

Political Institutions and the Emergence of Regulatory Commitment in England: Evidence from Road and River Improvement Authorities, 1600- 1750

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Abstract

How do political institutions affect regulatory commitment and investment? This paper explores this question using detailed evidence on regulation and the behavior of river and road improvement authorities in England from 1600 to 1750. It shows that the demand for rights to improve roads and rivers increased and became more secure following the Glorious Revolution of 1689. It also argues that regulatory commitment increased after 1689 because it was no longer uncertain whether the Crown or Parliament was the ultimate regulatory authority, and secondly, because norms and the veto power of the House of Lords prevented Parliament from renegeing on the rights of road and river undertakers.

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The degree of commitment is an important feature of any regulatory system. If the regulator can arbitrarily change the rules, then firms will be uncertain whether the regulator will expropriate their investments, or change the rules in any manner which reduces their profits. In such cases, firms are unlikely to invest, and productivity is lost. Many scholars argue that political institutions play a key role in determining the degree of regulatory commitment. Brian Levy and Pablo Spiller (1994), for example, argue that an independent judiciary, constitutional provisions, and norms can all limit the arbitrary behavior of regulators. The fundamental importance of political institutions for commitment and investment is a view that has gained increasing acceptance in economics, law, and political science (see North 1991; Acemoglu, Johnson, and Robinson 2005), but there are still relatively few studies that test whether changes in political institutions affect the degree of commitment and investment. This paper focuses on these issues by examining the connection between changes in political institutions, regulatory commitment, and the demand for rights to improve infrastructure in England between 1600 and 1750.

England is an important case because it was the first Western European economy to experience sustained economic growth, and it was the first to establish a centralized representative government with effective restraints on the power of the monarchy. England was also unique in the way that it implemented infrastructure investment. During the eighteenth century, Parliament passed over 3000 acts dealing with the regulation of individual projects, like roads, rivers, harbors, lighthouses, canals, bridges, and sanitation systems (see Hoppit, 1996; Innes, 1996). Most acts gave private individuals or companies the right to undertake a project, collect fees, and purchase property. The acts also named a body of commissioners who could resolve disputes between the undertakers and nearby property-owners. The legislation was quite

successful in promoting infrastructure investment, particularly the development of a transport network (Bogart, 2005).

One important feature of infrastructure acts was their security. Parliament rarely voided or substantially reduced the rights of the undertakers for projects, even though there were pressures from various interests to reduce the tolls, or assign rights to new groups. It is not clear, however, what factors contributed to greater security, and whether they influenced investment demand. This paper examines the effect of political institutions—specifically relations between the Crown and Parliament and relations within Parliament—on the demand for rights and the commitment to protect rights. My thesis is that changes in political institutions following the Glorious Revolution increased the demand for rights to improve infrastructure by increasing regulatory commitment.

The first part of the paper uses data on all patents and parliamentary bills to improve roads and rivers between 1600 and 1750 to examine whether demand for rights changed following major political events. Patents and bills were initiated by individuals interested in undertaking road and river improvements. They were also the only legal device by which individuals could obtain rights-of-way and the authority to collect tolls. The data show that patents and parliamentary bills to improve roads and rivers coexisted before the Civil War of the 1640s, but neither was common. The data also reveal that parliamentary bills temporarily increased after the Restoration of the Crown in 1661, but it was not until after the Glorious Revolution of 1689 that bills permanently increased and became the dominant form of organizing river and road investment.

The second part of the paper uses information from statutes, parliamentary records, and secondary sources to show that rights were more secure after the Glorious Revolution of 1689.

The only three river improvement acts before 1660 were either voided or substantially changed and the rights in several patents were diminished by the crown. By contrast, the vast majority of rights were respected after 1689, with the exception of rights for undertakers who were negligent in improving their road or river.

I argue that acts became more secure because of two key changes in the regulatory environment. First, Parliament emerged as the sole regulatory authority, ending uncertainty about whether the Crown also controlled regulation. Second, norms and the veto power of the House of Lords over the House of Commons prevented Parliament from arbitrarily voiding or diminishing the rights of road and river undertakers.

The emergence of Parliament made acts more secure because both the Crown and Parliament showed a willingness to void or devalue the rights initiated by the other whenever political circumstances changed. After the Crown was eliminated in the Civil War, there was substantial uncertainty about the enforcement of patents. Similarly, after the Restoration, the Crown did not recognize acts passed by the Commons during the 1650s, and even tried to eliminate its role in issuing rights altogether. Parliament reasserted its power in the 1660s, but as tensions with the crown reemerged in the 1680s, promoters could not be certain that acts would be upheld. It was not until after the Glorious Revolution, that undertakers could be certain that rights would not be dissolved because of a regime change.

The Revolutionary settlement was necessary for regulatory commitment, but it was not sufficient. Road and river undertakers also faced a risk that Parliament would arbitrarily change regulations by passing a new act. In fact, several bills were introduced in Parliament in the 1690s and early 1700s which proposed to void or substantially diminish rights vested in earlier acts. The House of Lords and the House of Commons stood to benefit in the short-run from

passing these acts because they could collect bribes from groups trying to appropriate rights to collect tolls. Members of the Commons stood to gain an additional benefit because they could capture votes from communities desiring lower tolls or other regulations that appropriated more of the surplus from undertakers.

Norms helped to discourage the Commons and Lords from pursuing these short-term goals because they established a belief that it was unacceptable to violate the property rights of undertakers that improved their road or river. The cost of violating this norm could be sufficiently great that the Lords and the Commons were willing to forgo the benefits of violating undertakers' rights. However, the costs of violating the norm were arguably lower for the Commons because they owned less property than the Lords. In addition, the benefits from violating rights were arguably greater for the Commons because they faced electoral pressures, while the Lords held their seats through hereditary right and did not need to earn the votes of local communities. The veto power of the Lords was therefore crucial because they had a greater incentive to reject any bill passed by the Commons that violated the rights of undertakers.

The findings here relate to the literature on political institutions and economic growth in pre-Industrial England. In a seminal paper, Douglass North and Barry Weingast (1989) argue that the Glorious Revolution increased the security of property rights by restraining the power of the Crown. Their hypothesis has been criticized by many economic historians because there is little evidence connecting institutional changes with outcomes like investment and technology adoption (see for example Clark 1996; Sussman and Yafeh 2007). This paper provides specific evidence that changes in English political institutions increased the security of property rights and fostered infrastructure investment. It also specifies the mechanisms that restrained Parliament from renegeing on property rights. Weingast (1997) argues that norms helped to

coordinate a ‘trigger’ strategy which protected property rights. David Stasavage (2003) argues that security depended on the emergence of a cohesive majority party which included groups favoring secure property rights. My evidence suggests there were complementarities between norms, which defined when property rights could not be violated, and an effective system of checks and balances, which vested veto power in groups that favored secure property rights.

A broader lesson from this study is that political conflict makes it difficult to achieve regulatory commitment. If there are multiple groups like the Crown and Parliament willing to use any means to control the political system, then infrastructure providers will never be certain whether regulations will be upheld. Therefore, the absence of severe political conflict is likely to be a necessary condition for regulatory commitment.

The paper is organized as follows. The first section provides background on English political institutions and road and river authorities. The second section introduces the data. The third evaluates the effects of major political events on the demand for rights. The fourth examines the connection between political institutions and regulatory commitment. The fifth section concludes.

1. Background

English political institutions underwent a substantial transformation between 1600 and 1750. The major changes occurred during the English Civil War of the 1640s, the Restoration in 1661, and the Glorious Revolution in 1689. The Civil War emerged from conflicts between King James I and Parliament in the early 1600s.² James I most famously battled with the House of Commons over taxation. He wanted the Commons to grant greater tax revenues, but they were

² For an overview of political institutions before 1661 see Smith (1997).

unwilling because they could not control how the King spent its money. Relations between the crown and Parliament became so embittered that James I called Parliament into session only once between 1610 and 1620. The disputes continued when Charles I assumed the throne in 1625. King Charles I called Parliament into session only 7 times between 1625 and 1642. The tensions between Crown and Parliament reached an apex in 1642 when Charles I stormed the House of Commons and started the English Civil War.

The beheading of Charles I in 1649 ended the Civil war and eliminated the monarchy and House of Lords as a political bodies. England became a republic under the sole authority of the House of Commons. The Commons controlled the government until 1653 when they were dissolved by Oliver Cromwell, the leader of the Parliamentarian Army. Cromwell was then named ‘Lord Protector’ and began making decisions by dictatorial force. With Cromwell’s death in 1658 there was an attempt to make his son the next Lord Protector, but his support was too weak and he was removed by the army. England’s brief experiment with republic government—known as the interregnum—came to an end in 1660, when the House of Commons issued a proclamation that King Charles II had been the lawful monarch since the execution of his father Charles I in January 1649.

The ‘Restoration’ of 1661 was an attempt to restore the old political system England, specifically the governing trinity consisting of the House of Lords, the House of Commons, and the King.³ It appeared to be successful in that Parliament met regularly throughout the 1660s and Charles II was granted greater tax revenues than his father. Tensions between the crown and Parliament remerged during the 1670s when Charles II pursued aggressive foreign policies and showed an affiliation with Catholicism. Tensions worsened in 1679 when some members of

³ For an overview of political institutions between 1661 and 1722 see Holmes (1993).

Parliament tried to exclude the brother of Charles II from assuming the throne. Charles II dissolved Parliament before it could pass the so-called Exclusion bill and subsequently called Parliament into session only once more before his death in 1685. The coronation of James II brought new fears that England was moving towards a Catholic, absolutist form of government.

