

The Turnpike Roads of England and Wales

Dan Bogart¹

1. Introduction

Turnpike trusts were authorized by Acts of Parliament to build, maintain and operate toll roads in Britain. These organizations were most prominent in the 18th and early 19th centuries, prior to the advent of railways, and they were an important institutional innovation. They originated in the 17th century because local governments, specifically parishes, were unwilling or unable to invest in roads. The finances of turnpike trusts were distinctive because they levied tolls on road users and issued bonds mortgaged on these tolls. Also, they were locally managed and financed. London financiers and the government provided little financial assistance. Turnpike trusts provided substantial economic benefits, most directly through improvements in transportation. Overall, turnpike trusts raised land values in nearby communities, promoted urbanization, and contributed to the growth of the British economy into the 19th century.

This paper provides a new overview of turnpike trusts. It draws on much of the published and working research undertaken to date. In particular, it uses new maps and graphs resulting from projects funded by the National Science Foundation and the Leverhulme Trust.² Special recognition goes to Max Satchell, Alan Rosevear, and Eduard Alvarez, who played key roles in creating the data and maps associated with turnpike trusts and the road network of the 17th century. The Cambridge Group for the History of Population and Social Structure has also been instrumental in creating new data on urbanization.

The first two sections of the paper explore the origins of turnpike trusts and describe the legislation that created them. The next three sections discuss the diffusion, finances, and economic effects of turnpike trusts. Lastly, I draw conclusions.

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2. The origins of turnpike trusts

A large network of roads and pathways was created in Britain during the Roman period and in the Middle Ages. By the mid-16th century this network was called the ‘Kings Highway.’ However, the English monarchy devoted few resources to road improvements. Responsibility for road maintenance was placed upon local governments known as ‘parishes’. Parishes financed road improvements by forcing their residents to work without pay and by levying property taxes. The free labor was known as ‘statute labor’ in England and corvee labor in much of continental Europe. It was limited to a maximum of six days per year by a statute passed in 1555. Property taxes were more novel and started in the 17th century. The Highway Law of 1692 stated that parish rate payers could be charged up to six pence for every pound of yearly income from land and other real property. The six pence rate represented a 2.5% tax on property income, which was substantial considering there were also parish taxes for poor relief and constables.

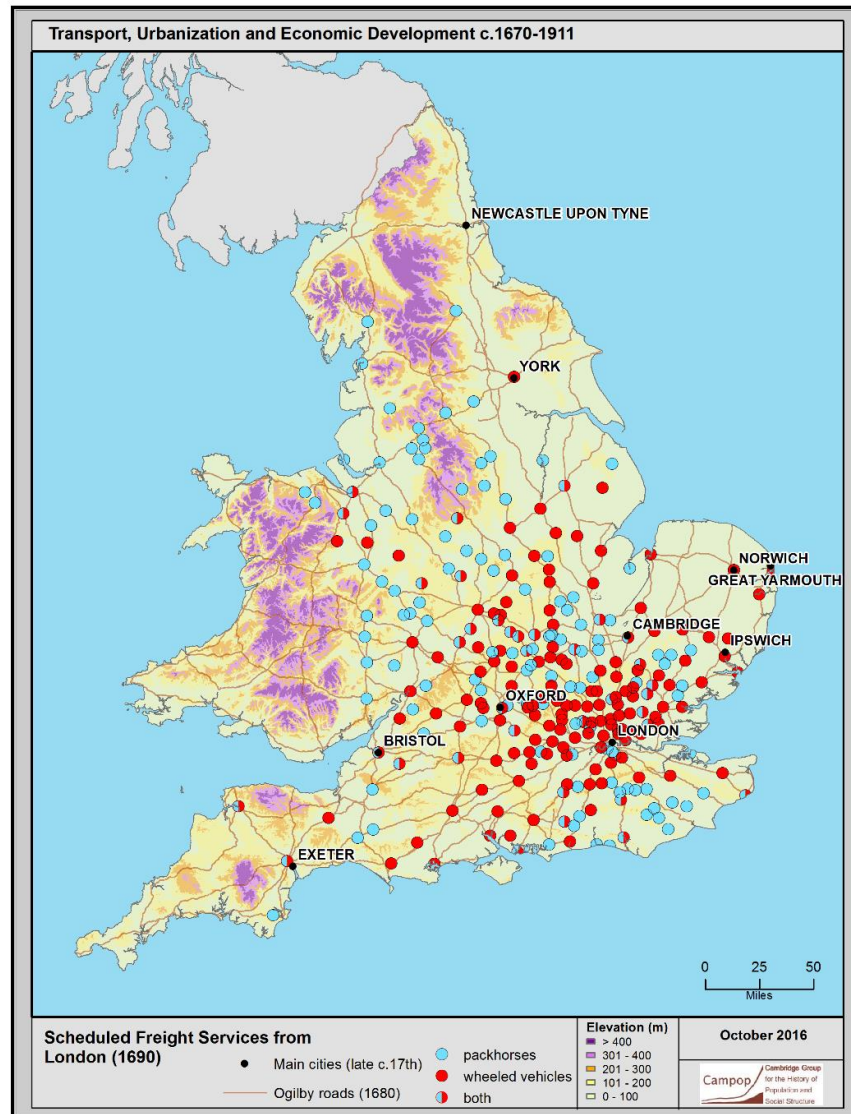
The public and local method of road financing was satisfactory in Britain’s pre-industrial economy. Road improvement costs in this era were low and traffic was largely internal to the parish. Conditions changed during the 17th and 18th centuries when wages increased and interregional trade and travel began to grow. There was a growing use of large wagons and carriages, which caused damage to roads.³ The problem was especially acute in the southeast of England around London. With half a million inhabitants in 1700, London was one of the largest European cities and its population required a substantial supply of food, fuel and consumer products. Much of this was transported by road.

Map 1 portrays towns with scheduled carrier services to London in the late 17th century. It shows whether carriers used wheeled vehicles, packhorses, or both.⁴ Wheeled traffic was widespread in the south-east and, consequently, this region had the greatest difficulties with road maintenance. In the immediate hinterland of London, the problem was especially acute because parishes had to maintain roads that were used by wheeled carriers en route to the rapidly growing capital. The poor state of roads during the winter months was another problem in the late 17th

³ The connection between growing traffic and problems in the parish roads system has been noted by several scholars including Albert, *the turnpike road system*, Pawson, *transport and economy*.

⁴ The map is based on De Laune’s 1681 publication, *The Present State of London*. Special thanks go to Max Satchell for digitizing and creating the map.

Map 1: Scheduled road carrier services to London in the late 17th century



and early 18th centuries. Wet weather sometimes made roads impassable. To illustrate, Liverpool’s town council lamented the costs of bringing, “Coal(s) and merchandizes to this town and port in bad weather, and especially in the winter season and at all times when the weather happens to be wet and unseasonable.” It went on to state that, “The roads to the coal pits and particularly in Prescott cannot be sufficiently repaired by the statute work.”⁵

⁵ Taken from James Picton, City of Liverpool, Municipal Archives and Records, from A.D. 1700 to the Passing of the Municipal Reform Act, Chapter 63, Streets and Buildings. Available online at https://archive.org/stream/cityofliverpoolm00pictrich/cityofliverpoolm00pictrich_djvu.txt

Like Liverpool town council, many observers argued that the parish system of road repairs was inadequate for some roads. In effect, there was a divergence between the road expenditures parishes could, or were willing, to provide and the funds needed for an improved network. Turnpike trusts emerged as a solution to this problem. According to Albert⁶, a parish in Hertfordshire, called Standon, is responsible for the first turnpike trust. Standon was forced to provide a high level of statute work by local Justices of the Peace in the 1640s and it appealed for a special tax to be levied on heavy loads. The tax was denied but the parish pursued the issue for several decades. Finally, in 1663, an Act of Parliament authorized a toll to be taken under the authority of the Justices in Hertfordshire, Cambridgeshire, and Huntingdonshire. This applied to a short section of the Great North Road, which connects London to York. The first turnpike trust had come into being.

3. Turnpike Acts

Turnpike trusts were created through a legislative process shared by many types of private and local Bill in England. This process is a unique aspect of British institutions in the 18th century.⁷ A Bill to create a turnpike trust almost always began with a petition to the House of Commons, often from landowners and commercial interests. The petitions normally stressed the need for road improvements and the inadequacy of the law. One example is a petition from 8th January 1752, dealing with roads near Taunton in Somerset. It came from the ‘principal inhabitants, gentlemen, clergy and freeholders, residing in or near, the town of Taunton, in County of Somerset.’ It reads as follows:

“That the highways leading from Taunton thru the parishes... are become so ruinous and bad in the winter season that the same cannot, by the ordinary course appointed by Laws and statutes of this realm, be sufficiently repaired and amended without the further assistance of Parliament; and therefore to the end that the said highways may be well an efficiently repaired and amended and kept in good and

⁶ See Albert, *The Turnpike Road system*, pp. 18-19.

⁷ For more details on the legislative process for producing private bills see Bogart and Richardson, *Property Rights and Parliament*.

sufficient repair for the safety of all his Majesty's subjects whose business requires their travel thru the said highways leave to bring a bill."⁸

Following most petitions, a Bill was written by a select House of Common committee. It was then reviewed by the whole House. Most turnpike Bills passed with little controversy, but sometimes local groups voiced concerns. In the case of the Taunton roads described above, there was a petition by Samuel Walker of Burlescomb (Devon) along with landowners, farmers and occupiers of land in Devon and Somerset and the carriers of 'culm', which was used to burn lime in those parts. It states their concerns about the proposed turnpike road and the implications of introducing tolls for their trade:

*"[We] set forth that not only in the neighborhood of Burlescombe but for an extent of many miles and especially to West and South [of Taunton], the lands are chiefly manured with lime and that large tracts of that county will receive no benefit from any other manure and that the occupiers are for the most part supplied therewith from certain kilns in Burlescombe and neighboring parishes, belonging to Samuel Walker, where there is a vast rock of limestone and that the fuel used in burning the lime is a species of coal, or mineral, called Culm ...In case of bill being passed, any tolls or duty should be payable for horses or beasts carrying Culm and Abbey coals it would be impossible for the carriers to continue bringing it at the present prices and if they should be raised (which the nature of the business will barely admit) of consequence the price of lime must be enhanced and a great discouragement ensue to the improvement of lands in these parts. And alleging that any increase in the great expense that the occupiers are obliged to be for this manure. Petitioners pray for relief."*⁹

Petitions like these usually resulted in some type of concession. Perhaps in this case, a reduced toll for transporting culm by horse. The concessions were a form of 'petty corruption'

⁸ This passage is taken from the Commons Journal 26 1750 -54, 8 January 1752.

