A Glorious Transition?

The Politics of Market Access in the Aftermath of Britain's Glorious Revolution

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Abstract

Creating organizations with broader social aims like public good provision is an important part of the development process, yet politics imposes barriers to creating organizations in many societies. To shed light on this issue we study the creation of companies expanding river navigation in Britain during an important period it is political history. In the decades following the Glorious Revolution, the Whigs and Tories traded places several times as the majority party in the House of Commons and competed vigorously in local elections. Using detailed data we show that the creation of river navigation companies depended on the spatial distribution of party representation and on the extent of local political competition. The results show that access to organizations was not entirely open in Britain, but the high degree of political competition offset some barriers to access by encouraging the selection of better projects. The results also contribute to the larger literature on the politics of access.

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I. Introduction

Barriers to entry are one of the key constraints on economic development. In addition to limiting the celebrated process of creative destruction, barriers to entry also limit the creation of organizations that provide key public goods. Such organizations include school boards, sanitation authorities, public works departments, religious orders and the like. History suggests that many societies have limited the creation of organizations. In a recent book, North, Wallis, and Weingast (2009) survey human history and argue that open access to organizations is rare. In their view, the natural state is one in which access is limited to prevent violence and maintain stability between rival elites. Rarely do elites accept a broad notion of the rule of law and political competition. Theirs and related work on institutions and political connections points to a broader question: how do societies make the transition to open access?[2]

History can inform such questions by showing how and when the transition occurred in successful economies. According to some accounts, Britain was put on a path to industrialization following the Glorious Revolution of 1689.[3] If such a characterization is correct then one might think that Britain also moved closer to open access following the Glorious Revolution. Few scholars have suggested this was the case however. North, Wallis, and Weingast (2009) point to restrictions on creating corporations following the Bubble Act of 1721 and the lack of a competitive two party system in Parliament. They see the emergence of competitive party

[2] See Acemoglu and Robinson (2011) for a leading view on institutions and development. On political connections see Ferguson and Voth (2008) and Sukhtankar (2012) for recent contributions.

[3] The most well-known work is North and Weingast (1989). The effects on property rights and investment have been central to the debate. See Clark (1996), Wells and Wills (2000), Klerman and Mahoney (2005), Zahedia (2011), Cox (2011), and Bogart (2011) for contributions on this issue.

politics and open access to economic organizations as emerging in the early nineteenth century. Similarly Harris (2000) emphasizes the ability of vested interests to block access to corporations in banking, insurance, and international trade until the early 1800s. According to Harris, the process of authorizing every corporation through a special act of Parliament was rife with corruption.

An account of history that diminishes the Glorious Revolution is complicated by two key facts. First, there was a tremendous increase in acts of Parliament creating regulated authorities to improve infrastructure and public services staring in the 1690s (Bogart 2011, Bogart and Richardson 2011). River improvement is a prominent example. Legislative acts established 'river navigation companies' with rights to levy tolls on barges and vessels, purchase land, and issue capital. Navigation companies were run by local groups, like city mayors, whose stated aim was to extend navigation inland. They were generally successful as indicated by the doubling of navigable waterways from 1660 to 1750 and the growth of domestic trade (Willan 1962).

The second key fact is that Britain had a competitive two-party system from the late 1680s through 1730s. The Whigs and Tories traded places as the largest party in the House of Commons seven times between 1690 and 1717. In the Commons the two parties fought over religious, constitutional, and fiscal issues. They also competed vigorously at the local level resulting in an unprecedented number of contested elections. Campaigns between rival candidates often emphasized local issues including legislation dealing with infrastructure. Although broad-based access was clearly yet to come, it is possible that Britain started the transition to open access in the decades following the Glorious Revolution. This paper investigates whether this view is correct by studying how politics affected the adoption of river

navigation companies. It also provides a new theoretical framework to study the politics of access.

River navigation emerged as a political economic issue in the 1690s and 1700s. While some touted the benefits of extending navigation, there were other groups that claimed to suffer large losses. Some landowners expressed concerns about damages to their property and some cities argued that trade would be diverted. In short, river navigation pitted promoters against powerful vested interests. The House of Commons was the focal point for this conflict because it was the first to review navigation bills and it was the most powerful body in Parliament. Bills for navigation were reviewed by committees composed of Members of Parliament. At this stage opposition groups, like landowners, would often emerge with the goal of killing the bill. Failure was common. Less than half of all bills for river navigation were passed from 1690 to 1717.

We model the process for promoting and passing river navigation bills as an investment decision imbedded in a persuasion contest. Promoters in each constituency represented in the Commons decide whether to initiate a project and then promoters and opposition groups expend effort trying to persuade the House of Commons to approve or reject bills. The Commons then makes its decision based on the evidence, its own biases, and chance events. Our premise is that the political characteristics of the constituency should be irrelevant to the promotion of bills and their success in the Commons if Britain was open access. Only economic characteristics would matter. On the other hand, if access was limited to serve political ends, then the likelihood of bills being promoted and succeeding would depend on links with the party in power. Promoters who have strong ties to the Whigs when the Whigs are in power have a better chance of getting approved. Stronger representation of the ruling party at the constituency level works in the

opposite direction because of the power of vested interests. Cities and landowners opposed to the project can more easily kill bills if the ruling party was strong in their area.

The degree of local political competition is another factor that affects access. We hypothesize that in competitive areas politicians gained from being associated with good projects and lost from being associated with weaker projects. As a result, Members of Parliament worked harder to get bills for good projects passed and they discouraged bills for weaker projects.

We test our theories using a new dataset on the party affiliation of all MPs serving in municipal boroughs and county constituencies in the Commons between 1690 and 1717. We also use data from Cruickshanks, Handley, and Hayton (2002) to identify whether constituencies had contested elections. With this information we construct measures of ruling party strength and political competition in a constituency and its neighbors. Another dataset supplies information on all river navigation bills and acts. We know for each legislative session which constituencies had bills within their boundaries, which succeeded and became acts of Parliament, and who promoted, supported, and opposed bills through petitions. New data on the market access and locational characteristics of constituencies are also added to control for economic determinants of navigation projects.

Our main empirical finding is that river acts were more likely to occur in constituencies where the ruling party was strong and where elections were more contested. The results are independent of the party in power (Whig or Tory) and are robust across different specifications and estimation strategies. The baseline model relates the probability of a river act occurring in a constituency to its economic and political characteristics, like the number of ruling party MPs and the number of contested elections near the constituency. The results are robust to including

fixed effects. We also use the deaths of sitting MPs and contested elections in previous legislative sessions as instruments for contests in current sessions. The standard test statistics fail to reject that contests are exogenous.

Across a range of measures we also show that lobbying and promotion were influenced by political characteristics. River navigation bills are found to be less likely in constituencies where the ruling party was strong and opposition to bills was more likely in constituencies where the ruling party was strong. Together these two findings are consistent with our theory that promoters were reluctant to introduce bills where vested interests could use their leverage with the ruling party to block the bill. Moreover we find that when the Tories were in power their main political supporters, the landowning interest, were more likely to promote bills.

Our analysis also yields further insights on local competition. We find that bills were less likely in constituencies where there were more contested elections. This result may be surprising at first, but it is consistent with our theory that competition can discourage promoters with low quality projects from going forward. Selection effects are also supported by another finding that among the bills introduced in the Commons those with more contested elections in their area were more likely to succeed.

The broader implications of our findings are subtle. On the one hand, it is clear that Britain did not fully transition to open access in the aftermath of the Glorious Revolution. On the other hand, the competitive nature of British politics at the local level offset some barriers to access by encouraging the selection of better projects. A broader lesson from the British case is that political competition can bring greater scrutiny and discourage politicians from authorizing

'boondoggle' projects that do more harm than good. Such an interpretation fits with recent findings that political competition is generally conducive for development. [4]

The rest of the paper is organized as follows. The second section provides background and the third lays out a theoretical framework. Section four discusses the data and five outlines the estimation strategy. The empirical results follow along with some conclusions.

II. Background

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. Although both were drawn from the elite of British society, the Whigs and Tories differed in several ways. First, the Tories favored privileges for the Church of England, lower taxes, and small government debt. The Whigs generally favored religious toleration and an aggressive foreign policy based on a well-funded army. Second, the two parties differed in terms of their economic base. The Tories were generally supported by landowners. The Whigs drew support from land as well, but more significantly they were the party of the financial and merchant classes. Third, the Whigs were led by a small group of party mangers known as the 'Junto.' They were particularly effective in mobilizing Whig MPs on key votes in the Commons. Robert Harley is the best known leader of the Tories and was influential throughout the period. Robert Walpole emerged as the new leader

[4] See Besley, Persson and Sturm (2010) for recent work on competition and Keefer and Knack (2007) for research on boondoggles and competition.

of the Whig party in the early 1720s following a split amongst its leadership. Walpole's rise marked the beginning of a long period of Whig dominance lasting up to the 1760s.

From 1690 to 1717, the Whigs and Tories competed vigorously for seats in what historians have described as the 'Rage of Party.' There were eleven elections and the majority party in the Commons changed at least seven times (see table 1). Also there were a large number of contested elections in this period. A contested election had more candidates than seats. It was typical for a constituency represented in the Commons to have two Members of Parliament (MPs) and in these cases a contested election had at least three and normally four candidates, often from opposing parties. The data collected by Cruickshanks, Handley, and Hayton (2002) show that in most sessions, between 33 and 39 percent of constituencies had their last election contested. Although one-third does not seem like a high proportion, it was large compared to other periods in British history and it was certainly high compared to other parts of Europe where representative institutions were dormant (Bosker, Buringh, and Luiten van Zanden, 2011).

