

# **Two Roads to the Transportation Revolution: Early Corporations in the U.K. and the United States**

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## Abstract

The U.K. and U.S. were world leaders in transport development by the mid-19<sup>th</sup> century. We compare the evolution of transportation organizations in the U.K. and the U.S. with a focus on the differences in their chartering regimes. We show that U.S. state governments incorporated far more transportation companies per person at far lower fees than did the U.K. Parliament. Our initial investigation suggests that a key difference was the greater degree of urbanization in the U.K. Greater urbanization increased profitability and enabled promoters to pay higher fees. It also contributed to greater conflicts with property owners raising the costs of obtaining charters. Another contributing factor was the competitive economic environment in which U.S. cities and localities raced to improve their transport links. The greater degree of democracy and decentralization in the U.S helped foster the competitive economic environment.

## **I. Introduction**

A long and vibrant literature has recognized that the “transportation revolution”—the emergence of turnpikes, improved bridges, canals, and railroads in the eighteenth and nineteenth centuries—helped generate economic growth in Britain and the United States.<sup>1</sup> Improvements in transportation expanded markets, thus setting the stage for productivity advances in both agriculture and manufacturing. Although new technologies, like steam locomotives, played a key role in the transportation revolution, many of the key breakthroughs involved institutional and organizational changes. Common law, which insisted that landowners near roads and rivers should pay for their maintenance, restricted collective efforts to improve transport. To overcome the limitations of common law, legislative bodies in Britain and the United States chartered trusts, joint-stock companies, and corporations to build and oversee transportation improvements. Individual promoters

collected tolls and user fees, which in turn allowed the projects to raise capital from a wider variety of sources. Flexible and adaptable to a wide range of improvements, these organizations provided incentives for private individuals to invest in projects with high rates of social return. Institutions, in essence, created the framework in which new transportation technologies could be developed and implemented.

Our goal is to compare the evolution of transportation organizations in the U.K. and the U.S. in the eighteenth and early nineteenth centuries. Both nations are rightly considered ‘success stories.’ Yet the success of each nation should not obscure important institutional differences. The existing literature has highlighted U.S.-U.K. differences in the structure of manufacturing and the operation of patent systems.<sup>2</sup> The stakes in this debate are large: Did the U.S. overtake the U.K. as the global economic leader because its political institutions were different or was it related to factor endowments? Transport offers an interesting extension to this literature. The prospects for transport investment are closely linked with population densities and natural resources. Transport projects also require regulation because they have the characteristics of natural monopolies.

In the seventeenth century, Britain’s Parliament wrestled the authority to grant charters away from the Crown. Afterwards Parliament jealously guarded its right to grant charters and was the sole authority for obtaining rights-of-way and the authority to collect tolls. For most of the eighteenth century Parliament was quite open to passing acts creating transportation organizations, but promoters paid handsomely for their rights through fees to clerks and solicitors.

The United States adapted (with considerable revision) Britain’s basic institutions for improving transport. Following the American Revolution state governments viewed

it as their right to issue charters. From Massachusetts to South Carolina states started passing special incorporation acts in ways similar to the U.K.'s parliament. U.S. states, however, extracted little in the way of rents—fees, bribes, or other charges were marginal. With corporate charters cheap and relatively easy to obtain, incorporations in the U.S. proceeded as a series of dramatic booms. We show that U.S. state governments incorporated far more transportation companies per person with far lower fees than did the U.K. Parliament.

Why, then, was it more expensive to get a transport charter from Parliament than a state government in the U.S.? Why were more charters demanded in the U.S.? We address these questions by focusing on the most salient economic and political differences between the two countries. Urbanization is a key factor in determining the profitability of transport investments and the transaction costs associated with authorizing transport investments. The United States had a largely rural population dispersed over a large area. It lacked a central city that could act as a natural anchor for a transportation network. Most transportation projects paid little in the way of direct returns. Investors, almost all of whom lived close to the improvement in question, instead hoped for “indirect” returns captured through higher land values. While it might have been possible for legislatures to force organizers to pay a portion of their expected higher land values in the way of fees and bribes, in reality the speculative nature of U. S. transportation improvements made the extraction of rents far less likely. The dearth of direct profits for U.S. transportation companies, in other words, created a highly elastic demand in which charging for charters would dramatically lower the number of organized companies.

Britain, on the other hand, was a far more developed and densely populated country with a wealthy central city. Most transportation projects thus paid investors some direct return in the form of interest on bonds or dividends on equity. Because they expected some direct return, organizers could more readily pay the fees that Parliament demanded. Operating in a more developed and thickly settled country also meant that transportation projects in Britain confronted more vested interests, whether property owners who feared eminent domain damages or merchants and artisans who feared new projects would endanger their livelihood. Sorting out these conflicts took time and money, which slowed the chartering process. Parliament's desire to sort out of these conflicts—which might be thought of as political transactions costs—helped give long-term credibility to Britain's transportation revolution, but they also raised the cost of getting charters.

The degree of democracy was also a key factor. The U.S had an active democratic political system where a large percentage of white males could vote. In the U.S., disgruntled constituents denied a corporate charter could vent their frustrations at the next election. Indeed, they often voiced their opposition to corporations that they perceived as “monopolists” or as “privileged.” In responding to such charges, state legislators typically chartered more corporations as part of logrolling deals that soon made legislative approval of turnpikes, toll bridges, and other local transportation corporations a routine part of legislative business. Larger corporations such as railroads generated more substantial controversy, but democratic political culture in the U.S. allowed different groups and localities to successfully pursue charters for “their” railroads. British politics were far less democratic. Voting was restricted to a smaller

percentage of males and seats in the House of Commons were often uncontested. Moreover elections were rarely swayed by populist rhetoric that corporations represented monopoly and privilege. Popular uprisings against transport authorities did occur, but on the whole they were exceptional events.

Political decentralization was also relevant to chartering regimes in the US and UK. The British Parliament issued all charters in England, Wales, and Scotland. Parliament, facing no domestic political competition, could charge promoters dearly for its blessing without fearing a substantial loss of economic activity to neighboring jurisdictions. U. S. state governments, on the other hand, faced a competitive environment that worked to dissipate rents. Failure to improve transportation might result in the loss of commerce and population to other states, thus encouraging state legislators to facilitate local projects.

The effects of centralization are difficult to establish empirically, but there is quantitative evidence that the British and Irish Parliament facilitated the passage of acts in their competing counties before 1801 when the Irish Parliament lost its independent authority to issue charters. There is also qualitative evidence that greater decentralization in the U.S. facilitated transport acts in areas where economic competition was greatest.

An important general point of our story was the ultimate success of both the United States and Britain. Each nation had enough flexibility to tailor corporate institutions to fit their differing economies. The more open chartering environment in the U.S. helped a relatively sparsely populated country rapidly develop, but the success of each transportation revolution shows that there was more than one way to achieve sustained economic growth in the nineteenth century. Rather than view one path to

development as superior to another, we conclude with a brief assessment of the costs and benefits of decentralized, open chartering in the U.S. with the greater centralization and somewhat less open system in Britain.

