

# **Population Densities, Political Structures, and the Early Corporation: The Transportation Revolution in the U.K. and 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 United Kingdom and the United States with a focus on the differences in their chartering regimes. We show that U.S. state governments incorporated far more transportation companies per persons at far lower fees than did the U.K. Parliament. Our initial investigation suggests that the key difference was the greater degree of democracy in the U.S. and its competitive economic environment in which cities and localities were engaged in a race to improve their transport links.

## **Introduction**

In their most simplistic renderings, the transportation revolutions of Britain and the United States are regarded as a discrete series of technological advances in which turnpikes replaced common roads, canals replaced turnpikes, and railroads ended up replacing canals. Scholars, of course, have long known that such a simplified chronology misses how these improvements were often complements as well as competitors. Turnpikes often acted as feeders to canals, while canals and railroads coexisted well into the twentieth century.<sup>1</sup> Less well known is the relationship between political institutions and the transportation revolution. Many of the key breakthroughs of the transportation revolution were institutional and organizational. Common law, which insisted that landowners near roads and rivers should pay for their maintenance, provided a restrictive framework for improving transport. Legislative bodies in Britain and the United States circumvented this problem by chartering 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.<sup>2</sup> 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 United Kingdom and the United States in the eighteenth and early nineteenth centuries. Both nations are rightly considered success stories in the sense that rapid improvements in transportation expand markets, thus setting the stage for productivity advances in both agriculture and manufacturing. Yet the success of each nation should not obscure important institutional differences.<sup>3</sup> 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 fiscal privileges. For most of the eighteenth century Parliament was quite open to passing acts creating transportation organizations, but in the process it extracted rents in the forms of fees and bribes.

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 United States proceeded as a series of dramatic booms. We show that U.S. state

governments incorporated far more transportation companies per persons with far lower fees than did the U.K. Parliament.

Why, then, did the British Parliament collect much more in the way of rents than the state governments in the United States? One set of hypotheses focuses on economic structure. Britain 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 rents that parliament demanded. The United States, on the other hand, 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.

Another set of hypotheses focuses on differing political systems of the U.S. and Great Britain. The U.S had a more democratic political process where a far larger 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 transportation corporations utterly routine. In Britain, far fewer men could vote, and many seats in parliament were not even contested, but instead controlled by a small number of powerful families. The absence of electoral pressures, we argue, made it easier for Parliament to extract rents.

A related hypothesis is that the greater degree of political decentralization in the United States complemented its more democratic political ethos. To improve transportation, would-be projectors had no choice but to ask Parliament for permission. Parliament, facing no domestic political competition, could charge projectors for its blessing. Parliament thus had an incentive to only allow as many transportation projects as would enrich MPs through bribes and fees. 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. One way of summarizing the issue is that chartering was monopolistic in Britain and competitive in the United States, which implies that Parliament would raise prices (via fees and bribes) and restrict quantity compared to the United States. While we view political decentralization as an important part of the story, we also believe that it was a product of more fundamental economic and political differences between the two nations. Along with democracy, the key difference between the U.S. and U.K. appears to be the competitive economic environment in which cities and localities were engaged in a race to improve their transport links.

## **II. The Low Price of Transportation Charters in the U.S.**

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>4</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, 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. U.S. canals were often chartered as corporations as well, but state governments of New York, Pennsylvania, Ohio, and several other states owned and operated large-scale canal systems.<sup>5</sup>

Even when organized as 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.

