiles were derived from the Historical U.S. County Boundary Files, 1790-1999 (Carville, Cao, Heppen, and Otterstrom 1996). To perform the analysis, first the geographic center of each state was determined. Then, the river, canal, and railroad routes for the period of 1820-1860 were incorporated (MacGill 1917). In the simulation, railroad travel times were set at 25 MPH, while river and canal travel times were 12 MPH (Nye 1994). Finally, straight lines from the geographic centers of each state to the nearest rail, canal, and river vertexes were added (Beyer 2007). Those "roads," which linked state centers to the broader network, were assumed to facilitate travel at 7 MPH. With the network analysis, the length of time required to travel between two geographic points can be simulated.

Network analyses were performed for each of the decennial years during the period. Since transport networks developed slowly, the same travel time weights were utilized throughout each respective decade. In order to weight the measures, the inverse square of travel time was utilized. The inverse square is a common transformation in geographic analyses, and produces data where closer events exert a greater influence on a state's railroad policies than more distant ones. Finally, the weighted averages were divided by the variable's mean, to produce more readable results.

Beyond the diffusion measures, states internal characteristics, including economic, po-

litical, and geographic factors, were built into the model. While states are diverse, a median state interest was assumed for all internal factors. Local economic conditions were measured with historical census data. Measures for a state's manufacturing capital, agricultural output, and total population were all incorporated in the model (Haines 2005). Values for the years between censuses were interpolated.³ When added to the model, each of the variables was divided by the mean, in order to produce more sensible coefficients.

After economic conditions, the next potential internal factor that could impact state rail polices is local political culture. To capture these factors, two measures were employed. First, a measure of state political ideology was included. The proxy for state political ideology was the governor's partisanship. The governor value was binary, with Whig, Republican, and Opposition governors coded as one, while Democratic governors were coded as zero. Since the governor is both a locally elected office and captures the opinions of the entire state, the governor's partisanship is an ideal proxy for state political attitudes. Data on historical governor's partisanship was obtained from the National Governor's Association (Association 2008). Second, a variable for the year each state joined the Union was also added. The year joined variable is intended as a control for frontier states. Western states often had restrictive constitutions which prevented them from aiding in infrastructure projects, as a means to avoid the debt burdens that plagued others states. In addition to economic and political factors, measures for internal geography were included in the analysis. First, a value for a state's area in square miles was factored into the model. The area measure was also divided by its own mean. A measure for the percentage of a state's counties with water access was also incorporated. Both measures capture local topography, which could plausibly have impacted states' infrastructure needs.

³In some cases, the census data point for the prior decade was not available, either because that value was not collected in an earlier census or a given state was not admitted to the Union. In those instances, the slope for projecting between the last census available and the next decade was used to predict backward as well. When that simulated value was negative, it was treated as missing data.

Finally, there are persistent concerns in event history models that observations do not possess a flat hazard rate. In effect, some dependent variables change with time, which will produce biased results (Box-Steffensmeier and Jones 2004). In order to correct for this problem, a temporal dependence control must be incorporated into the model. While there are many suggestions for addressing this problem, the solution adopted here is to include a duration dependency covariate as a control (Wong and Langevin 2007). To develop the control, a locally weighted regression on the probability of a state adopting rail support was performed on the time variable. The results of the regression are then incorporated into the model as an additional covariate.

Beyond statistical analyses, historical comparison is utilized to expand upon the findings. Historical comparison controls for potentially confounding factors by examining similar cases, while still isolating variation in causal variables (Amenta 2003). As a method, historical analysis also provides context for events, expanding on causal forces only suggested by statistical modeling. In diffusion studies, historical analysis is especially useful for identifying causal mechanisms with greater confidence (Savage 1985). The cases examined here are historical accounts of railroad promotion in Georgia, Alabama and South Carolina, as well as in New York, Maryland, and Pennsylvania. As major transportation states, the cases included are significant instances of state action that offer insight into the political process of state rail promotion. Further, within each set of cases, variables such as economic form and political environment are controlled, while variation across the two regions adds robustness to the conclusions. Through relying on secondary historical accounts, a more detailed overview of the antebellum political environment and the causal factors furthering and frustrating state's rail promotion agendas is highlighted.