## **II. Background**

In both the U.K. and the U.S., improving transportation involved creating organizations that relied heavily on private capital. Local governments in each nation possessed neither the revenue streams nor the administrative ability to improve long-distance transportation routes. A locality that wanted to improve a road or a river in its jurisdiction faced a pronounced coordination problem—if adjoining towns failed to keep up the road or river that passed through their localities, the effort of any single town or parish would largely be wasted. There was strikingly little enthusiasm in either Britain or the United States for creating centralized government bureaucracies with the power to improve roads, clear rivers, or construct canals.<sup>3</sup> Instead, both nations established private and quasi-private organizations to build projects such as turnpike roads, toll bridges, and river improvements. The British parliament authorized trusts, which had the power to issue bonds and collect tolls, to oversee turnpike construction and operation. Other British transportation improvements, such as canals and railways, organized themselves as joint stock companies or corporations that could issue equity or debt. The corporate form was especially popular in the United States, where state legislatures chartered most turnpikes, toll bridges, and river improvements as corporations. States sometimes chartered U.S. canals as corporations as well, but state governments of New York, Pennsylvania, Ohio, and several other states owned and operated large-scale canal

systems.<sup>4</sup> The profusion of different organizational types—private corporations, mixed enterprises, and outright state ownership—reflects the degree to which decentralization allowed states to experiment with different organizational forms.

Even when organized as “private” corporations, most of the transportation organizations involved a complex mix of private initiative and public authority that often defied our modern dichotomy of "private" and "public." While the trusts and corporations at the heart of the transportation revolution were associations of private individuals that raised private capital, governments in Britain and the United States made clear that such organizations depended upon government authority for their existence. At least in theory, transportation organizations acted as agents of the state, which gave Parliament and U.S. state governments authority to heavily regulate these organizations. As befitting the public nature of transportation trusts and corporations, British and U.S. governments approved specific routes, detailed procedures for resolving eminent domain disputes, and instituted complex regulations governing tolls and fees. Political and judicial authorities in both Britain and the United States saw transportation improvements, even when improved via private capital, as a public affair that demanded regulatory oversight.

### **III. The Low Price of Transport Charters in the U.S.**

How difficult was it to secure legislative permission for a transport project? In the United States, it was surprisingly easy. We focus on Middle Atlantic States (New York, New Jersey, Maryland, and Pennsylvania) plus the western state of Ohio. Readily available data for these states shows that the number of charters for turnpikes, toll

bridges, canals, and railroads is astounding (see table 1). These five states chartered more than a total of 1,800 companies between 1800 and 1840. The 1810s and the 1830s stand out as particularly significant; these two decades saw rapid growth that eventually ended in financial panic and recession. New York was clearly a leader, especially in the absolute number of charters. New York was also well ahead in per capita terms in the first decade, but the number of corporate charters had trouble keeping pace with the state's tremendous population growth. Notice that Ohio, settled by Americans for less than a generation, was the per capita leader in the 1830s. At least on the face of it, charters for U.S. transportation companies seemed easy to secure.

The corporate charters themselves bear out this point. States rarely (if ever) charged companies for the privilege of incorporation. The secondary literature on turnpikes and toll bridges—as well as a review of a sample of charters—reveals that legislatures did not even bother to assess modest administrative fees for transportation charters. The absence of such fees is striking. In Pennsylvania, for example, the state legislature required a corporation to sell a certain percentage of its stock before it could begin operations. To insure these requirements were met, the incorporators often had to send the governor a list of initial share subscribers. Such a process afforded the state government a perfect opportunity to collect fees in addition to the names of initial stockholders, but the legislature failed to do so.

Perhaps it is possible that individual members of the legislature—as opposed to the legislature as an institution—collected fees via bribes. The secondary literature does not associate charters for early transportation charters with widespread legislative corruption, but then again neither incorporators nor the legislators had any incentive to



leave behind a readily visible paper trail.<sup>5</sup> One important fact, however, militates against the story of widespread (but hidden) bribery: most of the transportation corporations chartered in the U.S. did not become operating concerns. In New York, for example, only about one-third of chartered turnpikes actually built enough road way to justify a toll gate.<sup>6</sup> Many projects, moreover, received multiple charters. Legislatures usually required the company to sell a certain percentage of its stock before beginning operations. When companies failed to meet these requirements, they sometimes went back to the legislature and asked for a new charter, perhaps with modifications to the route that might help attract new investors.<sup>7</sup> Such behavior suggests that corporate charters were sufficiently inexpensive that organizers secured their charter first and worried about viability later.

To say that corporate charters were inexpensive is not to say that they were free. Lobbying the legislature for a corporate charter took time and effort. Typically, organizers of a given project initiated a series of organizational meetings—usually advertised in local newspapers—and collected signatures for petitions. Organizers then incorporated these petitions to the state legislature, setting into motion the incorporation process. As the articles of incorporation made their way from committee to a general legislative vote, substantial political opposition might arise. A rival locality seeking to prevent the alteration of trade patterns could oppose the bill, as might some local residents who resented paying tolls for a local road, bridge, or river improvement. Such opposition was particularly significant in the 1790s when the corporate form was relatively new and untested, but it dissipated after 1800. Local travelers won significant toll exemptions that muted opposition, and state legislatures often adopted logrolling

schemes that made it difficult for one locality to block the improvements of another. Many of the "transactions costs" of legislative approval—coordinating initial meetings and legislative petitions—would have helped companies sell shares and raise capital once the legislature had approved its charter. The chartering process, in essence, acted as a means of ascertaining likely support for a project.

#### **IV. The British Parliament: Charging for Corporations**

How did the chartering regime differ in the U.K.? Data on the clerical summaries of all acts affecting local roads, bridges, canals, and railways can illuminate the patterns.<sup>8</sup> The clerical summaries identify acts creating authorities to improve transport and acts authorizing an existing trust or joint stock company to undertake new projects or improvements. For the purposes of comparison we counted original acts creating a new transport improvement authority along with acts that authorized more projects for an existing transport organization because U.S. charters contained similar information.<sup>9</sup>

Table 2 shows the number of turnpike, bridge, canal, and railway improvement acts in absolute and per capita terms for various sub-periods from 1800 to 1839. The data cover the regions of England, Wales, Scotland, and Ireland with a combined land area of 121,124 square miles. For comparison table 3 shows the number of turnpike, bridge, canal, and railroad charters in Ohio, New Jersey, Maryland, New York, and Pennsylvania for all years between 1800 and 1839. The combined land area of these five states is 150,167 square miles. During the nineteenth century there were far fewer acts per capita in the U.K. than charters per capita in the U.S. states we examine. Even if all the transport improvement acts in the eighteenth century were added to the U.K. total, it

would still come to around 40% fewer transport improvement acts per 10,000 residents than the U.S. states analyzed above.

Comparing railroad charters is particularly illuminating because this technology evolved in both countries at roughly the same time. Ohio, New Jersey, Maryland, New York, and Pennsylvania together had far more railroad charters per capita than the U.K. by 1840—in fact nearly 10 times as many. The higher number of acts translated into a higher number of railroad miles per capita. By 1840 the U.S. had 1.65 railroad miles per 10,000 residents. The U.K. had 0.69 railroad miles per 10,000 residents.<sup>10</sup>

Unlike U.S. corporations, U.K. projects had to pay significant costs to secure permission to operate. Promoters often hired solicitors or agents who paid all the fees and guided their bill through Parliament. The fees include payments to officers in the Commons and Lords as well as other expenses. Table 4 reports the bills paid to solicitors and agents for a sample of transport acts from 1825 to 1833. The average solicitors or agents bill was £505 or \$2405. For comparison annual incomes for white collar workers in Britain were between £175 and £500 in the 1820s. Manufacturing workers earned between £60 and £80 per year in the same period.<sup>11</sup> Thus the fees for charters were well beyond the means of most individuals.

The high price of acts in Britain should have encouraged promoters to select projects that were more likely to be completed. The evidence suggests that this was indeed the case. Table 5 shows the completion history for a sample of canal projects identified from a 10% random sample of canal acts.<sup>12</sup> The vast majority of canal projects authorized by acts were implemented within 5 years. Only two (or 10%) were never completed. The percentage of turnpike acts that were implemented can be estimated by

the number of trusts that obtained renewal acts after 21 years. Since renewal acts were expensive they would only be obtained if the trust was still in operation. Table 6 shows that among all trusts created before 1729, only 7% failed to obtain a renewal act before their term expired. Unlike the U.S. states, the vast majority of projects that Parliament authorized were actually completed.