⁹ This passage is taken from the Commons Journal 26 1750 -54, 3 February 1752.

and helped to quell opposition to the turnpike system. Without concessions, it is hard to imagine that so many turnpike Bills would have been passed. Introducing tolls and improving infrastructure is bound to generate some redistribution and in England, where local property rights were strong, it was necessary to appease certain groups.

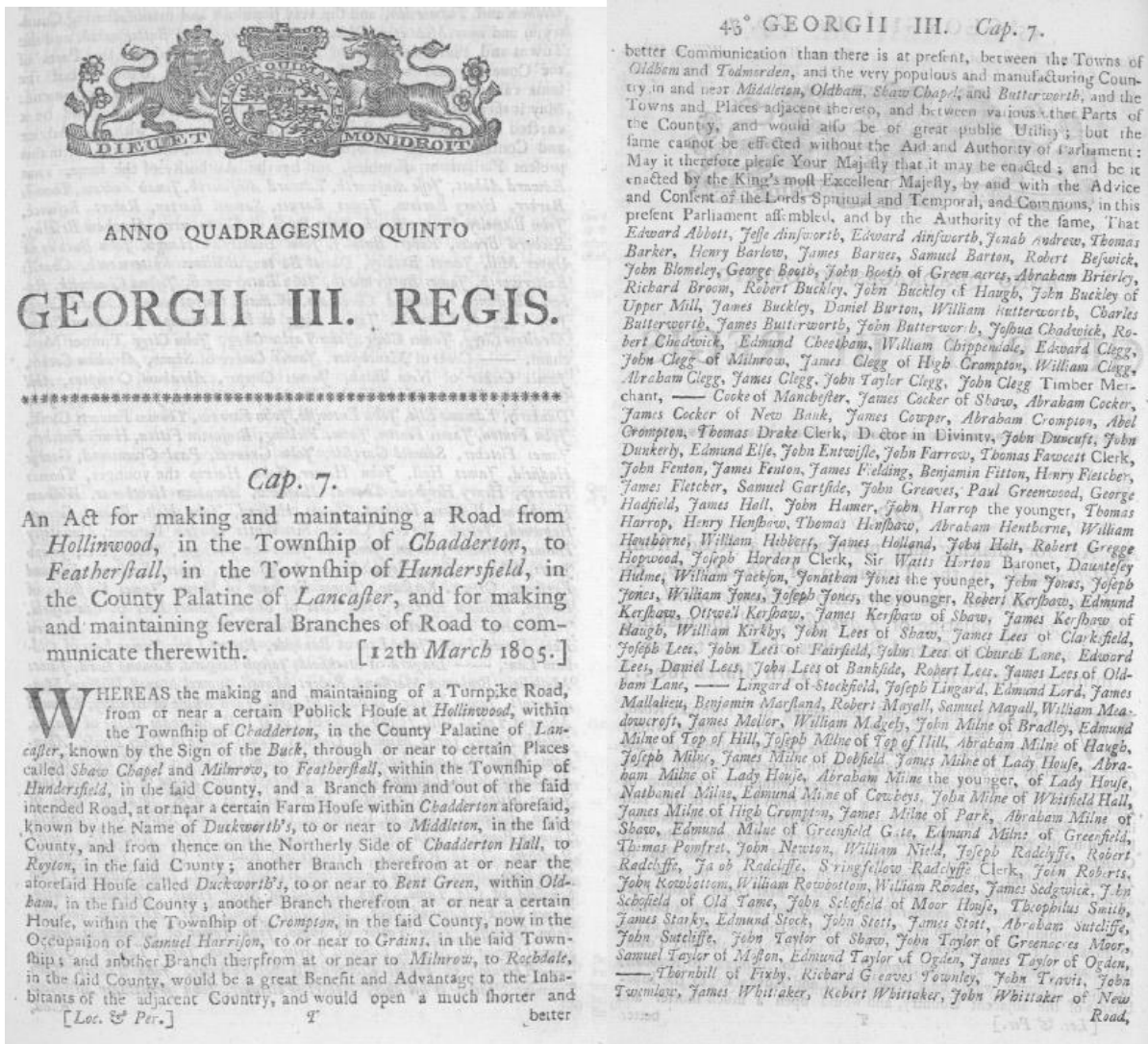
Once turnpike Bills were written and passed by the Commons, Lords, and Monarch they became known as a 'Turnpike Act.' Each Act established a body of trustees with authority over the road; this was usually composed of the turnpike's promoters and other members of the local elite. Trustees were given the right to levy tolls and issue bonds. As a bonus, trusts could claim statute labor from the parishes along their route. Acts normally placed several restrictions on trustees; for example, they could not charge tolls above a maximum schedule and they could not earn direct profits.

To illustrate, we may consider an Act of 1805. It was an 'Act for making and maintaining a Road from Hollingwood, in the Township of Chadderton, to Featherstall, in the Township of Huddersfield, in the County Palatine of Lancaster, and for making and maintaining several Branches of Road to communicate therewith.'¹⁰The first two pages of the Act are shown in Figure 1. It begins by stating that making and maintaining a road (at the specified locations) would greatly benefit local proprietors and occupiers of estates because shorter and better communication would be provided. It then names approximately 200 trustees from areas including Green Acres, Manchester, New Bank, Oldham lane and Bradley. Trustees were empowered to hold meetings and make orders subject to at least 5 trustees being present and the clerk posting a notice of at least 10 days. If necessary, 5 or more trustees could elect additional trustees, provided they had 50 pounds of income from real property like land, or if they were an heir apparent with an expected annual income of at least 100 pounds. If trustees held personal property, like moveable goods or financial assets, they were required to have a total wealth of 1000 pounds. The Act stated that trustees did not receive a salary and had to pay their own expenses. There were additional provisions stating how many trustees had to be present to revoke orders made at previous meetings. The main activities of the trust were to be undertaken

¹⁰ See Local and Personal Act, 45 George III, c. vii.

by the officers, the clerk, treasurer and surveyor, all of whom were appointed by the trustees. The officers were required to keep and present their books and accounts.

Figure 1: A Turnpike Act of 1805



The Hollingwood turnpike was given the right to levy a range of tolls on users depending on vehicle type (coach, wagon, or cart), number of horses drawing (1, 2, 4, or 6), wheel size (9 inches, 6 inches, or less than 6 inches), and type of livestock. The toll schedule from the Act is shown in Figure 2. Later in the Act it is stated there were toll exemptions for farmers transporting manure and other fertilizers, mail coaches, soldiers, voters on election days, those

going to church on Sundays and funerals, and finally those visiting sick parishioners. In other words, local or essential travel and traffic was not tolled. There were penalties on false exemptions and on evading the tolls, including a penalty on landowners that allowed travelers to evade through their property. If there were any disputes concerning the tolls, complaints were to be made to the Justice of the Peace for the County.

Figure 2: Toll schedule of an 1805 Turnpike Act

Tolls following shall and may be demanded, and taken before any Horse, Cattle, or Carriage, shall be permitted to pass through any such Turnpikes or Toll Gates respectively; that is to say,

For every Coach, Berlin, Laudau, Chariot, Chaise, Chair, Calash, Hearse, or other such like Carriage with more than Two Wheels, drawn by Six Horses or Beasts of Draught, the Sum of Four Shillings; and drawn by Four Horses or Beasts of Draught, the Sum of Three Shillings; and drawn by Three Horses or Beasts of Draught, the Sum of Two Shillings and Sixpence; and drawn by Two Horses or Beasts of Draught, the Sum of Two Shillings; and drawn by One Horse or Beast of Draught the Sum of One Shilling:

For every Curricule, Chaise, Chair, Calash, Hearse, or other such like Carriage, with Two Wheels, drawn by Two or more Horses or Beasts of Draught, the Sum of One Shilling and Sixpence; and drawn by One Horse or Beast of Draught, the Sum of One Shilling:

For every Waggon or other such like Four-wheeled Carriage, with Wheels of the Breadth of Nine Inches on the Bottom or Sole thereof, drawn by Seven or Eight Horses or Beasts of Draught, the Sum of Five Shillings and Fourpence; and drawn by Five or Six Horses or Beasts of Draught, the Sum of Four Shillings; and drawn by Four or fewer than Four Horses or Beasts of Draught, the Sum of Three Shillings:

For every Waggon or other such like Four-wheeled Carriage, with Wheels of the Breadth of Six Inches on the Bottom or Sole thereof, drawn by Five or Six Horses or Beasts of Draught, the Sum of Five Shillings; and drawn by Four or by fewer than Four Horses or Beasts of Draught, the Sum of Four Shillings:

For every Waggon or other such like Four-wheeled Carriage, with Wheels of less Breadth than Six Inches, and drawn by Five or Six Horses, the Sum of Six Shillings; and drawn by Four or by fewer Horses than Four, the Sum of Four Shillings and Sixpence:

For every Cart or other such like Two-wheeled Carriage, with Wheels of the Breadth of Nine Inches on the Bottom or Sole thereof, drawn by Five Horses or Beasts of Draught, the Sum of Three Shillings; and drawn by Four Horses or Beasts of Draught, the Sum of Two Shillings and Sixpence; and drawn by Three Horses or Beasts of Draught, the Sum of Two Shillings; and drawn by Two Horses or Beasts of Draught, the Sum of One Shilling and Sixpence; and drawn by One Horse or Beast of Draught, the Sum of One Shilling:

For every Cart or other such like Two-wheeled Carriage, with Wheels of the Breadth of Six Inches on the Bottom or Sole thereof, drawn by Four Horses or Beasts of Draught, the Sum of Three Shillings; and drawn by Three Horses or Beasts of Draught, the Sum of Two Shillings and Sixpence; and drawn by Two Horses or Beasts of Draught, the Sum of One Shilling and Sixpence; and drawn by One Horse or Beast of Draught, the Sum of One Shilling:

For every Cart or other such like Two-wheeled Carriage, with Wheels of less Breadth than Six Inches on the Bottom or Sole thereof, drawn by Three Horses or Beasts of Draught, the Sum of Three Shillings; and drawn by Two Horses or Beasts of Draught, the Sum of Two Shillings; and drawn by One Horse or Beast of Draught, the Sum of One Shilling:

For every Horse, Mare, Gelding, Mule, or Ass, laden or unladen, and not drawing, the Sum of Two-pence:

For every Drove of Oxen, Cows, or Neat Cattle, the Sum of One Shilling and Eight-pence *per* Score, and so in proportion for any greater or less Number: And,

For every Drove of Calves, Sheep, Swine, or Lambs, the Sum of Ten-pence *per* Score, and so in proportion any greater or less Number:

And that on each and every *Sunday* during the Continuance of this Act, there shall be demanded and taken at the said Turnpikes or Toll Gates respectively, by such Person or Persons to be nominated and appointed as aforesaid, before any Horse, Cattle, or Carriage shall be permitted to pass through the same on a *Sunday*, double the Tolls above mentioned, to be respectively demanded and taken for every Horse or other Cattle, Coach, Waggon, Cart, or other Carriage (except such Horses, Carts, or Carriages as shall be used or employed for carrying Milk only, the same being liable to the Payment of the same Tolls as are due and payable on any other Day of the Week, and no more) passing through any of the said Turnpikes or Toll Gates, on any other Day of the Week; which said respective Sums of Money shall be demanded and taken in the Name of or as a Toll; and if any Person or Persons subject to the Payment of any of the said Tolls, shall, after Demand thereof made, whether immediately on the same becoming due or at any Time after, neglect or refuse to pay the same or any Part thereof, it shall be lawful for the Person or Persons appointed as aforesaid to collect such Tolls, by himself, herself, or themselves, or taking such Assistance as he, she, or they shall think necessary (and which Assistance all Persons are hereby required to give, if called upon by the Person or Persons appointed as aforesaid to collect such Tolls) to seize and distrain any Horse, Beast, or other Cattle, upon which any such Toll is by this Act imposed, and also any Carriage which such Horse, Beast, or other Cattle may be drawing, together with their Saddles, Bridles, Geers, Harness, or Accoutrements, or any other of the Goods or Chattels of such Person or Persons so neglecting or refusing to pay the same; and if such Tolls, and the reasonable Charges of such Seizure and Distress, shall not be paid within the Space of Four Days next after such Seizure and Distress made, the Person or Persons so seizing and distraining shall and may sell the Horse, Cattle, Beast, or Carriage so seized and distrained, or a sufficient Part thereof, returning the Overplus (if any) and what shall remain unsold, upon Demand, to the Owner thereof, after such Tolls and all reasonable Charges shall be deducted and paid; and that all the Tolls to be collected or levied by virtue of this Act, shall be and the same are hereby vested in the said Trustees, and shall be applied and may be assigned in such Manner as herein-after mentioned.

The trustees of the Hollingwood turnpike could issue bonds mortgaged by the tolls. Orders to issue such bonds could only be made at meetings with at least 7 trustees and, of note, regular meetings required only 5 trustees. The Hollingwood turnpike Act stated that all bondholders were treated equally in terms of interest payments and that bonds could be transferred upon giving notice to the clerk.

The Hollingwood turnpike trustees were also given the right to purchase materials and, if necessary, to purchase land to widen or alter the road. Private owners were to be compensated. If owners could not come to an agreement with the trustees, the latter could issue warrants to the sheriff to impanel a jury of 12 ‘indifferent men of the county where the land lies.’ The jury’s decision on compensation would be considered final. There were also provisions on how payments should be made if the land was held by a corporation or trust. For land yielding 100 pounds or more per year, payments were to be deposited in the Bank of England and were subject to various rules.

The Hollingwood turnpike trustees could also claim a portion of the statute labor performed in the parishes along the route. The trustees and parish surveyors were to agree on the number of labour days that all eligible male residents should perform in a year. The maximum number of days was 6, and the Justice of the Peace was to determine the number of days if an agreement could not be reached. If statute laborers did not show up they were to be fined 10 shillings. The Act allowed parish residents to buy out their labor requirement, an agreement known as ‘compounding.’

Finally, turnpike Acts did not give permanent powers. They were only valid for 21 years, at which point the trustees had to apply for what became known as a ‘renewal act.’ The vast majority of trusts sought renewal Acts (sometimes before the 21 years) and most were approved by Parliament. Renewal Acts often included substantial changes to a trust’s power, perhaps most notably, to its toll schedules.

3. The Spread of Turnpike Trusts

Turnpike trusts were established in a slow piecemeal fashion. The first turnpike Act was in 1663, but the second was not until 1695, and it was not until the 1720’s that trusts became common along the major highways leading into London. Between 1750 and 1770 turnpike trusts diffused throughout much of the road network, especially in the industrializing areas of the West Midlands and the North. After 1770, the network continued to expand, even as canals were being built. By 1840, there were around 1000 turnpike trusts managing 20,000 miles of road.

The diffusion of turnpike trusts is best seen through maps. Albert and Pawson were the first scholars to make maps of the turnpike network. A new series of Geographic Information Software (GIS) turnpike maps has been created by this author, Max Satchell, and Alan Rosevear.¹¹ The underlying data include a digitisation of the turnpike roads from John Cary's New map of England of Wales and a part of Scotland (revised 1832). Cary roads are linked to a database that contains, for each section of road, the trust to which it belonged, the date it was 'turnpiked' or created, and the date it was lapsed. A comparison is also made with a GIS map of late 17th century roads produced by Max Satchell. This is based on a digitisation of the routes indicated by the strip maps of John Ogilby's atlas of "principal roads" in England and Wales that was published in 1675. This consisted of strip maps of 85 routes, at a 1:63360 scale, which plotted over 7500 miles of road.¹²

Map 2 shows all turnpike roads in 1750 plus Ogilby's principal roads in 1680. The ten largest cities of 1700 are also shown for additional perspective. By the mid-eighteenth century, turnpikes were established on major roads leading into London and most of the major towns - even as far north as Newcastle. Many were established on the principal roads mentioned in Ogilby. Thus, most of the early trusts improved existing roads rather than building new roads. Also notable is the cluster of turnpike roads in the west of England near Bristol. Albert called them 'town-centered' trusts. They were designed to foster trade between a town and its hinterland. It also appears there was a competitive element involved; towns were more likely to form trusts if neighbouring towns had previously done so.

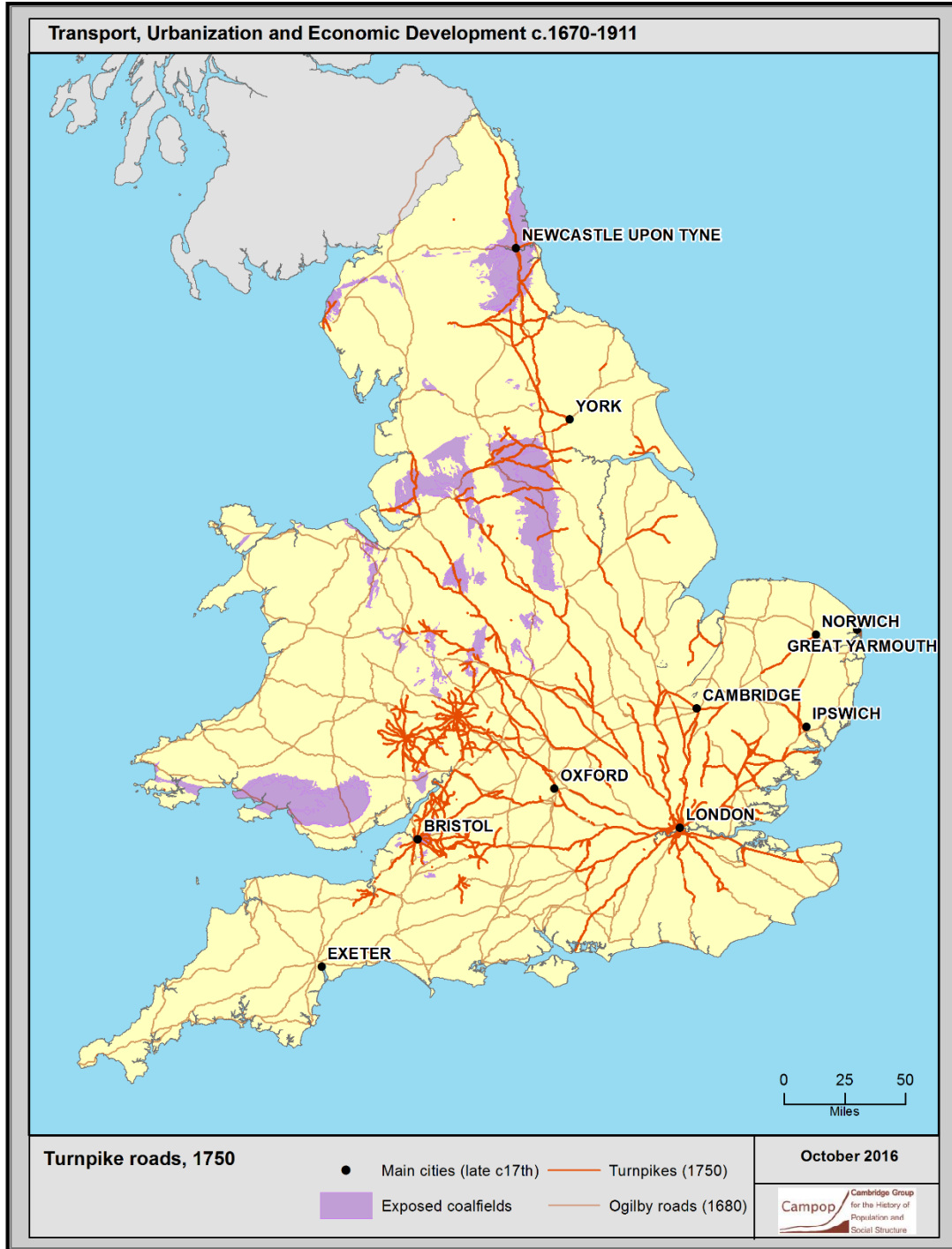
It is important to note that by 1750 there were many areas that had few if any turnpike roads despite them having the candidate roads identified by Ogilby. These areas include the Southwest, Wales, and much of the Midlands. The regions on the exposed coalfields had some turnpike trusts, but little more than elsewhere. Low population density is one reason why some areas had few turnpike roads. Less people meant there were fewer road users to fund toll