4 Results

The findings indicate that a state's internal conditions, rather than diffusion, accounts for the adoption of rail promotion programs. The output of all three Cox proportional hazard models are collected in Table 2. To summarize the models, the Wald statistic reveals that each model contains a variable that is significantly different than zero, but the third model is the most robust. As hypothesized, a state's internal factors do play a major role in rail promotion decisions. Notably, states with lower levels of manufacturing capital tended to be more likely to engage in active railroad promotion policies, from helping rail companies obtain credit to the state itself actually building a railroad. Further, in the first model, states with larger agricultural output were more likely to engage in rail promotion programs than other states. Thus, state action on railroads occurred when local private resources were insufficient to provide indigenous railroads, and rail infrastructure could only be provided with government assistance.⁴

These findings are striking since railroad capital was not always a local affair. Many railroads were funded by outside interests, particularly as urban businesses in other states attempted to gain access to new markets (Cronon 1992). Yet, despite the availability of capital from other states, a lack of indigenous manufacturing capital still led states to utilize government power to encourage rail growth. Manufacturing capital could be a proxy for another facet of the state's resources, such as bureaucratic strength. However, the more likely explanation is that while outside investors were interested in accessing materials within states which lacked manufacturing capital, the cost and subsequent risk of

⁴Figure 2 displays the distribution of manufacturing capital and agricultural output by year. In the manufacturing capital graph, the state with the highest manufacturing capital is Massachusetts. With such a considerably larger degree of manufacturing capital than other states, this datum could be biasing results. However, leaving Massachusetts out of the data set produces no substantively different results. For agricultural capital, the distribution is less extreme. Further, the largest agricultural production state was Ohio, a state which did not engage in rail promotion. Thus, it is unlikely that its large agricultural output biased the results.

investment was too great. As a result, there were too few external private actors willing to fund local roads, as well as insufficient local capital to begin a railroad endeavor. Numerous frontier states faced this dilemma: despite having rich natural resources, railroad construction was slow. Thus, Illinois and Missouri engaged in state rail promotion, and Iowa's cities and counties utilized municipal bonds to encourage rail construction (Larson 1984; Corliss 1950). Through public action, states that lacked industrial resources could provide a basic railroad foundation. By doing so, investors were reassured and more willing to contribute to future railroad development. Hence, rather than being undertaken by wealthier states, public rail promotion was utilized by state legislatures to address lacunae in their local economic infrastructure.

Another potential economic factor driving state legislatures decisions on rail promotion policies was local debt. For instance, Ohio's costly canal system could have prevented future state railroad promotion. However, state per capital debt is actually a poor predictor of local rail promotion choices. Utilizing state debt per capital for the year 1841, the correlation between state debt and rail policy adoption after 1841 is -0.011, implying that lower debt states were more likely to engage in rail promotion. (Rodden 2006).⁵ But, the relationship is exceptionally weak. Table 3 summarizes the relationship between state debt and local rail promotion policies. While all three states that engaged in rail policies after 1841 tended to have low debt levels, the table also reveals that states with both high and low debt levels elected to not engage in rail promotion policies. Some of the states included in the correlation were frontier states whose spending on internal improvements were limited by their constitutions. But, at the same time, wealthier northeastern states, from Connecticut to Ohio, with no such restrictions also decided against railroad promotion. Similarly, Alabama and Arkansas had similar economies, geographies, and debt levels, but

⁵Only three states both engaged in rail promotion policies after 1841 and all were included on the roster of state debt: Kentucky, Arkansas and Ohio.

nonetheless embarked on very different railroad promotion schemes. In Alabama, there were even business interests arguing for state-based rail aid, as a means to enhance the local port and improve their competitiveness in the region (Cline 1997). Yet, in spite of the interest in rail packages and a debt level comparable to Arkansas, Alabama's state legislature never endorsed railroad action. The lack of significance shown by a state's debt is not surprising, since presumably states are willing to engage in debt-generating practices out of the hope that future payoffs will offset current deficits (Peterson 1981). Though it plausibly could impact local development plans, compared to other internal economic factors, internal debt is not a driving factor in states' rail promotion policy choices.

In contrast to the local economy economy, local political factors had a minimal impact on state railroad policy innovations. For instance, the year a state joined the Union played no role in whether states adopted rail promotion policies. Similarly, the governorship of the state was not a significant influence on state rail promotion strategies, in contrast with theoretical expectations. A possible explanation for this lack of statistical significance is the positive correlation between manufacturing states and Whig/Republican governors. In other words, the Whig/Republican party tended to be stronger in the manufacturing North, while Democrats dominated the agricultural South. Therefore, it is plausible that Republican governors oversaw states with minimal need for state intervention due to an abundance of local capital, despite an ideological predisposition towards a vigorous, interventionist state.