## **V. The Role of Urbanization**

Urbanization contributed to the differences in chartering regimes by affecting the profitability of transport projects and the transaction costs of implementing projects. We begin by analyzing the link between urbanization, profitability, and the willingness to pay for charters.

Although formally organized as for-profit corporations, most U.S. companies paid little in the way of direct profits (dividends and stock appreciation). This was especially true of turnpikes, which typically generated just enough revenue to pay for operating expenses. In 1825, the Pennsylvania state government (which invested heavily in transportation companies) held just over \$1.8 million in turnpike stock, yet received only \$540 in dividend payments—a rate of return of far less than one percent. Not surprisingly, there was little in the way of a secondary market for these unprofitable stocks. In 1817, Biddle and Company of Philadelphia, one of the nation's biggest securities brokers, traded a grand total of 118 shares in transportation companies in 1817, a tiny fraction of the 71,369 total shares that the company handled.<sup>13</sup> In Virginia, an 1847 government report declared that stock of the state's turnpike and navigation companies "had no public value." No systematic data exists for other states, but

observers frequently noted that turnpike stock was unprofitable. Speaking of New York's turnpikes, DeWitt Bloodgood noted in 1838 that "Generally they have never remunerated their proprietors, nor paid much more than the expense of their actual repairs."<sup>14</sup> Even in New England, where high population densities resulted in more traffic and more revenue, turnpikes made little money. According to one historian, "it is doubtful whether more than five or six [New England's turnpikes] paid their proprietors even reasonably well."<sup>15</sup>

Other types of early U.S. corporations generated more direct profits, but not much more. Table 7 summarizes the share prices in Pennsylvania in 1842, when the state government tried to auction off its stock in various improvements in 1842. Turnpike stock sold for an average of \$3.35 per share, well below the initial par value (what investors initially paid for each share) of \$50 to \$100. What's more, the state found it impossible to auction off thousands of other turnpike shares—no buyers could be found at any price. The profitability of toll bridges was better, as they sometimes held quasi-monopoly status in large urban areas divided by rivers.<sup>16</sup> The state auctioned its toll bridge stock for \$9.66 per share, which still represented a steep loss for shares that it initially paid \$25 to \$100 apiece. The same pattern held true of navigation and canal companies—the state managed to unload most of its shares, but at a substantial loss.

It is more difficult to find comprehensive data on the profitability of early U.S. railroads. Railroads would eventually pay far higher dividends than other improvements, but it took several years for them to generate revenues and profits. Most of the railroads chartered in the 1830s were hit particularly hard by the Panic of 1837, which depressed revenues and profitability. The shares of three companies sold by the state of

Pennsylvania—which fetched the rock-bottom price of \$2.37 per share—reflected the rather dire short-term outlook for railroad stocks. .

The poor profitability of early U.S. transportation companies (at least from the standpoint of direct returns) stands in sharp contrast to their British counterparts. The dividends paid by joint stock canal companies have been extensively studied in the literature. Duckham summarizes the results of an 1825 report by the Quarterly Review on the dividends of eighty canals companies.<sup>17</sup> The average dividend equaled 5.7% of total capital. Studying the average is somewhat misleading because some canal companies paid very large dividends and most others paid less than 4%. Nevertheless the fact that U.K. canal companies paid some dividends stands in stark contrast to the U.S. case. U.K. turnpike authorities did not issue shares, but they issued a tremendous amount of bonds secured on the income of the tolls. How well did these bonds pay? Albert has argued that a large percentage of trusts in 1821 and 1837 were in ‘adverse’ financial condition.<sup>18</sup> Many trusts (more than half) nevertheless regularly paid interest on their bonds. The Charity Commission records also provide some evidence that turnpike bonds were not being traded at a heavy discount like U.S. turnpike shares.<sup>19</sup>

Underlying population densities are surely one reason why British transportation organizations generated direct returns for investors while U.S. companies did not. Chart 1 compares British population densities with those of the Middle Atlantic states and Ohio. The differences were striking. British population densities in 1800 were some five to fifteen times higher than the various U.S. states; by 1840, British population density was still five times greater than that of the U.S. The differences in population density resulted in a far larger urban population. In 1801, the proportion of British residents

living in cities of at least 5,000 was 25 percent. More people lived in London (900,000) than all U.S. residents in census defined urban areas (322,371).<sup>20</sup> America's urban population and manufacturing output would expand dramatically over the next three decades, but even in 1830 London's 1.9 million residents surpassed the 1.3 million persons living in all U.S. cities.<sup>21</sup> British transportation improvements could rely on more people—and hence great economic activity—to generate more revenue for each mile of turnpike, canal, or railroad. No wonder that few U.S. companies could hope for even minimal direct profits, while British companies typically rewarded investors well.

The financial difficulties of U.S. transport authorities lessened the incentives for U.S. legislatures to extract fees for their charters. The demand for charters in the rural U.S. was effectively 'elastic.' Higher fees would have resulted in far fewer charters. Even in the case of railroads, where construction costs were far higher, greater fees could discourage marginal projects. In urban Britain, Parliament could charge higher fees for acts. Demand was less elastic because the financial prospects were far brighter.

Simply having the ability to charge higher fees does not necessarily account for why Parliament charged so much more for transportation charters. The higher fees in the U.K. may have reflected the expenses incurred in convincing Members of Parliament (henceforth MPs) of a project's merits and in negotiating with opposition groups. This view is suggested by the relatively small proportion of total costs directly charged by Parliament. Promoters were required to pay fees to clerks in the Commons and Lords, who drafted the legal documents and ensured that MPs received copies of the bills. Data from a parliamentary inquiry in the 1830s shows that between 10 and 25 percent of the fees went to clerks in the Commons.<sup>22</sup> Most of the other 75 to 90% of the costs of

obtaining acts went to solicitors or agents. Solicitors and agents handled a variety of tasks for promoters. They were especially important when bills were opposed. The committee proceedings on opposed bills resembled a courtroom. Expert witnesses were selected by each side and were examined and cross-examined by M.P.'s.

The Birmingham to Worcester canal bill in 1791 provides an illustrative example. It proposed to construct a canal between Birmingham and the river Severn near Worcester. The bill was opposed by a rival canal between Birmingham and the river Severn via Stourbridge. It was also opposed by mill owners, landowners along the route, merchants in Stourbridge, and a segment of the manufacturing community in Birmingham.<sup>23</sup> The opposition to the bill meant that a lengthy proceeding was required in the Commons and Lords. The proceeding in the Lords shows that 17 witnesses were examined including three barge operators, a wagon carrier, an engineer, five land surveyors, an ironmaster, a manager of a coal mine, a coal merchant, a Birmingham manufacturer, a miller, and a carpenter. Several witnesses were clearly favorable to the project, perhaps because they were hired to give such opinions. Behind the scenes the promoters were also involved in negotiation. The act contained a clause prohibiting the Birmingham and Worcester canal from building close to its rival canal and even required they provide compensation in the event their rival's profits were decreased.<sup>24</sup>

The time and resources required to argue against opponents' claims and in some cases provide compensation can be described as 'political transaction' costs. Transaction costs were likely to be higher in Britain than the U.S. because of its greater urbanization. Land is more valuable in urbanized societies, making rights of way problems more difficult. Opposition is also greater because more is invested in mills, coal mines,



neighboring cities, and rival transport operators. Transport charters in Britain were bound to be expensive even if MPs wanted to charge lower fees.