¹¹ Max Satchell undertook an initial digitization of some 20,000 miles of turnpike road from Cary. The much larger task of assigning the trust data was conceived and undertaken with great rigour by Alan Rosevear. For more details see <http://www.campop.geog.cam.ac.uk/research/projects/transport/data/turnpikeroadnetwork.html>

¹² For details on the mapping of 1680 roads see <http://www.campop.geog.cam.ac.uk/research/projects/transport/data/roadnetwork1680.html>

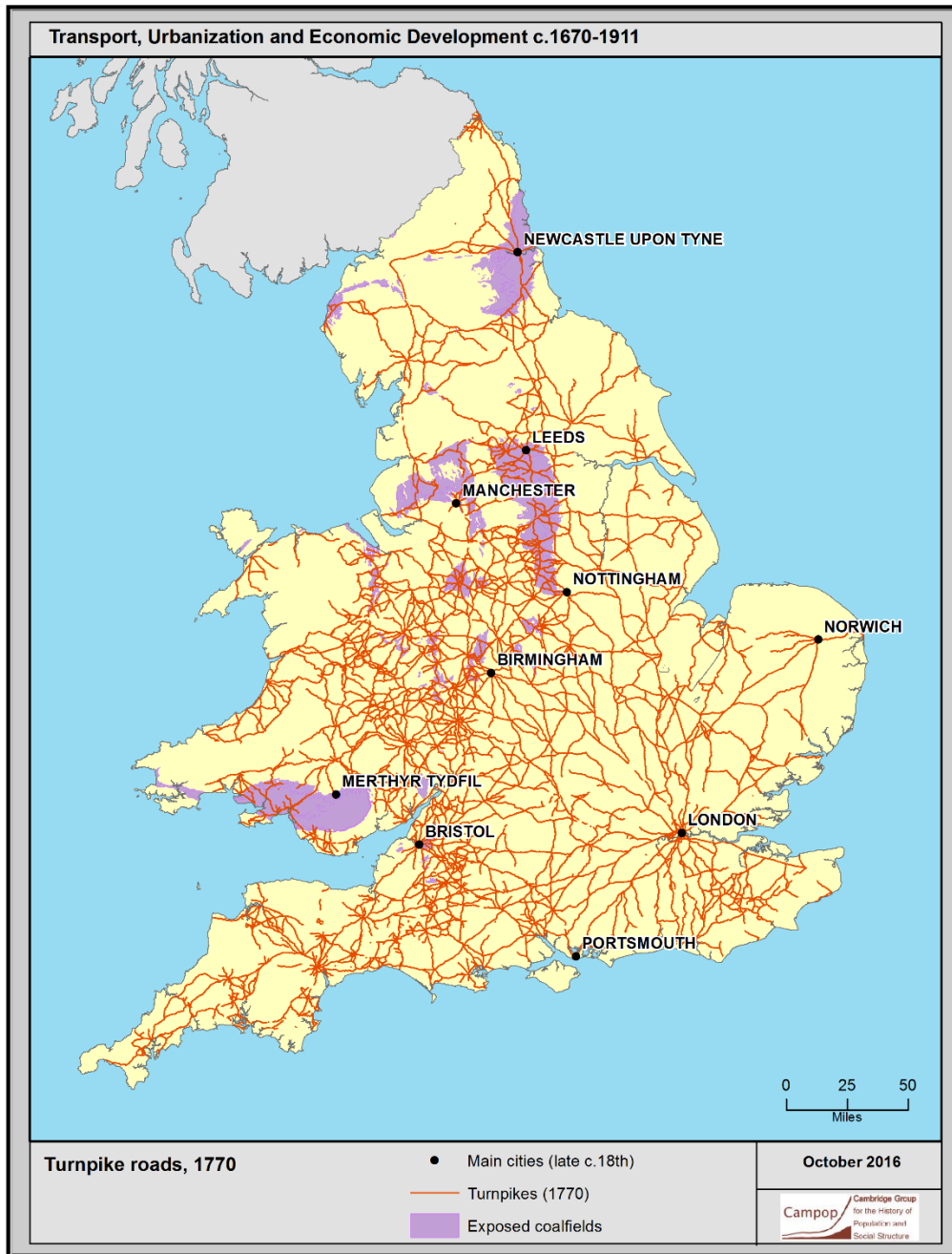
collectors, gates, and the cost of getting a turnpike Bill passed in Parliament. Hence, in some areas, turnpike roads were not yet financially viable. Conditions would change in the mid-18th century, especially near the coal fields, where steam engines began to revolutionize mining and manufacturing.

Map 2: Turnpike roads and major cities in 1750



Between 1750 and 1770 turnpike roads diffused widely across England and Wales. Approximately 10,000 miles of road were placed under trust authority in these two decades. As a result, tolls became commonplace on all roads near major towns. Map 3 shows turnpike roads in 1770 and the ten largest towns according to the 1801 census. Large cities like London, Leeds,

Map 3: Turnpike roads and major cities in 1770



Birmingham, and Bristol all had many turnpike roads. A particularly dense network of turnpike roads also formed in the West Midlands and West Yorkshire, especially near the coalfields. This development is notable because these areas were beginning to industrialize rapidly. Turnpike trusts also reached areas like the Southwest and Wales for the first time in the 1750's and 1760's.

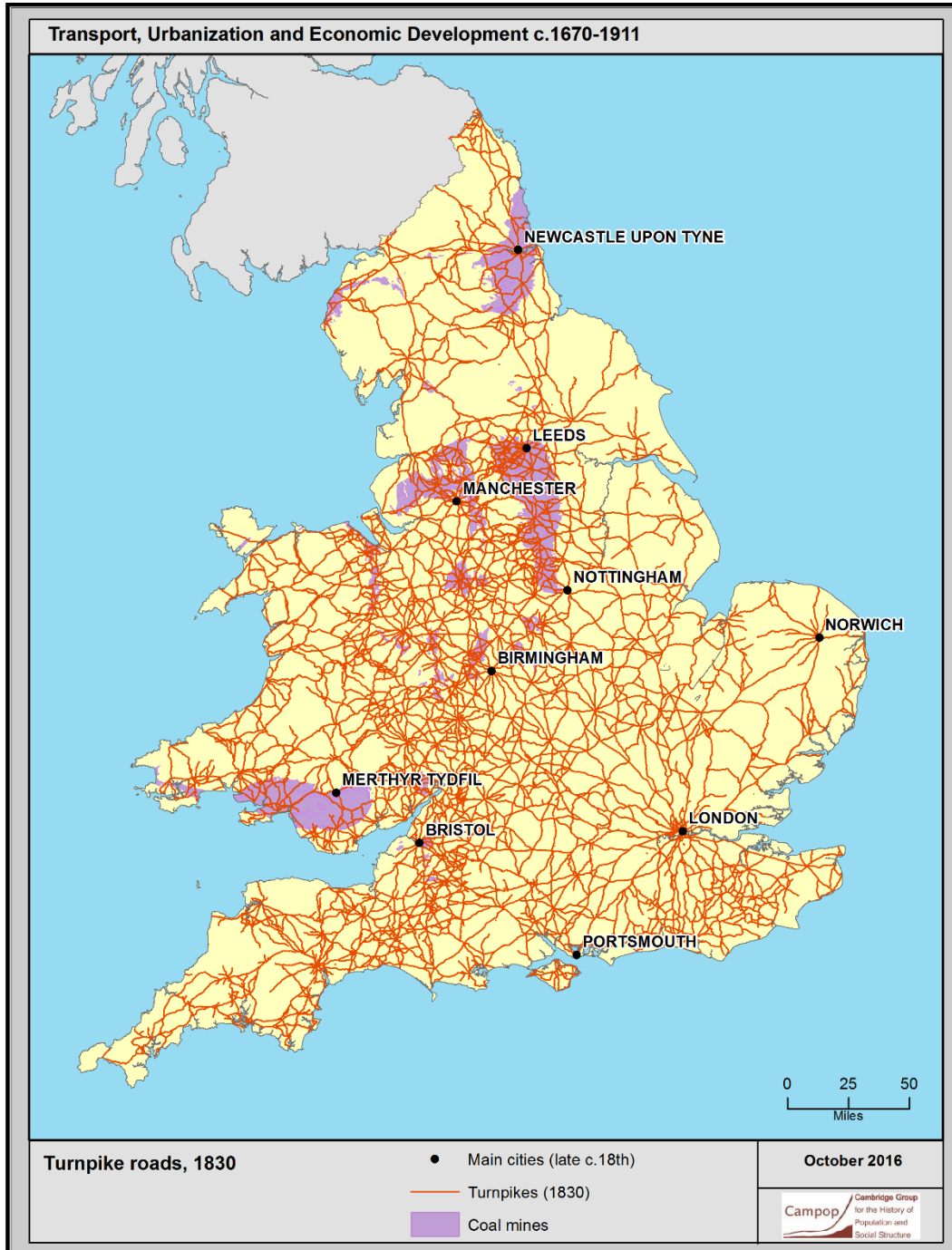
Thus, the turnpike boom of the mid-18th century brought these roads to every part of England and Wales.