Table 1: Legislative Sessions and the Majority Party 1690-1717

Session	Majority Party	Percentage of constituencies where last election was contested
1690-1695	Tory	38.8
1695-1698	Whig	32.4
1698-1700	Whig	39.9
Jan. 1701	Tory	34.3
Nov. 1701	Whig	33.5
1702-1705	Tory	34
1705-1708	Tory	41
1708-1710	Whig	34.3
1710-1713	Tory	48.1
1713-1715	Tory	34.7
1715-1717	Whig	40.6

Sources: Constructed from Cruickshanks, Handley, and Hayton's (2002) list of Tory, Whig, and unclassifiable MPs.

Notes: Percentage of constituencies with contested elections applies to England and Wales only.

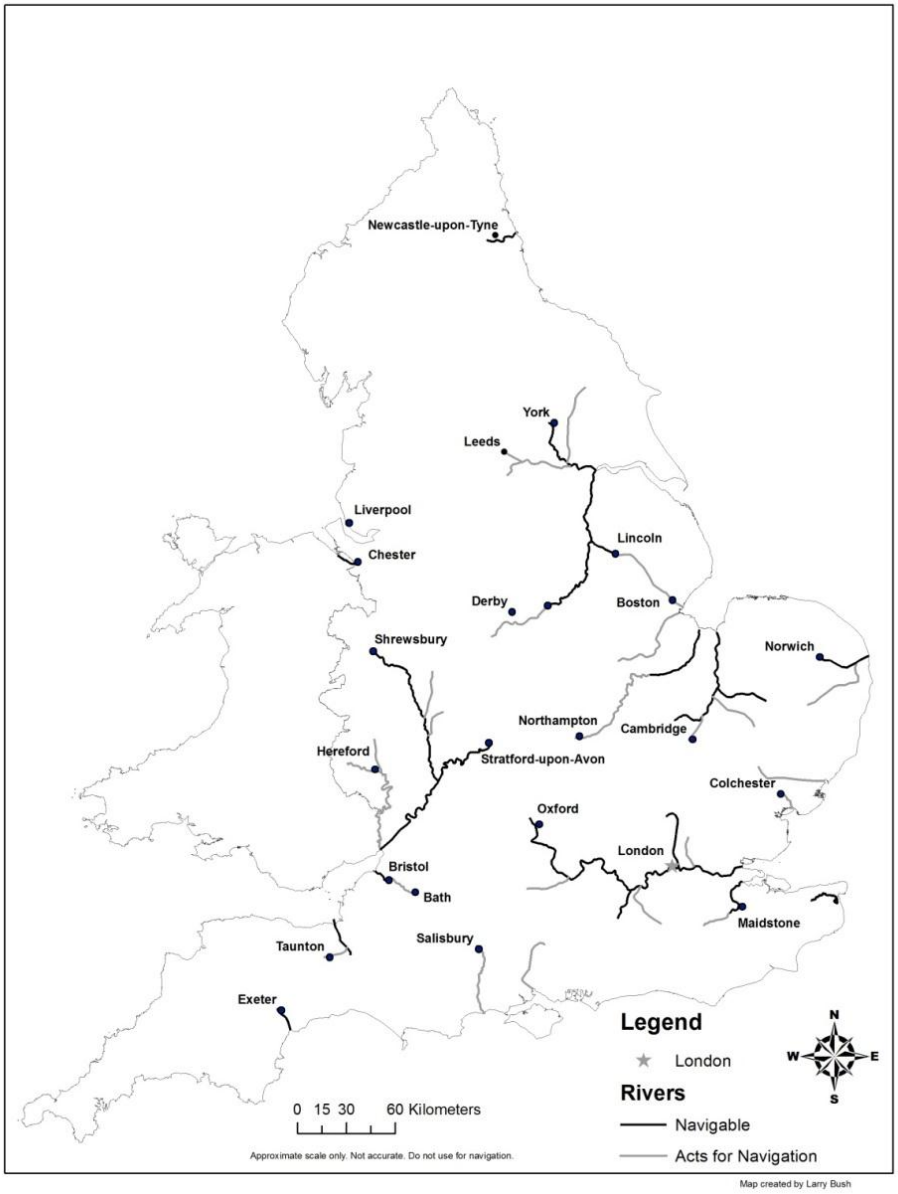
Much of the literature on British political history in the aftermath of the Glorious Revolution debates how religious, constitutional, and fiscal policies were influenced by the relative strength of the two parties in the Commons.[5] This paper studies a different policy issue relating to access. Historians have documented a significant increase in the number of acts dealing local and personal matters after 1690 and continuing through the eighteenth century (Hoppit 1997). Much of the legislation altered property rights and enabled investment or sales of property (Bogart 2011, Bogart and Richardson 2011). The focus here is river navigation acts which enabled the first significant improvement in Britain's transport infrastructure since the Middle Ages. In the early 1600s, most rivers were under the authority of local governing bodies known as Commissions of Sewers. Commissions could compel landowners to cleanse waterways and could tax land along riverbanks to pay for upkeep, but not tax individuals who traveled on the river and could not purchase land along a waterway or divert its course. These limitations kept sewer commissions from improving and extending navigable waterways (Willan 1964). A river navigation act addressed these problems by establishing a new special purpose organization. It endowed a company of 'undertakers' with rights to levy tolls and purchase land necessary for the project. The tolls were subject to a price cap and there were conditions on how the project was to be carried out. There were also provisions that allowed juries and commissioners to determine the price of land if companies and property owners could not come to an agreement.

River navigation acts played a key role in the extension of waterway transport. With the aid of their statutory powers, navigation companies dredged and straightened rivers. Their success

[5] See Holmes (1987), Horrowitz (1977), Harris (1993), Hoppit (2000), Pocock (1985), Davison et. al. (1992), Pincus (2011), and Stasavage (2003).

can be measured by the increase in miles of navigable waterway from around 850 mi. to 1600 mi. between the years 1660 and 1750 (Willan 1964). Figure 1 illustrates the extension of river navigation from 1690 to 1717, the period under study here. The black lines show rivers that were navigable in 1690 and the grey lines depict rivers with acts enabling improvements in their navigation. Acts were applied to rivers near the coast or as extensions of existing navigable rivers. Many were connected to cities of importance in the early eighteenth century. Most of these cities would continue to grow in the eighteenth century and some would industrialize.

Figure 1: Acts and Navigable Rivers, 1690-1717



River navigation companies are a good example of an organization that fostered economic development in Britain. They resolved a market failure in the provision of infrastructure and ultimately increased market access. Other examples include turnpike trusts, harbor improvement trusts, and later in the eighteenth century, canal and railway companies. Their diffusion sheds light on a key political economy question: how do individuals or groups in a society create productive organizations that require some type of government authorization? In the British case,

most infrastructure projects were proposed through a petition to the House of Commons. Petitions became bills that would either fail or succeed in gaining approval, first by the Commons and then by the Lords and Monarchy. Significantly, it was more common for river navigation bills to fail than succeed. Less than a third of river navigation bills succeeded from 1690 to 1717 (see table 2).[6] A related and important fact is that more than 40 percent of river navigation bills were formally opposed by groups through petitions to the House of Commons. As these figures suggest, the procedure for processing river navigation acts was politicized.

Table 2: River Navigation Bills initiated in the Commons, 1690-1719

	1	2	3
Period	Bills	% that became Acts	% that were formally Opposed
1690-1699	25	30%	48%
1700-1709	12	25%	42%
1710-1717	11	45%	45%

Source: see text below.

Promoters would usually articulate the reasons why extending river navigation would benefit the local area and the nation, but others disagreed and emphasized losses to local economic groups. An illustrative example is the bill to improve the River Avon from the city of Bath to Hanham Mills near Bristol. The project was proposed by the Mayor, Aldermen, and citizens of the city of Bath in January 1712.[7] In their proposal they stated that making the Avon navigable will employ the poor, promote the trade of Bath, train persons for sea-service, and preserve the roads and highways. After a committee was formed and the initial bill was written, there was a

[6] The sources for these tables will be discussed momentarily. It should also be noted that the failure rates are consistent with what Hoppit (1997) has shown for all legislation from 1690 to 1719.
[7] The details of the petitions related to this bill are available in the Journals of the House of Commons, 1712.

flurry of petitions opposing the bill or expressing concerns. Henry Parsons, who owned six mills on the river Avon, stated in a petition that his mills would be rendered useless to the great loss of the poor and to himself. He prayed that 'the bill may not pass, or that such damages as the petitioner will sustain thereby may be made good to him by the undertakers.' The Mayor, Burgesses, and Common people of the city of Bristol stated that the bill contained clauses that may be construed to interrupt their ancient Right, and encroach upon the rights lately granted to the petitioners. The city had been given authority to make the Avon navigable from Bristol to Hanham mills by an act of Parliament from a previous legislative session. The gentlemen and freeholders of the county of Somerset, living near the River Avon, stated the project will 'be a great prejudice to all parts of the country near the Bath, by bringing of corn, and other commodities, from Wales, and other parts, where the value of lands are low.' They were also concerned about the 'damages and trespasses they may sustain by making the said River navigable.' Similar arguments were made by the gentlemen and other inhabitants in the neighboring counties of Wiltshire and Gloucester. The only petition in support of the bill came from the freeholders, leaseholders, and occupiers of quarries near Bath. They argued that it will 'be a means to carry great quantities of wrought and unwrought stone from the quarries near the said River into diverse parts of this kingdom.' Effectively they were arguing that the project would expand the market for their heavy products.

The geographic location of opposition groups to the river Avon bill is also revealing. Some were from towns along the river and here concerns were expressed about damages to land and mills. Similarly Bristol, who stood at the 'mouth' of the navigation project, opposed the project on the grounds that it would damage its river navigation. Other opposition groups came from

towns that were farther away from the river but still in the region. These groups claimed to market or transport goods to Bristol and would suffer losses in income from cheaper imports.

