

Governance after the Glorious Revolution: Evidence on the Enforcement of Property rights in Britain's Transport Sector, 1690-1750

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Abstract

Britain's economic rise in the eighteenth century is often linked with the strong protection of property rights by Parliament. This view remains controversial because there have been few studies directly examining Parliament's role in the enforcement of property rights and the political economy forces are not well understood. This paper provides micro-evidence in the context of Britain's transport sector, where turnpike trusts were given rights to levy tolls subject to a cap. The toll caps were renegotiated in Parliament creating the potential for interest groups to lobby for lower tolls. Using novel data spanning from 1690 to 1750, I show that more than 83% of renegotiations either maintained or expanded toll caps, indicating that property rights designed by parliament were mostly secure. An econometric analysis also reveals under which conditions property rights in tolls were weakened in renegotiations. The odds were greater when local connections to the majority party and political competition were weaker. The odds of lower tolls were greater following elections, foreign wars, and bad harvests. The results enrich our understanding of governance after the Glorious Revolution and serve as a reminder that the enforcement of property rights is a politic-economic equilibrium.

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The importance of politics for economic development is a key theme in economic and historical research. In the case of Britain, political developments in the seventeenth century like the Glorious Revolution of 1689 are thought to be linked with its economic rise in the eighteenth century. According to this view property rights in land and commercial enterprises were well enforced because of institutions that limited the powers of the crown and enhanced the powers of parliament.² This argument has been criticized for being disconnected from the most important developments in the economy, particularly technological change.³ There is a further criticism that the political economy of Parliament is not well articulated. Parliament was controlled by two deeply divided political parties, the Whigs and Tories.⁴ There were also interest groups who had a strong influence over legislation in Parliament.⁵ This paper contributes to this debate by studying the enforcement of property rights in a key sector for Britain's economic development, and where the behavior of political parties and interest groups can be seen more clearly. The results enrich our understanding of political governance after the Glorious Revolution.

In the eighteenth century Britain's transport sector was revolutionized resulting in significant productivity growth (Bogart 2013). One of the leading developments involved the improvement of roads in the decades after 1700. Organizations known as turnpike trusts were granted rights to levy tolls subject to a toll cap, issue debt secured on the tolls, and purchase land. Their rights were created by acts of parliament and lasted for a fixed period of time usually 21 years. Periodically trustees had to petition the House of Commons requesting a renewal and possibly an expansion of their rights. But the renegotiations could also work against trustees.

² See North and Weingast (1989), Acemoglu and Robinson (2012), and Cox (2013).

³ See Mokyr (2009) and Allen (2009).

⁴ See Stasavage (2005), Pincus (2009), Carruthers (1999)

⁵ Mokyr and Nye (2007), Mokyr (2009), Harris (2000).

For example, their toll cap might be lowered reducing their ability to raise revenues. Some interest groups favored the reduction of toll caps as lowered their transportation costs.

The first contribution of this paper is to show that the toll caps were generally maintained or increased in renegotiations. Only 17% resulted in a toll cap being lowered. To arrive at this conclusion I use data from all 146 renegotiations of turnpike rights in acts of parliament between 1693 and 1750. The toll caps from a renegotiated turnpike act are compared with the previous or original act in order to determine what happened to a trust's tolls overall and in specific traffic categories like wagons, coaches, and livestock. The summary statistics give credence to the view that property rights designed by parliament were mostly secure.

The second contribution of the paper is to identify the political economy forces which determined whether the toll caps were lowered or maintained. In the period under study here most renegotiations occurred during the 'Whig Oligarchy,' from 1720 to 1750. The Whig party was dominant in the House of Commons under the leadership of Robert Walpole and his followers. Whig leaders like Walpole are thought to have been shrewd in their policy choices (Holmes and Szechi 1993). They protected the property rights of the monied interests, like the Bank of England, because the latter provided financial and electoral support to the Whig regime. Turnpike trustees were not as connected as directors of the Bank of England, but they were elite actors and they had the right to vote. Trustee requests for protection would have garnered the attention of Whig leaders, especially if there were more Whig MPs in the area of if an election was up-coming. However, Whig leaders were also cognizant of the popular interests who sometimes rioted against turnpikes and their tolls. Popular interests could derail government policies, even though they did not have the right to vote.

The role of these political economy forces is illustrated in a model of renegotiations in which trustees and popular interest groups engage in a contest to convince the majority party in the House of Commons to either maintain the toll caps or to lower them. The model assumes the leaders of the majority party are biased to the arguments of trustees who want to maintain the toll caps, but they might also adjust the bias depending on political considerations. These include the stage of the electoral cycle (i.e. whether an election is upcoming or just passed), the density of majority party MPs in the area of the turnpike road, and the degree of local political competition for seats in the Commons. The model yields a reduced form equation for the probability that an act is renegotiated unfavorably and incorporates the bias of the majority party and the endogenous lobbying efforts of interest groups and trusts.

The model is estimated using data from several sources. The most novel is a GIS data set on turnpike locations, the political affiliation of nearby MPs, and contested elections. Supplementary GIS data provides additional characteristics like the population size and economic function of nearby towns. The results from a logit model show that the odds of a toll cap being lowered were less when there were more majority party MPs nearby and more contested elections. Toll caps were never lowered in the year prior to an election, but the odds were higher in the year after an election compared to other years. Macro-economic conditions like bad harvests and foreign wars also raised the odds. The results suggest Whig leaders, like Walpole, were willing to reduce trustee rights when it was politically expedient. The enforcement of property rights was not automatic, even in Britain after the Glorious Revolution.

Background on British Politics

The Glorious Revolution of 1688 marked a significant turning point in the political history of Britain. Over the next two decades the House of Commons and Lords solidified a key role for Parliament in governing the country. The House of Commons, in particular, developed the fiscal and implicit constitutional power to check the authority of the Monarchy. The transition to 'limited' government was not harmonious and exposed divisions within British society. The most poignant example is the conflict between the Whigs and Tories.

Political parties emerged in the 1670s and 80s during the Exclusion crisis. The Whigs favored excluding James Stuart from the throne because of his Catholicism and views on the monarchy. The Tories formed to oppose exclusion because it represented too great an incursion into royal authority. After the Glorious Revolution, the Whigs and Tories were engaged in a frequent and close struggle for control over the House Commons. During the 'Rage of Party', between 1690 and 1714, there were ten elections and the majority party in the Commons changed six times. Party conflict was fueled by differences in economic and social interests. The Tories represented a significant portion of the landowning interest and on national issues they protected the interests of the Church of England and favored lower taxes. The Whigs generally represented larger landowners and financial interests. They favored religious toleration for dissenters from the Church of England and an aggressive foreign policy supported by a well-funded army. The two parties also differed in leadership. The Tories' best known leader was Robert Harley who served as Lord Treasurer from 1711 to 1714. The Whigs were led by a small group known as the 'Junto' who dominated the king's ministry for much of the 1690s.

There was a significant turn in British politics after 1715 when the intensity of party competition weakened and changed in character. There were six elections for seats in the House of Commons from 1715 to 1747 and in all of them the Whigs won a majority. The Tories were

damaged by their links with the failed Rebellion of 1715, which aimed to overthrow the Hanoverian monarchy and reinstall James Stuart to the throne. Religious tensions also weakened, giving less salience to the Tory critique of 'Church in Danger'. The emergence of Robert Walpole as the leader of the Whig party was another important development. Walpole used the 1715 Jacobite Rebellion to portray the Tories as a threat to the Revolutionary settlement of 1689. Walpole also courted a new group of Whigs by offering government offices and other perks. Walpole was successful in that he helped to maintain a Whig majority. Walpole fended off several attempts to overturn his power by a group known as the Opposition Whigs. After Walpole resigned as Lord Treasurer in 1742, Henry Pelham, a close associate of Walpole, emerged as a new leader of the government. Pelham employed similar tactics as Walpole in that he ran the government with the help of a close circle of Whig leaders. Like Walpole he was successful in keeping the Opposition out of power.