Why were so many turnpike roads created in the twenty years from 1750 to 1770 compared to the previous sixty years? Various explanations have been offered in the literature (Albert 1972, Pawson 1977, Bogart 2005). The 1750's and 60's were generally years of 'easy money' with low interest rates prevailing in London. It is likely that some trusts were formed in this period because borrowing was readily available and cheap. Another factor was the acceleration in population growth around the mid-18th century. As mentioned above, population growth meant more traffic and more toll revenue potential, which in turn reduced the average cost of improving and maintaining roads. The turnpike boom was also related to 'neighbour' or 'network effects'.

Network effects imply that the benefits of turnpikes increased as more were established on connecting road segments. Neighbor effects capture imitative behavior among members of the same group. In this context, they could arise because town leaders learned about the benefits of turnpikes by observing their effects in nearby locations. In a study of turnpike trusts along the London network, Bogart (2007) found that towns were more likely to adopt turnpikes if other turnpikes managed a greater proportion of their route to London.

The adoption of turnpike roads continued in the late 18th century and the first quarter of the 19th century (see Map 4). The extent of adoption was less than in the mid-18th century, but many areas added significant turnpike roads. Most were in the North and Wales and they were concentrated near the coal fields. The link between turnpike roads, urbanization, and industrialization is again evident.

Map 4: Turnpike roads and major cities in 1830



Turnpike trusts continued to maintain roads into the 1850s, when railway competition became more acute. Railways were often constructed along or near the routes of turnpike roads. Obviously, given the speed and cost advantage of railways, much road traffic that went by turnpike road switched to a railway. As a result, turnpike trusts lost their rationale and there were

calls to end turnpike roads. Mainly in the 1870's, a process of 'dis-turnpiking' occurred. This proved complex as many trusts still had debts from earlier improvements. Parliament was reluctant to cancel these debts or to pay them off directly. Instead, in the 1850's, trusts were informed that their current Acts would not be renewed.

How large was the turnpike network when at its peak in the 1830's? To answer this question, it is useful to compare the turnpike network of 1830 with Ogilby's principal roads in the late 17th century (see Maps 4 and 2). The substantially larger scale of the turnpike network is clear. There were 20,000 turnpike miles in 1832 and approximately 7500 miles of road documented in Ogilby. However, to be fair, many roads were not mapped in Ogilby, although there are intersections for cross roads in his maps and these are mentioned in his text. Several county maps produced prior to, or not long after 1680, also show extensive road networks. Ongoing research by Satchell and Rosevear will map the location of more roads in the late 17th century. This is likely to show that whilst turnpike trusts did add some new roads, their major contribution was upgrading the quality of existing roads (more details are given below). It is also important to point out that the parish road network was very large in the early 19th century. In England and Wales in 1813 there were 95,100 miles of road 'used for wheeled carriages' that were not turnpike roads or paved streets.¹⁴ It is likely that most of these parish highways existed in some form in the late 17th century when turnpikes began.

4. A regional perspective on the spread of turnpike trusts

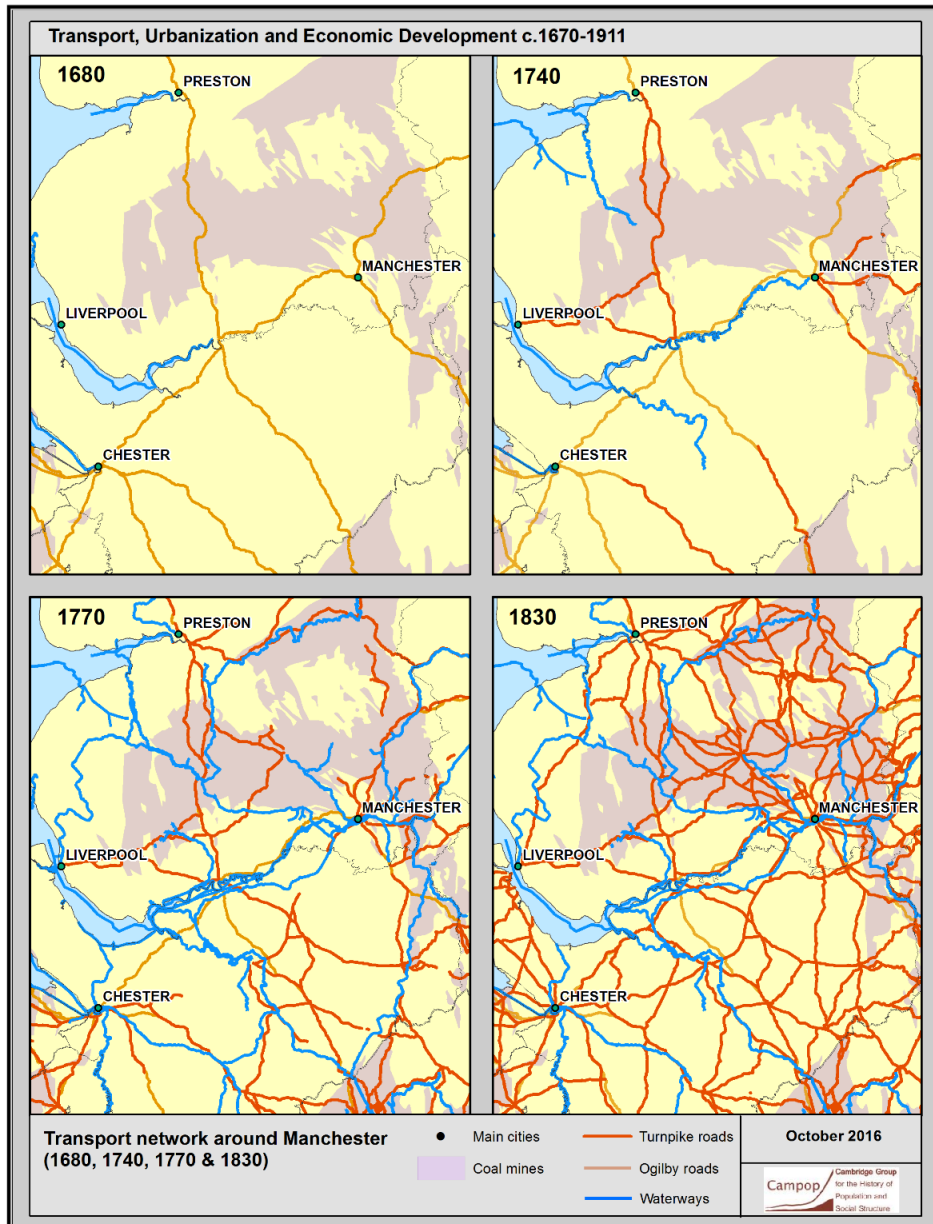
The diffusion of turnpike trusts at a regional level illustrates some of the national trends. It also shows the relationship of roads with methods of water transportation, like canals. Here, I focus on the region around Manchester because of its importance to the industrial revolution and

because there was a close connection between turnpike roads, river improvements, and canals in this region. Map 5 presents Ogilby's roads (brown), turnpike roads (red), and waterways (blue)

¹⁴ See British Parliamentary Papers 1840 XXVII "Appendix to the Report of Commissioners appointed to inquire into the State of the Roads," p. 614.

at four dates: 1680, 1740, 1770, and 1830.¹⁷ The maps highlight the way transportation developed.

Map 5: The evolution of the transport network near Manchester 1680-1830



In 1680, Manchester had no direct water transportation to the coast or to inland cities; however, it did have direct road connections to the coast near Liverpool, to Leeds through the

¹⁷ Special thanks to Max Satchell for making GIS maps of the waterways 1680, 1740, 1770 and 1830.

east-west trunk road across the Pennines and to London via the southern road through Derby. Most road transport was by packhorse because road quality was low. By 1740, Manchester had water access to the west coast following the improvement of navigation on the Irwell; at that point, its shipping costs to Liverpool and international markets declined significantly. Also, several roads near Manchester were improved, including its connections to London and nearby coalfields. By 1770, more turnpike trusts were established on roads near Manchester, which improved its links with several cities to the east and south. At this point, road carriers began to adopt faster coaches and larger wagons and Manchester's travel times and freight rates started to decline. The travel time between London and Manchester was around 90 hours in 1700. By 1787 it had fallen to 24 hours. More turnpike roads were established between 1770 and 1830, including better connections to coalfields in the north. Also, a local canal network began to form with connections to the national network of canals. Goods to and from Manchester could now reach numerous large cities throughout England and Wales by water or by road.¹⁸

5. Revenues and finances of turnpike trusts

One of the primary functions of a turnpike trust was the raising of funds for road improvements and maintenance. Trust revenues came from tolls and statute labour contributions. The latter came as payments in lieu of performing labour. Some trusts also had other contributions or income yielding assets. How large were these different types of revenue? From the 1820's precise figures are available because Parliamentary inquiries into all turnpike trusts became regular. The revenues (tolls, composition and incidental receipts) of all turnpike trusts in England and Wales in 1834 are shown in Table 1. There is also an estimated value of statute labour performed. Toll revenues equaled £1.4 million or 89% of all monetary revenues. The value of statute labor performed was higher than composition payments and together they account for 8.3% of all revenues.

Table 1: Categories of turnpike trust revenue in England and Wales in 1834

	% of monetary	% of all
value in pound	revenues	revenues

¹⁸ See Peter Maw, Transport and the Industrial City for more details on transport change near Manchester.

