Infrastructure and institutions: lessons from history

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Abstract

Many studies quantify the effects of infrastructures on economic welfare in the past with the aim of informing policy makers today. A different group of historical studies examines how infrastructures came about and how they were financed. These latter studies often highlight the role of the franchise and democracy. In this essay, I review historical studies on infrastructure and institutions, especially formal political constraints. One consistent finding is that policies to fund and place infrastructure in locations largely reflect the aims of those in power or with greater political influence. This illustrates one of the channels by which political institutions ultimately affect economic development. History offers a range of lessons, more of which can be uncovered through future research.

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1. Introduction

Physical structures such as roads, railways, bridges, tunnels, water supply, sewers, electrical grids, and telecommunications are the foundations of economic and social activity. Infrastructure’s importance is further indicated by the high levels of investment. From 2000 to 2012, approximately 5% of world GDP was invested in public capital, like roads, whereas 10-15% was invested in private capital, which mainly includes buildings and machinery.\(^2\) While a large share of investment goes to public capital, some would argue it is too low on the idea that there are unbuilt ‘roads to prosperity.’ However, for others public sector inefficiency is a concern and major reforms are needed to avoid so-called bridges to nowhere.\(^3\)

Many scholars have turned to history to better understand infrastructure. This is natural as they are long-lived assets offering services over several generations. The historical literature is vast, yet most studies can be classified in two groups. The first aims to quantify the effects of infrastructures on incomes, occupations, trade, education, and other outcomes in the past. The authors often suggest their estimates can be used by policy makers. It is common for public agencies in developing countries to perform a cost-benefit analysis for significant expansions to networks like a railway line or an improved highway corridor (see Dabla-Norris et. al. 2012). Historical studies are valuable because they speak to the broad range of benefits and to the long-term effects of specific infrastructures, including their unintended social costs.\(^4\)

The second group of historical studies examines more diverse topics, like how infrastructures came about, how they were financed, owned and regulated, and how they were built. It is rare for


these studies to explicitly offer lessons for policy makers, as they are usually grounded in a specific context. However, there is a common theme which often unites them: the role of institutions in shaping infrastructure outcomes. This essay focuses on this second group because it offers a different historical perspective, hopefully useful for current development.

In the Nobel prize address, North (1991) describes institutions as all the humanly devised constraints that structure political, economic, and social interaction. Concerning political, the extent of the franchise, or the right to vote, is thought to be crucial. The franchise has been linked with many policy differences and especially the extent of public good provision (Sokoloff and Engerman 2000, North, Wallis, Weingast 2009). Fiscal capacity, or the state’s ability to raise revenue across different groups and sectors, is another key aspect of political institutions. Like the franchise it is thought to have been crucial for the provision of public goods (Besley and Persson 2011). The power of the executive versus legislative branches is also given prominence in the literature. Some studies have argued that a more constrained executive leads to more secure property rights and ultimately private actors’ willingness to invest and innovate (Acemoglu et. al. 2005). The focus often turns to the nature of laws and courts when studying economic interactions, especially corporate governance. They are sometimes labelled contracting institutions and are related to legal origin, like the common or civil law (La Porta et. al. 2008).

There has been a lively debate in the literature on which institutions are most fundamental for economic development. Some studies provide evidence that political institutions are empirically more important than contracting institutions (Acemoglu and Johnson 2005, Trew 2012), while others argue political institutions are not the most fundamental (Glaeser et. al. 2004). My aim here is not to resolve this debate, but rather to explore the role of institutions in development through a historical analysis of infrastructure.
Previous scholars have pointed to the importance of institutions in the infrastructure sector and lessons for policy makers. For example, Laffont (2005) points to democracy as potentially limiting corruption. In studying renegotiation of public-private partnership contracts, Gaush, Laffont, and Straub (2007) conclude that ‘a good regulatory framework is especially important in contexts with weak governance and political opportunism.’ While there are several good studies on contemporary infrastructure, more needs to be learned (see Estache 2016 for a review).