The period from 1721 up to the late 1750s is known in British history as the Age of Oligarchy. The political system was run by a small group of Whigs who controlled the House of Commons, and thus gained the favor of the King. It is generally thought that the Whig Oligarchs adopted economic policies that benefitted their supporters, most notably large landowners and the financial interests behind the Bank of England, the East India Company, and other large corporations (Stasavage 2007). It is also suggested that the property rights of the powerful were strongly protected under the Whig Oligarchs, sometimes at the expense of more middling groups or those without a strong political connections to the Whigs (E.P. Thompson). There is a counter-view which suggests that 'popular opinion' had some influence over the policies of the Whig Oligarchs. The extent of the franchise was very limited in Britain at no more than 15 percent of the adult male population. Nevertheless the disenfranchised masses could influence politics

through petitioning to Parliament and in some occasion by rioting and protesting. One example is the Excise bill of 1733 which failed in part because of petitions and protests by shopkeepers and small manufactures throughout England (Langford).

The degree to which the Whig Oligarchs favored the rich and well-connected remains an open question in the literature. Most of the studies which have examined this issue have focused on major pieces of legislation. However, some of the most significant expressions of government policy can be found in the numerous local acts for building turnpike roads and harbors, dredging rivers, and enclosing village commons. These acts represented significant changes in property rights and had great bearing on local economies. Some recent work has begun to probe into the political economy of local acts, but much about them remains to be discovered. This paper examines the enforcement of property rights in turnpike roads, and in the process sheds greater light on whether the property rights of the elite were strongly protected under the Whig Oligarchs, or whether they sometimes conceded to popular interests whose interests were at odds with some elites.

Background on Turnpikes

Turnpike trusts were established because of dissatisfaction with an ill-formed system of infrastructure financing. At the beginning of the 1700s, local governments, known as parishes, were required by law to pay for road maintenance and improvements in their jurisdiction. Parishes were given the authority to claim labor services from their residents, or levy taxes on property income, but they could not levy tolls on road-users or issue bonds. Parishes were generally ineffective in providing road maintenance and investment. The main problem was that parishes were small, and therefore, most of the benefits went to through-travelers. The through-

traffic problem was especially relevant along the highways leading into London, where wagons and carriages passed through dozens of parishes along their route. In such cases, parishes had to pay for all the maintenance costs. Moreover, their expenditures increased through-traffic, which lowered prices in their market or added to congestion.

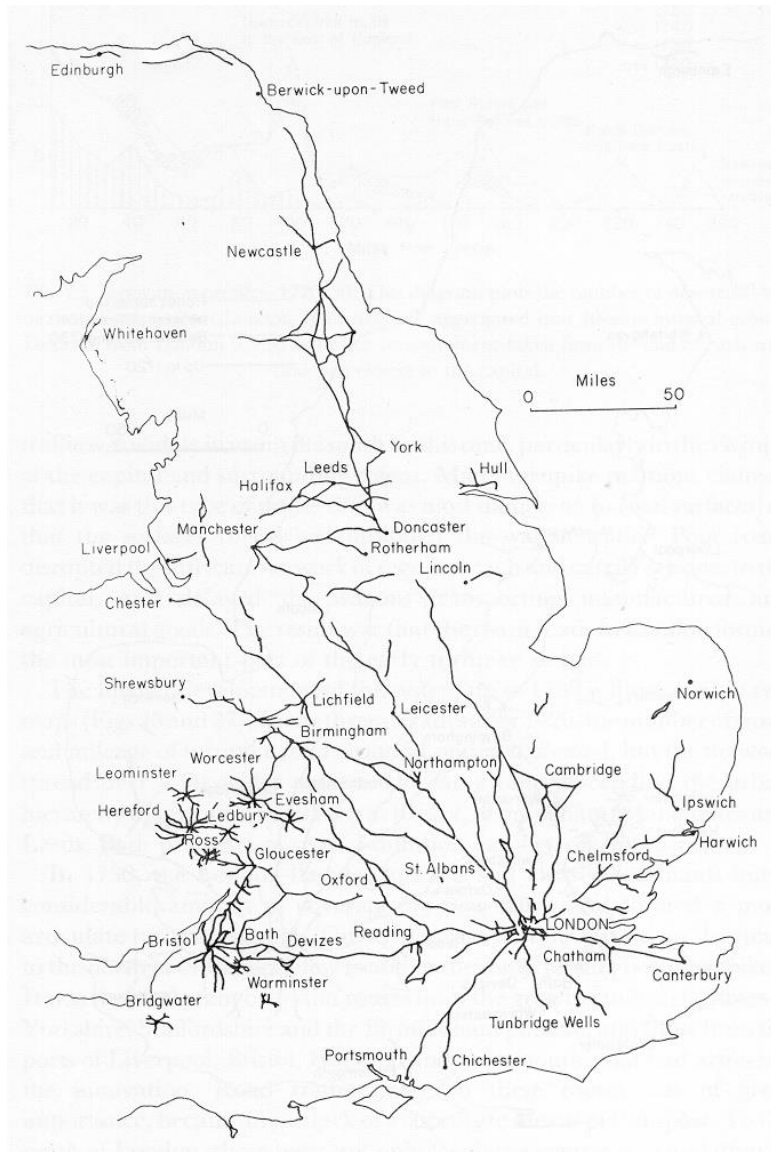
The poor quality of roads led to calls for a new system of financing. The impetus for reform did not come from government ministers or Members of Parliament, but rather from local groups who were dissatisfied with their roads. For example, in 1705 the inhabitants of Droitwich submitted a petition stating that the highway between Droitwich and Birmingham was “impassable, resulting in several carts and wagons being broken.” They went on to state that “goods are spoiled, many horses are lost...to the great prejudice of trade in this country.”

Petitions to improve local highways were assigned to a committee in the House of Commons. The committee wrote a bill which was then amended and voted up or down by the House of Commons. Initially many turnpike petitions failed to become acts of Parliament, but after the 1720s the failure rate for turnpike petitions declined to below 10 percent (Hoppit 1997).

A turnpike act transferred authority from parishes to a body of trustees. The trustees had the right to levy tolls, issue secured bonds, and purchase land, but they did not have the right to profit from the tolls. Instead it was expected that trustees would earn indirect benefits through higher rents or profits from trade. As this last remark suggests, turnpike trustees were drawn from the elite otherwise rents and trade profits would be of secondary importance. The trustees were named in the act and it was customary for all local individuals of importance to be named, including gentlemen, nobles, Justices of the Peace, government officers, and members of the clergy. Moreover, new trustees could be added only if they met a minimum property income

requirement. The income requirements were usually in excess of 50 pounds per year for landed estates, making the vast majority of the population ineligible.

In terms of their diffusion, turnpike trusts spread through the London road network from 1700 to 1750. Eric Pawson's (1977) map of turnpike trust network in 1750 shows how they were common along radial roads leading into London. Other trusts were established near provincial cities along their local roads and along some of the cross-roads in the northern and western England. After 1750 the turnpike network would expand much further. By 1820 turnpike trusts controlled nearly 20 percent of all carriage roads in England and Wales, which is higher than the proportion of any road network today.



Trusts made improvements to Britain's roads soon after they were established (Bogart 2005), but the process was not without difficulties and trusts were not always accepted. The challenges were especially great before 1750 when this new system of was still being developed. The most important dispute for this paper involved road users and local communities. Some users complained that the tolls were not being used properly. For example, the freeholders, landowners, and other inhabitants of Maisemore in Gloucestershire complained in 1747 that the

tolls paid at their local turnpike were being applied to roads elsewhere. Some road users also complained that the tolls were not necessary. The Justices of peace, gentlemen, clergy, freeholders, farmers, manufacturers, and other inhabitants within the district of Cleveland in Yorkshire argued in 1747 that a toll laid on carts, carriages, horses, and cattle laden with coals or cinders would be of a “very great prejudice to them.”

Trustees also voiced their problems. Some trustees expressed that their tolls were insufficient and needed to be enlarged. For example, the trustees of the Boroughbridge to Northallerton trust argued in 1747 that the tolls do not raise a sufficient sum of money to repair the road which is in many parts still ruinous. They went on to argue that toll exemptions for carts laden with coals were a key problem.

Conflicts over turnpikes could erupt in riots as in Bristol in 1727 and Leeds in 1753. However, the most common venue for resolving conflicts was in Parliament when turnpike acts were being renegotiated. In most cases, turnpike trusts were given the right to levy tolls for a specific period of time, usually 21 years. Trustees or other groups had to submit a petition requesting a renewal of the trust’s rights; otherwise its authority would end. At the time of renewal, Parliament could alter the rights of trustees. One of the most important was the maximum schedule of tolls, which acted as a toll cap in modern regulatory parlance. The toll caps were set in the founding act for different types of traffic including wagons, carriages, and livestock, and within these groupings there was a further distinction between wagons and carriages with different numbers of horses, and for different types of livestock. A change in the toll cap, say lowering the maximum on wagons, could significantly affect the trust’s revenues. One main goal of this paper is to identify the whether the toll caps were raised, lowered, or maintained in the renewal of turnpike acts. An increase in the cap would represent a clear

expansion in the trust's powers or their property rights. A decrease in the cap would signify the opposite, and might even be thought of as a violation of the trust's property rights.