Other than complying with a complex regulatory framework, how hard was it to secure legislative permission? 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>6</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>7</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>8</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, of course, 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, it rather quickly 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 the political "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 British Parliament: Charging for Corporations**

In Britain, the first transport projects to be authorized by Parliament were river navigations in the 1660s. River navigations were operated by individuals, joint-stock companies, and corporations. They received a monopoly right to levy tolls, to remove obstructions, and to make new cuts in the river. The diffusion of river navigations proceeded slowly through Britain's river network. Most rivers that were not navigable in 1600 had been made so by 1750 or 1820 at the latest. River navigation acts illustrate the high transaction costs of legislative approval in Britain. There were many proposals to improve rivers but less than half were successful in becoming acts.<sup>9</sup> Promoters faced opposition from a variety of vested interests, including towns which feared that river navigations would divert trade from their city, landowners near cities who feared lower prices for their agricultural goods, land carriers who feared the loss of their jobs, and finally mill-owners who feared the loss of water to drive their waterwheels.<sup>10</sup> In the early 1700s Parliament became more effective in passing river navigation acts due to procedural changes, decreased opposition, and its ability to compensate groups who lost from river improvements.

Following the early river navigations, the role of authorities created by statute or act expanded. Turnpike trusts became increasingly common on major roads up to the 1820s. The trusts were distinctive in that they could not earn profits. They raised their capital by issuing bonds secured on the income of the tolls. The improvement of bridges occurred at the same time as roads. Bridge improvement acts sometimes created trusts which raised capital through bonds and in other cases they formed joint stock companies which raised capital through the issuance of equity. One of the most famous bridges built

through the authority of an act was Ironbridge, the first bridge made of iron which towered over the river Severn in Staffordshire.

The canal era began in earnest with the opening of the Duke of Bridgewater's canal in 1761.<sup>11</sup> It linked the town of Worsley with Manchester and was enormously successful. Bridgewater's canal was unique in that it was entirely financed by the Duke himself. Most of other canal acts authorized the creation of joint-stock companies or corporations. The companies raised capital by issuing shares in local areas. The initial subscriptions were actively sought after even though the profits ended up being modest in most cases.

Railways emerged as the most important transport improvement starting in the 1820s. Railways were organized similarly to canals in that they were joint stock companies or corporations. The legendary success of Stephenson's rocket led to several railway acts in the 1830s. Their initial success fed into the first railway mania in which several hundred railways companies were authorized. Not all were successful in raising capital and building their lines, but they established the foundation for Britain's railway system in the remainder of the nineteenth century.

Parliament clearly passed numerous acts improving transport, but how did it compare with the U.S. in terms of the number of charters authorized? New data on the clerical summaries of all acts affecting local roads, bridges, canals, and railways can help in answering this question.<sup>12</sup> The clerical summaries identify two general types of transport improvement acts: (1) those creating authorities to improve transport and (2) those altering the original acts creating transport authorities. The original acts were similar to a charter creating a corporation or trust in the U.S. 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. Other acts in the second category authorized a trust or the joint stock company to undertake new projects or improvements by amending their original act. These were similar to amendment charters in the U.S. which also authorized new projects by existing companies. 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.

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.

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>13</sup> This comparison is particularly illuminating of the

differences between the U.S. and the U.K. because railroad technology was applied in both countries at roughly the same time.

One reason for these striking differences might well have been the relative cost of charters. In the U.S. corporate charters for transport organizations were essentially free, but this was not the case in the U.K. Promoters had to pay fees to officers in the House of Commons and Lords and if necessary they might have to pay bribes to MPs and Peers. Promoters often hired solicitors or agents who paid all the fees and guided their bill through Parliament. 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 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. Thus anywhere between 10 and 25 percent of the cost of passing acts was due to direct costs imposed by Parliament. The rest went to solicitors' fees and the expenses of drawing up plans for the project, which was required after the 1790s.

The data on fees strongly suggests there was some extraction by Parliament. M.P.'s, clerks, and solicitors all earned rents from the process of passing acts in Parliament. On the other hand, it should be kept in mind that these groups provided a service to promoters. Clerks drafted the legal documents and ensured that members received copies of the legislation. M.P.'s scrutinized projects and to a large degree they only approved those which were commercially viable. Solicitors guided the bill and organized witnesses. Fees also tended to be higher when there was opposition. Parliament allowed groups to oppose projects when their land or economic interests were

threatened. Promoters had to argue against these claims and in some cases provide compensation. To some degree, therefore, it was a respect for existing property rights in the U.K. which raised the cost of passing transport acts.