However, the correlation between manufacturing capital and Republican governorship is a modest 0.18, and dropping manufacturing capital from the models actually results in a negative coefficient, suggesting that Republican governors were less likely to oversee rail promotion than their Democratic counterparts. Given that railroad promotion projects were often undertaken due to necessity, local partisanship is most likely just a poor predictor

of whether a state will enact a rail promotion policy. Rather, practical demand simply trumps ideology. Thus, in many cases, local ideology may simply have had no meaningful relationship with states' railroad schemes. The same citizen concerns that resulted in state legislatures relying on local conditions rather than neighboring states policies also challenged partisan preferences. For instance, Democrats, including both James Calhoun and Stephen Douglas, were significant supporters of state action on railroads (Larson 2001). Hence, citizens and business elites pushed for rail promotion programs when they were needed, regardless of their ideological predispositions.⁶

Finally, the tests of geographic conditions' impact on state rail policy also returned results contrary to the theory's predictions. First, state size had no sizable impact on whether or not a state engaged in railroad promotion. One potential cause of this finding may be that larger states also tended to be newer, Western states, such as Texas or California. In fact, year joined and area are strongly, positively correlated. However, when year joined is removed, the results for area, though significant, are also negative. Thus, larger states were actually less likely to engage in rail promotion than other states. Physically larger states may merely have shied away from rail promotion because the costs were simply too great. Building a meaningful railway system in California would require tremendous investment and a significant tax burden, with uncertain results. In contrast, in a mid-sized state such as New York or Georgia, a substantially small investment could produce railways that connected economically significant sites together. Thus, while local necessity drives many states to invest in rail networks, the relationship is not necessarily linear. If the cost of state support rail infrastructure looms too large, state legislatures once again refrain from

⁶Since the finding on Republican governorship was unanticipated, a second test was performed, since it is possible that governorship is simply a poor measure of state ideology. Elections for governor are fairly rare events. Further, as a binary variable, the measure may simply have lacked sufficient variation. Therefore, a second model was estimated with local ideology measured through averaging the D-NOMINATE scores of the state's Congressional delegation (Poole and Rosenthal 1997; Poole 2007). However, in no case was the measure significant, and its inclusion did not significantly alter values of the other coefficients.

risky infrastructure projects in order to avoid insolvency and potential economic disaster.

Further, rather than opposing rail promotion, states with a higher degree of water access were actually more likely to engage in railroad promotion. Though surprising, this result most likely reflects a states' shipping interests seeking to maintain their competitive advantage. States with a great deal of water access frequently rely on shipping and their status as transportation hubs for their economic success. Initially canal and river interests often attempted to use political leverage to stall railroads from spreading. For instance, in New York, business interests centered on the Erie Canal attempted to strictly regulate railroads as a means to restrict their efficiency (Pierce 1953). Yet, eventually even in states with a great deal of maritime and river shipping, railroads' advantages, in terms of speed and access, became obvious. In order to maintain the status of the major shipping cities that appeared along river routes and in ports, states with water access turned to rail support to maintain their role in the national economy as well as to overcome any shortcomings in their own rail development that resulted from their initial reluctance to embrace the new technology. As a result, greater water access led states to embrace active rail promotion. Though my theoretical predictions were incorrect in some cases, the analysis nonetheless confirms that local economic conditions, notably a dearth of manufacturing capital, resulted in states undertaking rail promotion schemes.

What is also apparent in Table 2 is that diffusion was not a factor in the spread of railroad promotion. As predicted, the models indicate that neighbors' policies had very little meaningful impact on state legislatures decisions with respect to rail promotion, regardless if whether neighbors' policies were measured either by their mere instance or intensity. The one case where diffusion did impact states' rail policies was in the case of social learning. However, state legislatures actually tended to develop rail policies that contrasted with their nearest neighbors' programs. In sum, no matter how it was measured, diffusion

was not a significant factor in states' adoption of rail promotion programs, particularly in comparison to internal economic factors.⁷

Another interpretation of the negative social learning finding is that states witnessed problematic rail promotion schemes in other states, where rail promotion schemes failed at great expense to state revenues. Therefore, in light of these risks, other state legislatures may have decided to forego their own railroad promotion plans. Given economic depressions and large state debts incurred through earlier canal schemes, this alternative hypothesis is a distinct possibility (Rodden 2006). However, negative learning is an unlikely explanation for the failure of rail promotion policies to diffuse. First, the variable for year joined controls for states that entered the Union later and were also more likely to have constitutional provisions preventing state rail aid. Despite this control, the social learning measure is still negative, suggesting that state's were not declining rail promotion as a means to avoid economic pitfalls their neighbors' faced.

Additionally, rail promotion programs were both competitive in nature and long-term in structure. These features combine to make negative social learning a risky and unlikely approach for state legislatures to take when formulating their own rail promotion platforms. Rail promotion programs often took several years to move from the planning stage into implementation (Heath 1954). Then, it would be several more years before a state's success or failure with the program would be evident. Given how fierce economic competition among states is, in order to stay competitive with their rivals, state legislatures would not necessarily have the time to gauge the impact of rival's rail policy before making their own choice. If a state legislature waited, it could end up falling behind in rail infrastructure and suffering permanent economic losses due to that decision. Furthermore,

⁷Since they are not contiguous with the other states, it is possible that California and Oregon could have biased the results against diffusion. Therefore, models were estimated with both Oregon and California dropped from the model. However, the results returned were nearly identical, underscoring that diffusion was not a major factor in the emergence of state rail promotion programs.

there were numerous examples of successful rail promotion policies, in many states across the country. These successes included Missouri, Michigan, New York, Pennsylvania, South Carolina, Georgia, and Maryland. In all of these cases, state action prompted economic development via hastening railroad construction. Thereby, the negative coefficient on the weighted average variable suggests not negative social learning, but rather that states' local rail promotion schemes were not at meaningfully related to their neighbors' decisions.