Ultimately the bill to improve navigation on the river Avon passed. The two MPs who first presented the bill to the House of Commons were Trotman and Codrington, both of whom represented the city of Bath and were part of the large Tory majority in the 1710-1713 legislative session. Trotman and Codrington represented Bath for the first time following a contested election in 1710. Trotman was supported by the Second Duke of Beaufort. The Duke is an important character because he began influencing Bath politics in 1710 and played a role for some years. The Duke is also thought to have paid the fees to introduce the river Avon bill. The Duke's interest in the navigation project was likely related to his estate just outside of Bath (Hanham 2002).

The committee also played a role in the Avon bill. Trotman was the first name listed for the committee in the Journals of the House of Commons. Presumably he was the leader of the committee, although the records don't indicate a chair. Other MPs on the committee represented the surrounding counties of Somerset, Gloucester, and Wiltshire, but many others did not represent constituencies in the area. Interestingly over two-thirds of the committee members were Tories when the overall Tory majority was just over 50 percent.[8]

This example suggests that a combination of party politics and local economic conditions influenced the success of river navigation bills and project selection. The following section develops a theoretical framework to model the effects of politics and economic geography on bill

[8] The classification of MPs serving on the committee is based on data describing the political affiliation of all MPs introduced in the data section to follow.

promotion and success. Theory gives a set of testable predictions. It also provides explanations for some of the empirical results which are not immediately obvious.

III. Theoretical framework

Our theoretical analysis considers a setting where every constituency has a single project with an exogenously given expected financial return, gain to local users, and social loss. The timing is as follows: a promoter decides whether to introduce a bill, an opposition group decides whether to formally oppose the bill, the promoter and opposition expend effort trying to persuade the Commons, who then approves or rejects the bill. If approved then financial returns, gains, and losses are realized.

The first step in the analysis is to model financial returns to promoters once their bill was approved and they controlled river navigation companies. River improvements required large upfront investments that lasted several generations. Maintenance costs were small by comparison. Therefore, the profitability of a project depended on the size of upfront investments relative to the revenues generated over an extended time period. As an illustration let *I* by the investment cost paid in year 0, let rev_t be revenues in year *t*, let δ be the discount factor, and let *T* by the number of years before the upfront investment fully depreciates. Combing all terms, the net present value of a project, b, is defined as: $\text{b} = \sum_{t=0}^{T} \delta^t \text{rev}_t - I$.

Several factors underlie investment costs. Having a stream to dredge and straighten greatly reduced the costs as water supplies were scarce. Proximity to the coast or navigable waterway also reduced costs because it was necessary to connect with the existing waterway network. Ruggedness or changes in elevation meant that more locks had to be constructed. Locks were chambers where water could be raised or lowered allowing passage from lower to higher

elevations. Locks were one of the most expensive items in any navigation project. Compensation for landowners and mill-owners are a final factor and are related to population density. Areas with more people are likely to require more compensation costs.[9]

Demand was the main factor underlying revenues and was largely a function of local population size and income. Alternatives to river navigation are another demand factor, but they are less important in this context. As the earlier maps shows, there was rarely another navigable river within a reasonable distance. Coastal water transport was an option for some areas but it usually served as a complement to river transport. Road carriers competed to some extent with river barges and coastal vessels, but the period under study here (1690 to 1717) was before the major road improvements of the mid-eighteenth century.[10]

The gains to users also depended on location and population density. Donaldson and Hornbeck (2012) propose a general equilibrium model that identifies the income gains from transport improvements through changes in market access. Across a set of locations *D*, location *o*'s market access is the sum of the market size for all destinations X_d weighted by a function of *o*'s inverse transport costs to all destinations ${\tau_{od}}^{-\theta}$ and adjusted for other locations access to markets: $MA_o = \sum_{d \neq o}^{D} \frac{{\tau_{od}}^{-\theta} X_d}{\sum_{i \neq d,o}^{D} {\tau_{di}}^{-\theta} X_i}$. The implication for our analysis is that landowners at location *o* gain more from a river improvement if it increases their access to large markets (i.e. when ${\tau_{od}}^{-\theta} X_d$ increases). While geography is complicated, it will often be the case that lowering transport costs near population centers will tend to increase access. Thus proximity to cities is a key factor in determining the demand for river improvements.

[9] Financing costs were also important, but they are not modeled here as they varied over time but are likely to be similar across constituences.
[10] For more details on road improvements see Albert (1972), Pawson (1977), and Bogart (2005).

The same framework can establish when some groups will lose from river improvements. Notice that location *o*'s market access falls if other locations get better access to each other.[11] We have already seen some evidence for this mechanism. Recall that towns off the river Avon opposed the navigation improvement because they believed it would lower their income. Damages to land and other property were the other reason to oppose river projects. Therefore some locations whose market access increases might still lose from navigation projects because the damages to land were so costly.

To summarize, there is the net present value associated with a project *b*, a gain in land rents call it *g*, and losses from market access and property damage call it *l*. The benefit cost ratio of a project is *(b+g)/l*. In a moment it will be useful to convert the benefit cost ratio to an index. The index φ will be 1 for the project with the largest benefit to cost ratio and all others will have φ between 0 and 1 reflecting their fraction of the largest benefit cost ratio.

III.1 Incorporating Politics and Lobbying

To study how politics and lobbying affected access to organizations in our setting, we use a model of persuasion developed by Skeperdas and Vaidya (2012). They motivate their model with a court setting where plaintiffs and defendants produce evidence to influence a judge. Skeperdas and Vaidya derive a tractable functional form for the probability a judge issues a guilty verdict and show that it depends on three main factors: (1) the truth (actual innocence or guilt), (2) the bias of the court, and (3) the plaintiff and defendant's efforts in producing evidence.

[11] For example, in a three location case if the transport cost between 1 and 2 decreases and nothing happens to transport costs between locations 1 and 3 or between 2 and 3, then market access for 3 decreases and it suffers a loss in income. The losses are magnified if 1 or 2 is a large city and thus a large trading partner for 3.

There is a parallel to our setting where promoters and opposition groups made arguments to MPs in the Commons trying to influence their decision on bills. Applying Skeperdas and Vaidya's model gives a function for the probability *p* that the Commons approves a bill: $p = \frac{\pi\varphi e_p}{(1-\pi)(1-\varphi)e_o+\pi\varphi e_p}$, where $\varphi \in [0,1]$ is the index for the benefit- cost ratio of the project, $\pi \in [0,1]$ corresponds to the bias of the Commons in favor of the project, and e_p and e_o are the efforts of the promoter and opposition in producing evidence. Higher π, higher φ, and more effort by the promoter increases the probability of success all else equal. We think it is natural to assume that projects with higher benefits to costs (i.e. higher φ) will be more likely to succeed all else equal. The efforts e_p and e_o are endogenous and will be modeled momentarily.

The π parameter is crucial for our analysis and relates to the politics of access. If promoters operate in a world of open access then π would be constant for all or at the very least it would not depend on political considerations. But if politics works to limit access then π will vary with the promoter and the constituency. We have two main channels in mind. First, if a promoter has stronger links with one party, say the Whigs, then π would be larger for that promoter when the Whigs are in power. We call this the 'political connections' effect. Second, the incumbent party targets rejections in constituencies to satisfy opposition groups who would lose income from river projects *and* who supported the incumbent party in recent elections. In this case, π is lower for bills in constituencies where the ruling party was strong. We label this channel the 'blocking power of vested interests' and is common in many models of redistributive politics. [12]

[12] For example, see Cox and Mcubbins (1986) and Dixit and Londregan (1996). Another argument is that the ruling party favored bills in constituencies where the ruling party was strong in order to satisfy promoters. We do not find any evidence for this theory so we give it less emphasis here.

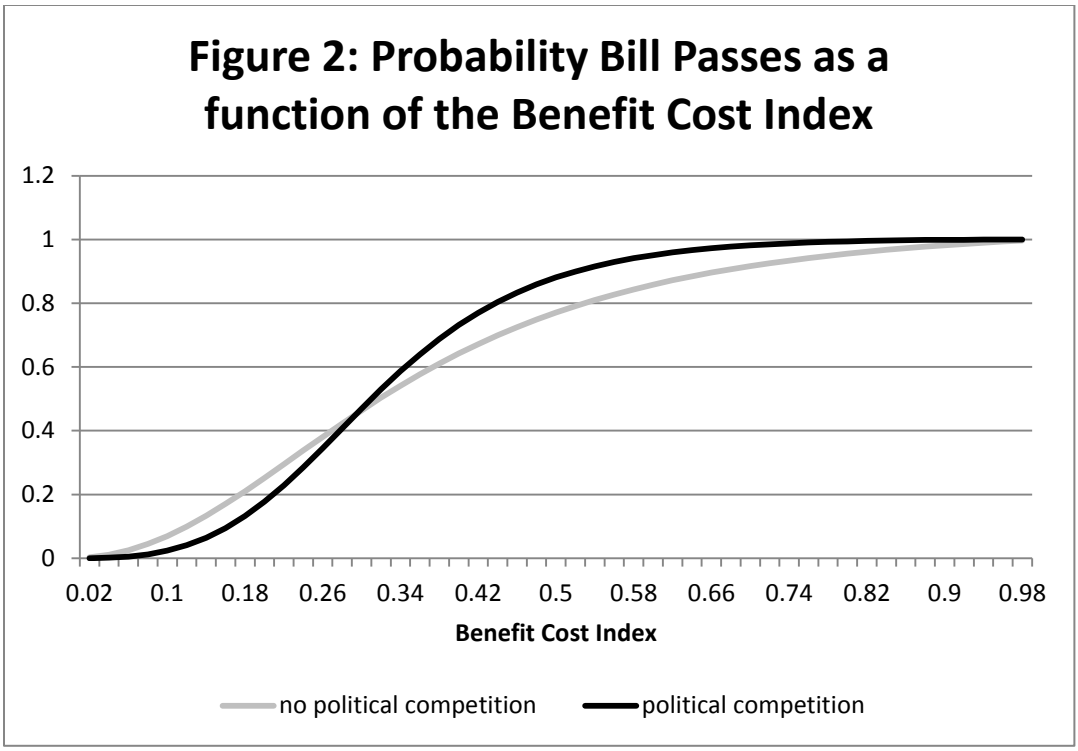
The parameter π also captures the effects of political competition. We hypothesize there was greater scrutiny of projects in areas with electoral competition. In these settings, MPs would have incentives to disassociate from projects having low benefits to costs because they could become a campaign issue. There is an opposite effect for projects having high benefits to costs. Here MPs facing competition would have incentives to associate with good projects for campaigning purposes.[13] The key implication is that φ and π interact in constituencies with electoral competition: π increases for high φ projects and π decreases for low φ projects.[14]