What insights does history offer? As a first point, current institutions, like constitutions, are often decades or centuries old. In many cases, democracy and autocracy have proven deeply persistent (Capoccia and Ziblatt 2010). Therefore, if one is looking to understand the effects of institutions on current outcomes in the infrastructure sector, it is necessary to understand the formation of institutions in the past. There is also a methodological reason to study history. In empirical work, it is often useful to employ a difference-in-differences regression, which compares outcomes in countries or contexts that changed some aspect of institutions with those that did not. Given the infrequency with which institutions change, a historical approach is almost necessary if one wants to follow this methodology. It also suggests that studies of infrastructure and institutions in the distant past can be useful if they provide constructive variation. This argument is like the notion that history offers a laboratory for the social sciences.

The historical literature on institutions and infrastructure is still growing, but one common finding is that the distribution of political power matters. In this essay, I review several studies which demonstrate that the aims of those in power or with greater political influence significantly affect policies to fund and place infrastructure in locations. Given that political institutions shape the determination of power and influence, they emerge as being fundamental to infrastructure outcomes. To be clear, my argument is not that institutions solely determine
infrastructure outcomes. Technological change is another big driver, and economic inequality could itself influence institutions (see Alston et. al. 2018, Djankov et. al. 2003). Properly conceived, institutions are constraints on outcomes that usually bind over the medium term.

The essay begins with a conceptual framework to clarify ideas. Then I review historical studies that feature the connection between institutions and infrastructure with a focus on the role of democracy and representation. Emphasis is given to studies making use of exogenous variation within political systems. One aim is to show how common methodologies in urban and regional economics can be used to study institutions. The conclusion gives directions for future research.

2. Conceptual framework

In the top box of figure 1 there are institutions, where to be clear I am mainly referring to formal constraints on political interactions. The middle left box has infrastructure outcomes, including the size of networks, their spatial distribution, the cost of construction and maintenance, and accessibility aspects, like user-fees. The middle right box is general and includes all channels from institutions to development not specifically dealing with infrastructure. Two important examples are educational spending and corporate financing, both of which have a rich historical literature.\(^5\) The bottom box has economic development, which includes facets like income, life expectancy, health, and equality. The arrows between each item reflect relationships of interest that have been studied in the literature.

Figure 1: Conceptual framework for understanding institutions and development

A vast number of studies focus on arrow 1 and especially the direction from infrastructure to economic development. Historical studies have played a key role. For example, on railways there are dozens of excellent works. One influential and instructive paper is Donaldson (2018), which studies how the differential placement of railway lines in British India affected agricultural incomes from 1870 to 1930. Employing a difference-in-differences specification, Donaldson finds that agricultural incomes increased by 15% more in districts that got railway lines relative to districts that did not. Donaldson addresses endogeneity with placebo checks using proposed railway lines that did not get built. Careful analysis shows that having unbuilt lines in a district did not predict differences in agricultural income, like the existence of built lines.

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For my purpose it is worth pointing out that Donaldson’s placebo checks rely on the political process by which rail infrastructure was created in British India. One of the Viceroy’s, John Lawrence, favored a large government funded railway network during his tenure from 1864 to 1869. Lawrence was exceptional for the British politicians that ran India. His successor Lord Mayo, and others that followed, preferred less government funding for railways. Much of Lawrence’s plan was not implemented and therefore India’s railway network took a different form and function (see Bogart and Chaudhary 2012). Considering the estimates from Donaldson, one might speculate that if India had a different political system, more railways would have been funded and different areas would have realized higher incomes as a result. The failure of Lord Lawrence’s plan is interesting beyond its role as an instrument.