Given the surprising result of finding no role for diffusion in states' rail policy innovations, a second test for diffusion was conducted. If diffusion occurs, spatial clustering should be found among states. In other words, states that are found near one another should possess similar rail policies since competitive pressure and communication would be greatest among contiguous neighbors. These regional competitive pressures should result in states that are near one another adopting similar rail promotion strategies if diffusion is occurring. To test this proposition, a series of Moran's I tests to detect spatial autocorrelation were performed. A Moran's I reports a score of how clustered an event or variable distribution is in space, as well as a z-score measure of significance. Table 4 summarizes the Moran's I scores for state rail promotion clustering in the decennial years from 1830 through 1860. States were coded on the one through three scale, to indicate the intensity of local rail promotion programs, with the score dependent on whether the state adopted a rail promotion scheme at any time prior to the given period. The results of the Moran's I tests indicate that, for the most part, there was not significant clustering of rail promotion policies during the antebellum period. Put another way, rail promotion policies were randomly distributed across space, underscoring the inability of diffusion to explain state rail promotion innovations.

However, mapping the diffusion of rail policies suggests a more nuanced conclusion than simply asserting that diffusion never occurred. Returning to Figure 1, the maps suggest

limited clustering in certain areas. For instance, New York, Pennsylvania, and Maryland all engaged in rail promotion policies. Clustering in the Mid-Atlantic is especially surprising, giving the high levels of manufacturing capital available in the area. Presumably, those states would have had sufficient local capital available to fund railroads through private means. In addition, clustering is visible in Missouri, Illinois, and Michigan as well as Virginia, Georgia, Tennessee, North Carolina and South Carolina. Thus, a limited type of diffusion appears to be occurring, just not on a regional or national scale.

For the most part, diffusion did not drive state legislatures railroad promotion policies, except in a specific subset of outlier cases where competition among states is especially intense. For example, railroad development in the Atlantic South began with South Carolina. In the 1830s, South Carolina found itself in an economically weak position. Despite healthy cotton crops, South Carolina was exporting relatively little cotton compared to its neighbors. In particular, Charleston, South Carolina found its shipping business being siphoned off both by smaller towns appearing upland along the Savannah River as well as by Savannah, Georgia. In an attempt to become the South's commercial center, Charleston's leading residents quickly turned to transportation infrastructure as a means to advance their own economic position. The result was the Charleston and Hamburg railroad, which at 136 miles, was the longest railroad in the world at the time of its completion in 1833 (Derrick 1930). Furthermore, South Carolina's railroad was an economic success, and diverted a significant amount of traffic back to Charleston.

After obtaining early successes in rail promotion, Charleston's interests continued to seek economic growth through infrastructure development. Seeking to pull even more traffic through Charleston, boosters pushed for a western railway that would cross the mountains and link the port with the growing frontier. In 1836, the Knoxville Convention brought together representatives from numerous states, including Georgia and many west-

ern states, to deliberate on the possibility of building state-supported railroads from the Southern Atlantic coast into the continent's interior (Derrick 1930; Heath 1954). Though a plan was developed in which South Carolina would collaborate with North Carolina, Tennessee, Kentucky, and Ohio to build a continuous railroad from Charleston to Cincinnati, the program never came to fruition. In large part, the plan floundered due to bickering over local advantage among the partner states. Significantly, business interests from Georgia were present at the railroad conference, and aware of South Carolina's plans (Heath 1954). These elites were inspired to bring this information back to Georgia, and use it to successfully push for a rail promotion agenda in their home state.

In Georgia, there was an existing demand from local manufacturing and shipping interests for a state-sponsored railroad, pre-dating South Carolina's discussion of Western access. Much as in South Carolina, the push for state involvement in the railways began with local shipping elites' concerns for their own commercial enterprises. As early as 1831, various non-coastal cities as well as the governor, Wilson Lumpkin, advocated state support for railroad construction. The largest support for the railroad originated from the northern center of the state, where elites in the growing population and manufacturing center of Athens sought improved shipping infrastructure. However, support for the rail network was not unanimous, and southern coastal regions already sufficiently served by Savannah opposed state railroad construction (Heath 1954). Though improved transportation infrastructure was an economic necessity in Georgia, early attempts to apply state resources to constructing railroads were initially quashed by internal competition between different regions of the state.