The efforts of the promoter and opposition group can be modeled using the standard tools of contests.[15] The objective function for the promoter is $pb - ce_p$ where $p = \frac{\pi\varphi e_p}{(1-\pi)(1-\varphi)e_o+\pi\varphi e_p}$ as above. The first term is the probability the bill is approved multiplied by the net present value of the project b. The promoter earns b only if the bill is approved and otherwise their payoff is normalized to 0. The second term is total cost of effort for the promoter, where c is the marginal cost and e_p is the effort level. The objective function for the opposition is $-pl - ce_o$. The opposition loses the contest with probability p in which case they get $-l$. The opposition wins the contest with probability $1 - p$ in which case they have a payoff normalized to 0. The marginal cost of effort for the opposition is c and is assumed to be the same as the promoter.[16]

[13] One justification comes from Besley, Persson, and Sturm's (2010) model of political competition, where a high proportion of swing voters in the electorate encourages incumbent politicians to adopt high-growth policies.
[14] There is another theory in the distributive politics literature that public spending should go to swing districts (see Dixit and Londregan 1996). If so then in our context the incumbent party might have desired to approve bills in constituencies where there is greater competition for seats. We find mixed evidence for this view so we give it less emphasis here.
[15] We refer the reader to Konrad (2009) for a good overview of contests.
[16] We could also model differences in the costs of effort between promoters and opposition groups. One approach assumes the costs differ according to the density of ruling party MPs near the promoter and opposition. This assumption gives qualitatively the same results as changes in π so we do not model it here.

The effort decisions are made strategically and the Nash equilibrium is derived from best response functions. The equilibrium efforts e_p^* and e_o^* satisfy the following relationship: $e_o^* = \frac{l}{b} e_p^* = \frac{\pi\varphi(1-\pi)(1-\varphi)l^2}{bc[(1-\pi)(1-\varphi)l/b+\pi\varphi]^2}$. After substitution, the equilibrium success function has the form: $p^* = \frac{\pi\varphi}{(1-\pi)(1-\varphi)\frac{l}{b}+\pi\varphi}$, and the expected payoff to the promoter is $b(p^*)^2$. A key comparative static concerns the relationship between p^* and π. It is easily shown that p^* increases in π and therefore any political bias working in favor of promoters will increase the success probability of a bill and their expected payoff.[17] The equilibrium success function p^* is also increasing in φ which captures the benefit cost ratio of the project. Therefore if φ and π both increase then the probability and promoter's payoff also increase and if φ and π both decrease then the opposite happens. As we argued earlier, with stronger political competition there is a favorable bias to the project when it has high benefits relative to costs and there is an unfavorable bias when the benefits to costs are low. As an illustration we simulate the model under the assumption that $\pi = \varphi^{0.75}$ when there is political competition and $\pi = 0.4$ without political competition. We also set the net present value to 10 and let the losses vary from 1 to 50. Figure 2 shows the equilibrium success probability as a function of the benefit cost index φ under the two scenarios. The key point is that political completion enhances the success of good projects and diminishes the success for bad projects.

[17] There is a non-monotonic relationship between π and efforts e_p^* and e_o^*. Starting from a point where π is close to one (i.e. where there is large bias in favor of promoters) opposition and promoter efforts increase. At some intermediate point efforts are maximized and then as π approaches zero opposition and promoter efforts start to decrease. The reason is that lobbying efforts payoff the most when the Commons does not have a strong bias in favor or against promoters.

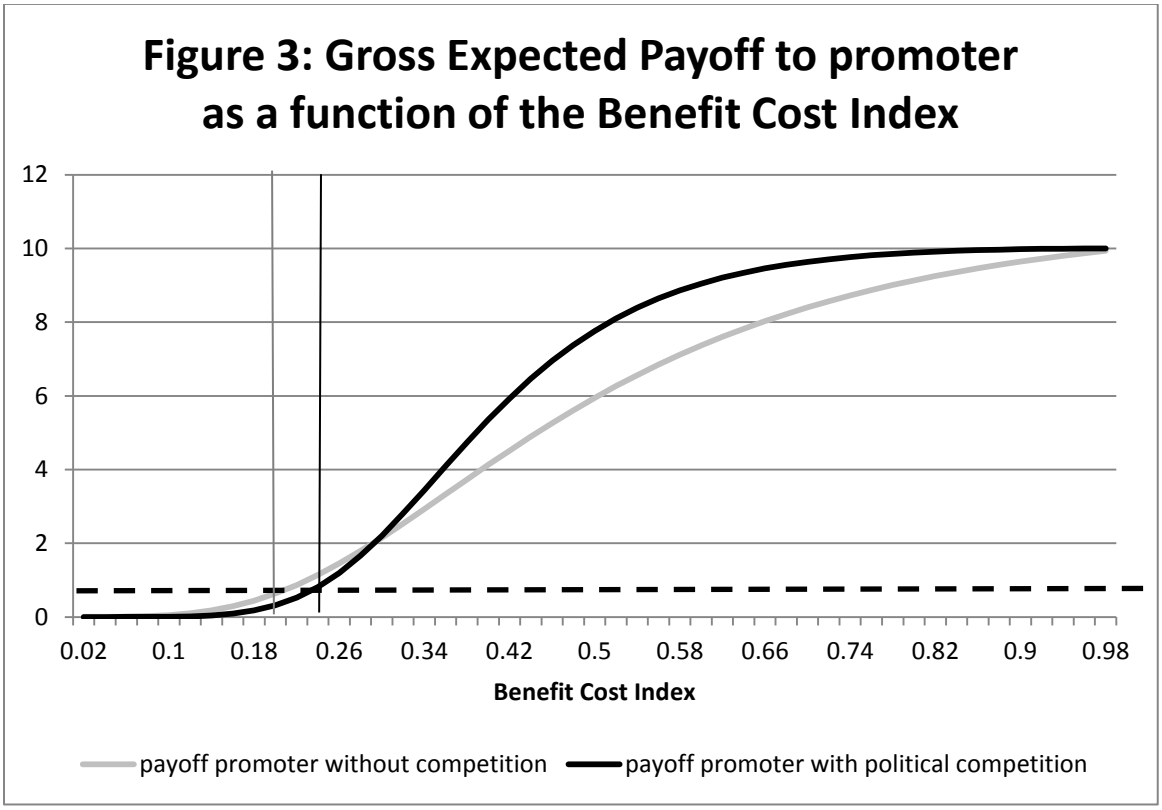


III.2 Modeling Bill Promotion

The final step in our theoretical framework addresses the promotion of bills and formal opposition to bills. We assume promoters must incur a fixed cost F_p to introduce a bill in the Commons. A rational, forward looking promoter will introduce only if their gross expected payoff $p^*(e_p^*, e_o^*)b - ce_p^*$ exceeds the fixed cost F_p. In making their decision, promoters anticipate e_p^* and e_o^* based on *b*, *l*, *c*, φ, and π which depend on economics and politics. [18] For example, a promoter is more likely to introduce a bill when the Whigs are in power if they have political connections with the Whigs, because they anticipate a higher success probability and expected payoffs through higher π. Promoters are less likely to introduce a bill if the ruling party is strong in their area because they anticipate it will lower their success probability and expected payoffs through lower π. The effects of political competition are more subtle. Promoters with

[18] Formally, they will introduce if $\frac{b(\pi\varphi)^2}{[(1-\pi)(1-\varphi)l/b+\pi\varphi]^2} > F_p$

high quality projects will be more likely to introduce a bill under political competition because their probability of success is higher, but promoters with lower quality projects will be less likely to introduce a bill because their probability of success is lower. Figure 3 shows a simulation of the gross expected payoffs for promoters under the assumption that $\pi = \varphi^{0.75}$ when there is political competition and $\pi = 0.4$ without political competition. The horizontal dashed line represents the fixed cost for the promoter. The vertical solid lines show the 'cutoff' benefit cost index for projects. In this example, there are some projects with a low benefit cost index that are introduced in constituencies without political competition but not in those with political competition. At a higher fixed cost the opposite occurs: there are some projects with a low benefit cost index that are introduced in constituencies with political competition but not in those without political competition.



The effect of political competition on success probabilities is another key point in this example. Notice that with a sufficiently low fixed cost as show in in figure 3, there will be a higher success probability for bills dealing with projects from areas with political competition simply because they tend have higher benefits to costs than bills for projects from areas without political competition. The opposite pattern could occur with higher fixed costs, where bills dealing with projects from areas with political competition tend have a lower benefits to costs. We label the former outcome 'positive selection' and the latter 'negative selection.'

Just like the promoter, opposition groups also face a choice whether or not to approach the Commons and formally oppose bills. The opposition first sees whether a bill was introduced that affects their income negatively. If there is such a bill and the opposition wants to formally oppose they must incur a fixed cost F_o. The opposition will formally oppose if their expected payoff $-p^*(e_p^*, e_o^*)l - ce_o^*$ exceeds F_o. Following the logic for promoters, formal opposition will be more likely if they have strong connections to the party in power and if the ruling party is strong in their area. The effects of political competition are again dependent on which bills get promoted. If political competition induces a sufficiently large positive selection then it could reduce the likelihood of formal opposition.