Another goal is to identify under what circumstances the maximum toll caps were raised, lowered, or maintained for a given trust. Turnpike trusts were non-profits, but the operation of turnpikes generated 'rents' which could be captured by different groups mainly trustees and creditors. Thus the economic characteristics of the trust and the economic environment in which it operated likely mattered. Politics are also potentially important. Most of the turnpike trusts that were established between 1700 and 1740 had their founding acts renegotiated under the period of Whig rule from 1721 to the late 1750s. Given that turnpike trustees were firmly part of the elite, one might think that the Whig Oligarchs worked to maintain trusts' powers. On other hand, as we have seen the Whig Oligarchs sometimes conceded to popular interests. It is possible that the Whig Oligarchs were more willing to sacrifice the property rights of a turnpike trust if their fellow Whig MPs would not be impacted negatively.

A first Look at Turnpike Toll Caps

There have been few studies in the literature empirically examining the enforcement of property rights in Britain. The analysis of turnpike toll caps is one of the first. In this section, I provide a first look at what happened to the toll caps during renegotiations of turnpike acts. The basis for the analysis is a collection of all turnpike acts between 1663 and 1750. The titles and dates of all acts of parliament are available from the Parliament Archives and have been coded and organized in previous work (Bogart 2012). Printed acts are more informative but difficult to obtain. Before 1714 all turnpike acts can be found in the *Statutes of the realm*. After 1714

turnpike acts are available in the Parliamentary Archives, but for this study they are drawn from the printed collection in William H. Clark Library in Los Angeles.

Printed turnpike acts range from a few pages to forty. They start with an introduction or preamble and are followed by sections containing specific provisions. From the introduction I record a brief description of the road or roads and their location. I also characterize acts as either founding a turnpike trust or renegotiating (a.k.a. renewing) the rights of a previous trust. There are many provisions in the act, and for the purposes of this paper I focus on the toll caps. All turnpike acts specified toll caps by traffic types, mainly wagons, by carriages, and by livestock. Within these three categories there were also further distinctions. For example, within the coach category most acts specified a different toll cap on coaches with six or more horses, four or five horses, and two or three horses. A similar pattern is found for wagons with toll caps being specified for carriages with different numbers of horses. In some acts, wagon toll caps were further distinguished by the type of cargo like grain and coal. I refer to these cases as ‘special cargo’ tolls. For livestock tolls, distinctions were made between a score of cattle as opposed to a score of hogs, sheep, and calves who were treated as a group. For the analysis that follows it is useful to collapse the toll caps for each traffic category (coaches, wagons, and livestock) into a single average measure. For wagons and coaches, the toll on wagons with six horses, four horses, and two horses are averaged. In a few cases, the toll cap was only specified for ‘wagons’ or ‘coaches’ so in these cases this was the toll that was used for the average. For livestock I averaged the cattle toll cap and the hogs, sheep, lambs, and calves cap. If there were special cargo tolls then these also averaged across six, four, and two horses. If there were multiple types of special tolls each was kept separate in the averaging.

A key question is whether individual trusts had their toll caps increased, decreased, or maintained. To this end, the acts are sorted by trusts including their founding act and any subsequent acts that renegotiated their authority.⁶ The percentage change in average toll caps is then measured for wagons, carriages, livestock, and possibly wagons with particular cargo. Next, indicator variables are created if the average toll is increased in any of the categories, decreased in any of the categories, or maintained. Thus an act can maintain the trust's toll caps in all categories, it can increase the toll caps in at least one category, it can decrease the toll caps in at least one category, and it can both increase and decrease the tolls in at least one category.

A summary of the indicator variables for toll cap changes is given in table 1. The key finding is that most renegotiated acts maintained toll caps (57.5%) or increased them (34.9%). Relatively few of renegotiated acts reduced the tolls (17%) and even fewer (about 8%) reduced the toll caps without any corresponding increase in toll caps. It would appear on these numbers that the rights to levy tolls were mostly protected in renegotiations.

Table 1: Summary of Indicators for Toll Cap Changes in Renegotiated Acts

Variable	N	Mean	St. Dev
Indicator if all Toll caps maintained	146	0.575	0.495
Indicator if any Toll cap decreased	146	0.171	0.378
Indicator if any Toll cap increased	146	0.349	0.478
Indicator if Toll cap had Increase and Decrease	146	0.095	0.294

Sources: see text.

⁶ Among the trusts with acts renegotiated by 1750, the average had 1.42 renegotiations. The average date for the renegotiated acts was 1736.

A similar conclusion is reached if the toll caps are studied by traffic type (see table 2). The average toll cap for coaches was reduced in 6.1% of renegotiated acts. For wagons it was 6.8%, and for livestock 7.5%. Thus across traffic categories the likelihood of a toll decrease was similar. The likelihood of a toll cap increase was generally higher for wagons and coaches compared to livestock or special cargo. Also significant is the fact that when toll caps were changed in a renegotiated act, the percentage change was generally higher for toll cap increases. For example, if the toll cap was lowered for wagons the average reduction was 27.8%, but if it was increased then the average increases was 71.6%.

Table 2: Summary of Toll Cap Changes in Renegotiated Acts by Traffic Type

Coaches							
	N	Mean	St. Dev		N	Mean	St. Dev
Indicator if Average Coach Toll cap maintained	146	0.726	0.447				
Indicator if Average Coach Toll cap decreased	146	0.061	0.241	Percentage decrease toll cap	9	-27.8	18.8
Indicator if Average Coach Toll cap increased	146	0.212	0.41	Percentage increase toll cap	31	59.7	44.3
Wagons							
	N	Mean	St. Dev		N	Mean	St. Dev
Indicator if Average Wagon Toll cap maintained	146	0.691	0.463				
Indicator if Average Wagon Toll cap decreased	146	0.068	0.253	Percentage decrease toll cap	10	-22.9	13.3
Indicator if Average Wagon Toll cap increased	146	0.239	0.426	Percentage increase toll cap	35	71.6	71.3

increased cap

Livestock							
	N	Mean	St. Dev		N	Mean	St. Dev
Indicator if Average Livestock Toll cap maintained	146	0.773	0.419				
Indicator if Average Livestock Toll cap decreased	146	0.075	0.264	Percentage decrease toll cap	11	-28.76	21.2
Indicator if Average Livestock Toll cap increased	146	0.15	0.359	Percentage increase toll cap	22	81.12	66.6

Sources: see text.

While most trusts enjoyed good protection of their rights to levy tolls, some did not as their toll caps were lowered by renegotiated acts. Moreover, some trusts saw their rights to levy tolls expand as their toll caps were raised by renegotiated acts. Why was there a difference in these outcomes across trusts? To address question, I adopt the perspective that the enforcement of property rights is a political-economic equilibrium. The degree of enforcement is a function of the lobbying efforts of interest groups, the political connections of interest groups to the government, and the interests of the government itself. In the next section, I sketch a model which illustrates these concepts and motivates the empirics that follow. Before doing this it is useful to give a brief justification for why an interest group model is illuminating. For turnpike acts (any many other forms of legislation in Britain), there is rich information in the *Journals of the House of Commons* on the process by which bills became acts (see Hoppit 1997 for an overview of this source). To see how interest groups played a role, I identify all turnpike bills between 1663 and 1750. From the description of the road I am able to match all the bills to the list of turnpike acts discussed earlier and therefore identify which bills were for renegotiating a

turnpike act. Next, I determine whether the turnpike bill was initiated by an order from the House of Commons or from a petition by an interest group. This exercise shows that the vast majority of turnpike bills were initiated by petitions. Only 4 out of 146 bills were ordered by the House of Commons. The takeaway is that interest groups started the process by which turnpike acts were renegotiated.