To further understand infrastructure and development, it is helpful to understand the process which leads to infrastructure outcomes. That is, to study arrow 4 in figure 1. It is useful to start by describing three steps in the ‘production’ of infrastructure. In the first ‘decision-making’ step, political actors decide which projects to undertake during the current budget cycle and whether regulations should change for facilities in use. These are non-trivial decisions because they entail financial commitments over several years, settling disputes about competing projects and imposing costs on different populations. Vested interests, or politically powerful groups, could have a large influence on decisions, which is an issue I consider below. The second step involves the financial arrangements, which might involve private or international funding. Successful financing is also non-trivial, as evident by the long list of projects that were approved but never built. The third step involves capital works where infrastructures are built. The procurement of inputs can be challenging since private land must be taken, laborers must be brought-in for extended time, and technologies may need to be developed or adapted.
Many factors influence each of these steps. My claim is that institutions are often fundamental. Space limitations prevent a complete analysis and so I will mainly emphasize studies on the decision-making stage, including local government funding, targeting strategies employed by central governments, and systematic denial of infrastructure access to certain groups.

Furthermore, more focus will be given to political institutions and especially the extent of the franchise. The franchise is worth extra attention because it has evolved unevenly across societies. For most of human history it was quite limited and often absent. Where there was some voting or representation, it was often closely held by elite men through property and literacy requirements.

In the nineteenth century the franchise was extended in western countries, like the US, Canada, and Europe. The first step was to give more white men the right to vote. Procedures like secret ballots also indirectly extended the franchise by preventing employers from knowing who their employees voted for. In the early twentieth century women would get the right to vote in most western countries. Later, the franchise would be effectively extended to more racial groups through civil rights laws. I start by studying franchise effects on local government funding of local infrastructure projects like roads and sanitation systems.

### 3. Political institutions and local infrastructure spending

The political economy of infrastructure spending is different when a project is being financed by a central versus local government. Infrastructures usually have local or regional effects, but if funded centrally then all regions usually pay a share. The common pool aspect creates a different incentive for political actors and is discussed in the next section.

Local politicians face trade-offs if they want to fund more infrastructure: either taxes must be raised, spending on other budget items must be cut, or there needs to be greater borrowing. Therefore, the decision of how much to spend on infrastructure will partly depend on the
budgeting preferences of those who determine political representation, which depends on how the franchise is distributed across society. For analytical purposes, I assume that infrastructure projects benefit the rich and middle class more than the poor. This assumption is reasonable if they primarily raise property values, which are normally more important for middle to upper income households. Now, if the franchise is tilted towards the rich, then political actors are more likely to raise taxes, cut social spending, or borrow to pay for infrastructure. But if the franchise is balanced between the rich and the poor, political representatives may spend less on infrastructure to save taxes, limit borrowing and spend more elsewhere.

History provides some surprising contexts to estimate the effects of the franchise on infrastructure spending. Russia is not normally considered to be a country with a broadly held franchise, but in the late nineteenth century non-elite men had some voice and participated in local government. For centuries, Russia had serfdom, but following some key military defeats, the Russian government decided to abolish serfdom in 1864. As part of the transition, local governing bodies called zemstva were established (Nafziger 2011). Zemstva responsibilities included the funding of local roads, education, and health services in their district. They did not receive any significant funding from the central government. Decisions were made by a board of representatives with seats allocated to a first, second, and third curia. Rural and urban property owners appointed to the first and second curia. Peasant communal villages appointed the third. For reasons related to the way emancipation was implemented, some zemstva had many seats allocated to the third curia, at least until the 1890s when a reform began to lessen their role.

Nafziger (2011) examines how variation in peasant representation affected zemstva spending on roads, education, health, and administration. Spending data is available for 358 zemstva in two cross-sections, 1883 and 1903. These are matched with district-level economic characteristics
like land use, communal and noble land ownership, urbanization, and occupational structure. There is an identification challenge here and in all studies of this type. Variation in peasant representation was determined by a political negotiation between the Russian government in Moscow and the major landowners throughout the country. The choice to give more peasant representation to some zemstva may be correlated with characteristics that affect spending. Nafziger employs a rich set of controls to address potential bias. The major finding of interest here is that greater peasant representation in 1903 was associated with higher spending on education, health, and administration, but it was not associated with higher road spending. Thus, the share of spending on the main infrastructure category, roads, fell when the franchise was more widely held to include the poorer segments of Russian society.