III.3 Predictions

All the hypotheses from the theoretical framework are summarized in table 3. Most have been discussed above. One key point is that the effects of political competition are ambiguous. One possible outcome is the following: the fixed costs of introducing bills are relatively low and therefore political competition induces a positive selection as shown in figure 3. In that case, political completion will be identified with a lower likelihood of introducing a bill. If the positive

effect political competition on success probabilities is sufficiently large conditional on the benefits and costs then success probabilities will be higher for bills from areas with political competition and the overall probability of an act will be higher. Lastly, the probability of opposition should be lower in constituencies with political competition because of selection and MP bias. As a preview, we find evidence of this outcome below.

Table 3: Predictions from Theory

Political factor	Summary of prediction
Political Connections	Promoters with Whig affiliation should be more likely to introduce bills, have a higher success probability, and are more likely to get an act when Whigs are in power. Ditto for Tory Promoters when Tories are in power.
Blocking power vested interests	Promoters in constituencies where the ruling party is strong should be less likely to introduce bills, have a lower success probability, and are less likely to get an act
	Opposition groups where the ruling party is strong should be more likely to formally oppose bills
Political Competition	Political competition near constituency could make bills more or less likely, success probability could be higher or lower, and acts could be more or less likely
	Signs and magnitudes are affected by bill selection and MPs bias in favor of bills with higher benefits to costs.
	Political competition near a constituency could make opposition more or less likely. Sign should be opposite from success probability.

IV. Data and Sources

The British historical context provides surprisingly rich data to test theories on the politics of access. The daily records for the House of Commons have survived and are printed in the *Journals of the House of Commons*. The *Journals* identify all bills introduced in the Commons including the period under study here. From the *Journals* the details of every river bill were entered in a spreadsheet, including petitions, orders, committee reports, votes, amendments, and

whether it became an act. The petitions are particularly useful because they identify the aims of the bill, the groups supporting the bill, and those opposed. Based on their description, bills that proposed to create a river navigation companies are separated from bills that amended rights to existing organizations. Our analysis concerns the fate of new authorities and so bills for amendments are excluded. The resulting sample consists of 58 river navigation bills and among these 27 became river navigation acts. All bills and acts are geo-referenced using newly constructed digital maps.

In order to study the link with politics we match river navigation bills with political constituencies in England and Wales (Scotland is dropped because it entered the Union in 1707 and it had no river acts before 1717). Each constituency is one of two types: a county or a municipal borough. There were over 200 boroughs and 45 counties. The counties were known as 'shires' and most covered an area around 1000 square miles. Boroughs could be large cities like London and Bristol, but most were medium sized towns with 1000 to 2000 people. The smallest boroughs were called 'rotten' because they had few electors and were considered corruptible.

Matching bills and constituencies is fairly straightforward because most references to bills in the *Journals* are very specific in describing the city or county near a project. For example, the River Avon bill discussed earlier clearly identifies the cities of Bath and Bristol (both of which are boroughs) and so we assign it to them. In a few cases the cities named in the bill are not boroughs. In these cases we assigned bills to county constituencies that govern those cities.

Surprisingly, there is no available data set summarizing the party affiliation of every MP and as a result we had to construct such information from primary and secondary sources. The data and procedures are described in a separate paper (Bogart and Oandasan 2012) and build on

Cruickshanks, Handley, and Hayton (2002). To briefly summarize we identify whether each MP was a Whig when the Whigs were the majority party in the Commons and whether each MP was a Tory when the Tories were the majority party. Thus a dummy variable identifies whether each MP is affiliated with the 'ruling party' or not in every legislative session. The political classification draws on division lists which identify party affiliation directly or voting on major pieces of legislation associated with the leaders of the two parties.

The political data cover eleven legislative sessions from 1690 to 1717. Table 4 gives a summary. The last column gives our estimates for the percentage of ruling party MPs as a total of all MPs in the House of Commons. Notice that in some sessions the largest party does not have a majority. In part this reflects our strict standard for measuring party. For example, if an MP voted against a major bill supported by the leaders of the ruling party then we do not classify them as with the ruling party in that session.

Table 4: Summary of Party Data

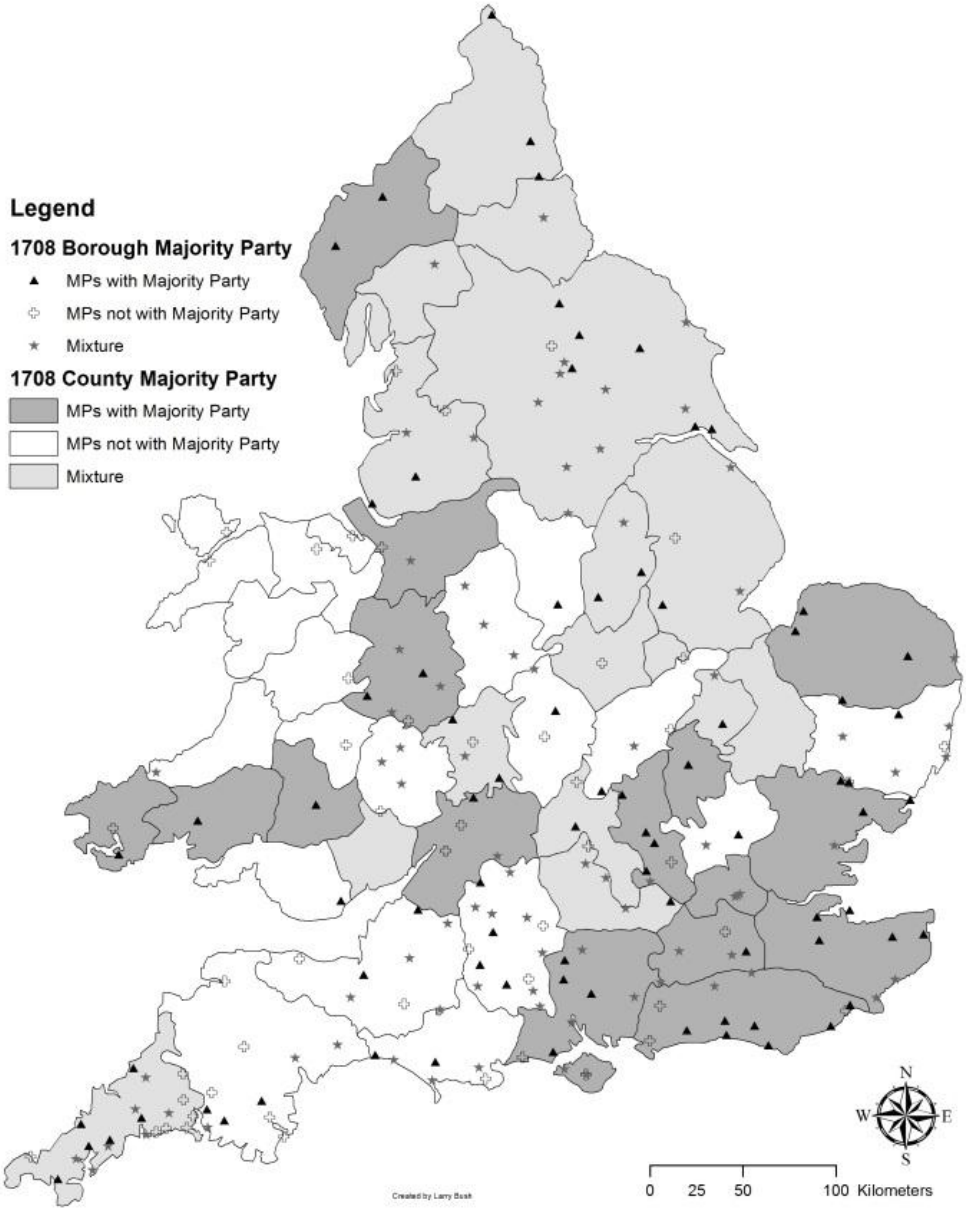
Session Starting Date	Ruling Party	Percentage of MPs in the House with Ruling Party
1690	Tory	43.70%
1695	Whig	48.90%
1698	Whig	49.90%
1701 Jan.	Tory	49.00%
1701 Nov.	Whig	42.30%
1702	Tory	52.00%
1705	Tory	46.70%
1708	Whig	56.10%
1710	Tory	55.10%
1713	Tory	59.50%
1715	Whig	58.70%