The identity of the interest groups behind the petitions is also revealing. I classify the petitioners into 3 groups: (1) the general population, such as the inhabitants of some town or parish (2) local governments like mayors, grand juries, and JPs, and (3) the turnpike trustees. Within the general population, I also identify whether groups identified themselves as road-users. The classifications for those groups who petitioned for the renegotiation of turnpike bills is shown in table 3. Trustees were the most likely group and are found in 79% of the petitions initiating bills for renegotiation. The prominence of trustees is not surprising as their rights to levy tolls and carry out other activities were being renegotiated. What is perhaps more surprising is that the general population often petitioned for renegotiations. Road users were part of the general population group and are found in 16% of the petitions for bills, but they cannot account for the entire participation of local population groups. Local governments were also involved, but to a lesser degree.

Table 3: Classification of groups who petitioned for the renegotiation of a turnpike act

Interest Group	Number of Bills initiated in part by Group	% of Bills initiated in part by Group
General Population	65	46.7
Local Government	26	18.7
Trustees	110	79.1

Sources: see text.

For a sample of bills, I have also classified petitioner's explanations of why a bill was necessary. Thirty-nine percent stated that the turnpike act needed to be renegotiated because the term was coming to an end. Recall most turnpike trusts had authority to levy tolls for 21 years, at which point they needed a new act to renew their authority. Around 50% of petitioners asked for an expansion of powers. The precise powers that needed 'expansion' were not always articulated, but in some cases the trustees explicitly requested additional tolls. Interestingly, there was only one case in the sample of bills where petitioners initiating a bill explicitly stated that the tolls should be lowered. Perhaps the latter is not surprising as openly stating an attack on the tolls might have incited trustees.

Interest groups also played a role at the committee stage. After bills were introduced they were assigned to a committee. Committees could receive petitions from groups who learned that there was a bill for renegotiating a turnpike act. The aim of petitions at this point was to influence the committee who made the key decisions on the provisions of the bill. In 26% of the bills to renegotiate turnpike acts before 1750, at least one petition was submitted to the committee. The identities of petitioners are again classified into the general population, local governments, and trustees, and then within the general population, road-users and landowners were further identified. The results are reported in table 4. What is most striking is that trustees were less involved in this stage, whereas local governments and the general population participated much more. Landowners were the most common group within the general population. Less but still numerous were groups that identified themselves as road users. As one last note, in 10% of the bills to renegotiate more than one petition was submitted by different

groups in the general population. In the most extreme case, there were 10 petitions from different groups in the general population. As this case, suggests the general population at times put effort into influence the renegotiation of turnpike acts.

Table 4: Classification of groups who petitioned committees renegotiating turnpike bills

Interest Group	Number of Petitions to Committee by Group
Local Government	15
Trustees	6
General Population	73
Road Users	14
Landowners	44

Sources: see text.

A Model of Endogenous Enforcement

The model is based on contest theory, which has been used in a variety of economic settings similar to ours. Our model follows Skeperdas and Vaidya (2012) most closely where they study a court setting where judges are influenced by the persuasion efforts of plaintiffs and defendants (Appelbaum and Katz 1986, Nitzan 1994, Stein 2002, Konrad 2009). Here I consider a setting where the toll caps of a turnpike trust are being renegotiated in Parliament. For the moment we assume that the issue is whether to lower the toll caps, or whether to maintain them. The issue to raise the toll caps can be modeled in a similar way but it is beyond the scope of this paper.

The decision to modify toll caps is ultimately made by the Whig leaders in the House of Commons as they had a majority to implement legislation. It is assumed that Whig leaders do not have complete information on whether it is best to lower or maintain the toll caps, and therefore they rely on the evidence provided by trustees and interest groups. The evidence contains information about whether lowering the toll caps is useful or not. For example, a group of road users might try to convince Whig leaders that the tolls are too high and that the road could still be maintained at a lower toll. The assumption of incomplete information seems reasonable in this context. Communication costs were high (even accounting for road improvements) and thus it was difficult for Whig leaders to independently evaluate the economic conditions. Moreover, testimony by witnesses and experts was common in the renegotiation of turnpike acts, presumably because it was useful for making regulatory decisions.

Another assumption in the model is that the efforts put forth by the interest groups and trustees in producing evidence are endogenous. Trustees will put in more effort in developing evidence if they have a lot of rents to lose. Likewise, interest groups will put more effort into their evidence if much is to be gained. The optimal choice of efforts is natural once one realizes that these were basically lobbying expenditures which many would agree are based on rational choices.

The next key assumption is that Whig leaders are biased giving greater weight to the evidence of one side. Given political histories of this period, it is natural to assume that Whig leaders were generally biased to trustees as they were part of the elite and most road users were not. However, there may have been cases where the bias to trustees was weaker or stronger. In the model, I assume that Whig leaders adjusted their bias given the local and macro political environment. For example, if the region near the turnpike has fewer Whig MPs then Whig

leaders are less biased to trustees and more open to the evidence provided by interest groups like road users. A similar assumption is common in many political economy models dealing with majority parties or ruling coalitions (Cox and Mcubbins 1986, North, Wallis, and Weingast 2009). One mechanism posits that Whig leaders wanted to help sitting Whig MPs maintain close ties with trustees who were key actors in local politics. The opposite might apply when an area had Tory or Opposition MPs. Perhaps Whig leaders could blame Tory or Opposition MPs for not protecting the rights of trusts. The electoral cycle may have also affected the bias. Trustees might have helped Whig MPs get elected and thus in the year before an election the bias to trustees would be greater.

Bringing these elements together, I consider a ‘contest’ that captures the interaction between interest groups, trustees, and parliament. The contest is ‘won’ by the interest group if the toll cap is lowered and it is won by the trust if the toll cap is maintained. The contest has the following timing. In the first stage, the trustees and the interest group expend effort trying to persuade the Whig leaders to either lower toll caps or maintain them. In the second stage, Whig leaders make a decision to lower the tolls or maintain them. Their decision is captured by a contest success function p that takes one of two values 0 or 1. The probability $p = 1$ that the toll cap is lowered is given by $p = \frac{A_{ig}e_{ig}}{A_{ig}e_{ig} + A_{tt}e_{tt}}$, where A_{ig} measures the bias in favor of the interest group, A_{tt} measures the bias in favor of the turnpike trustees, and e_{ig} and e_{tt} is the evidence provided by the interest group and trustees respectively. If the evidence of the interest group e_{ig} is better and all else is equal then the chances are better that the toll cap will be lowered. If A_{tt} is large relative to A_{ig} then the interest group has little chance of getting the toll caps lowered all else

equal. Below I put more structure on the bias terms, but for the moment it is best to leave them general.

Evidence is costly to produce and it is assumed that the interest group must pay e_{ig} units of money to produce e_{ig} units of evidence. The interest group balances the effort expenditures against a monetary gain of b if the toll cap is lowered. If the toll cap is maintained then the interest group's payoff is normalized to 0. Combining their costs and benefits yields the expected payoff for the interest group from the contest:

$$\text{Expected Payoff Interest Group} = pb + (1 - p)0 - e_{ig} = \frac{A_{ig}e_{ig}}{A_{ig}e_{ig} + A_{tt}e_{tt}}b - e_{ig} \quad (1).$$

The same unitary marginal cost of evidence is assumed to apply to the turnpike trustees. They experience a loss l if the toll cap is lowered and 0 otherwise. Its expected payoff from the contest is:

$$\text{Expected Payoff Trustees} = p(-l) + -e_{tt} = \frac{A_{ig}e_{ig}}{A_{ig}e_{ig} + A_{tt}e_{tt}}(-l) - e_{tt} \quad (2).$$

To get the main results of the model it is necessary to determine the efforts of the interest group and trustees. Working backwards, the equilibrium probability that the toll is lowered in stage 2 is given by $p^* = \frac{A_{ig}e_{ig}^*}{A_{ig}e_{ig}^* + A_{tt}e_{tt}^*}$ where e_{ig}^* and e_{tt}^* are equilibrium efforts chosen by the interest group and trustees in stage 1. Turning to stage 1, the efforts are determined using standard results in the theory of contests.⁷ The effort decisions are made strategically and the Nash equilibrium is derived from best response functions. The equilibrium efforts e_{ig}^* and e_{tt}^* satisfy the following relationship: $e_{tt}^* = \frac{l}{b}e_{ig}^* = \frac{A_{ig}A_{tt}bl^2}{[A_{ig}b + A_{tt}l]^2}$. Notice that the ratio of the

⁷ We refer the reader to Konrad (2009) for a good overview of contests.

equilibrium efforts $\frac{e_{tt}^*}{e_{ig}^*}$ is equal to the ratio of losses to benefits $\frac{l}{b}$. The greater the expected losses for the incumbent relative to the entrant, the more the incumbent will expend effort relative to the entrant. After simplification, one can show that the equilibrium success function has the following simple form:

$$p^* = \frac{A_{ig}b}{A_{ig}b + A_{tt}l} = \frac{A_{ig}}{A_{ig} + A_{tt}\frac{l}{b}} \quad (3).$$

Notice that p^* increases in A_{ig} and decreases in A_{tt} , implying that the toll caps are more likely to be reduced the greater the bias to the interest group. p^* also decreases in $\frac{l}{b}$ implying that the toll caps are less likely to be reduced with greater losses experienced by trustees relative to the gains by interest groups.