Internal conflict plagued state rail promotion plans in other states, as well. In Illinois, representatives from every geographic corner of the state demanded inclusion on the proposed rail plan. As the bill matured, the size of the proposed plan continued to grow as a

means to quell dissent. Eventually, the program collapsed under its own size due to massive debt (Corliss 1950; Stover 1975). Similarly, while Iowa did not have a state-sponsored railroad, counties and municipalities did offer inducements to rail companies. Due to local competition among localities, Iowa's railroads were built slowly and haphazardly, as companies reoriented to obtain local government support. Thereby, Iowa failed to produce a coherent rail system that effectively linked the state together (Hofsommer 2005a; Hofsommer 2005b; Larson 1984). Since rail policies exert differential impacts on various locations within a state, local conflict makes rail promotion schemes difficult to shepherd into being. However, when there is an overwhelming need for state action, due to either a lack of local capital for railroads or competition with other states, state legislatures manage to broker a compromise and successfully introduce state rail promotion programs.

In the Atlantic South, competition with South Carolina over regional shipping dominance ultimately prodded Georgia's legislature to a successful compromise on state-supported railroads. As South Carolina prospered from its own railroads, Georgia's coastal regions began to warm to the idea of a state-sponsored railroad in the state's central region. Through expanding the plan to include branch lines throughout the central and western parts of the state, in 1836 Georgia's state legislature finally passed a bill to begin the construction of its own state-supported railroad. Though ultimately a failure, South Carolina's elites' attempt to expand their own railroad network beyond their state's border inspired action in Georgia. Primarily, there was a growing concern in Georgia that South Carolina would breach the western mountains first, leaving Georgia stranded in a secondary economic tier. This concern was sufficient to motivate Georgia's elites to develop a compromise plan, and eventually construct a state-built railroad.

Further, the case of limited diffusion between Georgia and South Carolina also still underscores the impact of local conditions on rail promotion strategies. With its rugged

landscape and lack of capital in the northwestern portion of the state, Georgia undertook a very active and aggressive rail promotion scheme. While Georgia was spurred to action by South Carolina's rail plans, Georgia's legislature did not copy the indirect support favored by its wealthier neighbor. Hence, in the case of Georgia and South Carolina, a pre-existing economic rivalry over trade on the Atlantic Coast spurred diffusion, though with distinctions, between the two states.

The diffusion of policies among highly competitive states is not confined to southern states, as evidenced by a similar process that unfolded in the mid-Atlantic. In the antebellum period, Pennsylvania was competing with both New York and Maryland to become the region's major port city. In particular, all three states were actively seeking to dominate Western trade. At the time, Pennsylvania was competing with Maryland's state-supported turnpikes and railroads as well as the state-supported Erie Canal in New York. To respond to these efforts, Pennsylvania undertook a major infrastructure plan of its own in 1827. In the first instance of railroads being supported by public funds, Pennsylvania's state legislature set out to build the Pennsylvania Mainline. The Mainline contained both canal and rail sections, and its goal was to cross the mountains and to then dominate trade in the Northwestern frontier (Burgess and Kennedy 1949; Wilson 1899). Rather than reflecting internal political or economic conditions, such as a shortage of local capital, Pennsylvania's rail promotion efforts resulted from diffusion as a consequence of competition with other states.

In response to rail development in other states, New York state eventually reciprocated by also investing in a rail network. Much as in Georgia, demands for state support for railroads in New York began early, driven by cities not included on the Erie Canal route. New York's rail proponents argued that better transportation was central to their economic growth (Stevens 1926; Pierce 1953). Initially, the high degree of water access in New York

stalled progress on a state-supported rail system. In particular, canal interests in the state actively worked against state support for railroads, as a means to protect their own investments (Pierce 1953; Harlow 1947). However, as other states invested in railroads, New York was ultimately compelled to respond. In particular, as Boston-based railroads began to reach markets in New York, support for state railroad aid in New York suddenly increased rapidly (Harlow 1947). Much as in the South, New York and Pennsylvania adopted state promotion programs primarily as a result of localized competition to dominate regional commerce.

Generally, competition was not a factor in railroad diffusion, outside of a few particular cases. The implication is that states are not necessarily competing equally with all of their neighbors. The mere presence of a rail policy in neighboring states, regardless of how closely connected the states are or how many states adopt the policy, will not necessarily trigger a similar response from a state legislature. But when states are actually directly competing for the same limited resources, then they are much more likely to imitate each other's policies. However, for the most part, states are indifferent to their neighbors infrastructure policies. Rather, neighboring states may actually be potential collaborators, with states cooperating with one another for everyone's benefit. The result is that state legislatures relied on local conditions and demands, instead of diffusion, when crafting their local rail policies.