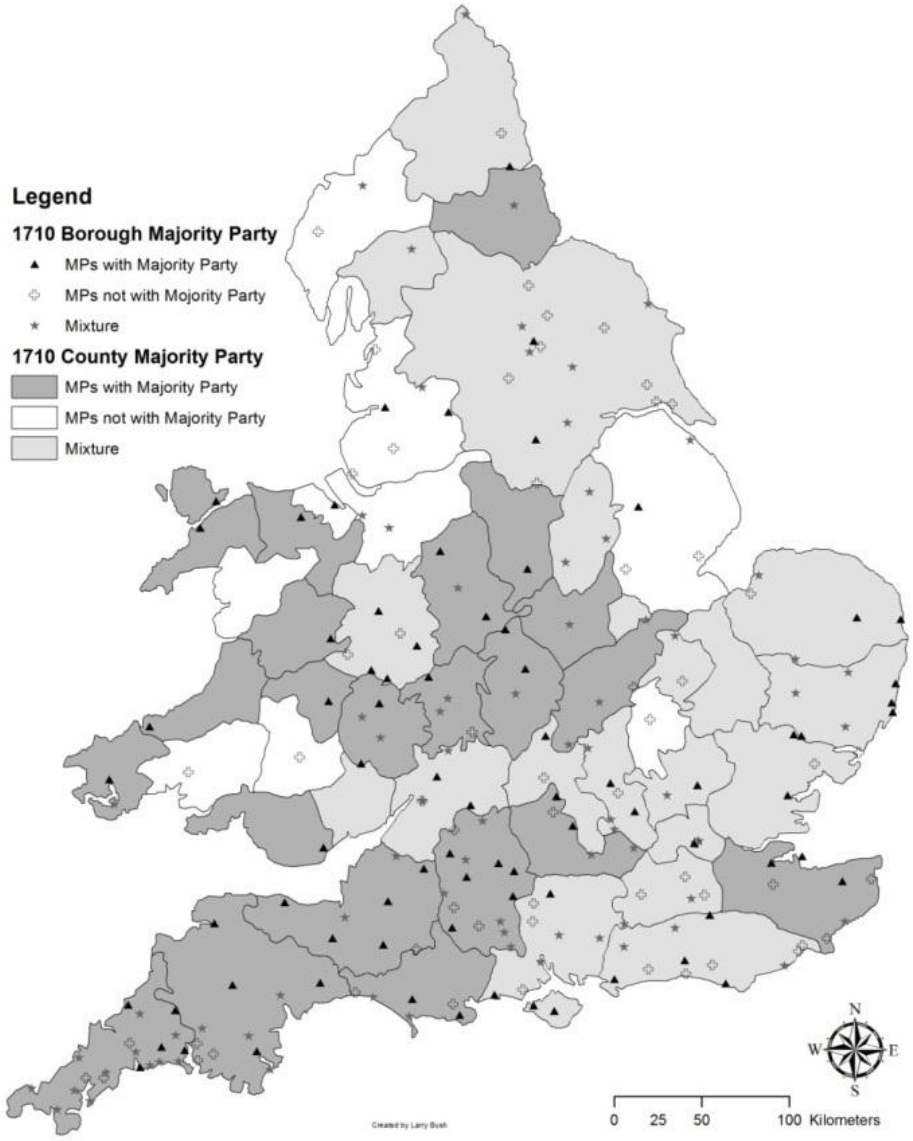
Sources: see text.

The party affiliation of each MP is used to measure the number of ruling party members in each constituency for every legislative session. To illustrate the data, we identified three types: (1) constituencies where the ruling party was strongly represented, (2) constituencies where the ruling party was not strongly represented, and (3) mixed representation.[19] Figure 4 maps the classifications for 1708 when the Whigs were the ruling party and does the same for 1710 when the Tories were the ruling party. Boroughs are indicated with symbols. Counties are outlined with white, light grey, or dark grey backgrounds. Darker symbols or counties are constituencies where the ruling party was strongly represented. The main point is to show that ruling party representation varied across space and changed over time with the identify of the ruling party.

Figure 4: Geography of Ruling Party Representation in 1708 and 1710

[19] Our classifications are based on the fraction of MPs with the ruling party. In most cases there are two MPs for a constituency so the possible values for the fraction with the ruling party are 0, 0.5, and 1. If an MP left the House within a session we have more than two MPs, in which case the fraction with the ruling party ranges between 0 and 1 and is based on the length of each MPs tenure. A constituency is considering to be well represented by the ruling party if the fraction of MPs in the ruling party is above 0.8. A constituency is not well represented by the ruling party if the fraction of MPs in the ruling party is below 0.2. The consistency has mixed representation if the fraction of MPs in the ruling party is in-between 0.2 and 0.8.


Legend
1708 Borough Majority Party
MPs with Majority Party
MPs not with Majority Party
Mixture
1708 County Majority Party
MPs with Majority Party
MPs not with Majority Party
Mixture
N
W
E
S
0 25 50 100 Kilometers



We also measure the number of ruling party MPs in the area surrounding each constituency. To do this we linked all borough constituencies to a point in space using latitude and longitude coordinates for every town in England and Wales. For counties we use the most geographically central town for the latitude and longitude measurement. Next the number of ruling party MPs and the number of total MPs are calculated at various distances ranging from 10 to 35 miles. As explained later, we want to identify the geographic scale at which political variables matter.

Other constituency-level political variables are incorporated. Cruickshanks, Handley, and Hayton (2002) report whether a constituency had a contested election.[20] As with ruling party MPs, we calculate the number of contests at distances ranging from 10 to 35 miles. A related variable is an indicator for whether a constituencies' MP died in the middle of a legislative session. Deaths turn out to be a good variable to predict future contests as will be discussed in the next section. Cruickshanks, Handley, and Hayton (2002) also report the number of voters in each county or borough. The general rule was that all freeholders in a county with more than 40 shillings a year in income could vote. The number of borough voters provides another interesting source of variation. It partly reflects city size (the borough of London for example had the most voters) but it also reflects the degree of democracy and different voting rules.

In the future we plan to add data on the population of all counties and an indicator for the population size of all boroughs. For the moment we calculate the market potential for each constituency using the 67 largest cities in England with a population above 2500. Market potential is calculated using the inverse distance weighted sum of city populations. A final variable measures the distance to the existing network of navigable waterways c.1690 using GIS tools and a digital map of navigable waterways.

Summary statistics for all the variables are shown in table 5. The likelihood of a constituency having at least one river bill in its jurisdiction is relatively low at 13 percent. The proportion having a river act is slightly lower as not all bills passed. The political variables are shown in various forms and calculated across all constituency-legislative session cells. The number of

[20] Information on vote tallies are not available for many contests so unfortunately we cannot use it (see Cruickshanks, Handley, and Hayton 2002)

ruling party MPs in a constituency is smaller and has higher variation than the number of ruling party MPs within 10, 20, or 30 miles.

Table 5: Summary Statistics

Variable	obs.	mean	st. dev.	Min	max
River Bills and Acts					
Constituencies with at least one River bill introduced	268	0.134	0.341	0	1
Constituencies with at least one River Act	268	0.082	0.275	0	1
Political variables, by constituency and legislative session					
Number of MPs in constituency with Ruling Party	2948	0.976	0.7999	0	4
Number of MPs within 10 miles with Ruling Party	2948	2.438	1.978	0	11.59
Number of MPs within 15 miles with Ruling Party	2948	4.165	3.083	0	19.147
Number of MPs within 20 miles with Ruling Party	2948	6.78	4.569	0	25.38
Number of MPs within 25 miles with Ruling Party	2948	9.861	5.941	1	28.388
Number of MPs within 25 miles	2948	19.14	9.822	2	42
Dummy for contested election in constituency	2948	0.374	0.483	0	1
Number of constituencies with contested elections within 25 miles	2948	3.819	2.72	0	13
Dummy for Sessions when Whigs are in Power	2948	0.4545	0.498	0	1
Control variables					
Year and month when legislative session ended	2948	1705.8	6.952	1695.1	1717.1
Dummy for County constituency	2948	0.194	0.395	0	1
Number of voters for municipality	2376	373.78	765.9	10	7237
Number of voters per sq. mi. for county	572	2.76	1.8	0.195	10.67
Market Potential	2948	8376	33503	1847	551842
Distance to original navigable waterway network	2948	25.42	19.74	0	92.96

Sources: see text.

V. Empirical Strategy

We use a binary choice model to study our primary outcome of interest: the incidence of river navigation acts across time and space. Let the variable $y_{it} = 1$ if constituency *i* has a river

act in its jurisdiction in legislative session *t* and 0 otherwise. The probability that $y_{it} = 1$ is a function of economic and political characteristics of constituency *j* in legislative session *t* and is summarized by the vector x_{it}. Some characteristics in x_{it} are common across all constituencies but vary across time, like whether the Whigs were the ruling party; some are fixed within a constituency across time, like the distance to the navigable waterway network c.1690; others vary within constituencies over time, like the number of nearby ruling party MPs in a legislative session. There is no simple expression of the functional relationship between $prob(y_{it} = 1)$ and the characteristics x_{it}. A parsimonious specification is the logit model with each economic and political variable entering individually as explanatory variables. A more flexible specification is a logit model with interactions between all variables. Some of the interaction terms are of direct interest. For example, it could be that having more ruling party MPs near a constituency has a different effect when the Whigs are in power or when previous elections are contested. We analyze these possibilities below.

We also incorporate the irreversibility and scale of river projects. Most constituencies had at most one river project suitable for navigation in the 1690s and early 1700s. Suitability depended on geographic characteristics like a nearby stream or river and sufficient demand to cover the fixed costs of revenue. In the data only one constituency had more than one river navigation act (the massive county of Yorkshire) from 1690 to 1717. Thus we treat acts as a one-time event for each constituency much like a discrete time hazard model. The probability that a constituency had an act in its jurisdiction is estimated conditional on it not having previously had an act. Once a constituency has a river act they are dropped from the data. Otherwise we would continue to 'treat' a constituency with political shocks even though they are no longer relevant.

There are several measurement and identification issues that we address. The first deals with the spatial scale of local political variables like ruling party MPs and contested elections. Our theoretical framework relates the local strength of the ruling party and the extent of local political competition to bill success functions, but it does not specify at what spatial range these variables matter. Here our aim is to let the data speak by estimating the model with different distance measures and identifying the one with the highest joint significance as measured by the F-statistic. In a sense we are examining whether the number of local ruling party MPs and contested elections matters at any spatial scale.

A second issue concerns endogeneity. Despite our best efforts to identify all relevant economic and political variables there are inevitably unobservable factors that might be correlated with our variables of interest. One could also imagine causation running from a desire to get acts to contested elections. We first address these issues using a linear probability model with fixed effects for each constituency and for each legislative session. To be specific we estimate $y_{it} = \alpha + \mu_i + \delta_t + \beta x_{it} + \varepsilon_{it}$ where μ_i is the constituency fixed effect, δ_t is a year fixed effect, and ε_{it} is error term. The advantage of this model is that any time-invariant unobservable factors correlated with our variables for ruling party density and local political competition are controlled for with the constituency fixed effect. The downside is that we cannot estimate the effects of time-fixed characteristics like market potential and we could get predicted probabilities less than 0 and more than 1. We view the linear probability model as a complement to our baseline models which include fixed characteristics of interest.