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>14</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 the vast majority of trusts renewed their authority. 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.

### **III. Direct Profitability vs. Indirect Returns**

The differences between the U.K. and the U.S. policies reflected the underlying motivations of investors in each nation. U.S. investors primarily sought long-term benefits from general economic development. British investors did as well but they also expected to make substantial direct profits via dividends and stock appreciation. 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>15</sup> The same was true in Virginia, where 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>16</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>17</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>18</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. Railroads had the most financial difficulty during and immediately after their initial construction, which may well have lessened the incentives for U.S. legislatures to extract fees for their charters.

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>19</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 the financial condition of a large percentage of trusts in 1821 and 1837 was ‘adverse.’<sup>20</sup> That being said, there were many trusts (more than half) that 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. Most turnpike bonds were issued in denominations of £50. The purchase or sale price of turnpike bonds was rarely less than £50. This suggests that most turnpike bonds were being traded at par.

Why did British transportation organizations generate direct returns for investors while U.S. companies did not? Underlying population densities were surely part of the answer. 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. Britain’s profitability advantage was largely the result of its far larger urban population. In 1801, the proportion of British residents living in cities of 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>21</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>22</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.

Even if they paid poor direct returns, 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>23</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 range of scholarly studies conducted on county, state, and national levels 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>24</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 that 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>25</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>26</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>27</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 any improvements 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.

British companies, on the other hand, could more readily pay fees and bribes to Parliament. Dealing with companies with far brighter financial prospects, Parliament could take an initial cut of profits. Parliament, of course, had little interest in charging too much for corporate charters, as unduly restricting their supply would lower the total

revenue that it could extract. Parliament seems to have succeeded in optimizing its returns by charging enough to line the pockets of its members, but not charging so much as to kill the goose that laid the golden eggs.

#### **IV. Urban structure and the Demand for Charters**

Differences in the urban structure provide another explanation for the higher number of charters in the U.S. compared to the U.K. A more evenly distributed urban population and a more open urban hierarchy created greater demand for transportation charters in the U.S. 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. 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. Edinburgh, the U.K.'s second most populous city in 1801 was one-eleventh the size of London and the same was true of Liverpool, the third largest city. Philadelphia, the U.S.'s second most populous city was approximately half the size of New York and the same was true of Baltimore, the third largest city.

The urban hierarchy in the U.S. and the U.K. deviate from the well known rank-size rule (a.k.a. Zipf's Law), but in different ways. The rank-size rule implies that the second-largest city is one-half the size of the largest, the third largest city is one-third the size of the largest, and so on. U.K. cities were 57% smaller on average than they would have been if they followed the rank-size rule, while U.S. cities were 48% larger on average than they would have been if they followed the rank-size rule. In other words,

the urban structure in the U.K. was dominated by a large city—London—while the U.S. had many medium-sized 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. In the U.K. all cities in the top eleven in 1801 were also in the top eleven in 1831. The same is generally true of the lower ranking cities. 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. Overall it appears that the urban structure in the U.S. was more open in that cities could both rise and fall.

How did the more balanced urban hierarchy in the U.S. influence the number of charters? The well-known gravity model of trade predicts that two economies will trade more if they both have a large economy and they are close together. In many empirical applications the log of bilateral trade between two countries is assumed to be equal to the log product of their G.D.P., their distance, and other factors. An implication of this specification is that two economies should trade more if they are both of equal size compared to the case where their total population is the same but one is larger than the other.<sup>28</sup>

The gravity model yields predictions about bilateral trade but it could also be applied to the adoption of inter-city transport links. The gravity model would predict that an inter-city transport link should be more likely if the product of the populations in the

two cities was higher. In turn this would suggest that charters establishing inter-city transport links should have been greater in the U.S. because it had more medium-sized cities than the U.K.