Conflicts between the Crown and Parliament finally came to an end with the Glorious Revolution. In 1688, Protestant Members of Parliament invited William, Prince of Orange, to invade England and remove James II from the throne. James II fled and Parliament named William and his wife Mary as the new King and Queen of England. As one of their first acts, William and Mary consented to the Bill of Rights in 1689 which laid out the principles of limited government, specifically that Parliament had to consent to all taxation and that Parliament would meet regularly to pass laws. The Glorious Revolution did not eliminate all political instability in England, as the Whig and Tory political parties continuously battle for control of the Commons throughout the 1690s and early 1700s. It did, however, mark the end of a century of severe political conflict.

The English economy also underwent substantial changes between 1600 and 1750. England was typical of most European countries because it was caught in a Malthusian-trap. Conditions began to change after 1600, however. Greg Clark (2005) shows that both population and real wages increased in the seventeenth century. Robert Allen's (2000) evidence on agricultural productivity reveals a similar picture. He shows that agricultural output per-worker increased by 50 percent between 1600 and 1700. England was on its way to breaking the Malthusian-trap.

Higher population and higher agricultural productivity created new possibilities for trade, but the transport network presented a bottleneck. England was well endowed with rivers, but many internal areas remained more than 15 miles from a navigable waterway (Willan, 1964). England

also had a road network that connected London with all major provincial cities, but many roads were too narrow and poorly maintained. In short, there needed to be substantial investments in making rivers navigable and in widening and improving roads.

The existing system for maintaining roads was inadequate to meet the demand for improvements after 1600. Two acts in 1555 and 1557 made parishes (i.e. villages) responsible for maintaining roads within their jurisdiction. The acts required that every laborer work on the roads for at most 6 days per year, and that every freeholder or tenant contribute materials and the use of horses and carts.⁴ It was believed that local inhabitants should be responsible for their own road maintenance because they were the main users. This premise worked reasonably well until trade expanded beyond the parish and the benefits of improving roads began to accrue to merchants and farmers in other areas. The parish system was also designed to satisfy road maintenance rather than road improvement as parishes were not required to undertake road widening or resurfacing in their jurisdiction.

The existing system for maintaining rivers was similarly ill-equipped to meet the need for investment after 1600. Custom dictated that inhabitants near a river should be responsible for its maintenance, but many failed to remove debris and other impediments to navigation. Locals could try to improve the river by forming a Commission of Sewers, which had rights to compel landowners to cleanse the river, and if necessary, levy a property tax to pay for maintenance expenses. Most Commissions of Sewers suffered from the same problems as parishes. They had no authority to tax inhabitants other than those who were adjacent to the river, and they could not purchase land or divert the path of the river (Willan, 1964).

⁴ For parish road provision see Webb and Webb (1913), Jackman (1916), Albert (1972), and Pawson (1977).

There were a series of major changes in the provision of roads and rivers during the seventeenth century. Parliament and the King began to reduce the authority of parishes and Commissions of Sewers by issuing patents or by passing acts giving individuals the right to levy tolls and undertake improvements on a specific road or river. The patents and acts originated from private citizens and local governments who submitted petitions, or had a Member of Parliament introduce a bill on their behalf.

Before 1640 the Crown was more active in issuing patents to improve rivers, but starting in 1661 most rights were issued through acts of Parliament. A total of 70 acts were passed between 1661 and 1749 dealing with rights to improve specific rivers. Figure 1 shows T. S. Willan's map of all rivers that were affected by acts between 1600 and 1750. The result of this legislation was an extensive river network connecting major cities with the coast.

All rights to improve roads were issued through acts rather than patents. They became known as turnpike acts because they authorized the erection of a gate to collect tolls. Between 1663 and 1749 a total of 260 turnpike acts were passed dealing with rights to improve specific roads. All acts except two were passed after 1689. Figure 2 shows Eric Pawson's map of all roads affected by turnpike acts before 1750. The network was not yet complete in 1750, but the main routes between London and many provincial cities were already maintained by turnpikes.

2. Data

In this section, I provide a brief overview of the data sources on river and road authorities. The Parliamentary Archives maintains a website, *Portcullis*, which contains the title of every act of Parliament starting in 1500.⁵ I use the *Portcullis* database to identify all acts which dealt with

⁵ See <http://www.portcullis.parliament.uk/DserveA/> for more details.

individual roads and rivers between 1600 and 1749. The full text of some river acts and road acts are available in *the Statutes of the Realm* (Great Britain, 1963). For other acts, it was necessary to consult private collections, such as the Public Acts series at the William Clark Library in Los Angeles, or the Parliamentary Archives in London. I use the full text of the acts to code regulatory provisions for all river and road authorities created between 1600 and 1749. For example, I identify the individuals with the right to improve roads and rivers, the length of their term, and the maximum tolls that could be charged.

I also use the index of the *Journals of the House of Commons* and the *Journals of the House of Lords* to identify all bills introduced in Parliament dealing with specific roads and rivers. Road and river bills started either through a petition from an individual or an order by the House of Commons or the House of Lords. The bills were assigned to several Members of Parliament who issued a report and wrote the first draft. Next the bill moved through various stages before the final vote, amendments with the other House, and royal assent. Some bills failed to become acts because they were dropped at some stage in this process, but often they were reintroduced in subsequent sessions and became acts.⁶

I entered the details of every road or river bill introduced in Parliament between 1600 and 1749 into a spreadsheet, including petitions, orders, committee reports, votes, and amendments. The petitions are particularly useful because they identify groups that favored or opposed the bill. The petitions also identify the aims of a bill. Some attempted to obtain rights to improve the navigation of a river or to better maintain and improve a road. Others proposed to amend the rights of an existing authority. Based on their description, I separate all bills that proposed to improve a road or river from bills that amended existing rights. Table 1 shows the totals for each

⁶ See Hoppit (1997) for more details on the failure of legislation, and the process of passing acts.

type and the percentage that became acts in the session they were introduced. Over half of all road and river bills proposed improvements. The percentage that became acts was similar regardless of whether the bill proposed an improvement, but it was much lower for river bills compared to roads.

I also use secondary sources for information on river patents. T.S. Willan (1964) and Dorothy Summers (1973) identify eight patents granted to river promoters. Their discussion indicates that river patents provided a similar set of rights as river acts. They granted individuals indefinite or long-term rights to collect tolls and improve rivers. Patents were different, however, from acts because they were granted by the Crown and they could be revised by the King or his agents in the Privy Council.

Below I use the number of patents and parliamentary bills to improve roads and rivers as a measure of the demand for rights to improve roads and rivers issued by Parliament or the Crown. The demand for rights to improve a road or river necessarily implies there was some demand for investment in roads and rivers because a promoter would not go through the effort unless they expected to earn profits or higher property-values from cheap transport. However, it was very difficult to improve a road or river without the rights-of-way and authority to collect tolls, which could only be obtained through a patent or an act. Therefore the number of bills and patents also provides a close measure of the number of river or road projects that promoters wanted to undertake.

3. Political Institutions and the Demand for Improvement Rights, 1600-1749

Theory suggests that the demand for rights to improve roads and rivers will be low if political institutions imply that regulators cannot commit to upholding the property rights of undertakers.

A corollary hypothesis suggests that the demand for rights should increase following a change in political institutions that increases regulatory commitment. In this section, I test this second hypothesis by examining whether the number of parliamentary bills and patents to improve roads and rivers changed following major political events, like the Civil War, the Restoration, and the Glorious Revolution.

Figure 3 shows the number of proposals (i.e. bills + patents) to improve rivers, along with dates of major political events. Overall there appears to be a connection between changes in the demand for rights and major political events. Prior to 1661 there were few proposals to improve rivers, but after the Restoration the number of proposals increased significantly. The momentum did not last though as proposals declined in the late 1670s and 1680s. Proposals to improve rivers increased once again after the Glorious Revolution of 1689, but this time they remained at a higher level throughout the 1700s and 1710s. The average number of river improvement bills per year was 2.00 between 1689 and 1719, compared with an average of 1.04 between 1661 and 1688.

Figure 4 show the number of proposals to improve roads, along with the dates of major political events. Once again there appears to be strong relationship between changes in the demand for rights and major political changes. In this case, the Restoration had a small and temporary impact, whereas the Glorious Revolution is strongly connected with the increase in road proposals. The average number of road improvement bills per year was 1.58 between 1689 and 1719, compared with an average of 0.21 between 1661 and 1688.⁷

⁷ The data on river and road improvements acts show a similar connection with major political changes. The average number of river improvement acts was 0.74 between 1689 and 1719, compared with an average of 0.36 between 1661 and 1668. One road improvement act was passed between 1661 and 1689, compared with 34 acts between 1689 and 1719.

The preceding evidence suggests that the Glorious revolution permanently increased the demand for rights to improve roads and rivers. However, there could be some other change in the economic environment after 1689 that can explain the increase in demand. One candidate is interest rates, but there is no evidence for any substantial drop between the 1680s and the 1690s. Table 2 shows the average return on charity assets by decade along with the number of proposals. The return on charity assets proxies for interest rates because it represents the average return on alternative investments like land (see Clark, 1996). Interest rates were trending downwards throughout the seventeenth century, and there was only a marginal decrease between the 1680s and the 1690s. Moreover, there was a rise in interest rates between the 1650s and the 1660s when the number of proposals temporarily increased following the Restoration.