Category	sterling		
Tolls	1,434,069	93.9	89.4
Parish composition in lieu of statute duty	58,077	3.8	3.6
Incidental receipts	35,494	2.3	2.2
Total monetary revenues	1,527,640		
Estimated value of statute labor performed	75,758		4.7
Total all revenues, including statute labor	1,603,398		

Sources: Data are drawn from British Parliamentary Papers 1840 (XXVII, p. 647).

How did the turnpike trusts spend their money? Table 2 shows the expenditure categories for all trusts in England and Wales in 1834.

Table 2: Categories of turnpike expenditure in England and Wales in 1834

	value in pound sterling	% of total expenditure
Labor (manual and team)	516,376	31.9
Materials for surface repairs	217,048	13.4
Improvements	217,152	13.4
Land purchased and damages to land	30,202	1.9
Tradesman's bills	67,098	4.1
Salaries to trust officers	92,954	5.7
legal	28,889	1.8
Interest	280,376	17.3
Debt Payments	107,810	6.7
Incidental expenses	59,045	3.7
Total	1,616,950	

Sources: Data are drawn from British Parliamentary Papers 1840 (XXVII, p. 647).

The first five categories conservatively include road spending and total 64% of the all expenditure. Interest and debt payments are just over 25%. The remaining 10% goes to trust

salaries, legal expenses, and incidentals. Thus, around two-thirds of turnpike expenditures were directly related to the maintenance or improvement of roads and as much as 75% was at least indirectly related - including trusts' managerial costs. Therefore, in total, trusts spent around £1.2 million on roads in 1834. To give some perspective on this figure, total British central government tax revenues in 1834 were about £50 million, making turnpike revenues about 2.4% of central government revenues. Parish highway rates were £1.1 million in 1827.²⁰ So, added together, turnpike and parish road expenditures equaled around 5% of central government tax revenues.

It is important to understand that turnpike trusts relied on borrowing to finance road improvements. Total borrowing for 1834 was £153,000 - equaling 9.5% of all revenues, including the value of statute labor performed. There were two main types of debt. The first were bonds secured on the tolls (so-called mortgaged debt). The second were unsecured bonds (so-called floating debt). The mortgage bonds had no set maturity date and the trustees could repay the principal in full at any time. All bonds for an individual trust were generally treated equally and so there were no first or second claims on the revenues. The exception was that if any individual bondholder did not receive their scheduled interest payment within six months they could foreclose on the tolls and become the first claimant on the revenues. The interest rates on the mortgage debt could not exceed 5 per cent because of usury laws and most ranged between 4 and 5%.

The overwhelming proportion of investors in turnpike bonds came from areas near the road. As an illustration, Buchanan's detailed study of the Bath turnpike trust shows that many investors were resident in Bath with a minority having neighboring Bristol or London addresses.²¹ Webster's analysis of 41 mortgage ledgers provides more general evidence on investor identities. Webster found that 42 per cent of investors can be classified as landowners, 31 per cent as commercial interests, and 27 per cent as savers. Banks or other financial institutions contributed little to none.²²

²⁰ See British Parliamentary Papers 1840 XXVII "Appendix to the Report of Commissioners appointed to inquire into the State of the Roads," p. 615.

²¹ Buchanan, "The evolution of the English turnpike trusts."

²² Webster, *The Public Works Loan Board 1817-76*.

The central government provided little funding to turnpike trusts until the Public Works Loan Board (PWLB) was founded in 1817 by an Act of Parliament. Trusts had to apply for a loan and, if accepted, the PWLB often insisted on the right of first payment for its debts over all others. In most cases, the PWLB charged 5% interest - the maximum allowed by usury laws. The PWLB lent £401,000 to 107 trusts in England and Wales between 1817 and 1832. Most of the loans were granted in the years 1817, 1818, and 1826. PWLB loans look small compared to the £6.8 million in outstanding turnpike debt by 1829, but it did contribute at least 15% of the additions to turnpike capital in the 1820s, a period of sizeable investment.²³

By the 1830s the financial scale of turnpike trusts had become quite large, especially considering their local and private organizational structure. The financial position of all turnpike trusts in England and Wales is shown in Table 3. Trust debts (including mortgage, floating debts, and balances due to the treasurer) were just above £7.4 million. Another type of liability, unpaid interest, was also sizeable and equal to £1 million. Based on the unpaid interest, one might conclude that trusts were financially unsuccessful. However, nearly all the unpaid interest applied to approximately 15% of the trusts. Most trusts had little or no unpaid interest.²⁴ Also if one compares interest payments from Table 2 with total mortgage debt, trusts paid about 4% to their bondholders. Notably a 4% return is higher than the yield on government bonds in the 1830s.

Overall, turnpike trusts had liabilities equal to £8.45 million. On the asset side, treasurers' balances and arrears equaled £417,000. The difference between assets and liabilities is accounted for by the capital value of turnpike roads. One estimate puts the value of turnpike road capital at £14.4 million in 1834.²⁵ Thus there was a huge equity value associated with turnpike roads. Of course, by law, no private individual held this equity. It implicitly belonged to the government as turnpike roads were still part of the 'King's highway.'

Table 3: Financial assets & debt of turnpike trusts in England & Wales in 1834

²³ Webster, *The Public Works Loan Board 1817-76*.

²⁴ Bogart, "Investing in Early from Public Works".

²⁵ Bogart, "Investing in Early from Public Works".

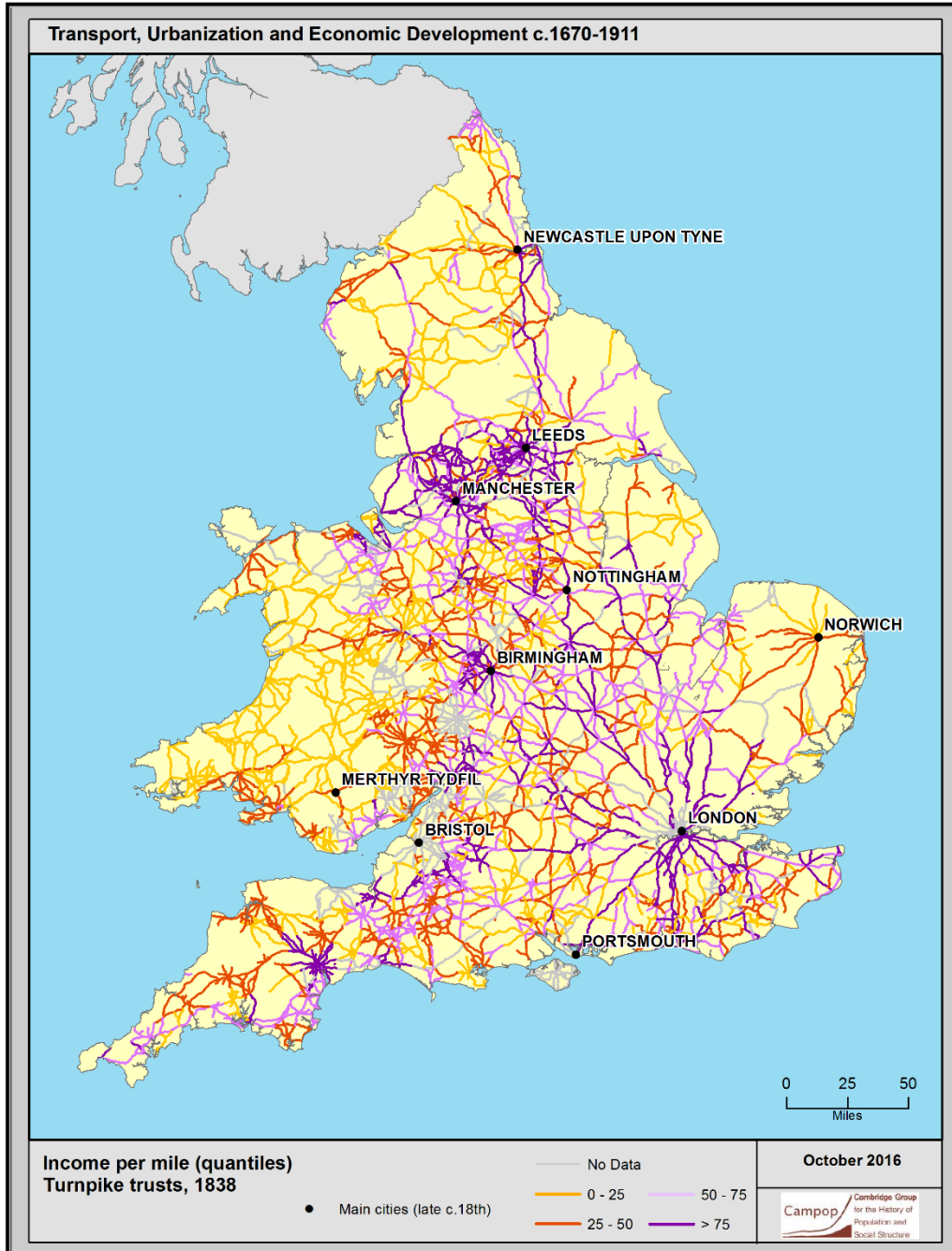
	Assets	liabilities
Balances held by treasurer and other arrears, Dec. 31, 1834	417,457	
Mortgage debts		7,068,275
Floating debts		273,937
Balances due to the treasurer Dec. 1, 1834		108,922
Unpaid interest		1,002,255
Total liabilities		8,453,389

Sources: Data are drawn from British Parliamentary Papers 1840 (XXVII, p. 647).