The model yields clear predictions but in order to take them to the data more structure is needed. Regarding the bias terms A_{ig} and A_{tt} , I assume they are function of national and local politics. To be more specific, let $A_{ig} = A_1$ where A_1 is the baseline bias to the interest group. Also let $A_{tt} = A_2 + \alpha_1(\textit{election year}) + \alpha_2(\textit{local politics})$, where A_2 is the baseline bias to the trust and $\alpha_2(\textit{election year})$ captures the additional bias to trustees before elections. The idea is that if elections bolster the political connections of trustees relative to the broader public then it will be unlikely that toll caps get lowered just before elections because A_{tt} will become large. The third term, $\alpha_2(\textit{local politics})$, captures the additional bias to the trustees based on local politics. There are several potential factors as work here. One is the strength of Whig party representation in the vicinity of the turnpike road. Here the idea is that local connections to the party in power bolster the political connections of trustees. Another factor is the number of incumbents in the vicinity of the turnpike road. More incumbents could bolster the connections

of trustees. Lastly, the degree of political competition could matter. Political competition can have different effects. One possibility in this context is that it worked to strengthen the connections of trustees because they could vote and the broader public could not.

Various aspects of the economic environment will also influence the outcome of turnpike renegotiations. Their role is captured through the economic gains and losses experienced by interest groups and trustees. Formally I let $b = g_b(x_i, y_t)$ and $l = g_l(x_i, y_t)$, where x_i is a set of characteristics specific to the trust and the region surrounding it and y_t is a set of time varying characteristics that are common to all trusts. Locational factors are clearly important for the payoffs. To give one example, turnpike roads close to major cities had higher traffic levels and thus trusts could more easily make their bond payments. Therefore, urban proximity might lessen the losses l to trustees from lower toll caps. There would also be a large number of road users who might gain b from lower toll caps. The end result is that urban proximity contributes to a higher probability that the toll caps are lowered. Macro-economic conditions are another factor that could influence the gains and losses. Bad harvests meant that road users were sensitive to tolls and thus their gains to lowering the tolls might have been higher. We should also note that shocks like bad harvest could also weaken the bias to trustees.

Pulling all the elements together, we have an estimating equation for the probability that turnpike renegotiation i in year t resulted in lower tolls:

$$Prob(\text{toll caps lowered } i) = f[g_b(x_i, y_t), g_l(x_i, y_t), \text{election year}, \text{local politics}] \quad (4)$$

The variables entering the equation are described in the following section.

Data Sources and Variables

Limited sources present an immediate challenge in estimating the model, as there is no comprehensive source describing turnpike trust characteristics in the early 1700s. The first parliamentary surveys come in 1821. Fortunately, a number of variables can be constructed from parliamentary and secondary sources. The first panel in table 5 summarizes the variables on trust characteristics for the 146 turnpike acts that were renegotiated before 1750. ‘Year Trust Founded’ identifies the year the trust was established and is taken from the data on turnpike acts discussed above. The text of the founding act indicates the number of years until the trust’s authority expires. ‘Years to Until Expiration of Act’ measures the number of years left when the act was renegotiated. Note that the mean was 6.22 implying that many trusts had their act renegotiated several years before it was set to expire. At the other end of the spectrum, some turnpike acts were renegotiated after the act expired, which essentially meant there was a lapse in authority. Turnpike acts renegotiated in this fashion are identified by the variable ‘Expired.’

Justices of the Peace (JPs) were officials appointed by the monarch who were responsible for county government. They were commonly given control over roads in turnpike acts before 1714. Acts where JPs’ authority was being renegotiated are identified by the indicator variable ‘JP-Managed.’ The debt of the trust was often reported in a summary of the committee’s proceedings concerning turnpike bills. I use the summaries in the Journals to measure the debt whenever this information is given. The average debt at the time of renegotiation was 2226. Albert (1972) gives the road mileage for all trusts managing what he defines as the principal roads into London road. I use Albert’s data to define ‘Road miles’ for London trusts. I supplement these figures with mileage data for trusts in 1821.⁸ As the mileage for non-London trusts is taken from the nineteenth century some measurement error is introduced. Nevertheless a

⁸ The report from the ‘Select Committee to consider the Acts now in Force Regarding Turnpike Roads and Highways,’ British Parliamentary Papers 1821 IV, p. 343.

good proxy for road mileage is useful. I define a variable ‘Wagon toll cap per mile’ using each trust’s average toll caps for wagons found in the acts divided by total road mileage. The Wagon toll cap is based on the previous act, or in other words, the act that is being renegotiated. A similar variable is defined for coach toll caps and livestock toll caps. Albert identifies a group of trust’s managing main London roads. However, the description of roads in turnpike acts along with Eric Pawson’s (1977) map of the turnpike road network (shown above) suggest there were other trusts that managed important roads into London. I use these sources to supplement Albert in creating an indicator variable, ‘London Road,’ for acts renegotiation rights on a London road. Pawson’s map is also used to identify trusts managing networks, which are defined as multiple road segments which meet at one or more points. Good examples of networks are the ‘town-centered’ trusts around cities like Worcester and Hereford in western England (see Pawson’s map above). ‘Road Network’ is an indicator for acts where the trust manages a network.

Turnpike acts were renegotiated in different years, implying differences in the macroeconomic and political environment. I match ‘Year Act’ with available time-series based on the year when an act’s legislative session began. Legislative sessions usually ran from December to April of the following year. I use annual time-series variables dated from December’s calendar year. Two interest rates series are provided by Ward (1974) and Clark (1998). Ward’s series is based on an average of mortgages every five years. I interpolate to create an annual series. Clark’s is based on average returns on charity assets in each year. Indicators for foreign wars and bad harvests are taken from Holmes and Szechi. Inflation is taken from Clark’s consumer price index (2010). Coastal trade growth is a measure of shipping activity based on the number of ships annually arriving in coastal ports. It is taken from Bogart (2012) and is based partly on Ward (1974). Elections were usually held in late Spring and Summer. I

define a variable ‘Legislative Session Before Election’ if the turnpike act was renegotiated in the session just prior to the Spring or Summer election and 0 otherwise. ‘Legislative Session After Election’ is defined analogously. The omitted legislative sessions are those not before or after an election.

Table 5: Summary Statistics

trust characteristics					
Variable	N	Mean	St. Dev	min	max
Year Trust Founded	146	1717.6	14.7	1663	1747
Years to Until Expiration of Act Expired	146	6.22	6.11	-15	20
JP-Managed	146	0.034	0.182	0	1
Debt	96	0.1	0.31	0	1
Road miles	146	2226	2180	0	9000
Wagon toll cap per mile	146	19.1	14.7	4	95
Coach toll cap per mile	144	0.048	0.033	0.006	0.167
Livestock toll cap per mile	144	0.056	0.043	0.007	0.2
London road	143	0.039	0.028	0.002	0.1875
Road Network	146	0.71	0.45	0	1

Macroeconomic or Political Time variables

Variable	N	Mean	St. Dev	min	max
Year Act	146	1736.8	10.8	1693	1751
Interest rate, Ward Mortgages	146	4.73	0.22	4.42	5.42
Interest rate, Clark Charity	146	4.4	0.42	3.78	5.57
foreign war	146	0.46	0.5	0	1
bad harvest	146	0.15	0.36	0	1
Inflation	146	0.26	2.47	-6.46	4.41
Coastal trade growth	146	0.00	1.36	-2.45	3.66
Legislative Session Before election	146	0.13	0.34	0	1
Legislative Session After election	146	0.15	0.36	0	1