Railroads are one area where it is possible to test the hypothesis. The data discussed earlier show that U.S. states issued far more charters for railroads than the UK did in the 1820s and 1830s. To investigate the issue further we examined the number of rail connections among the top ten cities in each country. Bradshaw's Railway timetables identify inter-city rail connections in Britain. The edition for 1843 shows whether a passenger could travel directly between two cities or by changing trains in an intermediate city. There is no equivalent to Bradshaw's directory for the U.S., but maps show there was no rail connection between many large cities because it was not possible to take a train without disembarking and traveling by road or by water. In other cases, the maps illustrate that one could travel by train directly between two cities or by changing trains at an intermediate city.

There was a maximum of 45 railroad connections between the top ten cities in each country. The U.S. had 9 inter-city rail connections in the early 1840s, while the U.K. had 15. A probit regression illustrates the role of population and distance in the probability of an inter-city rail link by 1840 (see table 10). The dependent variable is 1 if two cities have a rail connection and the explanatory variables are the product of their populations in 1820 and their distance in miles. The results are consistent with the predictions of the gravity model. The product of the populations has a positive and significant effect on the probability of an inter-city connection and the distance has a negative and significant effect on the probability of a connection.

The estimates address the following counter-factual: how many rail connections would the U.S. have had if its urban hierarchy was like that of Great Britain? In other words, suppose New York was the relative size of London, Philadelphia was the relative size of Edinburgh, Baltimore was the relative size of Glasgow, and so on. The estimates suggest that the U.S. would have had 28% fewer rail connections if its cities were the same relative size as Britain's cities. The more balanced urban structure in the U.S. appears to have increased the number of charters by increasing the demand for inter-city transport links.

The results also show that the U.S. had more rail connections than would be predicted by the model. The coefficients imply the U.S. should have had between 6 and 7 connections when in reality it had 9. The opposite is true for the U.K. The more 'open' urban hierarchy in the U.S. might explain some of the additional differences. Openness added to the boisterous booster spirit that animated early U.S. 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 that feared losing population, wealth, and prestige to rival cities could hardly tolerate restrictive and expensive corporate chartering policies. Urban rivalries 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.

## **V. Democracy and Government Competition**

Thus far we have focused on how economic differences influenced the distinctive chartering regimes of the United States and Britain. There were also, of course, significant differences in political structure, as the United States was undoubtedly far more democratic than Great Britain. Although the various colonies had significant restrictions on white male suffrage, states slowly began to relax these restrictions once the United States had won its independence. Tax-based qualifications, which were significantly easier to meet, replaced property qualifications in many of the original colonies. New western states, eager to attract new migrants, generally adapted universal white manhood suffrage. Older states followed their lead. In 1840, 78 percent of all adult white males voted in the presidential election.<sup>29</sup> In Britain, the franchise was much more severely restricted. As late as 1865, only 18.7 percent of adult white males voted in Parliamentary elections in England and Wales. 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 1865, only 287 of Parliamentary seats out of 496 seats (58 percent) were contested.<sup>30</sup>

Not only was the United States more democratic, but its wealth was also distributed more equally. The United States certainly had its own economic elite, including wealthy merchants in the Northeast and slaveholding planters in the South. While different data sets make direct comparisons difficult, the evidence clearly indicates that the economic power of the U.S. elite—at least as measured by the percentage of wealth owned by the top 1 percent—was far less than Britain's far 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., Alice Hanson Jones estimated that the top 1 percent of U.S. households owned only 16.5 percent of all wealth (as measured by net worth). The degree of economic inequality in the U.S. certainly increased over the first half of the nineteenth century. By 1860, the top 1 percent in the U.S. owned 29 percent of all assets, still far less than the degree of stratification in nineteenth-century Britain.<sup>31</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>32</sup>

Thanks to the greater degree of democracy and economic equality in the United States, political insiders could not monopolize or otherwise 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 of outsiders who believed that they had been unfairly denied access to corporate charters.<sup>33</sup> The relatively broad distribution of property in the United States 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 simply issue new charters. Restricting access to charters became politically difficult. As local communities flood the legislature with requests for charters, approval soon became routine.