The variation in toll revenue across trusts provides another perspective. One can match the data on trusts provided by Parliamentary reports with GIS data and with the maps of turnpike trusts that are shown above.²⁷ Then, one can divide trusts into four quartiles based on their toll revenue per mile in 1838. Such analyses enable Map 6 to be created. Here, purple represents the 75th to 100th percentile of trusts in revenue per mile. In other words, purple turnpike roads earned the highest revenue. The colour lavender shows the 50th to 75th percentile of trusts in revenue, red the 25th to 50th percentile, and orange shows the 0 to 25th percentile. As Map 6 shows, there was a tendency for turnpike trusts near major towns like London, Manchester, and Leeds to have the highest toll revenue per mile. The lowest toll revenue per mile were in Wales, parts of the West Midlands, and East Anglia, where there were fewer towns. Thus, there is a positive and

Map 6: Turnpike toll revenues per mile in 1838 by quartiles

²⁷ Special thanks goes to Alan Rosevear for linking turnpike trusts across parliamentary reports, which contain information on toll revenues among other items.



significant relationship between urbanization and revenue per mile. This connection is important because a positive feedback loop existed between these two factors. Higher urbanization created more traffic and, hence, higher revenues. Also, higher revenues meant better roads, which enabled more people to live in towns.²⁹

²⁹ See Wrigley, "Urban Growth in Early Modern England."

6. The effect of turnpikes on the transport sector and economy

The official rationale for creating turnpikes was that the ‘ordinary’ laws for repairing highways needed to be amended if roads were to be improved. Did turnpike trusts meet these goals? Or did turnpike trusts simply replace the spending that parishes were already doing?

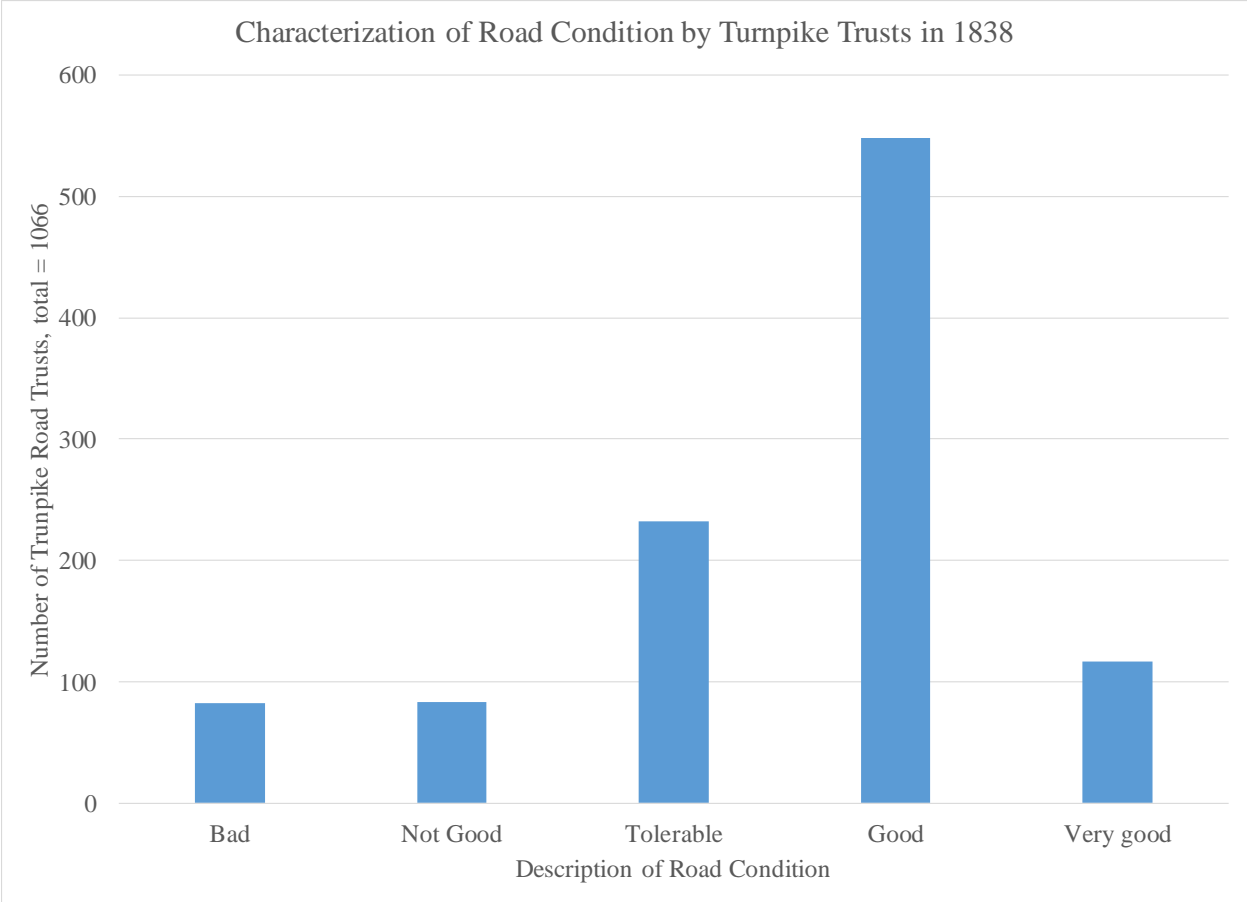
One study has analyzed the road spending of parishes in the five years before a turnpike trust was established in their jurisdiction. The evidence shows that less than 5% of parishes levied highway rates (i.e. taxes on property owners) in those five years, implying that the only spending that was occurring was related to statute labour.³⁰ The same study also estimated average turnpike trust road spending during their first 20 years of operation. They spent between 10 and 20 times more than the parishes they replaced. Thus, there is good evidence to believe that trusts raised the overall spending on roads rather than simply replacing parish expenditures.

Did greater road spending improve road quality? An assessment of each trusts’ road condition in 1838 may help us to answer this question. At that time, a Parliamentary committee asked all trusts to assess their road’s condition as “Bad”, “Tolerable”, “Good” or “Very good”. The distribution of responses is shown in Figure 3. Over 60% of roads were characterized as “Good” or “Very good.” In contrast, a relatively small number of roads, 15%, were classified as “Bad” or “Not Good”; notably, the trusts running these roads were in poor financial condition with unpaid interest. Thus, it appears that greater expenditure by turnpike trusts generally resulted in a better road network, especially when a trust’s finances were healthy.

How were road-users affected by the rise of turnpike trusts? The evolution of road transport costs in the 18th and early-19th centuries suggests that road users did benefit from trusts. Gerhold studied the trends in freight rates between London and Leeds and found

Figure 3: The characterization of roads by turnpike trusts in 1838

³⁰ Bogart, "Did turnpike trusts increase transportation investment."



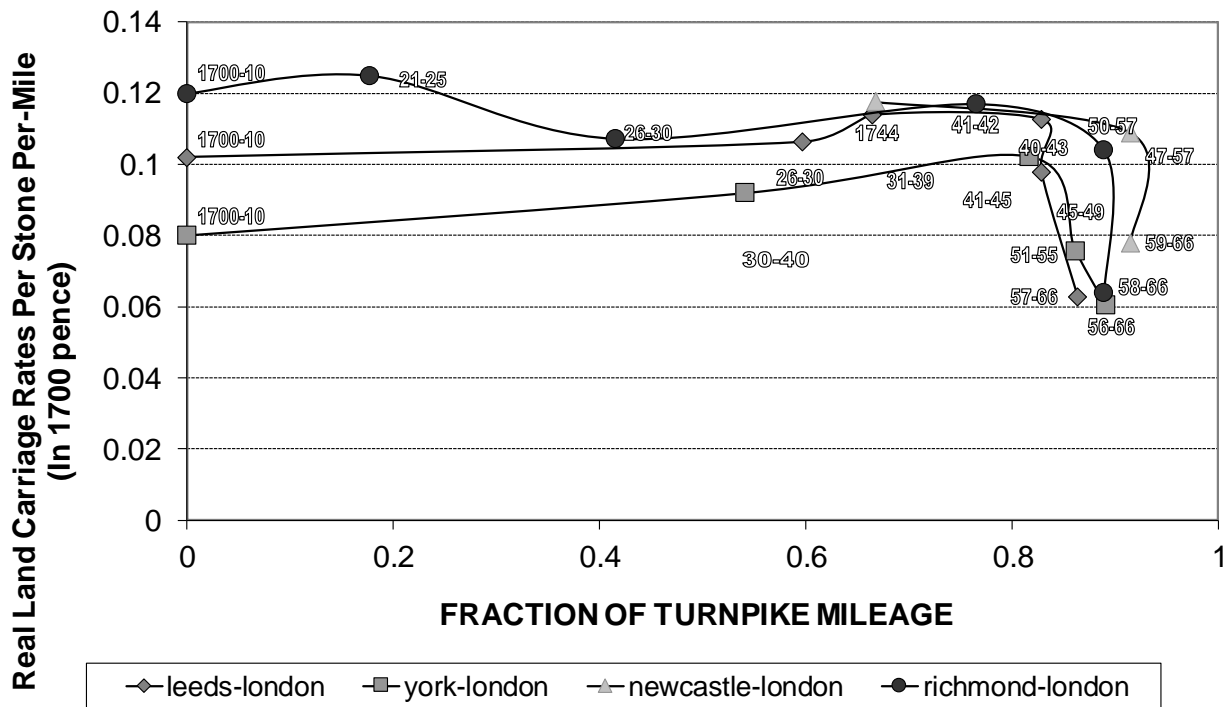
that freight rates in 1838 were around one-half their level in 1692.³¹ At the same time, the cost of inputs, like horse feed and wagoner’s wages, rose by 75%. In a competitive industry like road transportation, such figures imply dramatic productivity growth. If there was no productivity growth, then one would expect freight rates to rise with the cost of inputs, in this case by approximately 75%. Instead, freight rates fell by 50%, implying a growth in productivity of more than 200%.

Another question is whether the lower transport costs incurred on better roads more than offset the added cost of the tolls charged by turnpikes. The evidence indicates that tolls were not excessive. An illustration is shown in Figure 4. It plots the evolution of freight rates per stone (14 lbs.) per-mile against the fraction of turnpike mileage between Leeds and London, York and

³¹ Gerhold, "Productivity Change."