Political Characteristics based on Matched Town

Variable	N	Mean	St. Dev	min	max
County MPs with Majority Party	146	0.4	0.661	0	2

MPs from constituencies within 15 mi.	146	7.5	3.83	2	18
Majority MPs from constituencies within 15 mi.	146	3.25	2.54	0	12
MPs from constituencies within 15 mi.	146	7.5	3.83	2	18
Incumbent MPs from constituencies within 15 mi.					
Contested elections within 15 mi.	146	1.95	1.6	0	8

Economic Geography Characteristics based on Matched Town

Variable	N	Mean	St. Dev	min	max
Market Potential (000s)	146	42.5	85.1	11.5	779.5
Towns within 15 mi.	146	14.1	6.75	2	30
Harbour Towns within 15 mi.	146	0.23	0.58	0	5
Mining Towns within 15 mi.	146	0.13	0.46	0	2
Manufacturing Towns within 15 mi.	146	1.88	1.6	0	7
Towns with navigable rivers within 15 mi.	146	3.13	4.35	0	14
Towns on main pre-turnpike roads within 15 mi.	146	10.67	7.06	1	27
Towns with free schools within 15 mi.	146	0.76	0.98	0	4
Towns with Alms Houses within 15 mi.	146	0.45	0.84	0	3
Towns with local govt. capacity within 15 mi.	146	1.78	1.01	0	4

Sources: see text.

It should be noted that there is an identification problem in estimating the effects macroeconomic and political variables. The problem is that trustees could initiate the renegotiation of their act in different years in order to avoid an unfavorable environment. For example, say that harvest failures created a bias in favor of lowering the toll caps all else equal. Then trustees who had more interest groups pressure to lower the tolls would want to avoid renegotiating in years when the harvest failed. The implication is that there is a selection process by which some trusts had their acts renegotiated in years of harvest failures. The same could be said of any other time variable creating bias in favor of lowering toll caps or raising them. I address the time-selection problem below by studying renegotiations for trusts whose acts were close to expiring. These trusts did not have the option of delaying their renegotiation too far into the future, and thus were stuck with the prevailing macro and political environment.

The political characteristics near a turnpike road will play a key role in the analysis. I add this information in several steps. The first step is to match towns and renegotiated turnpike acts to a list of 782 market towns. The market towns include all the large urban centers of the early eighteenth century like London, Bristol, and Norwich. It also includes emerging industrial and port towns like Manchester, Birmingham, Leeds, and Liverpool. In other research I have geo-code all 782 market towns by matching them with the latitude and longitude of their modern location. Turnpike acts are matched to market towns based on the preamble to the act and the bills, both of which describe the towns passing through roads. Albert, Pawson, and Robert Morden's road maps also provide a useful guide in matching. As was often the case, the turnpike road passed through multiple market towns. In these cases, the town with the largest population is matched. Petitioners to turnpike bills are also matched using the information reported in the *Journals*.

The matched towns are used to measure political characteristics near the turnpike road (see the last panel of table 5). Elsewhere I have identified the number of majority party Members of Parliament (MPs) in each county and municipal borough constituency in the House of Commons for every parliament from 1690 to 1750 (Bogart 2013). County constituencies are matched with the town based on whether it lies within the county. The variable 'County MPs with Majority Party' measures the number of majority party MPs representing the county. In all English counties, except Middlesex, there were 2 MPs representing the county. In a further step, municipal borough constituencies are matched with market towns and are thus geo-coded. Similarly, county constituencies are geo-coded based on the most central point. I then define various political variables at distances ranging from 10 to 25 miles. For example, 'Majority MPs from constituencies within 15 mi.' is the number of majority party MPs from boroughs and

counties within 15 of the matched towns. A similar variable is defined for the number of MPs irrespective of party. Spatial measures are also created for the number of county or borough constituencies that had a contested election in the most recent parliamentary election and the number of incumbents. A contest involved two or more candidates for the same seat in the Commons. It provides an indicator of local political competition (Cruickshanks, Handley, and Hayton 2002, Sedgwick 1970). Incumbents are defined as MPs that served in the same county and borough in the previous parliament as documented in *the History of Parliament*.

As noted in the introduction, the political variables, like ‘County MPs with Majority Party’ and ‘Majority MPs from constituencies within X miles,’ are given an interpretation in the analysis below. The main assumption is that the trustees were key players in local politics. They helped to sway elections for MPs, and when enlisted with the majority they helped to implement government policies in their localities. Building on this idea, the number of majority party MPs in proximity to a turnpike trusts provides a measure of trustees’ connections to the majority party. One hypothesis is that greater majority party representation near a trust reduced the likelihood that its tolls would be reduced, and potentially increased the probability that its tolls would be increased.

One concern in carrying out the test for political connections is that majority party representation is correlated with economic characteristics that also might influence renegotiations. The majority party was typically the Whigs and it drew its strength from certain constituencies. One way of addressing this issue is to rigorously measure the economic geography near turnpike roads. To this end, several variables are constructed based on the characteristics of towns. Richard Blome’s *Britannia* describes the economic and political features of 782 towns in England and Wales around the year 1670 (Bogart 2014). Blome

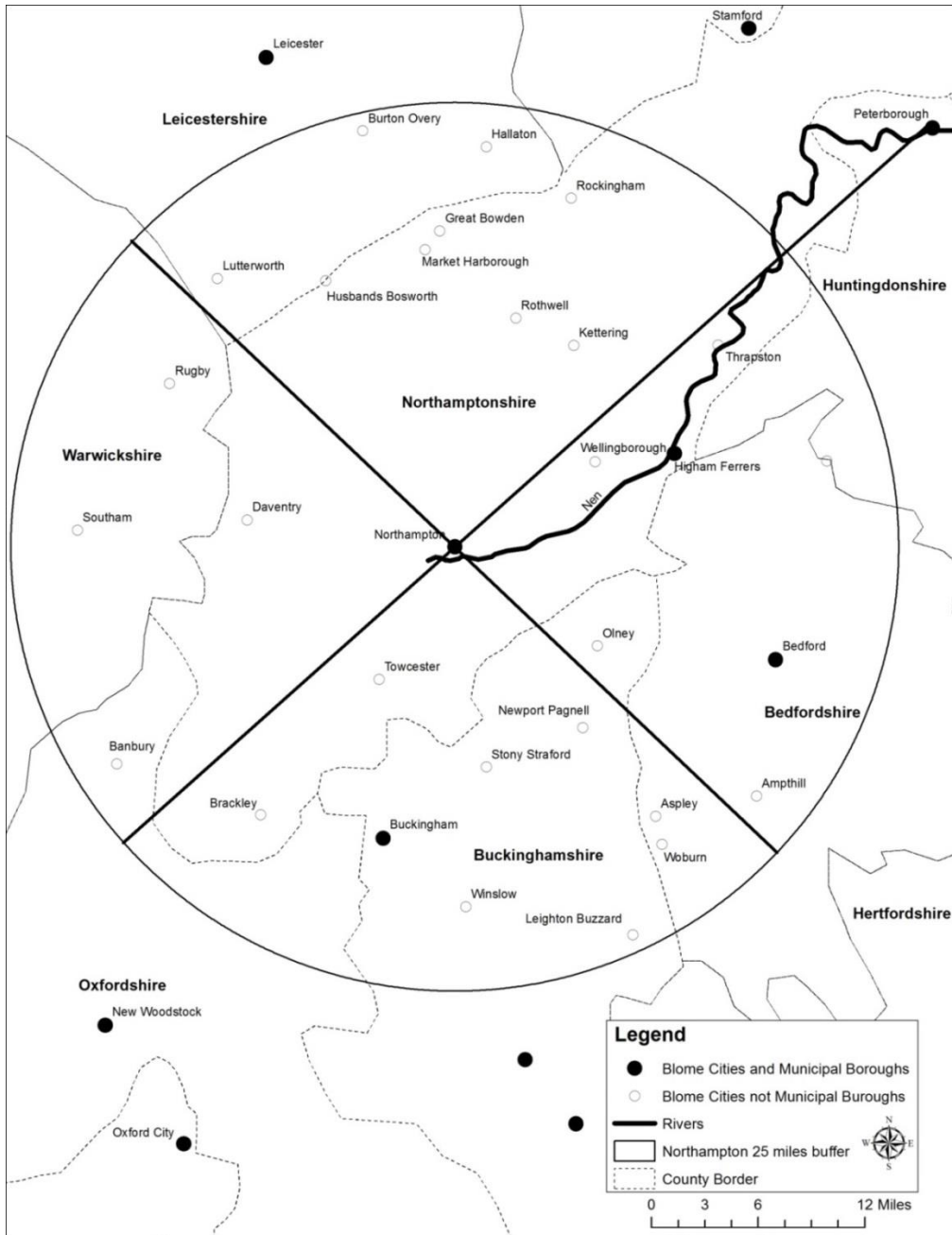
identifies whether the town has manufacturing or mining. A description of infrastructure is given, such as whether the town had river navigation, notable roads, or had a coastal harbor. Social services are also described including whether a free school was provided in the town and whether there was an alms house for the poor. Blome provides information on local government too such as whether the town had a mayor, city council, or other types of public officials. Population estimates have been added to each town in Blome using the Cambridge Population History Group's estimates for the year 1670. Readers will note that the population and characteristics of towns are drawn from the late seventeenth century, while the analysis of turnpike acts is mainly from the second quarter of the eighteenth century. While the 50 year gap is not ideal, it is unlikely that town characteristics changed drastically in this period as it predates the industrial revolution. Moreover, to this author's knowledge the data used here is the best that can be done with current information, especially for a wide range of towns.