5 Discussion

In the antebellum period, railroad policy innovations within states were not directly influenced by actions in other states, contrary to other policy arenas. Instead, developmental policy innovations were driven by specific, local conditions. In this way, rail promotion policies were similar to other infrastructure and technology policies, such as contemporary

highway regulation. Most notably, states pursued railroad promotion projects to overcome particular shortcomings of their present economic systems, using state power to address needs that private interests proved incapable of correcting. For instance, rail promotion projects were more common in states lacking adequate manufacturing capital because, in these states, the state was the only viable entity to address an economic need that private actors were not meeting. Even though the central state was not driving rail construction during this period, state governments stepped in and were able to successfully encourage rail promotion where it otherwise might have lacked.

However, while not the primary force behind rail promotion programs, diffusion did play a small role in the spread of railroad innovation policies. In specific circumstances, where states were directly competing with one another for economic dominance, a limited form of rail policy diffusion did occur. While states are not competing with all of their neighbors, they are cognizant of and inspired by policy developments in their closest rivals. In these instances, as economic elites gain knowledge of rail aid in rival states, they attempt to secure similar local advantages for themselves.

Additionally, it is important to note that though diffusion was not a driving force in states adopting rail promotion schemes, this does not mean that other states' railroad policies never influenced local rail development. Rail promotion is only one aspect of a state's railroad infrastructure. The long-term regulation and planning of the railroad are distinct processes, which could be influenced by events in other states. It is these long-term development processes that the next chapter specifically addresses.

The findings on railroad innovation raises questions with regards to diffusion and infrastructure policies more broadly. Political scientists generally argue that diffusion is a common force driving policy innovations at the local level, especially for regulatory and redistributive policies. Yet, diffusion was not a major factor in railroad policy innova-

tions, despite the importance such developmental projects serve in interstate competition. This unexpected finding suggests that innovations in infrastructure policies, and perhaps economic development programs more broadly, occur for different reasons than policies in other arenas. Instead of diffusion, infrastructure programs derive from a state's internal conditions rather than neighbor's actions. More research is needed to determine whether this finding applies across other developmental policies, including not only infrastructure systems, such as highways, but in other areas as well, such as job training and economic stimulation programs.

Beyond the implications for policy diffusion, an emphasis on state railroad programs also emphasizes both the importance of state governments and geography in American state building. First, antebellum railroad development underscores that initially American state building was almost exclusively a local affair. American political development theories tend to emphasize the growth of the national administrative state, notably the central bureaucracy (Skowronek 1982; Bensel 1995; Bensel 2000). But with its federal structure, American political development involved more than action at the national level. Increasingly, American political development theories emphasize the role of local governments in driving federal policy or providing necessary national resources, such as military support or health care (Teaford 2002; Katznelson 2002). Along these same lines, transportation development was an important public resource provided by local governments. By examining state railroad programs, the current analysis furthers the literature on how local governments factored into developing national capacity through decentralized action.

Additionally, the present analysis also sheds light on the role of space and geography in American political development. Space plays an important role in defining social relations among individuals and institutions (Mann 1986; Harvey 2000). The built environment directly influences communication, shipping, and travel in nation-states, shaping

core/periphery relations as well as political centralization. Given the role of the frontier in American political history, the spatial problem is particularly salient for American state building theories (Turner 1996; Stegner 1954). My emphasis on railroad building during the antebellum period raises the issue of how local infrastructure projects affected America national capacity building. By encouraging rail development where infrastructure was otherwise insufficient, state rail promotion undeniably improved national capacity by improving the nation's internal improvements network. The next question that requires further attention is whether these local projects actually operated efficiently with one another across state borders, and thereby truly furthered national state building through decentralized decision making.

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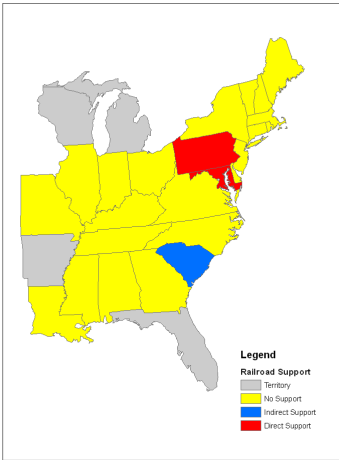
Table 1: Ordinary Least Squares Regression of the Impact of State Rail Policies on Miles of Track Within a State, 1860

| Variables ^a | Coefficients |
|-------------------------------------|---|
| <i>Political Factors</i> | |
| Rail Support | 159.51 (121.22) |
| Republican Governor | 74.88 (220.00) |
| <i>Internal Demographics</i> | |
| Population | 0.00022 ^{***} (0.00008) |
| Manufacturing Capital | -2.23x10 ⁻⁶ (5.21x10 ⁻⁶) |
| Agricultural Output | 0.000017 ^{***} (3.91x10 ⁻⁶) |
| <i>Geographic Conditions</i> | |
| Area | 0.00028 (0.0016) |
| Adjusted R ² | 0.69 |
| Number of Observations | 31 |