Our second approach is to use instrumental variables. We use the number of deaths of sitting MPs near constituency *i* in legislative session *t-1* and the number contested elections near constituency *i* in legislative session *t-1* to instrument for the number of contested elections near

constituency *i* in legislative session *t.* The idea is that deaths created an exogenous opportunity for a political entrepreneur to enter. Often seats in the Commons were decided by collusion among leading families. Sons would often follow the retirement of fathers. When a key family member died the collusive arrangement could break down. We also use lagged contested elections as there is likely to be some persistence in contests which is unrelated to shocks captured by ε_{it}. We conduct a variety of specification tests including over-identification tests.

We also study other outcome variables like the incidence of river navigation bills and the success of bills in Parliament. The same logit and fixed effects regression frameworks are used for bills and they provide a check on the results for acts. There is an additional insight is that some political factors, like contests, can induce selection effects that won't show up for river acts but may for bills. Finally we study the incidence of opposition to bills. The data identify the locations of opposing groups and as with bills, we match to constituency characteristics.

VI. Results

The first step is to establish at what geographic scale local political factors affected river acts. We begin by estimating several models with different spatial measures. The first specification includes own constituency political variables, like the number of ruling party MPs in a constituency, the total number of MPs in a constituency, and whether there was a contested election in the constituency, along with a dummy for Whig rule and the full set of controls discussed above, like market potential and distance to an existing navigable waterway. Note in this specification the number of ruling party MPs captures the effect of increasing their size while holding the overall number of MPs constant. Increasing total MPs captures the effect of having more representatives absent any party consideration. Subsequent specifications include

MPs and contests within 10, 15, 20, 25, 30, and 35 miles respectively. Throughout the standard errors are clustered on constituencies.

Table 6 reports estimates for all specifications. The results show that the number of ruling party MPs within 25 miles significantly influenced the probability of having a river act as did the number of contested elections within 35 miles.[21] In no specification other than (1) did the number of MPs in an area affect the probability of a river act. Specification (8) uses two different spatial scales, ruling party MPs within 25 miles and the number of contested elections within 35 miles. It has a higher F-statistic for joint significance than the other specifications that impose the same spatial scale on ruling party MPs and contested elections. We focus on (8) in the discussion that follows.

Turning to the coefficients, there is a negative and significant sign on the number of ruling party MPs within 25 miles. Why does this result imply? Our theory is that the ruling party targeted rejections of bills to constituencies where powerful vested interests might lose from the project and who supported them in previous elections. Another related explanation is that opposition groups more easily struck deals with ruling party MPs in their area and as a result they were more effective than promoters in killing bills. Another key finding concerns contested elections. Having more contested elections near a constituency significantly increases the probability of getting a river act. Our explanation is that local political competition made MPs more favorable and induced a selection of projects with high benefit to cost ratios that were easier to get through Parliament. We will have more to say about these mechanisms in the analysis of bills momentarily.

[21] A range of 25 to 35 miles makes sense given that promoters could be some distance from projects. Also building on the river Avon case, supporters and opposition groups could be in towns 20 to 40 miles from the river project.

Table 6: River Acts: Baseline Logit Regressions

	constituency spatial measure							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Own Const.	within 10 miles	within 15 miles	within 20 miles	within 25 miles	within 30 miles	within 35 miles	MP 25 & Contest 35 miles
political variables	coeff. st. error	coeff. st. error	coeff. st. error	coeff. st. error	coeff. st. error	coeff. st. error	coeff. st. error	coeff. st. error
Number ruling party MPs	0.033	-0.046	-0.098	-0.123	-0.135	-0.046	-0.053	-0.15
	0.278	0.194	0.129	0.09	0.077*	0.061	0.047	0.081*
Number of MPs	0.656	-0.19	-0.129	-0.037	-0.013	-0.025	-0.021	-0.058
	0.396*	0.137	0.084	0.041	0.042	0.037	0.027	0.053
Number of contested elections	0.069	-0.256	0.251	0.227	0.137	0.151	0.179	0.225
	0.478	0.317	0.261	0.151	0.112	0.08*	0.066***	0.072***
Whig	0.933	0.921	0.942	0.987	0.979	1.005	1.059	1.118
	0.448**	0.446**	0.447**	0.448**	0.457**	0.453**	0.46**	0.46**
controls	yes	yes	yes	yes	yes	yes	yes	yes
N	2820	2820	2820	2820	2820	2820	2820	2820
Pseudo R2	0.045	0.067	0.06	0.06	0.067	0.053	0.061	0.097
Chi2 for political variables	4.36	6.69	7.66	8.87	7.93	5.46	9.15	17.05
p-value	0.22	0.08	0.05	0.03	0.04	0.14	0.027	0.0007

Notes: Standard errors are clustered on constituencies. *,**, and *** represent statistical significance at the 1%, 5% and 10% level.

Readers will also notice the positive and significant effect of Whig party rule and by implication the negative and significant effect of Tory rule. A full investigation of this result is

beyond the scope of this paper, but one speculation is that the two parties differed in their economic interests. As landowners had closer ties to the Tories, they might have leaned harder on party leaders to reject bills when the Tories were in power. In a number of cases, landowners were opposed to river navigation bills and so this theory is plausible. The Whigs by contrast had less connection with landowners so they were not persuaded to the same degree. The Whigs might have been more persuaded by navigation promoters, especially if they were drawn from the manufacturing and mercantile groups which were the base of the Whig party.[22]

The estimates in table 6 are from a logit model where all the political and economic variables enter individually. The model is appealing because of the ease of interpretation; however, there is no theoretical reason to favor this specification over a more flexible one. Therefore we also estimate a logit model where every economic and political variable enters individually, with their square, and with interactions. The main variables of interest are the number of ruling party MPs within 25 miles and the number of contested elections within 35 miles. As the coefficients are hard to interpret directly, we report the effects in terms of the predicted probability of getting an act under a one-standard deviation change relative to the unconditional mean probability.[23]

The results are reported in table 7 and are similar to the more parsimonious logit model. Increasing the number of ruling party MPs from one standard deviation below the mean to one standard deviation above decreases the probability of a river navigation act by 169% relative to the mean probability. Increasing contested elections has an even larger effect and in the opposite

[22] There is an alternative explanation emphasizing the leadership and ideology of the Whigs. They were arguably the party pushing developmental projects and as we shall see later there is more evidence that the Whigs were pushing river navigation projects. For related theories on the Whigs see Pincus (2009) and Pincus and Robinson (2012).
[23] For example, in the case of the number of ruling party MPs, we replace every observation with a one standard deviation decrease and then calculate the predicted probability using the coefficients. Then an average is calculated over all predicted probabilities to get the total predicted effect. The same is then done for a one standard deviation increase in ruling party MPs for comparison.

direction. A move from one standard deviation below the mean to one standard deviation above increases the probability of a river act by 305%.

Table 7: Estimated effects in Flexible Logit specification

	predicted probabilities: River acts			
	1	2	3	4
	one standard deviation below mean	one standard deviation above mean	difference, 2-1	difference as % of mean
Number ruling party MPs within 25 miles	0.0154	0.0022	-0.0132	-169.23
Number of contested elections within 35 miles	0.0081	0.0319	0.0238	305.128

We can further test the robustness of the results using linear fixed effects models. All time-invariant characteristics like indicators for whether the constituency is a borough or distance from a waterway must necessarily be dropped. The Whig dummy is also dropped as we include fixed effects for each legislative session. The results are reported in table 8. Specifications 1 and 2 use the 25 and 35 mile spatial scale respectively. Specification 3 uses 25 miles for the number of ruling party MPs and 35 miles for the number of contested elections. The findings are consistent with earlier results. Specification 3 shows that increasing the number of ruling party MPs lowers the likelihood of river navigation acts and increasing the number of contested elections increases the likelihood of river acts. The results are important because they show time-invariant unobserved characteristics associated with constituencies are not conflated with our political variables of interest.

Table 8: River Acts: fixed effects regressions

	1	2	3
	within 25 miles	within 35 miles	MPs 25 & Contests 35
	coeff.	coeff.	coeff.
political variables	st. error	st. error	st. error
Number ruling party MPs	-0.001	-0.0004	-0.0009
	0.0004*	0.0003	0.0004**
Number of contested elections	0.0006	0.0016	0.0016
	0.0008	0.0007**	0.0007**
Session and constituency fixed effects	yes	yes	Yes
N	2820	2820	2820
R2	0.28	0.28	0.28

Notes: Standard errors are clustered on constituencies. *,**, and *** represent statistical significance at the 1%, 5% and 10% level.

The remaining concern is that some time-varying unobservable characteristic has an influence on rivers acts and is correlated with our variables of interest. The omitted variables problem is particularly troubling if it leads to an upward bias in the coefficient estimates. Fortunately we have an instrument for contested elections that we can use to address the identification problem. The second stage regression is the linear probability model with constituency and year fixed effects. It is identical to specification 3 in table 8. The first stage has the number of contested elections within 35 miles on fixed effects, the number of contested elections within 35 miles in the previous session, and the number of MPs within 35 miles who died in the previous session. The system is shown below.

$$y_{it} = \mu_i + \delta_t + \beta_1 \#contestedelections_{it} + \beta_2 \#rulingpartyMPs_{it} + \varepsilon_{it}$$

$$\#contestedelections_{it} = \mu_i + \delta_t + \gamma_1 \#contestedelections_{it-1} + \gamma_2 \#MPdeaths_{it-1} + \varepsilon_{it}$$

There are always two key questions concerning instruments. First, do they explain enough variation in the endogenous variable? Second, can they be excluded from the second stage regression explaining river navigation acts? F-statistics on the significance of the instruments in the first stage are the standard approach to address the first question. We report these below. With respect to the exclusion restrictions, MP deaths are plausibly exogenous as they relate to shocks to human health after conditioning on constituency and time characteristics with the fixed effects. Also there is no obvious reason to think that MP deaths would explain river navigation acts directly. With respect to lagged contested elections it is less clear that it is excludable. Fortunately, as we have two instruments, over-identification tests provide a guide on exclusion.