The result is a set of economic geography characteristics for trust's whose acts were renegotiated. See the last panel of table 5. 'Market Potential' refers to the market potential of the town matched with the renegotiated turnpike act based on location. Higher values imply that the trust operated in proximity to large urban centers, principally London.⁹ The remaining variables count the number of towns with various characteristics within 15 miles of the matched town. For example, 'Manufacturing Towns within 15 mi.' simply counts the number of towns with manufacturing within 15 miles of the matched town.

To illustrate the data, consider the 25-mile region around the town of Northampton. It is matched with three turnpike acts that were renegotiated. The clear circles are market towns and

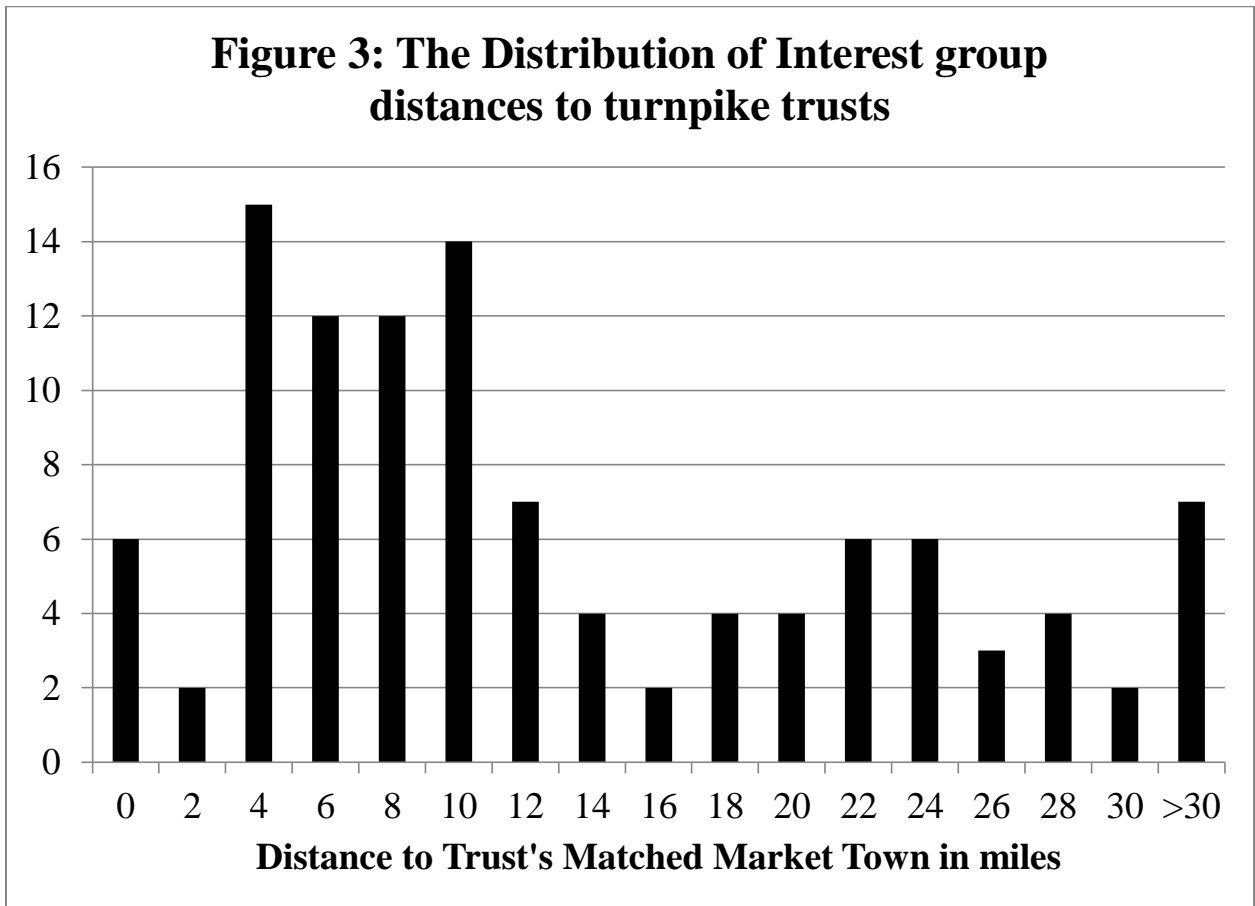
⁹ The market potential for city i is $\sum_{j=1}^{782} Pop_j/d_{ij}$, where Pop_j is the population of city j and d_{ij} is the Euclidean distance between city i and city j . The sum is over all 782 cities in the Blome list. The distance between city i and itself is taken to be $0.333 * \sqrt{1/\pi}$ following the convention adopted by Keeble et al. (1982).

the black-filled circles are market towns that are also municipal boroughs represented in the House of Commons. In other words, they could have majority party MPs or MPs that are not affiliated with the majority. The central points in the counties of Northamptonshire, Buckinghamshire, and Bedfordshire counties are within the 25 mile buffer and their MPs party characteristics would be included in the number of MPs within 25 miles. Lastly, each of the towns has a list of characteristics, like manufacturing status, that would also be included in variables defined at the distance of 25 miles from Northampton.



Below I analyze political and economic variables at four distances from the market town: 10, 15, 20, and 25 miles. There is a rationale for these distances based on the locations of interest groups who petitioned turnpike committees. Recall from table 4 there were 73 petitions to committees where the general population was involved. There were 110 separate interest groups within these petitions who stated their location. I matched the 110 groups to a parish and then

using the latitude and longitude of parishes I calculate the distance in miles to the market town matched with the turnpike act. The distribution by distance bins is given in figure 3. The mean distance is 12.9 miles with most being less than 15 miles and few greater than 25 miles. The implication is that the economic and politic characteristics most relevant to turnpike renegotiations were defined within a relatively short distance. In the next section, I use statistical testing to identify the distances which best fit the data.



Results

The first step is establishing at what spatial scale the political and economic variables should be measured. I consider three candidate distances 10, 15, 20, and 25 miles and estimate the following logit model.

$$Prob(y_{it} = 1) = \Delta[x_i, x_t, z_{id}] \quad (4)$$

where y_{it} is an indicator variable equal to 1 if the toll cap in renegotiation i in year t was lowered, Δ represents the probability function for the logit, x_i is a vector of trust characteristics, x_t is a vector of macro and political variables in year t , and z_{id} is a vector of political and economic characteristics defined at a distance of d miles. For example, $d = 10$ it includes MPs within 10 miles and majority party MPs within 10 miles. For the moment my main interest is not in the coefficients, but in the best-fit under different distances d . Table 6 reports the pseudo r-square for different specifications. The model with the highest r-square is the one where variables are defined within 10 miles. Below I focus on the $d = 10$ mile specification.

Table 6: Model Specification Tests for Economic and political variables

		Toll decreases
Model	N	pseudo r-square
all within 10 miles	119	0.399
all within 15 miles	124	0.326
all within 20 miles	124	0.382
all within 25 miles	124	0.337

Notes and Sources: see text.