## **VI. Developmental Aims and Inter-city Competition**

U.S. improvements promised substantial indirect benefits from higher property values. Many contemporary observers noted a strong relationship between transportation improvements and higher land values. Pennsylvania gazetteer Thomas F. Gordon reported in 1832 that "None [of the turnpikes] have yielded profitable returns to the stockholders, but everyone feels that he has been repaid for his expenditures in the improved value lands, and the economy of business."<sup>25</sup> An article in the Poughkeepsie Journal urged residents to invest in the New Paltz Turnpike not because of dividend payments, "but from an expectation that the investment would be returned with treble interest, in the addition which would be made to business and the value of property." A number of scholarly studies confirm such assessments; they have found that transportation improvements such as navigation companies and early railroads raised land values anywhere from 4 to 10 percent. Property owners living closest to the lines of improvement typically benefited the most.<sup>26</sup>

The combination of poor direct profits and high indirect returns made early U.S. transportation companies, to some degree, public goods. If many local landowners benefited from the improvements, then why buy unprofitable stock? Why not let neighbors buy shares that would quickly depreciate in value? Historians have documented how a vigorous spirit of civic boosterism—including rousing speeches, well-attended public meetings, and widespread publicity in local newspapers—helped to

motivate local investment.<sup>27</sup> Analysis of shareholder lists bolsters that interpretation. Investors tended to live near the improvement in question, which makes sense given that those owning property closest to the project stood to gain the most. The distribution of shares tended to reflect the distribution of property. The top ten percent of investors (typically large local landowners and prominent merchants) owned around forty percent of a given company's shares, while a large number of more modest investors purchased the rest.<sup>28</sup> In Pennsylvania, for example, the average holding of turnpike investors was around \$200, while the median holding was \$100. The large number of modest investors seemed to be spreading the pain of low direct returns as widely as possible, while still contributing to a project that promised to deliver substantial indirect benefits.<sup>29</sup>

The strong developmental impetus of early U.S. corporations helps account for why state legislatures never attached fees for charters. U.S. transportation companies could ill-afford additional costs, especially up-front costs that would have forced many local organizers to raise a substantial sum of capital even before formally organizing their company. Obtaining a corporate charter cheaply and easily allowed local organizers to gauge the depth of community sentiment and their ability to attract investment into what were essential non-profit enterprises that still promised significant economic benefits to the community at large. That so many companies obtained charters yet never built the actual project suggests the underlying fragility of these enterprises. State governments had no incentive to see more fail. Individual legislators—who undoubtedly owned land in the localities they represented—had considerable incentive to speedily approve transportation corporations.

The greater openness of the urban hierarchy provides a related explanation for the higher number of charters in the U.S. compared to the U.K. The U.S. and the U.K. both had a peculiar urban hierarchy in the early 19<sup>th</sup> century. The largest city in the U.K., London, had a very large population compared to other cities, while the largest city in the U.S., New York, had a relatively small population compared to other cities. Another difference is that the urban structure in the U.K. was more stable than the urban structure of the U.S. in the early nineteenth century. Table 8 and 9 illustrate this pattern by listing the population and rank of the 33 largest cities in each country in 1800/01 and 1830/31. In the U.K. all cities in the top eleven in 1801 were also in the top eleven in 1831, and the same stability held generally held true of the lower ranking cities as well. The U. S. was far different. New York, Philadelphia, Baltimore, and Boston were the four largest cities in the U.S. in 1800 and 1830, but several cities with a high rank in 1830 were much lower in 1800. For example, Albany was the seventeenth largest city in 1800 and it was the ninth largest city in 1830. The correlation between the rankings of U.S. cities in 1801 and 1830 is 0.55, whereas the correlation between the rankings of UK cities is 0.9. The urban structure in the U.S. was more open in that cities could both rise and fall.

The more 'open' urban hierarchy in the U.S. added to the boisterous booster spirit that animated early transportation companies. Commercial and urban growth, of course, would fuel capital gains resulting in urban real estate speculation. On the flip side, cities that failed to keep pace might suffer absolute declines in trade and population. Urban boosters exaggerated such fears, but an overwhelming amount of qualitative evidence indicates that civic leaders saw the race for commerce as a zero-sum game in which some cities would win while others would lose. On the national level, New York, Philadelphia,

Boston, and Baltimore battled for commercial supremacy, while scores of small towns and cities sought to become preeminent within their own region or county. Civic leaders who feared losing population, wealth, and prestige to rival cities could hardly tolerate restrictive and expensive corporate chartering policies. Urban rivalries, in fact, may have led to too much investment in transportation. The great success of New York's Erie Canal led Philadelphia, Baltimore, and Richmond to try to emulate the Empire State's great success. The resulting state-financed canals ultimately failed in their quest to redirect trade and saddled Pennsylvania, Maryland, and Virginia with significant debt.

## **VII. The Role of Democracy**

Thus far we have focused on economic differences. There were also, of course, significant differences in political structure, as the U.S. was more democratic than Britain. Although the various colonies had significant restrictions on white male suffrage, states slowly began to relax these restrictions once the U.S. had won its independence. Tax-based qualifications, which were significantly easier to meet, replaced property qualifications in many of the original states. New western states, eager to attract new migrants, generally adapted universal white manhood suffrage. Older states followed their lead. In 1840, 78% of all adult white males voted in the presidential election.<sup>30</sup> In Britain, the franchise was much more severely restricted. In 1774, the estimates are that 13.9% of adult males in England and Wales voted and in 1831 only 12.2% of adult males voted.<sup>31</sup> Even that number does not fully capture the relative lack of democracy in Britain, as many parliamentary seats were simply given to members of

prominent families or their political allies. In 1774, 18% of seats in the Commons were contested (i.e. more than one candidate ran); in 1818 the figure was the same.<sup>32</sup>

Not only was the U. S. more democratic, but its wealth was also distributed more equally. The U.S. certainly had its own economic elite, but the evidence clearly indicates that the percentage of wealth owned by the top 1 percent was far less than Britain's more hierarchal and aristocratic society. In 1810, the top 1 percent of British households owned almost 55 percent of marketable net worth, a figure which rose to 61 percent by 1875. For the U.S., the top 1 percent in 1860 owned 29 percent of all assets, far less than the degree of stratification in nineteenth-century Britain.<sup>33</sup> State and local studies are consistent with the aggregate U.S. figures. Steckel and Moehling, for example, have recently calculated that the total taxable wealth owned by the top 1 percent of households in Massachusetts fluctuated with the range of 20 to 33 percent between 1820 and 1860.<sup>34</sup>

The greater degree of democracy and economic equality in the United States made it more difficult to limit the availability of corporate charters. Aggrieved citizens denied corporate charters could use their power at the ballot box to make their voices heard. Those seeking corporate charters used a republican rhetoric suspicious of "privilege, ""corruption," and "monopolists" to paint political opponents as "aristocrats" who used political power for individual gain. Such rhetoric was most identified with Jeffersonian republicans and Jacksonian Democrats, but it could be used by any group who believed that they had been unfairly denied access to corporate charters.<sup>35</sup> The relatively broad distribution of property in the U.S. gave a large cross-section of the population a vested interest in the approval of transportation companies, which promised to increase property values of everyone in a particular locality. Rather than risk the

mobilization of potential political opponents, legislators found it expedient to issue new charters. Restricting access to charters became politically difficult. As local communities flood the legislature with requests for charters, approval for turnpikes, toll bridges, and other local improvements became routine.