The results are reported in table 9. The fixed effects model without instrumenting is also shown for comparison. In the first stage (not shown) MP deaths are positively related to contests and contests in the previous session are negatively related to contests in the current session. The instruments are not 'weak.' The first-stage F-stat is above 16 and meets the standard cutoffs in the literature. The instruments also pass the over-identification test implying they are rightly excluded from the second stage. Turning to the main result, the coefficient on the number of contested elections increases in size but is no longer statistically significant because the standard error is much larger. While precise estimates are desirable, it is important to emphasize that the main goal was to investigate an upward bias in the coefficient on contested elections. We do not find evidence that the 2SLS coefficient for contested elections is smaller than the same coefficient in the FE model. Moreover, the endogeneity test statistic fails to show a significant difference between the 2SLS coefficient and the FE coefficient on contested elections. Our takeway is that the endogeneity bias on contested elections is not a major concern.

Table 9: River Acts: fixed effects regressions with 2sls

	FE	2SLS
	1	2
	coeff.	coeff.
political variables	st. error	st. error
Number ruling party MPs	-0.0009	-0.0006
	0.0004**	0.0004
Number of contested elections	0.0016	0.0023
	0.0007**	0.0065
year and constituency fixed effects	yes	yes
N	2820	2820
First Stage		
F-stat		16.89
P-value		0
Over-identification test		
Chi-square Stat		0.365
P-value		0.54
Endogeneity Test		
F-stat		0.012
P-value		0.91

Notes: Standard errors are clustered on constituencies. *,**, and *** represent statistical significance at the 1%, 5% and 10% level.

VI.1 Results for Bills and Success Rates

More insights can be gained by studying the effects of political variables on the likelihood of a river bill being introduced and its success conditional on introduction. Table 10 shows the estimates for bills using our 'flexible' logit model with squared terms and intereactions between all variables. Like before we report the effects of a one-standard deviation change on the

probability of getting a bill. The results show that river bills are less likely when there are more ruling party MPs within 25 miles, but the magnitude of the coefficient is smaller. The change in probability relative to the mean is less than 50 percent for the number of ruling party MPs. In the model for acts the change in probability is 169 percent. Clearly something additional is happening at the approval stage in the Commons which we shall analyze momentarily.

Table 10: River Bills: Flexible Logit specification

	predicted probabilities: River bills			
	1	2	3	4
	one standard deviation below mean	one standard deviation above mean	difference, 2-1	difference as % of mean
Number ruling party MPs within 25 miles	0.0172	0.0074	-0.0098	-48.51
Number of contested elections within 35 miles	0.0275	0.0235	-0.004	-19.8

The most notable finding in table 10 is that increasing the number of contested elections lowers the probability of a river bill. The quantitative magnitude is not large (a 19.8% reduction relative to the mean) but it is very different from the results for acts, where there was a 305% increase in the probability relative to the mean. Our explanation is project selection. We argued earlier that local political competition could increase scrutiny of projects and discourage those with low benefit-cost ratios. If so then promoters will drop weaker projects when there is greater local political competition. The logit model includes economic control variables that relate to benefits and costs, but inevitably some negative project characteristics will not be measured and are in the error term. However, these negative characteristics are observable to promoters and if local political competition interacts with these negative characteristics making bills less likely, then political competition will have a negative effect on bill promotion.

The selection argument is further supported by an analysis of how political factors influence the success or failure of river bills. Table 11 reports results from a logit model analyzing the probability of success for the 58 constituencies that had a river bill introduced. It shows a large positive coefficient on the number of contested elections. Our explanation is that the bills which came before the Commons from constituencies with more contests had better characteristics, like higher benefit-cost ratios, and therefore the Commons was more likely to pass them. Also MPs were more favorable to bills with higher benefit-cost ratios when there was competition. The two effects of competition combine to increase the success probability.

Table 11: Effect of Politics on Probability Bill Passes

political variables	coeff. st. error
Number ruling party MPs	-0.197 0.184
Number of MPs	-0.163 0.137
Number of contested elections	0.484 0.160***
Whig Dummy	1.35 0.729**
controls	yes
n	58
Pseudo R2	0.248

Notes: Standard errors are clustered on constituencies. *,**, and *** represent statistical significance at the 1%, 5% and 10% level.

VI.2 Results for Opposition and Support

An analysis of opposition gives more evidence on the political mechanisms at work. The Journals of the House of Commons contain all petitions from groups opposing river bills. We match the locations of these groups to constituencies and carry out a similar logit analysis as with bills and acts. Specifically we are interested in whether any group from a constituency is more likely to oppose a river bill based on the political characteristics of the constituency. Not all constituencies had bills introduced in each session, so we restrict the sample of constituencies and legislative sessions to those where a bill was introduced in a constituency that was less than 50 miles away. The resulting sample contains 1013 constituency-legislative sessions. Like before we also did a specification search to identify the spatial scale for ruling party MPs and contests. Below we report results for the number of ruling party MPs within 15 miles and the number of contested elections within 25 miles. Note that the spatial scale of political variables is smaller than for acts. This makes sense because we are now focusing on individual groups and have more precise information on their locations.

The results are reported in table 12. There are several important conclusions. First, a constituency is more likely to record opposition if there are more ruling party MPs nearby. These findings are consistent with our earlier results showing that having more ruling party MPs near a constituency reduced the likelihood of river navigation acts. Our theory again is that greater ruling party strength an area encouraged opposition efforts which reduced the probability of a river bill's success.

Table 12: Effects of Politics on Probability Opposition

Political variables	coeff. st. error
Number ruling party MPs within 15 miles	0.156 0.088*
Number of MPs within 15 miles	0.012 0.063
Number of contested elections within 25 miles	-0.158 0.075**
Whig Dummy	0.909 0.315***
controls	yes
n	1013
Pseudo R2	0.19

Notes: Standard errors are clustered on constituencies. *,**, and *** represent statistical significance at the 1%, 5% and 10% level.

The second important conclusion concerns contested elections. The results show that contested elections are negatively associated with the probability of opposition. Selection again provides an explanation. If bills for projects with better characteristics (i.e. higher benefit-cost ratios) were more likely in areas with contested elections then our theory would suggest that formal opposition should be less likely. Also opposition should be less likely if MPs are more favorable to projects with higher benefits to costs.

VII. Additional Results on Political Connections

There is one more piece of evidence supporting our argument that politics affected access. According to our argument about political connections, groups that were more closely affiliated

with the Whigs should have been more likely to introduce bills when the Whigs were in power and groups more affiliated with the Tories should have been more likely to do so when the Tories were in power. The standard histories of both parties would suggest that merchants were more affiliated with the Whigs and landowners were more affiliated with Tories. If this is correct, there should be some differences between the two parties in terms of which group promoted bills.

We classify the identify of promoters into four groups: (1) mayors and city leaders, (2) landowners, (3) merchants or corporations, and (4) MPs through orders for bills. Unfortunately in the fourth case, we cannot be sure which MP introduced the bill. Table 13 shows the number of bills promoted by each group in all legislative sessions and when the Whigs were in power. The most striking result is that landowners were less likely to promote bills under the Whigs. Overall they promoted 26 percent of bills but under the Whigs landowners promoted only 8 percent. We would expect this pattern if political connections made Whig MPs and leaders less favorable to bills introduced by landowners, the main supporters of the Tories.

Table 13: Promotion of Bills by Group and by Party

	all	
Groups named in first to petition for a river act	number	percent of total
Mayor or city leaders	20	47
Landowners	11	26
Merchants	5	12
Unknown Bill ordered	12	28

	when Whigs are in power	
Groups named in first to petition for a river act	number	percent of total
Mayor or city leaders	11	44
Landowners	2	8

Merchants	4	16
Unknown Bill ordered	10	40

VIII. Conclusion

There were remarkable changes in Britain's political system after the Glorious Revolution. One of the most important is the emergence of a competitive two party system. The Whigs and Tories traded places as the largest parties in the House of Commons seven times between 1690 and 1717. At the same time Britain embarked on many new policies, including the establishment of numerous statutory authorities which extended market access through the financing of transport infrastructure. In this paper, we study whether party politics influenced the creation of river navigation companies in Parliament. We find evidence that party politics mattered. Constituencies were more likely to get a river navigation act if there were fewer ruling party MPs in their area and they were more likely to get acts if there were more contested elections. Our theory is that the ruling party targeted rejections to satisfy vested interests who supported them in the previous election and that local political competition encouraged MPs to favor bills with high benefits to costs and disfavor bills with low benefits to costs.

The implication for our understanding of politics and development after the Glorious Revolution is subtle. On the one hand, it is clear that Britain did not make the full transition to open access in the decades after the Glorious Revolution. As the evidence shows political connections influenced whether a constituency got river navigation acts. On the other hand, party competition at the national level meant that the ruling party rarely controlled a constituency for long. The advantages to vested interests were not permanent. Also party competition at the local level provided incentives for MPs to favor high quality projects. The result was that Britain

avoided boondoggle projects that did more harm than good. In the end, there is a case that Britain's political system after the Glorious Revolution aided development most notably in the areas of infrastructure and property rights. Expropriation risks for infrastructure investors were low and access to organizations was broadening. Political parties and competition were central to the beginnings of this transition.

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