Another possibility is that faster economic growth can explain the increase in river and road proposals after 1689. Data on real wages and population shows an upward trend in growth throughout the seventeenth century, but there was little change between the 1680s and 1690s. Clark's (2005) real wage index for craftsman falls from 53.6 in the 1680s to 50.2 in the 1690s. Wrigley and Schofield's (1981) estimates indicate that population fell from 5.00 million in the 1670s to 4.87 million in the 1680s, and 4.95 million in the 1690s.

The point is not that economic growth and interest rates had no influence on the demand for rights. On the contrary, increases in population and real wages, along with lower interest rates created a demand for road and river improvements starting in the mid-seventeenth century. However, the data indicate that the demand for rights to undertake these improvements could not be regularly satisfied until after the Glorious Revolution.

4. Political Institutions and Regulatory Commitment, 1600-1750

In this section, I examine the regulation of road and river authorities across 4 periods: 1603-1642, 1643-1660, 1661-1688, and 1689-1749. I document that the rights of road and river improvement authorities became more secure after 1689, as long as they were successful in improving their road or river. I also argue that the elimination of uncertainty over who controlled regulation—the crown or Parliament—as well as the emergence of norms and the veto power of the House of Lords increased regulatory commitment, and ultimately increased the demand for rights.

4.1. 1603-1642: Regulation under the early Stuarts

The reign of King James I and King Charles I witnessed unprecedented conflict between the Crown and Parliament in England. These conflicts had an important effect because they created uncertainty about who was the ultimate regulatory authority, and whether the Crown or Parliament would enforce the regulations initiated by the other. Table 3 shows all proposals to improve rivers between 1604 and 1642. Before 1625 most river proposals were introduced in Parliament, but between 1625 and 1641 most promoters turned to patents. Parliamentary proposals for road improvements also declined after 1625. In this case though, there is no evidence that patents were increasingly used for roads.

The shift to river patents in the 1630s coincided with King Charles I attempt to expand the authority of the Crown, and diminish the power of Parliament. River patents increased the Crown's ability to extract favors from various interest groups. More importantly, it gave the Crown a new source of tax revenue. One of the first patents was awarded to Arnold Spencer in 1627, in which he could collect tolls for 80 years on all rivers that he was able to improve by 1638 (Willan, 1964 p. 26). In return, Spencer had to pay the King a fee of 5 pounds per annum

for every river he improved. Charles I tried to capture a larger portion of the surplus in the 1634 patent granted to Thomas Skipworth for improving the river Soar. Skipworth was required to pay a tenth of the profits to the King, but he was unsuccessful in completing the project because of a lack of funding (Willan, 1964 p. 26). Charles I awarded at least three other river patents in the late 1630s which also required annual payments to the crown.

A 1623 bill to improve highways near Biggleswade illustrates how the Crown also tried to expand its control over road improvements. It proposed to give the Lord Chancellor and the Lord Treasurer the right to appoint groups who could levy tolls along the Biggleswade highway, one of the busy routes between London and northern England. The Lord Chancellor and the Lord Treasurer were two of the King's closest advisors, and therefore, the bill would have given the Crown substantial authority over the collection of tolls. The bill failed to become law apparently because it was linked with parliamentary opposition to monopolies (Emission, 1934).

Parliament had good reason to oppose regulations that increased the crown's tax revenues and expanded its influence. Charles I was trying to establish an absolutist regime similar to France or Spain, and river patents contributed to this goal. Promoters thus faced substantial uncertainty in that Parliament was unlikely to enforce these patents or other regulations if they regained power. These concerns turned out to be warranted because Parliament did not recognize the rights vested in river patents during the interregnum, and they remained in an ambiguous standing until after the Glorious Revolution.

There was also uncertainty about whether Parliament or the Crown would alter their own regulations arbitrarily. Parliament showed a willingness to abruptly change the rights it granted to the undertakers for the River Thames. The Thames act of 1606 gave the Lord Chancellor the right to appoint 18 commissioners to oversee the improvement of the river between Oxford and

London. One commissioner was to come from Oxford University, one from the city of Oxford, and four from each of the counties of Oxfordshire, Berkshire, Wiltshire, and Gloucestershire. The commissioners had the right to improve the river, including the authority to force property owners to sell their land and assess taxes in their respective districts. These rights were also deemed as permanent, because there was no expiration date for the act.

In 1623, Parliament passing a new act for the Thames, repealing the 1606 act. It had a similar structure except it vested authority only in the commissioners from Oxford, and thus voided the authority of commissioners in Berkshire, Wiltshire, and Gloucestershire. It is not clear why there was a change, but one can presume that commissioners in the other 3 counties would have preferred to retain some control, as it allowed them to levy taxes and assess damages on property owners in their county.

Decisions in the Privy Council regarding the rights of patent holders for the Great Ouse and the river Lark illustrate that the Crown was willing to alter its regulations in response to pressures from interest groups. In 1626, John Jackson owned the patent for the Great Ouse between St. Neots and St. Ives, which specified that he had the right to levy at most 3 pence per ton. Inhabitants in St. Neots, Huntingdon, Godmanchester, and St. Ives complained to the Privy Council that the rates were too high. The President of the Privy Council, the Earl of Manchester, then ordered that the maximum toll be reduced to 2.5 pence per ton.⁸ Later, in 1635, Henry Lambe had a patent to improve the Lark between Bury St. Edmond and the Great Ouse. Lambe had begun the project but faced resistance from local mill-owners who claimed they were being adversely affected by the project. The King appointed a body of commissioners in 1636 to investigate the problems. Among other onerous conditions, the commission recommended that

⁸ See Summers (1973) pp. 48-49 for a discussion of this particular case.

that no tolls be levied on the river between the town of Mildenhall and the river Ouse, which represented over half of the entire route originally granted to Lambe. In 1638, the crown agreed with the commissioners and decreed that the river remain toll free between Mildenhall and the Ouse. This arbitrary change in the regulatory rules must have reduced the profits for Lambe because he could not collect tolls along much of the river he had already begun to improve.⁹

Overall, there were two interrelated problems that limited regulatory commitment before 1642. First, there was uncertainty about whether the Crown or Parliament might change their own regulatory rules in response to pressures by interest groups. Second, conflicts between the Crown and Parliament made it unclear who was the regulatory authority and whether each would uphold rights granted by the other.

4.2. 1643-1660: Regulation in the Interregnum

There was great political instability between 1643 and 1648 as the Crown fought with parliamentary forces on the battlefield. Under such circumstances, it is not surprising there were few proposals to improve roads or rivers. No one knew who would prevail in the Civil War and what type of laws would be upheld afterwards.

The elimination of the Crown after the Civil War created uncertainty regarding the status of river patents issued by Kings James I and Charles I. Several patent holders did not complete their works and it is not known what happened to their rights (i.e. the Avon between Bath and Bristol, the Soar, the Lark). In two cases, there is evidence that patent holders undertook significant investments, before losing their rights because of financial distress. Arnold Spencer supposedly invested 10,000 pounds in the Great Ouse between St. Neot's and St. Ives. He died heavily indebted in 1655 and his creditors subsequently took over the river (Summers, 1970).

⁹ See Willan (1964) pp.27-28 for a discussion of this particular case.

William Sandys invested 20,000-30,000 pounds in the river Avon in Warwickshire, before his rights passed to his creditors.

There is also some evidence suggesting that patent holders lost their rights. Arnold Spencer was also granted patent for the Great Ouse between Bedford and St. Neots. Spencer's rights do not appear to have been maintained because the city of Bedford controlled of the navigation in the 1650s. Spencer's rights were officially eliminated by an act in 1665 that gave Sir Humphrey Bennet and others the rights to collect tolls on the Great Ouse near Bedford (Summers, 1970). In another case, the heirs of John Mallet had their patent for the river Tone renewed by King Charles II in 1683. It is not known why they renewed their patent, but one possibility is that their rights were eliminated after the Civil War.

Although the Civil War created uncertainty about patents, it seemingly ended the uncertainty about whether Parliament was the ultimate regulatory authority, and as a result, road and river promoters might have been encouraged that their rights would be more secure. It was in this context that the House of Commons passed an act in 1651 authorizing a group of individuals to levy tolls and improve the river Wey near London. The regulatory structure of this act was very similar to those that followed. It gave the Mayor of Guildford, along with James Pitson, John Howe, John Waltham, and Richard Scotcher rights to make the river navigable. The undertakers could charge no more than 4 pence for a load of goods, and no more than 12 pence per passenger.¹⁰

The river Wey act was the first act of its kind in the 1600s. It was also quite successful as the undertakers invested 15,000 pounds in the making the river navigable. One of the undertakers, James Pitson, also claimed that the profits were "quietly and peaceably enjoyed by the

¹⁰ A text of the act is available in *Acts and Ordinances of the Interregnum, 1642-1660* (1911), pp. 514-17.

makers.”¹¹ Despite the apparent success of the river Wey act, it was not duplicated during the rest of the 1650s. Table 4 shows all bills to improve rivers and roads between 1642 and 1660. In 1651, there was one proposal in Parliament to improve a highway around London, but it did not become an act. In 1656, another act was passed to improve the river Ouse near York, but there is no evidence that it was implemented. In 1658 and 1659, there were 2 proposals for improving the river Nene and the river Thames, but both failed to become acts.