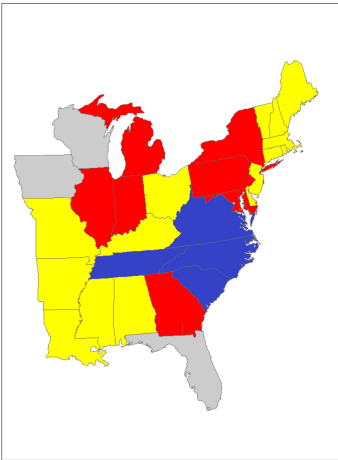
*** denotes significance at 0.01 level.

^aThe dependent variable is the number of miles of railroad track within a state in 1860. The independent variable of interest is a state's rail promotion program in 1850. The ten year lag allows for the policy decision in 1850 to exert some type of impact. The remaining variables are control variables. The state rail program data was developed primarily from Million. The other variables are from historical census data, retrieved from ICPSR Data Set 2896.

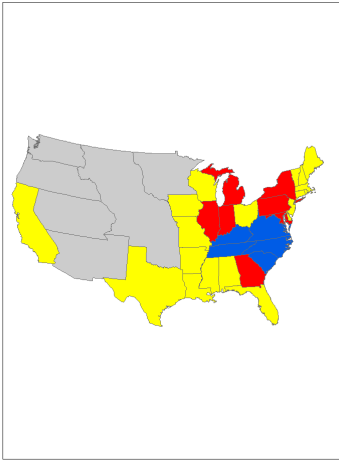
Figure 1: Diffusion of State Railroad Policies in the Antebellum Period, By Decade