There are other historical contexts with similar findings. In the nineteenth century, large investments in urban infrastructure (streets, sewer systems, water supply, refuse collection and gas supply) were made for the first time. There is a literature estimating the effects of urban infrastructure on health (see Kesztenbaum and Rosenthal 2017, Alsan and Goldin 2019). My interest is with their provision. In many countries, like Britain, urban infrastructure funding was a local issue. The central government delegated authority to towns. Some subsidies were provided, but not enough to cover the high costs. British towns varied in their political structure, including the way council representatives were selected. In 1835, all incorporated towns were reformed, and all male heads of household were given the right to vote in selecting councils. In unincorporated towns, the franchise was graduated, meaning the wealthy obtained multiple votes. This changed in 1894 when a national law required a secret ballot and one-household-one ballot rules. How did this reform affect urban infrastructure spending?
The effects are related to the different views among contemporaries regarding the scale of urban investment that should be under-taken. Chapman (2018) argues that the upper and middle class regarded streets, sanitation, and gas supply as top priorities. Support appears to have been mixed among the lower-class households, mainly because of the concern that higher taxes would ensue. Therefore, it is possible that the democratic reform of 1894 led to less support for urban infrastructure and hence less spending. Chapman estimates the differential effect of the reform using data on spending in 432 towns from 1883 to 1902. A matched difference-in-difference approach exploits the relative expansion of the franchise in unincorporated towns relative to similar incorporated towns after 1894. Unincorporated towns spent significantly less on urban infrastructures after 1894 than the control group of incorporated towns. The negative effect on spending was strongest when democratic reform transferred more political power to the poorer classes. The overall conclusion is that the extent of the franchise mattered.

4. Political institutions and infrastructure targeting in legislatures

Central governments sometimes make decisions on infrastructure spending and in those contexts the effects of the franchise and representation are different. In legislative settings, infrastructure is often considered to be targeted redistribution, or so-called pork barrel spending (see Cadot, Röller, and Andreas 2006). The literature shows that political representatives almost always support more infrastructure spending in their district because the cost is largely borne by other districts (see Knight 2004, 2008). Moreover, the degree of spending is often determined by the strength of representation. For example, districts whose representative in the national legislature are co-aligned with the leader or majority party will often get more infrastructure spending, and similarly if their elections for national seats are highly competitive (see Albouy 2013).
The historical literature suggests that the nature of targeted infrastructure spending can differ across institutional settings and with significant economic implications. Spain during its Restoration Period from 1874 to 1923 provides one case (Curto-Grau, Herranz-Loncan, and Solé-Ollé 2012). Democratic institutions were being re-established after a period of significant civil strife. Two political parties, the liberals and conservatives, agreed to share power in the Spanish parliament through a so-called peaceful turn system, meaning one session was controlled by the liberals and the next by the conservatives. One strategy for maintaining the turn-system was to reduce spending in districts that were controlled by third parties. Like many collusive agreements, the turn system proved fragile and the two leading parties began to lose control. The extension of universal male suffrage in 1890 appears to have been a key shift, making elections more competitive and fostering local political ties.