Increasing tensions between Oliver Cromwell and the House of Commons is likely to be the key factor behind the decline of river bills in the 1650s. In 1653, Cromwell dissolved the Parliament that had sat since 1649 on the grounds they “would never answer those ends which God, his people, and the Whole nation expected from them.” Cromwell then wrote a new constitution stating that government was now by “a single person and a Parliament.”¹² During the late 1650s, Cromwell increasingly acted like a king, and encroached upon the rights of the Commons. There is also evidence that some individuals sought to obtain a patent from Cromwell for improving the river Salwerpe in 1655.¹³ As a result, there was uncertainty once again regarding who was the regulatory authority, and whether the rights granted by acts would continue to be enforced.

4.3. 1661-1688: Regulation after the Restoration

¹¹ Details on the petition are available in the Parliamentary Archives, HO/PO/JO/10/1/307.

¹² Cromwell’s views are quoted in Seel and Smith (2001), pp. 62-67.

¹³ Jim Shead (2007) states that Andrew Yarranton and Captian offered to seek letters patent from the Lord Protector to make the river navigable. [Yarranton] made an agreement with Droitwich corporation which allotted land to him for 21 years as payment for this. No further action was taken on this proposal.

The Restoration of 1661 was an attempt to reinstate the old political system—specifically government by the Crown, the Commons, and the Lords. Initially, however, it was very unclear how the three heads would govern and what type of policies would be introduced. Prior to 1661, Parliament granted rights to individuals through acts, while the Crown or the Protector did the same through patents. How would rights be granted following the Restoration?

Two competing models emerged in the early 1660s, one proposed to eliminate Parliament's authority in issuing rights, and the other expanded Parliament's authority. A bill in 1662 proposed a procedure by which any person or persons could improve any river in England and Wales.¹⁴ The communities affected by the river improvement could nominate individuals to serve on a commission that would mediate disputes between undertakers and property-owners. The commissioners would then be approved by the Lord Chancellor. If enacted, this bill would have effectively removed Parliament from the process of issuing rights. It would have also expanded connections between local groups and the king's ministers, like the Lord Chancellor.

The bill passed through the House of Lords, but failed in the House of Commons. There are no records of the debate in the Commons surrounding this bill, but it is likely that many Members did not favor any proposal which reduced the authority of Parliament. Instead the House of Commons wanted to encourage river and road bills in Parliament. Between 1661 and 1670, 24 bills were introduced in the Commons to improve rivers and 6 bills were introduced to improve roads (see table 5). The years 1664 and 1665 were particularly active with 10 river bills and 2 road bills being introduced.

The increase in road and river promotions during the early 1660s was partly stimulated by the increased power of Parliament. The Restoration left the crown with fewer instruments of

¹⁴ A draft of the bill is in the Parliamentary Archives, HL/PO/JO/10/1/311.

coercion, and made it financially dependent on Parliament. Therefore, it might have appeared to potential undertakers that Parliament had become the main regulatory authority, and that the crown could not interfere with acts of Parliament. However, only 9 of the river proposals and 1 road proposal became acts from 1661 to 1670, and many were not successfully implemented. Moreover, the number of proposals began to decrease in the 1670s, and by 1680 the earlier momentum all but ceased. What happened?

The most likely explanation is that proposals declined because there was greater uncertainty about whether the Crown *or* Parliament could commit to uphold the rights of road and river undertakers. The reinstatement proceedings surrounding the river Wey act illustrate this lack of commitment. The Restoration settlement stipulated that all acts passed by Parliament between 1642 and 1660 were nullified. This implied that the rights vested in the 1651 act to improve the river Wey and the 1656 act to improve the Ouse in Yorkshire were also nullified. The undertakers for the Ouse do not try to get their rights reinstated, but two of the undertakers for the river Wey, Windsor Sandys and James Pitson, tried to get an act reinstating their rights in 1663. In a petition, the undertakers claimed that several individuals illegally purchased land in their name and then demanded “the whole revenue of the river” as compensation for their property. The undertakers protested, but apparently were unable to enforce their rights because of their tenuous legal standing following the nullification of their act 1661. Their bill failed in Parliament, even though Sandys and Pitson appear to have invested 15,000 pounds in the river during 1660s.¹⁵

In 1664, King Charles II named a new conservator for the river Wey, John Radycliffe, who was to have rights for 30 years. Apparently the King was upset that the original undertakers used

¹⁵ Details on the petition are available in the Parliamentary Archives, HL/PO/JO/10/1/317.

materials from his father's confiscated estate, and wanted to grant rights to someone else. In 1664, Radycliffe attempted to get an act of Parliament to strengthen his new claim, but it also failed to pass.¹⁶ The authority to improve the River Wey was not resolved until a 1670 act named Sir Adam Browne, Sir Edward Ehurland, Sir Joseph Sholdon, Knight Henry Hilliard, Arthur Ouslowe, and George Woodruff as the undertakers with sole rights to the profits. It appears that no compensation was offered to the original undertakers, implying that their investments were effectively expropriated.

There was another case in the 1660s which illustrates the potential for expropriation when political circumstances changed. William Sandys was granted a patent to improve the river Avon in 1638, but his rights later passed to one of his financiers, William Say. Say was convicted of treason after the Restoration and his property was confiscated. Rights in the river Avon passed to James Duke of York, the brother of King Charles II. Shortly thereafter, rights to collect tolls on the river Avon were reinstated as a provision in the 1662 act for improving the Rivers Stour and Salwerpe. James then sold his rights to Lord Windsor, profiting handsomely.¹⁷

The proceedings surrounding the river Wey and the river Avon did not inspire confidence that the Crown or Parliament would enforce the property rights of river promoters. This uncertainty was magnified by the growing tensions between the Crown and Parliament in the late 1670s. Charles II and James II called Parliament into session only 3 times between 1678 and 1688, and the sessions were roused by religious conflict. There is also evidence of a reemergence of river patents. In 1683, Charles II granted a patent reinstating the rights of John

¹⁶ Details on the petition are available in the Parliamentary archives, HL/PO/JO/10/1/319.

¹⁷ This case is described in the Wikipedia (2007) entry for Andrew Yarranton, which is based on the Biographical Dictionary of Civil Engineers.

Mallet's heirs in the river Tone.¹⁸ The reemergence of patents, along with conflict between Charles II and Parliament, suggest there was still uncertainty about whether Parliament was the ultimate regulatory authority.

Table 6 provides a summary of all acts and decrees that voided or diminished rights to improve rivers between 1603 and 1688. The seven identified cases imply that 63% of all authorities created before 1661 had their rights voided or diminished. If we include all patents holders who had difficulties enforcing their rights during the Interregnum, then 100% of all authorities created before 1661 had their rights voided or diminished. None of the authorities created by acts in the 1660s and 1670s had their rights changed, which implies that at least 33% of all authorities before 1688 had their rights voided or diminished. The apparent increase in security after 1661 is questionable, however, because river and road promoters had to wonder whether acts of Parliament would be upheld if Charles II and James II increased their power.

4.4. 1689-1749: Regulation after the Glorious Revolution

The Glorious Revolution ushered in a number of changes in England's political institutions. Those changes which most affected the security of rights to improve roads and rivers were the emergence of Parliament as the main political authority, and the establishment of checks and balances between the Commons and Lords. The emergence of Parliament as the ultimate regulator was a direct consequence of the Revolutionary Settlement. The principles of the settlement are listed in the English Bill of rights of 1689 (see Holmes 1993). Article 2

¹⁸ Information on the original patent comes from Willan (1964) p. 26. Its reinstatement comes from the preamble to 'An Act for making and keeping the River Tone navigable from Bridgwater to Taunton in the County of Somerset, Statutes of the Realm: volume 7: 1695-1701.

establishes that the Crown could not dispense with laws or the execution of laws, which included river and road acts. Article 4 states that Parliament had to consent to all taxation, including tolls levied by undertakers or trustees. Lastly, article 13 states that Parliament should meet frequently, which would allow individuals to obtain road and river acts more regularly.

Beyond enunciating such principles as the Bill of Rights, Parliament also ensured that the king's ministers, like the Lord Chancellor, would not be involved in road and river acts. The Lord Chancellor played an important role in many river and road proposals before 1688, and his authority became an issue in a river proposal in 1691 dealing with the river Nene. It proposed to give the Lord Chancellor the right to appoint undertakers to improve the river, but it was not passed.¹⁹ It marked the last attempt to give the Lord Chancellor the authority to nominate undertakers. In every road or river act after 1691, Parliament either directly named the undertakers, or it gave local commissioners the right to appoint undertakers. The Crown and its ministers were permanently shut-out of the process.

The Glorious Revolution established Parliament's control over regulation, but this was not sufficient for regulatory commitment. As the new sovereign, Parliament could pass an act at any time renegeing on the rights of undertakers. I use the information in river acts to assess whether in fact Parliament voided or diminished the rights of river undertakers created since 1661. I do the same for all acts affecting road authorities created between 1661 and 1709. Tables 7 and 8 summarize the findings, while tables 9 and 10 in the appendix provide the details. The data indicate that three acts voided the rights of undertakers, while six acts diminished rights by reducing the maximum tolls that could be charged. The data also indicate that rights were generally more secure after 1689. 6% of river authorities and 7% of road authorities had their

¹⁹ A draft of the act is available in the Parliamentary archives, HL/PO/JO/10/1/452/646.

rights voided before 1689. These figures are much lower than the percentage of river authorities who had their rights voided before 1689. Several road and river authorities had their tolls reduced, but even after including these cases, the likelihood of rights being voided or diminished was lower after 1689.