There is some evidence within the U.S. that greater democracy contributed to higher numbers of charters for transport improvement. Table 10 shows the number of transport acts per capita in the 1820s and 1830s for the five U.S. states as well as the average percentage of males who voted in the presidential elections in the same decades. If greater democracy contributed to lower fees for acts or greater effort by politicians then there should have been a higher increase in acts per capita from the 1820s to the 1830s in states where there was a greater increase in the percentage of males who voted. The bottom panel of table 10 shows that this was indeed the case. Ohio had the greatest increase in acts per capita and the greatest increase in the percentage of males who voted. Maryland had the lowest increase in acts per capita and it had the lowest increase in the percentage of males who voted. Across the five states the correlation between the change in acts per capita and the change in the percent voting was 0.78.

Conditions were quite different in Britain where democracy was more muted. The small proportion of males who voted has already been noted. Consistent with this fact the general view among historians is that elections had little influence on specific policies.<sup>36</sup> This conclusion seems to apply to charters as well. In Britain the number of contested seats provides a local measure of democracy, as data on the number of males who voted in each county is lacking. If elections mattered in Britain, then one would expect a positive relationship between the number of transport charters and the number of

contested seats in a county. This relationship can be tested using Thorne's data on contested elections in each county.<sup>37</sup> A simple correlation analysis was performed using the number of road acts and the number of contested elections for all constituencies in each English county in two separate periods 1790-1806 and 1807-1818. The change in the number of road acts between the 1790-1806 and 1807-1817 periods is insignificantly related to the change in contested elections. The same result holds for canal acts over the same two periods. The robustness can be confirmed by including a variable for the change in population growth for the county from 1791 to 1801 and 1811 to 1821. The change in population growth is positively and significantly related to the change in road acts, but the change in contested elections is not. The difference between Britain and the U.S. is not surprising. In Britain, there was a striking absence of the republican rhetoric focusing on "privilege, "corruption," and "monopoly."

A greater degree of democracy, it should be stressed, did not always lead to more open economic institutions. Some states restricted charters as part of a fiscal strategy of "asset finance." Instead of levying taxes, state governments sometimes borrowed money to invest in enterprises that could generate large and steady rates of return. Investment in banks, which frequently generated healthy profits, was the most common strategy. States such as Pennsylvania essentially granted a few favored banks quasi-monopoly status in return for generous bonuses and grants of bank stock. Such practices smacked of giving privileges to favored insiders, but politicians aggressively defended such practices as a means of eliminating taxation. In Pennsylvania, the state derived 23 percent of its revenue from bank investments, which essentially allowed the state to forgo a property tax.<sup>38</sup> Such arrangements broke down in the late 1830s, when bank panics, falling land

values, and declining economic activity put many “asset finance” states near the edge of bankruptcy.

Could transportation enterprises fulfill the same function as banks? New York's famously successful Erie Canal supplied most of the state's revenue for many years, and legislators were therefore leery of chartering railroads that might cut into its operating profits. New Jersey's Camden and Amboy Railroad and Delaware and Raritan Canal were even better examples. In 1830, the New Jersey legislature granted the two corporations (which became known as the "Joint Companies") a monopoly on the immensely profitable traffic between New York City and Philadelphia. In return, the state received preferred shares and levied "transit duties" on goods and passengers. The resulting revenue allowed the state to abolish the property tax and expand state support for public education.<sup>39</sup>

New Jersey's unusual arrangement with the "Joint Companies" was clearly exceptional. The Joint Companies obviously benefited from New Jersey's peculiar geography. Lying between New York and Philadelphia, the Joint Companies monopolized a lucrative route to produce profits that most other transportation companies could not generate. Shippers and passengers residing in New York and Philadelphia—and not residents of New Jersey—suffered the most from the monopoly. In many ways, the monopoly was a crafty means of levying a tax on interstate commerce. Rival entrepreneurs, hoping to charter competing railroad companies, resented the Joint Companies monopoly status, yet their pleas fell on deaf ears. The stockholders of the Joint Companies craftily managed to align their own interests with the interests of the state's taxpayers and politicians. The state legislature, in fact, explicitly adopted the



policy of "the principle of protection as means of revenue" in defending the monopoly.<sup>40</sup> New Jersey's Jacksonian Democrats, usually hostile to "privilege," readily supported the state's arrangement as an anti-tax measure. Despite campaigns to end the monopoly, it persisted until 1870. The political insiders who controlled the joint companies certainly benefited from their legal monopoly, but with the public support.

### **VIII. The Role of Political Decentralization and Centralization**

One reason why few states emulated New Jersey was the fear that people and commerce might relocate to another state. Pennsylvania, for example, viewed New York and Maryland as rivals in the race to attract trade from the newly settled West. Granting a legislative monopoly to a company or even restricting access to charters might ultimately result in the loss of new trade opportunities, stoking fears of economic and political decline relative to other states. In the U.K. regions also competed with one another, but there was a potentially important difference in how competition was mediated through the political system of each country. In the U.S. legislatures had the authority to issue charters for transport improvement in their state only. They could neither authorize nor prevent the authorization of projects in nearby states. By contrast U.K. regions like England, Wales, and Scotland did not have the direct authority to pass transport acts. This right belonged to the British Parliament as a whole before 1801 and the U.K. Parliament after 1801 when Ireland was incorporated. Thus in the U.S. several legislatures possessed monopolies on charters in their own territory, while in the U.K. only a single legislature held such power.

How did these differences in political structure influence transport acts or charters? One hypothesis is that the quantity of acts was lower in Britain because Parliament was a monopolist and the quantity of charters was higher in the U.S. because legislators operated in a more competitive environment. According to this view, Parliament set fees at the point where the marginal revenue from acts equaled the marginal cost. At this fee level, some promoters would not petition for acts because they had a low willingness to pay and they had no other political body to turn to. Parliament did not mind the loss in revenues from the marginal project because its members were more than compensated by the higher fees charged to petitioners willing to pay for the act. U.S. legislators would have made a similar calculation, but they faced an additional cost. The loss of marginal projects would result in lower economic activity in its area, but more importantly it might lead to a diversion of economic activity to other U.S. states. The diversion of economic activity would affect legislator's incomes adversely in the long-run. As a result, state legislators would have an incentive to lower the fees to encourage the promoter of the marginal project to submit their petition. M.P.'s in the U.K. would not face the same cost because trade would be diverted to other areas in the U.K. which remained under their control. Parliament could therefore keep the fees high.

The same argument can be made with respect to the effort of the leadership in the legislature rather than the fees. The monopoly argument would imply that leaders in the Commons and Lords were less willing to exert effort to facilitate the passage of transport acts because they did not fear the movement of economic activity to a jurisdiction outside the U.K. In the U.S., state leaders would be more willing to exert effort because they did feared the movement of economic activity to a nearby state.

The effects of political structure are not easy to test. Ideally one would like to observe the U.S. with one legislature or the U.K. with many regional parliaments. Irish unification offers one such test case. Ireland had its own parliament before 1801 when it was unified with Great Britain. The Irish Parliament was abolished and all acts relating to transport were passed in London through the U.K. parliament. The legislative monopoly hypothesis would predict that prior to unification Irish M.P.'s kept fees low and exerted higher effort in passing acts to prevent trade from being diverted to competing areas like the northwestern coast of Wales and England and the southwestern coast of Scotland. M.P.'s in the British parliament would have been sensitive to similar considerations in counties that competed with those in Ireland. After unification, M.P.'s in the U.K. parliament would have treated the competing regions the same as others because economic activity remained within the U.K.

The preceding argument suggests that if the centralization of the U.K. Parliament mattered, then counties in Ireland, the northwestern coast of Wales and England, and the southwestern coast of Scotland should have had more acts before unification in 1801 than after when compared to all other counties in the Britain. Table 11 shows the number of road, canal, and harbor acts for each of the affected regions 10 years before and after unification in 1801. The same comparison is made 20 years before and after unification to allow for a delayed response due to the Napoleonic Wars. Road acts dropped substantially in Ireland and along the Scottish border after unification. The change in road acts was smaller for counties along the Welsh and English border. The key comparison is between the treated counties (i.e. Ireland, the Welsh border, the Scottish border, and the English border) and the control counties (i.e. all other counties in Britain).