Curto-Grau, Herranz-Loncan, and Solé-Ollé (2012) provide evidence on how the peaceful turn system worked with respect to road spending, and when it unraveled. The liberals and conservatives in the Spanish parliament decided on each individual road project instead of an entire national network. This policy choice was probably related to the political value of roads in Spain. These authors collect data on parliamentary road spending by district from 1880 to 1910 and the political affiliation of Members of the Spanish Parliament (MPs). The authors find that between 1880 and 1892 road spending was significantly less in districts controlled by third parties compared to districts controlled by the majority party. However, after 1892 third party districts got similar spending than the majority districts. The introduction of male universal suffrage is thought to be a key reason. The authors go further in arguing that road spending under the peaceful turn system did not always have large effects on development (Herranz-Loncan 2007). Inefficient road placement is thought to be one reason.
Non-democracies can also exhibit targeted infrastructure spending and perhaps in ways that are more harmful for development. Evidence for this claim has been found in several cross-country regressions during recent times (Keefer and Knack 2007). A related insight comes from the history of Kenya as analyzed by Burgess, Jedwab, Miguel, Morjaria, and Padró i Mique (2015). Like many African countries, Kenya has significant ethnic diversity and segregation across space. The two major ethnic groups, the Kalenjin and Kikuyu, have played a key role in Kenyan politics. Following independence in 1963 Kenya had democratic institutions and with a government led by ethnic Kikuyu. Then starting in 1970 it had a period of autocratic institutions, one led by a Kikuyu leader and one by a Kalenjin. This was followed by a return of democracy in 1993, and like before, one government was led by Kalenjin and the next by Kikuyu. Kenya’s governmental transitions provide a unique context to estimate the effect of democracy versus autocracy on infrastructure spending. The preceding authors start with the theoretical assumption that a leader is more likely to stay in power if they can offer co-ethnics more infrastructure spending in their districts (recall other districts pay). The authors then assume that under democracy, leaders are constrained in the degree to which they can target. Therefore, to stay in power under democracy, infrastructure will be distributed more evenly across ethnic groups.

The theory applies to any infrastructure project, but road building is arguably ideal. Roads were the single largest expenditure item in Kenya’s annual development budget. They were almost entirely funded by the central government and therefore relevant to the political economy of the young nation. Burgess, Jedwab, Miguel, Morjaria, and Padró i Miquel estimate the effect of co-ethnic targeting under democratic versus autocratic periods. They gather data on road expenditure and numbers of paved road miles across Kenyan districts from 1964 to 2002. They also classify the main ethnicity of districts. Their results show that in autocratic periods, road
spending and road expansion were significantly higher in districts that were co-ethnic with the government leader. But in democratic periods road spending and expansion was not significantly different in districts that were co-ethnic to the leader. Moreover, they argue that road spending and allocation increased market potential more in democratic periods. The broader lessons from Kenya and Spain is that the franchise affects the degree and nature of infrastructure targeting with implications for economic development.

5. Political institutions and restrictions on access to infrastructure

Many studies show how the geographic specificity of infrastructure influences how it is used by those in power. There can be situations where politicians gain from restricting infrastructure projects in some areas. This could occur if politically powerful groups experience negative externalities and act as ‘hold-ups.’ As a modern example, homeowners in the southeast of England have opposed extensions to runways at Heathrow airport because of noise, pollution and increased traffic. Their lobbying efforts have been successful in stopping runways for decades.7

History illustrates how restrictions to infrastructure can happen under different institutional environments. One study focuses on early eighteenth-century England, where there were efforts to improve river navigation (Bogart 2018). Adam Smith famously touted the importance of river improvements, stating “Good roads, canals and navigable rivers, by diminishing the expense of carriage, put the remote parts of the country more nearly upon a level with those in the neighborhood of the town. They are upon that account the greatest of all improvements.”8

Channeling Smith’s ideas, there were strong proponents of improving rivers, mainly upstream

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7 See https://www.economist.com/the-economist-explains/2016/10/14/why-it-has-taken-70-years-to-build-a-new-runway-for-london
88 Quote taken from The Wealth of Nations, Chapter XI, Of the Rent of Land([1776] 1976, p. 164)
towns who would benefit from cheaper goods. But there was also significant opposition from downstream towns and property owners. Opponents emphasized damages to mills, which relied on river water flows and hardship for the poor, who would suffer from the competition of areas with cheaper land and lower wages. How did England’s political system mediate such conflicting views, especially when opposition came from politically powerful groups?