The three cases where rights were voided were all similar in that undertakers appear to have been negligent. This suggests that Parliament only reneged on undertakers' rights when they were not successful in improving their road or river. The Wye and Lugg act of 1695 provides a clear indication that Parliament did not commit to protect the rights of negligent undertakers. The Sandys family received the right to collect tolls and improve the Wye and Lugg rivers by an act in 1662. In 1695, Parliament passed another act voiding their rights and giving new authority to the Bishop of Hereford and several other dignitaries in the area. The opening passage of the act states that "Sir William Sandys, Windsor Sandys, and Henry Sandys never did any thing towards the making of the said River of Lugg navigable. And what they did towards the said Work upon the said River of Wye was performed so slightly that most of the Locks and Passages by them made did in a very few years fall utterly to decay and ruin." The act then declares that the river should be toll-free in order that the "benefits and advantages intended to the inhabitants of the County of Hereford by the said act may not be totally frustrated by the neglect or failure of the said former Undertakers." Parliament followed a similar course in 1726 when it passed an act voiding the rights of the bishop of Hereford and local dignitaries who were given the right to improve the Wye and Lugg rivers in 1695. A committee investigating the bill reported that no work was done to improve the Lugg, and there were still many obstructions on the Wye.²⁰

²⁰ See the Journals of the House of Commons, 3.3.1726.

The Fornhill to Stony Stratford case provides more evidence that Parliament would void undertakers' rights if they were negligent. The trustees for the Fornhill to Stony Stratford road borrowed more than 7000 pounds in 1707 and 1708 to improve the road. The creditors, however, claim to have been misinformed regarding the expected revenues from the tolls, and requested in 1709 that a new act extend the term and increase the tolls.²¹ A new act was passed in 1709 extending the term, but the tolls were not increased. It also included a provision that the creditors could take receivership of the tolls if the trustees had not repaid their debts by 1711. Apparently, the trustees were unable to borrow and the creditors took over the tolls.²² In 1716, Parliament tried to clarify the situation by passing an act that vested authority in the trustees from the 1709 act and another group appointed by the Justices of the Peace for Buckinghamshire.

The 1716 act was not amended for its entire term of 23 years, but once it was set to expire, Parliament decided that it would not renew the rights of the existing trustees for the Fornhill to Stony Stratford road. In 1736, the trustees submitted a petition for an extension of their rights, but it failed to pass and in 1739 their authority ended.²³ In 1740, a new act was passed naming a replacement body of trustees. In the petition for the new bill, the inhabitants of Buckinghamshire described the road as being 'ruined.'²⁴ This sentiment was affirmed by the Member heading the committee for the bill.

The river Dee act of 1743 also indicates that by reducing the maximum tolls, Parliament did not arbitrarily diminishing the rights of undertakers. The act was initiated by merchants and traders in Chester who petitioned to reduce the maximum tolls that could be charged by the

²¹ Ibid, 15.02.1709.

²² Ibid, 21.3.1737.

²³ Ibid, 16.3.1736.

²⁴ Ibid, 6.12.1739.

Company of Proprietors for the River Dee. Surprisingly, the company consented to the reduction in their tolls, even though it could diminish profits. In a petition to Parliament the company stated that “the mayor and citizens, and merchants and traders of the city of Chester, being of opinion, that the tonnage rates, granted to the said Undertakers by the first-mentioned Act, are too high, and a discouragement to the trade of the said city. The [company], at their request, have consented that the same may, by authority of Parliament, be repealed; and that, in lieu thereof, other and less tonnage or keelage rates may be granted to the [company].”²⁵ Parliament passed an act in 1743 reducing the tolls that the Company could charge. The fact that the company indicated its approval suggests that Parliament would not have reduced the tolls without its consent.

Overall it appears that Parliament generally maintained the rights of undertakers provided they were successful in improving their road or river. A key question is how did Parliament commit to protecting their rights? The House of Commons and the House of Lords might be tempted to void the rights of undertakers and grant them to another group who was willing to pay a high bribe. The Commons might also be tempted to reduce the maximum tolls because they could gain votes from communities that used the rivers or roads. Thus there needed to be formal and informal institutions within Parliament that prevented it from succumbing to these temptations.

The mechanism that came to protect undertakers’ rights was based on a set of norms which specified when the rights of undertakers could not be violated, and the veto power of the House of Lords. The evidence above suggests that Parliament believed that the rights of undertakers should be upheld as long as they made significant improvements and continued proper

²⁵ Ibid, 31.1.1743.

maintenance. This norm of protection did not have to extend to negligent undertakers because Members of Parliament believed they were corrupt or incompetent, and therefore, did not deserve their rights. A violation of the norm was costly to Members because it went against an accepted belief that property rights should be protected. The cost of violating these norms could be sufficiently great that the Lords and the Commons were willing to forgo the short-run benefits of violating undertakers' rights.

Norms could deter the Commons and Lords from voiding undertakers' rights, but the costs of violating accepted beliefs may not have been sufficient in all cases. In particular, the Commons may still have an incentive to violate rights because they stood to gain votes when they lowered tolls for communities using the road or river. The Lords did not face this pressure because they were not elected. Another factor was the difference in wealth between the Commons and Lords. Some Members of the Commons were quite wealthy, but others held marginal amounts of wealth.²⁶ The lower wealth of the Commons was potentially important because it reduced the costs from violating the norm that property rights should be maintained. Moreover, lower wealth would imply that the Commons was more influenced by bribes from groups hoping to obtain rights to collect tolls. The veto power of the Lords was therefore crucial because they had a greater incentive to reject any bill that violated the property rights of undertakers.

The decision to enforce property rights can be described through a game between the Commons and Lords. Figure 5 shows the sequence of play and the payoffs for the Commons and the Lords when the undertaker has already made some investments in improving their road

²⁶ Cruickshanks, Handley and Hayton (2002) provide an excellent data source on Members of the House of Commons from 1690-1715. Ongoing research using these sources shows that more than 10% of the Members heading committees for river bills had financial problems and over 15% obtained their wealth through marriage rather than independently. This suggests that the Commons were not unilaterally wealthy.

and river. The game begins when some group introduces a bill in the Commons to void or substantially reduce the rights of an undertaker. The Commons can reject or pass the bill. If the Commons accepts, then the Lords choose whether to accept or reject the bill. If the Lords reject then they receive a payoff of 0, which is their normalized payoff when the property rights of undertakers are maintained. If the Lords accept the bill, then they receive a payoff of $\delta^L - \alpha^L$, where δ^L is the political and monetary gains for the Lords when they pass an act that violates the property rights of undertakers and α^L are the cost for the Lords of violating the norm that undertakers rights should be protected. The Lords will choose to reject the bill if and only if $\delta^L - \alpha^L$ is negative; that is when the political and monetary gains of violating rights are less than the cost of violating norms of protection.

The Commons have a similar payoff structure, but the parameters are different. If the Commons rejects the bill in the first stage then they receive a payoff of 0, which is their normalized payoff when the property rights of undertakers are maintained. If the Commons passes the bill, but the Lords reject, then the Commons receives a payoff of $-\varepsilon$, where ε reflects the costs associated with writing a bill that was eventually rejected. If the Commons passes the bill and the Lords accept, then the Commons receives a payoff of $\delta^C - \alpha^C$, where δ^C and α^C are defined as before. The key difference is that δ^C is assumed to be greater than δ^L because the Commons faced electoral pressures, while α^C is assumed to be smaller than α^L because the Commons owned less property, and therefore it was less costly to violate norms protecting property. Similar to the Lords, the Commons will reject the bill if and only if $\delta^C - \alpha^C$ is negative;

There are two equilibriums in the enforcement game. In one the Commons will reject all bills that propose to void or change the rights of undertakers. This equilibrium will occur under two sets of parameter values. First, if $\delta^C - \alpha^C$ is negative, then the Commons will reject because

the costs of violating norms are too great relative to their benefits from bribes and additional votes. Second, if $\delta^C - \alpha^C$ is positive and $\delta^L - \alpha^L$ is positive then the Commons would like to pass the bill because the benefits of votes and bribes are larger than the costs of violating norms, but they anticipate that the Lords will reject and therefore they also reject to avoid the costs of writing a failed bill. In the second equilibrium, the Commons and the Lords will accept the bill and renege on the rights of undertakers. This will occur if $\delta^C - \alpha^C$ and $\delta^L - \alpha^L$ are both negative, in which case the benefits of bribes and votes are greater than the cost of violating norms for both Houses. The frequency of each equilibrium depends on the parameter values, however, the assumption that the Lords experience higher costs and lower benefits from violating norms of protection implies that bills are more likely to be rejected, and property rights maintained.

The decision whether to void the rights of negligent undertakers can also be modeled using a two-stage game. I do not describe the detail here to save space. The main point is that the Lords and Commons both had an incentive to void the rights of negligent promoters because there were political and monetary gains from appeasing communities, and there were no costs from violating norms because Members believed that negligent undertakers did not deserve their rights.

There are several pieces of evidence which support the argument that norms and the veto power of the Lords helped to protect the property rights of undertakers after 1689. Perhaps the best evidence concerns a bill in 1693 that proposed to void the rights of undertakers for the river Salwerpe. It shows that the Commons were willing to renege on undertakers' rights and that the Lords were willing to veto such bills. The model predicts that the Commons will never pass a bill that is eventually rejected by the Lords. However, it is possible that the Commons could

make a mistake, or they were learning about the strategies of the Lords. Such out-of-equilibrium cases are important because they reveal the significance of the Lord's veto power.