There was a 57.3% drop in road acts in the treated counties between the 1790s and the 1800s, but in the control counties there was a 12.4% increase. The difference-in-difference in the percentage change was minus 69.7%. A similar set of results holds for canal acts which decreased in Ireland and the English border counties 10 years after unification. In the control group canal acts decreased as well, but the difference-in-difference shows that canal acts declined more in the treatment group of counties in Ireland, the Welsh border, the Scottish border, and the English border. For harbor acts the results are mixed. In the ten-year period before and after unification harbor acts decreased more in the treatment counties, but in the twenty-year period before and after unification harbor acts increased more in the treatment counties.

Overall the calculations provide suggestive evidence that British and Irish MPs kept fees relatively low or exerted extra effort to facilitate transport acts in their respective counties that competed with one another before unification in 1801. More broadly the results suggest that the high degree of political centralization in the U.K. tended to impede transport charters. In the terms of the U.S. the analysis is generally consistent with the view that political decentralization contributed to the higher number of transport charters in the U.S. The potent combination of competitive urban rivalries and political decentralization reinforced one another and contributed to ease of getting a charter.

## **IX. Concluding Thoughts**

The nineteenth century U.S. had a similar institutional framework as the U.K. because of its colonial heritage. In the arena of transport policy the U.S. followed the

British model in issuing charters to private organizations for specific projects. The U.K. and the U.S. differ considerably, however, in how they implemented their chartering regimes. The U.S. adopted a lower cost and more open charter policy than the U.K.

We suggest that a number of different factors led to this outcome. Differences in urbanization and urban structure were primary factors. In the U.S. state legislatures could not charge high fees because the low level of urbanization reduced the profitability of transport projects. The more open urban hierarchy and a highly competitive booster mentality also fueled the desire for cheap and readily available transportation charters. British companies, operating in a wealthier, more densely populated country, generated higher direct profits. British companies could more readily pay fees necessary to obtain a charter. These fees might well have reflected the high costs of achieving political consensus in a more densely-populated countryside with a greater variety of conflicting interests. In a more negative light, the fees may also have represented a way for Parliament to enrich itself and its members.

Differences in political institutions were also contributing factors. The more democratic and decentralized political system in the U.S. readily responded (with some notable exceptions related to asset financing) to the demand for more charters. The more aristocratic and centralized political structure of Britain, on the other hand, created a more conservative chartering, which helped justify Parliamentary fees. One might draw an analogy between transportation charters and patenting systems in the U.S. and Britain. As Sokoloff and Khan have shown, the British government established a complex patenting system with high fees that essentially limited patenting “to individuals who could raise the capital to apply for the patent and had access to information and other

privileges that reduced the bureaucratic and political costs.”<sup>41</sup> Inventors in the United States paid far less in patenting fees and could rely upon far more efficient judicial protection of their claims. Patenting rates in the United States, not surprisingly, were far higher than in Britain. Like patenting, the large number of corporate charters reflected, at least in part, how more democratic political institutions in the U.S. helped create more open economic institutions.<sup>42</sup>

In the end, what is the ultimate importance of understanding the two paths to the transportation revolution? On one level, our comparison comports with James W. Hurst's famous arguments that legal and political institutions led to a "release of energy" that transformed the U.S. economy. The story, though, is more complex than celebrating the democratic and entrepreneurial ethos of the U.S. while denigrating conservative and aristocratic Great Britain. British chartering policies undoubtedly slowed the pace of the transportation revolution, as the high costs of charters meant that more marginal projects were built slowly and sometimes not at all. While the British economy would have probably benefited from a more open chartering policy, Parliament still allowed considerable institutional innovation to take place. The U.S. system's emphasis on decentralization, moreover, produced its own set of problems. States sometimes prevented out-of-state rivals from obtaining charters, thus restraining competition. State competition sometimes encouraged desperate investment in transportation projects—such as the Pennsylvania Mainline Canal—that had little chance for success. The "release of energy" from open chartering policies certainly contributed to the rapid development of U.S. economy, but the U.S. still had to grapple with its own institutional shortcomings. The two paths of the transportation revolution had their own potential pitfalls, but

nevertheless allowed each nation to harness a complex mixture of political authority and private capital to jump-start economic development.

**Table 1: Corporate Charters for U.S. Transport Companies in Selected States, 1800-1839**

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**Panel A: Number of Charters**

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	<b>1800-09</b>	<b>1810-1819</b>	<b>1820-29</b>	<b>1830-39</b>
Ohio	2	18	28	241
New Jersey	29	29	13	49
Maryland	10	46	31	32
New York	145	185	143	240
Pennsylvania	45	153	101	284
<b>TOTAL</b>	<b>231</b>	<b>431</b>	<b>316</b>	<b>846</b>

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**Panel B: Number of Charters per 10,000 Residents**

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	<b>1800-1809</b>	<b>1810-1819</b>	<b>1820-29</b>	<b>1830-39</b>
Ohio	0.146	0.443	0.368	1.961
New Jersey	1.338	1.149	0.441	1.416
Maryland	0.396	1.616	0.962	0.883
New York	1.921	1.603	0.871	1.104
Pennsylvania	0.638	1.646	0.842	1.848
<b>TOTAL</b>	<b>1.117</b>	<b>1.423</b>	<b>0.749</b>	<b>1.497</b>

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**Sources: see text.**



**Table 2: Acts for U.K. Transportation Authorities, 1800-1839**

<b>Panel A: Number of Acts for new transport improvements</b>					
	1800-09	1810-1819	1820-29	1830-39	1800-39
Turnpike	185	199	363	207	954
Bridges	18	21	38	37	114
Canals	47	36	28	33	144
Railways	10	11	42	94	157
TOTAL	260	267	471	371	1369

<b>Panel B: Number of Acts per 10,000 residents</b>					
	1800-09	1810-1819	1820-29	1830-39	1800-39
Turnpike	0.11	0.102	0.161	0.084	0.388
Bridges	0.01	0.01	0.016	0.015	0.046
Canals	0.027	0.018	0.012	0.013	0.058
Railways	0.005	0.005	0.018	0.038	0.063
TOTAL	0.154	0.137	0.209	0.151	0.557

Sources: see text.

**Table 3: U.S. Transport Charters by Mode, 1800-1839**

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Panel A: Number of Transport Charters

Turnpike	997
Bridges	361
Canals	153
Railways	364
Total	1875

Panel B: Number of Charters per 10,000 residents

Turnpike	1.764
Bridges	0.638
Canals	0.270
Railways	0.644
Total	3.317

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Sources: see text.

**Table 4: Solicitor and Agents bills for the passage of transport improvement acts**

Act	Year	Bill in (in £)
Birmingham Roads	1825	740
Limerick Railway	1828	723
ShipleY Roads	1828	325
Hammersmith Bridge	1829	363
Finchley Roads	1829	416
Highham Bridge	1830	359
Rickmansworth Roads	1830	74
Festiniog Railway	1832	667
Bradford and Leeds Railway	1832	903
Hull and Hedon Roads	1832	495
East London and London Railway	1828	458
East London and London Railway	1829	535
Average Solicitors and Agents Bills		505

Source: Report from the Select Committee on House of Commons Officers and Fees, pp. 424-429 (BPP 1833 XII).