There is more evidence within the U.S. that greater democracy contributed to higher numbers of charters for transport improvement. Table 11 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 11 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 the Britain where democracy was more muted. British MPs, shielded from potential populist uprisings, could charge their constituents for transportation charters with little fear of political retaliation. Bribes and fees became

an accepted part of political culture given the limited ability of political outsiders to challenge the system. One might draw an analogy between transportation charters and patenting systems in the U.S. and Britain. As Sokoloff and Kahn 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>34</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. The high patenting rates in the United States and 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>35</sup>

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>36</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>37</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 the 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>38</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.

### **Political Decentralization vs. Parliamentary Monopoly**

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 in the two countries. In the U.S. legislatures had the authority to issue charters for transport improvement authorities 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, Scotland, and Ireland did not have the direct authority to pass transport acts. This right belonged to the U.K. Parliament as a whole. 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, say as economic activity moved from Pennsylvania to New York. As a result, legislators in states like Pennsylvania 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 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 case to test the theory. 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 newly formed U.K. parliament. The legislative monopoly hypothesis would predict that prior to unification Irish M.P.'s kept fees low to prevent trade from being diverted to other areas like Wales

or Scotland. M.P.'s in the U.K. parliament would have been less sensitive to such considerations after unification because trade remained within the U.K. Therefore, if the expanded spatial authority of the U.K. Parliament mattered, then Ireland should have had more acts before unification than after, especially when compared to neighboring regions like Wales or Scotland.

Table 12 shows data on canal acts affecting Ireland, Scotland, and Wales before and after unification. Canal acts went from five to zero in Ireland ten years before and after unification and from three to six in Scotland ten years before and after unification. Similarly, the number of canal acts in Ireland decreased in the twenty year period following unification and in Scotland they increased. The bottom panel of Table 12 shows the same comparison between canal acts in Ireland and Wales. Canal acts in Wales decreased over the same periods just like Ireland, but the decline was not as large in Wales, particularly between 1781 and 1800 compared to 1801 and 1820.

The results are quite different if harbor improvement acts are considered (see table 13). In Ireland there was a large increase in harbor improvement acts following unification. The same is true of Scotland, but the percentage increase was much smaller by comparison. In the case of Wales harbor improvement acts increased little following unification whereas they increased significantly in Ireland.

Overall the test yields ambiguous results on the effects of changes in political structure in the U.K. There is no clear evidence that Irish M.P.'s kept fees lower and encouraged more acts when they had a Parliament separate from the U.K. This casts some doubt on the view that the number of acts would have been higher in the U.K. if it had a political structure like the U.S. where there were several regional legislatures with

monopolies on charters in their own territory. In some ways, though, this result is not so surprising given the limitations of the data. Ireland, Wales, Scotland, and England did not necessarily compete against each other in the same way as the U.S. states, especially given the primacy of London and the general stability of the United Kingdom's urban hierarchy. Perhaps if one of the fast-growing industrial cities—like Manchester—had access to their own parliament, they might have well worked to significantly reduce the costs of transportation charters and increase their number. In the U.S. the potent combination of competitive urban rivalries and political decentralization reinforced the policy of reducing chartering costs.

### **Concluding Thoughts**

We have suggested that a number of different factors led the U.S. to adopt a lower cost and more open transportation charter policy. On the demand side, a desire to raise long-term land values, a more open urban hierarchy, and a highly competitive booster mentality fueled the desire for cheap and readily available transportation charters. British companies, operating in a wealthier, more densely populated country, generated higher direct profits and could more readily pay fees and bribes to obtain a charter. On the supply side, a more democratic culture and a more decentralized political system in the U.S. readily responded (with some notable exceptions related to asset financing) to the demand for more charters. Political insiders in Britain, on the other hand, had little reason to fear the political consequences extracting rents from incorporators. Dividing these factors into "supply side" and "demand side" categories is somewhat misleading, as

the two categories frequently interacted. The greater degree of democracy and decentralization in the U.S., for example, might have arisen in part because of the widespread desire to raise land values, which placed a premium on local control. Ideally, we would like to have sophisticated tests to sort out these issues, but complexity of the interactions and the limitations of the data make such an exercise well beyond the scope of our paper.