London, Newcastle and London, and Richmond and London.³³ The freight rates are labelled ‘real’ because they are divided by a cost of living index with a value of 1 in 1700. In all four cases, real land carriage rates declined once turnpike trusts had been established along at least 80% of the route. The most dramatic change occurred between Richmond and London, where land carriage rates declined from 0.12 pence per stone in 1700 to 0.064 pence in 1758. The York to London case is also interesting because land carriage rates increased temporarily between 1741 and 1745, when several turnpike trusts were established along this route. The brief rise in carriage rates suggests that, in some cases, the tolls raised freight charges but, it appears, this only happened in the short-run.

Figure 4: Real freight rates per stone per mile



A more challenging question is the degree to which turnpike trusts lowered freight rates on the average. In another paper, I compare the changes in freight rates between major cities with

³³ Bogart, "Turnpike trusts and the transportation revolution."

the changes in route mileage managed by turnpike trusts. I estimate the effect of increasing the share of turnpike mileage along a route while controlling for overall trends in freight rates.³⁵ The evidence suggests that the half of the 40% decline in freight rates between 1750 and 1800 were attributable to turnpike trusts.

Perhaps the most dramatic benefits to road users from turnpike trusts were improvements in speed. Jackman and Pawson report data on travel times by coach between major towns in the 18th and early-19th centuries.³⁹ The times are based on departures and arrivals and do not deduct time spent at stops or over-night stays. As noted earlier, the travel time between London and Manchester was around 90 hours in 1700. By 1787 it had fallen to 24 hours. A larger sample shows similar trends. In a previous paper, I calculated the average journey miles per hour for 225 journeys reported in Jackman and Pawson.⁴⁰ Journey miles per hour are the total distance divided by the total time in the journey. Hence, this statistic includes over-night stops, which are not always noted in the data. The calculations show that between 1750 and 1800, average journey speeds increased from 2.6 to 6.2 miles per hour. By 1829, average journey speeds had increased to 8.0 mph with some coaches reaching speeds above 10 mph. While this does not sound fast in modern times, it was significant in the pre-railway age.

In summary turnpike trusts appear to have lowered transport costs and speeded up travel to a sizeable degree. Yet, they also had broader benefits. Improved land values were an especially important consequence because they provided landowners with the motivation to promote turnpikes and to purchase their bonds. In a previous paper, I make a comparison of the natural log of real property income per acre in 1815 for parishes that had turnpike trusts with those that did not.⁴¹ The natural log comparison provides a good approximation to the percentage difference, and the 1815 property income is useful because it is national in coverage. The evidence for the counties analyzed is shown in the Table 4. On average, parish property income per acre was 0.11 log points (or 11%) higher in parishes with turnpike trusts than parishes without them. However, it should be noted that some counties parishes with turnpikes did not

³⁵ Bogart, "Turnpike trusts and the transportation revolution."

³⁹ Jackman, *The Development of Modern Transportation*, and Pawson, *Transport and Economy*,

⁴⁰ Bogart, "Turnpike trusts and the transportation revolution."

⁴¹ Bogart, "Turnpike trusts and property income."

have higher, and may have had lower, property income. The effects of turnpike trusts, it seems, were not equivalent across England and Wales.

Table 4: Comparison of the property income of parishes with and without turnpikes in 1815

Mean difference in the natural log of property income per acre between parishes or plots with turnpikes vs. those without turnpikes: within-county estimates

County	Tax data Mean difference in the log property income per acre
Bedfordshire	0.07
Cambridgeshire	-0.01
Hertfordshire	<u>0.28*</u>
Leicestershire	<u>0.28*</u>
West Riding, Yorkshire	<u>0.40*</u>
Buckinghamshire	-0.03
Worcestershire	-0.26
North Riding, Yorkshire	<u>0.25*</u>
Lincolnshire	<u>0.11*</u>
Somersetshire	0.1
Shropshire	0.07
<u>Average across counties</u>	<u>0.11</u>

Note: * indicates statistical significant at the 10% level or below

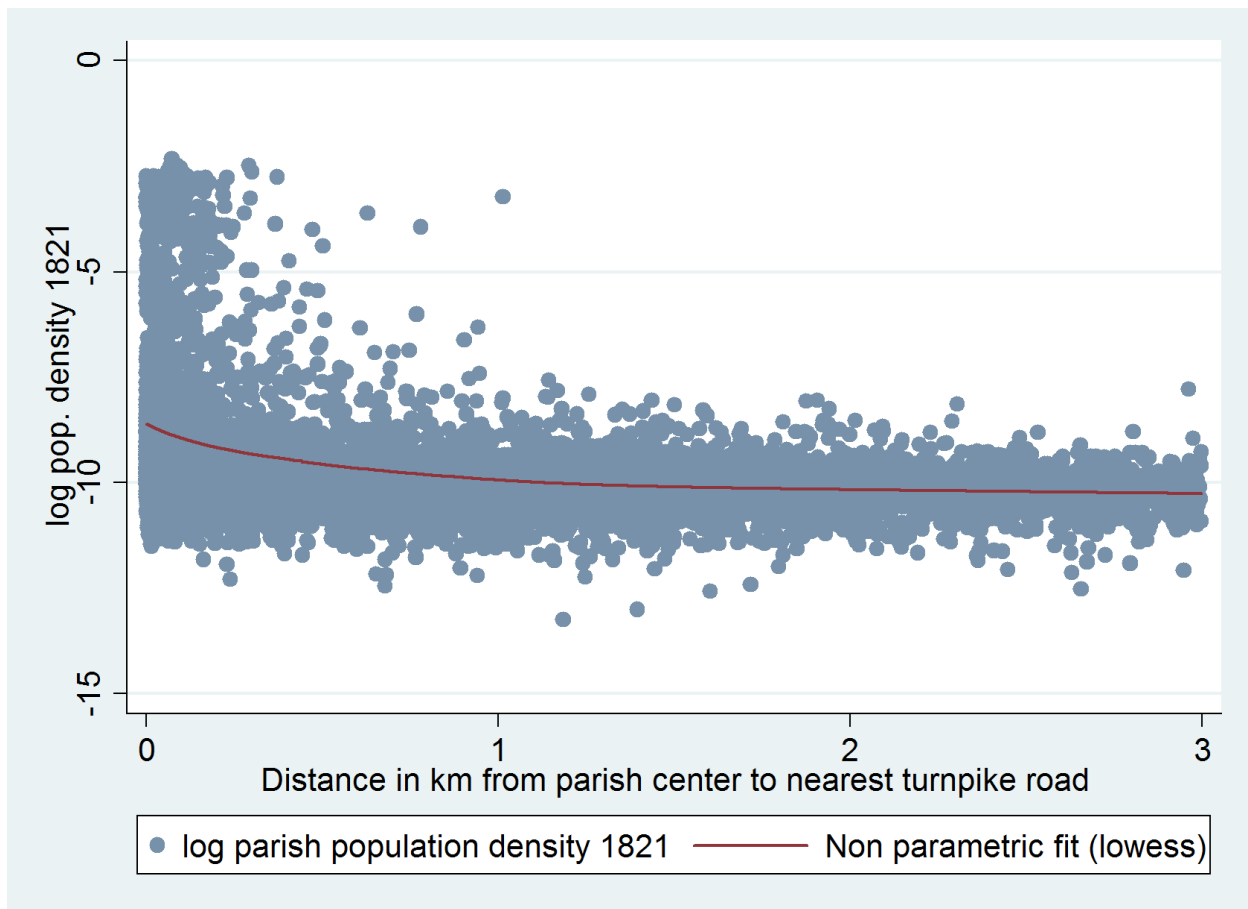
Why did turnpike trusts raise property income on the average? One explanation is that by reducing transportation costs, they simultaneously improved farmers' profits and lowered the prices paid by urban consumers. Calculations of the reduced transport costs associated with turnpike trusts suggest that the gains to farmers in terms of higher prices can explain much (perhaps 75%) of the higher property income attributed to turnpike trusts. The remainder may be due to their effects on land use, agricultural productivity, urbanization, or the attraction of inns that served the road transport sector. Such effects have been highlighted by several scholars who study transport improvements. For example, Szostak argues that turnpike trusts raised productivity by encouraging innovation and Pawson suggests turnpikes contributed to higher urbanization.⁴²

⁴² Szostak, the Role of Transportation, and Pawson, Transport and Economy.

To date, no one has estimated the effect turnpikes had on land use, aggregate productivity and urbanization. Ongoing research is attempting to illuminate these connections. As a preview, I have analyzed the relationship in 1821 between distance to the nearest turnpike road and parish population density. The population data are drawn from the 1821 Census and span over 10,000 parishes. Parish boundaries are digitized using GIS Software and combined with point data on the location of over 1000 market towns.⁴³ From this we define a parish center, which is derived from the location of each settlement's main market place - if there is one. Otherwise, we use the centroid, which is the most central point in the parish boundary. Next, we calculate each parish's distance to the nearest turnpike road in 1830 using the GIS of turnpike roads. Figure 5 presents the results in a scatter plot, which includes a red best-fit line. The graph indicates a strong

Figure 5: Relationship between distance to a turnpike & parish population density in 1821

⁴³ For more details on towns see <http://www.campop.geog.cam.ac.uk/research/projects/transport/data/towns.html>



negative correlation between population density and distance to a turnpike road. Hence, parishes with higher population densities tended to be closer to turnpike roads - and vica versa. Of course, association does not imply causation. Hence, the negative correlation reported above does not necessarily imply that turnpikes caused population to become denser. As noted earlier, towns with denser populations were more likely to adopt turnpike trusts; consequently, it could be that turnpikes were a reaction to urbanization. Clearly, more research is needed to unravel any causal relations that existed between turnpikes and population density.

7. Conclusions

Turnpikes are often compared with canals and railways. Road improvements were the cheapest and easiest option by far and, unlike canals and railways, they did not lead to domestic and international capital flows. However, turnpikes also had the smallest benefits given their reliance on horse-drawn transport. Nevertheless, turnpikes clearly generated substantial benefits in their era. At a time when local and central governments were largely ineffective, these

organizations facilitated transportation improvements. More generally, their history illustrates how institutional changes can encourage local infrastructure investment and promote economic development.

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