**Table 5: The Completion rate for U.K. Canal projects authorized by Acts**

Projects identified in 10% Random Sample of Canal Acts	year original act	year when completed
Cromford	1789	1794
Kennet and Avon	1796	1810
Birmingham to Bilstone to Atherley	1768	before 1784
Neath canal	1791	1795
Trent and Mersey Canal, tunnel Harecastle Hill	1823	c1825
Birmingham and Liverpool Junction Canal	1826	1835
Birmingham and Liverpool Junction Canal, Newport Branch	1827	1835
Lough Corrib to Galway Bay canal	1830	c1835
Sankey Bridges to Widnes branch canal	1830	1833
Chard Canal	1834	1842
Canal from Forth and Clyde to Campsie in Stirling	1837	never built
Montgomeryshire canal, Newton Branch	1815	1819
Edinburgh to Falkirk	1821	c1825
Bradford canal	1771	1774
Wyrley and Essington Canal	1792	1797
Rochdale canal	1794	1804
Bath to Bristol	1811	never built
Between Birmingham and Worcester & Birmingham Canals	1815	c1820
Calder and Hebble, Halifax branch	1825	1828
Forth and Cart Canal	1836	1840
Stourbridge Extension Canal	1837	1840
Number of Canal Projects		21
% that were not started or completed		10%

Sources: Priestly, History of Inland Waterways and Shead, “Waterways Information.”

Notes: Canal projects were identified through a 10% random sample of acts.

**Table 6: English Turnpike Trusts before 1730 that did not obtain a renewal act before their term expired.**

turnpike road	year created	term expired	year authority was resumed
Great North Road in Hert., Cam. and Hunt.	1663	1672	1693
Ryegate and Crawley in Surrey	1697	1712	1755
Barnhill and Hutton Heath in Cheshire	1706	1727	?
London Norwich road, St.Stephen to Norfolk	1726	1747	1767
Roads into Tewkesbury in Gloucester	1726	1747	1756
Roads into Bridgewater in Somerset	1730	1751	1758
Number of trusts created between 1663 and 1730			87
% that did not renew their authority			7%

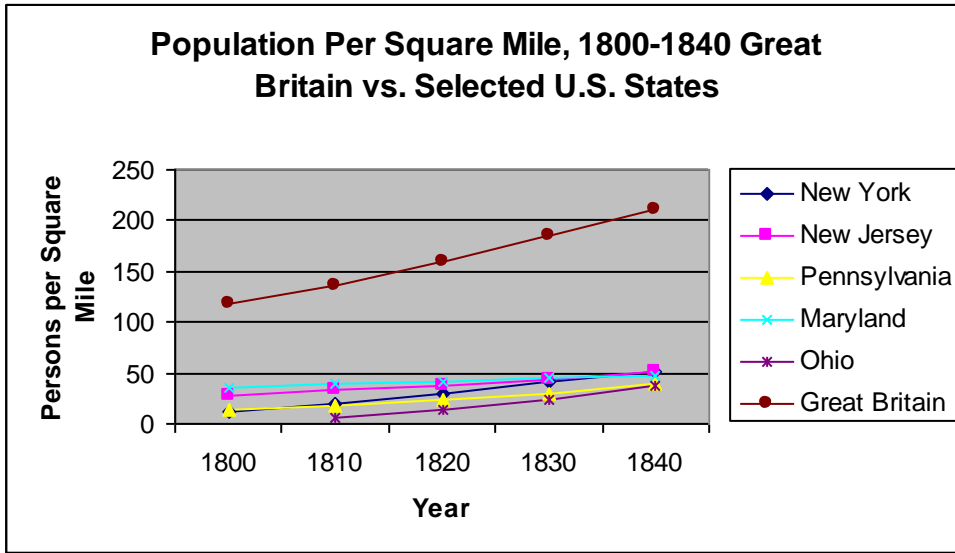
Sources: The data come from Turnpike acts from 1663 and 1750 in Statutes of the Realm

**Table7: Stock Prices for Pennsylvania Corporations at 1842 State Auctions**

Corporation Type	Number of Companies	Number of Shares Sold	Average Price of Shares	Par Value of Shares
Turnpikes	40	16,069	\$3.35	\$50-\$100
Toll Bridges	21	17,046	\$9.66	\$25-\$100
Canals and Navigation Companies	6	7,350	\$12.35	\$50-\$100
Railroads	3	710	\$2.37	\$50

Source: Hartz, Economic Policy and Democratic Thought

Chart 1



Sources: see text.

**Table 8: Urban Structure in U.S.: 1800 and 1830**

City	1800		1830	
	Pop	Rank	Pop	Rank
New York	60.5	1	202	1
Philadelphia	41.2	2	80.4	3
Baltimore	26.5	3	80.6	2
Boston	24.9	4	61	4
Charleston	18.8	5	30	6
Northern liberties	10.7	6	28.8	7
Southwark	9.6	7	20.5	10
Salem	9.4	8	13.9	14
Providence	7.6	9	16.8	12
Norfolk	6.9	10	9.8	24
Newport	6.7	11	8.01	33
Newbury port	5.9	12	6.3	44
Richmond city	5.7	13	16	13
Nantucket	5.6	14	7.2	38
Portsmouth	5.3	15	8.02	32
Gloucester	5.313	16	7.5	36
Albany	5.289	17	24.2	9
Schenectady	5.288	18	4.2	64
Marblehead	5.211	19	5.1	55
New London	5.15	20	4.3	62
Savannah	5.14	21	7.3	37
Alexandria	4.9	22	8.2	31
Middleborough	4.4	23	5	56
New Bedford	4.3	24	7.6	35
Lancaster	4.2	25	7.7	34
New haven	4	26	10.2	23
Portland	3.7	27	12.6	16
Hartford	3.523	29	7	39
Peterburg	3.521	30	8.3	30
Washington dc	3.21	31	18.8	11
Georgetown	2.9	32	8.4	28
York	2.5	33	4.2	66
correlation rank in 1800 & 1830				0.558

Sources: U.S. Bureau of the Census. Internet Release date: June 15, 1998.

<http://www.census.gov/population/www/documentation/twps0027/tab03.txt>



**Table 9: Urban Structure in the U.K.: 1801 and 1831**

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City	1801		1831	
	Pop	Rank	pop	Rank
London	959	1	1655	1
Edinburgh	83	2	162	5
Liverpool	82	3	202	2
Glasgow	77	4	202	3
Manchester	75	5	182	4
Birmingham	71	6	144	6
Bristol	61	7	104	8
Leeds	53	8	123	7
Sheffield	46	9	92	9
Plymouth	40	10	66	10
Norwich	36	11	61	11
Bath	33	12	51	16
Newcastle upon Tyne	33	13	54	13
Portsmouth	33	14	50	17
Hull	30	15	52	15
Nottingham	29	16	50	18
Aberdeen	27	17	57	12
Dundee	26	18	45	20
Paisley	25	19	46	19
Sunderland	24	20	39	26
Bolton	18	21	42	22
Exeter	17	22	28	32
Greenock	17	23	27	33
Leicester	17	24	41	23
Stockport	17	25	36	27
Yarmouth	17	26	25	37
York	17	27	26	36
Coventry	16	28	27	34
Chester	15	29	21	43
Shrewsbury	15	30	21	44
Salford	14	31	41	24
Bradford	13	32	44	21
Tynemouth	13	33	23	40
correlation rank in 1801 and 1831				0.900

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Sources: Mitchell, British Historical Statistics..