This question takes on broader interest because when river navigation was being debated England had just went through the Glorious Revolution of 1688. The Revolution effectively strengthened the role of parliament and fostered a competitive two-party system involving the Whigs and Tories. The role of parliament and political parties might have been incidental in the development of river navigation because the norm at this time was that infrastructure projects should be financed by local individuals and communities. But since projects required approval through a legislative act, and could thus be blocked by vested interests, parliament and parties ultimately did influence outcomes.

Bogart (2018) estimates how the geographic, economic, and political characteristics for hundreds of towns mapped into their likelihood of getting parliamentary approval for river navigation projects between 1690 and 1741. The estimation also includes the characteristics of upstream and downstream neighboring towns, of which the latter were more likely to oppose. One key finding is that towns proposing river navigation in parliament were significantly less likely to have their project approved if downstream towns had more politicians co-aligned with the majority party. The same did not hold if upstream towns had more co-aligned politicians. The reason is that they tended to support projects. Overall, the estimates suggest stronger political representation by opposing interests delayed or blocked navigation project approval. Thus, political power was a significant factor in determining which towns had access to the ‘greatest of all improvements.’
There are other examples in history where infrastructure was systematically denied to groups. In the early 1900s US cities began investing in water and sewage treatment systems, with significant implications for epidemic diseases like Typhoid (Troesken 2004). In the South, these investments were made in the context of the Jim Crow laws, which implemented significant racial segregation and inequality. From a political economy perspective, one would expect that urban politicians in the South won very few votes if they made sanitation investments in African American neighborhoods. They might even be rewarded by some voters if they only invested in white neighborhoods.

Troesken (2002) analyzes water and sewage provision across and within US cities between 1880 and 1925. Surprisingly, this author finds that differences in investment based on racial composition were not that large. Case studies show that African American neighborhoods had investment in water and sewage, although they often were delayed relative to white neighborhoods. Troesken also collects data on the number of water-mains across cities in 1890, 1900, and 1920. Regressions show that mains increased significantly in cities when their population rose, and moreover that African-American population mattered nearly as much as white population. The hypothesis of infrastructure targeting, based on racial characteristics, was not clearly supported. Troesken’s explanation is that white voters were fearful of spillover effects from typhoid outbreaks in African American neighborhoods. Thus, this study suggests disenfranchised groups may not always be under-provided with infrastructure if the politically powerful get positive spillovers.

More research is needed to better understand restrictions on access. The degree of mobility is perhaps an important underlying factor. If population and businesses can leave areas where
blocking interests are successful, then the economic impacts will be less. Also, blocking interests might lessen opposition if out-migration is possible.

6. Political institutions and infrastructure financing

As discussed earlier, financing is one of the key steps in providing infrastructure. History shows that institutions played a central role here as well. This topic deserves a fuller treatment, but some lessons can be drawn from railway financing during the nineteenth century. During the first three decades of the railway era (1830 to 1860) the private sector built, owned, and operated most networks under government approval or concessions. Much of the funding was domestic. During later decades foreign investment was more common, especially from western Europe. Financial guarantees were offered to foreign railway companies as an inducement to invest (Eichengreen 1995). Some governments also funded state-owned railway enterprises by borrowing on international markets.

Railway history is relevant for thinking about public-private partnerships and their viability under different institutions, a key topic in recent decades (Estache 2016). Partnerships were common in early railways, but in some cases they ended abruptly through nationalizations. Bogart (2009) examines the causes and consequences of railway nationalization across countries between 1860 and 1913. One aim is to test the hypothesis that governments were less likely to nationalize if the executive was constrained by the constitution. A cross-country regression for the extent of nationalization by 1913 provides one test. An index for constraints on the executive is shown to have a negative effect. Panel regressions also show that between 1870 and 1913 nationalizations were less likely when constraints on the executive increased in a country.
Case studies illustrate how an independent legislature could make the process of nationalization lengthy and costly for government leaders. In 1891, Japanese leaders introduced a nationalization bill into the lower house of representatives, but it was rejected. The second Japanese nationalization bill was initiated in 1905. There was a contentious debate in the lower house and the cabinet was forced to use a wide range of inducements to convince members to support. The bill was then sent to the upper house, where again there was substantial debate. Finally, the two houses had to agree on amendments amidst shouting matches between various supporters and opponents. The Italian case provides more evidence. In the 1870s government leaders proposed to purchase an important company and by extension much of the network. The Italian parliament strongly opposed and partly for this reason the government in power fell.