In the end, what is the ultimate importance of free and readily available corporate charters in the United States? On one level, our comparison comports with James W. Hurt'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 aristocratic and corrupt Great Britain. British chartering policies undoubtedly slowed the pace of the transportation revolution, as the high costs of charters meant that more marginal projects gotten 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 focus on decentralization and localism, 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.



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

<b>Panel A: Number of Charters</b>				
	<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>

<b>Panel B Number of Charters per 10,000 Residents (Decadal Averages)</b>				
State	1800-1809	1810-1819	1820-29	1830-39
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
TOTAL	1.117	1.423	0.749	1.497

**Sources: see text.**

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

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Panel A: Number of Acts for new transport improvements

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	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

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Panel B: Number of Acts per 10,000 residents

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	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

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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 on road
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

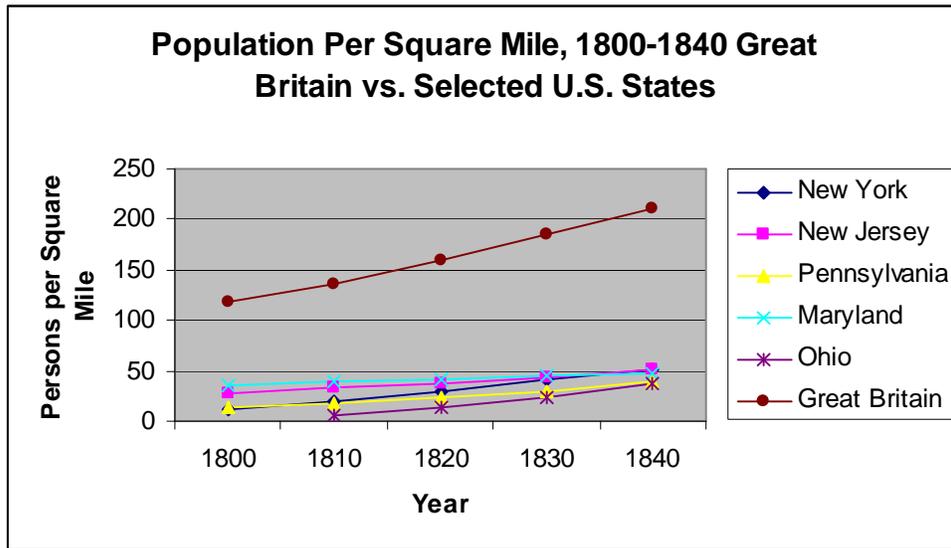
**Table 7**

**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

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

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

Sources: Mitchell, British Historical Statistics..

Table 10: Probit Analysis of Inter-City Rail Links in the U.S. and U.K.

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dependent variable =1 if there is a rail link between city l and city j

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Variable	Coefficient	standard error
popi*popj	9.88E-06	(0.00000426)*
Distanceij	-0.0121067	(0.0028956)*
N	90	
Pseudo R-square	0.4281	

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Sources: see text.

Table 11: Democracy and Transport Acts across five U.S. state

Panel A: Voting Rates and Acts per capita

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

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

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

Table 12: Changes in Irish, Scottish, and Welsh Canal Acts before and after Unification in Ireland in 1801.

Panel A: Ireland vs. Scotland				
	ireland	Difference	scotland	Difference
canal acts from 1791 to 1800	5		3	
canal acts from 1801 to 1810	0	-5	6	3
canal acts from 1781 to 1800	8		6	
canal acts from 1801 to 1820	1	-7	7	1
Panel B: Ireland vs. Wales				
	ireland	Difference	wales	Difference
canal acts from 1791 to 1800	5		8	
canal acts from 1801 to 1810	0	-5	1	-7
canal acts from 1781 to 1800	8		9	
canal acts from 1801 to 1820	1	-7	4	-5

Sources: see text.

Table 13: Changes in Irish, Scottish, and Welsh Harbor Acts before and after Unification in Ireland in 1801.