The Salwerpe river was originally affected by an act in 1662, which gave the Earl of Bristol and two others the right to improve the river Salwerpe. The Earl of Bristol's rights were sold to Sir Thomas Baldwyn who proceeded to invest more than 6000 pounds in the river Salwerpe. In 1693, a new bill was introduced in the Commons that would give the Earl of Shrewsbury and Lord Coventry sole rights to improve the river. Sir Thomas Baldwyn's son submitted a petition to the Commons opposing the bill on the grounds that his father and the Earl of Plymouth had invested in the river and that the proposed bill "tends to make void the said Act, and to take away all the works and materials done in pursuance thereof."²⁷ Baldwyn's petition did not prevent the bill from passing through the House of Commons on March 9, 1693.

In mid-March, the Lords began deliberations on the river Salwerpe bill. Sir Thomas Baldwyn submitted a petition to the Lords asking that they "not make void the former act or meddle with his rights." Baldwyn also suggested there were broader implications from voiding his rights by stating that "it is of dangerous consequence to take away any persons right, purchased under an act of Parliament, without their consent."²⁸ The Lords later dropped the Salwerpe bill and the rights of the Baldwyn family were protected. The veto power of the Lords was clearly important in this case, but it was also significant that Baldwyn suggested there were "dangerous consequences" from violating his rights. In effect, he was suggesting that norms would be violated if the Lords did not reject the bill.

²⁷ Ibid., 10.2.1693.

²⁸ Details on the petition are available in the Parliamentary archives, HL/PO/JO/10/1/455/733.

The river Itchen bill in 1715 provides evidence that the Commons was also willing to reject bills because they violated the norm that undertakers rights should be protected if they improved their road or river. Seven individuals were originally given the right to collect tolls and improve the river Itchen in 1665. In 1714, property owners near the river submitted a petition to the Commons requesting that the act be modified because “it hath not been of effect to answer the ends for which it was made; but becomes a grievance to the petitioners.”²⁹ It is not clear what was proposed, but George Huxley, one of the undertakers of the River Itchin, felt strongly enough to petition against the bill stating that “should it pass, it would not only defeat the petitioners of their right, but utterly destroy the said navigation.”³⁰

Inhabitants in the towns of Andover, Stockbridge, Whitchurch, and Winchester subsequently submitted petitions asking that no amendment act should be passed because the river Itchen was “of great advantage to [their] city and country, by the cheap and safe carriage of all goods and merchandizes.”³¹ The Commons subsequently dropped the bill and chose to maintain the rights of the undertakers. It was of significance that neighboring towns, like Andover, Stockbridge, Whitchurch, and Winchester petitioned against the bill because it provided a signal to the Commons that the undertakers had made investments and were continuing to maintain the river. The commons therefore knew the consequences of siding with property owners and violating the norms of protection for undertaker’s rights.

Overall Parliament proved to be very amicable to undertakers who willing to improve their road or river. The list of amendment acts in the appendix shows that undertakers regularly came

²⁹ See the Journals of the House of Commons, 12.3.1714.

³⁰ Ibid, 14.5.1714.

³¹ Ibid, 31.5.1714, 3.6.1714, 1.6.1714, and 3.6.1714

to Parliament requesting an expansion of their rights. Parliament generally granted these requests as long as they contributed to improvements. For example, the undertakers for the river Wear petitioned for an amendment in 1726 that would allow them to borrow on the security of the tolls rather than their own personal security. The committee reporting on the bill agreed that the undertakers needed the additional rights to finance investment, and the act was subsequently passed.³² In another example, the undertakers for the river Dee petitioned for the right to form a corporation because it would help in raising 4000 pounds to preserve the works on the river. Parliament granted their request by passing an act in 1740 creating the ‘Company of Proprietors of the Undertaking for Recovering and Preserving the Navigation of the River Dee.’³³ It was the second river navigation corporation authorized by Parliament.

5. Conclusion

England made substantial investments in its river and road networks during the eighteenth century. Most of these investments were implemented through acts of Parliament which gave individuals the right to levy tolls and improve a specific road or river. One contributing factor to the success of these acts was their security. Undertakers made investments with the assurance that Parliament would not arbitrarily void or diminish their rights.

In this paper, I argue that the emergence of regulatory commitment was linked with the profound changes in political institutions during the seventeenth century. I show that the demand for rights to improve roads and rivers increased following the Glorious Revolution of 1689. I also argue that two key changes enhanced commitment after 1689 and contributed to the

³² Ibid, 3.3.1726.

³³ Ibid, 18.12.1740.

growth in demand for rights. First, the revolutionary settlement ended uncertainty about whether the Crown or Parliament was the ultimate regulatory authority. Second, there was an emergence of norms, which combined with the veto power of the House of Lords, to prevent Parliament from renegeing on the rights of undertakers.

The findings are of broader interest because they provide evidence that political institutions contributed to the security of property rights in England. They also suggest that greater security contributed to investment, and perhaps the emergence of sustained economic growth in the eighteenth century.

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Appendix

Tables 8 and 9 describe all acts affecting river authorities created between 1689 and 1749, and all road authorities created between 1689 and 1709. I decided to examine road authorities created before 1709 because it was infeasible to collect information on the vast number of road authorities that were created before 1749. The sample of road authorities is very informative though because it covers the first turnpike authorities.

Tables

Table 1: Summary of Road and River Bills, 1600-1749

Period	All Roads Bills	% that became Acts	All River Bills	% that became Acts
1600-1660	5	20%	14	29%
1661-1689	7	29%	29	34%
1690-1699	10	50%	26	30%
1700-1709	21	62%	16	25%
1710-1719	37	81%	21	57%
1720-1729	77	86%	21	66%
1730-1739	68	87%	28	36%
1740-1749	102	84%	15	40%

Period	Bills that proposed to Improve Roads	% that became Acts	Bills that proposed to Improve Rivers	% that became Acts
1600-1660	5	0%	14	29%
1661-1689	6	17%	29	34%
1690-1699	8	40%	26	30%
1700-1709	16	56%	16	25%
1710-1719	25	84%	20	55%
1720-1729	44	86%	13	77%
1730-1739	21	82%	22	36%
1740-1749	46	74%	7	29%

Source: see text.

Table 2: Return on Charity Assets and Proposals to Improve Roads and Rivers

Years	Average return on Charity Assets	Proposals to improve Rivers	Proposals to improve Roads
1600-09	6.03%	3	3
1610-19	5.91%	2	0
1620-29	5.99%	7	1
1630-39	5.77%	5	0
1640-49	5.57%	1	0
1650-59	5.43%	4	1
1660-69	5.51%	18	6
1670-79	5.47%	10	0
1680-89	5.14%	1	0
1690-99	5.00%	26	8
1700-09	4.85%	16	16
1710-19	5.01%	20	25

Source: Return on Charity assets Clark (1996). Proposals see text.

Table 3: Proposals to Improve Rivers and Roads, 1603-1641

<u>Bills to Improve Rivers</u>	<u>Year</u>	<u>Successful in Becoming Act of Parliament?</u>
Lea	1604	No
Avon	1605	No
Thames	1606	Yes
Avon, Bath to Bristol	1620	No
Ouse, near York	1620	No
Wey	1620	No
Thames (repealed 1606 act)	1623	Yes
Aire and Calder	1625	No
Medway	1628	No
Wye	1640	No
<u>Patents to Improve Rivers</u>		
Great Ouse, St. Neots to St. Ives	1617	
Avon, Bath to Bristol	1620	
Great Ouse, Bedford to St. Neots	1627	
Soar, Leceister to the River Trent	1634	
Lark, Bury to the River Ouse	1635	
Avon, near Warwickshire	1636	
Tone, Bridgewater to Ham Mills	1638	
Stour in Essex	1638	
<u>Bills to Improve Roads</u>		
Nonsuch to Talworth, in Surrey	1606	Yes
All highways Sussex, Surrey, and Kent	1607	No
Biggleswade in Bedford	1609	No
Biggleswade in Bedford	1622	No

Source: see text.

Table 4: Proposals to Improve Roads and Rivers, 1642-1660

<u>Bills to Improve Rivers</u>	<u>Year</u>	<u>Successful in Becoming Act of Parliament?</u>
Wey	1651	Yes
Ouse, near York	1656	Yes
Nene [Nyne]	1657	No
Thames	1659	No
<u>Bills to Improve Roads</u>		
Around London	1651	No

Source: see text.

Table 5: Proposals to Improve Roads and Rivers, 1661-1688

Bills to Improve Rivers	Year	Successful in Becoming Act of Parliament?	Successfully Completed before 1688?
Stower and Salwerp	1661	Yes	No
London to Bristol, Salisbury to Christ Church, Yarmouth to York	1662	No	
Wye and Lugg	1662	Yes	No
Wey	1662	No	
Ouse (Bedford)	1663	No	
Mersey and Weaver	1663	No	
Avon, Sarum to Christ-Church	1664	Yes	No
Cornwall Rivers	1664	No	
Darwent	1664	No	
Rivers from Bristol to London	1664	No	
Rivers from Bristol to London	1664	No	
Wey	1664	No	
Bristowe Causey, in Surrey	1665	Yes	Yes
Medway	1665	Yes	No
Itchen, Great Ouse (Bedford to St. Neots), Mole	1665	Yes	Yes
Wey	1665	No	
Chester	1669	No	
Wey	1669	No	
Brandon and Waveney	1670	Yes	Yes
Chester	1670	No	
Wey	1670	Yes	Yes
Trent	1670	Yes	No
Weaver	1670	No	
Tone, Bridgewater to Taunton	1673	No	
Darwent (Derby)	1675	No	
Darwent (Derby)	1677	No	
Vale (Cornwall)	1678	No	
Vale (Cornwall)	1678	Yes	Yes
Wye and Lugg	1685	No	
<u>Bills to Improve Roads</u>			
Standon Road	1661	No	
Watlingstreet Road	1663	No	
Standon Road	1663	No	
Cambridge Road	1663	Yes	No
London to Chester	1664	No	
Bedford Roads	1664	No	

Source: see text.