Nationalizations generally had detrimental effects on subsequent network expansion and railway cost efficiency (Bogart 2009, 2010). One potential reason is that they reduced incentives for private-sector funding and cost-saving innovation. It was possible that the public sector could step in and fill the void left by the private sector. However, state efficacy depended on fiscal capacity, another important aspect of political institutions. This is the conclusion reached by Bignon, Esteves, and Herranz-Loncan (2015). They study how there was a two-way positive feedback between government tax revenues and railway network size in Latin America. Of most interest here is their finding that higher legislative effectiveness stimulated greater government tax revenues and ultimately railway development. Legislative effectiveness is a measure of institutional quality, which leads to more taxation according to several historical studies on fiscal capacity (see Dincecco 2015, Johnson and Koyama 2017).

7. Conclusions and directions for future research
Many scholars have turned to history to better understand infrastructure in the economy and society. In this essay, I review studies on how political institutions have influenced infrastructure decisions. One general finding is that the distribution of political power in a society mattered. Decisions to fund and place infrastructure in locations generally reflected the aims of those in power or with greater political influence. As several cases show, decisions changed significantly when the franchise was extended. This conclusion comes from studies analyzing funding and placement before and after major political changes, like the extension of the franchise. However, more research studying outcomes pre and post institutional change are needed.

More studies on the connection with infrastructure financing are also needed. The brief summary on private and public funding of railways in the previous section illustrates the potential role of political institutions. The growing literature on fiscal capacity could do more to study effects on the provision of infrastructure as has been done for education financing. For example, Musacchio, Martínez Fritscher, and Viarengo (2014) study Brazil during the First Republic, 1889–1930, where individual states determined educational spending in a decentralized fiscal system. They find that export tax revenues were a key driver of spending across states. But they also find that in states with slavery and more exploitive economic institutions during the colonial period, the response to an increase in export tax revenue was much less.9 In settings like this, one might ask if elites in exploitive states spent surplus tax revenues on infrastructure or if they appropriated it in some other way.

More research is also needed on contracting institutions. One argument is that the Common Law led to stronger minority shareholder rights and more generally determined government

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9 See Lindert (2004) and Chaudhary, Musacchio, Nafziger, and Yan (2012) for overviews of historical educational policies in Europe, Brazil, Russia, India, and China.
credibility compared to civil law systems (La Porta et. al. 2008). While legal systems are widely studied in finance, few have focused on infrastructure. One challenge is that legal systems rarely change. Japan offers one potential case as it adopted a version of the German civil code in 1896.

There is also a need for more research on how institutions affect infrastructure capital works. Contracting institutions are again likely to be important since the taking of land is often necessary. Relatively little quantitative historical research has been done on this topic.

Rosenthal’s (2009) study of French canal building, pre and post French Revolution, is one of the few to explicitly emphasize land procurement problems. Others should follow its lead in studying outcomes pre and post institutional change.

As a final remark, there are implications for studies on how infrastructures affect economic development. If places with good institutions also tend to have good infrastructure, then in many studies the identified effect of infrastructure on development may be picking up the effects of good institutions through some other unmeasured channel, say education.10 There is no simple solution to this problem, but one may need to include institutional measures as controls along with infrastructure and perhaps instrument for both to get causal identification. Hopefully this essay makes clear that history still has much to teach us about the enduring challenge of making ‘roads to prosperity.’

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10 I thank one referee for suggesting this implication of my research.


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