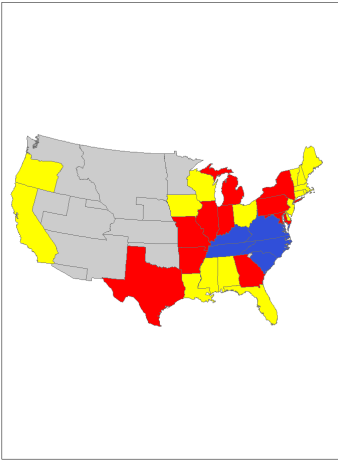
(a) 1830



(b) 1840

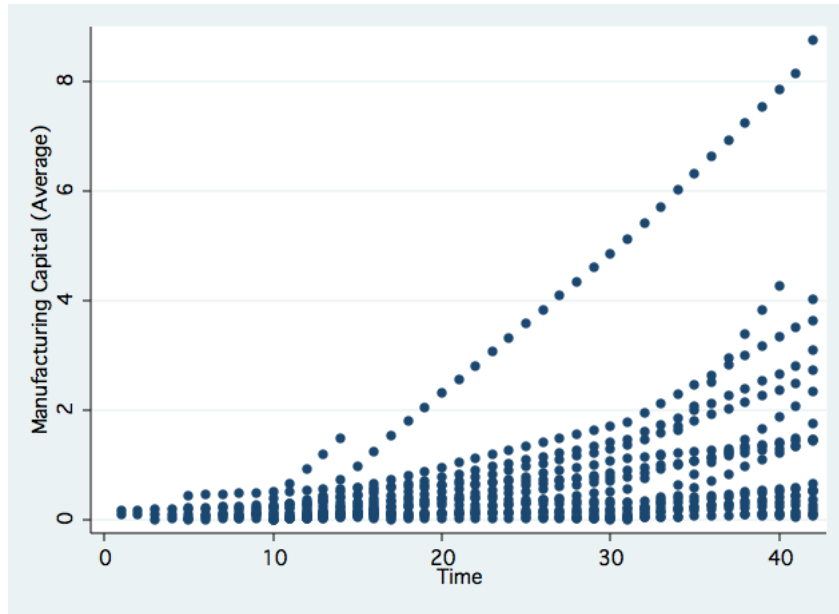


(c) 1850

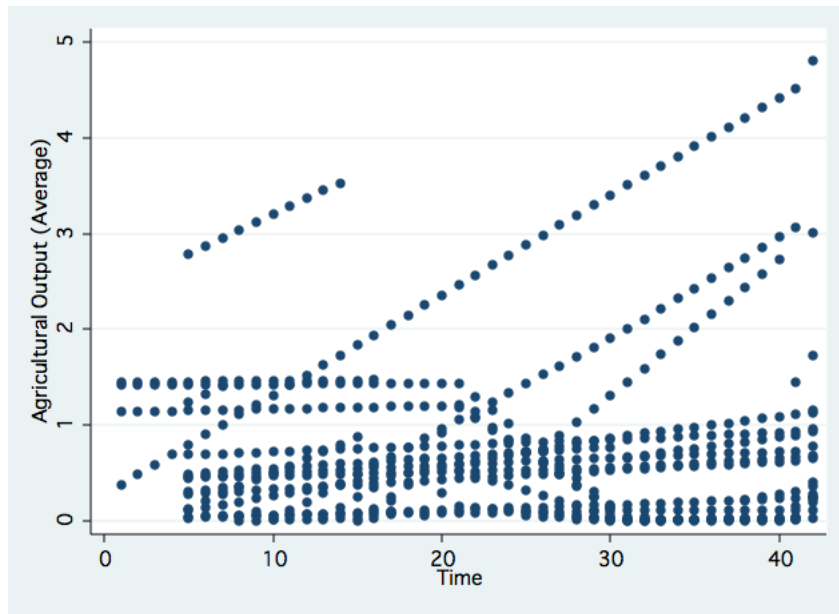


(d) 1860

Figure 2: Distribution of Manufacturing and Agricultural Capital, 1821-1862



(a) Manufacturing Capital



(b) Agricultural Output

Table 2: Cox Event History Analysis of the Diffusion of State Rail Promotion Programs, 1821-1862

| Variables ^a | Model 1 | Model 2 | Model 3 |
|-------------------------------------|---------------------------------|-------------------------------|------------------------------------|
| <i>Diffusion Variables</i> | | | |
| Neighbor Count | -0.30 ^{***} (0.081) | - | - |
| Neighbor Average | - | -0.36 ^{**} (0.14) | - |
| Neighbor Weighted Average | - | - | -355.21 ^{***} (84.024) |
| <i>Political Factors</i> | | | |
| Republican Governor | 0.0044 (0.18) | 0.011 (0.18) | -0.021 (0.17) |
| Joined | -0.0028 (0.0062) | 0.00096 (0.0074) | -0.0023 (0.0072) |
| <i>Internal Demographics</i> | | | |
| Population | -0.012 (0.096) | -0.21 (0.45) | -0.24 (0.37) |
| Manufacturing Capital | -0.19 ^{**} (0.085) | -0.17 [*] (0.10) | -0.078 (0.072) |
| Agricultural Output | 0.40 ^{***} (0.13) | 0.29 (0.19) | 0.16 (0.14) |
| <i>Geographic Conditions</i> | | | |
| Water Access | 0.71 ^{***} (0.20) | 0.72 ^{***} (0.25) | 0.51 ^{**} (0.23) |
| Area | -0.24 (0.20) | -0.32 (0.18) | -0.33 (0.29) |
| Wald Chi Square (<i>df</i>) | 841.06 (9) | 772.02 (9) | 239.38 |
| Overall Model Significance | 0.0000 | 0.0000 | 0.0000 |
| Number of Observations | 545 | 545 | 472 |

* denotes significance at the 0.10 level.

*** denotes significance at 0.01 level.

^aThe dependent variable is period when a state developed a rail program, as measured in years. The independent variable of interest is the measure of neighbor's rail policies, including a count of neighbors' rail policies, the average of neighbors' rail policies, and the average neighbors' rail policies weighted by travel time between the centroid of the states. The data was developed from historical census data in ICPSR Data Set 2896. Information for state rail policies was derived primarily from Million 1896.

Table 3: State Per Capita Debt and Railroad Promotion Policies, 1841-1862

| No Support ^a | Indirect | Direct |
|--------------------------|--------------------|---------------------|
| Connecticut (0.00) | Kentucky (3.96) | Missouri (2.19) |
| Delaware (0.00) | | Arkansas (27.43) |
| Iowa (0.00) | | |
| New Hampshire (0.00) | | |
| New Jersey (0.00) | | |
| North Carolina (0.00) | | |
| Rhode Island (0.00) | | |
| Vermont (0.00) | | |
| Maine (3.46) | | |
| Ohio (7.19) | | |
| Massachusetts (7.35) | | |
| Mississippi (18.63) | | |
| Alabama (26.07) | | |
| Louisiana (68.06) | | |
| Florida (73.43) | | |

^aStates are grouped by their degree of railroad support, with states that offered any support to a railroad after 1841 placed in the corresponding category. Underneath each state is a measure of that state's per capita debt in 1841.

Table 4: Moran's I Analysis of Railroad Promotion Policy Clustering, 1830-1860

| Year ^a | Moran's I | Z-Score |
|-------------------|-----------|---------|
| 1830 | -0.01 | 0.76 |
| 1840 | 0.04 | 1.50 |
| 1850 | 0.04 | 1.61 |
| 1860 | 0.05* | 1.83 |

* indicates significance at the 0.10 level.

^aMoran's I analysis was performed with ArcMap. Rail promotion data is organized by decade when a state began a rail promotion program, and codes for indirect, direct, and no support.