Table 6: Acts or Decrees voided or Diminished Rights of River Undertakers: 1603-1688

River Act or Decree	Year Rights are known to be voided or Changed
Thames Some Undertakers voided by new act	1623
Great Ouse (St. Neots to St. Ives) Maximum tolls reduced by decree from Privy Council	1626
Lark Route cut in half by decree from King	1638
Avon (Warwickshire) Undertakers rights voided because of Treason	1661
Ouse (Yorkshire) Undertakers rights voided by Restoration Settlement	1661
Wey Undertakers rights voided by Restoration Settlement	1661
Great Ouse (Bedford to St. Neots) Undertakers rights voided by act	1665
% of Authorities created before 1661 whose rights were voided or diminished by act or decree	63%
% of Authorities created before 1688 whose rights were voided or diminished by act or decree	33%

sources: see text.

Table 7: Acts that Voided or Diminished Rights of River Undertakers: 1689-1749

River Acts	Year Rights are known to be voided or Changed
Wye and Lugg Undertakers voided by new act	1695
Channel, Colchester to Wivenhoe Maximum Tolls reduced by new act	1718
Wye and Lugg Some Undertakers voided by new act	1726
Channel, Colchester to Wivenhoe Maximum Tolls reduced by act	1739
Dee Maximum Tolls reduced by act	1743
% of Authorities before 1749 whose rights were voided by act of Parliament	2%
% of Authorities before 1749 whose rights were voided or diminished by act of Parliament	6%

sources: see text.

Table 8: Acts that Voided or Diminished Rights of Road Undertakers: 1689-1749

Road Act	Year Rights are known to be voided or Changed
Cherrill to Studley Bridge Maximum Tolls Reduced by act	1726
Hockliffe to Woborne Maximum Tolls Reduced by act	1728
Fornhill to Stony Stratford Road Undertakers eliminated by act	1740
Cherrill to Studley Bridge Maximum Tolls reduced by act	1744
% of Authorities created between 1689 and 1709 whose rights were voided by acts	7%
% of Authorities created between 1689 and 1709 and whose rights were voided or diminished by acts	21%

sources: see text.

Table 9: River Acts that altered the rights of Undertakers. 1689-1749

River	Year	Details on Amendment
Wye and Lugg	1695	It voided all the rights of the Sandys family to collect tolls and improve the rivers. The act stated that the Sandys “never did any thing towards the making of the said River of Lugg navigable.” New authority was given to the bishop of Hereford and several local dignitaries. Also the tolls were eliminated and the Wye and Lugg became free rivers.
Tone, Bridgewater to Taunton	1707	Amendment initiated by undertakers of original act, J.P.’s from Somerset, and neighboring towns requesting an additional toll to pay for a new lock. The petition was opposed by inhabitants in several places, who argued that the additional toll was burdensome and unnecessary. A grand jury of Somerset petitioned in favor of the undertakers and the act passed. It gave additional tolls.
Channel from Colchester to Wivenhoe	1718	Extension initiated by a petition from Mayor, Aldermen, Assistants, and Common-Council of Colchester, who served as undertakers for the earlier act. They stated that they had an outstanding debt of 12,000 pounds and could not repay the debt without an extension of their authority. An act was passed extending their rights for another 21 years. The tolls were reduced on all commodities.
Kennet, Reading to Newbury	1720	Amendment initiated by the undertakers named in the original act. The original act required that works be completed within a specified time. They requested additional time to complete the works because of “extraordinary floods, and unforeseen Accidents.” Act grants an extension. All other rights are unchanged.
Nene, Northampton to Peterborough	1724	Amendment initiated by a petition from commissioners from original act requesting to eliminate a clause in the original act which required the commissioners to negotiate with contractors to make the entire river navigable, and not in parcels. The petition was opposed by the inhabitants of Peterborough on the grounds that the clause was designed to aid the city and “keep their trade from neighboring places.” The Act was passed eliminated the clause. All other rights were unchanged.
Wye and Lugg	1726	Amendment initiated by a petition from inhabitants of Hereford requesting that new commissioners be named because most have died and there is not enough to continue improvements. A new act was passed stating that “the undertakers of the previous act have not done anything to the river Lugg and little work was done on the river Wye.” It names a new body of commissioners. It also gives property owners the right to appeal the commissioner’s decision to a jury.
Wear, near Sunderland	1726	Amendment initiated by commissioners who served as undertakers for the original act. They requested the right borrow money upon the credit of the act, rather than their personal security. They wanted to borrow 6000 pounds for improvements. The Act enabled commissioners to

borrow on credit of act. All other rights were unchanged.

Kennet, Reading to Newbury	1729	Amendment initiated by a petition of the undertakers named in the original act. The undertakers state that they cannot sue and recover debts without the consent of all undertakers. Some undertakers are requesting an amendment of this clause. Undertakers also complained that the commissioners refused to call a jury and that they awarded excessive damages to property-owners. Act was passed reforming jury.
Ouze, near York	1731	Amendment initiated by petition of trustees of original act and inhabitants of York requesting that the tolls be increased and that the tolls on various goods be adjusted so according to their respective values. They claimed that the adjusted tolls would aid in the “perfecting of the work.” The act was passed increasing the tolls and making the schedule uniform by weight. All other rights are unchanged.
Dunn, Holmstile to Tinsley and Dunn, Holmstile to Barmby Dun	1732	Amendment initiated by petition of undertakers from original act dealing with Dunn from Holmstile to Tinsley and the undertakers for the Dun from Holmstile to Barmby Dun. They asked to merge and create a corporation. The shares were to be issued based on money invested to date. The act was passed creating the Company of Proprietors of the Navigation of the River Dun. All other rights are unchanged.
Dun, Bramby Dun to Fishlock Ferry	1739	Amendment initiated by petition of the Company of Proprietors of the Navigation of the River Dun requesting the right to improve a different section of the Dun river. The bill was opposed by inhabitants in several cities and the undertakers for the river Ouze who state that that the act will draw water from the Ouze. The act was passed giving the Company the right to undertake the project. It includes many toll exemptions.
Channel from Colchester to Wivenhoe	1739	Extension initiated by the commissioners of the act and the city leaders of Colchester. They request that their powers be extended for another 21 years so they can maintain a lock. The act was passed extending their rights for another 21 years. Toll on coal was reduced further to 3 pence.
Dee	1740	Amendment initiated by the undertakers for the river Dee requesting that they be incorporated. They hoped to raise more money to preserve their works. The act was passed creating the Company of Proprietors of the Undertaking for Recovering and Preserving the Navigation of the River Dee. All other rights are unchanged.
Dee	1743	Amendment initiated by mayor and citizens of Chester requesting that the tolls on the river be reduced to encourage trade. The Dee company also submitted a petition consenting to the reduction in tolls. The act was passed reducing the tolls on all types of vessels.
Wear, near Sunderland	1746	Amendment initiated by commissioners who served as undertakers for the original act. Their requested that their authority be extended for another term of years. They also requested an increase in the tolls to pay for an extension of the pier in Sunderland. The act was passed extending the term for another 21 years. The tolls were increased.

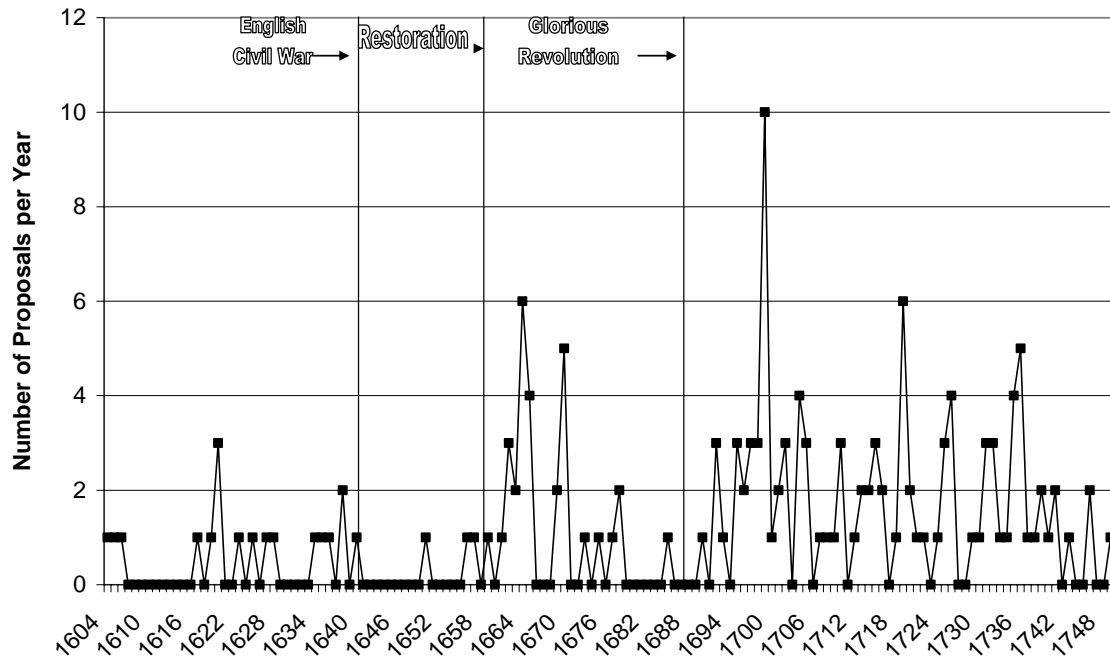
Table 10: Road Acts renewing or altering rights for authorities created from 1689 to 1709