Turning to the coefficient estimates, table 7 shows the odds ratios for all the variables entering the model. The odds ratio measures the increased probability of a toll cap being

decreased if the variable increases by one-unit. One of the most important results is that the odds of a reduced toll cap are lower with more majority party MPs within 10 miles. The interpretation provided by the model is that stronger connections to the majority party helped trustees to protect their rights. Another interesting result is that lower odds with more contested elections within 10 miles. It suggest that political competition favored trustees, perhaps because they had the right to vote and their vote was more valuable in competitive elections. The role of elections is also seen in the result that no toll caps were lowered in the year before an election. Again if trustees were important in local elections then it would have been unwise for Whig leaders to antagonize them just before an election. Interestingly, the results also show that the odds of a toll cap decrease were significantly higher in the year after an election. Perhaps there was a backlash against protecting trustee rights by the general public and the least costly year to appease these interests was just after an election.

There are some other results concerning trust characteristics and economic geography. The later the trust was founded the less likely that it lowered its tolls, and if there was no debt information then the trust was more likely to have its toll caps decreased. The trust age could be related to economic factors. Older trusts were generally founded on higher traffic roads with more surplus revenues, and hence there may have been greater relative gains for interest groups to lobby for lower tolls. A related result is that the odds were higher for trusts in areas with more market potential. Again it could be related to the revenue surpluses that would likely be associated with these trusts.

Table 7: Logit Model explaining Toll Cap Decreases

trust characteristics					
variable	Odds Ratio	St. Err.	variable	Odds Ratio	St. Err.
Year Trust Founded	0.935	0.032	Wagon toll per mi.	7.44E+11	1.66E+13
Debt Info Missing	5.174	4.196	Livestock toll per mi.	21237	3.88E+07
Debt level	1.0003	0.0002	Coach toll per mi.	1.60E-06	0.00003
JP-Managed	4.412	6.838	London road	1.766	1.433
Road miles	1.01	0.026	Road Network	2.543	2.878
Macroeconomic or Political Time variables					
variable	Odds Ratio	St. Err.	variable	Odds Ratio	St. Err.
Year Act	1.065	0.076	Inflation	0.805	0.139
Interest rate, Ward	0.122	0.322	Coastal trade growth	1.565	0.495
foreign war	0.772	0.786	Before Election'		0 predicts
bad harvest	0.496	0.489	After Election'	11.351	15.407
Political Characteristics based on Matched Town					
variable	Odds Ratio	St. Err.	variable	Odds Ratio	St. Err.
County MPs with Majority	0.535	0.314	Incumbent MPs	1.226	0.541
MPs	1.949	0.548	Contested Elections	0.469	0.179
Majority MPs	0.377	0.138			
Economic Geography Characteristics based on Matched Town					
variable	Odds Ratio	St. Err.	variable	Odds Ratio	St. Err.
Market Potential	1.027	0.015	Towns with Roads	0.474	0.146
Harbour towns	4.872	3.671	Towns with Free schools	0.474	0.618
Mining towns		0 predicts	Towns with Alms Houses	1.045	1.381
Manufacturing towns	1.067	0.502	Towns with Local govt.	3.693	3.409

Navigable rivers towns	0.622	0.225
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N		119
Pseudo R-square		0.399

Notes: Bold and italics indicate statistical significance at the 5%, and 10% levels.

Endogenous Renegotiation

As noted above trustees and interest groups had some control over when renegotiations occurred. As shown in the data earlier some turnpike acts were renegotiated several years prior to their expiration, usually at the behest of the trustees. Their choice to renegotiate early could impact the analysis. For example, consider a setting where a trust has some economic characteristic which makes the ratio of gains to losses $\frac{l}{b}$ low and hence it faces a higher likelihood that the toll cap will be lowered in a renegotiation. Suppose also that the variable *Whig Strength* is high near a turnpike trust in the current parliament, mitigating to some extent their economic characteristic lessening $\frac{l}{b}$. Knowing that their strong political connections to the Whigs may not last in the next parliament, the trustees might be encouraged to renegotiate in the current parliament. As a result, the degree of *Whig Strength* at the time of renegotiation may not be endogenous.

To assess the potential bias from early renegotiation, I divided the sample into two groups. The first group has renegotiations that occurred less than 6 years from the expiration and the second has renegotiations occurring 6 or more years from expiration. Table 8 shows the probability of a toll cap decrease was much higher for the first group. The main takeaway is that there is likely to be some selection based on time-varying characteristics.

Table 8: Toll Cap Decreases distinguishing by time to expiration of act

Variable	toll cap decrease indicator	
	mean	St. Err.
if less than 6 years to act's expiration	0.236	0.427
if 6 or more years to act's expiration	0.1	0.302
t-stat		-2.21
p-value		0.028

An estimation of the model for the sub-sample with acts expiring in less than 6 years should provide a less biased estimate for the variables that vary with time. The results are shown in table 9. I continue to find that the odds are higher in years after an election, but several other variables now become significant. The odds are higher for years with foreign wars and bad harvests. Both of these variables could reflect the importance of lower tolls to general public in times of crisis. They could operate through greater lobbying efforts by interests groups and/or appeasement policies by Whig leaders in crisis years. With respect to the political characteristics, like majority party MPs and contested elections, they are weaker in the sub-sample. However, there are lower odds associated with more majority party MPs in the county constituency, which suggests a similar channel as having majority party MPs nearby.

Table 9: Logit Model for Toll Cap Decreases when Act expires in less than 6 years

Macroeconomic or Political Time variables					
Variable	Odds Ratio	St. Err.	variable	Odds Ratio	St. Err.
Year Act	1.077	0.064	Inflation	0.646	0.129
Interest rate, Ward	4.83	15.39	Coastal trade growth	2.96	1.51
foreign war	12.23	17.76	Before Election'		0 predicts

bad harvest	14.15	14.79	After Election'	13.88	16.42
Political Characteristics based on Matched Town					
variable	Odds Ratio	St. Err.	variable	Odds Ratio	St. Err.
County MPs with Majority	0.364	0.21	Incumbent MPs	1.27	0.76
MPs	0.962	0.381	Contested Elections	0.984	0.557
Majority MPs	1.172	0.25			
N					66
Pseudo R-square					0.22

As a way of summarizing all the results table 10 gives the predicted probability of a toll cap decrease. In the model with the full sample I calculate what I term the ‘baseline scenario,’ where the trust operates a London road with average miles and average debt. Britain is not at war and does not have a harvest failure. The baseline is not the year before an election, nor the year after. All macro-economic variables like inflation are set at their mean as are the political and economic geography characteristics. As can be seen the probability of a toll cap decrease is very low ($p=0.02$) in the baseline scenario. It rises a bit if the number of majority party MPs falls from 2 to 1, or the number of contested elections falls from 1 to 0. The largest changes from the baseline come in years after an election, foreign war, or harvest failure. As estimated in the sub-sample, the predicted probabilities here are 0.4 or a little less. They are much higher than the baseline where war and harvest failure don’t occur. It appears that the political and macro-economic circumstances were the main factors driving Whig leaders to weaken trustee’s rights.

Table 10: Summary of Predicted Probabilities of a Toll Cap Decrease

Predicted Probability
Full Sample

model	
Baseline scenario	0.02
one majority party MP within 10 miles	0.05
no contested elections within 10 miles	0.04
	sub-sample less than 6 years to expiration
model	
Baseline scenario	0.04
before an election	0
after an election	0.39
foreign war	0.36
harvest failure	0.4

Conclusion

Britain's economic rise in the eighteenth century is often linked with the strong protection of property rights by Parliament. This view remains controversial because there have been few studies directly examining Parliament's role in the enforcement of property rights and the political economy forces are not well understood. This paper provides micro-evidence in the context of Britain's transport sector, where turnpike trusts were given rights to levy tolls subject to a cap. The toll caps were renegotiated in Parliament creating the potential for interest groups to lobby for lower tolls. Using novel data spanning from 1690 to 1750, I show that more than 83% of renegotiations either maintained or expanded toll caps, indicating that property rights designed by parliament were mostly secure. An econometric analysis also reveals under which conditions property rights in tolls were weakened in renegotiations. The odds were greater when local connections to the majority party and political competition were weaker. The odds of lower tolls were greater following elections, foreign wars, and bad harvests. The results enrich our understanding of governance after the Glorious Revolution and serve as a reminder that the enforcement of property rights is a politic-economic equilibrium.

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