**Table 10: Democracy and Transport Acts across five U.S. state**

Panel A: Voting Rates and Acts per capita

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state	period	acts per capita	voting rate
Ohio	1820s	0.368	55.3
New Jersey	1820s	0.441	51
Maryland	1820s	0.962	64.95
New York	1820s	0.871	50.75
Pennsylvania	1820s	0.842	38.1
Ohio	1830s	1.961	74.65
New Jersey	1830s	1.416	65.1
Maryland	1830s	0.883	61.55
New York	1830s	1.104	66.15
Pennsylvania	1830s	1.848	52.9

Panel B: Changes from 1820s to 1830s

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State	change in transport acts per capita	change in vote rate
Ohio	1.593	19.35
New Jersey	0.975	14.1
Maryland	-0.079	-3.4
New York	0.233	15.4
Pennsylvania	1.006	14.8
correlation		0.776

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Sources: For voting rates see Sokoloff and Engerman, "Suffrage Institutions," p. 906.

**Table 11: Changes in Transport Acts before and after Unification of the Irish and British Parliaments in 1801.**

act type	Ireland	Welsh Border	Scottish border	English border	total treatment	treatment % diff	control % diff	Diff-n-Diff
road acts								
1791 to 1800	33	6	12	24	75	-57.3	12.4	-69.7
1801 to 1810	5	4	3	20	32			
1781 to 1800	41	7	15	32	95	-37.9	35.9	-73.8
1801 to 1820	8	7	8	36	59			
canal acts								
1791 to 1800	5	0	1	17	23	-69.6	-48.6	-21
1801 to 1810	0	1	3	3	7			
1781 to 1800	8	1	1	18	28	-64.3	-23	-41.3
1801 to 1820	1	1	3	5	10			
harbor acts								
1791 to 1800	1	3	1	2	7	28.6	57.1	-28.5
1801 to 1810	2	4	3	0	9			
1781 to 1800	1	4	1	3	9	155.6	135.3	20.3
1801 to 1820	8	4	8	3	23			

Sources: see text.

Notes: Welsh border counties include Flint, Denbigh, Anglesey, Carnarvon, Merioneth, Cardigan, Pembroke. English border counties include Cheshire, Lancashire, and Cumberland. Scottish border counties include Dumfrieshire, Kirkcudbrightshire, Wigtownshire, Ayrshire, Renfrewshire, Dumbartonshire, Argyll, Bute, and Iverness-shire.. The control group includes all British counties except Cheshire, Lancashire, and Cumberland.

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## Notes

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<sup>1</sup> Freeman, "Introduction," pp. 1-30.

<sup>2</sup> See, for example, Sokoloff and Dollar, "Agricultural Seasonality" and Kahn and Sokoloff, "Patent Institutions."

<sup>3</sup> The U.S national government financed the National Road and scattered funding for other projects, but such spending was only 10 percent of what state investment in internal improvements and banks. Wallis, "Early American Federalism and Economic Development, 1790-1840," p. 283.

<sup>4</sup> Goodrich, Government Promotion, 270-71.

<sup>5</sup> Individual companies might have had corruption among corporate officers—say a treasurer or president using company funds for their own personal use—but that is far different than legislators taking bribes for charters.

<sup>6</sup> Klein and Majewski, "Economy, Community, and Law," 482.

<sup>7</sup> To cite but one example: The Rivanna Navigation Company, a rather small company located in central Virginia, had its charter changed numerous times. See Majewski, House Dividing, 88-97

<sup>8</sup> See Bogart and Richardson, "Adaptable Property Rights," for more discussion of the data.

<sup>9</sup> Some acts in the second category simply extended the term of a transport authority. For example, a turnpike trust often obtained a renewal act after their original authority expired in 21 years.

<sup>10</sup> The data on railroad miles in Britain and the U.S. comes from Mitchell, Historical Statistics.

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- <sup>11</sup> For annual earnings see Williamson and Lindert, "English Workers' Living Standards," p.4.
- <sup>12</sup> The percentage of canal acts that were implemented can be estimated using the detailed histories put together by Jim Shead, "Waterways Information," and Joseph Priestley, Historical Account of the Navigable Rivers.
- <sup>13</sup> Calculated from Wright, Wealth of Nations Rediscovered, 155.
- <sup>14</sup> Klein and Majewski, 499.
- <sup>15</sup> Taylor, "Turnpike Era in New England," 266.
- <sup>16</sup> It was also far easier for bridges to collect tolls: unlike turnpikes, toll bridges did not have to worry about informal "shunpikes" skirting around toll gates.
- <sup>17</sup> Duckham, "Canals and River Navigations," p. 123. Ward, The finance of Canals.
- <sup>18</sup> Albert, Turnpike Road System, Appendix D.
- <sup>19</sup> Charity commission records report the prices paid for assets by charities in England from the 1500s to the early 1900s. The prices of turnpike bonds were often purchased or sold at prices around £25 or £50, which was their usual denomination. See Clark, "The Charity Commission" for more details on the source.
- <sup>20</sup> U. S. Bureau of the Census, Historical Statistics of the United States, p. 14.
- <sup>21</sup> B. R. Mitchell, British Historical Statistics (Cambridge: Cambridge University Press, 1988), p. 25; Historical Statistics of the United States, p. 14.
- <sup>22</sup> For turnpike acts between £50 and £100 went to fees for House of Commons officers. For bridge acts between £95 and £180 went to fees for House of Commons officers. For railway and canal acts, officer fees were between £60 and £330. See table 4 for data sources.
- <sup>23</sup> Counter-petitions and the details of the proceedings for this bill in the House of Lords are available at the Parliamentary Archives in the House of Lords, Main Papers, 30/3/04, May 1791.
- <sup>24</sup> Priestly, Navigable Rivers, p. 1691.
- <sup>25</sup> Gordon, Gazetteer, p. 35.
- <sup>26</sup> Coffman and Gregson, "Railroad Development and Land Value," 191-204; Craig, Palmquist, and Weiss, "Transportation Improvements and Land Values," 173-189; Majewski, House Dividing, 28-32; Wallis, "The Property Tax as Coordinating Device," pp. 238-244.
- <sup>27</sup> Klein, "The Voluntary Provision of Public Goods?"; Majewski, "Who Financed the Transportation Revolution?"
- <sup>28</sup> Hilt, "When did Ownership Separate from Control," p. 664.
- <sup>29</sup> Majewski, "Toward a Social History," p. 309.
- <sup>30</sup> Engerman and Sokoloff, "Evolution of Suffrage Institutions," 906.
- <sup>31</sup> Jupp, The Governing of Britain, 1688-1848, p. 236.
- <sup>32</sup> Jupp, The Governing of Britain, p. 236.
- <sup>33</sup> Lindert, "Three Centuries of Inequality in Britain and America," pp. 181,188.
- <sup>34</sup> Steckel and Moehling, "Rising Inequality," p. 167.
- <sup>35</sup> Wallis, "Early American Federalism and Economic Development, 1790-1840," pp. 294-299; Wood, Radicalism of the American Revolution, 305-325; Majewski, House Dividing, 85-110.

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<sup>36</sup> Jupp, **The Governing of Britain**, p. 245.

<sup>37</sup> Thorne, **The House of Commons**, p. 358-367.

<sup>38</sup> Wallis, "The Public Promotion of Private Interests (Groups), pp. 239-40; Wallis, "Early American Federalism," pp. 291-294; Wallis, "State Constitutional Reform of Government Finance," pp. 40-41.

<sup>39</sup> Cadman, The Corporation in New Jersey, 50-61.

<sup>40</sup> Quoted in Cadman, The Corporation in New Jersey, 58.

<sup>41</sup> Khan and Sokoloff, "Patent Institutions," 298.

<sup>42</sup> Our analysis here echoes a similar point made by Sokoloff and Engerman on the relationship among equality, democracy, and institutions in Latin America and the U.S. See Engerman and Sokoloff, "Factor Endowments, Institutions, and Differential Paths to Growth."