Road/original authority	Years	Details on Renewal Acts
Shenfield to Harwich/ J.P.'s, Essex	1707 1726 1747	First renewal initiated 5 years before original act was set to expire. J.P.'s state that more repairs are needed. Act is passed extending term for 15 years. No other rights are changed. Second renewal initiated 2 years before expiration. J.P.'s state that the road still needs repair. Town of Maldon submits petition to have their roads added. Act is passed extending the term for another 21 years and adding additional roads. It also transfers authority to a body of trustees. Third renewal initiated in the year second act expired. Trustees state that the road still needs repair and that more roads should be added to their authority. The act is passed extending the term for 21 years and adding the additional roads. The tolls are increased on coaches, but all other remain the same.
Wymondham to Attleborough/ J.P.'s, Norfolk	1708 1726 1747	First renewal initiated 4 years before original act was set to expire. J.P.'s stating that more repairs are needed and that more roads should be added to their authority. Act was passed extending authority from Wymondham to Hethersett. The tolls were not changed. Second renewal initiated 3 years before expiration. J.P.'s state that the roads still need repair. Act is passed extending authority for another 21 years. The tolls are not changed. Third renewal initiated in year of expiration. J.P.'s state that roads still need repair. They also want to improve several new roads. Act is passed extended the term for another 21 years and adding more roads. The tolls are unchanged.
Gloucester to Birdlip Hill/ J.P.'s, Gloucester	1722 1743	First renewal initiated 4 years before original act was set to expire. Mayor of Gloucester states that the road was ruinous. New act gives authority to body of trustees. Tolls on wagons are increased by 50%. All other tolls remained unchanged. Second Renewal initiated in year of expiration. Trustees state that they borrowed 1100 pounds to improve the road, and 300 remains to be paid. Act is passed extending the term for another 21 years. Tolls on wagons and coaches are reduced, but tolls on all livestock are increased.
Hockliffe to Woborne/ J.P.'s, Bedfordshire	1728 1743	First renewal initiated in year that the original act was set to expire. J.P.'s state that roads still need repair. Act is passed extending the term for 21 years and transferring authority to a body of trustees. Tolls on wagons and coaches are reduced. Second renewal is initiated 6 years before expiration. Act is passed extending term for another 21 years. Tolls are unchanged.
Fornhill to Stony Stratford/ 33 trustees	1709 1716 1740	First amendment initiated by creditors of the trust two years after original act is passed. Creditors state that they borrowed 6400 pounds, but cannot be paid unless the term is extended and the tolls are increased. Act is passed extending the term of the original act to

30 years. It also requires that trustees borrow new funds and repay creditors by March 25, 1711, otherwise the creditors could take receivership of the tolls. Trustees were unable to borrow and creditors took over temporarily, before commissioners appointed a new body of trustees. Second amendment act is also initiated by creditors. They complained that the tolls were still too low. Act is passed extending the term for 23 years. Authority is vested in the trustees for the first act and those who took over after receivership. The tolls on cattle are increased. Act also includes a provision that new bonds pay no more than 5% interest. The rights vested in third act expired in 1739. A new act was initiated by inhabitants of Buckinghamshire and Bedfordshire stating that the road was still out of repair. It passed in 1740 naming a new body of trustees.

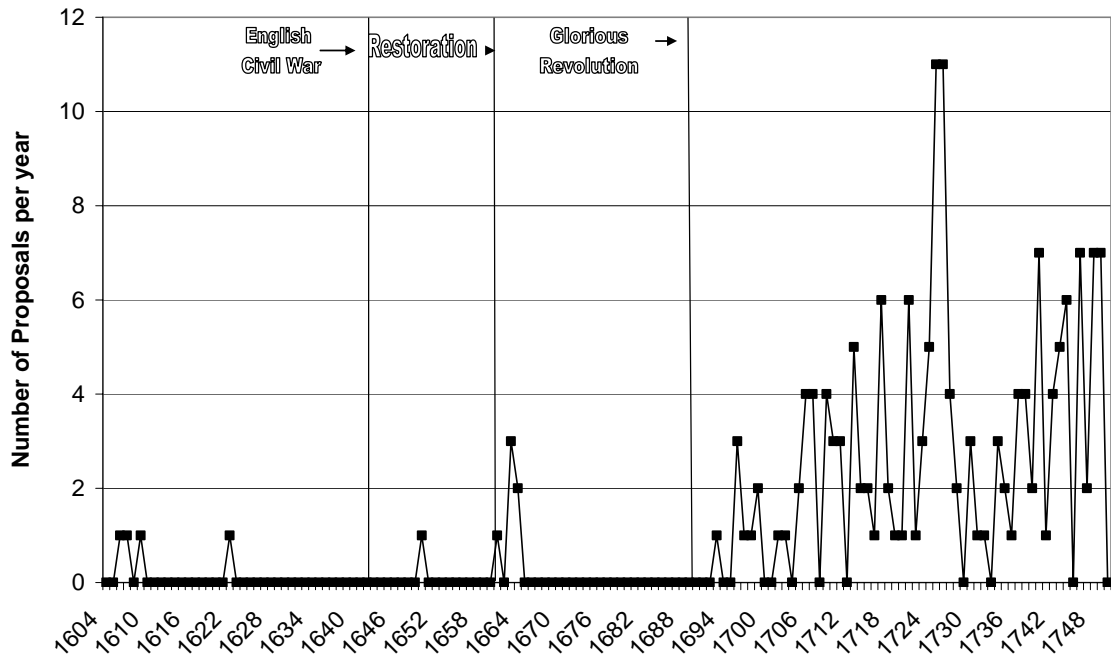
Stratford to Dunchurch/ 76 trustees	1725 1737 1740	<p>First renewal initiated 4 years before original act was set to expire. Trustees state that roads will not be repaired and bonds cannot be paid if act is not extended. Act is passed extending the term for another 21 years. It also increases the tolls on livestock. Second renewal was initiated 9 years before expiration of the previous act. They state that the road cannot be repaired unless the term is extended and the tolls are increased. Act is passed extending the term for another 21 years, but the tolls are not changed. Third act is initiated by trustees who state that they need the authority to move the toll gates in order to increase revenues. The act is passed allowed trustees to move the gates.</p>
Bath Roads/ J.P.'s, three counties	1721 1739	<p>First renewal act initiated 8 years before original act was set to expire. J.P.'s state that the road cannot be repaired unless term is extended. The revenues only cover the interest payments. Act is passed extending the term and adding roads, but tolls are not increased. Second renewal is initiated by J.P.'s 3 years before preceding act is set to expire. They requested an additional term to repair the road. The act is passed extending the term for another 21 years. Tolls are unchanged.</p>
Cherrill to Studley Bridge/ J.P.'s, Wiltshire	1726 1744	<p>First renewal act initiated 2 years before original act was set to expire. J.P.'s state that term needs to be extended to repay the 5000 pounds in debts. Act is passed extending term for another 21 years. The tolls on cattle are reduced, all others remain unchanged. Second renewal is initiated 3 year before previous act expired. J.P.'s state that the term needs to be extended to pay off a debt of 700 pounds. The act is passed extended the term for another 21 years. The tolls are reduced on coaches.</p>

Figure 3: Number of Proposals to Improve Rivers, 1604-1749



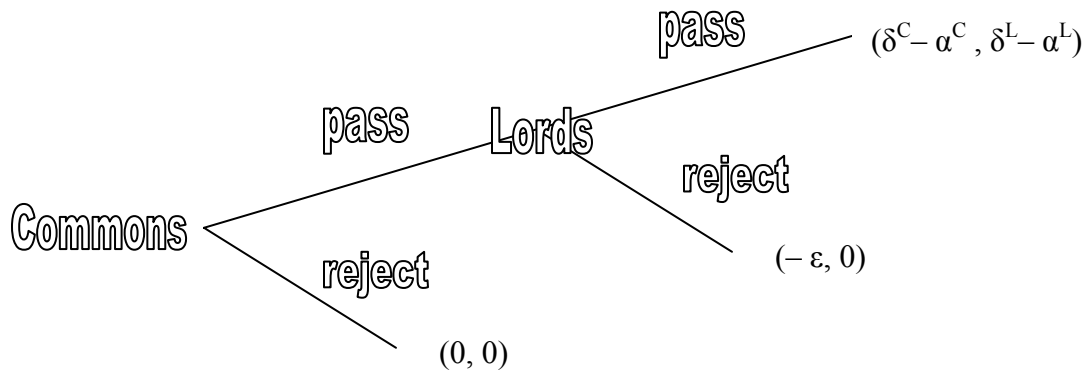
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Figure 4: Number of Proposals to Improve Roads, 1604-1749



source: see text.

Figure 5: Enforcement Game when Undertakers improve their road or river



Notes : The parentheses represent payoffs for the Commons and Lords, respectively. δ^C and δ^L are the political and monetary gains for the Commons and Lords from the passing a bill that violates the property rights of undertakers. δ^C is assumed to be greater than δ^L . α^C and α^L are the cost of violating the norm that undertakers rights should be protected if they improved their road or river. α^C is assumed to be smaller than α^L . ϵ is the costs of writing a bill that is eventually rejected.