Panel A: Ireland vs. Scotland				
	ireland	difference	scotland	difference
harbor acts from 1791 to 1800	1		6	
harbor acts from 1801 to 1810	2	1	9	3
harbor acts from 1781 to 1800	1		8	
harbor acts from 1801 to 1820	8	7	20	12
Panel B: Ireland vs. Wales				
	ireland		wales	
harbor acts from 1791 to 1800	1		5	
harbor acts from 1801 to 1810	2	1	5	0
harbor acts from 1781 to 1800	1		6	
harbor acts from 1801 to 1820	8	7	5	-1

Sources: see text.

## Notes

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

<sup>2</sup> Much of Sokoloff's own research focused on how the growing "extent of markets" fostered innovation and higher rates of productivity in the United States. See, for example, "Innovative Activity in Early America," pp. 813-1850; "Invention, Innovation, and Manufacturing Productivity," pp. 679-736; and Sokoloff and Villalflor, "The Market for Manufacturing Workers," pp. 29-65.

<sup>3</sup> In many respects, our comparison of the economic and institutional differences between Britain and the United States follows the example set by Sokoloff. See, for example, Sokoloff and Dollar, "Agricultural Seasonality" and Kahn and Sokoloff, "Patent Institutions."

<sup>4</sup> The U.S national government financed the National Road and scattered funding for other projects, 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>5</sup> Goodrich, Government Promotion, 270-71.

<sup>6</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>7</sup> Klein and Majewski, "Economy, Community, and Law," 482.

<sup>8</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>9</sup> Bogart, 2008, "Competition and Commitment." Hoppit, Failed Legislation.

<sup>10</sup> Willan, River Navigations.

<sup>11</sup> For an overview of canal development see Duckham "Canals and River Navigations,"

<sup>12</sup> See Bogart and Richardson, "Adaptable Property Rights," for more discussion of the data.

<sup>13</sup> The data on railroad miles in Britain and the U.S. comes from Mitchell, Historical Statistics.

<sup>14</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>15</sup> Calculated from Wright, Wealth of Nations Rediscovered, 155.

<sup>16</sup> Klein and Majewski, 499.

<sup>17</sup> Taylor, "Turnpike Era in New England," 266.

<sup>18</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>19</sup> Duckham, "Canals and River Navigations," p. 123. Ward, The finance of Canals.

<sup>20</sup> Albert, Turnpike Road System, Appendix D.

<sup>21</sup> U. S. Bureau of the Census, Historical Statistics of the United States, p. 14.

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- <sup>22</sup>B. R. Mitchell, British Historical Statistics (Cambridge: Cambridge University Press, 1988), p. 25; Historical Statistics of the United States, p. 14.
- <sup>23</sup> Gordon, Gazetteer, p. 35.
- <sup>24</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>25</sup> Klein, "The Voluntary Provision of Public Goods?"; Majewski, "Who Financed the Transportation Revolution?"
- <sup>26</sup> Hilt, "When did Ownership Separate from Control," p. 664.
- <sup>27</sup> Majewski, "Toward a Social History," p. 309.
- <sup>28</sup> Suppose that two cities had a population of 50. The log product of their populations is 15.3. Now suppose that one city had a population of 25 and the other 75. The log product of their population is 13.9. According to the gravity model trade should be higher in the first case, all else equal.
- <sup>29</sup> Engerman and Sokoloff, "Evolution of Suffrage Institutions," 906.
- <sup>30</sup> Smith, Dorling, and Shaw, Poverty, Inequality and Health in Britain, p. xxxviii.
- <sup>31</sup> Lindert, "Three Centuries of Inequality in Britain and America," pp. 181,188.
- <sup>32</sup> Steckel and Moehling, "Rising Inequality," p. 167.
- <sup>33</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.
- <sup>34</sup> Khan and Sokoloff, "Patent Institutions," 298.
- <sup>35</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."
- <sup>36</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>37</sup> Cadman, The Corporation in New Jersey, 50-61.
- <sup>38</sup> Quoted in Cadman, The Corporation in New Jersey, 58.

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